

POPULATION TRENDS FOR TULARE PSEUDOBALIA AND STRIPED ADOBE LILY

Kern County has more endangered, threatened and rare plant species than most states. The geography and environmental conditions in the county lends itself to many micro environments. The western part of the county is in the rain shadow of the coastal range which provides limited rainfall. The valley floor has many different types of plant habitat caused by the alluvial formation from the coastal range and the Sierras. Next come the foothills of the southern Sierras with the grassland Savana. The hardwood range starts at about 1500 feet elevation and continues up into the mixed conifer hardwood starting at about 3500 feet. The higher part of the county could be considered alpines. The alpine region on the east side of the Sierras is in the rain shadow and has a lot of desert influence. Finally, the eastern part of the county is part of the Mojave Desert.

During the mid- to late-1990s, there was considerable interest in endangered, threatened and rare plants growing in the western foothills of the south Sierras. This part of the county supports the greatest level biodiversity as well as human activities. Also, most of this area is under private ownership.

Two plant species became of great concern for the environmental community as well as the land owners. The "best" available information was found in the Natural Diversity Data Base (NDDB) maintained by the California Department of Fish and Game. Considerable time was spent studying the NDDB and groundtruthing its data. It was observed that NDDB data did not have plant data on a continuous basis. The data only gave a snapshot in time as far as plant numbers were concerned. The next observation was that the data contained no plant density data which could be used to evaluate the vigor of a plant population over time.

Tulare Pseudobahia (*Pseudobahia peirsonii*) and Striped Adobe Lily (*Fritillaria striata*) were two plants of greatest concern in Kern County. A long-term study was established in 1998 to follow the yearly plant density of these two species. Three permanent sites were established for Tulare Pseudobahia and four sites were established for Striped Adobe Lily. Each site had a permanent marker in the center of each population. Belt transects were ran North, East, South, and West off the permanent marker. All of the plants were counted within each belt transect and the area of each transect was calculated so plants per square foot could be calculated (plant density).

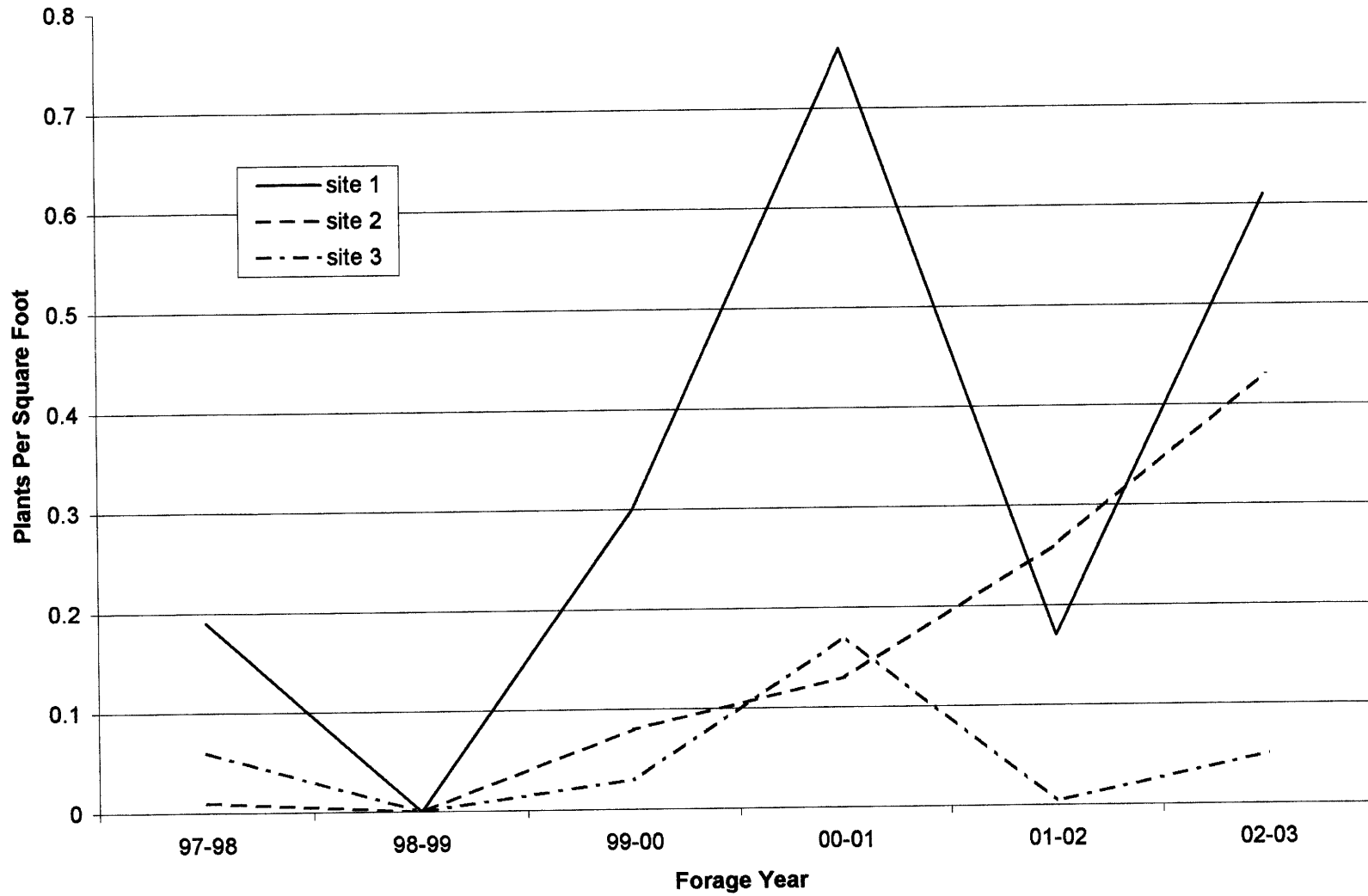
Tulare Pseudobahia

This species is listed as endangered by the Federal and State governments. It is generally found from 500 to 2500 feet in elevation in the grassland and the lower blue oak zone. It is found in heavy, light colored clay soils. Depending on the year, flowering occurs between mid-March and mid-April. The sites in this study only had an estimated 10 to 15% plant cover. The most abundant plants on the sites were foxtail, (*Hordium* spp) and pepper grass (*Lepidium nitridum*). These sites would be considered very unproductive range sites. Cattle grazed the pastures from late fall until late spring each year.

Plant density was varied at all three sites during the six-year study. In fact poor vegetation cover is one way to find Tulare Pseudobahia populations.

Figure 1 shows the plants per square foot. There did not appear to be a consistent plant density trend over the three sites. The data shows there is a large variation between years. A point can be made that any one-year would not give a very accurate estimation of the plant density for any of the sites. It would appear that current management of cattle grazing had a minimal impact on plant density.

Figure 1. The Number of Tulare Pseudobahia Plants Per Square Foot.



Striped Adobe Lily

The Striped Adobe Lily is classified as threatened by the state and is not listed by the Federal government. This species is usually found in the grassland and in the blue oak woodlands. It is found from 1000 to 2800 feet elevation in heavy clay soils. This lily is found in some of the more productive range sites. Lily populations are found in association with large numbers of annual grasses and annual forbes. Soap plant (*Chloragalum pomeridianum*) is considered a companion plant and is found through most of the lily populations. Depending on the year, flowering occurs between mid-February and mid-March. The bulb of the mature Striped Adobe Lily is found 10 to 12 inches below the soil surface. Reproduction is by seed. Early work showed that the seeds germinate the first year and produce a pea-sized bulb a few inches below the soil surface. Each year a new bulb is produced a few inches below the previous year's bulb and this process continues until the bulb reaches 10-12 inches. It is estimated that plants are 6-8 years old before they produce flowers. Field work in Kern County has verified that small bulbs can be found in the soil at varying depths.

Sites 1 and 2 are in horse pastures and are grazed year round. Sites 3 and 4 are grazed by cattle during the fall and late spring.

Figure 2 shows the plant densities of Striped Adobe Lily during this study. The data shows that sites 2 and 4 support higher plant densities than sites 1 and 3. Also, mature plants on sites 1 and 2 had more bells (flowers) per flower stock than plants on sites 3 and 4. The observations in this study do not show any relationship between the number of bells and plant density. The conditions to support more dense populations are not clear at this time.

Again, any one-year's data would not reflect population trends. Also, data from one population could not be extrapolated to population trends at other sites.

Conclusion

This study did not address numbers of plants in given population. However, it did develop data to show plant densities varied considerably between years. It also showed that certain sites could support more dense plant population than other sites. Plant density was the parameter of choice in this study because it better reflects the vigor of a given population and the variation in plant production between sites.

Figure 2. The Number of Striped Adobe Lily Plants Per Square Foot

