

Lizard Abundance in Managed Central California Grasslands

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Doug Bell presented a study stemming from Dave Riensch's Master's thesis (California State University East Bay) on lizard abundance in managed central California grasslands. The study was conducted within the East Bay Regional Park District, which consists of regional parks, recreation preserves and land banks encompassing more than 97,000 acres in Alameda and Contra Costa Counties. The District is known to provide habitat for twenty-three threatened and endangered species, and fifty-seven species of special concern. Some studies done previously, such as by Busak and Bury, 1974 and Jones, 1981, demonstrated positive correlations between grazing and some lizard species. However, these studies focused mostly on the Southwest and as such may not be germane to Central California grasslands. Closer to the East Bay, Germano, Rathbun, and Saslaw, 2001, conducted a study in California's southern San Joaquin Valley which demonstrated that heavy growth of non-native grass depresses populations of blunt-nosed leopard lizards. Thus, previous evidence suggests that grazing management can affect lizard populations. In general, lizards can be utilized as indicators of grassland health. For example, In California the western fence lizard is one of the most common lizards in grassland areas of the inner coast ranges, and is an important prey species for the state and federally threatened Alameda whipsnake. A major goal of this study was to measure lizard abundance on grazed and ungrazed grassland communities and to compare abundance with RDM (Residual Dry Mass). Western fence lizard size class abundance in grazed and ungrazed communities was also examined. Just the very basic trends uncovered by Dave's work were presented.

As noted earlier, the study was conducted within the East Bay Regional Park District, more specifically at Garin Regional Park in Hayward, and Sunol Regional Wilderness in Sunol. Three treatments were included in the study; one grazed all year, one grazed seasonally from December to June, and one was left ungrazed for more than fifteen years. Standard protocol methods were used for measuring RDM, three samples were collected at each trap array and then converted to yield RDM in pounds per acre. The amount of RDM remaining at the end of the season was used to qualify grazing intensity as light (more than 1000 pounds RDM per acre), moderate (1000-750 pounds RDM per acre), or heavy (less than 750 pounds RDM per acre). For sampling three twenty-four foot drift fences were set up, with four 4-gallon buckets per trap array, and standard sampling protocol outlined in Jones, 1981, was used. Measures were taken to ensure that no animals were harmed during the course of the study; pitfalls sheltered animals from direct sunlight, a trap-cover locking system kept out predators, traps included a damp sponge on the bottom, and provided "safe houses" for shrews or other animals that might fall into the traps. The traps were checked every twenty-four hours for a maximum of three consecutive days over the course of three field seasons June through August. Permanent marking methods were utilized for the purpose of capture/recapture studies. Marking of specific adult and sub-adult lizards was accomplished by toe clipping lizards between forty and eighty millimeters snout vent length.

Recaptures provided information pertaining to natural growth rates and population estimates. Temporary marking methods were also utilized to provide real time capture/recapture data in the field, which could be put into lizard abundance measures. Temporary marking was accomplished by color tattooing lizards between twenty and eighty millimeters snout vent length following the procedure outlined in Tinkle, 1967. This procedure provided information about lizard abundance and allowed for individual recognition. Four species of lizards were trapped over the course of the study: the western skink, the western fence lizard, the northern alligator lizard, and the California whiptail lizard. However, only a limited number of California whiptails and alligator lizards were captured, so the primary focus of the data is on the western fence lizards and western skinks.

Results from 630 trap nights of effort from 2002 through 2004 revealed a significant difference in abundance between grazed and ungrazed treatments for both the western fence lizard and the western skink. Both species were significantly more abundant on the grazed treatments, which included data for both seasonal and year round grazing regimes. The total number of lizards per 35 traps was compared to the RDM values calculated at each trap-site and demonstrated a significant negative correlation between RDM and lizard abundance. Thus, as RDM levels increased, fewer lizards were trapped. Data from western fence lizard and western skink size class abundance yielded interesting results: adult size classes were significantly more abundant in both grazed treatments compared with the ungrazed treatments. However, there was no significant difference observed between treatments for juvenile western fence lizards or western skinks.

In sum, this research demonstrated that western fence lizard and western skink abundance tends to be higher in managed, grazed grasslands than in ungrazed grasslands at the sites included in this study. This research has significant management implications for the East Bay Regional Park District, as it will help managers to shape vegetation management strategies aimed at maintaining grassland communities in the East Bay Area. This will become increasingly important for maintaining overall biodiversity in the East Bay Area as the region continues to grow in human population. District managers also place a high premium on obtaining results from research conducted in local environments in order to help shape policy on these lands. In particular, long-term monitoring of populations and communities combined with multidisciplinary studies are needed to better understand and manage special status species in a variety of habitats including grasslands.

To date, more than 408 wildlife volunteers have helped with Dave's research project as part of the District's wildlife volunteer program that aims to foster community involvement in the area. These volunteers contributed 2800 hours of service towards this research effort, saving the District an estimated \$84,000 dollars in costs.