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GLEN CANYON NATIONAL RECREATION AREA

GRAZING MANAGEMENT PLAN
(General Management Plan - Grazing Component)

VALUES AND PURPOSES GUIDELINE
GOALS AND OBJECTIVES FOR GRAZING MANAGEMENT
JULY 1998

National Park Service
Resource Management Division
Glen Canyon National Recreation Area
P.O. Box 1507
Page, Arizona 86040

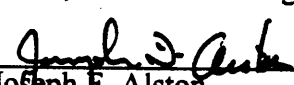
Recommended by:


John P. Rittenour
Chief, Resource Management

Date:

8/18/98

Concurred by:


Joseph F. Alston
Superintendent

Date:

10-31-98

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FINDING OF NO SIGNIFICANT IMPACT (FONSI) AND DECISION NOTICE



United States Department of the Interior

NATIONAL PARK SERVICE
Glen Canyon National Recreation Area
Box 1507
Page, Arizona 86040

AUG 24 1999



D18

Dear Participant:

Here is your copy of the Decision Notice and Finding of No Significant Impact (FONSI) on the Grazing Component (Plan) of the General Management Plan for Glen Canyon National Recreation Area (NRA). We will make some small revisions to the Grazing Plan based on the comments we heard at the public meetings and in the letters we received during the public review process.

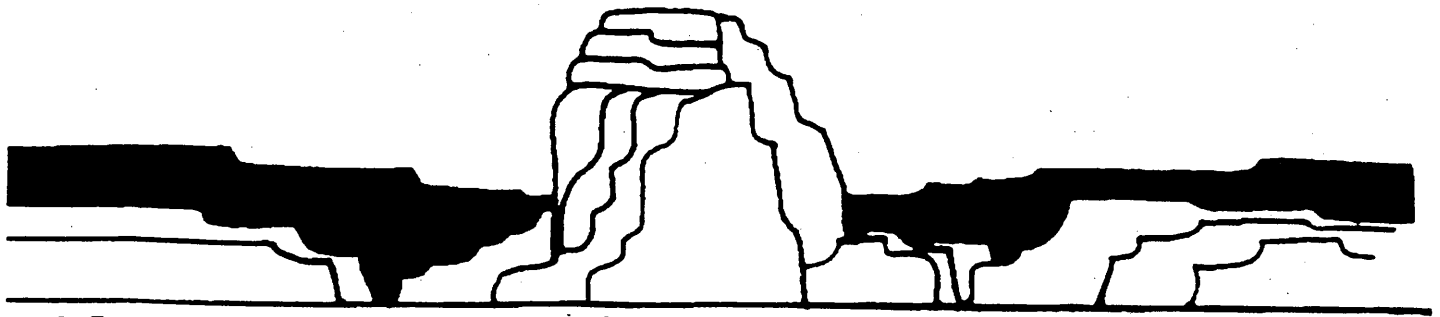
We value the comments received and have addressed the most common issues in the FONSI and in the enclosed errata sheet. If you desire a revised plan, or wish to comment further on the final decision, please submit your requests or comments to:

Superintendent
Glen Canyon NRA
Box 1507
Page, Arizona 86040

We ask that all responses or plan requests be submitted by September 30, 1999. Thank you for your interest in the grazing plan and future direction of the Glen Canyon National Recreation Area grazing program.

Sincerely,

Joseph F. Alston
Superintendent



Glen Canyon National Recreation Area

FINDING OF NO SIGNIFICANT IMPACT AND DECISION NOTICE FOR GRAZING COMPONENT OF THE GENERAL MANAGEMENT PLAN

JUNE 15, 1999



INTERMOUNTAIN REGION
NATIONAL PARK SERVICE
U.S. DEPARTMENT OF INTERIOR



FINDING OF NO SIGNIFICANT IMPACT AND DECISION NOTICE FOR THE GRAZING COMPONENT OF THE GENERAL MANAGEMENT PLAN

This statement has been prepared in accordance with the National Environmental Policy Act of 1969, as amended. The proposed alternatives, as defined in the Environmental Assessment for the Grazing Component (Plan), conform to the objectives of the General Management Plan (GMP) for Glen Canyon National Recreation Area (NRA) (1979). The Grazing Component (Plan) includes a description of the current range condition, goals and objectives for each of the natural and cultural resources, and proposed changes in the administration of grazing within the recreation area. The proposed alternatives, as analyzed in the environmental assessment, comply with the GMP and agree with the purpose and intent of the enabling legislation for Glen Canyon NRA.

In addition to the GMP for Glen Canyon NRA, other planning documents were reviewed to ensure compliance with existing National Park Service Policies, and adjacent Bureau of Land Management (BLM) plans and policies, and County and local government planning documents. Socio-economic statistics were obtained from personal contacts with local Chamber of Commerce organizations, and their most recent publications on income, population and economic trends for areas in southern Utah. Also, current BLM "Allotment Management Plans (AMP's)" and other "Activity" plans were reviewed for use in the development and analysis of grazing operations within Glen Canyon National Recreation Area (NRA).

The Decision

After careful review of the public comments on the Grazing Component (Plan), the range of alternatives presented, and the impacts analyzed in the Environmental Assessment (EA), the National Park Service (NPS) will implement the Proposed Action (Alternative 1). It was determined that the Grazing Component best meets the intent of National Park Service mandates to protect the cultural, historic and natural resources of Glen Canyon NRA. The final grazing component has been updated to reflect public comments, and it will now include a monitoring schedule and list of prioritized allotments.

The BLM is currently developing Environmental Assessments (EA's) to renew "Term Grazing Permits," for lands in the Grand Staircase-Escalante National Monument (GSENM) and Glen Canyon NRA. This process will be followed by the development of "Allotment Management Plans (AMP)" for prioritized allotments in these areas. Development of the AMP's will be conducted by the Bureau of Land Management and will include opportunities for public review and input. This process will begin in 1999, and Glen Canyon NRA will work with the BLM to ensure NPS lands receive adequate consideration in the prioritization of AMP development.

Public Review Process

The alternatives developed for the EA considered NPS planning objectives, land and recreational use issues, and existing NPS and BLM land use policies and mandates. Scoping brochures were mailed out in January 1998, followed by the release of the Draft Grazing Component (Plan) in early 1999. Notice of the availability of the Environmental Assessment for the Grazing Component was printed in the Federal Register on February 26, 1999. The public comment period ended on April 30, which included a 30-day extension to allow additional public input. The Environmental Assessment and Draft Grazing Component (Plan) was made available for public review and comment from February 26 through April 30, 1999. Approximately 150 copies of the document were distributed to individuals and organizations that responded to the original scoping brochure, or requested copies following the Notice of Availability in the Federal Register. Five public meetings were conducted in the towns of Monticello, Kanab, Escalante, and Hanksville, Utah, and Page, Arizona between March 22 and March 31, 1999.

The four alternatives presented to the public for review are described below:

The **No-Action** alternative, Alternative 2, would have maintained existing grazing prescriptions and the current process of conducting a "Values and Purposes" Determination for all proposed rangeland developments. Past BLM policy was to concentrate available funding and personnel on areas where management action is most needed to improve resource condition, resolve serious resource-use conflicts, and focus on where investments in range improvement will yield the greatest positive return. This approach is called "selective management."

Alternative 1, the "Proposed Action" introduced the Glen Canyon NRA Grazing Component of the General Management Plan, which is composed of several elements: 1) descriptions of the existing resource protection and grazing administrative responsibilities of the National Park Service and Bureau of Land Management; 2) an assessment of the current range condition by resource; 3) Goals, objectives and recommendations for grazing practices and management actions; and 4) maximum grazing intensities (utilization) compatible with the purpose of the recreation area.

Alternative 3, was to follow the new Bureau of Land Management "Standards and Guidelines" (S&G's) within Glen Canyon NRA, as implemented on BLM administered lands outside of Glen Canyon NRA. The S&G's are similar to the objectives developed by the NPS for this grazing plan, and could be used to meet many NPS goals. However, there are enough differences between NPS objectives and the S&G's (some resources of concern to NPS management are not addressed in the S&G's) that some NPS goals/objectives would not be addressed by use of the S&G's. Implementation would follow the same BLM processes as outside the recreation area, and would not be triggered by changes in grazing leases or as existing permits are bought or sold. A greater emphasis would be required to ensure lands within Glen Canyon NRA meet the S&G's as detailed for each state, and that grazing authorizations for an allotment would be tied to

permittee performance in attaining the goals and objectives set by the NPS grazing component.

Allotments within the recreation area, not meeting existing S&G's, would be given a higher priority by BLM and NPS for S&G's implementation and development of Allotment Management Plans.

Alternative 4 is similar to the Proposed Action, but upon approval to implement the NPS grazing plan, as defined in Alternative 1, the BLM would require immediate implementation of NPS grazing practices on all allotments within Glen Canyon NRA. This would require a reassessment of allotment condition and trend, and field inventories to determine the present condition of those "other" resources not presently understood or placed at risk by the current grazing prescription. Time frames would be established, in consultation with the BLM, NPS and the permittee, in which the permittee would be required to show progress towards prioritized goals or objectives established for that particular allotment. The BLM, with help from the NPS, would monitor stated parameters to track permittee compliance and progress. Permittee compliance and progress would be reviewed when a change in the use of an allotment occurs (sale or transfer included), when a range development was proposed, or when the permittee requests changes to the grazing program.

The NPS received a total of 28 letters/comments from the general public, state agencies, ranchers and local organizations. The most common comments received during the public review period, and from the public meetings, are grouped below into the following main topics:

- Custom and Culture Issues
- Consistency with Existing Policies
- Economic Impacts of the Alternatives
- Consideration of a "No Grazing" Alternative
- Comments on Mitigation Measures

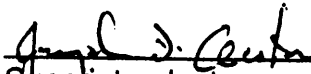
Other comments identified issues and/or concerns about riparian use and the need to protect water quality and wildlife habitat. Some stated that all allotments should have current Allotment Management Plan (AMP) or grazing should stop until AMP's are completed. Others replied that all grazing should cease until there is sufficient data available to show no derogation or impairment to Glen Canyon NRA natural and cultural resources. A detailed discussion of these issues is presented as an "errata" sheet, attached to the FONSI/Decision Notice.

The proposal does not constitute an action that normally requires preparation of an EIS. The proposal will not have a significant effect on the human environment. Negative environmental impacts that could occur are minor and temporary in effect. There are no unmitigated adverse impacts on public health or safety; threatened or endangered species; sites or districts listed in, or eligible for listing in the National Register of Historic Places; known ethnographic resources; or other unique characteristics of the region.

No highly uncertain or controversial impacts, unique or unknown risks, cumulative effects, or elements of precedence were identified. Implementation of the action, as described above, will not violate any federal, state, or local law.

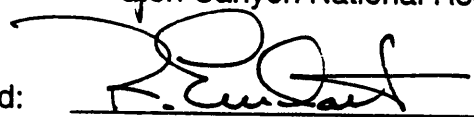
Based on the foregoing, it has been determined that an EIS is not required for this project and thus, will not be prepared.

Recommended:


Superintendent
Glen Canyon National Recreation Area

Date: 7-12-99

Approved:


Regional Director
Intermountain Region

Date: 22-July-99

Attachment

same as on adjacent BLM, State, or private lands, subject to "typical" agency funding sources (e.g. State Grazing Advisory Board).

If an action is proposed in one of the targeted allotment categories, called "Improvement" or "Custodial," there would be requirements placed on the permittee to bring the status of the allotment up to the "Maintenance" category. The permittee would have to complete the actions prescribed to improve the status of the allotment before a "values and purposes determination" could be completed to authorize the action. For example, if a permittee were to request to put in or improve a range development (e.g. stock tank) there would be specific costs associated with that project. The permittee would pay for materials, equipment, labor and restoration of the work site (soil erosion protection measures). These costs would not be due to the NPS grazing plan.

Since the work is to be conducted in a "targeted" allotment that is already impacted from some aspect of the grazing operation, or there is some land limitation (steep slopes, highly erodible soils, etc.), the NPS grazing component would establish certain requirements to be completed by the permittee (or NPS/BLM) before a Values and Purposes determination can be completed to authorize the development (stock tank). There might be additional erosion protection measures required in 3 down-slope drainages, or a cultural inventory might have to be completed, etc. The NPS would fund the cultural survey, but the permittee would have to fund the erosion protection measures. In this case, the costs would depend on the size and type of erosion protection measures to be implemented. The actual costs to the permittee will depend on site-specific factors and allotment needs. Factor in the benefits to the rancher for better forage utilization and increased weight gain/head and the economic cost may be minimal. There are so many factors that can affect the **actual** economic cost to the rancher that it is impossible to provide such an analysis, given so many hypothetical scenarios.

It is safe to say that the methods used and requirements of the permittee will not go beyond best management practices that support a "typical," properly functioning ranch operation where good land stewardship prevails. As AMP's are developed, more site-specific developments will be detailed, thus allowing better cost estimates and analysis of the economic impacts on the operator/permittee.

The development of these AMP's will be conducted by the BLM, with input from Glen Canyon NRA as applicable, and is to include a public review process (NEPA).

Comment: Why was there no "Cease all grazing" alternative in the Environmental Assessment.

NPS Response:

Grazing is authorized in the enabling legislation for Glen Canyon NRA, and it was analyzed and approved in the General Management Plan (1979) for Glen Canyon NRA. Grazing is an important tradition in this region with strong local ties to the surrounding communities in northern Arizona and southern Utah. The intent of this planning effort was not to eliminate grazing from the recreation area, but to provide a better understanding of the values and

purposes and long term goals and objectives of the NPS grazing program to the general public, the permittees, and the Bureau of Land Management.

We feel that grazing can be accomplished within Glen Canyon NRA without causing significant resource damage, if best management practices and effective land stewardship is practiced. We may, at a later date, determine that certain areas within Glen Canyon NRA should not be grazed due to changes in legislation (Wilderness Act, Endangered Species Act, etc.), if additional listings of plant or animal species occurs, findings of unacceptable resource impacts, or where new areas are reserved for scientific study, etc. The Grazing Component allows for these future possibilities.

Comment: How will mitigation measures be accomplished? What is the time frame for implementing the NPS goals and objectives found in the grazing component?

NPS Response:

We have prioritized five allotments within Glen Canyon NRA that will be the focus of our initial monitoring and data collection efforts. These five allotments make up 50 percent of the acreage grazed within Glen Canyon NRA. The allotments are Lake Canyon in the San Juan Resource Area, Sewing Machine in the Henry Mountain Resource Area, and Rock Creek-Mudholes, Lake, and Soda in the Grand-Staircase Escalante National Monument. The next step is to work with the BLM to get NPS priorities into the BLM allotment priorities for range assessment and monitoring and AMP development. This effort began in January 1999, with NPS priorities being submitted for year 2000 and 2001.

Beginning this summer, NPS staff will begin the review of existing allotment management plans and BLM field data files to find gaps in resource and range trend information, and to better understand the history and use occurring in the allotment. NPS and BLM staff will work together to identify issues and allotment needs on the five priority allotments, and then develop allotment action plans to address the most pressing problems or issues.

Thank you for submitting your comments and ideas on the Grazing Component for Glen Canyon National Recreation Area.

I. INTRODUCTION

Glen Canyon National Recreation Area (NRA) was established on October 27, 1972, (Public Law 92-593), "to provide for public outdoor recreation use and enjoyment of Lake Powell and lands adjacent thereto...and to preserve scenic, scientific, and historic features contributing to public enjoyment of the area." Glen Canyon NRA encompasses 1,236,880 acres in southern Utah and northern Arizona.

Glen Canyon NRA is subject to the same organic legislation as other units of the National Park Service (NPS) such as national parks, monuments, historic sites, etc. The NPS Organic Act directs the NPS to "...promote and regulate the use of Federal areas known as national parks... to conserve the scenery and the natural and historic objects and wildlife therein and to provide for the enjoyment of the same in such a manner and by such means as will leave them unimpaired for the enjoyment of future generations."

Code of Federal Regulations, Title 36, Section 2.60(a)(1), states that grazing is prohibited except "as specifically authorized by Federal Statutory Law." Grazing within Glen Canyon NRA is authorized by the recreation area's enabling legislation.

Lands within Glen Canyon NRA were first used for livestock grazing 100 years prior to the establishment of the recreation area. Grazing has continued up to the present time and is a use recognized by Congress in the act of 1972 establishing the recreation area. Working together, the NPS and the Bureau of Land Management (BLM) are to protect the values and purposes of the recreation area and administer grazing permits.

By identifying resource goals and objectives this plan establishes decision making criteria so that permittees, the public, and agency personnel interested in livestock grazing in Glen Canyon NRA can make informed decisions regarding recreation area resource protection. It encourages sound grazing practices to minimize or avoid impacts to recreation area resources. The core of this plan is the BLM implementation of its grazing program insuring the integration of NPS resource stewardship responsibilities.

To reach resource protection goals, the NPS and BLM will utilize a combination of sound grazing practices, opportunities that are presented when new actions are proposed or permit transfers take place and NPS requests specific changes. These requests, although limited, will be made to prevent or reduce impacts to resources protected as a result of the designation of the recreation area as a unit of the National Park System. Present permittees, using sound grazing practices, whose activities are not causing irreversible resource damage, should not be unduly affected. Long-range achievement of these resource goals will be accomplished over time as a result of implementation of this plan and the application of knowledge gained from required monitoring.

This plan is to be used by the Superintendent of Glen Canyon NRA to make informed decisions regarding approval of proposed (future) grazing related activities that may impact recreation area resources. The Superintendent must comply with the Redwoods Act of March 27, 1978, which states that in areas of the National Park System "The authorization of activities...shall not be exercised in derogation of the values and purposes for which these various areas have been established..."

Before authorizing an activity it must be determined if recreation area values and purposes are affected. This decision process is called a "Values and Purposes Determination". It is addressed in two agreements between the BLM and the National Park Service (NPS) (Appendix A). The 1984 Memorandum of Understanding is between the NPS and the BLM and the 1993 Interagency Agreement is between Glen Canyon NRA and BLM (Utah and Arizona). These agreements prescribe the manner in which the BLM administers grazing permits within the

recreation area and the values and purposes determination requirement for the Superintendent of Glen Canyon NRA. The determination requirement is to insure that grazing activities do not conflict with the protection of resources as called for in the 1916 NPS Organic Act or the Glen Canyon General Management Plan (1979).

The purposes of the recreation area are identified in the 1972 act establishing Glen Canyon NRA.

It was established "...in order to provide for public outdoor recreation use and enjoyment of Lake Powell and lands adjacent thereto in the States of Arizona and Utah and to preserve scenic, scientific, and historic features contributing to public enjoyment of the area...". The values of the recreation area are the vegetation, soil, water quality, wildlife, archaeologic, historic, paleontologic, scenic and recreation resources that make up the scenic, scientific and historic features which define the outdoor recreational use and enjoyment of Glen Canyon NRA.

Congress, in establishing Glen Canyon NRA, directed the Secretary of the Interior to administer the area, through the NPS, in accordance with the above purposes, as well as for "...the fundamental purpose of...conserving the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."

Congress directed that "The administration of...grazing leases within the recreation area shall be by the BLM. The same policies followed by the BLM in issuing and administering...grazing leases on other lands under its jurisdiction shall be followed in regard to lands within the boundaries of the recreation area, subject to provisions of section 3(a) and 4 of this Act" (Appendix A).

Five BLM resource areas administer 34 grazing allotments that partially or entirely occur within Glen Canyon NRA. In all, about 882,678 acres of the recreation area are situated within these allotments. Of this acreage, approximately 85% (762,361 acres) is currently subject to grazing use, while the remainder (120,317 acres) currently un-allotted. About 52 permittees operate in these allotments. This plan was prepared in consultation with BLM.

II. PURPOSE AND NEED FOR GRAZING MANAGEMENT PLAN

A. PURPOSE OF THE GRAZING MANAGEMENT PLAN

This plan provides information on existing grazing management: an overview of grazing in the Glen Canyon NRA environment and a description of BLM grazing management on other lands under its jurisdiction and on allotments in the recreation area. It also describes the resource criteria to be used to assess potential impacts from a proposed action (value statement, resource condition, management goal, objective(s), action(s) to determine achievement of the objective and monitoring requirements for each resource as it relates to grazing).

The purpose of this plan is further defined in the General Management Plan (GMP) for Glen Canyon NRA in that the grazing resources component of the GMP is to provide a "...detailed description of the range, recommendations for specific range improvement practices and devices, management activities and maximum grazing intensities compatible with the purpose of the recreation area". Achieving the goals and objectives of this plan will meet those requirements.

This plan describes the "values" of recreation area resources and the management goal for each resource. Each resource goal is supported by objectives designed to meet or obtain that goal. If a proposed action meets these objectives, or can meet them by incorporating prescribed mitigation requirements, the action will be considered to have complied with the "purposes" of the recreation area. The Superintendent will recommend that it be approved by the BLM authorizing official.

The goals and objectives described in this Grazing Management Plan will be applied in making values and purposes decisions. Not every objective will apply to all actions. Only those objectives that are applicable will be applied. Actions that are effected include permit transfers when an allotment does not have a current Allotment Management Plan (AMP), an allotment is in an Improve or Custodial category, or there is ongoing unacceptable degradation of recreation area resources. These goals and objectives also apply to changes in existing AMP's, proposed ground disturbing activities, or other actions described in the 1993 Interagency Agreement (Appendix A).

B. NEED FOR GRAZING MANAGEMENT PLAN

Described as the "Grazing Component of the General Management Plan" this plan is identified as a requirement in the 1979 Glen Canyon NRA GMP (GMP, Table 1). It is also defined as a planning goal to be completed as funding becomes available (GMP, Table 4).

What the Grazing Management Plan Will Not Address

This plan will only address the management of feral horses or burros, wildlife, watersheds, recreational uses, vegetation management, or other activities as it directly relates to grazing. The specific management of these resources or activities, other than their relationships to grazing, are addressed, or will be addressed, separately in the appropriate natural and cultural resource management/action plan(s) or visitor use plans.

This plan will not address grazing on Navajo Nation lands or lands below elevation 3720' adjacent to the southeastern shoreline of Lake Powell or the southern bank of the San Juan River.

C. SETTING

The rangelands of Glen Canyon NRA occur in an arid to semi-arid climate, with annual rainfall varying from 4-12 inches per year in most localities. Winters are cold, with some precipitation falling as snow, while summers are hot. Precipitation is extremely variable from year to year and even within years between different portions of the recreation area. In drought years, vegetative growth is reduced, or often absent, compared to wetter years. The vegetation of the region includes arid shrublands, grasslands and semi-arid pinyon-juniper woodlands. Much of the recreation area consists of talus, cliffs, badlands formed by clay, and slickrock that lacks vegetation or supports only scattered saltbushes and annuals. Perennial grasslands are relatively rare in the recreation area, but provide much of the available forage for livestock. Stocking rates (acres/AUM) are generally low for western rangelands, reflecting the sparse vegetation cover of the region. In Glen Canyon NRA the total acres per AUM varies from 17 acres (Upper Cattle Allotment) to 193 acres (Rock Creek-Mudholes Allotment). However, the reported acres per AUM do not usually reflect the amount of acreage actually grazed. Portions of most allotments consist of cliffs, talus, slickrock and other areas where grazing is generally not feasible. Hence, grazable acres per AUM are generally lower than the cited values.

III. GRAZING HISTORY

Domestic animals were introduced into the area now included in Glen Canyon NRA in the late 1700's. Herds of cattle were utilized as a source of meat on the long journeys into the Glen Canyon area and other domestic livestock, like mules and burros, were used to pack additional supplies. The old Spanish Trail was first utilized by the Dominguez-Escalante expedition in 1776, as the group crossed the Colorado River at a point subsequently called the "Crossing of the Fathers," which is now below the waters of Lake Powell, at Padre Bay. This historic crossing was the first of many, with historical documentation indicating that ensuing drives could have had cattle herds that numbered in the thousands. There was no serious attempt to utilize the range resources until the early 1860's. The first recorded sheep introduction came in 1863 near Kanab, Utah.

Settlers brought small numbers of livestock to the area known today as the "Escalante-Fifty Mile Mountain" area in the early 1870's. During subsequent expansion into southeastern Utah in the late 1870's, settlers created the famous Hole-in-the-Rock trail as they moved from Escalante into present day San Juan County. In 1879-1880 settlers departed Escalante, accompanied by some 1,800 cattle, and traveled east to settle the new community of Bluff, Utah. Once there, their cattle ranged from the Colorado River to the San Juan River. In the mid 1880's, pressure from other ranching companies wanting to utilize the rangeland forced the settlers to form a grazing association called the "Bluff Pool." One purpose of the association was to defend the range from large ranching operations from Texas and New Mexico that were trying to expand into the Bluff area.

Peak numbers of Bluff Pool livestock occurred in 1886, when the area was used by large numbers of cattle being driven into the area from central and northern Utah via Hanksville and Halls Crossing. An 1890 census recorded 19,732 animals utilizing the area. It was around this time, 1891, that the Abajo Mountains were being utilized by the Scrup Brothers, mainly in White and Dark Canyons. The following years were dry and livestock numbers decreased due to drought and overuse of the range. Livestock numbers continued to decline during the late 1890's, and by 1900, only 9,866 cattle were counted in San Juan County. This trend continued until the start of World War I when the wartime economy reversed this trend. However, the trend peaked out at the close of the war, and by the 1920's numbers were once again near the 9,000 figure. In 1913, data from the Utah Bureau of Statistics indicates that sheep had begun to replace cattle during the hard economic times as 110,000 sheep and only 15,000 cattle were recorded in Kane County. Statistics from 1974 indicated a trend back to cattle, when Kane County listed 5,583 sheep and 8,125 cattle.

Although historically grazed by sheep, today there are no domestic sheep within Glen Canyon NRA. AUM's and numbers of livestock have fluctuated by allotment in the last 10 years as a result of economic changes and drought. Grazing was relinquished on the Antelope Island, Escalante River, and Horseshoe South Allotments through a willing seller-willing buyer process and vegetation resources were reallocated to meet other resource needs. From time to time since the establishment of the recreation area, allotments, or parts of allotments, have been placed in "non-use" based on livestock/wildlife conflicts, to meet recreation or research needs, or to reduce livestock/recreation conflicts.

IV. EXISTING NATIONAL PARK SERVICE MANAGEMENT

A. GENERAL MANAGEMENT PLAN (GMP) for GLEN CANYON NATIONAL RECREATION AREA

The GMP provides management direction to the recreation area superintendent, identifies land uses, describes measures for the preservation of resources and indicates types and general intensities of development and use. After public involvement, the Glen Canyon NRA GMP was completed in July 1979 and identified the need for this grazing plan. The GMP details the content and purpose of a "Grazing Resources Plan". The content of the grazing plan is to include: "detailed description of the condition of the range, recommendations for specific range improvement (development) practices and devices, management activities, and maximum grazing intensities compatible with the purpose of the recreation area."

The GMP describes "Management Zones" that specify long-term allocation of the land and water resources within Glen Canyon NRA. These management zones established land and water use activities that are allowed or prohibited within the respective zones. The four management zones described in the GMP are Natural, Recreation and Resource Utilization (RRU), Development, and Cultural.

The Natural Zone includes Glen Canyon NRA's most outstanding scenic resources, relatively undisturbed areas, isolated and remote from the activities of man, or areas bordering on places with established land-use practices complementary to those of the zone. The management strategy for this zone is the maintenance of isolation and natural processes and consumption of renewable resources subject to protection of recreational area values. Grazing is allowed. Generally, management practices necessary to sustain grazing are limited to non-mechanical means.

The RRU Zone consists of areas possessing somewhat less scenic value, greater susceptibility to the activities of man, potential or actual mineral resources, or value for utility rights-of-way or development. Management strategy for this zone is the maintenance of natural processes while allowing to the extent possible, both mineral leasing and grazing. Enhancement of fish and game populations and consumption of renewable and nonrenewable resources are subject to protection of recreation area values. Grazing and mining may be prohibited in portions of this zone to protect recreation area values and resources. Permitted activities are grazing, mining, utility rights-of-ways, transportation systems, riding mountain bikes and scenic touring (autos, legal 4-wheeled-drive, and boats). The use of all vehicles (includes off-road vehicles and bicycles) is restricted to open roads and designated off-road vehicle use areas. Unpaved roads and primitive trailhead facilities such as parking and sanitary devices are allowed, with required NEPA clearance.

The Cultural Zone was delineated to focus on the preservation, interpretation, and restoration (where deemed appropriate by professional analysis) of historic and archeological resources. This zone embraces cultural or historic resources, with the management strategy geared to interpretation and preservation. Permitted activities include scholarly study, access to resources, trail establishment, placement of protective enclosures, and interpretive facilities. Grazing may be permitted, however, mining is prohibited.

The final management zone is the Development Zone, which provides for visitor services and maintenance of facilities, and where the existing developed areas exist. This zone permits the development and placement of relatively elaborate, permanent structures necessary to support recreational activities, and allows the full range of recreational uses described above in the Natural Zone, as well as management of dam structures and utilities. Hunting and mining are prohibited within the entire zone, and grazing is prohibited only in the developed areas of the zone.

B. AGREEMENTS BETWEEN THE NATIONAL PARK SERVICE AND THE BUREAU OF LAND MANAGEMENT

To foster coordination between the BLM and the NPS, an "Umbrella" MOU for grazing administration within units of the NPS where grazing is authorized was signed by the Directors of the BLM and NPS on September 4, 1984. To implement this MOU, an Interagency Agreement was executed in 1993 between Glen Canyon NRA and both Utah and Arizona BLM state offices. The intent of this agreement is to "...conduct a program to coordinate grazing management activities on Glen Canyon NRA which shall be carried out by the respective BLM District Managers of the Arizona Strip, Cedar City, Richfield, and Moab Districts...and in coordination and cooperation with the Superintendent of Glen Canyon NRA..."

These agreements state that the "...BLM has expertise in developing, implementing, and analyzing grazing programs..." and that "...NPS has expertise in determining whether an activity is consistent with the values and purposes of Glen Canyon NRA". The BLM shall not act on any grazing authorizations, range developments, management plans, management agreements, or resource monitoring and evaluation efforts or approve or act on a change in a grazing permit; change in the kind of livestock; change in the season of use; new construction, reconstruction or major maintenance of existing range developments/improvements; a new or modified allotment management plan; a new grazing system; or new resource monitoring or evaluation efforts (not covered by an agreed upon plan) until the Superintendent of Glen Canyon NRA has completed a determination regarding the potential effects of the proposed action upon the values and purposes of Glen Canyon NRA.

C. ADDITIONAL FEDERAL LAWS. DEPARTMENT OF INTERIOR

In addition to the legislation and agreements cited above, a wide variety of legislation has been enacted which has direct or indirect effect on the management of resources and administration of grazing within Glen Canyon NRA. The most pertinent are:

National Park Service

- * National Park Service Authorities Act (P.L. 94-458; 90 Stat.1939; 16 U.S.C. 1a, et seq.)
- * Redwood National Park Act of 1968, as amended (P.L. 90-545; Title 16 U.S.C. 79a).

Other Environmental Legislation:

- * National Environmental Policy Act (NEPA), 1969 (P.L. 90-190) and as amended.
- * Endangered Species Conservation Act of 1969
- * Endangered Species Conservation Act of 1973, as amended (P.L. 93- 205;87 Stat. 884; 16 U.S.C. 1531-1543).
- * Federal Water Pollution Control Act (Clean Water Act of 1972) (P.L. 92-500;33 U.S.C. 1251 et seq.) as amended.
- * National Historic Preservation Act of 1966 (P.L. 89-655;80 Stat. 915).
- * Archeological Resources Protection Act of 1979 (P.L. 96-95;16 U.S.C. 470aa, et seq.).
- * Antiquities Act of 1906
- * Clean Air Act (42 U.S.C. 7401 et seq.).
- * Lacey Act of 1900, as amended (18 U.S.C. 42-44).

V. BUREAU OF LAND MANAGEMENT LIVESTOCK GRAZING MANAGEMENT

A. INTRODUCTION

Livestock grazing in Glen Canyon NRA is administered by the Bureau of Land Management (BLM) in accordance with the enabling legislation for Glen Canyon NRA found at 16 U.S.C. 460dd-5, which states in part; "The administration of ... grazing leases within the recreation area shall be by the Bureau of Land Management. The same policies followed by the BLM in issuing ... grazing leases on other lands under its jurisdiction shall be followed in regard to the lands within the boundaries of the recreation area, subject to the provisions of sections 460dd-2(a) and 460dd-3 of this title." Thus the BLM manages livestock grazing use as directed in the following laws and regulations:

*The Taylor Grazing Act of 1934 as amended (43 U.S.C. 315 et seq.)

*The Federal Land Policy and Management Act of 1976 as amended (43 U.S.C. 1701 et. seq.)

*The Public Rangeland Improvement Act of 1978 (43 U.S.C. 1701 et. seq.)

*Title 43 of the Code of Federal Regulations Subpart 4100 titled Grazing Administration- Exclusive of Alaska (August 22, 1995)

B. MANAGEMENT PROCEDURES

The BLM's primary instrument for authorizing use is a Grazing Permit. Grazing permits are issued to qualified applicants to authorize use on the public lands and other lands under the administration of the BLM that are designated as available for livestock grazing through land use plans. In this case the land use plan is the Glen Canyon National Recreation Area General Management Plan. All changes in grazing use in Glen Canyon NRA are subject to review by the Superintendent of Glen Canyon to determine if such changes are consistent with the Values and Purposes for which Glen Canyon NRA was established. These values and purposes are protected through the terms and conditions section of a particular kind of Grazing Permit called the Term Grazing Permit. These Term Grazing Permits are generally issued for a period of 10 years, unless, (1) the land is being considered for disposal; (2) the land will be devoted to a public purpose which precludes grazing prior to the end of 10 years; (3) the term of a base property lease is less than 10 years, in which case the term coincides with the term of the lease or; (4) it is determined that a permit for less than 10 years is in the best interest of sound land management.

Each year, permittees are required to submit applications outlining their intended use. Upon approval by the authorized officer, the permittee is issued a billing for livestock use in accordance with the Term Grazing Permit.

Glen Canyon NRA includes all or part of 34 grazing allotments encompassing approximately 882,678 acres. However, no livestock grazing is authorized in five of these allotments (approximately 120,317 acres). Three areas (Antelope Island, Horseshoe South and the Escalante River) covering approximately 69,800 acres are no longer grazed by livestock due to retirement of the grazing privileges through a willing seller/buyer arrangement. In addition, approximately 139,522 acres within Glen Canyon NRA are not within designated grazing allotments. (See Appendix B for allotment specific data)

BLM's policy is to concentrate available funding and personnel on areas where management action is most needed to improve resource condition, resolve serious resource-use conflicts, or

where investments in range improvement will yield the greatest positive return. This approach is called selective management.

Selective management is essentially a land categorization process designed to help BLM managers assign management priorities among allotments or groups of allotments in a planning area. To facilitate this approach, BLM has developed three categories in which allotments are grouped according to their potential to respond to management. This potential is determined by analyzing the allotment's ecological status, resource potential, presence of resource-use conflicts or controversy, opportunity for positive economic return, the present management situation or objectives, and other criteria as appropriate. The categories are expected to take into account nearly all resource situations; however, special categories may be developed for allotments or areas requiring unique management objectives. The categories are Maintenance (M), Improvement (I), and Custodial (C). Objectives for the three categories are to; (1) maintain current satisfactory condition (M); (2) to maintain current satisfactory condition or improve current unsatisfactory condition (I); and (3) manage custodially (C), while protecting existing resource values. Custodial allotments tend to be less productive for grazing than other categories. For example, locally some Custodial allotments consist primarily of slickrock or clay barrens that lack vegetation suitable for grazing livestock. Of the 29 allotments in Glen Canyon NRA where livestock grazing is authorized, 19 are in the Improvement category, 6 are in the Maintenance category, 4 are in the Custodial category.

Recently, the BLM took additional measures, in part, to help prioritize its grazing management efforts. As provided by the regulations developed by the Secretary of the Interior on February 22, 1995, the BLM adopted "Fundamentals of Rangeland Health" and their companion rules "Standards for Rangeland Health" and "Guidelines for Grazing Management" for all BLM lands including those in Utah and Arizona. The purpose of developing and implementing Standards and Guidelines (S&Gs) is to help assure that the BLM is giving management priority to maintaining functioning ecosystems. This means that the needs of the land and its living and nonliving components (soil, air, water, flora, and fauna) are to be considered first. Only when ecosystems are functioning properly can the consumptive, economic, political, and spiritual needs of man be maintained in a sustainable way.

In 1997, the BLM organizations in Utah and Arizona, through their respective Resource Advisory Councils, developed Standards and Guidelines for use in their respective states. Standards spell out conditions to be achieved on BLM lands. Guidelines describe practices that will be applied in order to achieve Standards. A copy of the S&Gs for Utah and for Arizona are included in appendix H.

The BLM still intends to utilize the selective management criteria as an aid in setting priorities for expenditures on allotments. However priorities for management actions, including monitoring and evaluation (allotment assessments), will be set through implementation of S&Gs. Allotments will be assessed in priority order based on conformance with the S&Gs. Assessments could range from simple exercises to resolve minor conflicts to formal evaluations depending on the level of conformance with the S&Gs.

Resource management objectives are developed for each grazing allotment in coordination with the NPS. These objectives describe the condition or productivity of the resources that are needed to sustain the desired mix of uses. BLM uses the objectives, in consultation with the NPS, to develop appropriate management actions, such as the installation of rangeland improvements or development of allotment management plans. BLM also uses the objectives to determine what inventory and monitoring data are needed to determine if progress toward their achievement is being made.

Methodologies for rangeland inventory and monitoring are described in BLM Handbooks H-4400-1 through 7. Rangeland inventories are used to identify and support needed management

actions, establish a baseline for measuring changes in resource condition (identified through monitoring), and to establish a common basis of comparison among various land types and ownerships.

Generally, BLM monitoring studies fall into four broad categories but may vary based on the specific resource management objectives being measured:

1. Actual use data are collected from livestock operators to provide information concerning the actual amount of grazing use that has occurred on an area of rangeland during a specific period of time. Data on wildlife use are also collected by BLM in cooperation with the Utah Division of Wildlife Resources and the Arizona Game and Fish Department. These data are essential in determining the need for, or amount of, adjustments in grazing use or in revising existing management plans.
2. Utilization data provide information concerning the percentage of forage that has been consumed on an area of rangeland during a specific period of time. In addition, use pattern data may also be collected on an allotment to provide more information. Utilization data are important in evaluating the effects of grazing use by livestock and wildlife, and, in some cases, recreational use on specific areas of rangeland. Utilization data may also aid in identifying areas of concentrated use that may be dispersed by some form of range improvement or change in management.
3. Trend is the directional change in kind, proportion, and/or amount of plant species over time. Trend data provide information needed over the long-term to determine the effectiveness of "on the ground" management actions. Trend data are useful in indicating whether the rangeland is moving toward or away from its potential or whether it is meeting specific management objectives.
4. Climatic information is the fourth category of monitoring data. Although soil, topography, animals, and man influence the kinds and amounts of vegetation, climate is regarded as the most important influence on resource capabilities, especially in desert environments. Aspects of climate that may be collected include: precipitation (amount, time of occurrence, and distribution), soil and air temperature, wind, and evapotranspiration rates. These data are combined with the first three types of information to evaluate the effects of management on the rangeland resources over time.

BLM personnel, in consultation with the NPS, review monitoring data every 3-5 years through an allotment evaluation process on high priority allotments. If the evaluation of the monitoring data indicates that a change in resource conditions has occurred and an adjustment in grazing management is required, then the Term Grazing Permit is modified to effect these changes.

As was stated earlier, the BLM works closely with the NPS to ensure that livestock grazing uses do not interfere with or degrade the values or purposes for which the recreation area was established. This cooperation and coordination is spelled out in the 1993 Interagency Agreement.

VI. PLAN IMPLEMENTATION

Working in partnership with BLM, NPS will begin implementation of this plan immediately. Implementation will include two levels of effort: ongoing and response to proposed actions.

ONGOING: NPS and BLM will cooperatively develop a monitoring plan that will address levels of effort necessary to meet NPS resource goals and objectives to protect recreation area values and purposes and effectively meet BLM grazing policy, guidelines, and standards. This

monitoring plan will identify inventory and monitoring needs for proposed actions as well as long-term needs.

Both NPS and BLM will evaluate resource conditions and initiate mitigation actions as needed to meet the resource objectives in this plan. NPS will identify unacceptable resource conditions and, if degradation is the result of grazing activities, NPS will request that BLM initiate grazing administration action(s) to mitigate unacceptable impacts to recreation area resources. BLM will insure that grazing in the recreation area is in compliance with the respective Utah and Arizona "Standards for Rangeland Health and Guidelines for Grazing Management".

NPS will identify scientifically important areas and work with BLM and permittees to initiate steps necessary to protect them.

PROPOSED ACTIONS: The goals and objectives in this plan will be used to make values and purposes determinations regarding proposed actions that are ground disturbing, such as range improvements. Actions and monitoring requirements found in Appendix D will be applied where applicable.

BLM will use resource goals and objectives in determining annual use levels to adjust the season of use or the number of animals as applicable.

NPS will provide information regarding resource goals and objectives to BLM to be incorporated into BLM planning documents such as Allotment Management plans.

Under ordinary circumstances, when a permit transfer is proposed, the Superintendent will respond with a Values and Purposes determination within 45 days. The NPS will evaluate all transfers. When a permit is transferred, the Superintendent may request that BLM take action to incorporate changes necessary to meet resource goals and objectives into the permit. Such requests will be forwarded to BLM as a part of the Values and Purposes determination and identified as required mitigation for NPS approval of the proposed action or permit transfer.

Unless there is unacceptable resource damage or no Allotment Management Plan exists, transfers of allotment permits in the Maintenance Category should not require extensive administrative changes.

Transfer of a permit for allotments in the Improvement Category will be approved only after the National Park Service has exercised the opportunity to amend the "terms" of the permit. The amendments will reflect the potential changes to management of a given allotment based upon monitoring data, standard and guidelines (BLM), goals and objectives (NPS) or an allotment evaluation. The purpose of the amendments will be to move the allotment from an improvement to maintenance category.

Transfers of permits for allotments in the Custodial Category will be addressed on a case-by-case basis.

VII. RESOURCE VALUES, GOALS AND OBJECTIVES

This section of the plan discusses the resources identified in the recreation area enabling legislation as values (scenic, scientific, and historic features) and purpose (provide for public outdoor recreation use and enjoyment). The value of the resource is described along with a condition summary for that resource. The management goal for that resource and the objectives that must be maintained or obtained to meet the goal are presented. These goals and objectives will be used to analyze impacts associated with a proposed action. These goals and objectives

will also be used to determine if resource management or grazing administration actions are needed to protect resource values.

The scenic, scientific, and historic resources described below contribute directly to the value of the visitor's recreation experience or use and enjoyment of Glen Canyon NRA. A value statement is made for each resource; describing its value and its relationship to the purpose of the recreation area. The condition of a resource does influence the visitor's recreation experience, i.e., a degraded resource detracts from or negatively impacts the experience.

The 1979 GMP directed that this plan provide a description of the range. To meet this requirement, a resource condition summary is provided for each resource that addresses that resource in relation to grazing.

The goal and objectives for management of each resource are described herein. They provide guidance to ensure that the full spectrum of environmental, ecological, cultural, and recreational values represented in Glen Canyon NRA are addressed. They assist the Superintendent in making reasoned and informed decisions regarding approval of proposed actions or development of needed mitigation requirements. They are to be applied to proposed changes in grazing activity. They have been developed to further coordination and understanding between the BLM, NPS, and permittees. In the future, consistent application of these goals and objectives in making "Values and Purposes Determinations" will prevent the frustration that historically occurred when proposals were reviewed on a case-by-case basis.

The objectives below describe the information needed by the Superintendent to determine if a resource management goal can be met and, therefore, approve a proposed action. Approval may include mitigation requirements.

Each objective is followed by a reference to NPS, BLM or both to designate the lead agency responsibility for accomplishment of that objective. The cost for data collection can be determined early in the proposal development stage. If required, mitigation costs can be more accurately determined. Both the Memorandum of Understanding and the Interagency Agreement between the NPS and BLM can be found in Appendix A. These documents spell out agency responsibilities in greater detail.

Utilizing the resource goals and objectives that follow, the Superintendent may determine that unacceptable resource degradation is occurring and initiate a request that the BLM Authorizing Official incorporate corrective action through administration of the grazing permit. One or more objectives from the resource matrix may be needed. Values and purposes decisions may be initiated for a variety of activities, such as construction of stockpounds or water developments, adjustments in stocking rates, and other changes in the Allotment Management Plan. The transfer of a permit is considered an action requiring a values and purposes determination.

Monitoring needs will be prioritized based on baseline information needs and resource priority. Priority monitoring needs include situations where an allotment management plan does not exist, an allotment is in the improvement or custodial category or existing information shows that current grazing activities are causing unacceptable degradation of recreation area resources. The NPS and BLM will jointly develop monitoring plans and prioritize needs and actions.

A. VEGETATION

Value Statement

Vegetation provides the basis for wildlife habitat, and produces the necessary forage for livestock. Healthy vegetation (with adequate cover and composition) inhibits soil erosion, maintains high water quality, regulates water quantity, and maintains the nutrient cycling

essential for both plant and animal life. Native vegetation is of great scientific value, and provides for scenic and aesthetic enjoyment by recreation area visitors.

Resource Condition

Glen Canyon NRA contains an outstanding array of Colorado Plateau vegetation communities, a diverse flora, and several state rare and federally listed species. Unusual and interesting plant communities occur in Glen Canyon NRA, many of which are of great scientific and scenic value.

Hanging gardens, which are wetlands existing in undercut alcoves and on cliffs and fed by a perched aquifer, are prominent around Lake Powell and in its side canyons. The largest and best developed alcove gardens in the world occur within the recreation area. These unique communities support many rare and endemic plant species. Another scientifically important community that may have been more widespread prior to the formation of Lake Powell is the mixed deciduous woodland, which occurs in shaded and well-watered side canyons. Extensive wetland and riparian communities are also found in side canyons with permanent streams and springs. Above the canyons, large tracts of desert shrubland, grassland, and pinyon-juniper woodland occur.

A total of 780 species are currently known from Glen Canyon NRA (Spence and Zimmerman 1994). Three of these are federally listed, Carex specuicola, Pediocactus bradyi and Cycladenia jonesii. Several species are listed as state rare by the Utah Heritage Program, of which at least three are restricted in the state to the recreation area (see Appendix D).

Currently, relatively little is known about the recent status and trend of vegetation that is subject to livestock grazing in Glen Canyon NRA. Grazing occurs on about 762,361 acres out of 882,678 acres within allotments in Glen Canyon. The BLM maintains and surveys trend plots on and adjacent to recreation area lands as part of their general monitoring program on BLM lands. Ecological trend and status data are available for some but not all grazed areas of Glen Canyon NRA (see appendix B).

Resource goal and objectives

Goal: Maintain naturally diverse plant communities and species populations similar to Potential Natural Community composition (see Appendix C). These include a full complement of native species, plant vigor and health, natural structure for wildlife habitat, dynamic changes, reproductive success, and populational genetic and evolutionary responses.

The objectives and various actions to be taken to meet the objectives are listed below. The particular action taken will depend on the characteristics of the vegetation and location. Generally, if an allotment is in Maintenance condition, then the proposed actions for each objective may not be needed. However, if the allotment is not in the Maintenance category, one or more of the following objectives and actions may be necessary.

Objective 1: Maintain in upland (dry site) plant communities, as natural a community as possible, including the full range of native species, a viable seedbank, and minimal presence of increasing undesirable species (BLM/NPS).

Desirable Conditions. Potential natural community (PNC) composition for major plant communities is based on standard descriptions in the Natural Resource Conservation Service (NRCS) O-35 Green River resource area and field work done in Glen Canyon NRA (see Appendix C). These composition values provide the target requirements in most cases for vegetation condition within Glen Canyon NRA. Unless otherwise stated, the PNC is the desired plant community (DPC). In certain situations, such as in the case of maintaining a special status species, or where fire plays a role, desirable vegetation status may depart from the PNC or late seral requirements. Biomass and cover values for

key species and life form groups in these tables should be considered approximate and somewhat idealized. It is unlikely that vegetation exactly corresponding to the values in these tables exists. Furthermore, many land site descriptions are based on examples elsewhere in the NRCS Green River Resource Area, and are not specifically based on sites in Glen Canyon NRA. The reported values should be used in conjunction with information on site conditions (landforms, elevation, slope, fire history, other disturbances) that can cause variation in the abundances of many species. Undesirable species that occur in Glen Canyon NRA are also listed in Appendix C.

It is recognized that there are alternative theories to the traditional PNC concept. In particular, recent work has validated the "state and transition" approach which suggests that traditional techniques of vegetation manipulation through stocking rates may be inadequate in many plant communities. Some vegetation has been altered to such an extent by past disturbances (e.g., fire, grazing, construction, establishment of exotics) that simply adjusting stocking rates or even removal of livestock will not cause a shift in community composition towards the PNC stage. Currently the NPS is conducting field studies in Glen Canyon NRA on the utility of these newer approaches to grazing management. Until this work is finished, the PNC condition will be retained as a useful goal, recognizing that in some cases reduction in stocking rates or removal of livestock may not lead to the desired future condition.

The following items 1 through 8 are actions that may be taken to attain the desirable targets and accomplish Objective 1.

1. Establish maximum utilization levels of 45% for Indian ricegrass in all key areas in allotments within Glen Canyon NRA, and also for other key species as necessary, until vegetation meets desirable community composition (PNC).
2. In allotments or pastures that are grazed in spring, utilization of Indian ricegrass and other key species will not exceed 25%.
3. In non-maintenance or other high-priority allotments, utilization of Indian ricegrass and other key species will not exceed 25% in spring.

The established utilization level is based on key areas, selected in consultation with the BLM. Key areas are those that: 1) are representative of the area's vegetation, 2) support sufficient amounts of the key species, and 3) are utilized but are not areas of congregation (e.g., such as happens around watering sources). Generally, key areas are situated at least from 1/2 to 1 mile from areas of heavy use (such as around stock ponds). The principal key species utilized in Glen Canyon NRA is Indian ricegrass (*Stipa hymenoides*) but at higher elevations needle-and-thread (*Stipa comata*) and sand dropseed (*Sporobolus cryptandrus*) are also important. Other species that can be used as indicators include Galleta grass (*Hilaria jamesii*), mormon teas (*Ephedra cutleri* and *E. viridis*), winterfat (*Eurotia lanata*), and four-wing saltbush (*Atriplex confertifolia*; see Appendix C). In addition to these key areas for forage utilization, others may be chosen, in consultation with the BLM, near areas with recreational activities or in areas where important resources (natural or cultural) occur that are of importance to Glen Canyon NRA.

Utilization levels are based on standards used by the BLM. Utilization in spring and fall should not exceed 50%, and 60% in the winter. C. Wayne Cook (National Wildlife Federation vs. BLM 1993) suggests that yearly utilization at 60% in winter on the Colorado Plateau is probably too high. He also pointed out that in pastures grazed every year spring utilization of 50% was too high, and that in order to allow for reproduction 25% was the maximum allowable utilization. Levels have been set at 45% in key areas in this plan for all grazing periods, except under conditions (see above) where spring utilization should not exceed 25%. Once 45% utilization of Indian Ricegrass, and if deemed necessary other key species has been reached, livestock will be moved from the area.

4. Adjust grazing seasons for Glen Canyon NRA allotments until vegetation meets desirable community composition (PNC).

Season and Elevation ¹	Proposed Grazing Season
Fall Period - Low elevation (<5000')	9/30 - 11/15
Fall Period - High elevation (>5000')	10/1 - 11/15
Winter Period - Low Elevation (<5000')	11/16 - 2/28
Winter Period - High Elevation (>5000')	11/16 - 3/15
Spring Period - Low elevation (<5000')	3/1 - 4/15
Spring period - High elevation (>5000')	3/16 - 5/1
Summer period - Low elevation (<5000')	None
Summer period - High elevation (>5000')	None

¹ Elevations are approximate and may be adjusted depending on site and vegetation

Grazing seasons are defined in the table above for low (below 5000') and high (above 5000') elevations. In general, pastures or allotments with both elevational zones will be managed for the more sensitive communities, usually those below 5000'. Seasons of use may deviate from the table if utilization is below 45%, a grazing system is in place, and ecological trend is stable or improving. The spring grazing season has been somewhat shortened in order to allow for adequate reproduction by Indian ricegrass. Key species are listed by resource area and allotment in Appendix C.

5. Maintain or increase amounts of desirable plant species and keep low or reduce numbers of undesirable increasing species (PNC; see Appendix C).

Butler et. al. (1994) note that snakeweed (Gutierrezia species) is a good indicator of range in poor condition in the recreation area. Since snakeweed can be an increaser (or sometimes an invader) on Glen Canyon NRA range that has been overgrazed, it can serve as an indicator of range in poor condition. However, snakeweed also has a strong cyclic nature dependent on climate, and increases in abundance on a site may reflect factors other than grazing. Any use of the species as an indicator must take this into account. Natural levels of snakeweed can be found in the PNC composition tables for the communities in Glen Canyon NRA. Other groups of species that appear to be related to overgrazing are the locoweeds (selected Astragalus species), principally A. lentiginosus and A. praelongus, and the larkspurs (Delphinium). These species may be poisonous to livestock, as many contain toxic levels of chemicals like selenium, nitrotoxins, locoine, and delphinine. These three groups can be used as indicators of change in areas where they occur. Increases in populations of these taxa in selected key areas, in combination with decreases in desirable or key species, will be used to indicate that changes in grazing activity may be needed. In some cases, particular climate events can trigger heavy growth and flowering in many locoweeds, so presence and abundance must be used with care in evaluating range conditions.

6. Establish trend plots in key areas to determine successional trend and ecological status.

7. Establish grazing exclosures in key areas through consultation with the BLM to determine long term effects and recovery from livestock grazing, as well as how climate affects species growth and abundance.

Exclosures of sufficient size (a minimum of 30 m X 30 m) provide valuable baseline data on how climate and other factors affect vegetation independently of livestock grazing. Such baseline data can be used to determine if declines in selected species (e.g., key species) result from climate change (drought), grazing, or a combination of these as well as other factors. The number of exclosures or transects depends on the level of precision needed to detect change in monitored species. Brady et. al. (1995) provide a useful summary of sample sizes for the point-count transect method, which is similar to some BLM monitoring techniques.

8. Adjust stocking rates or change grazing prescription until key areas meet late seral or potential natural community composition criteria (see Appendix C). For specially designated areas (Research and Protected Natural Areas; see objective 3), conditions must meet potential natural community composition criteria, as set forth above.

Objective 2: To protect healthy populations of special status species, including federally listed threatened and endangered species, federal candidate C1 and former C2 species, and state heritage ranked rare and sensitive species (NPS/USFWS).

Appendix D lists 18 special status species that occur within Glen Canyon NRA. Of the three federally protected species, one (Pediocactus bradyi) occurs in an area not currently grazed, but the second (Cycladenia jonesii) occurs in an active allotment. However, this latter species prefers habitats that are largely inaccessible to livestock, and the species appears to currently sustain little or no impact through grazing activities. A biological assessment of the potential impacts of grazing on C. jonesii has not been completed.

Of the former federal C2 candidates (now NPS sensitive), four occur in or near hanging gardens (Erigeron kachinensis, E. zothecinus, Habenaria zothecina, and Perityle specuicola), two are found on or near the Tropic Shale in the Warm Creek area (Camissonia atwoodii and Cymopterus higginsii), and two occur in sandy and rocky desert shrublands in the middle part of the recreation area. (Dalea flavescens var. epica and Psoralea thompsonae var. whitingii).

Finally, seven proposed Utah state sensitive species are included. All but one of these species occurs in riparian zones and hanging gardens (Viguiera soliceps occurs on Tropic Shale badlands). Two species (Imperata brevifolia and Aralia racemosa) are known from only one locality each within Glen Canyon NRA.

Desirable conditions. Special status species will not be subject to grazing if studies show that impacts occur.

1. Determine population biology and ecology of species to assess if grazing causes significant impacts to populations,
2. Consult with US Fish & Wildlife Service through section 7 compliance procedures.
3. If impacts are discovered and the species or populations require protection, determine the best method, including but not limited to fencing, changes in grazing seasons or pasture rotations, or removal of grazing.

Objective 3: Manage and protect scientifically important areas and hanging gardens to prevent grazing induced changes (NPS).

Appendix E lists known scientifically important areas within Glen Canyon NRA other than hanging gardens. Studies by the NPS and The Nature Conservancy have documented that these areas support important plant communities, including ungrazed relicts, and often include sensitive plant species. At present, none are established Research Natural Areas. No grazing will be allowed in the identified relict areas (approximately 12,000 acres) because of their

importance to Glen Canyon NRA resource values, management, or scientific research. No range developments will be authorized in scientifically important areas. The NPS will seek Research Natural Area (RNA) designation for all eligible relict and near relict (relict areas that have been grazed but not severely altered) areas. Two additional categories, Protected Natural Area (PNA) and Experimental Research Area (ERA), may be used as they provide additional important management options for areas that do not meet RNA criteria. PNA's are based on important natural features that are generally smaller in size than areas with an RNA designation, or they are protect single important resources (such as a specific patch of vegetation). ERA's are already disturbed but are useful for comparisons and for research on the impacts of various kinds of disturbances, including grazing.

Desirable Conditions. Sensitive plant communities of importance for scientific research will not be subject to livestock grazing impacts.

1. Prioritize areas according to immediacy of threats, and importance of resource to Glen Canyon NRA.
2. Determine if RNA, PNA or ERA designation, and/or fencing is most appropriate to protect the site.
3. Prepare ERA, PNA or RNA justification report.
4. Consult with BLM on ways to exclude livestock from PNA or RNA areas.

Objective 4: Protect wetlands, riparian zones, and spring and seep vegetation (NPS/BLM).

These communities support much of the biodiversity in Glen Canyon NRA (Spence 1995). They also provide critical habitat for the majority of the wildlife species in the recreation area (cf. Johnson 1989). Many riparian communities in Glen Canyon NRA are of major scientific importance (Spence 1995). Baseline data on riparian vegetation is lacking from much of Glen Canyon NRA. Desirable conditions can be developed from data supplied by Spence (1995), who surveyed and classified permanent riparian zones in side canyons of Lake Powell (see Appendix C). Inventory techniques and terminology are derived from Platts et. al. (1987; also see Myers 1989, pp. 16-23). Key riparian species are listed in Appendix C. Riparian reaches (zones or sections of stream) to monitor will be selected in consultation with the BLM. Principal monitoring techniques include Proper Functioning Condition assessment (BLM 1993) and Greenline Riparian and Wetland monitoring (Cagney 1993). Other techniques and approaches will be developed in consultation with the BLM and where possible with BLM inventory and monitoring protocols (Myers 1989).

For key riparian reaches in high priority or non-M allotments, maintain populations of all native species and specific conditions detailed below.

1. Streambank alteration (e.g., bank collapse, loss of vegetation) shall not exceed 25% for streambanks in key areas (see Platts et. al. 1987; pp. 75-83; Myers 1989, pp. 16-23 for definitions and methods).
2. Browse (of previous years growth) and forage utilization (of current years growth) shall not exceed 30% in key areas.
3. Reduce abundance of undesirable species to low levels (<5%) in areas where present (show declines through monitoring), and prevent establishment of undesirable species in areas where they are currently not present (see Table 9; Appendix C).
4. Establish monitoring transects for vegetation status and trend determination in areas currently not meeting desirable conditions.

5. Adjust stocking rates, rest periods, reduce length of season, change season of use, or remove livestock until desirable conditions are met.

Objective 5: Determine the current status and trend of the grazed rangelands in Glen Canyon NRA (NPS/BLM).

Baseline data are not available for all grazed portions of Glen Canyon NRA. This objective is designed to provide data essential for proper management of grazing activities and proper use of annual forage production. The results of this work may indicate changes are necessary in potential natural community composition.

Complete classification and inventory of the ecological status and successional trend of the upland vegetation in Glen Canyon NRA, using the methods and steps outlined below.

1. Compile and analyze existing data.
2. Inventory the current status of the upland arid and semi-arid vegetation, including species richness, diversity, structure, and successional status.
3. Establish permanent monitoring transects to determine future trends.
4. Establish permanent photographic points in association with permanent transects.
5. Revise the current vegetation classification for the recreation area, incorporating new data.
6. Establish baseline community classification criteria to direct management of grazing.

B. SOILS

Value Statement

The evolutionary and ecological processes of the soil (abiotic) ecosystem, which includes surface cover, microbial populations, soil nutrient cycling and physical/chemical transformations, are critical to the protection of scientific processes and scenic values within Glen Canyon NRA.

Resource Condition

The percentage of soil impacted by grazing activities versus recreational or vehicle activities, within Glen Canyon NRA, is not available. Trend data collected over the past several years does not address the various impacts on the soil. There is no data available from the trend plots that provides information on "normal" rates of soil development or levels of organic deposition.

Most of Glen Canyon NRA is considered to be arid rangeland. Remote mesa tops may hold the key to understanding existing natural plant community potential for similar areas. These remote areas, far from developed water sources and subject to minimal grazing pressure, may be used to assess current trend and site stability for larger areas within Glen Canyon NRA. Studying and monitoring these sites may provide necessary information on the greater area's plant communities in regards to soil development, nutrient availability, and "average" litter and plant cover values. Development and monitoring of livestock grazing "exclosures" could help to determine other factors that have an effect on various soil activities, outside of grazing. This information can be useful to the grazing program by providing answers on the recovery rate of the vegetation after a disturbance; what is the successional direction or trend; or what is the recovery rate of cryptobiotic populations.

Resource Goal and Objectives

Goal: Maintain the evolutionary and ecological processes of the soil ecosystem.

Objective 1: Collect data on rates of soil erosion on various grazed and ungrazed plots, targeting areas showing excessive erosion, such as rills, soil pedestals, or actively eroding gullies (NPS).

Use a combination of rangeland monitoring and sedimentation studies to quantify annual losses or gains from selected, established trend and riparian plots. Determine values from plots and compare to expected erosion rates developed by the Natural Resources Conservation Service (NRCS) in all sample areas, through the year 2005.

Objective 2: Enhance soil productivity and surface cover by promoting deposition of sufficient cover and litter to protect the soil from excessive water and wind erosion, and to promote infiltration (NPS).

Note: Field data may be collected during routine trend plot monitoring or plant utilization studies, etc., or incorporated into other studies conducted by other resource disciplines.

C. WATER QUALITY

Value Statement

Glen Canyon NRA was established, "...to provide for public outdoor recreation use and enjoyment of Lake Powell and lands adjacent thereto...and to protect and preserve the scenic, scientific and historic resources...". Water resources within Glen Canyon NRA are essential to support complex and diverse biological communities, riparian vegetation, fish and wildlife, which are often isolated by vast expanses of desert. Visitors come to enjoy water related recreation at Lake Powell and intriguing hikes into remote canyons. Backcountry hikers rely upon local springs and seeps to supply drinking water, and enjoy the aesthetic value of natural free flowing water. Maintaining high water quality and instream flows are management priorities for sustainability of water and water-dependent resources.

Resource Condition

Surface water resources include Lake Powell, springs and seeps, intermittent and perennial streams and five major rivers that flow into Glen Canyon NRA, four of which enter upstream of Glen Canyon Dam to form Lake Powell: the Colorado, Dirty Devil, San Juan, and Escalante Rivers. Lake Powell is the dominant water resource within Glen Canyon NRA, as one of the nation's largest reservoirs, it expands over 180 miles in length, and results in over 1900 miles of shoreline. Little baseline data exists on water quality and quantity for most water sources away from Lake Powell. Little is known about aquatic wildlife in side canyons and streams around Lake Powell, or in other natural bodies of water such as waterpockets.

Goal: Maintain water quality in all natural bodies of water and sources of water (does not include stock ponds or reservoirs) and maintain natural flows to preserve water dependent resources. At a minimum, water quality standards will meet the Utah State water requirements of 303(d) and 317 (e) as defined in the S&Gs (appendix B).

Objective 1: In all natural surface waters accessible for public use, water quantity and quality including physical/chemical parameters of flow, temperature, conductivity, pH, turbidity, salinity, dissolved oxygen, suspended and dissolved solids, and nutrients will not be degraded (NPS).

Objective 2: Bacteriological levels for fecal coliform in natural surface waters will not exceed standards for recreational use (NPS).

Objective 3: Preserve naturally occurring aquatic species diversity, composition and abundance (NPS).

Objective 4: Maintain integrity of stream morphology, instream flows, riparian zone, and springs' natural emergence (NPS/BLM).

Objective 5: Preserve the aesthetic value of natural water. Instream flows will be maintained in natural, unaltered condition (NPS).

Objective 6: Ensure access to water sources for wildlife and recreational uses (NPS).

D. WILDLIFE

Value Statement

The terrestrial and aquatic wildlife resources of Glen Canyon NRA are an integral part of the desert ecosystem to be experienced and enjoyed by visitors to the recreation area. These wildlife resources, which the NPS is charged to protect and preserve for the enjoyment of future generations, have intrinsic and scientific value.

Resource Condition

Glen Canyon NRA supports eleven species of special status wildlife, which includes federally threatened and endangered species and Utah and Arizona state listed candidate species: Peregrine Falcon, Mexican Spotted Owl, Southwestern Willow Flycatcher, Bald Eagle, Spotted Bat, Chuckwalla, Colorado Squawfish, Humpback Chub, Bonytail Chub, Razorback Sucker, and Flannelmouth Sucker. Local populations of other aquatic species, such as northern leopard frogs, warrant special consideration. Other species include a variety of mammals, reptiles and amphibians. Currently, 295 species of birds have been reported from the recreation area. Surveys for small mammals have not been done, although 65 species have been reported including at least 15 species of bat. At least 30 species of reptiles and amphibians are known, but others may be found with more survey work. Virtually no work has been done on invertebrates in the recreation area other than recent inventories of aquatic invertebrates in springs and along the Escalante River.

Little is known about grazing effects on most wildlife in Glen Canyon NRA. Some work has been done in adjacent areas, such as in Capitol Reef National Park (e.g., Willey 1994). Within the NRA, Bich (1992) noted differences in rodent species composition and abundances in several sites on Grand Bench.

Goal: Maintain components and processes of natural ecosystems, including the natural abundance, diversity and ecological integrity of the wildlife and fish.

Objective 1: Protect federally listed and other special status species and their critical or required habitat (NPS/USFWS).

Objective 2: Maintain the natural abundance and diversity of bird species (NPS).

Objective 3: Maintain or establish populations of wild mammals where suitable habitat exists - (NPS).

Objective 4: Maintain the natural abundance and diversity of herpetofauna (NPS).

Objective 5: Maintain the natural abundance and diversity of insects.

Desirable conditions for objectives 1-5. Wildlife species will not be subject to grazing if studies show that significant impacts occur.

1. Consult with the US Fish & Wildlife Service on federally listed species;
2. Determine through research and monitoring studies the status of those wildlife species of concern in grazed allotments and pastures;
3. If impacts to wildlife populations are found, determine best way to maintain healthy populations, including but not limited to fencing, changes in grazing season or rotation, adjustments in AUM's, or changes in vegetation utilization or other vegetation action items.

Objective 6: Minimize the competition between livestock and wildlife. Consider livestock interactions and disease transmission (NPS/BLM).

Objective 7: General predator control activities will not be permitted.

Based on documented predator activity that identifies an individual animal, or limited number of individual animals, a specific control action may be authorized by the NPS. (NPS)

Objective 9: Feral or trespass animals will be removed (BLM/NPS).

E. CULTURAL RESOURCES

Value Statement

Cultural resource properties are irreplaceable and non-renewable resources with scientific, cultural, educational, and interpretive value.

This value statement is reflected in the management directives contained in NPS Management Policies, NPS 28 (1988). These policies prohibit any actions which might result in unmitigated site destruction: "The NPS will not take or allow any action that reduces the research potential of cultural resources without an appropriate level of research and documented data recovery." It further requires that, "Any action that will affect cultural resources adversely will be undertaken only if the following additional criteria are also met: 1) There is no reasonable alternative; and 2) All reasonable measures to limit adverse effect will be taken, including recovery of data and salvage of materials, as appropriate."

Resource Condition

Nearly 2300 cultural resource sites have been recorded within the boundaries of Glen Canyon NRA, most of which date to the prehistoric period. Much of the survey work was completed prior to the filling of Lake Powell. Since that time, about 2 percent of the 1 million acres surrounding Lake Powell within the recreation area have been intensively surveyed. Site densities in those surveys have ranged from 5 to 108 sites per square mile. Assuming an average 14 sites/square mile, potentially over 19,000 sites have not yet been identified and recorded on the 882,500 acres open to grazing.

Approximately 900 of the 2300 total sites were recorded by the University of Utah and the Museum of Northern Arizona during the pre-inundation studies of the late 1950s. The remaining 1400 sites have been recorded during surveys and studies conducted since that time.

It is estimated that approximately 60 percent of the 900 sites recorded during the preinundation studies (about 550 sites) were destroyed by the rising waters of Lake Powell, leaving about 350 of those sites still in existence today. With the addition of the 1400 sites recorded after the preinundation work, approximately 1750 sites remain in the present pool of recorded sites.

The majority of the prehistoric sites recorded within Glen Canyon NRA date to the Pre-Formative and Formative periods (AD 600 - 1300) of the Anasazi and Fremont cultures, although evidence for Paleo-Indian (9500 - 7000 BC) and Archaic (7000 - 200 BC) period occupations have been observed in limited sections of the recreation area. A small number of protohistoric remains (post-AD 1300) are also present, characterized mostly by ephemeral open sherd and lithic scatters, brush shelters, and diagnostic rock art panels. Historic cultural resources are also present in relatively small numbers.

In Glen Canyon NRA, five general site type categories are recognized. These include alcove sites, open surface sites, historic sites, rock art sites, and Traditional Cultural Properties.

Alcove sites are generally located in concave recesses in the sides or heads of steep-walled canyons, and can occur as well under tilted talus boulders, and in overhanging cliff faces, crevices, and shallow concave holes in the canyon walls. Specialized types of alcoves include rockshelters and caves, with varying degrees of protection from the elements. Alcove sites often contain both above-ground and subterranean structural remains, and they can accommodate other archaeological features as well including but not limited to storage cists, granaries, rock alignments, hearths, rock art, and middens (prehistoric trash dumps), along with associated artifacts and perishable materials.

Open surface sites are characterized by their lack of any natural shelter such as overhanging cliff faces or ledges. They contain the same kinds of archaeological features described for alcove sites, and may show evidence of agricultural features as well.

Historic sites must be at least 50 years old and contain cultural material deposited after 1540, the year the Spanish entered the area for the first time. Types of historic sites within the recreation area include those related to mining, ranching, pioneering, and recreational activities as well as Native American use of the land. Features found at historic sites include many objects related to the history of grazing and its way of life as well as other activities such as structures, corrals, dumps, trails, roads, inscriptions, boats, and historic paraphernalia such as tin cans, glass, china, metal, and milled wood. Historic sites are located in alcoves as well as on open surfaces.

Rock art is a specialized feature that occurs in alcoves, on vertical cliff faces, and on boulders. Both prehistoric pictographs (painted elements) and petroglyphs (pecked elements) are known to exist in the recreation area. Historic inscriptions, along with Navajo and other Native American rock drawings, are considered rock art as well. Rock art becomes a site type category only when it is the only feature present at a given location. When rock art is associated with other prehistoric and/or historic features, then it is a feature within one of the other three site type categories.

Traditional Cultural Properties include those locations associated with the cultural practices or beliefs of a living community, rooted in the community's history and are important in maintaining the continuing cultural identity of the community.

Resource Goal and Objectives

Goal: Protect and preserve the scientific value, and foster appreciation for, the cultural resources and their settings within Glen Canyon NRA. This protection and preservation extends to both prehistoric and historic cultural resources as well as Traditional Cultural Properties.

Objective 1: Protect cultural resources within the Primary and Secondary AOI. (NPS)

A cultural resources inventory of the Primary Area of Impact (AOI) will be conducted on high priority projects and ground disturbing activities. The Primary AOI is the area directly affected by a proposed activity, and includes an additional buffer area to account for possible resource damage experienced during implementation of the proposed activity. If the proposed activity in the Primary AOI is a water development project, a Secondary AOI will also be inventoried. This Secondary AOI includes a minimum of up to a 2 mile radius around the water development site, which is the average daily range of livestock from their water source in cool weather.

The inventory will include both a Class I literature search for previously identified cultural resources, and a Class III intensive survey of the impact areas. Transects, fifteen to 20 meter wide, will be walked until the entire Primary, and if necessary, the Secondary AOI has been inspected. Located sites will be plotted on appropriate 7.5 minute topographic quads and recorded using a Global Positioning System to ensure accurate georeferencing.

Objective 2: All alcove sites identified within the Primary and Secondary AOI will be protected from damage or loss due to livestock grazing activities (fenced). (NPS)

All alcove sites identified within the Primary and Secondary AOI will be documented using the appropriate Intermountain Antiquities Computer System (IMACS) forms. Site condition evaluation, photo documentation, field and feature sketches, site mapping, artifact collections, and topographic plotting will be performed as appropriate. Alcove sites may be fenced or other action taken to prevent access to livestock. Prior to beginning any fencing activity, a Section 106 compliance will be required.

Objective 3: All open surface sites identified within the Primary and Secondary AOI will be protected from damage or loss due to livestock grazing activities. (NPS)

All open surface sites identified within the Primary and Secondary AOI will be documented using the appropriate IMACS forms. Site condition evaluation, photo documentation, field and feature sketches, site mapping, artifact collections, and topographic plotting will be performed as appropriate. Open surface sites may be fenced or other action taken to prevent access to livestock. Prior to beginning any fencing activity, a Section 106 compliance will be required.

Objective 4: All historic sites identified within the primary and secondary areas of impact will be protected from damage or loss due to livestock grazing activities. (NPS)

All historic sites identified within the Primary and Secondary AOI will be documented using the appropriate IMACS forms. Site condition evaluation, photo documentation, field and feature sketches, site mapping, artifact collections, and topographic plotting will be performed as appropriate. Historic sites may be fenced or other action taken to prevent access to livestock. Prior to beginning any fencing activity, a Section 106 compliance will be required.

Objective 5: All rock art sites identified within the primary and secondary areas of impact will be protected from damage or loss due to livestock grazing activities. (NPS)

All rock art sites identified within the Primary and Secondary AOI will be documented using the appropriate IMACS forms. Site condition evaluation, photo documentation, field and feature sketches, site mapping, artifact collections, and topographic plotting will be performed as appropriate. Rock art sites may be fenced to prevent access by livestock. Prior to beginning any fencing activity, a Section 106 compliance will be required.

Objective 6: Mitigate potential impacts to cultural resources not protected in situ. This mitigation includes the curation of artifacts and other materials collected during mitigation efforts. (NPS)

Objective 7: American Indian traditional, cultural, or ceremonial sites will be identified and protected. (NPS)

No ground disturbing activities will be authorized until a determination has been made that no traditional cultural properties (TCP) will be affected. If potential impacts to a TCP occur, formal consultation with Native American tribes will be done.

F. PALEONTOLOGICAL AND QUATERNARY RESOURCES

Value Statement

Dinosaur trackways found in the Morrison formation, shark teeth in the Mancos Shale, and Quaternary Period resources including packrat middens and preserved faunal and floral remains are irreplaceable scientific resources.

Resource Condition

Limited reconnaissance level surveys have documented the presence of single tracks and trackways in the recreation area. Formations containing fossilized resources are widely distributed. Existing range improvements may or may not have been surveyed for paleontological resources prior to construction.

Only reconnaissance level quaternary resource surveys have been completed. These surveys have demonstrated that the semi-arid environment of Glen Canyon NRA has preserved packrat middens, alluvial deposits of floral and faunal remains, skeletal material, and other diagnostic materials in settings that allow for accurate aging of deposits. These resources are critical to understanding past environments and environmental change. Grazing impacts to quaternary resource sites may include erosion and loss of provenience.

Resource Goal and Objectives

Goal: Preserve paleontological and quaternary resources in-situ or insure full data recovery and curation of recovered specimens.

Objective 1: A literature search and first order survey to locate and record paleontological and quaternary resources will be completed prior to ground disturbing activities. (NPS)

Objective 2: Paleontological and quaternary resources will be protected in-situ whenever possible. Removal will occur only when necessary to safeguard resources from impacts that cannot be administratively controlled. (NPS/BLM)

G. SCENIC RESOURCES

Value Statement

Glen Canyon NRA contains magnificent scenic vistas. Deep canyons, sheer cliffs, distant mountain ranges, colorful soils and vegetation, and a unique collection of mesas, buttes, and spires all form a mosaic of visual enchantment for the visitor specifically identified for protection in the enabling legislation.

Scenic values are those elements of a landscape which contribute positively, both through the senses and the emotions, to the overall quality of a visitor's enjoyment and use of the recreation area. Visitor studies demonstrate the importance placed on preservation of the scenic resource (Wood, et.al., 1989).

Resource Condition

Visitor surveys have consistently shown that enjoying scenic vistas is one of the most important activities while visiting national park areas. At Glen Canyon NRA, viewing scenery has rated as important, very important, or extremely important by both lakeshore and backcountry visitors.

Scenic resources include a variety of tangible elements such as landforms, color, vegetation, uniqueness, and absence of development or modification which are obvious and, to some degree, quantifiable while also creating emotional responses which may be provoked by the landscape. Some emotional responses may not be directly tied to visual/sensual apprehension but to memories, pleasures, and associations accumulated over time.

Determining scenic values utilizes the BLM Visual Resource Management Guidelines, NPS Guidelines, Policies and Management Plans as well as the U.S. Forest Service Visual Assessment Program.

The following elements make up scenic value:

1. Landforms -- Topography; the Colorado Plateau is characteristically known for its varied and unique skyline of buttes, mesas, spires, arches, mountains, etc. Topography featuring high vertical relief, highly eroded landforms, rock outcrops, spires, and other interesting landforms have high scenic value. Large dune formations, eroded badlands, deep canyons, and the like would also rate highly. The degree to which these landforms dominate the view would determine, to some extent, the value of the view. Landforms with little or no relief, flat or with low rolling hills, and few remarkable details or interesting features would have lower scenic value.
2. Vegetation -- A variety of natural or native vegetation with an interesting relationship of form, pattern, and texture has high scenic value. Areas with less variety would tend to be rated lower. Areas of little or no vegetation may generally have lower value.
3. Water -- Where it is present, water which is clear and clean, either still or running, has high scenic value. In Glen Canyon NRA, the absence of water or a water source does not lower the scenic value.
4. Color -- Combinations of rich colors or a smaller variety of especially vivid colors. Pleasing contrasts in rock, soil, and vegetation. Colors might be dependent on time of day (e.g. sunrise or sunset). Extremely muted colors or generally monochromatic landscapes may have less scenic value.
5. Proximity -- What is in the immediate proximity. Adjacent scenery may enhance the view contributing to a higher value than if the adjacent area were neutral or detracting.
6. Uniqueness -- Is the view one of a kind? What are the opportunities for duplicating a scenic view such as this? Is the scenic view of a unique feature or combination of features. Value would also be enhanced if there was a unique opportunity for plant or wildlife viewing. The more "typical" a view is determined to be within its region, the lower the value.
7. Modification -- To what extent will an activity modify the scenic view from its natural state? Aesthetically undesirable or discordant sights, influences, or modifications degrade scenic values. This addresses the extent to which the hand of man is visible in the scene and to what extent, if any, this disrupts the scene. Some modification, especially if it is in harmony with the natural scene, could be acceptable, perhaps, even enhancing the view (e.g. Anasazi ruins). What extent does the modification itself disrupt the scene and the visitor's reaction to its presence.

While large landforms are not directly affected by grazing impacts, viewsheds may be impacted visually by the presence of water tanks, fence lines, roads related to grazing, stock trails, etc., which break up the natural flow of the eye across the landscape, reminding the visitor that man has modified the natural scene. Vegetation utilization can reduce the amount and kind of vegetation, reducing the variety of texture, color and pattern.

Existing recreation area scenic inventories divide viewsheds into four categories: signed or designated overlooks, existing and proposed marinas, major travel routes along the lake surface, and access roads to the recreation area and backcountry areas.

Resource Goal and Objectives

Goal: Maintain scenic resources.

Objective 1: No long-term loss of scenic resources. (NPS)

Potential impacts to scenic views will be evaluated based on the seven elements. Required mitigation such as location of improvements so they do not affect the scene may be utilized.

Determine "Visual Absorption Capability" and "Visual Vulnerability" of the affected scenic resources and do not permit impacts that diminish visual quality to include a determination of the area's ability to recover from the impact. (Desert landscapes are fragile and susceptible to long-term degradation from short-term activities).

Objective 2: Identify and protect cultural landscapes. (NPS)

Objective 3: Protect critical scenic resources in areas of heavy recreation use such as access road corridors, trailheads, major backcountry vehicle routes, boat accessible beach camping locations and developed scenic overlook viewsheds. In these critical scenic resource areas effects of grazing will be minimized so that vegetative components of the scene will be maintained. (NPS)

H. RECREATIONAL RESOURCES

Resource Value Statement

Glen Canyon NRA was established "... in order to provide for public outdoor recreation use and enjoyment of Lake Powell and lands adjacent thereto in the States of Arizona and Utah". Millions of visitors use the recreation area each year. There are millions of recreation overnights on the shores of Lake Powell and in the backcountry. Recreation use ranges from those activities which require solitude and an undisturbed setting to very mechanical recreation such as power boating and four-wheel driving. Recreation area management zoning has addressed these diverse activities.

Resource Condition

Some of the more popular backcountry activities include backpacking and camping, day hiking, mountain biking, and driving unpaved roads. While in the backcountry visitors enjoy viewing scenery, taking pictures, studying nature, solitude, and viewing archeological or historical resources. Backcountry users are willing to expend the extra time, effort, and planning it takes for a backcountry trip in order to reap what they feel are the "rewards" of the backcountry: pristine scenery, solitude, wildness, and remoteness.

Glen Canyon NRA has a significant and unique backcountry which offers a distinctive recreational opportunity for visitors. Grazing related impacts may have a negative impact on the recreational values and desired experiences of visitors within Glen Canyon NRA.

Much of the backcountry use in Glen Canyon NRA is made up of day hikers from boats on Lake Powell and river runners while most overnight backcountry use occurs in the Natural Zone, primarily in the Orange Cliffs, Escalante, and Halls Crossing/San Juan areas. Conflicts between livestock impacts and recreational use have occurred. Conflicts or negative impacts on the recreational experience may occur from the presence of livestock or as a result of associated impacts.

Although cattle (and other livestock) have historically grazed the lands of Glen Canyon NRA, cattle are not normally considered a part of the backcountry experience of a unit of the National Park Service. Backcountry users tend to have both strong expectations for their recreational experience, as well as strong opinions as to what is and is not appropriate backcountry activity.

Resource Goal and Objectives

Goal: Protect recreation resources and the visitor experience (enjoyment and use) by reducing or mitigating recreation/livestock conflicts.

Objective 1: Prevent or reduce livestock/recreation conflicts so that recreational use and enjoyment of the recreation area is not impaired. (NPS/BLM)

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APPENDIX A - LEGISLATION AND AGREEMENTS

Enabling Legislation

Memorandum of Understanding

Interagency Agreement

Public Law 92-593

An Act to establish the Glen Canyon National Recreation Area in the States of Arizona and Utah. (95 Stat. 1811)

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That in order to provide for public outdoor recreation use and enjoyment of Lake Powell and lands adjacent thereto in the States of Arizona and Utah and to preserve scenic, scientific, and historic features contributing to public enjoyment of the area, there is established the Glen Canyon National Recreation Area (hereafter referred to as the "recreation area") to comprise the area generally depicted on the drawing entitled "Boundary Map Glen Canyon National Recreation Area," numbered GIC-91,008 and dated August, 1972, which is on file and available for public inspection in the office of the National Park Service, Department of the Interior. The Secretary of the Interior (hereafter referred to as the "Secretary") may revise the boundaries of the recreation area from time to time by publication in the Federal Register of a revised drawing or other boundary description, but the total acreage of the national recreation area may not exceed one million two hundred and thirty-six thousand eight hundred and eighty acres.

Sec. 2. (a) Within the boundaries of the recreation area, the Secretary may acquire lands and interests in lands by donation, purchase, or exchange. Any lands owned by the States of Utah or Arizona, or any State, political subdivisions thereof, may be acquired only by donation or exchange. No lands held in trust for any Indian tribe may be acquired except with the concurrence of the tribal council.

(b) Nothing in this Act shall be construed to affect the mineral rights reserved to the Navajo Indian Tribe under section 3 of the Act of September 2, 1908 (73 Stat. 1696), or the rights reserved to the Navajo Indian Tribal Council in said section 3 with respect to the use of the lands there described under the heading "PACANA, B".

Sec. 3. (a) The lands within the recreation area, subject to valid existing rights, are withdrawn from location, entry, and patent under the United States mining laws. Under such regulations as he deems appropriate, the Secretary shall permit the removal of the nonleasable minerals from lands or interests in lands within the national recreation area in the manner prescribed by section 10 of the Act of August 4, 1939, as amended (53 Stat. 1196; 48 U.S.C. 387 et seq.), and he shall permit the removal of leasable minerals from lands or interests in lands within the recreation area in accordance with the Mineral Leasing Act of February 28, 1930, as amended (30 U.S.C. 181 et seq.), or the Acquired Lands Mineral Leasing Act of August 7, 1947 (30 U.S.C. 351 et seq.), if he finds that such disposition would not have signif-

cant adverse effects on the Glen Canyon project or on the administration of the national recreation area pursuant to this Act.

(b) All receipts derived from permits and leases issued on lands in the recreation area under the Mineral Leasing Act of February 25, 1920, as amended, or the Act of August 7, 1947, shall be disposed of as provided in the applicable Act; and receipts from the disposition on non-leaseable minerals within the recreation area shall be disposed of in the same manner as moneys received from the sale of public lands.

Sec. 4. The Secretary shall administer, protect, and develop the recreation area in accordance with the provisions of the Act of August 25, 1916 (39 Stat. 535; 16 U.S.C. 1 et seq.), as amended and supplemented, and with any other statutory authority available to him for the conservation and management of natural resources to the extent he finds such authority will further the purpose of this Act: *Provided, however,* That nothing in this Act shall affect or interfere with the authority of the Secretary granted by Public Law 493, Eighty-fourth Congress, second session, to operate Glen Canyon Dam and reservoir in accordance with the purposes of the Colorado River Storage Project Act for river regulation, irrigation, flood control, and generation of hydroelectric power.

Sec. 5. The Secretary shall permit hunting, fishing, and trapping on lands and waters under his jurisdiction within the boundaries of the recreation area in accordance with applicable laws of the United States and the States of Utah and Arizona, except that the Secretary may designate zones where, and establish periods when, no hunting, fishing, or trapping shall be permitted for reasons of public safety, administration, or public use and enjoyment. Except in emergencies, any regulation of the Secretary pursuant to this section shall be put into effect only after consultation with the appropriate State fish and game department.

Sec. 6. The administration of mineral and grazing leases within the recreation area shall be by the Bureau of Land Management. The same policies followed by the Bureau of Land Management in issuing and administering mineral and grazing leases on other lands under its jurisdiction shall be followed in regard to the lands within the boundaries of the recreation area, subject to the provisions of sections 3(a) and 4 of this Act.

Sec. 7. The Secretary shall grant easements and rights-of-way on a nondiscriminatory basis upon, over, under, across, or along any component of the recreation area unless he finds that the route of such easements and rights-of-way would have significant adverse effects on the administration of the recreation area.

Sec. 8. (a) The Secretary together with the Highway Department of the State of Utah, shall conduct a study of proposed road alignments within and adjacent to the recreation area. Such study shall locate the specific route of a scenic, low-speed road, hereby authorized, from

Glenn Canyon City to Bullfrog Basin, crossing the Escalante River south of the point where the river has entered Lake Powell when the lake is at the three thousand seven hundred-foot level. In determining the route for this road, special care shall be taken to minimize any adverse environmental impact and said road is not required to meet ordinary secondary road standards as to grade, alignment, and curvature. Turnouts, overlooks, and scenic vistas may be included in the road plan. In no event shall said route cross the Escalante River north of Stephens Arch.

(b) The study shall include a reasonable timetable for the engineering, planning, and construction of the road authorized in section 8(a) and the Secretary of the Interior shall adhere to said timetable in every way feasible to him.

(c) The Secretary is authorized to construct and maintain markers and other interpretive devices consistent with highway safety standards.

(d) The study specified in section 8(a) heretofore shall designate what additional roads are appropriate and necessary for full utilization of the area for the purposes of this Act and to connect with all roads of ingress to, and egress from the recreation area.

(e) The findings and conclusions of the Secretary and the Highway Department of the State of Utah, specified in section 8(a), shall be submitted to Congress within two years of the date of enactment of this Act, and shall include recommendations for any further legislation necessary to implement the findings and conclusions. It shall specify the funds necessary for appropriation in order to meet the timetable fixed in section 8(b).

Sec. 9. Within two years from the date of enactment of this Act, the Secretary shall report to the President, in accordance with subsections 8(e) and 3(d) of the Wilderness Act (78 Stat. 890; 16 U.S.C. 1133 (e) and (d)), his recommendations as to the suitability or nonsuitability of any area within the recreation area for preservation as wilderness, and any designation of any such area as wilderness shall be in accordance with said Wilderness Act.

Sec. 10. There are hereby authorized to be appropriated such sums as may be necessary to carry out the purposes of this Act, not to exceed, however, \$400,000 for the acquisition of lands and interests in lands and not to exceed \$87,385,400 for development. The sums authorized in this section shall be available for acquisition and development undertaken subsequent to the approval of this Act.

Approved October 27, 1972.

Legislative History

House Report No. 79-1446 accompanying H.R. 15716 (Committee on Interior and Insular Affairs),
Senate Report No. 92-126 (Committee on Interior and Insular Affairs),
Congressional Record:

Vol. 117 (1971): June 22, considered and passed Senate.
Vol. 118 (1972):

Oct. 12, considered and passed Senate.

1971a.

Oct. 14, Senate considered in House amendment, with amendments; House considered in Senate amendment.
Presidential Compilation of Presidential Documents: Vol. 2, No. 46 (1972):
Oct. 26, Presidential statement.

"UMBRELLA"
MEMORANDUM OF UNDERSTANDING
BETWEEN
BUREAU OF LAND MANAGEMENT
AND
NATIONAL PARK SERVICE

WHEREAS, under the Federal Land Policy and Management Act of 1976, 43 U.S.C. §1701, et seq., and the Taylor Grazing Act of 1934, 43 U.S.C. §315, et seq., the Bureau of Land Management (BLM) is responsible for the administration of grazing on public lands under the jurisdiction of BLM, and BLM has implemented these statutory responsibilities through grazing regulations currently codified in 43 CFR Part 4100; and

WHEREAS, under the National Park Service Organic Act, (16 U.S.C. §1, et. seq.), as well as legislation establishing certain units of the National Park System (herein System), the National Park Service (NPS) is responsible for the administration of grazing on lands under the jurisdiction of NPS where grazing is consistent with the values and purposes for which these lands were set aside, and NPS has implemented these statutory responsibilities through grazing regulations currently codified in 36 CFR §2.60; and

WHEREAS, BLM has expertise in developing, implementing, and analyzing grazing programs; and

WHEREAS, Congress established Glen Canyon National Recreation Area (Glen Canyon NRA) "in order to provide for public outdoor recreation use and enjoyment of Lake Powell and lands adjacent there to . . ." and to preserve scenic, scientific, and historic features contributing to public enjoyment of the area" (16 U.S.C. §460dd-1); and Congress directed the Secretary of the Interior to administer the area, through NPS, in accordance with the above purposes, as well as "the fundamental purpose of . . . conserv[ing] the scenery and the natural and historic objects and the wildlife therein and . . . provid[ing] for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations" (16 U.S.C. §1, cited in id. §460dd-3); and

WHEREAS, Congress directed BLM to administer grazing leases in Glen Canyon NRA; and Congress further directed that BLM's policies with respect to grazing leases on other lands under BLM's jurisdiction be followed on lands within Glen Canyon NRA, subject to the values and purposes of the area set forth above (id. §460dd-5); and

WHEREAS, a final, approved General Management Plan for a unit of the System represents the formal land use plan for the preservation and use of the unit; and

WHEREAS, the NPS has expertise in determining whether an activity is consistent with the values and purposes of Glen Canyon NRA as well as other units within the National Park System;

NOW, therefore, in consideration of the above premises, BLM and NPS agree on this fourth day of September, 1984, as follows:

1. NPS is responsible for the administration of grazing on all units of the System except Glen Canyon NRA which is specifically provided for in paragraph 2, below. NPS will administer grazing programs in units of the System in accordance with its grazing regulations currently codified in 36 C.F.R. §2.60. NPS will consult with BLM on grazing activities as it determines appropriate or necessary. In units of the System other than Glen Canyon NRA where BLM assists NPS in administering grazing programs, NPS retains decisionmaking authority on all grazing issues. NPS and BLM agree to review and modify as necessary existing agreements between the agencies concerning grazing programs in other units of the System in order to reflect the understanding of this "Umbrella" Memorandum of Understanding.
2. BLM's grazing regulations shall apply to grazing administration in Glen Canyon NRA, subject to the following provisions:
 - a. In its administration of grazing in Glen Canyon NRA, BLM shall consult and cooperate with NPS to ensure that grazing authorizations, range improvements, allotment management plans, management agreements, and resource monitoring and evaluation efforts do not conflict with the Glen Canyon NRA enabling legislation (16 U.S.C. §460dd-1, et seq.), the NPS Organic Act (id., §§1, 2, and 4, as amended), or the approved NPS General Management Plan for Glen Canyon NRA.
 - b. BLM shall coordinate its decisionmaking concerning grazing in Glen Canyon NRA with NPS. NPS shall participate in planning and clearance to ensure that the values and purposes of Glen Canyon NRA are adequately considered.
 - c. BLM shall not act on any grazing authorizations, range improvements, management plans, management agreements, or resource monitoring and evaluation efforts, without first receiving a written determination from the NPS Regional Director regarding the potential effect of the proposed action upon the values and purposes of the area. In addition, the NPS Regional Director will provide to BLM any terms and conditions deemed necessary by NPS for inclusion in BLM's proposed action to ensure the activity's compatibility with the area's values and purposes. BLM shall provide the NPS adequate opportunity to make such a written determination and provide any such terms and conditions, i.e., at least 45 days under ordinary circumstances from receipt of the complete proposed action, including any environmental documentation where applicable. The NPS shall submit these materials to BLM in a timely manner. BLM may act on a proposed action, upon written explanation to all concerned and opportunity for comment from NPS, if BLM has not received the aforesaid materials within the specified time period (unless extended under documented extraordinary circumstances).
 - d. If the NPS Regional Director determines in writing that a proposed action is likely to conflict with the Glen Canyon NRA enabling legislation, the NPS Organic Act, or the approved NPS General Management Plan for Glen Canyon NRA, and BLM and NPS cannot agree on the action at the local level, NPS and BLM shall refer the matter in conflict to the next level of management for resolution.

- e. BLM and NPS will review the existing MOU's between the Superintendent, Glen Canyon NRA and BLM's State Directors for Arizona and Utah, and revise these MOU's as necessary to reflect the understanding of this "Umbrella" MOU and to implement it in greater detail.
3. With respect to lands within the System where grazing was administered by BLM before the lands were transferred to the NPS, and outstanding grazing permits were issued by BLM before the transfer of jurisdiction, the parties agree as follows:
- a. NPS shall administer these outstanding grazing permits in accordance with their terms and conditions.
 - b. Except as the outstanding permit may otherwise provide, when NPS renews such an outstanding permit or issues a new permit in its place, NPS will administer the new permit under NPS regulations. Accordingly, the provisions of paragraph 1, above, apply.
 - c. A cooperative agreement may provide for BLM to administer these permits on behalf of NPS, with or without reimbursement.

Robert J. Burford
Director, Bureau of Land Management

7/9/84
Date

Russell E. Dickenson
Director, National Park Service

August 20, 1984
Date

INTERAGENCY AGREEMENT
between
BUREAU OF LAND MANAGEMENT
and
NATIONAL PARK SERVICE
for
GRAZING MANAGEMENT
on
GLEN CANYON NATIONAL RECREATION AREA

WHEREAS, Congress established Glen Canyon National Recreation Area "...to provide for public outdoor recreation use and enjoyment of Lake Powell and lands adjacent thereto...and to preserve scenic, scientific, and historic features contributing to public enjoyment of the area" (16 U.S.C. 460dd-1). Congress directed the Secretary of the Interior to administer the area, through the National Park Service (hereinafter referred to as NPS), in accordance with the above purposes, as well as for "...the fundamental purpose of...conserving the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." (16 U.S.C. 1, cited in id., 460dd-3); and

WHEREAS, Congress directed the Bureau of Land Management (hereinafter referred to as BLM) to administer grazing leases in Glen Canyon National Recreation Area. Congress further directed that BLM's policies with respect to grazing leases on other lands under BLM's jurisdiction be followed on lands within Glen Canyon National Recreation Area (hereinafter referred to as the NRA), subject to the value and purposes of the area set forth above (id. 460dd-5); and

WHEREAS, the NPS has expertise in the management of National Parks, and specifically in the management of Glen Canyon National Recreation Area, including the evaluation of environmental impacts from all activities which occur in the area and in determining whether any activity is consistent with the values and purposes of the NRA as well as other units within the National Park System; and

WHEREAS, BLM has expertise in developing, implementing, and analyzing grazing management programs, including the effect of livestock grazing and related range improvements on the environment; and

WHEREAS, Congress recognized that the NRA contains nationally significant natural and cultural resources as well as outstanding and unique opportunities for public outdoor recreation by establishing the area as a national recreation area and by its inclusion in the National Park System; and

WHEREAS, the final approved Glen Canyon General Management Plan and all of its components, developed under the NPS Organic Act, 16 U.S.C. 1, et seq. and National Environmental Policy Act, represents the formal land use plan for the management of the NRA; and

WHEREAS, the Umbrella Memorandum of Understanding (MOU) between the BLM and the NPS relating to grazing management directed that the existing memoranda of understanding be reviewed to reflect the intent of the Umbrella MOU and to implement it in greater detail.

The Regional Director, Rocky Mountain Region, National Park Service (hereinafter referred to as the Regional Director), and the BLM State Directors of Arizona and Utah (hereinafter referred to as the State Director/s), hereby enter into this agreement to conduct a program, to coordinate grazing management activities on the NRA which shall be carried out by the respective BLM District Managers of the Arizona Strip, Cedar City,

Richfield and Moab Districts (hereinafter referred to as the District Manager/s) and in coordination and cooperation with the Superintendent of the NRA (hereinafter referred to as Superintendent).

NOW, therefore, the NPS and BLM agree that:

1. **LEGISLATIVE AND POLICY PRIORITIES:** The BLM will administer all grazing by domestic livestock on the NRA in accordance with the Taylor Grazing Act of 1934, 43 U.S.C. 315 et seq., the Public Rangeland Improvement Act, 43 U.S.C. 1701 et seq. and the Federal Land Policy and Management Act of 1976, 43 U.S.C. 1701 et seq. and the regulations thereunder, currently codified in 43 C.F.R. Part 4100 subject to the Glen Canyon enabling legislation (P.L. 92-593), the Act of August 25, 1916, the Umbrella MOU and this agreement.

a. This agreement does not apply to the management of wild and free roaming horses and burros, or wildlife, watershed or vegetation management activities not directly associated with grazing management activities.

2. **CONSULTATION, COOPERATION, and COORDINATION:** In the administration of grazing in the NRA, BLM and NPS will consult, cooperate and coordinate their efforts to ensure that grazing authorizations, range improvements, allotment management plans, resource monitoring and evaluation efforts and other grazing activities do not conflict with and are in support of the Glen Canyon NRA enabling legislation (16 U.S.C. 460dd-1, et seq.), the NPS Organic Act (id., 1, 2, and 4 as amended), and the approved NPS General Management Plan for Glen Canyon NRA.

a. The District Managers (or authorized official) will keep the Superintendent informed on grazing management activities on the NRA including any changes in grazing allotments; range improvements; stock driveways; range trend condition and utilization; and any other grazing activities within the NRA.

b. The Superintendent will keep the District Managers informed on NPS management activities which affect livestock grazing on the NRA including present or planned recreation developments, transportation corridors, utility lines, land classifications and other similar projects.

c. A meeting to review grazing matters on the NRA and to exchange information and enhance coordination will be held annually with NPS and BLM alternating as host. NPS will host meetings on the even years and BLM will host meetings on the odd years. If desired by either agency, joint meetings or inspections of range conditions will be conducted to review grazing activities and help determine future management needs.

Requests for a change in the kind of livestock, changes in grazing permits which are in excess of the present preference or outside of the existing season of use for a pasture or allotment on the NRA will be coordinated with NPS before being approved.

e. Copies of all changes to and/or new licenses, permits, agreements, decisions, plans and other documents pertaining to grazing on the NRA will be

furnished to NPS upon issuance. All information needed by NPS for their annual grazing report and other grazing reports will be forwarded to NPS upon request.

f. When a grazing preference (permit) is amended or cancelled because of NPS plans, policies or programs, NPS will provide BLM with the rationale for the action and testify, if necessary, before an administrative law judge as to the need for this action.

g. In order to make more efficient use of personnel and equipment, either NPS or BLM will assist the other agency when called upon, if staffing, budget, and workload permit.

3. MANAGEMENT ACTIONS: Before the District Manager (or authorized official) approves or acts on a change in a grazing permit; change in the kind of livestock; change in the season of use; new, reconstruction or major maintenance of existing range improvements; a new or a modified allotment management plan; a new grazing system; or new resource monitoring or evaluation efforts (not covered in an agreed upon plan) he will send it to the Superintendent for a determination regarding the potential effects of the proposed action upon the values and purposes of the NRA.

a. When BLM initiates an action requiring an environmental assessment, the District Manager (or authorized official), in cooperation with the Superintendent, will prepare the necessary documents. The Superintendent, by signing the document, will indicate his/her concurrence with the analysis of impacts. The Superintendent will send to the District Manager a Values and Purposes Determination. In that document, the Superintendent will provide, where appropriate and possible, any terms and conditions deemed necessary for inclusion in the proposed action to ensure that the activities are compatible with the NRA's values and purposes. The Values and Purposes Determination will be in effect for one year. If the project is not constructed within that time, the determination and the proposal must be reevaluated.

b. When NPS initiates an action requiring a change in the grazing program on the NRA, and an environmental assessment is necessary, the Superintendent, in cooperation with the District Manager, will prepare the necessary documents. The District Manager (or authorized official), by signing the environmental assessment, will indicate his/her concurrence with the analysis of impacts.

c. A grazing permit is defined as any authorization or administrative action relating to grazing which authorizes livestock grazing on allotments within the NRA.

d. The Values and Purposes Determination is defined as the assessment of the potential effects of the proposal on the values and purposes of the NRA as stated in the Glen Canyon enabling legislation, the NPS organic act, the Glen Canyon General Management Plan, the National Environmental Policy Act, and other pertinent laws and policies.

e. The Superintendent will, under ordinary circumstances, provide the required values and purposes determination within 45 days of receipt of the completed proposal. If necessary, a longer response period will be negotiated with the appropriate District Manager (or authorized official).

f. If the Superintendent determines, in writing, that a proposed action conflicts with the values and purposes of the NRA and the District Manager and Superintendent cannot agree on the action, the matter shall be referred to the State Director and Regional Director for resolution.

4. RANGE IMPROVEMENTS: All livestock use facilities (constructed after the effective date of this agreement) will be authorized only with a BLM cooperative agreement, as provided for under 43 CFR Part 4100.

a. BLM and NPS agree that nonstructural range improvements, land treatments, and new line shacks are not appropriate on the NRA. In addition, all water developments must consider the needs of wildlife and recreation and will not be constructed, maintained, or utilized in such a way as to preclude the access to that source by wildlife or recreation users. Water rights, not presently allocated, will be obtained by NPS.

b. A complete proposed action (necessary before the Superintendent can provide the required values and purposes determination) should contain a site specific drawing; a list of materials needed with the amount and source of sand, gravel or other locally obtained materials; a list of the major pieces of construction equipment needed; a description of access to the construction site; an estimate of future maintenance requirements and a reference to the planning document upon which the project is based (Allotment Management Plan, etc.).

c. When grazing permits are canceled or modified for other than public purposes, existing range improvements will be evaluated for abandonment or removal. Removal may be completed by the benefitting party, owner, or agency.

5. MONITORING: Both NPS and BLM recognize that the Glen Canyon National Recreation Area is a nationally significant resource. Grazing activities shall be monitored to evaluate their effects on the natural, cultural, and recreational resources of the NRA through the development and implementation of resource monitoring plans.

a. BLM will develop and implement a program to monitor vegetation utilization, condition and trend, and other grazing management activities on the NRA in accordance with current BLM policies and procedures, the results of which will be regularly shared with the Superintendent.

b. NPS will develop and implement a program to monitor the natural, cultural, and recreational resources of the NRA in accordance with NPS policy under the approved resources management plans. The results of that program will be regularly shared with the District Managers.

c. There may be times when joint monitoring efforts would benefit both agencies. Both BLM and NPS will keep the other informed of such opportunities and will work together as these opportunities arise.

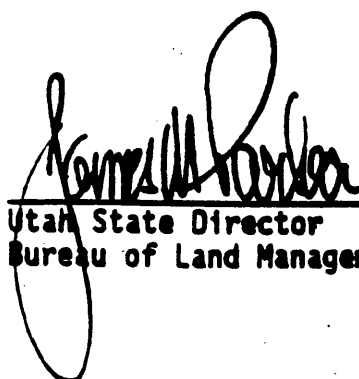
6. TRESPASS: NPS will report to BLM all cases of grazing trespass which comes to its attention. NPS will cooperate with BLM on the investigation and resolution of trespass on the NRA.

7. PLANNING: NPS, in cooperation with BLM, will develop a grazing component to the Glen Canyon General Management Plan. The grazing component will provide a guideline for integration of grazing management activities with the values and purposes of the NRA and will address specific grazing issues, as needed. It will also include a jointly developed livestock use map indicating those areas where livestock use will and will not be allowed. When livestock are to be excluded from an area they have historically been allowed to use, fencing will be the responsibility of the agency requiring the action.

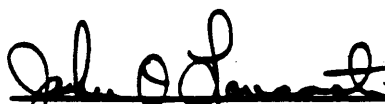
8. PREDATOR, PLANT, AND PEST CONTROL: Predator, pest, and noxious weed control activities will be authorized and carried out by NPS. Control efforts will be approved by NPS in coordination with the U.S. Department of Agriculture Animal Plant Health Inspection Service (APHIS). NPS will coordinate directly with APHIS if any predator or pest control work is necessary within the NRA and will complete all necessary NEPA documentation.

9. SUPPLEMENTAL FEEDING: BLM and NPS agree that the use of supplemental feed, including salt, may be authorized for improved livestock and rangeland management. Maintenance feeding of harvested feed (hay and grain not in block form or otherwise regulated by salt) are not appropriate on the NRA, except in emergencies with NPS concurrence.

10. TERMS OF THE AGREEMENT: This agreement shall be in effect until superceded or rescinded by either party, with 60 days written notice, and it shall be reviewed every 5 years from the date of the final signatory. After each review, a reaffirmation form will be signed and attached.


Utah State Director
Bureau of Land Management

3-19-93
Date


Superintendent
Glen Canyon National Recreation Area
National Park Service

5/10/93
Date


Arizona State Director
Bureau of Land Management

5/3/93
Date

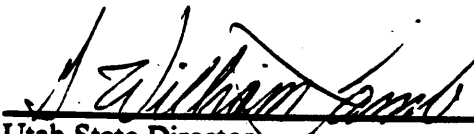
REAFFIRMATION MEMORANDUM

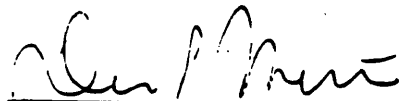
AGREEMENT NUMBER IA 1440-3-0001

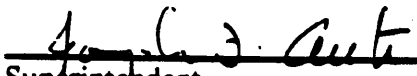
We, the undersigned, have the authority and do hereby reaffirm this agreement between the National Park Service and the Bureau of Land Management for the purpose of Grazing Management on Glen Canyon National Recreation Area.

The original agreement was signed by both the Utah and Arizona State Directors of the Bureau of Land Management and the Superintendent, Glen Canyon National Recreation Area.

This agreement and all its terms and conditions is to continue in effect for an additional five years beginning May 10, 1998 through May 9, 2003.

 2/13/98
Utah State Director Date
Bureau of Land Management

 2/24/98
Arizona State Director Date
Bureau of Land Management

 3-2-98
Superintendent Date
Glen Canyon National Recreation Area
National Park Service

APPENDIX B - ALLOTMENT DATA TABLES

GRAND STAIRCASE ESCALATE NATIONAL MONUMENT - ESCALANTE RESOURCE AREA

Table 1.

Allotment Name	Allotment Number	AMP ¹	Year ⁶	Implemented ⁶	Management Class ²	Management System ³	Season of Use ^{4,5}
Moody	6019	No	-	-	C	CG	11/1-3/31
Wagon Box Mesa	6029	No	-	-	C	CG	11/1-3/31
Big Bowns Bench	6003	No	-	-	M	DR	10/16-4/15
Upper Cattle	6028	Yes	1984	No	I	DR	11/1-6/15
Lower Cattle	6017	Yes	1967	Partially	M	CG	10/1-4/15
Forty Mile Ridge	6012	Yes	1987	Yes	I	DR	11/1-6/15
Soda	6026	Yes	1987	Yes	I	DR	10/1-5/31
Lake	6015	Yes	1989	Yes	I	RR	6/1-9/30
Navajo Bench	-	-	-	-	-	Not Active	-
Harvey's Fear	-	-	-	-	-	Not Active	-
Spencer Bench	-	-	-	-	-	Not Active	-
Last Chance	6016	Yes	1982	Yes	I	WS	AY

¹ Allotment Management Plan

² C = Custodial M = Maintenance I = Improvement

³ CG = Continuous Grazing DR = Deferred Rotation RR = Rest Rotation WS = Winter/Summer

⁴ Season of use within Glen Canyon National Recreation Area

⁵ AY = All Year

⁶ NA = (Information) Not Available

Table 2. Escalante Resource Area

Allotment Name	Total Preference ¹	Active Preference ¹	Livestock Class ²	Wildlife AUMs ¹
Moody	1,600	1,600	Ca	924
Wagon Box Mesa	633	633	Ca	621
Big Bowns Bench	1,276	1,276	Ca	377
Upper Cattle	6,297	6,297	Ca	1,906
Lower Cattle	6,875	6,875	Ca	402 ³
Forty Mile Ridge	6,439	4,155	Ca	1,872
Soda	4,287	2,755	Ca	1,350
Lake	2,271	2,271	Ca	986
Navajo Bench	-	-	-	-
Harvey's Fear	-	-	-	-
Spencer Bench	-	-	-	-
Last Chance	5,156	3,708	Ca	7,938

¹Animal Unit Months (AUM's)

²Ca = Cattle

³Glen Canyon NRA portion only

Table 3. Escalante Resource Area

Actual use by year ^{1,2}	85-86	86-87	87-88	88-89	89-90	90-91	91-92	92-93	93-94	94-95
Moody	769	998	931	1,325	794	1,300	1,541	1,350	1,296	1,044
Wagon Box Mesa	439	544	391	452	199	534	473	594	601	341
Big Bowns Bench	1337	1,215	1,081	1,110	216	774	259	1,349	1,376	1,411
Upper Cattle	4,916	4,576	4,930	3,811	1,894	2,170	1,826	3,766	4,541	4,631
Lower Cattle	5,348	5,523	3,937	4,000	2,069	4,117	5,045	3,706	5,577	4,965
Forty Mile Ridge	1,554	3,288	3,557	3,423	1,076	1,424	1,019	1,365	1,959	3,707
Soda	1,479	2,272	2,615	2,459	1,420	1,398	1,573	2,512	1,942	2,388
Lake	1,370	1,333	1,308	1,361	967	713	774	1,182	1,416	1,116
Navajo Bench	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Harvey's Fear	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Spencer Bench	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Last Chance	3,457	3,665	3,500	3,535	2,362	2,857	2,561	2,815	3,333	3,113

¹Animal Unit Months (AUMs)

²NA =Not Available

Table 4. Escalante Resource Area

Allotment Name	Total Acres in Allotment	Acres in NRA (%) ^{1,4}	Acres Suitable For Grazing in NRA (%) ^{2,3,4}	Active Acres in NRA ⁴	Unallotted Acres in NRA ⁴
Moody	49,341	29,576 (60)	12,068 (41)	All	None
Wagon Box Mesa	28,041	770 (3)	450 (58)	All	None
Big Bowns Bench	18,245	3,858 (21)	400 (10)	All	None
Upper Cattle	63,658	6,946 (11)	2,504 (36)	All	None
Lower Cattle	83,049	17,300 (21)	14,438 (83)	All	None
Forty Mile Ridge	58,381	18,338	17,187 (94)	All	None
Soda	75,983	57,645 (76)	46,223 (80)	All	None
Lake	52,872	5,283 (10)	5,283 (100)	All	None
Navajo Bench	10,905	10,905 (100)	NA	Not Active	All
Harvey's Fear	4,330	2,466 (57)	NA	Not Active	All
Spencer Bench	7,918	7,760 (98)	NA	Not Active	All
Last Chance	253,522	22,989 (9)	17,388 (76)	All	None

¹Percentage of "Total Acres in Allotment"

²Percentage of "Acres in NRA"

³ NA = Not Available

⁴Glen Canyon National Recreation Area

Table 5. Escalante Resource Area

Allotment Name	Total Trend Plots ¹	Trend Plots in NRA ³	Trend ¹	% PNC ^{1, 2}	% Late Seral ¹	% Mid Seral ¹	Early Seral ¹
Moody	2	0	Static	NA	NA	NA	NA
Wagon Box Mesa	2	0	Static	NA	NA	NA	NA
Big Bowns Bench	3	0	NA	NA	NA	NA	NA
Upper Cattle	7	0	NA	NA	NA	Na	NA
Lower Cattle	10	0	NA	NA	NA	NA	NA
Forty Mile Ridge	11	0	NA	NA	NA	Na	NA
Soda	7	2	NA	NA	NA	NA	NA
Lake	4	0	NA	NA	NA	NA	NA
Navajo Bench	0	0	NA	NA	NA	NA	NA
Harvey's Fear	0	0	NA	NA	NA	NA	NA
Spencer Bench	0	0	NA	NA	NA	NA	NA
Last Chance	7	2	Static	NA	NA	NA	NA

¹ NA = Not Available

² Potential Natural Community

³ Glen Canyon National Recreation Area

Table 6. Escalante Resource Area

Allotment Name	Developed Springs ^{1,5}	Undeveloped Springs ^{1,5}	Reservoirs ^{1,2}	Catchments ^{1,3}	Tanks ^{1,4}	Rain Gauges ¹
Moody	1	5	10	0	0	1
Wagon Box Mesa	0	0	0	0	0	0
Big Bowns Bench	1	1	1	0	0	0
Upper Cattle	2	0	3	0	0	2
Lower Cattle	1	2	0	0	1	0
Forty Mile Ridge	1	0	0	0	0	1
Soda	3	1	2	0	2	3
Lake	5	1	0	0	0	0
Navajo Bench	NA	NA	0	0	0	0
Harvey's Fear	NA	NA	0	0	0	0
Spencer Bench	NA	NA	0	0	0	0
Last Chance	0	1	3	1	0	1

¹In or adjacent (within two miles) to Glen Canyon National Recreation Area

²Stock ponds, impoundments, earth "tanks"

³Catchment = apron + storage tank + pipe + trough

⁴Storage tanks, "ring tanks", steel tanks, concrete tanks

⁵NA = Not Available

Table 7. Escalante Resource Area

Allotment Name	Miles of Fences ¹	Corrals ¹	Line Shacks ¹	Cattle Guards ¹	Well
Moody	1/2	1	1	0	
Wagon Box Mesa	<1/4	0	0	0	
Big Bowns Bench	3/4	0	0	0	
Upper Cattle	0	0	0	0	
Lower Cattle	1	1	0	1	1
Forty Mile Ridge	4	0	0	1	
Soda	6	1	0	2	1
Lake	1.5	1	1	0	
Navajo Bench	0	0	0	0	
Harvey's Fear	0	0	0	0	
Spencer Bench	0	0	0	0	
Last Chance	1	1	0	0	

¹Within or adjacent (within two miles) to Glen Canyon National Recreation Area

HENRY MOUNTAIN RESOURCE AREA

Table 8. Henry Mountain Resource Area

Allotment Name	Allotment Number	AMP ¹	Year	Implemented	Management Class ²	Management System ³	Season of Use ^{4,7}
Robber's Roost	0901	No	-	-	I	CG	AY
Flint Trail	-	-	-	-	-	--	Unallotted
Sewing Machine	0902	No	-	-	C	CG	11/1-4/30
Rockies	0110	Yes	1965	Yes	M	TP	11/1-5/31
Waterpocket	0117	No	-	-	M	CG	11/1-4/15
Bullfrog	0101	No	-	-	M	CG	10/15-5/15
Slickrock	-	-	-	-	-	-	Unallotted

¹ Allotment Management Plan

² C = Custodial M = Maintenance I = Improvement

³ CG = Continuous Grazing DR = Deferred Rotation RR = Rest Rotation WS = Winter/Summer

⁴ Season of use within Glen Canyon National Recreation Area

⁵ AY = All Year

⁶ NA = (Information) Not Available

Table 9. Henry Mountain Resource Area

Allotment Name	Total Preference ⁵	Active Preference ⁵	Livestock Class ⁶	Wildlife AUMs ^{5,7}
Robber's Roost	7,924	5,288	C/H	545
Flint Trail	-	-	-	166
Sewing Machine	1,599	1,599	C	188
Rockies	6,514	5,328	C	363
Waterpocket	3,154	3,007	C	31
Bullfrog	4,096	3,120	C	458
Slickrock	0	0	-	0

⁵Animal Unit Months (AUM's)

⁶C = Cattle H = Horses S = Sheep

Table 10. Henry Mountain Resource Area

Actual use by year ¹	85-86	86-87	87-88	88-89	89-90	90-91	91-92	92-93	93-94	94-95
Robber's Roost	6,012	5,020	4,680	5,076	5,476	3,838	4,022	4,200	4,637	2,006
Flint Trail	--	--	--	--	--	--	--	--	--	--
Sewing Machine	1,704	1,415	1,252	283	158	414	414	340	424	480
Rockies	2,601	2,097	3,704	4,887	160	1,355	1,966	2,408	1,362	3,162
Waterpocket	2,626	2,439	1,524	1,674	1,734	1,270	2,147	2,216	1,733	1,187
Bullfrog	2,387	2,476	2,007	1,985	251	467	2,535	2,299	2,249	815
Slickrock	70	70	70	70	70	70	70	70	70	70

¹Animal Unit Months (AUM's)

Table 11. Henry Mountain Resource Area

Allotment Name	Total Acres In Allotment	Acres in NRA (%) ^{2,4}	Acres Suitable For Grazing in NRA (%) ^{3,4}	Active Acres in NRA ⁴	Unallotted Acres in NRA ⁴
Robber's Roost	204,272	21,145 (11)	21,145	All	0
Flint Trail	117,749	71,108 (60)	0	None	71,108
Sewing Machine	131,609	67,682 (51)	67,682	All	0
Rockies	172,754	39,280 (23)	39,280	All	0
Waterpocket	73,011	31,461 (44)	31,461	All	0
Bullfrog	93,574	668 (1)	668	All	0
Slickrock	65,177	27,878 (42)	0	None	27,878

²Percentage of "Total Acres in Allotment"

³Percentage of "Acres in NRA"

⁴Glen Canyon National Recreation Area

Table 12. Henry Mountain Resource Area

Allotment Name	Total Trend Plots	Trend Plots in NRA ⁷	Trend ¹	% PNC ^{1,2}	% Late Seral ¹	% Mid Seral ¹	Early Seral ¹
Robber's Roost	6	1	Static	5	27	44	24
Flint Trail	0	0	NA	NA	NA	NA	NA
Sewing Machine	0	0	NA	12	25	57	6
Rockies	7	0	Static	3	11	64	22
Waterpocket	4	0	Up	13	28	41	18
Bullfrog	7	0	down	2	19	61	18
Slickrock	0	0	NA	NA	NA	NA	NA

¹NA = Not available

²PNC = Potential Natural Community

⁷Glen Canyon National Recreation Area

Table 13. Henry Mountain Resource Area

Allotment Name	Developed Springs ³	Undeveloped Springs ³	Reservoirs ^{3,4}	Catchments ^{3,5}	Tanks ^{3,6}	Rain Gauges ³
Robber's Roost	4	0	1	0	1	1
Flint Trail	-	-	-	-	-	-
Sewing Machine	1	2	5	0	0	0
Rockies	2	0	5	0	0	2
Waterpocket	0	2	-	0	0	1
Bullfrog	0	0	-	0	0	0
Slickrock	-	-	-	-	-	-

¹NA = Not available

³In or adjacent (within two miles) to Glen Canyon National Recreation Area

⁴Stock ponds, impoundments, earth "tanks"

⁵Catchment = apron + storage tank + pipe + trough

⁶Storage tanks, "ring tanks", steel tanks, concrete tanks

Table 14. Henry Mountain Resource Area

Allotment Name	Miles of Fences ¹	Corrals ¹	Line Shacks ¹	Cattle Guards ¹
Robber's Roost	1/2 mile	2	0	1
Flint Trail	-	-	-	-
Sewing Machine	1/4 mile	1	0	2
Rockies	3 mile	1	0	1
Waterpocket	3 miles	0	0	2
Bullfrog	0	0	0	0
Slickrock	100 yds	0	0	1

¹In or adjacent (within two miles) to Glen Canyon National Recreation Area

GRAND STAIRCASE ESCALATE NATIONAL MONUMENT - KANAB RESOURCE AREA

Table 15. Kanab Resource Area

Allotment Name	Allotment Number	AMP ¹	Year	Implemented	Management Class ²	Management System ³	Season of Use ^{4,7}
Upper Warm Creek	25024	Yes	1982	Partial	I	DR	11/1-5/31
Lower Warm Creek	25015	No	-	-	M	CG	11/1-3/31
Wiregrass (Clark Bench)	04145	No	-	-	M	DR	11/1-3/31
Bunting Well	25012	Yes	1984	Yes	I	RR	AY
Nipple Bench	25018	Yes	1981	Yes	I	RR	12/1-4/30
Rock Creek-Mudholes	6020	Yes	1982	Partial	I	RR	AY

¹ Allotment Management Plan

² C = Custodial M = Maintenance I = Improvement

³ CG = Continuous Grazing DR = Deferred Rotation RR = Rest Rotation WS = Winter/Summer

⁴ Season of use within Glen Canyon National Recreation Area

⁵ AY = All Year

⁶ NA = (Information) Not Available

Table 16. Kanab Resource Area

Allotment Name	Total Preference ⁵	Active Preference ⁵	Livestock Class ⁶	Wildlife AUMs ⁵	
Upper Warm Creek	1547	1477	C	331	
Lower Warm Creek	225	225	C/H	210	
Wiregrass (Clark Bench)	608	608	C	150	
Bunting Well	3447	3307	C	9	
Nipple Bench	1650	885	C	0	
Rock Creek – Mudholes	5000	2100	C	2230	

⁵Animal Unit Months (AUM's)

⁶C = Cattle H = Horses

Table 17. Kanab Resource Area

Actual use by year ^{1,2}	85-86	86-87	87-88	88-89	89-90	90-91	91-92	92-93	93-94	94-95
Upper Warm Creek	1155	823	658	1033	870	664	627	615	229	122
Lower Warm Creek	225	225	225	224	209	250	249	224	206	0
Wiregrass (Clark Bench)	1298	1258	1152	969	824	511	1187	1672	1529	485
Bunting Well	1794	1512	1404	861	1635	978	1944	912	1729	0
Nipple Bench	NA	NA	264	659	509	414	381	651	333	0
Rock Creek-Mudholes	NA	NA	NA	NA	NA	336	306	556	729	958

Table 18. Kanab Resource Area

Allotment Name	Total Acres In Allotment	Acres in NRA (%) ^{3,5}	Acres Suitable For Grazing in NRA (%) ^{4,5}	Active Acres in NRA ⁵	Unallotted Acres in NRA ⁵
Upper Warm Creek	75,725	20,627 (27)	20,627	20,627	0
Lower Warm Creek	33,242	33,242 (100)	33,242	33,242	0
Wiregrass (Clark Bench)	30,379	21,024 (69)	21,024	21,024	0
Bunting Well	46,017	1,030 (2)	1,030	1,030	0
Nipple Bench	30,616	554 (2)	554	554	0
Rock Creek-Mudholes	111,267	69,978 (63)	18,859	18,859	51,119

¹Animal Unit Months (AUM's)²NA = Not Available³Percentage of "Total Acres in Allotment"⁴Percentage of "Acres in NRA"⁵Glen Canyon National Recreation Area

Table 19. Kanab Resource Area

Allotment Name	Total Trend Plots	Trend Plots in NRA ⁵	Trend ^{2,7}	% PNC ⁶	% Late Seral ²	% Mid Seral ²	% Early Seral ²
Upper Warm Creek	12	3	Up	NA	NA	NA	NA
Lower Warm Creek	2	2	NA	NA	NA	NA	NA
Wiregrass (Clark Bench)	9	1	S/D	NA	NA	NA	NA
Bunting Well	8	0	S/D	NA	NA	NA	NA
Nipple Bench	4	0	NA	NA	NA	NA	NA
Rock Creek-Mudholes	7	2	Up	NA	NA	NA	NA

²NA = Not Available

⁶Potential Natural Community

⁷S/D = Static/Down

Table 20. Kanab Resource Area

Allotment Name	Developed Springs ¹	Undeveloped Springs ¹	Reservoirs ^{1, 2}	Catchments ^{1, 3}	Tanks ^{1, 4}	Rain Gauges ¹
Upper Warm Creek	2	4	4	1	1	1
Lower Warm Creek	0	0	0	0	0	0
Wiregrass (Clark Bench)	0	0	0	0	0	0
Bunting Well	0	0	0	0	0	0
Nipple Bench	0	0	0	0	0	1
Rock Creek-Mudholes	3	1	2	0	0	2

¹In or adjacent (within two miles) to Glen Canyon National Recreation Area²Stock ponds, impoundments, earth "tanks"³Catchment = apron + storage tank + pipe + trough⁴Storage tanks, "ring tanks", steel tanks, concrete tanks

Table 21. Kanab Resource Area

Allotment Name	Miles of Fences ¹	Corrals ¹	Line Shacks ¹	Cattle Guards ¹	
Upper Warm Creek	1.5 Miles	1	0	1	
Lower Warm Creek	.15 Miles	0	0	1	
Wiregrass (Clark Bench)	0	0	0	0	
Bunting Well	0	0	0	0	
Nipple Bench	0	0	0	0	
Rock Creek-Mudholes	0.5 Miles	2	0	0	

¹In or adjacent (within two miles) to Glen Canyon National Recreation Area

SAN JUAN RESOURCE AREA

Table 22. San Juan Resource Area

Allotment Name	Allotment Number	AMP ¹	Year	Implemented	Management Class ²	Grazing System ³	Season of Use ⁴
Indian Creek	4815	No	-	-	I	DR	10/1-6/15
White Canyon	6837	Yes	1969	no	I	DR	All year
Lake Canyon	6833	Yes	1970	No	I	DR	10/6-6/5
Slickhorn	6834	No	-	No	I	DR	10/16-6/15
~~XXXXXX~~	6827	No	-	-	I	CG	10/1-5/31
Texas Muley	6844	No	-	-	I	DR	11/15-5/31

¹ Allotment Management Plan

² C = Custodial M = Maintenance I = Improvement

³ CG = Continuous Grazing DR = Deferred Rotation RR = Rest Rotation WS = Winter/Summer

⁴ Season of use within Glen Canyon National Recreation Area

⁵ AY = All Year

⁶ NA = (Information) Not Available

Table 23. San Juan Resource Area

Allotment Name	Total Preference ₄	Active Preference ₄	Livestock Class ⁵	Wildlife AUM's ⁴	
Indian Creek	8518	8518	C	0	
White Canyon	7407	5544	C/H	0	
Lake Canyon	6936	4895	C/H	0	
Slickhorn	2908	1795	C/H	500	
Parkins Brothers	7321	7321	C/H	0	
Texas Muley	2877	1960	C/H	(500) ⁶	

⁴Animal Unit Months (AUM's)

⁵C = Cattle H = Horses

⁶Originally part of Slickhorn Allotment; wildlife AUMs divided between the two proportionally.

⁷Season of use within Glen Canyon National Recreation Area

Table 24. San Juan Resource Area

Actual use by year ¹	85-86	86-87	87-88	88-89	89-90	90-91	91-92	92-93	93-94	94-95
Indian Creek	5621	6077	4883	5900	4430	3547	3065	5189	4140	5171
White Canyon	NA	5171	NA	NA	3320	NA	2772	2676	NA	4200
Lake Canyon	5713	4240	5883	NA	4800	2800	4757	2536	NA	NA
Slickhorn	1976	1635	2095	NA	1565	1040	1581	NA	1797	1881
~~Perkins Brothers~~	4027	4478	5099	4095	5142	4272	2771	3951	4143	1467
Texas Muley	1909	1905	2109	2508	1620	1720	1747	991	639	1101

¹Animal Unit Months (AUM's)

Table 25. San Juan Resource Area

Allotment Name	Total Acres In Allotment	Acres in NRA (%) ^{2,3}	Acres Suitable For Grazing in NRA (%) ^{2,4}	Active Acres in NRA ²	Unallotted Acres in NRA ²
Indian Creek	234,680	20,426 (9)	15,524 (76)	All	0
White Canyon	248,257	34,985 (14)	29,737 (85)	All	0
Lake Canyon	651,060	186,769 (29)	115,797 (62)	All	0
Slickhorn	132,839	7,786 (6)	7,241 (93)	All	0
~~Perkins Brothers~~	108,960	12,650 (12)	11,765 (93)	All	0
Texas Muley	67,730	1,303 (2)	1,186 (91)	All	0

²Glen Canyon National Recreation Area³Percentage of "Total Acres in Allotment"⁴Percentage of "Acres in NRA"

Table 26. San Juan Resource Area

Allotment Name	Total Trend Plots	Trend Plots in NRA ¹	Trend 1988	% PNC 1988 ²	% Late Seral 1988	% Mid Seral 1988	% Early Seral 1988
Indian Creek	39	0	Static	3	11	39	20
White Canyon	9	0	Static	15	33	35	2
Lake Canyon	19	2	Static	11	24	20	7
Slickhorn	12	0	Static	10	25	31	27
Perkins Brothers	10	0	Static	17	53	22	1
Texas Muley	6	0	Static	4	0	66	21

Table 27. San Juan Resource Area

Allotment Name	Developed Springs ³	Undeveloped Springs ³	Reservoirs ^{3,5}	Catchments ^{3,4,6}	Tanks ^{3,4,7}	Rain Gauges ³
Indian Creek	0	0	0	0	0	3
White Canyon	0	1	4	0	0	0
Lake Canyon	0	6	0	0	0	1
Slickhorn	0	0	0	0	0	0
Perkins Brothers	0	1	2	0	0	0
Texas Muley	0	0	1	0	0	1

¹Glen Canyon National Recreation Area²Potential Natural Community; % does not add to 100-remainder is slickrock, outcrops, and badlands³In or adjacent (within two miles) to Glen Canyon National Recreation Area⁴NA = Not Available⁵Stock ponds, impoundments, earth "tanks"⁶Catchment = apron + storage tank + pipe + trough⁷Storage tanks, "ring tanks", steel tanks, concrete tanks

Table 28. San Juan Resource Area

Allotment Name	Miles of Fences ¹	Corrals ¹	Line Shacks ¹	Cattle Guards ¹	
Indian Creek	0	0	0	0	
White Canyon	0	0	0	0	
Lake Canyon	1 1/2 miles	0	1	0	
Slickhorn	0	0	0	0	
Perkins	1/10 miles	0	0	0	
Texas Muley	0	0	0	0	

¹In or adjacent (within two miles) to Glen Canyon National Recreation Area

VERMILLION RESOURCE AREA

Table 29. Vermillion Resource Area

Allotment Name	Allotment Number	AMP ¹	Year	Implemented	Management Class ²	Management System ³	Season of Use ^{4,9}
Ferry Swale	5336	Yes	1992	Yes	I	DR	11/1-4/15
Wahweap	5340	No	-	-	C	CG	AY
Lees Ferry	5332	Yes	1983	Yes	I	DRR	11/1-4/15

Table 30. Vermillion Resource Area

Allotment Name	Total Preference ₃	Active Preference ₃	Livestock Class ⁶	Wildlife AUMs ⁵	
Ferry Swale	2631	1818	C	0	
Wahweap	648	276	C/H	0	
Lees Ferry	1266	540	C	0	

Table 31. Vermillion Resource Area

Actual use by year ^{5,7}	85-86	86-87	87-88	88-89	89-90	90-91	91-92	92-93	93-94	94-95
Ferry Swale	1280	1339	1335	1568	1610	1485	1039	918	867	1162
Wahweap	216	276	276	276	183	158	276	276	21	73
Lees Ferry ¹	540	540	0	644	540	0	589	540	0	540

¹Allotment Management Plan

²I = Improvement C = Custodial

³DR = Deferred Rotation CG = Continuous Grazing

⁴AY = All year

⁵Animal Unit Months (AUM's)

⁶C = Cattle H = Horses

⁷NA = Not Available

⁸Only AUM's on Glen Canyon National Recreation Area reported

⁹Season of use within Glen Canyon National Recreation Area

Table 32 Vermillion Resource Area

Allotment Name	Total Acres In Allotment	Acres in NRA (%) ^{1, 4}	Acres Suitable For Grazing in NRA (%) ^{2, 4}	Active Acres in NRA ⁴	Unallotted Acres in NRA ⁴
Ferry Swale	40,898	14,584 (36)	14,584 (100)	14,584	0
Wahweap	10,702	10,702 (100)	5,990 (56)	5,990	4,712
Lees Ferry	20,060	3,760 (19)	3,760 (100)	3,760	0

Table 33. Vermillion Resource Area

Allotment Name	Total Trend Plots	Trend Plots in NRA ^{4, 9}	Trend 1988 ⁹	% PNC 1988 ^{5, 9}	% Late Seral 1988 ⁹	% Mid Seral 1988 ⁹	% Early Seral 1988 ⁹
Ferry Swale	1	0	NA	NA	NA	NA	NA
Wahweap	0	NA	NA	NA	NA	NA	NA
Lees Ferry	2	0	Static	NA	NA	NA	NA

¹Percentage of "Total Acres in Allotment"²Percentage of "Acres in NRA"³In or adjacent to Glen Canyon National Recreation Area⁴Glen Canyon National Recreation Area⁵Potential Natural Community⁶Stock ponds, impoundments, earth "tanks"⁷Catchment = apron + storage tank + pipe + trough⁸Storage tanks, "ring tanks", steel tanks, concrete tanks⁹NA = Not Available

Table 34. Vermillion Resource Area

Allotment Name	Developed Springs ³	Undeveloped Springs ^{3,9}	Reservoirs ^{3,6}	Catchments ^{3,7}	Tanks ^{3,8,9}	Rain Gauges ³
Ferry Swale	0	NA	4	0	4	1
Wahweap	0	0	1	0	4	0
Lees Ferry	3	0	0	0	1	0

Table 35. Vermillion Resource Area

Allotment Name	Miles of Fences ^{1,2}	Corrals ^{1,2}	Line Shacks ^{1,2}	Cattle Guards ^{1,2}	
Ferry Swale	19	2	0	4	
Wahweap	13	1	0	0	
Lees Ferry	1.5	1	0	0	

¹Percentage of "Total Acres in Allotment"

²Percentage of "Acres in NRA"

³In or adjacent to Glen Canyon National Recreation Area

⁴Glen Canyon National Recreation Area

⁵Potential Natural Community

⁶Stock ponds, impoundments, earth "tanks"

⁷Catchment = apron + storage tank + pipe + trough

⁸Storage tanks, "ring tanks", steel tanks, concrete tanks

⁹NA = Not Available

**APPENDIX C - RANGE SITES AND POTENTIAL NATURAL COMMUNITIES
IN GLEN CANYON NATIONAL RECREATION AREA**

Table 1. List of Soil Conservation Service ecological sites (range sites) within Glen Canyon NRA, with principal species.

SCS SITE*	SCS SITE NAME	PRINCIPAL SPECIES
109D	DESERT LOAM	<i>Atriplex confertifolia</i>
115D*	DESERT SAND	<i>Stipa hymenoides</i> / <i>Hilaria jamesii</i>
118D*	DESERT SANDY LOAM	<i>Ephedra cutleri</i>
121D*	DESERT SANDY LOAM	<i>Coleogyne ramosissima</i>
122D	DESERT SHALLOW LOAM	<i>Atriplex confertifolia</i>
123D*	DESERT SHALLOW LOAM	<i>Atriplex confertifolia</i> / <i>Hilaria jamesii</i>
124D*	DESERT SHALLOW CLAY	<i>Atriplex corrugata</i>
125D	DESERT SHALLOW CLAY	<i>Hilaria jamesii</i> / <i>Atriplex confertifolia</i>
130D*	DESERT SHALLOW SANDY LOAM	<i>Hilaria jamesii</i> / <i>Atriplex confertifolia</i>
133D*	DESERT SHALLOW SANDY LOAM	<i>Coleogyne ramosissima</i>
136D*	DESERT STONY LOAM	<i>Atriplex confertifolia</i> / <i>Hilaria jamesii</i>
139D	DESERT STONY LOAM	<i>Coleogyne ramosissima</i>
142D	DESERT VERY SHALLOW GYPSUM	<i>Atriplex corrugata</i> / <i>Tiquilia</i>
206SD	SEMIDESERT GRAVELLY LOAM	<i>Pinus edulis</i> / <i>Juniperus osteosperma</i>
209SD	SEMIDESERT LOAM	<i>Artemisia tridentata</i> / <i>Stipa hymenoides</i>
212SD	SEMIDESERT SAND	<i>Stipa hymenoides</i>
215SD	SEMIDESERT SANDY LOAM	<i>Stipa hymenoides</i>
218SD	SEMIDESERT SANDY LOAM	<i>Stipa hymenoides</i>
223SD*	SEMIDESERT SHALLOW CLAY	<i>Atriplex corrugata</i> / <i>Hilaria jamesii</i>
224SD	SEMIDESERT SHALLOW SAND	<i>Coleogyne ramosissima</i>
227SD	SEMIDESERT SHALLOW SAND	<i>Pinus edulis</i> / <i>Juniperus osteosperma</i>
230SD*	SEMIDESERT SHALLOW SANDY LOAM	<i>Atriplex confertifolia</i>
233SD*	SEMIDESERT SHALLOW SANDY LOAM	<i>Coleogyne ramosissima</i>
236SD	SEMIDESERT SHALLOW SANDY LOAM	<i>Pinus edulis</i> / <i>Juniperus osteosperma</i>
242SD	SEMIDESERT STONY LOAM	<i>Hilaria jamesii</i> / <i>Atriplex confertifolia</i>
243SD	SEMIDESERT STONY LOAM	<i>Coleogyne ramosissima</i>
246SD	SEMIDESERT STONY LOAM	<i>Pinus edulis</i> / <i>Juniperus osteosperma</i>
260SD	SEMIDESERT VERY STEEP STONY LOAM	<i>Juniperus osteosperma</i> / <i>Elymus salinus</i>

Table 1 (continued).

SCS SITE	SCS SITE NAME	PRINCIPAL SPECIES
302U	UPLAND DISSECTED SLOPE	<i>Pinus edulis</i> / <i>Juniperus osteosperma</i>
306U	UPLAND LOAM	<i>Artemisia tridentata</i> / <i>Stipa comata</i>
309U	UPLAND SAND	<i>Sporobolus cryptandrus</i> / <i>S. contractus</i>
312U	UPLAND SHALLOW LOAM	<i>Artemisia nova</i> / <i>Poa fendleriana</i>
315U	UPLAND SHALLOW LOAM	<i>Pinus edulis</i> / <i>Juniperus osteosperma</i>
317U	UPLAND STEEP STONY LOAM	<i>Pinus edulis</i> / <i>Juniperus osteosperma</i>
328U	UPLAND VERY STEEP STONY LOAM	<i>Pinus edulis</i> / <i>Juniperus osteosperma</i>
003	ALKALI BOTTOM	<i>Sarcobatus vermiculatus</i> / <i>Sporobolus airoides</i>
009	ALKALI FLAT	<i>Sporobolus airoides</i> / <i>Elymus elymoides</i>
011	LOAMY BOTTOM	<i>Artemisia tridentata</i> / <i>Elymus smithii</i>
012	SEMI-WET SALT STREAMBANK	<i>Sporobolus airoides</i> / <i>Salix exigua</i>
015*	SANDY BOTTOM	<i>Atriplex canescens</i> / <i>Stipa hymenoides</i>
018*	TALUS SLOPE	<i>Ephedra torreyana</i> / <i>Elymus salinus</i>

*Based in part on site-specific field work done in Glen Canyon NRA

Table 2. Potential natural community composition for grassland and sand shrub SCS ecological sites in Glen Canyon NRA. Percent composition by weight is shown for selected species and groups. SCS site classification is in Table 8.

SPECIES X ECOLOGICAL SITE	115D	118D	212SD	215SD	309U
<i>Stipa hymenoides</i> (Indian ricegrass)	25*	40*	30*	30*	10*
<i>Hilaria jamesii</i> (galleta grass)	10*	15*	5	10*	-
<i>Sporobolus</i> species (dropseeds)	-	5	5	5	30*
<i>Bouteloua gracilis</i> (blue grama)	-	-	-	-	10*
<i>Stipa comata</i> (needle-and-thread)	p	p	5	10*	10*
Other grasses (perennial/annual)	1	1	5	5	5
Perennial forbs	3	5	10	5	10
Annual forbs	3	2	5	3	p
<i>Atriplex canescens</i> (4-wing saltbush)	3	p	10*	15*	5
<i>Ephedra</i> species (mormon tea)	40*	15*	5	5	15*
<i>Coleogyne ramosissima</i> (blackbrush)	2	5	-	-	-
<i>Ceratoides lanata</i> (winterfat)	-	p	-	5	5
<i>Gutierrezia</i> species (snakeweed)	5	1	p	p	p
<i>Artemisia filifolia</i> (sand sagebrush)	p	p	5	-	-
Other shrub species	1	1	10	5	p
<i>Opuntia</i> species (prickly pear)	p	4	p	p	p
<i>Yucca</i> species	2	1	-	-	-

*=key species (these can vary from site to site by $\pm 5\%$).

p=present, variable in amount but often $<1\%$.

Table 3. Potential natural community composition for blackbrush SCS ecological sites in Glen Canyon NRA. Percent composition by weight is shown for selected species and groups. Common names can be found in Table 1 for most species. SCS site classification is in Table 8.

SPECIES X ECOLOGICAL SITE	121D	218D	224SD	133D	139D	233SD	243SD
<i>Stipa hymenoides</i>	10*	20*	15*	8*	3	15*	3
<i>Sporobolus</i> species	3	3	p	-	2	-	2
<i>Hilaria jamesii</i>	9*	15*	p	6	17*	5	15*
<i>Stipa comata</i>	-	-	p	-	-	-	-
Other perennial grasses	-	10	10	-	1	5	-
Annual grasses	1	p	p	1	2	2	5
Perennial forbs	5	10	2	2	3	1	5
Annual forbs	3	p	3	3	7	p	5
<i>Coleogyne ramosissima</i>	50*	17*	45*	45*	35*	50*	35*
<i>Ephedra</i> species	12*	8	10*	15*	5	5	5
<i>Gutierrezia</i> species	5	3	p	5	5	5	2
<i>Atriplex canescens</i>	3	7	p	3	-	-	3
<i>Ceratoides lanata</i>	-	2	-	-	-	-	p
<i>Atriplex confertifolia</i>	-	-	-	5	-	-	7*
Other shrub species	p	p	10	7	20*	10	10
<i>Opuntia</i>	p	p	2	p	p	1	p
<i>Yucca</i>	p	p	-	p	p	1	2

*=key species (these can vary from site to site by $\pm 5\%$).

p=present in variable amounts, often $<1\%$.

Table 4. Potential natural community composition for shadscale and saltbush SCS ecological sites in Glen Canyon NRA. Percent composition by weight is shown for selected species and groups. SCS site classification is in Table 8.

SPECIES X ECOLOGICAL SITE	109D	130D	142D	125D	136D	122D
<i>Hilaria jamesii</i>	15*	25*	10*	25*	20*	15*
<i>Stipa hymenoides</i>	13*	15*	3	p	10*	10*
<i>Sporobolus</i> species	5	-	3	p	2	5
Other perennial grasses	2	2	2	10	3	-
Annual grasses	2	3	1	2	3	p
Perennial forbs	5	5	20*#	10	6	10
Annual forbs	3	10	5	3	1	p
<i>Atriplex confertifolia</i> (shadscale)	30*	15*	20*	25*	30*	30*
<i>Ceratoides lanata</i>	5	10*	-	-	-	5
<i>Artemisia spinescens</i> (bud sagebrush)	5	-	-	2	-	5
<i>Ephedra</i> species	5	-	15*	8	1	10
<i>Gutierrezia</i> species	5	2	p	p	1	p
<i>Artemisia bigelovii</i> (Bigelow sagebrush)	-	-	-	-	5	-
<i>Coleogyne ramosissima</i>	-	5	-	p	10	-
<i>Atriplex corrugata</i> (mat saltbush)	-	-	20*	-	-	-
<i>Tetradymia spinosa</i> (spiny horsebrush)	-	-	-	-	5	-
Other shrub species	5	8	-	15	3	8

*=key species (these can vary from site to site by $\pm 5\%$). #10% composition by *Tiquilia latior*.

p=present in variable amounts, often <1%.

Table 4 (continued).

SPECIES X ECOLOGICAL SITE	230SD	242SD	123D	124D	223SD
<i>Hilaria jamesii</i>	25*	30*	20*	10*	15*
<i>Stipa hymenoides</i>	5	10	10	10	5
<i>Sporobolus</i> species	5	2	3	-	-
Other perennial grasses	5	3	1	5	3
Annual grasses	p	p	1	p	2
Perennial forbs	6	10	6	5	10
Annual forbs	2	p	4	5	5
<i>Atriplex confertifolia</i> (shadscale)	20*	20*	35*	10	20*
<i>Ceratoides lanata</i>	p	5	2	-	-
<i>Artemisia spinescens</i> (bud sagebrush)	-	-	2	5	5
<i>Ephedra</i> species	7	5	2	5	10
<i>Gutierrezia</i> species	5	p	2	-	p
<i>Artemisia bigelovii</i> (Bigelow sagebrush)	5*	5*	-	-	-
<i>Coleogyne ramosissima</i>	-	-	-	-	-
<i>Atriplex corrugata</i> (mat saltbush)	-	-	-	45*	20*
<i>Tetradymia spinosa</i> (spiny horsebrush)	-	p	5	p	p
Other shrub species	15	10	7	-	5

*=key species (these can vary from site to site by $\pm 5\%$).

p=present in variable amounts, often $<1\%$.

Table 5. Potential natural community composition for miscellaneous shrub communities and SCS ecological sites in Glen Canyon NRA. Percent composition by weight is shown for selected species and groups. SCS site classification is in Table 8.

SPECIES X ECOLOGICAL SITES	018	209SD	306U	312U	CELA ¹
<i>Hilaria jamesii</i>	10*	10*	5	p	25*
<i>Stipa hymenoides</i>	10	15*	10	p	25*
<i>Poa</i> species (bluegrass)	-	-	p	20*	-
<i>Stipa comata</i>	-	5	15*	5	-
<i>Bouteloua gracilis</i> (blue grama)	-	p	5	10*	-
Other perennial grasses	10*#	15	10	10	2
Annual grasses	p	p	-	-	10
Perennial forbs	10	10	10	12	3
Annual forbs	5	p	p	p	2
<i>Artemisia tridentata</i> (big sagebrush)	-	20*	25*	-	-
<i>Artemisia nova</i> (black sagebrush)	-	p	p	20*	-
<i>Atriplex canescens</i>	-	5	5	-	p
<i>Ephedra</i> species	35*	-	5	5	p
<i>Ceratoides lanata</i>	-	5	5	-	25*
<i>Chrysothamnus</i> species	p	p	-	5	-
<i>Gutierrezia</i> species	5	p	p	-	p
Other shrub species	15	10	5	13*@	8

¹based on cover rather than biomass, data from Rasmussen and Brotherson (1986); *=key species (these can vary from site to site by $\pm 5\%$). p=present in variable amounts, often <1%. #5% *Elymus salina*; @5% *Cercocarpus montanus*.

Table 6. Potential natural community composition for piñon-juniper SCS ecological sites in Glen Canyon NRA. Percent composition by weight is shown for selected species and groups in the understory. All sites are dominated by two-needled piñon (*Pinus edulis*), Utah juniper (*Juniperus osteosperma*), or both. SCS site classification is in Table 8.

SPECIES X ECOLOGICAL SITES	227SD	260SD	206SD	236SD	246SD
<i>Stipa hymenoides</i>	10	15*	10*	7	20*
<i>Hilaria jamesii</i>	7	5	15*	7	5
<i>Elymus salinus</i>	p	15*	-	p	-
<i>Stipa comata</i>	3	-	5	3	-
Other perennial grasses	5	5	10	3	5
Annual grasses	p	p	p	p	p
Perennial forbs	10	10	10	10	5
Annual forbs	p	p	5	p	5
<i>Artemisia bigelovii</i>	15*	5	-	5	5
<i>Ephedra</i> species	10	10	10	10	10
<i>Shepherdia rotundifolia</i> (buffaloberry)	5	-	-	p	-
<i>Coleogyne ramosissima</i>	-	-	10*	35*	-
<i>Gutierrezia</i> species	p	p	p	p	p
<i>Ceratoides lanata</i>	-	5	-	-	10*
<i>Atriplex confertifolia</i>	-	20*	-	-	25*
<i>Atriplex canescens</i>	-	-	10	-	p
Other shrub species	35	10	15	20	25*

*=key species (these can vary from site to site by $\pm 5\%$).

p=present, variable in amount but often $<1\%$.

Table 6 (continued).

SPECIES X ECOLOGICAL SITES	315U	302U	317U	328U
<i>Stipa hymenoides</i>	5	3	10	5
<i>Poa</i> species	5	-	p	p
<i>Hilaria jamesii</i>	5	-	p	p
<i>Elymus elymoides</i> (squirrel-tail)	-	7*	-	-
<i>Elymus salinus</i>	-	2	40*	35*
<i>Stipa comata</i>	-	3	p	P
Other perennial grasses	5	p	10	P
Annual grasses	p	p	p	P
Perennial forbs	8*#	10	10*#	5
Annual forbs	2	p	p	P
<i>Artemisia bigelovii</i>	20*	-	-	P
<i>Ephedra</i> species	15*	5	5	5
<i>Shepherdia rotundifolia</i>	5	50*	10*	10*
<i>Symphoricarpos longiflorus</i>	-	-	5	5
<i>Amelanchier utahensis</i>	-	-	-	15*
<i>Cercocarpus montanus</i>		-	-	10*
<i>Gutierrezia</i> species	5	-	-	-
<i>Purshia mexicana</i>	5	-	-	-
Other species	20	20	10	10

*=key species (these can vary from site to site by $\pm 5\%$); #5% *Petradoria pumila*;
p=present, variable in amount but often <1%.

Table 7. Potential natural community composition for riparian SCS ecological sites in Glen Canyon NRA. Percent composition by weight is shown for selected species and groups. SCS site classification is in Table 8.

SPECIES X ECOLOGICAL SITE	003	009	011	012	015
<i>Sporobolus airoides</i> (alakali sacaton)	25*	10*	-	35*	-
<i>Elymus elymoides</i>	5	10*	5	-	p
<i>Sporobolus</i> species	p	5	-	p	5
<i>Hilaria jamesii</i>	-	5	-	p	15*
<i>Stipa hymenoides</i>	-	5	5	5	25*
<i>Distichlis spicata</i> (saltgrass)	-	p	-	10*	p
<i>Bouteloua gracilis</i>	-	-	10*	-	-
<i>Poa</i> species	-	-	10*	-	-
Other perennial grasses	-	-	20*#	-	10
Annual grasses	p	p	p	p	p
<i>Juncus</i> species (rush)	-	-	-	p	p
Perennial forbs	10	10	p	5	5
Annual forbs	p	5	5	5	5
<i>Salix exigua</i> (coyote willow)	-	-	-	15*	-
<i>Populus fremontii</i> (Fremont cottonwood)	-	-	-	5*	-
<i>Chrysothamnus nauseosus</i> (rabbittbrush)	p	-	5	5	p
<i>Tamarix chinensis</i> (tamarisk)	-	-	-	5	-
<i>Sarcobatus vermiculatus</i> (greasewood)	45*	30*	-	-	-
<i>Sueda</i> species (seepweed)	5	p	-	-	-
<i>Artemisia tridentata</i>	p	-	30*	-	p
<i>Ceratoides lanata</i>	-	-	-	p	5
<i>Atriplex confertifolia</i>	-	p	-		-
<i>Atriplex canescens</i>	p	-	5	p	10*
<i>Ephedra</i> species	-	-	-	p	5
<i>Gutierrezia</i> species	-	-	-	-	5
Other shrubs	10	10	5	10	10

*=key species (these can vary from site to site by $\pm 5\%$); #10% *Elymus smithii* (western wheatgrass);

p=present, variable in

amount but often <1%.

Table 8. Species composition in permanent riparian zones in Glen Canyon NRA (data from Spence 1995). The mean percent contribution to total cover in each vegetation type for selected species is shown (values do not add to 100%).

SPECIES X SITES ¹ (N=number of plots)	POFR (N=33)	SAEX (N=17)	MiFo (N=10)	PAVI (N=9)
<i>Salix exigua</i> (coyote willow)	p	15*	p	-
<i>Baccharis salicina</i> (seep willow)	4*	10*	5	p
<i>Populus fremontii</i> (Fremont cottonwood)	14*	p	p	3
<i>Juncus arcticus</i> (arctic rush)	p	17*	17*	5
<i>Equisetum hyemale</i> (horsetail)	3	16*	16*	6
<i>Euthamia occidentalis</i> (western goldenrod)	-	-	12*	-
<i>Elymus canadensis</i> (Canada wildrye)	3	5	5	-
<i>Oxytenia acerosa</i> (copperweed)	1	p	p	10*
<i>Panicum virgatum</i> (switchgrass)	p	3	3	15*
<i>Tamarix chinensis</i> (tamarisk)	p	p	-	p
<i>Melilotus alba/officinalis</i> (sweetclover)	p	p	p	p
<i>Chrysothamnus viscidiflorus</i> (rabbittbrush)	3*	p	-	p
<i>Chrysothamnus nauseosus</i> (rabbittbrush)	4*	-	-	p
<i>Distichlis spicata</i> (saltgrass)	p	p	p	p
<i>Salix goodingii</i> (Gooding's willow)	2*	-	-	-
<i>Ipomopsis aggregata</i> (skyrocket gilia)	1	p	p	4
<i>Oenothera longissima</i> (tall evening-primrose)	1	p	p	3
<i>Muhlenbergia asperifolia</i> (scratchgrass)	1	p	6	5*
<i>Gutierrezia species</i> (snakeweed)	p	-	-	p
<i>Artemisia ludoviciana</i> (false-tarragon)	4	p	p	p
<i>Castilleja linariifolia</i> (Wyoming paintbrush)	2	p	p	p
<i>Stipa hymenoides</i> (indian ricegrass)	1	-	-	-
<i>Clematis ligusticifolia</i> (western virgin-bower)	3	-	-	-
<i>Rhus aromatic</i> (squawbush)	1	-	-	-

¹POFR=*Populus fremontii* woodland, SAEX=*Salix exigua*-*Baccharis salicina* scrub, MiFo=Mixed forb community, PAVI=*Panicum virgatum* grassland. *=key species; p=present, variable in amount but often <1%.

Table 9. Undesirable adventive and native species of concern in Glen Canyon NRA.

SPECIES	COMMON NAME	ORIGIN ¹	HABITAT ²
<i>Astragalus species</i>	Locoweeds	N	U
<i>Bromus diandrus</i>	Ripgut brome	I	R
<i>B. rubens</i>	Red brome	I	R/U
<i>B. tectorum</i>	Cheatgrass	I	R/U
<i>Centaurea repens</i>	Russian Knapweed	I	R/U
<i>Elaeagnus angustifolia</i>	Russian olive	I	R
<i>Gutierrezia microcephala</i>	Thread snakeweed	N	R/U
<i>G. sarothrae</i>	Broom snakeweed	N	U
<i>Melilotus alba</i>	White sweet-clover	I	R
<i>M. officinalis</i>	Yellow sweet-clover	I	R
<i>Salsola tragus</i>	Russian thistle	I	U
<i>Tamarix chinensis</i>	Tamarisk	I	R
<i>Xanthium strumarium</i>	Cocklebur	I	R

¹Origin: I=introduced, N=ative.

²Habitat: R=riparian-wetland, U=upland-desert.

APPENDIX D - ACTIONS AND MONITORING

The National Park Service, in cooperation with the Bureau of Land Management, will develop a monitoring plan that will identify monitoring requirements and methods for each resource. The actions and/or monitoring requirements identified in this appendix in 1997 address minimum information needs as a beginning point for development of that monitoring plan. As development of a monitoring plan progresses and monitoring data or research results dictate, this appendix will be amended. Upon completion of the monitoring plan this appendix will be the monitoring plan utilized by Glen Canyon NRA to determine if resource goals and objectives are being met.

- * Each resource will be analyzed to determine the adequacy of existing baseline information. Where baseline information is lacking it will be obtained.
- * Monitoring will include comparison of resources in grazed and ungrazed conditions.
- * Development of the monitoring plan will include research needed to determine the potential application of new monitoring methods that will address multiple resources in a holistic manner or on a landscape scale.
- * To reflect the limited human and fiscal resources available the monitoring plan will be designed to obtain the greatest efficiency and provide timely data with a minimal level of effort.

Vegetation resources

- * Key areas and species will be identified.
- * Establish criteria to determine the number and location of trend plots, transects and grazing exclosures.
- * Develop monitoring schedule for plots, transects and exclosures to determine baseline variability and trend (may be annual for 3 years and every 5 years thereafter).
- * Utilization monitoring will be done annually.
- * Upon determination that special status species are present monitoring requirements for each species will be developed. Monitoring will be done to determine effects of livestock and provide information necessary to formulate actions to mitigate those effects. Special status species monitoring may be intense (annual) during initial data gathering and less intensive (every 3-5 years) after mitigation actions are implemented.
- * Monitoring schedules for scientifically important areas may be intense until special designation is achieved after which monitoring will only be necessary to insure the integrity of the designated area.
- * Wetlands, riparian and seep and spring monitoring requirements must reflect site specific needs and may require monitoring for 2 years (either once or twice per year depending on site and objectives), then at least once every 3 years (more often may be necessary during wet climate phases).

Soils

- * Develop a monitoring protocol and schedule that will obtain information on nutrient analysis, organic matter and soil respiration rates.
- * Monitoring will provide information on litter component, rill expansion, soil loss and cryptobiotic crust occurrence.
- * Monitoring sites will, at a minimum, include sites that have been utilized at 60% or greater as well as locations determined as necessary to provide trend information.
- * Sediment loading will be monitored at identified riparian sites.

Water

- * Determine protocols to be used for water monitoring, i.e., Standard Methods, US Geologic Survey or Utah state standards.
- * Identify streams, springs, and seeps that will be monitored.
- * Determine seasonal flow and establish acceptable seasonal variances.
- * Establish monitoring protocols for dissolved oxygen.
- * Identify water resources used for recreational purposes and establish monitoring plan for these water resources which includes description of indicator species and sampling and processing protocols. Bacterial monitoring at popular beach camping sites at lakeshore locations within allotments will be required.
- * EPA Rapid Bioassessment Protocol will be used to conduct biological assessments of the aquatic communities. An Index of Biotic Integrity (IBI) such as established by Karr, or locally modified indices for aquatic invertebrates will be utilized to develop monitoring protocols for aquatic resources.
- * Establish a monitoring schedule of biological assessments to detect a loss of species, or a shift in species composition (dominance or abundance) to serve as an indicator that livestock may be adversely affecting water quality and/or the aquatic community.
- * Streamside management zones (SMZ) to protect riparian resources will be established. Stream morphology and channel stability will be characterized based on the Rosgen classification system (Rosgen 1984). Streamside management zones will be established based on stream classification, riparian vegetation communities and aquatic communities, using standard BLM methods where possible. Highly erodible soils or geologic strata containing potential contaminants such as trace elements, salts or minerals/petroleum will be identified. Instream flows will be quantified.

Wildlife

- * Based on locations and habitat needs of special Status Species, develop monitoring plans for each species to detect negative impacts to stable populations and provide data needed to enhance nonstable populations.

*Coordinate Special Status Species monitoring with the Fish and Wildlife Service as necessary.

* Monitoring will provide data necessary to determine if impacts to native wildlife populations are occurring because of livestock grazing activities.

* Monitoring plans will provide data on forage utilization and forage availability for wildlife populations.

* Monitoring of avifauna and mammal populations will be done.

* Following inventory efforts to determine the presence and diversity of herpetofauna, herpetofauna will be monitored.

* To-date, very limited information on invertebrates within Glen Canyon NRA exists. Survey and monitoring will be necessary to establish baseline information and detect change.

* Predators will be monitored in the same manner as other mammals or raptors. The BLM will inform NPS regarding individual problem animals.

Cultural

* All alcove, open surface, historic and rock art sites that are fenced to prevent livestock impacts will be monitored to ensure that livestock access remains restricted. Unfenced sites will be monitored to insure that sites are protected in-situ.

Paleontological and Quaternary

* Monitoring of paleontological and quaternary sites will be accomplished.

Scenic

* Monitoring plan will include locations of photograph points and a schedule of when comparison photographs will be taken.

Recreation

* Monitoring will include use of visitor surveys and analysis of reported conflicts.

Current Management/Monitoring Constraints

- i) administrative constraints - As mentioned above, Glen Canyon NRA has two managers, the BLM and NPS. The administrative responsibilities of grazing belong to the BLM. The BLM, is divided into five separate field offices, representing two states (Arizona and Utah). Each BLM Field Office has partial authority of the grazing administration of the NRA. This has resulted in five unique management/monitoring programs.

- ii) boundary constraints - Grazing currently occurs on 29 allotments representing 880,000 acres of upland and riparian plant communities of Glen Canyon NRA. The majority of these allotments have shared responsibilities because allotment boundaries cross agency boundaries. For example, the Rock-Creek Mudholes allotment is shared by the NRA and the Grand Staircase-Escalante National Monument. Similarly, the Waterpocket Fold Allotment is shared by the NRA and the BLM Henry Mountain Field Office. As a result of these agency partnerships, total acreage of the 29 allotments exceeds 3 million acres. Assessments and consequent management changes should reflect the 3+ million acres currently being managed.
- iii) personnel constraints - The current land responsibility of each BLM range conservationist assigned to NPS allotments is approximately 500,000 acres. It has been clearly stated by BLM personnel that while they will assist with the monitoring of the NRA, they can not offer any assistance beyond what they are currently required to do. Moreover, the NPS can allocate the time and resources of only one full-time employee to the monitoring of rangeland resources.
- iv) economic constraints - The NPS does not have a hard source of money to monitor resources on an annual basis.
- v) scientific constraints - The NPS will engage only in field monitoring activities that can provide both statistically and biologically meaningful information.

Actions

In January 1998, the NRA hired a Range Ecologist. During the ensuing year the Range Ecologist systematically evaluated the management of each of the five BLM Resource areas responsible for the grazing administration of park lands. The results of this analysis were presented at an Interagency Meeting in Escalante Utah, January 1999. The upshot was that 1) each resource area managed/monitored rangeland resources differently in regards to estimating carrying capacity, season of use, integration of cultural and natural resource information (other than forage species and big game), monitoring and assessment techniques, and enforcement of cooperative agreements (e.g. fence maintenance) and trespass regulations 2) there were few allotment management plans to provide direction towards protection of natural and cultural resources on park lands. The presentation of this information resulted in an agreement by all BLM resource areas and NPS staff to focus management/monitoring efforts on priority allotments. We supported this because prioritization of allotments will facilitate the ability to address management and monitoring issues given the management constraints mentioned above.

The allotments were prioritized according to size, management status, and problem history. There are five priority allotments that represent 51% of the active grazing acres in the NRA and are as follows: Rock Creek-Mudholes, Soda and Lake allotments (Grand Staircase-Escalante National Monument) Sewing Machine allotment (Henry Mountain Field Office), and the Lake Canyon allotment (San Juan Field Office). During the months of June and July 1999 a meeting was held between the NPS and each BLM Field Office to begin the assessment process for each of the allotments. After the assessment process is completed for each allotment and gaps in management information as well as specific resource problems are identified, issue-driven monitoring plans will be crafted and implemented. Our expectation is to complete the evaluation of the Lake Canyon and Sewing Machine Allotments in 2000 and implement monitoring plans in 2001. The assessments for the Rock Creek-Mudholes, Soda and Lake allotments will most likely be completed in 2001 with a monitoring plan in place in 2002.

**APPENDIX E - KEY INDICATOR SPECIES, SPECIAL STATUS SPECIES, AND
SCIENTIFICALLY IMPORTANT AREAS IN GLEN CANYON NATIONAL RECREATION
AREA**

Table 1. KEY INDICATOR SPECIES by BLM resource area and allotment within Glen Canyon NRA. If an allotment is not specified then key species are the same in all allotments within the resource area.

RESOURCE AREA and ALLOTMENT	UPLAND SITES	RIPARIAN SITES
Vermillion Resource Area	Sthy-Spcr-Atca	none present
Kanab Resource Area	Sthy-Atca-Putr	Salix, Pofr, Muas
Escalante Resource Area		
Moody Allotment	Sthy-Atca	Salix, Pofr, Muas
Soda Allotment	Sthy-Atca-Cora	Salix, Pofr, Muas
Lake Allotment	Sthy-Elsm	Salix, Pofr, Muas
All other allotments	Sthy-Spcr-Atca	Salix, Pofr, Muas
Henry Mountains Resource Area	Sthy-Spcr-Hija	Salix, Pofr, Muas
San Juan Resource Area		
Indian Creek Allotment	Sthy-Stco-Hija	Salix, Pofr, Muas
Lake Canyon Allotment	Sthy-Hija-Epvi-Cora	Salix, Pofr, Muas
Texas Muley Allotment	Sthy-Stco-Atca-Artr	Salix, Pofr, Muas
All other allotments	Sthy-Hija-Atca-Epvi	Salix, Pofr, Muas
San Rafael Resource Area	Sthy-Atca	Salix, Pofr, Muas

Species acronyms. UPLAND: Sthy=Stipa (Oryzopsis) hymenoides; Spcr=Sporobolus cryptandrus; Atca=Atriplex canescens; Putr=Purshia tridentata; Cora=Coleogyna ramosissima; Elsm=Elymus (Agropyron) smithii; Hija=Hilaria jamesii; Stco=Stipa comata; Epvi=Ephedra viridis (includes E. cutleri); Artr=Artemisia tridentata. RIPARIAN: Salix=Salix exigua, S. goodingii, S. lutea or other species; Pofr=Populus fremontii; Muas=Muhlenbergia asperifolia.

Table 2. SPECIAL STATUS SPECIES (including federally listed or candidate plant species or Utah state sensitive species) within Glen Canyon NRA.

SPECIES	FEDERAL/STATE STATUS
<i>Aralia racemosa</i>	--/S1
<i>Camissonia atwoodii</i> ¹	C2/S1
<i>Carex specuicola</i>	Listed threatened
<i>Cladium californicum</i>	--/S1
<i>Cycladenia jonesii</i> ¹	Listed Threatened
<i>Cymopterus higginsii</i> ¹	C2/S1
<i>Dalea flavescens</i> var. <i>epica</i> ¹	C2/S2
<i>Dodecatheon pulchellum</i> var. <i>zionense</i> ¹	--/S1
<i>Erigeron kachinensis</i>	C2/S1
<i>Erigeron zothecinus</i>	C2/S1
<i>Habenaria zothecina</i>	C2/S1
<i>Imperata brevifolia</i> ¹	--/S1
<i>Ostrya knowltonii</i>	--/S2
<i>Pediocactus bradyi</i>	Listed endangered
<i>Perityle specuicola</i>	C2/S1
<i>Psoralea thompsonae</i> var. <i>whitingii</i> ¹	C2/S1
<i>Rubus neomexicanus</i>	--/S1
<i>Viguiera soliceps</i> ¹	3C/S3

¹occurs in area currently or potentially grazed

Table 3. SCIENTIFICALLY IMPORTANT AREAS with significant vegetation resources. Rare species include all special status species. Areas are divided into those that are of have been grazed in the past, and those that appear to be relicts.

SITE	RESOURCE OF IMPORTANCE	ESTIMATED ACRES
Relict Sites		
Millard Canyon	relict Douglas fir stand	45
Lower Wilson's Creek	rare species; relict riparian forest	15
Horn Mesa	relict blackbrush and grassland	1115
5381 Mesa	relict blackbrush and grassland	1820
Monument Mesa	relict blackbrush and grassland	650
Mancos Mesa	relict blackbrush and grassland	1650
Romana Mesa	relict blackbrush	175
Stevens Bench	relict piñon-juniper and grassland	4810
Lower Gypsum Canyon	relict grassland	1720
Total acreage		12000
Scientifically Important Grazed Sites		
Muley Point	grasslands, rare species	200
Warm Creek Tropic Shale badlands ¹	rare species, saltbush	100
Last Chance Creek	rare species, hanging gardens	100
Happy Canyon	rare species, relict Douglas fir	45
North/South Blocks	near relict piñon-juniper, saltbush	100
Choproch Bench	near relict piñon-juniper	1340
Grand Bench	near relict blackbrush and grassland	1700
Lake Canyon	riparian communities	200
Mazuki Point	near relict blackbrush and grassland	1020
Wilson Mesa ²	see below	54000
Total acreage		58805

¹Selected representative area only, near Ahlstrom Point road junction.

²Based on an original 1992 NPS RNA proposal that includes Lower Wilson Creek and Cottonwood Canyon.

**APPENDIX F - PURPOSES AND SIGNIFICANCE OF GLEN CANYON NATIONAL
RECREATION AREA**

PURPOSES OF GLEN CANYON NATIONAL RECREATION AREA

To provide for public outdoor recreation use and enjoyment of Lake Powell and lands adjacent thereto.

To preserve and protect the scenic, scientific, and historic features contributing to public enjoyment of the area.

SIGNIFICANCE OF GLEN CANYON NATIONAL RECREATION AREA

- **Glen Canyon NRA offers a tremendous diversity of both water and land-based recreational opportunities.**

Glen Canyon National Recreation Area contains some of the most rugged and remote backcountry within the Colorado Plateau. A diversity of recreational opportunities including hiking, mountain biking, 4-wheel drive exploration, horseback riding, hunting, wildlife viewing, and backcountry camping is provided in an isolated and quiet environment.

Recreational uses such as pleasure boating, water skiing, swimming, kayaking, fishing, and remote beach camping are some of the water-based activities available at Lake Powell. These uses are intertwined with the surrounding environment and are oriented toward natural rather than man-made features or entertainment.

Enjoyment of the area began with early river runners, and today over three million people annually come to Glen Canyon to enjoy the unique environment. The Colorado River forms the backbone of the recreation area, but other waterways like the San Juan, Dirty Devil, Paria, and Escalante rivers have contributed to the topography by carving the labyrinth of spectacular canyons that exists today. Together, these opportunities enhance the visitor experience and provide a range of possibilities for river runners, canoeists, kayakers, and hikers.

- **Glen Canyon contains Lake Powell, the second largest man-made lake in North America, which provides both a unique opportunity to recreate in a natural environment and a transportation corridor to remote backcountry areas of Glen Canyon NRA.**

Created by Glen Canyon Dam—a major storage unit of the Upper Colorado River Storage Project authorized by Congress in 1956—this impoundment stretches along 186 miles of the Colorado River and 75 miles of the San Juan River. The reservoir is capable of holding 27 million acre feet of water, has a surface area of 255 square miles, and a shoreline of 1,960 miles.

The reservoir comprises only 13 percent of the recreation area, but offers a unique chance for visitors to experience hundreds of miles of remote shoreline in an arid environment, to boat into scenic, isolated canyons and drainages, and to participate in a myriad of water sports. The lake also serves as an access route for hikers into the backcountry. This variety of experiences adds to the wonder of Glen Canyon NRA and is what makes the recreation area a national treasure.

- Glen Canyon NRA, in the heart of the Colorado Plateau region, offers a unique combination of water and desert environment. It offers a natural diversity of rugged water and wind carved canyons, buttes, mesas, and other outstanding physiographic features.

The contrast between blue-green Lake Powell waters and surrounding vistas of red cliffs combined with the clarity of night skies and the opportunities for exploration make the recreation area a unique destination for visitors.

Geologically, it consists primarily of Jurassic Sandstone 140 to 200 million years old. Wind and water-deposited sands eventually consolidated into porous, loosely cemented sandstone. Through the processes of uplifting and rapid erosion, today's surface formations have been carved into the spectacular shapes and forms seen today. There are countless cliffs, spires, pinnacles, knobs, arches, and natural bridges throughout the area.

The bench and upland areas support a wide variety of Colorado Plateau plant communities ranging from the dominant cold desert, shrub-grassland to cottonwood, willow, and tamarisk groves near flowing water, and juniper-pinon woodlands at higher elevations. Most of these communities are located in some of the 588,855 acres classified as "Natural Zone" and recommended as suitable for wilderness designation. These areas are protected and managed so as to preserve the natural conditions.

- The climate and physical features of Glen Canyon NRA have created local environments favorable to the preservation of scientifically important objects, sites, populations, habitats or communities that are significant in and of themselves or provide opportunities to add to our understanding of past or ongoing events.

Eolian and alluvial deposits and packrat middens provide information for paleo-environmental reconstruction and an understanding of climatic change. The recreation area's quaternary resources, dinosaur trackways, megafaunal and paleofloral deposits are recognized internationally.

The recreation area encompasses upland and riparian habitat that supports populations of sensitive, endangered and threatened species including pediocactus, *cycladenia jonsii*, peregrine falcon, bald eagle, willow flycatcher, colorado squawfish, and razorback suckers. Found in the deep, narrow canyons, hanging gardens form along seeps in the canyon walls and in shaded plunge-basin riparian habitats and add interest, color, and diversity to the park.

The deep drainages of the Colorado River form distributional barriers for many wildlife species and relic vegetative communities. This provides opportunities for scientific studies related to genetic diversity, insularization, and relic and disturbed land comparisons.

- Evidence of 10,000 years of human occupation and use of resources within Glen Canyon NRA provides a continuing story of the prehistoric, historic, and present-day affiliation of humans and their environment.

Thousands of prehistoric archeological sites are present in Glen Canyon NRA including cliff dwellings, granaries, open habitation sites, lithic and ceramic scatters, and rock art panels. Paleoindian, Archaic, Fremont, and Ancestral Puebloan remains and historic structures provide evidence of prehistoric human use of the area. A museum collection of approximately 80,000 objects are curated at Park Headquarters and other museum facilities the west.

Traditional and cultural practices of modern American Indians continue based on a close affiliation and past use of lands within the recreation area. Modern American Indian groups continue to participate in traditional practices and view some areas of the NRA as sacred.

The area's historic period began with the exploration of the Dominguez-Escalante party in 1776, the first non-Indians to cross the river in Glen Canyon. John Wesley Powell's 1869 and 1871 expeditions helped to open this remote part of the west to settlement in the late 1800's. The Hole-in-the-Rock Trail and establishment of ferry crossings at Lees Ferry, Hite, and Hall's Crossing testify to the tenacity of early settlers and the difficulty of establishing transportation routes.

Authorized in 1956, construction of Glen Canyon Dam and its effects was one of the catalysts for the modern environmental movement. The Dam was completed in 1964 and Lake Powell reached full pool in 1980. The operation of Glen Canyon Dam and its effects on the ecosystem are still a subject of much study and controversy.

- Glen Canyon NRA constitutes a significant part of the outstanding public lands in the Colorado Plateau.

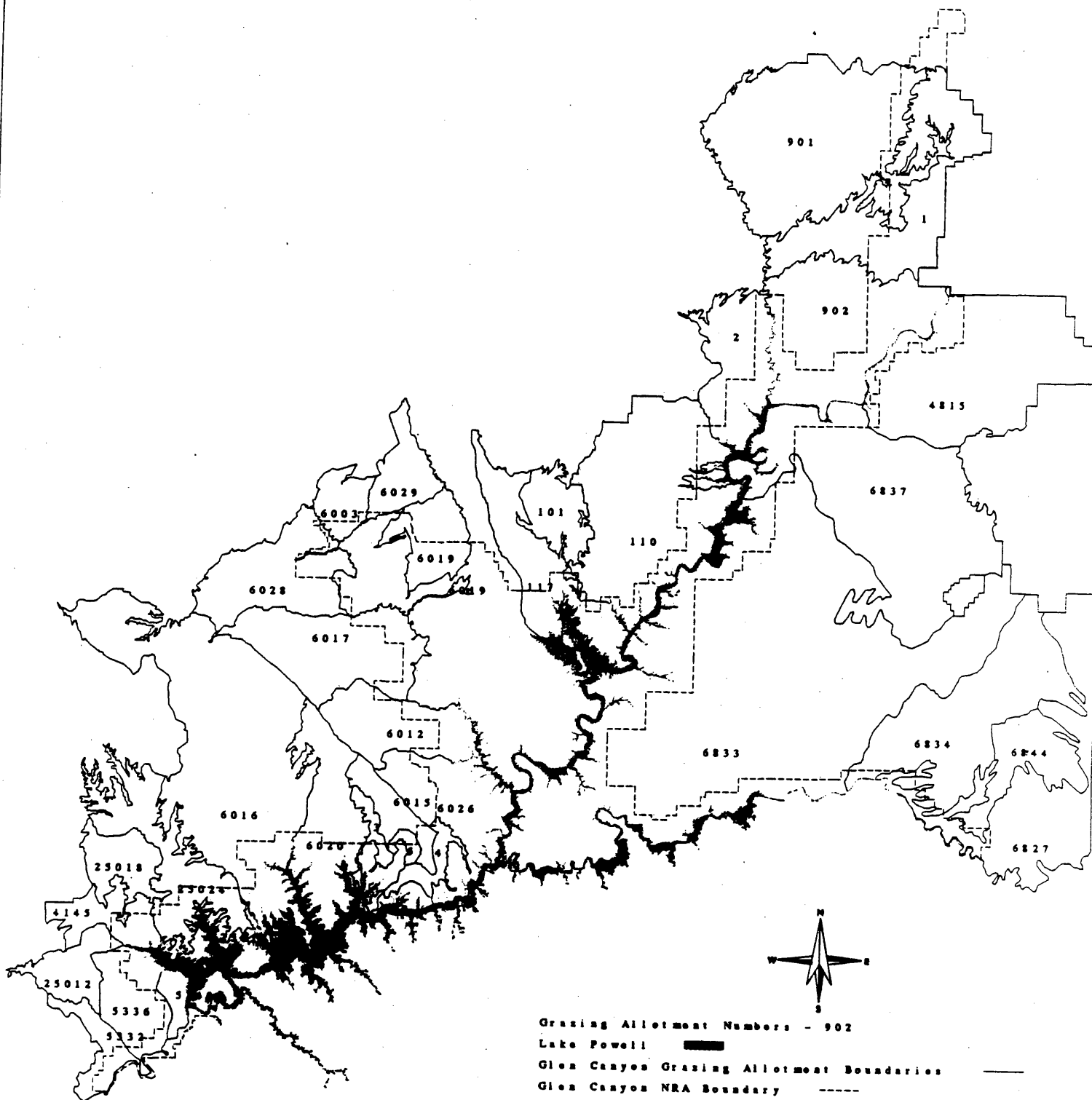
The presence of Glen Canyon NRA contributes significantly to local economies in many ways including attracting million of visitors annually who spend over \$350,000,000 in the region. This results in more opportunities for employment within Glen Canyon NRA, regionally, and in neighboring communities.

Glen Canyon NRA is the hub of the "Grand Circle," an area encompassing Glen Canyon NRA, seven national parks, seven national monuments, a Navajo Tribal park, and a variety of state parks and historic sites. The area is recognized internationally as a unique recreation destination which offers a diversity of recreational opportunities and visitor experiences.

Glen Canyon has diverse, natural ecosystems that cross man-made boundary lines requiring coordination and cooperation between neighboring land managers. Adjacent land managers include two states, five counties, five Bureau of Land Management resource areas, three National Parks, the City of Page, and the Navajo Nation.

APPENDIX G - ALLOTMENT MAP AND ALLOTMENT NAMES

GLEN CANYON NRA GRAZING ALLOTMENTS



Produced by GLCA-OIS
11/17/97

GLEN CANYON NRA ALLOTMENT NAMES

ESCALANTE RESOURCE AREA - CEDAR CITY DISTRICT - UTAH

3 SPENCER BENCH (Unallotted)
4 NAVAJO BENCH (Unallotted)
5 HARVEY'S FEAR (Unallotted)
6003 BIG BOWNS BENCH
6012 FORTY MILE RIDGE
6015 LAKE
6017 LOWER CATTLE
6019 MOODY
6026 SODA
6028 UPPER CATTLE
6029 WAGON BOX MESA
6016 LAST CHANCE

HENRY MOUNTAIN RESOURCE AREA - RICFIELD DISTRICT - UTAH

1 FLINT TRAIL (Unallotted)
2 SLICK ROCK (Unallotted)
101 BULLFROG
110 ROCKIES
117 WATERPOCKET
901 ROBBERS ROOST
902 SEWING MACHINE

KANAB RESOURCE AREA - CEDAR CITY DISTRICT - UTAH

04145 (CLARK BENCH) WIREGRASS
25012 BUNTING WELL
25015 LOWER WARM CREEK
25018 NIPPLE BENCH
25024 UPPER WARM CREEK
6020 ROCK CREEK-MUDHOLES

SAN JUAN RESOURCE AREA - MOAB DISTRICT - UTAH

4815 INDIAN CREEK
6827 PERKINS BROTHERS
6833 LAKE CANYON
6834 SLICKHORN
6837 WHITE CANYON
6844 TEXAS MULEY

VERMILLION RESOURCE AREA - ARIZONA STRIP DISTRICT - ARIZONA

5332 LEES FERRY
5336 FERRY SWALE
5340 WAHWEAP

**APPENDIX H – BUREAU OF LAND MANAGEMENT STANDARDS AND
GUIDELINES FOR HEALTHY RANGELANDS**



Rangeland Health



Standards and Guidelines for Healthy Rangelands

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Utah State Office
1997

In America's West, rangelands are the dominant landscape. Sometimes overlooked and under-appreciated, rangelands contribute significantly to the quality of life of residents and visitors alike. BLM's 200 million + acres of rangeland have long been valued for livestock grazing and mining, but rangelands now are also prized for their recreation opportunities, wildlife habitats, watershed, cultural values, and scenery.

During the western migration of the mid and late 1800s, rangelands attracted settlers who wanted to build a new life of ranching, farming, business, and mining. As settlement continued, competition for land and water intensified. Land was put to uses that were not sustainable over the long term, and insufficient thought was given to future needs.

With time, competing interests have changed and intensified. Over the past 125 years, significant public values have been placed at risk. Irreplaceable topsoil has been lost, habitats are diminished, and clean water supplies are coming into question. A new focus is emerging from this continuing uncertainty, one that looks at sustainability of ecosystems rather than production of commodities. The land itself is in jeopardy, and the variety of products and values that this land has produced may not be sustained for future generations of Americans unless ecosystems are healthy and productive.

It is time for a change, and BLM is changing to meet the challenge. BLM is now giving management priority to maintaining functioning ecosystems. This simply means that the needs of the land and its living and nonliving components (soil, air, water, flora, and fauna) are to be considered first. Only when ecosystems are functioning properly can the consumptive, economic, political, and spiritual needs of man be attained in a sustainable way. To achieve these ends, BLM has developed the following Fundamentals of Rangeland Health and their companion rules—Standards for Rangeland Health and Guidelines for Grazing Management for BLM Lands in Utah.

Fundamentals of Rangeland Health

As provided by regulations, developed by the Secretary of the Interior on February 22, 1995, the following conditions must exist on BLM Lands:

(a) Watersheds are in, or making significant progress toward, properly functioning physical condition, including their upland, riparian-wetland, and aquatic components; soil and plant conditions support infiltration, soil moisture storage, and the release of water that are in balance with climate and landform and maintain or improve water quality, water quantity, and timing and duration of flow.

(b) Ecological processes, including the hydrologic cycle, nutrient cycle, and energy flow, are maintained, or there is significant progress toward their attainment, in order to support healthy biotic populations and communities.

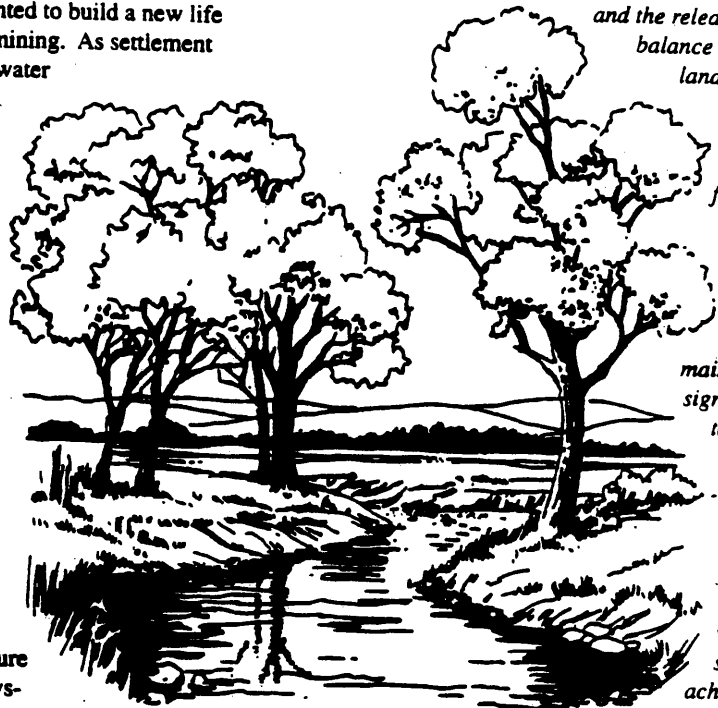
(c) Water quality complies with State water quality standards and achieves, or is making significant progress toward

achieving established BLM management objectives such as meeting wildlife needs.

(d) Habitats are, or are making significant progress toward being, restored or maintained for Federal threatened and endangered species, Federal Proposed, Category 1 and 2 Federal candidate and other special status species.

In 1997, the BLM in Utah developed rules to carry out the Fundamentals of Rangeland Health. These are called Standards for Rangeland Health and Guidelines for Grazing Management.

Standards spell out conditions to be achieved on BLM Lands in Utah, and Guidelines describe practices that will be applied in order to achieve the Standards.



Standards for Rangeland Health

Standard 1. Upland soils exhibit permeability and infiltration rates that sustain or improve site productivity, considering the soil type, climate, and landform.

As indicated by:

- a) Sufficient cover and litter to protect the soil surface from excessive water and wind erosion, promote infiltration, detain surface flow, and retard soil moisture loss by evaporation.
- b) The absence of indicators of excessive erosion such as rills, soil pedestals, and actively eroding gullies.
- c) The appropriate amount, type, and distribution of vegetation reflecting the presence of (1) the Desired Plant Community [DPC], where identified in a land use plan, or (2) where the DPC is not identified, a community that equally sustains the desired level of productivity and properly functioning ecological conditions.

Standard 2. Riparian and wetland areas are in properly functioning condition. Stream channel morphology and functions are appropriate to soil type, climate and landform.

As indicated by:

- a) Streambank vegetation consisting of, or showing a trend toward, species with root masses capable of withstanding high streamflow events. Vegetative cover adequate to protect stream banks and dissipate streamflow energy associated with high-water flows, protect against accelerated erosion, capture sediment, and provide for groundwater recharge.
- b) Vegetation reflecting: Desired Plant Community, maintenance of riparian and wetland soil moisture characteristics, diverse age structure and composition, high vigor, large woody debris when site potential allows, and providing food, cover and other habitat needs for dependent animal species.
- c) Revegetating point bars; lateral stream movement associated with natural sinuosity; channel width, depth, pool frequency and roughness appropriate to landscape position.
- d) Active floodplain.

Standard 3. Desired species, including native, threatened, endangered, and special-status species, are maintained at a level appropriate for the site and species involved.

As indicated by:

- a) Frequency, diversity, density, age classes, and productivity of desired native species necessary to ensure reproductive capability and survival.
- b) Habitats connected at a level to enhance species survival.
- c) Native species reoccupy habitat niches and voids caused by disturbances unless management objectives call for introduction or maintenance of nonnative species.
- d) Appropriate amount, type, and distribution of vegetation reflecting the presence of (1) the Desired Plant Community [DPC], where identified in a land use plan conforming to these Standards, or (2) where the DPC is identified a community that equally sustains the desired level of productivity and properly functioning ecological processes.

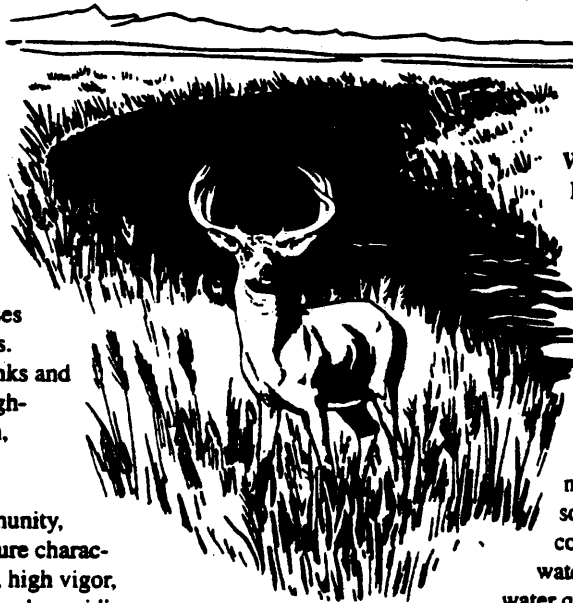
Standard 4. BLM will apply and comply with water quality standards established by the State of Utah (R.317-2) and the Federal Clean Water and Safe Drinking Water Acts. Activities on BLM Lands will fully support the designated beneficial uses described in the Utah Water Quality Standards (R.317-2) for surface and groundwater.¹

As indicated by:

- a) Measurement of nutrient loads, total dissolved solids, chemical constituents, fecal coliform, water temperature and other water quality parameters.
- b) Macro-invertebrate communities that indicate water quality meets aquatic objectives.

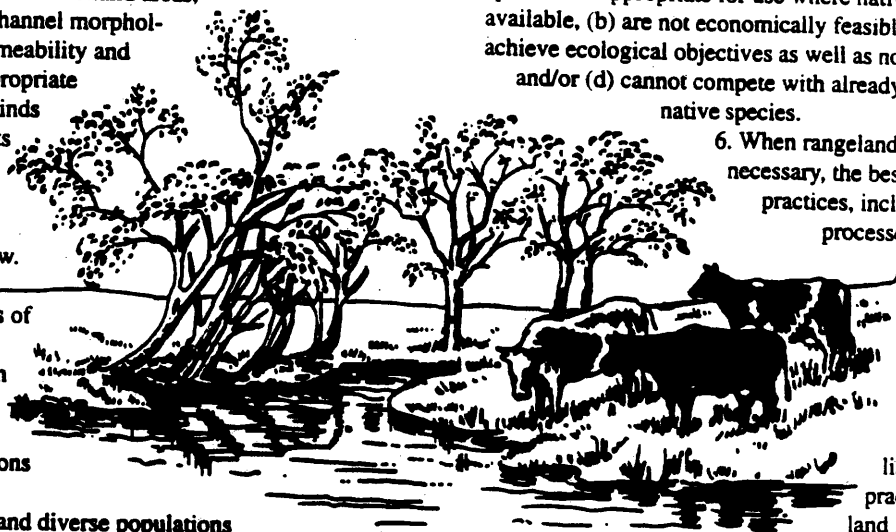
Because BLM Lands provide forage for grazing of wildlife, wild horses and burros, and domestic livestock, the following rules have been developed to assure that such grazing is consistent with the Standards listed here.

¹ BLM will continue to coordinate monitoring water quality activities with other Federal, State and technical agencies.



Guidelines for Grazing Management

1. Grazing management practices will be implemented that:
 - a) Maintain sufficient residual vegetation and litter on both upland and riparian sites to protect the soil from wind and water erosion and support ecological functions;
 - b) Promote attainment or maintenance of proper functioning condition riparian/wetland areas, appropriate stream channel morphology, desired soil permeability and infiltration, and appropriate soil conditions and kinds and amounts of plants and animals to support the hydrologic cycle, nutrient cycle, and energy flow.
 - c) Meet the physiological requirements of desired plants and facilitate reproduction and maintenance of desired plants to the extent natural conditions allow;
 - d) Maintain viable and diverse populations of plants and animals appropriate for the site;
 - e) Provide or improve, within the limits of site potentials, habitat for Threatened or Endangered Species;
 - f) Avoid grazing management conflicts with other species that have the potential of becoming protected or special status species;
 - g) Encourage innovation, experimentation and the ultimate development of alternatives to improve rangeland management practices;
 - h) Give priority to rangeland improvement projects and land treatments that offer the best opportunity for achieving the Standards.
2. Any spring or seep developments will be designed and constructed to protect ecological process and functions and improve livestock, wild horse and wildlife distribution.
3. New rangeland projects for grazing will be constructed in a manner consistent with the Standards. Considering economic circumstances and site limitations, existing rangeland projects and facilities that conflict with the achievement or maintenance of the Standards will be relocated and/or modified.



4. Livestock salt blocks and other nutritional supplements will be located away from riparian/wetland areas or other permanently located, or other natural water sources. It is recommended that the locations of these supplements be moved every year.

5. The use and perpetuation of native species will be emphasized. However, when restoring or rehabilitating disturbed or degraded rangelands nonintrusive, nonnative plant species are appropriate for use where native species (a) are not available, (b) are not economically feasible, (c) can not achieve ecological objectives as well as nonnative species, and/or (d) cannot compete with already established native species.

6. When rangeland manipulations are necessary, the best management practices, including biological processes, fire and intensive grazing, will be utilized prior to the use of chemical or mechanical manipulations.

7. When establishing grazing practices and rangeland improvements, the quality of the outdoor recreation experience is to be considered. Aesthetic and scenic values, water, campsites and opportunities for solitude are among those considerations.

8. Feeding of hay and other harvested forage (which does not refer to miscellaneous salt, protein, and other supplements) for the purpose of substituting for inadequate natural forage will not be conducted on BLM lands other than in (a) emergency situations where no other resource exists and animal survival is in jeopardy, or (b) situations where the Authorized Officer determines such a practice will assist in meeting a Standard or attaining a management objective.

9. In order to eliminate, minimize, or limit the spread of noxious weeds, (a) only hay cubes, hay pellets, or certified weed-free hay will be fed on BLM lands, and (b) reasonable adjustments in grazing methods, methods of transport, and animal husbandry practices will be applied.

10. To avoid contamination of water sources and inadvertent damage to non-target species, aerial application of pesticides will not be allowed within 100 feet of a riparian/wetland area unless the product is registered for such use by the EPA.

ARIZONA STANDARDS AND GUIDELINES

Arizona Standards and Guidelines (S&G) for grazing administration have been developed through a collaborative process involving the Bureau of Land Management State S&G Team and the Arizona Resource Advisory Council (RAC). Together, through meetings, conference calls, correspondence, and Open Houses with the public, the BLM State Team and RAC prepared Standards and Guidelines to address the minimum requirements outlined in the grazing regulations. The Standards and Guidelines, criteria for meeting Standards, and indicators are an integrated document that conforms to the fundamentals of rangeland health and the requirements of the regulations when taken as a whole.

Upland sites, riparian-wetland areas, and desired resource conditions are each addressed by a standard and associated guidelines.

Standard 1: Upland Sites

Upland soils exhibit infiltration, permeability, and erosion rates that are appropriate to soil type, climate and landform (ecological site).

Criteria for meeting Standard 1:

Soil conditions support, or are making significant progress toward supporting, proper functioning of hydrologic, energy, and nutrient cycles. Many factors interact to maintain stable soils and healthy soil conditions, including appropriate amounts of vegetative cover, litter, and soil porosity and organic matter. Under proper functioning conditions, rates of soil loss and infiltration are consistent with the potential of the site.

Ground cover in the form of plants, litter or rock is present in pattern, kind, and amount sufficient to prevent accelerated erosion for the ecological site; or, ground cover is increasing as determined by monitoring over an established period of time.

Signs of accelerated erosion are minimal or diminishing for the ecological site as determined by monitoring over an established period of time.

As indicated by such factors as:

- Ground Cover
 - litter
 - live vegetation, amount and type (e.g. grass, shrubs, trees, etc.)
 - rock
- Signs of erosion
 - flow pattern
 - gullies
 - rills
 - plant pedestaling

11. On rangelands where a standard is not being met, and conditions are moving toward meeting the standard, grazing may be allowed to continue. On lands where a standard is not being met, conditions are not improving toward meeting the standard or other management objectives, and livestock grazing is deemed responsible, administrative action with regard to livestock will be taken by the Authorized Officer pursuant to CFR 4180.2(c).

12. Where it can be determined that more than one kind of grazing animal is responsible for failure to achieve a Standard, and adjustments in management are required, those adjustments will be made to each kind of animal, based on inter-agency cooperation as needed, in proportion to their degree of responsibility.

13. Rangelands that have been burned, reseeded or otherwise treated to alter vegetative composition will be closed to livestock grazing as follows: (1) burned rangelands, whether by wildfire or prescribed burning, will be ungrazed for a minimum of one complete growing season following the burn; and (2) rangelands that have been reseeded or otherwise chemically or mechanically treated will be ungrazed for a minimum of two complete growing seasons.

14. Conversions in kind of livestock (such as from sheep to cattle) will be analyzed in light of Rangeland Health Standards. Where such conversions are not adverse to achieving a Standard, or they are not in conflict with BLM land use plans, the conversion will be allowed.

FOR MORE INFORMATION

Contact:

**Bureau of Land Management
324 South State Street
Salt Lake City UT 84145-0155
(801) 539-4010**

Exceptions and exemptions (where applicable):

- none

Guidelines:

1-1. Management activities will maintain or promote ground cover that will provide for infiltration, permeability, soil moisture storage, and soil stability appropriate for the ecological sites within management units. The ground cover should maintain soil organisms and plants and animals to support the hydrologic and nutrient cycles, and energy flow. Ground cover and signs of erosion are surrogate measures for hydrologic and nutrient cycles and energy flow.

1-2. When grazing practices alone are not likely to restore areas of low infiltration or permeability, land management treatments may be designed and implemented to attain improvement.

Standard 2: Riparian-Wetland Sites

Riparian-wetland areas are in properly functioning condition.

Criteria for meeting Standard 2:

Stream channel morphology and functions are appropriate for, or making significant progress toward, proper functioning condition for existing climate, landform, and channel reach characteristics. Riparian-wetland areas are functioning properly when adequate vegetation, land form, or large woody debris is present to dissipate stream energy associated with high water flows.

Riparian-wetland functioning condition assessments are based on examination of hydrologic, vegetative, soil and erosion-deposition factors. BLM has developed a standard checklist to address these factors and make functional assessments. Riparian-wetland areas are functioning properly as indicated by the results of the application of the appropriate checklist.

The checklist for riparian areas is in Technical Reference 1737-9 "Process for Assessing Proper Functioning Condition." The checklist for wetlands is in Technical Reference 1737-11 "Process for Assessing Proper Functioning Condition for Lentic Riparian-Wetland Areas." These checklists are reprinted on the pages following the Guidelines for Standard 3.

As indicated by such factors as:

- Gradient
- Width/depth ratio
- Channel roughness and sinuosity of stream channel
- Bank stabilization
- Reduced erosion
- Captured sediment
- Ground-water recharge
- Dissipation of energy by vegetation

Exceptions and exemptions (where applicable):

- Dirt tanks, wells, and other water facilities constructed or placed at a location for the purpose of providing water for livestock and/or wildlife and which have not been determined through local planning efforts to provide for riparian or wetland habitat are exempt.
- Water impoundments permitted for construction, mining, or other similar activities are exempt.

Guidelines:

2-1. Management practices maintain or promote sufficient vegetation to maintain, improve or restore riparian-wetland functions of energy dissipation, sediment capture, groundwater recharge and stream bank stability, thus promoting stream channel morphology (e.g. gradient, width/depth ratio, channel roughness and sinuosity) and functions appropriate to climate and landform.

2-2. New facilities are located away from riparian-wetland areas if they conflict with achieving or maintaining riparian-wetland function. Existing facilities are used in a way that does not conflict with riparian-wetland functions or are relocated or modified when incompatible with riparian-wetland functions.

2-3. The development of springs and seeps or other projects affecting water and associated resources shall be designed to protect ecological functions and processes.

Standard 3: Desired Resource Conditions

Productive and diverse upland and riparian-wetland plant communities of native species exist and are maintained.

Criteria for meeting Standard 3:

Upland and riparian-wetland plant communities meet, or are making significant progress toward, desired plant community objectives. Plant community objectives are determined with consideration for all multiple uses. Objectives also address native species, and the requirements of the Taylor Grazing Act, Federal Land Policy and Management Act, Endangered Species Act, Clean Water Act, and appropriate laws, regulations, and policies.

Desired plant community objectives will be developed to assure that soil conditions and ecosystem function described in Standards 1 and 2 are met. They detail a site-specific plant community, which when obtained, will assure rangeland health, state water quality standards, and habitat for endangered, threatened, and sensitive species. Thus, desired plant community objectives will be used as an indicator of ecosystem function and rangeland health.

As indicated by such factors as:

- Composition
- Structure
- Distribution

Exceptions and exemptions (where applicable):

- Ecological sites or stream reaches on which a change in existing vegetation is physically, biologically, or economically impractical.

Guidelines:

3-1. The use and perpetuation of native species will be emphasized. However, when restoring or rehabilitating disturbed or degraded rangelands, non-intrusive, non-native plant species are appropriate for use where native species (a) are not available, (b) are not economically feasible, (c) can not achieve ecological objectives as well as non-native species, and/or (d) cannot compete with already established non-native species.

3-2. Conservation of Federal threatened or endangered, proposed, candidate, and other special status species is promoted by the maintenance or restoration of their habitats.

3-3. Management practices maintain, restore, or enhance water quality in conformance with State or Federal standards.

3-4. Intensity, season and frequency of use, and distribution of grazing use should provide for growth and reproduction of those plant species needed to reach desired plant community objectives.

3-5. Grazing on designated ephemeral (annual and perennial) rangeland may be authorized if the following conditions are met:

- ephemeral vegetation is present in draws, washes, and under shrubs and has grown to useable levels at the time grazing begins;
- sufficient surface and subsurface soil moisture exists for continued plant growth;
- serviceable waters are capable of providing for proper grazing distribution;
- sufficient annual vegetation will remain on site to satisfy other resource concerns, (i.e. watershed, wildlife, wild horses and burros); and
- monitoring is conducted during grazing to determine if objectives are being met.

3-6. Management practices will target those populations of noxious weeds which can be controlled or eliminated by approved methods.

3-7. Management practices to achieve desired plant communities will consider protection and conservation of known cultural resources, including historical sites, and prehistoric sites and plants of significance to Native American peoples.

APPENDIX I – ACKNOWLEDGEMENTS

ACKNOWLEDGEMENTS

Consultation:

Bureau of Land Management Field Offices, including Vermillion, Kanab, Escalante, Henry Mountains, and San Juan

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REAFFIRMATION MEMORANDUM

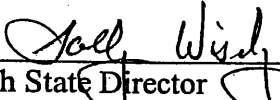
AGREEMENT NUMBER IA 1440-3-0001

We, the undersigned, have the authority and do hereby reaffirm this agreement between the National Park Service and the Bureau of Land Management for the purpose of Grazing Management on Glen Canyon National Recreation Area, with the following exceptions:

1. Due to BLM organization changes, the BLM District Managers referred to in the agreement will now be referred to as Field Manager(s) of the Arizona Strip, Richfield, and Monticello Field Offices and the Grand Staircase-Escalante National Monument.
2. The Grazing Management Plan identified for cooperative planning has been completed and is a component to the Glen Canyon General Management Plan.

The original agreement was signed by both the Utah and Arizona State Directors of the Bureau of Land Management and the Superintendent, Glen Canyon National Recreation Area.

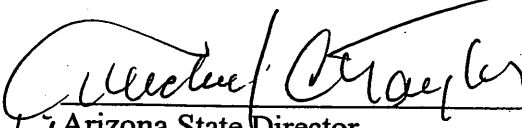
This agreement and all of its terms and conditions, with the exceptions identified above, is to continue in effect for an additional five years beginning May 10, 2003 through May 9, 2008.



Utah State Director
Bureau of Land Management

5/5/03

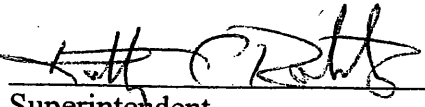
Date



Arizona State Director
Bureau of Land Management

5/13/03

Date



Superintendent
Glen Canyon National Recreation Area
National Park Service

5/15/03

Date

