

Locating Relict and Unique Vegetation of the Grand Canyon Parashant National Monument

Interim Report for 2005

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This report serves as an interim report of findings for the 2005 field season. For the 2005 field season, our work followed two main lines of investigation. First, we focused on visiting several areas with potential for relict or unique vegetation to gain a better understanding of the ecology of the area. Second, and the main focus of our research this year, was one trip to Lone Mountain, which was suggested by GCPNM staff as an area that has not been grazed in a number of years. This was also followed by a trip to sites directly adjacent to Lone Mountain that have had more intensive management.

2005 Sites Visited

We scouted several different areas in 2005 to investigate vascular plant assemblages that might provide a good seed source for land restoration. The only low-elevation area we have found that is close to a road, easily accessible for seed-collecting crews, and contains a diverse assemblage of native grasses is along a roadcut in the steep switchbacks about 5 miles east of the Mt. Trumbull Schoolhouse. This area had excellent representation of *Poa fendleriana* and other native grasses in the steep, rocky slopes, but lower cover of native grasses in the less steep areas. Higher elevations sites near Mt. Logan and Mt. Trumbull also had some good assemblages of native species, especially where grazing exclosures had been established. Comparisons to the Lone Mountain and Toroweap sites may provide ecological insights. In the Toroweap valley we examined areas north and south of the NPS Toroweap Monument boundary, with two different management histories. The Monument portion on the north is currently grazed, and the southerly portion of the valley bottom (National Park) had not been grazed in at least 10 years, according to the ranger at the Tuweep Station. This area should be investigated further as an important source of information on changes in vegetation post-grazing. It is unique in that it represents a valley bottom that has not been grazed and has a good assemblage of native grasses. This is significant in light of the heavy infestations of *Sisymbrium irio* that we observed in the recently grazed valleys of GCPNM in 2005. Lastly, we visited several exclosures on Black Rock Mountain that are near populations of the rare endemic *Townsendia smithii*. These represent the highest elevation exclosures that we have visited thus far.

Lone Mountain and Comparison Area

With the generous support of the GCPNM, we were among several scientists flown onto Lone Mountain, southwest of Whitmore Point. After careful consideration of the topography viewed from the helicopter and the information shared with us by ranchers in the area, we suggest that in the heat of the growing season, it will be dangerous to attempt walking to Lone Mountain via the traditional access from the north or east (Fig 1, view looking north along fault line).

Lone Mountain is a dry, relatively flat butte that is surrounded on all sides by steep topography, making access difficult. Overall, on the top of the butte, there are areas with deeper soils that support relatively high cover of vascular plants as well as areas with thinner soils that are characterized by lower cover of vascular plants and a well-developed microbiotic crust. We could not locate any springs or water developments that are indicated on the GIS layers for this area. Anecdotal evidence suggests that the area may have been grazed lightly in the time between the 1920s and the 1950s, but the lack of water would indicate that any grazing that did occur was short-lived. Additionally, a mine is noted on the GIS layers and was mentioned by a local rancher, and we did find a probable mine claim, but no actual excavation seems to have taken place. The claim consists of a pile of rocks with a wooden stake (Fig. 2).

We documented the vascular plant species on Lone Mountain and established georeferenced plots for ecological data. The list of vascular plants encountered on Lone Mountain is attached in Appendix A. The ecological plots consisted of 10m square plots, georeferenced with a handheld GPS unit, but not marked with a permanent marker. We established 15 plots, representing the range of vegetation we encountered. Within the plots, we used ocular estimates for percent cover and cover class for each species of vascular plant, percent cover of bare ground, and percent cover of microbiotic crust. For comparison, we visited sites directly across the fault line to the east of Lone Mountain. These sites were highly comparable ecologically (same parent material, elevation, slope, etc.), but had been more intensively managed, and had been grazed in 2005. We established 10 plots in the comparison area, and these data are presented together in Appendix B. Our impression of Lone Mountain is that there is a relatively high diversity of native vascular plants and many examples of large, healthy native shrub and grass species. We would expect it to be an excellent seed source area when the drought lessens. In our next report, we will provide a statistical comparison between the Lone Mountain (ungrazed) and reference (grazed) sites.

Fig. 1. View towards north along the fault line, with Lone Mountain to the west (left).



Fig. 2. The mine claim.



Appendix A. List of vascular plant taxa encountered on Lone Mountain.

Family	Genus	species	Description
Agavaceae	Agave	utahensis	
Agavaceae	Yucca	angustissima	
Agavaceae	Yucca	baccata	
Agavaceae	Yucca	elata	
Anacardiaceae	Rhus	aromatica	
Asteraceae	Baileya	multiradiata	
		nauseosus	
Asteraceae	Chrysothamnus	junceus	
Asteraceae	Dyssodia		
Asteraceae	Machaeranthera	canescens	
Asteraceae	Melampodium	leucanthum	white 'zinnia'
Asteraceae	Parthenium	incanum	
			in cliff.. large flr. heads, triangular lvs
Asteraceae	Perezia	wrightii	
Asteraceae	Perityle	tenella	
Asteraceae	Psilostrophe	sparsiflora	
Asteraceae	Stephanomeria	pauciflora	
Asteraceae	Xanthocephalum	microcephala	
			shrubby & white-flowered (unusual)
Boraginaceae	Cryptantha	conferiflora	
Brassicaceae	Descurainia	sp.	
Brassicaceae	Lepidium	densiflorum	
Brassicaceae	Lepidium	fremontii	
Cactaceae	Echinocactus?	?	
Cactaceae	Echinocereus	engelmanii	
Cactaceae	Ferocactus	sp.	
Cactaceae	Opuntia	echinocarpa	
Cactaceae	Opuntia	sp.	
Caesalpinaceae	Cassia	bauhinioides	
Celastraceae	Mortonia	utahensis	
Chenopodiaceae	Atriplex	canescens	
Chenopodiaceae	Krasheninnikovia	lanata	
Cupressaceae	Juniperus	osteosperma	
Ephedraceae	Ephedra	nevadensis	
Ephedraceae	Ephedra	trifurca	
Euphorbiaceae	Euphorbia	fendleri	
Fabaceae	Astragalus	nuttallianus	
Krameriaceae	Krameria	grayi	
Linaceae	Linum	aristatum	
Linaceae	Linum	perenne	
Loasaceae	Mentzelia	californica	(may be albicaulis)
Mimosaceae	Acacia	greggii	
Nyctaginaceae	Mirabilis	multiflora	
Plantaginaceae	Plantago	patagonica	
Poaceae	Aristida	adscensionis	
Poaceae	Bromus	rubens	
Poaceae	Erioneuron	pulchellum	
Poaceae	Hesperostipa	speciosa	

Poaceae	Muhlenbergia	microsperma	
Poaceae	Munroana	squarrosa	
Poaceae	Pleuraphilis	jamesii	
Poaceae	Schismus	barbatus	
Poaceae	Scleropogon	brevifolius	
Poaceae	Vulpia	octoflora	
			pale lavender flowers, hair point, pinnately divided lvs
Polemoniaceae	Eriastrum	eremicum	
Polemoniaceae	Eriastrum	sparsiflorum	
Polemoniaceae	Gilia	inconspicua	basal lvs pinnate
Polemoniaceae	Linanthus	bigelovii	
Polemoniaceae	Linanthus	arenicola	
Polemoniaceae	Phacelia	lemmonii	
Polygonaceae	Eriogonum	cf. davidsoni	
Polygonaceae	Eriogonum	fasciculatum	
Polygonaceae	Eriogonum	hermannii	
			threadlike branches, yellow flrs., annual
Polygonaceae	Eriogonum	howellii	
Polygonaceae	Eriogonum	inflatum var. deflatum	
Polygonaceae	Rumex	venosus	
Pteridaceae	Cheilanthes	feeii	
Rosaceae	Coleogyne	ramosissima	
Rosaceae	Purshia	mexicana	
Rutaceae	Thamnosma	montana	
Scrophulariaceae	Penstemon	eatonii	
Solanaceae	Datura	stramonium	
Solanaceae	Lycium	pallidum	

Appendix B. Lone Mountain and Comparison Area plot data.

[illegible]

Ephedra viridis					1		1			1	2		1		2	2			2		1			1
Eriastrum sparsiflorum	1	1	2	1	1	1	2	2	1						1			1	1	1		1		
Eriogonum cf. davidsoni																1					1			
Eriogonum howellii	1		1			3	1	1																
Eriogonum inflatum var. deflatum	1				4		1	1							1		1	1	2	2	1			1
Eriogonum microthecum											2		1											
Erodium cicutarium	1			1						1					1	1	2	1	3	3	4	3	2	3
Euphorbia fendleri												1												
Gilia inconspicua			1	1				1		1	1				1									
Krameria grayi											1				2			1			2	2	1	
Langloisia											1				1	1		1			1			
Lepidium densiflorum	1	1	1			1				1				2	1						1		1	
Linum perenne	1		1	1	1	1	1	1									1							
Lycium								2																
Lygodesmia									1															
Machaeranthera canescens	1				1	1																		
Melampodium leucanthum		1								1												1	1	
Mentzelia californica	1																							
Mirabilis multiflora	1		2	1	2		1	1													1			
Mortonia scabrella		3									2	2	2	1	2							2	3	
Munroana																					1			
Opuntia echinocarpa					2	3	2					2						1	1	1				
Parthenium incanum											2													
Phacelia												1												
Plantago patagonica					1		3			1	1										1		1	

[illegible]