



United States Department of the Interior

NATIONAL PARK SERVICE
Water Resources Division
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IN REPLY REFER TO:

January 15, 1995

L54(2380)
LAME-GLCA

Memorandum

To: Chief, Water Resources Division

Through: Chief, Water Operations Branch *WJF* 1-23-96

From: Hydrologist, Water Operations Branch

Subject: Trip Report for Travel to Lake Mead NRA and Glen Canyon NRA, September 20-27, 1995

PURPOSE: The purpose of the trip was to provide technical consultation for watershed concerns on the Shiviwits Plateau in Lake Mead NRA and oversight on WRD funded riparian grazing project at Glen Canyon NRA.

ITINERARY: I departed Fort Collins Sept. 20th and arrived at the LAME the same day. I departed LAME Sept. 22th and arrived at GLCA on Sept. 25th. I returned to Fort Collins on Sept. 27th.

CONTACTS: Curt Dueser - Resource Management Specialist, LAME
John Cook - Range Conservationist, LAME
John Spence - Botanist, GLCA
John Ritenour - Chief of Resources, GLCA

DISCUSSION: This trip provided opportunities to make field observations and to exchange planning and resource management ideas with staff of both parks. The principal focus was grazing management but fire management, road erosion, and gully control structures were also discussed.

Watershed Issues on Shiviwits Plateau at Lake Mead NRA - The Shiviwits Plateau is a large mass of land forming a peninsula along the north rim of Grand Canyon and is managed by Lake Mead NRA. The area is quite remote and undeveloped. Grazing still occurs in most of this high altitude mesa in conjunction with the local BLM District grazing program.

Grazing has been continuous year-round cow/calf operations by several family ranchers. One grazing unit, partially in the park, is a reserve pasture used only when other units are being rested. It is in relatively good shape. Continuous grazing pressure in most of the area is reducing desirable grass species and inadvertently favoring sagebrush and juniper.

The condition of much of the Shiviwits plateau, as far as watershed values are concerned, is not up to its potential. Sagebrush and juniper have replaced grasslands and do not provide adequate ground cover to encourage infiltration and protect soils from excessive runoff and sheet erosion. Some drainages have eroded to bedrock with scattered gullies which are still active. Most of the roads do not have proper drainage and erosion control measures, and some sections of the road network are in extremely poor shape.

Concerning grazing management, a major goal for park management should be a general improvement of ground cover and herbaceous vegetation. Any riparian zones near springs should be protected against constant overuse. Regarding fire management opportunities, partial conversion of sagebrush and juniper vegetation types to grasslands would be beneficial for increased rainfall infiltration and reducing flashy runoff. Improving this condition would increase available moisture to plants and reduce the desertification trend.

Opportunities exist to reduce road erosion. I encourage road closure and rehabilitation where vehicle access is not critical. The resource management and maintenance staffs at Point Reyes NS have implemented several successful road closure and rehabilitation projects, and would be a good source of information on technical designs for road closure and restoration. The resource management program should coordinate with Maintenance Division to implement road and trail repair and to implement Best Management Practices to manage runoff and to reduce erosion of the road network. One of the parallel roads that cross the Horse Valley meadow could be closed and revegetated to improve infiltration and moisture retention. Mats of dead sagebrush could be staked down in the eroding road/stream channel to reduce flow velocity, trap sediment and impede vehicle travel. This could be accomplished with standby fire crews.

Regarding gully erosion, "loose rock" check dams may be attempted in the gully in front of the fire camp buildings to reduce risk to structures. Details of construction and design should be discussed on site with erosion control expertise available from WRD. Older log check dams should be removed. The strategy for reducing most gullying is dependent on improving vegetation cover and rainfall infiltration.

There are several watershed models which can be used to evaluate the predicted hydrologic and erosion response to improved vegetation management. The Universal Soil Loss Equation could be used as a planning tool to provide general indication of relative soil erosion based on predicted improvements in vegetation. The SCS Curve-Number Method can be used to evaluate predicted changes in runoff and peak flow. The accuracy of the Curve Number Method is limited to the quality and detail of the input data. However, in most cases, it is adequate for approximations and indicators of relative trends. Information

needs for a Curve Number analysis are: (1) hydrologic soil groups from county soil maps, (2) vegetation type and percent canopy cover, (3) slope and length, (4) rainfall and, (5) land use practices.

One of the ideas discussed with park staff was land management units. Basin delineation by watersheds for land management in this area has less importance than other areas due to low topographic relief, little vegetation response to slope and aspect, geologic variation, and rambling location of roads and fences. Identifying and naming channel networks has value in order to facilitate future management and monitoring activities.

Hydrologic response to vegetation management will take time (decades) and be episodic due to the probability of large rainstorms, rarity of wet years and persistent arid climate. Gullies will be evident probably for centuries and may possibly be a permanent part of the landscape. However, accelerated erosion can be reversed when vegetation is established and maintained in the bottom of the gullies.

My recommendations to the Lake Mead NRA staff are to utilize the above mentioned planning analysis tools as appropriate and incorporate a monitoring scheme to document the effects of the vegetation management. The WRD can assist in the application of the models referenced above during the plan development phase.

Riparian Grazing Study in Glen Canyon NRA. Glen Canyon NRA is famous for Lake Powell, however, it also has a very large terrestrial component. A good portion of it is open to grazing that is managed by the Bureau of Land Management. The arid condition of most of the range forces most of the livestock into the riparian zones and often remain close to Lake Powell for watering. The park is collecting data to demonstrate impact of cattle grazing on vegetation and stream bank erosion in order to prescribe improved management practices.

Two study sites were visited demonstrating the diversity of problems and opportunities to be encountered in the field. Last Chance Creek on the north side of the park is remote and rarely visited by outsiders. The usual sandstone bluffs form a steep walled canyon several miles from the lake. Cattle previously trailed up and down the canyon, entering and exiting where the canyon opens up about a mile below the access road.

Last Chance Creek exhibits many signs of flash floods and will be difficult to effectively exclude cattle with a fence across the channel. Swinging panels are suggested, however, frequent maintenance will be required. Data collection immediately after a flash flood could reflect impacts from storms rather than non-grazing by cattle. Another problem is dealing with invasive exotic plants, primarily tamarisk. Good study design and interpretation will be required to account for its presence.

Lake Canyon Creek is located south of the Colorado River and north of the San Juan Arm. It is only reached by horseback or helicopter making access and equipment logistics difficult.

The unique feature of Lake Canyon is the abundance of fine sand deposited there before the construction of Glen Canyon Dam. The fine material and the perennial flows set the stage for a lush riparian zone. However, erosive flash floods in the region can cause considerable downcutting of the channel. Again, careful data collection in grazed and ungrazed portions of the riparian zone is critical for meaningful results.

While the difficulties on site are apparent from this field trip, the study plan has merit if executed faithfully. Good work in the field should produce valuable results for improved grazing management in Lake Mead NRA and elsewhere in arid environments.

In addition to excluding grazing along riparian areas in GLCA, we recommend other management strategies which have been shown to improve riparian conditions (assuming some grazing must continue). Grazing strategies could include seasonal or annual rest periods, locating salt licks away from water, developing upland water supplies, and other techniques from the literature. I have included for park staff some references on riparian grazing management.

ACTION ITEMS:

1. Provide technical assistance to LAME with runoff models. Responsible party - R. Inglis. Target date - when requested.
2. Provide project oversight to WRD funded ongoing riparian grazing study. Responsible party - R. Inglis. Target date - Sept. 1996.



(2) Enclosures for GLCA