

CHARACTERIZATION OF RELICT COMMUNITIES  
FOR MONITORING PARK ECOSYSTEMS  
IN GLEN CANYON NATIONAL RECREATION AREA

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Objectives

Grazing by domestic livestock is authorized on the Glen Canyon National Recreation Area and occurs on about 80% of the NRA lands. Concern over competing land uses has generated considerable interest in the direct and indirect effects of grazing on community structure and function (Kleiner and Harper 1972, 1977, Loope 1977, Jefferies and Klopatek 1987). The primary objectives of this study are to: (1) identify and evaluate the abiotic and biotic factors influencing the structure and species composition of relict and grazed pinyon-juniper, blackbrush/ricegrass, and ricegrass grassland communities, and (2) select, refine and validate a system that can be used to field monitor condition and trend of relict and grazed communities.

Methods

Our general approach is to first characterize relict pinyon-juniper, blackbrush/ricegrass, and ricegrass grassland communities with respect to selected soil and topographic features. Areas that represent the end product of light, moderate and heavy grazing by livestock and have similar physical characteristics as the corresponding relict community will then be identified. We assume that grazed areas having physical characteristics similar to relict areas have the potential to produce a similar plant community, even though current botanical composition and productivity may have been modified by grazing (Passey and Hugie 1963, Shiflett 1973). Evaluation of sites that represent a gradient of long-term utilization by cattle will facilitate development of a community condition classification that will separate effects of grazing from other environmental factors that influence community composition and productivity. Distance from water, degree of slope and the extent of physical evidence of

livestock (degree of soil disturbance, number and extent of trails, presence of feces, etc.) are the criteria that will be used to classify a site as either being lightly, moderately or heavily grazed by cattle (Holechek et al. 1989). Finally, community characteristics, both floral and faunal, that may serve as indicators of current ecological status of grazed communities relative to relict communities will be identified, evaluated and refined.

### Results

Time and resources during the 1989 field season limited the study to an initial aerial and ground reconnaissance of the pinyon-juniper community on the South Block and the Orange Cliffs, and several blackbrush/ricegrass communities near the NRA headquarters. A preliminary evaluation of some of the proposed methodology was also conducted and will be modified somewhat for the 1990 and 1991 field seasons.

A meeting with Drs. Joel Tuhy and Nick Van Pelt of the Utah Natural Heritage Program was held in Salt Lake City, Utah in October. Dr. Tuhy was one of the principal investigators on a 1988 inventory of relict vegetation areas in the NRA which qualitatively described a set of undisturbed or nearly undisturbed sites for most of the park's major plant community types. The purpose of the meeting was to discuss the feasibility of our proposed methodology, and to outline some potential logistical problems in traveling to some of the relict and grazed communities. The selection of specific study sites was also discussed.

### Conclusions

The goal of this study is to produce a monitoring system sensitive to grazing which can be easily interpreted within the management objectives of the Glen Canyon National Recreation Area. To be useful, the technique should be easy to use in the field under a variety of environmental conditions and ecological situations. Accessibility to relict areas that may serve as reference sites will be the major limiting factor. Many sites will require travel by helicopter which may, because of budget constraints, limit the number of relict sites that can be studied.

Literature Cited

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