

AN ANALYSIS OF RELICT PLANT COMMUNITIES
OF GLEN CANYON NATIONAL RECREATION AREA

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Objectives

This work being conducted on the Glen Canyon National Recreation Area (NRA) has two primary goals, each of which contains two specific objectives. The first major goal is to characterize the vegetation communities of the NRA. Specific objectives are to (1) develop a cover-type vegetation classification, and (2) prepare a map of these vegetation units, for the NRA.

The second major goal is to seek relict examples of the range of vegetation types defined under the first goal. Specific objectives are to (1) develop a list of known and potential relict areas in the NRA, and (2) inspect and obtain quantitative descriptions of as many of these areas as possible.

Identification of relict areas in the Glen Canyon NRA will provide places for basic scientific research in unaltered ecosystems. Further, such areas have value for the applied sciences of resource management, by defining the productive potentials of ecosystems. Relict areas are also reference points for guiding the reclamation of disturbed areas. The latter two points are especially important in the NRA, given that grazing and some minerals activity still occur there.

Methods

The vegetation classification and map are being generated from existing sources, many of which are outside the realm of published literature. Information on vegetation communities in and near the NRA is being synthesized from about 20 sources. The vegetation map is being prepared from soil maps that have been developed in conjunction with 1 published and 3 draft soil surveys:

1. USDA-SCS (1985) - Soil survey, Warm Creek portion of Glen Canyon NRA

2. USDA-SCS (In Prep.) - Field maps and draft soil surveys for Canyonlands, San Juan and Henry Mountains areas

Using these soil maps as a base, the Bureau of Land Management has delineated vegetation communities that are associated with each soil unit. This was done through their Soil-Vegetation Inventory Method (SVIM) procedure (USDI-BLM, No Date). A synthesis of SCS soil maps and the corresponding BLM vegetation units will result in a vegetation map for most of the NRA.

The list of known and potential relict areas is derived from several sources. These include the project investigators' personal experience, published literature and unpublished reports, personal interviews with persons familiar with the NRA, and aerial reconnaissance.

All potential relict areas suggested by the above sources are given a preliminary assessment and priority ranking. This involves a judgement of expected site quality, made by reviewing written and verbal records of use history that exist in NRA and BLM files. Areas whose use history casts serious doubt on relict status are given a low priority for site visit, or are rejected from further consideration.

Potential relict areas that pass the preliminary screening are then inspected. Such inspection first verifies the supposed relict status of the site. This procedure focuses on several criteria:

1. Presence and abundance of exotic plant species, and species known to be invaders or increasers under disturbances such as grazing.
2. Obvious signs of human-related disturbance or use, such as seismograph lines, livestock manure or trails, etc.
3. Subtle indications of human or livestock presence based on such features as plant vigor, litter cover, diversity and cover of cryptogamic soil. The investigators' experience with both relict and altered communities on the Colorado Plateau is used in such judgements.

Those sites judged to be relict following this initial onsite verification then have their vegetation and environmental features sampled using a releve technique. Information recorded includes plant species composition and cover, plus cover of cryptogams, litter, rock and bare soil. This procedure is rapid enough to make efficient use of time spent in areas with difficult or expensive helicopter access, but is sufficiently detailed to allow description of plant communities and associated environment features.

Results

Preliminary classification work has resulted in a tentative list of vegetation cover types in the NRA. These types are presented in Table 1.

Among the sources reviewed to obtain suggestions of potential relict areas, the

Table 1. Tentative vegetation cover types within the Glen Canyon NRA.

Aquatic/Riparian

- Populus fremontii/Salix exigua (natives, less disturbance)
- Hanging gardens: many different combinations of many different species

Forests/Woodlands

- Pseudotsuga menziesii (in isolated pockets only)
- Pinus ponderosa (probably no well-developed stands)
- Pinus edulis-Juniperus osteosperma (several well-defined subtypes)

Shrublands

- Quercus gambelii
- Cercocarpus intricatus
- Artemisia tridentata
- Artemisia nova
- Sarcobatus vermiculatus
- Atriplex confertifolia, often with Ephedra torreyana codominant
- Atriplex corrugata
- Ceratoides lanata (Eurotia lanata)
- Coleogyne ramosissima
- Quercus undulata, Artemisia filifolia, Ephedra cutleri

Grasslands

- Oryzopsis hymenoides-Hilaria jamesii-Stipa comata (often with Ephedra cutleri)
- Elymus salina

Barrens: sandstone slickrock, shale or talus, with only scattered vegetation

most fruitful were people familiar with the NRA. Conversations with 13 knowledgeable individuals yielded suggestions of more than 30 known and potential relict areas in the NRA. They also provided information on particular areas that are certainly not in relict condition, thus further narrowing the list of locations to be inspected.

An aerial reconnaissance of much of the NRA was made from Park Service fixed-wing aircraft in May, 1986. As a result, several previous suggestions were eliminated, and several new potential relict areas were added to the list. Several other possible areas were also eliminated based on field inspection during July, 1986.

The current list of known and potential relict areas is presented in Table 2.

Seven potential relict areas were inspected in July, 1986. In all of these the focus was on vegetation communities associated with perennial water, either streams or hanging gardens. The best area seen was Ribbon Canyon. It contains several outstanding hanging gardens and most of the plants endemic to such habitats, including uncommon species such as Ostrya knowltonii and Rubus neomexicanus. Four other areas also contain excellent-condition riparian zones or hanging gardens. These four are Alcove Canyon, Wilson Creek, Cow Canyon, and the left-hand (east) fork of Iceberg Canyon. Two other areas, Hidden Passage Canyon and Knowles Canyon, were found to be unworthy of further consideration.

A trip to The Block was made in October 1986. Its vegetation communities are very similar to, and in much better condition than, those in similar habitats elsewhere in the greater grass cover beneath the pinon-juniper woodlands and especially in the sagebrush parks.

Conclusions

The Glen Canyon NRA contains a number of moderate- to large- sized relict areas. These areas support undisturbed examples of vegetation communities that are common on the Colorado Plateau. Recognition and protection of these sites will aid the growth of a region-wide system of protected relict areas.

References Cited

- USDA Soil Conservation Service. 1985. Soil survey report. Glen Canyon National Recreation Area, Kane County, UT: Warm Creek Portion.
- USDA Soil Conservation Service. In Prep. Soil survey of Canyonlands Area, Utah.
- USDA Soil Conservation Service. In Prep. Soil survey of Henry Mountains Area, Utah.
- USDA Soil Conservation Service. In Prep. Soil survey of San Juan Area, Utah.

Table 2. List of known and potential relict areas in the Glen Canyon NRA, current as of December 1986.

Orange Cliffs

- The Block
- Grottoes and north-facing slopes with Douglas-fir in French Spring Fork of Happy Canyon and in upper Millard Canyon
- Wingate and Chinle exposures in the head of the Main Fork of Happy Canyon

Canyonlands NP to Hite

- Mouth of Gypsum Canyon

Hite to Bullfrog

- "5381" Mesa
- Mesa northwest of "The Horn"
- Mesa between Scorup and Blue Notch Canyons
- North end of Mancos Mesa

Bullfrog to Rock Creek (on Colorado Arm)

- Head of left-hand (east) fork of Iceberg Canyon
- Ribbon Canyon
- Mid-level benches below Navajo Point, including Billie Flat Top and Mazuki Point
- Bottoms of Middle Rock Creek and/or Dry Rock Creek

Escalante Arm

- Cow Canyon
- Parts of Choprock and Silver Falls Benches (?)
- Lower Waterpocket fold - whole area is unallotted, and there should be relict remnants within

San Juan Arm

- Alcove Canyon
- Wilson Creek

Rock Creek to Lees Ferry

- Grand Bench
 - Romana Mesa
 - Antelope Island RNA
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USDI Bureau of Land Management. No Date. Unpublished Soil-Vegetation Inventory Method (SVIM) data. Henry Mountain Resource Area, Hanksville, UT, and San Juan Resource Area, Monticello, UT.