



Terrestrial Vertebrate Inventories

The Question: *What species of terrestrial vertebrates are present at Point Reyes National Seashore (PORE), John Muir National Historic Site (JOMU), and Eugene O'Neill National Historic Site (EUON)?*

One of the main goals of the initial five-year inventory program in the San Francisco Bay Area Network's Inventory and Monitoring Program is to document the presence of vascular plants and vertebrates within its' national parks. Natural resource inventories like these allow the National Park Service to account for park resources, including the presence and distribution of plants and animals. At PORE, JOMU, and EUON many vertebrate species were known to occur within the boundaries of the parks, but some species had not been documented in many years, the presence of some species were entirely unknown, and the distribution among different habitats was unknown.

The Project: *Use multiple methods of sampling to detect as many vertebrates as possible over different seasons and in different habitats.*

Between 1998 and 2001, biologists from United States Geological Survey: Western Ecological Research Center (USGS) inventoried vertebrates at 16 sites that represent 8 of the primary habitats within PORE. They used automatic cameras to detect large- and medium-sized mammals, and a combination of pitfall traps (primarily for salamanders, frogs, lizards, small snakes), artificial cover boards (amphibians and reptiles), Sherman live traps (small mammals), and automatic cameras (large- and medium-sized mammals). Drift fences running between the pitfall traps and funnel traps were used to increase capture efficiency. The cameras and trap arrays were operated six months.

At JOMU and EUON, inventories in non-developed areas were initiated in January 2001 with searches for reptiles and amphibians under natural debris. In February and March 2001, a more formal inventory was begun that included: 1) automatic cameras for photographing large and medium-sized mammals, 2) periodic live trapping for small mammals, and 3) use of natural and artificial cover boards to attract and find reptiles and amphibians. Field work was completed in April 2003.

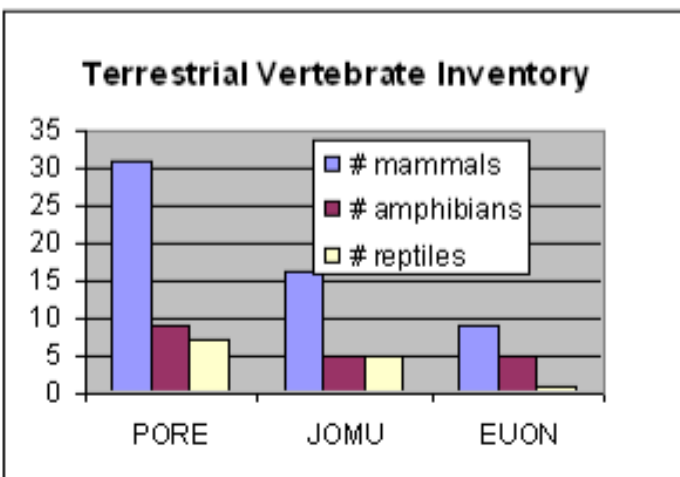


Figure above shows contrasting numbers of mammals, amphibians, and reptiles inventoried at Point Reyes National Seashore (PORE), John Muir National Historic Site (JOMU), and Eugene O'Neill National Historic Site (EUON) during 1998-2003.

The Results: *At PORE, the photography and trapping combined detected 31 species of mammals, nine reptiles, and seven amphibians, for a total of 47 species. At JOMU, the cameras, coverboards, traps, and searches detected 16 mammals, 5 reptiles, and 5 amphibians; at EUON, 9 mammals, 5 reptiles, and 1 amphibian were detected.*

Point Reyes National Seashore Inventory

From results at the first eight inventory sites at PORE, it appears that two years of trapping and photography provide a good inventory of the local fauna; very few additional species were detected at the additional eight inventory sites during the third year of the inventory work. Not all terrestrial vertebrates known to occur within the park were documented though. The most notable mammals not

detected were medium-sized and include mountain beaver, porcupines, river otter, and ringtail cats, though all of these species are known to occur within the park. It might be possible to modify the use of automatic cameras to increase the likelihood of detecting these species, especially mountain beaver.

Due to the length of the inventory and the large number of sample sites and captures at PORE, the USGS researchers were able to detect habitat preferences which were greater for the small mammals, reptiles, and amphibians than for the more mobile large- and medium- sized mammals. There were significant differences in detection rates between individual species, not only in their overall rates of detection, but also in how well various species were detected with different techniques. Interestingly, when comparing techniques for detecting small mammals, reptiles, and amphibians, there were also strong differences in detection rates for different species.

John Muir National Historic Site and Eugene O'Neill National Historic Site Inventories

At JOMU and EUON, USGS researchers photographed the same five species of native mammals at each site (coyote, gray fox, mule deer, raccoon, and striped skunk). There were two introduced species at JOMU (Eastern fox squirrel, opossum), and the same two species as well as a red fox at EUON. There were a variety of domestic mammals, with the greatest diversity at JOMU. This diversity probably reflects the presence of a small ranch immediately to the east of JOMU, as all the animals photographed were most likely local. Notable species missing from photographic detection at both JOMU and EUON were bobcats, brush rabbits, black- tailed jackrabbits, or badgers, which are also are widespread and common.

Other notes of interest:

- The failure to trap deer mice at JOMU and EUON was surprising given the high numbers of deer mice trapped at PORE. Deer mice could be in competition with the extremely common brush mouse at the East Bay sites, a species that does not occur at PORE.
- The limited breeding habitat in and around JOMU probably limits the diversity of amphibians at that site. While at EUON, an adjacent large pond may provide habitat for more amphibian species that could occur on occasion at EUON, but only the fully terrestrial slender salamanders were detected.
- Both JOMU and EUON have the potential to provide at least marginally good habitat for a greater diversity of reptiles, but many expected species were not detected (e.g., Western rattlesnake, garter snake). More extensive surveys would be necessary to document them.

Additional Resources

USGS: Western Ecological Research Center, Point Reyes Field Station
<http://www.werc.usgs.gov/pt-reyes/index.html>

Fellers, G. M. and D. Pratt. 2002. Terrestrial vertebrate inventory, Point Reyes National Seashore, 1998- 2001. U.S. Geological Survey, Western Ecological Research Center, Point Reyes Station, CA., 75pp.

Fellers, G. M., L. Long, G. Guscio, and D. Pratt. 2004. Final report of inventories of terrestrial vertebrates at John Muir National Historic Site and Eugene O'Neill National Historic Site. U.S. Geological Survey, Western Ecological Research Center, Point Reyes Station, CA. 17 pp.



Lizards, frogs, snakes, and salamanders were among the terrestrial vertebrate species inventoried through the USGS western Ecological Research Center efforts..