

Tinaja Vegetation Study

Proposal

August 15, 1988

INTRODUCTION

Although riparian habitats are restricted to a small percentage (0.28%) of the total area within Capitol Reef National Park (Barth and McCullough, 1987), these water dependent systems support a diverse array of plant and wildlife species. Most of these habitats have been heavily used by cattle that, like the wildlife, are drawn to the water and shade that these areas provide. Only in the higher waterpockets or "tinajas" along the Waterpocket Fold is it possible to find riparian habitats that have not been used by cattle. The purpose of this study is to determine the composition and abundance of plant species in a series of grazed and ungrazed tinaja communities. A further purpose is to investigate how the soil moisture of these waterpockets, or areas containing water deposited sand, is related to the overall tinaja vegetation patterns.

Objectives:

I. Determine the density and distribution of plant species inhabiting grazed and ungrazed tinaja communities by estimating the percent cover and canopy of each species encountered.

II. Determine the soil depth and moisture at randomly determined locations around each tinaja.

III. Map the solar exposure of each study site.

IV. Establish permanent photo points at each study site for monitoring future changes in the plant communities.

Hypotheses:

Ho1: There is no relationship between plant species composition and soil moisture.

Ho2: Plant species abundance is not related to soil moisture.

Ho3: Plant community composition does not change with increasing distance from the tinajas.

Ho4: Plant community structure, determined by plant canopy estimates, does not change with increasing distance from the tinajas.

Ho5: There is no difference between the plant species composition of grazed and ungrazed tinajas.

Ho6: There is no difference in the abundance of individual plant species in grazed and ungrazed tinaja communities.

MATERIALS AND METHODS

A series of ten tinaja communities located in the Willow and Cottonwood drainages along the Waterpocket Fold will be sampled over a ten-day period (see attached map). Each study site will be photographed from a designated point and the solar exposure it receives at 9:00 a.m., noon and 3:00 p.m. will be recorded on individual study site maps. The distance between the water surface and the high water mark will also be noted at each site.

The high water mark of each tinaja will serve as the basic transect line. Beginning at the south end of the tinaja, pairs of random numbers will be drawn from a chart and used to determine the sampling coordinates both parallel and perpendicular to this line, i.e., a pair such as 3,7 would direct the sampler 3 meters along the high water line and 7 meters away from the tinaja. At each sampling point a 1/4 meter sampling frame will be set up and the plot will be marked with a flagged nail for subsequent sampling. Sand or soil depth will be measured with a 1-meter length of rebar and soil moisture readings will be taken just below the soil surface (2-3 cm) and at 10, 20, 30, 40 and 50 cm levels as possible. Percent cover for each grass, forb and shrub species and the percent canopy covering the entire plot will be estimated and recorded on data sheets. Canopy cover for trees will be described in terms of a range from 0-25, 25-50, 50-75 and 75-100 percent. Unknown plants will be described in specific terms for later identification. At least five samples, (but preferably 10-15) will be taken within each subjectively determined plant community.

Correlation analysis will be used to test the relationship between the percent cover of each plant species, soil moisture and grazed v. ungrazed plant communities. Significant differences will be further analyzed with the Student's T-test. Ordination will be used to investigate any patterns in the distribution of plant species around grazed and ungrazed tinajas.

Field Materials

camera and film

30m tape

random number table

10-penny nails

flagging tape

1m piece of rebar

soil moisture meter

1/4m² sampling frame

maps of each tinaja for illustrating solar exposure

data sheets and pencils

plant identification books

