

Anaho Island: Mammalian Species Richness

Report

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Introduction

We assessed the mammalian species richness on Anaho Island (Figure 1) using live trapping between July 18th and July 23rd 2005.

Anaho Island is located in Pyramid Lake on the Paiute Indian Reservation in Nevada. Predominant vegetation on the island include shadscale (*Atriplex confertifolia*), *Bromus* spp., Russian thistle (*Salsola kali*), Alkali weed (*Bassia hysopifolia*), Greasewood (*Sarcobatus vermiculatus*), four-wing saltbush (*Atriplex canescens*) and salt grass (*Distichlis stricta*) along beaches. At the closest point the island is 400 m from the eastern shore of Pyramid Lake.

The last mammalian species richness survey was performed between 1963 and 1967 (Woodbury 1967). This study consisted of 574 trap nights, using lethal snap-traps during the months of July and August. A total of eight transects were used over three years (110 trap nights in 1963; 389 trap nights in 1964; 75 trap nights in 1965). Trap success declined over the three years from 0.18 in 1963 to 0.15 in 1964 to 0.01 in 1965. Only deer mice (*Peromyscus maniculatus*) were captured ($n = 84$) during the study. However, it is not clear whether Woodbury (1967) trapped such that any diurnal rodents could have been caught. Woodbury concluded that there was a high-density deer mouse population on the island, and no other mammalian species occurred on the island, despite small mammal species of the genera *Perognathus*, *Neotoma*, *Dipodomys* occurring on the mainland. There are also coyotes (*Canis latrans*) and bobcats (*Lynx rufus*) on the mainland. There has been one possible sighting of an antelope ground squirrel (*Ammospermophilus leucurus*) and possible sign of kangaroo rats (*Dipodomys* sp.) on the island (D. Withers, pers. comm.). Thus, the present study was

designed to assess the current mammalian species richness on Anaho Island, given the possibility of change over time (localized extinction, or long-distance colonization events) or the possibility that all species may not have been detected during Woodbury's (1967) study.



Figure 1. Anaho Island.

Methods

We employed 1312 trap nights between July 7th and 8th and July 18th and July 23rd 2005. 990 trap-nights involved folding and non-folding Sherman traps, capable of catching a wide variety of small mammals; 322 trap-nights involved smaller, mesh traps, capable of only capturing deer mice. Traps were open for 160 night-time hours and 97 day-time hours. Ten transects were distributed across the island, some along the same contours as Woodbury (1967, Figure 2); linear transects are the most appropriate trapping design to estimate species richness (Wilson *et al.*, 1996). Each transect was visited twice, except 1 and 2 were visited 3 times, and 8, 9 and 10 were visited once. Traps were baited with dry cobb mix, sunflower seeds and/or peanut butter (Table 1).

Results

Nine deer mice were captured in the 1312 trap nights. No other mammalian species was trapped, and no large mammal sign was detected over the six days. Average weight of the captured deer mice was 15 ± 3 g. Three females and nine males were captured. Tissue (ear clips) and hair samples were taken for future genetic or stable-isotope analysis.

Discussion

Our study corroborates Woodbury (1967), in that the only mammalian species caught on Anaho Island was *P. maniculatus*. It is not surprising that no additional

species colonized the island, as 400 m would be considered a rare long distance dispersal event for most small mammals. In addition Woodbury's 574 trap nights on a 3.5 km² island, was likely a sufficient capture effort to detect presence/absence of rodent species.

Woodbury (1967) determined that there was a high density of deer mice on the island, and that there was a "very direct relationship" between density of the mice and rattlesnakes (*Crotalus viridis*), and suggested that the rattlesnake feeds exclusively on deer mice, though no study was performed directly addressing this association. The results of the present study suggest that the deer mouse population is of a comparatively lower density. Trap success was 0.008 in comparison to yearly range of 0.01 – 0.18 in 1963-1965. Methodology did not differ in terms of bait and time of year, and in fact the effort in present study was much higher.

During the six days spent on the island, we observed only six rattlesnakes, despite walking during all hours of dawn and dusk, when rattlesnakes are most active, in addition to day time hours. D. Withers (pers. comm.) has suggested a decline in rattlesnake sightings in the last several years. It is possible, that rattlesnake population density has declined (based on anecdotal accounts of abundance presented in Woodbury (1967)) concomitantly with a decline in deer mouse populations. Lizard population density at present seem high, and could present an alternative food source for rattlesnakes.

Incidental observations during the six-day stay on Anaho Island include two gopher snakes (*Pituophis melanoleucus*) on the east side of the island, near the beach. Gopher snakes were not observed during the 1963-1965 study, however Woodbury (1967) noted that other scientists had observed this snake. We observed a nesting barn owl (*Tito alba*) and a black-crowned night heron (*Nycticorax nycticorax*) in the cliff face on the southwest side of the island. We observed foraging bats, which were also not observed by Woodbury (1967).

Table 1. Live trapping effort data for small mammals on Anaho Island, Pyramid Lake, Nevada.

Transect	# Nights	Total day hours	Total night hours	Total hours	Mice caught	# Sherman traps	# Mesh traps
1	2	17 hrs 45 min	19 hrs	36 hrs 45 min	1	122	11
2	2	20 hrs	19 hrs	39 hrs	2	24	17
3	2	11 hrs 15 min	19 hrs	30 hrs 15 min	0	31	8
4	2	9 hrs	19 hrs	28 hrs	2	32	23
5	2	10 hrs 45 min	19 hrs	29 hrs 45 min	3	61	6
6	2	7 hrs 15 min	19 hrs	26 hrs 15 min	1	56	0
7	2	10 hrs	19 hrs	28 hrs 45 min	0	8	32
8	1	5 hrs 30 min	9 hrs 30 min	15 hrs	0	76	0
9	1	2 hrs 30 min	9 hrs 30 min	12 hrs	0	25	25
10	1	3 hrs	9 hrs 30 min	12 hrs 30	0	75	75
TOTALS		97 hours	164 hrs 30 min	258 hours 30 min	9		



Figure 2. Trapping transects, deer mouse capture locations and rattlesnake sightings on Anaho Island, Pyramid Lake, 2005.

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