

ECOLOGICAL ANALYSIS OF THE PARASHAUNT GRAZING ALLOTMENT,
LAKE MEAD NATIONAL RECREATION AREA

By

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Setting

The Shivwits Plateau is a fault-block forming the north Rim of the Grand Canyon between the Grand Wash Fault on the west and the Hurricane Fault on the east. Side canyons dissect the Plateau into a number of points. The Parashaunt allotment comprises two points: Burnt Canyon Point, a relatively short and broad point, on the west side of Burnt Canyon, and Twin Point, a long and narrow point, on the east side of Burnt Canyon.

Kaibab limestone, a Permian formation, is the substrate on these points. The soil covering it is thin and rocky. Both points lie at an elevation of 6,000 feet.

Utah juniper (Juniperus osteosperma) and pinyon (Pinus monophylla) are codominant. Throughout much of the western United States this community alternates with a shrub community dominated by sagebrush (Artemisia tridentata and related forms). Normally the trees occupy the ridges, and the shrubs occupy the valleys between the ridges. The Shivwits Plateau, although dissected by canyons, is comparably flat. Sagebrush and other shrubs occur as an understory in the woodland community. There are few openings in the woodland, and these are small.

Some authors have applied the term "pygmy forest" to this community, but this community seldom forms a closed canopy which makes "woodland" a better term. However, on the Shivwits Plateau, the canopy is often closed. The mature trees are widely spaced and at one time the canopy was open, but in the last 50 to 100 years younger trees have filled in the openings and the canopy is closed.

History of Grazing Use

Authorized grazing use records for the period 1973 to 1986 were provided by BLM. Authorized use varied from 2,290 to 3,708 AUM's. There were annual variations but no trend. The lowest use was in 1986; the next lowest use was in 1974. The highest use occurred in 1980. The average use for this 14 year period is 3,200 AUM's. The average stocking rate for this period is 267 head.

BLM states that 16 percent of the allotment is on LMNRA lands. If LMNRA lands provided only 16 percent of the actual use, then the cattle would be on LMNRA lands for only two months of each year. The actual use was probably twice this.

The Parashaunt allotment was used for winter grazing. As snow covered the feed on the BLM land, which lies at a higher elevation, the cattle would drift onto LMNRA land.

This could be expected to occur sometime in November. The cattle would drift back onto BLM land in the spring after the snow had melted and new feed became available; this would occur sometime in April. All of the cattle were probably on LMNRA lands for about 5 months of each year.

All of the cattle were rounded up in the spring of 1988 and removed. There is at present no authorized use on the Parashant allotment.

Range Conditions

My observations were confined to Twin Point. I assume that Burnt Canyon Point is comparable to the northern and best portion of Twin Point. For this discussion Twin Point, like Gaul, can be divided into three parts. The three range condition classes intergrade; their boundaries are not distinct.

Just inside the LMNRA boundary fence, the range is in fair condition. Both cliff-rose (Cowania mexicana var. stansburyana) and sagebrush have good vigor. Blue grama (Bouteloua gracilis) is common in the understory, and there are occasional clumps of squirreltail (Sitanion hystrix) and mutton grass (Poa fendleriana). Some forbs very palatable to deer are also present such as geranium (Geranium richardsonii) and deer-vetch (Lotus wrightii).

With increasing distance from the boundary, there is a gradual deterioration in range condition. The bunchgrasses and palatable forbs disappear, and blue grama becomes less frequent and less vigorous. Snakeweed (Gutierrezia sarothrae) becomes more abundant. A little over a mile from the boundary the condition class drops into the poor category.

I have used the original terms for condition classes, i.e., Excellent, Good, Fair, and Poor. These classes are a bit ambiguous because they combine and confuse forage production with ecological succession. Modern terminology defines range condition classes in terms of ecological succession. Using this more technical classification, we can say that the range is in a middle seral stage at the boundary and deteriorates gradually into earlier seral stages.

Range conditions continue to deteriorate with increasing distance from the boundary. About four miles from the boundary the range condition becomes as poor as it can get, a condition best described as denuded. An understory, palatable or unpalatable, is lacking. Young junipers are browse-lined, but otherwise the woodland component of the vegetation appears unchanged. The ground

under the trees is mostly bare except for occasional patches of scurf pea (Psorelea tenuiflora) and birdsbeak (Cordylanthus parviflorus), both worthless as forage.

About eight miles from the boundary range conditions begin to improve gradually. As the end of the point is reached grasses reappear. This represents a progression from pioneer (denuded) to a middle seral stage.

To recapitulate: I will say that both ends of Twin Point are in a somewhat deteriorated condition--about average for the Southwest which has been grazed by livestock for a hundred years (the first 50 of it uncontrolled) and in which the mule deer population has gone through one or more cycles of boom and bust. For the middle portion of Twin Point, the forage resource for both cattle and deer has been utterly destroyed.

Drawing on my 25 years of professional experience in range management and range and wildlife research, I will speculate on how this situation came about. I prefer to think of it as deduction in the Sherlock Holmes manner rather than speculation, but you are the judge.

I believe that the situation on the points of the Parashaunt allotment of the Shivwits Plateau is similar to that of the points of the Central allotment of the Kaibab Plateau. I spent two years intensively studying how deer and cattle used the Central allotment. The big difference was that the Kaibab points had an abundance of grass. Cattle grazed on grass all winter and left the browse to the deer.

There is no water on Twin Point. A small tank was constructed near the south end, but its watershed is inadequate. It was dry in the spring, summer and fall of 1988; there is no evidence that it ever held water. Both deer and cattle had to depend on snow (as they did on the Kaibab) to meet their water requirements. For lack of water I doubt that deer spend the summer on Twin Point.

The bunchgrasses that dominated the herbaceous understory of the pristine natural community were eliminated by overgrazing by cattle. Overgrazing also prepared a good seedbed for tree reproduction. This may have occurred during or shortly after World War I, but it may have happened a hundred years ago. Tree ring counts of the younger trees would give us the date for the original depletion of the forage resource on Twin Point.

The low-vigor blue grama present at the north end of the point contributes very little to the forage resource; production is low (about 50 pounds per acre for 1988) and it

is covered by snow most of the grazing season. Therefore any cattle on this range would have to depend on the same plants as deer, mainly cliff-rose and sagebrush.

Cliff-rose is the preferred forage for both deer and cattle. After the available cliff-rose has been closely cropped (85-90 percent use) deer and cattle will consume sagebrush. Chemical analysis indicates that sagebrush should be fairly nutritious; however, both cattle and deer lose weight on a straight sagebrush diet.

On the Kaibab cattle and deer foraged all winter on bare ground within easy reach of snow, their water source. After a storm they would move further down on the points; as the snowline retreated they followed it back. On Twin Point the north end was probably protected by a snow cover and the south end received less use than the middle portion because it was too far from the snow. Therefore the grazing use was concentrated on the middle portion of the point. The result was complete depletion of the forage resource.

I have inspected the esplanade below the Grand Canyon rim from four trails. Blackbrush (Coleogyne ramosissima) is the dominant shrub, but several good grasses are common in the understory. From this I surmise that good forage was available to both cattle and deer on the Parashaunt allotment below the rim. However a scarcity of water makes this forage mostly unavailable. The only source of water is small depressions in the sandstone that are filled by rainwater. The esplanade is below the snowline for most storms.

This leaves us with two intriguing questions: When was the middle portion of Twin Point denuded of forage, and was it the result of overgrazing by cattle or by deer?

The remains of dead cliff-rose and dead sagebrush are plentiful. This proves that we have an overgrazed condition and not a naturally barren site. These remains will last a long time in an arid climate. From the degree of weathering, I would guess that the destruction occurred about 25 years ago plus or minus 10 years.

We have no data on actual use by livestock and data on authorized use only since 1973. The stocking rate did not vary significantly for the 14 years of record. If the history of grazing use on the Parashaunt allotment conforms to that of most BLM grazing allotments, the stocking rate was considerably higher in the 40 years preceding 1973. I believe it is reasonable to assume that stocking rates for cattle have declined during the fifty years that Twin Point has been managed by BLM.

Residents of the Mount Trumbull area in the thirties bought licenses and paid the extra fees charged for hunting on the Kaibab. Continual poaching by local residents had made the deer elsewhere on the Arizona Strip so scarce that hunting had no chance for success. This is what the Mount Trumbull residents told me when I sold them their hunting permits in 1937.

The deer population on the Kaibab built up in the forties and crashed in the fifties. In the sixties the Arizona Strip provided the best deer hunting to be had in Arizona. Then came the inevitable crash and deer are again scarce on the Shivwits Plateau.

I believe that the elimination of the forage resource on the middle portion of Twin Point occurred during the deer boom days of the sixties. In the last 14 years deer numbers have declined but cattle numbers have been fairly stable. In this period there has been considerable reproduction of cliff-rose on both the north and south ends of the Point, and new shoots are appearing below the browse line on the older shrubs.

Additional evidence that leads me to suspect that deer were largely responsible for the denuded condition of the middle portion of Twin Point is the absence of snakeweed. The progressive deterioration of range conditions in the northern portion was marked by increasing amounts of snakeweed. I doubt that cattle would ever graze snakeweed close enough to exterminate it. It is even reported to be poisonous to cattle (1). Since snakeweed was also killed out in the denuded area, I suspect that deer were responsible.

Trend in Range Conditions

The drastic reduction in deer numbers has resulted in range improvement on the northern and southern portions of Twin Point. Cliff-rose is the key species for both deer and cattle; it is increasing and vigor is improving. Range condition of the middle portion is as poor as it can get. Range condition can only improve here, but there is little evidence that this is occurring. In more technical language the understory (the trees are in satisfactory condition) is not in an early seral stage but back at the beginning. Succession must begin all over again on a barren substrate. Penstemon (Penstemon pachyphyllus subsp. congestus) has colonized a small patch of this barren soil. This may represent the first seral stage.

Four camera points and a permanent line transect were established to monitor changes in range condition. All are marked with iron stakes. See attached photographs.

Wildlife

The Arizona Department of Wildlife plans to introduce wild turkeys on the Shivwits Plateau. The reseeded areas on BLM lands adjoining LMNRA will provide good summer habitat for turkeys. The LMNRA portion of the Parashaunt allotment has little attraction for wild turkeys at any season.

Mule deer were once abundant, but the population has been greatly reduced in recent years. A nucleus for an expanded deer herd is still present. The forage resource has been depleted, but at the present time it is more than ample to support the present deer population.

Recovery of the deer herd depends on recovery of cliff-rose; this can be encouraged. Cliff-rose reproduction at the north end of Twin Point is being suppressed by competition from sagebrush and tree reproduction. Cliff-rose would benefit from burning this area; I am not prepared to judge what the side effects of this prescription might be.

Plant Species of Special Concern

As a category 2 species, Rosa stellata, is being considered for listing as threatened or endangered. This species is very uncommon so it doesn't have a common name. Needing one for his book, W. B. McDougall named it "desert rose" (2). Since it is a West Texas species associated with pinyon-juniper woodland, "desert rose" is not appropriate. I suggest TRT for "thorny rose of Texas" as it is exceedingly well armed with numerous, long, stout spines.

The occurrence of TRT in northern Arizona is a remarkable example of a disjunct distribution. The normal range of the species is western Texas, southern New Mexico and Mexico (3, 4). Several populations have been discovered in the Grand Canyon. One is on Twin Point.

I determined the extent of this colony by pacing to determine an average length and breadth. The colony occupies five acres. I established a permanent line transect 100 feet in length in what I judged to be the densest population. I had 20 hits on Rosa stellata; it is the dominant species in the understory (see Table 1). I counted all the plants on a plot of 5 square meters. There were 16 TRT plants (see Table 2). My plot had perhaps twice as many TRT plants as the average for the colony as the plants are more scattered around the fringes of the colony. Making this correction the density is 16,000 plants per hectare. The total population for this colony is about 32,000 plants.

This colony is bisected by the road on Twin Point. Except for this coincidence, it might not have been discovered. I believe that other colonies could be found on Twin Point by gridding the point with closely spaced (about 500 feet) paced transects. More colonies might be discovered by making similar surveys on other points where Kaibab limestone is the substrate. If you have Endangered Species funds to spend, this would be a project to consider.

More than 50 species of Rosa occur in the western United States. These are generally regarded as fair to good browse for cattle and good to excellent browse for sheep and deer (1). The Rosa stellata colony on Twin Point occurs only a short distance south of the denuded central portion. This colony has withstood the drought years of the thirties, a century of cattle grazing, and at least one decade with an excessive deer population. The thorny rose of Texas may be too well armed to be palatable to either, deer or cattle.

The cattle are gone, deer numbers are low, recreational use of Twin Point is very light. I can't conceive of any threat to this species. It may be increasing.

Plants along the fringes of the colony are more widely spaced and smaller. This is not the usual relation. Generally, plants with lots of space grow to large size; plants that are crowded are small. If these plants are small because they are young and haven't reached full growth--the colony is expanding. If their small size is due to stunted growth because of some limiting environmental factor (which is not apparent)--the colony has reached its maximum limits.

Management Recommendations

Ever since the National Park Service became responsible for managing the Lake Mead National Recreation Area, there has been an obligation to permit cattle grazing. This obligation has been eliminated on the Parashaunt allotment.

Now that cattle are off this allotment, I strongly favor keeping them off. Deer and cattle are not always in conflict; they can and sometimes do complement each other. Because of the lack of grass forage, deer and cattle are in direct competition on the Parashaunt allotment. The forage resource has been depleted from past overuse by both deer and cattle. The northern and southern portions of Twin Point will recover. The middle portion is too far gone; it will take many years for this range to recover or even show appreciable improvement.

Cattle placed on Twin Point would probably drift onto the National Park in wet winters.

Table 1 Transect 1-1

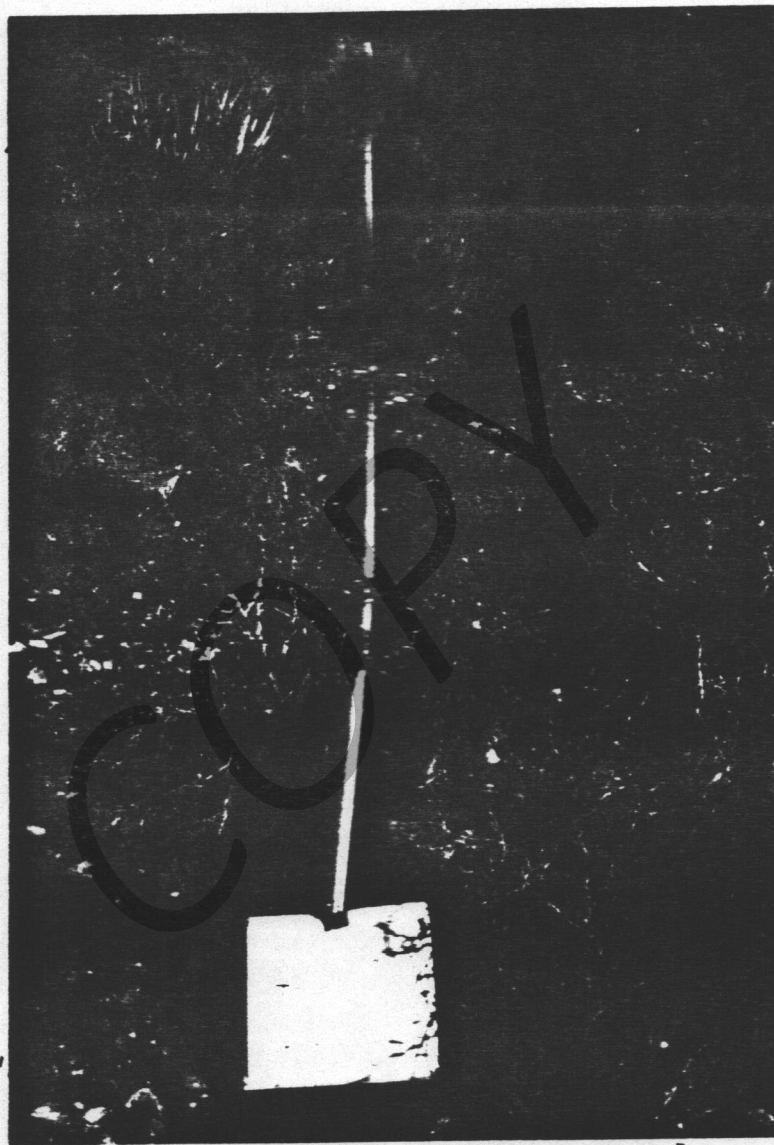
<u>Ground Cover</u>	Eits
soil	33
pebbles	20
rock	2
litter	5
cryptogams	0
<u>Live Plants</u>	
<u>Rosa stellata</u>	20
<u>Yucca baccata</u>	4
<u>Poa fendleriana</u>	2
<u>Perstemon linarioides</u>	9
<u>Eriodera nevadensis</u>	4
<u>Gutierrezia sarothrae</u>	1

Table 2. FIVE SQUARE METERS PLOT

Species	Number of Plants
<u>Rosa stellata</u>	16
Poa fendleriana	8
Cowania mexicana	
var. stansburyana	4
Sitanion hystrix	3
Coleogyne ramosissima	2
Juniperus osteosperma	
(seedlings)	2
Penstemon linarioides	2
Gutierrezia sarothrae	2

REFERENCES CITED

1. Dayton, W. A., 1931. Important Western Browse Plants, USDA Misc. Pub. No. 101. 212 p.
2. McDougall, W. B., 1964. Grand Canyon Wildflowers, 258 pp. Museum of Northern Arizona Bull. No. 43. Northland Press, Flagstaff, Ariz.
3. Kearney, Thomas H. and Robert H. Peebles, 1942. Flowering Plants and Ferns of Arizona 1070 pp. USDA Misc. Pub. No. 423.
4. Tidestrom, Ivar and Sister Teresita Kittell. 1941. A Flora of New Mexico and Arizona. 897 pp. Catholic University Press, Washington, D.C.

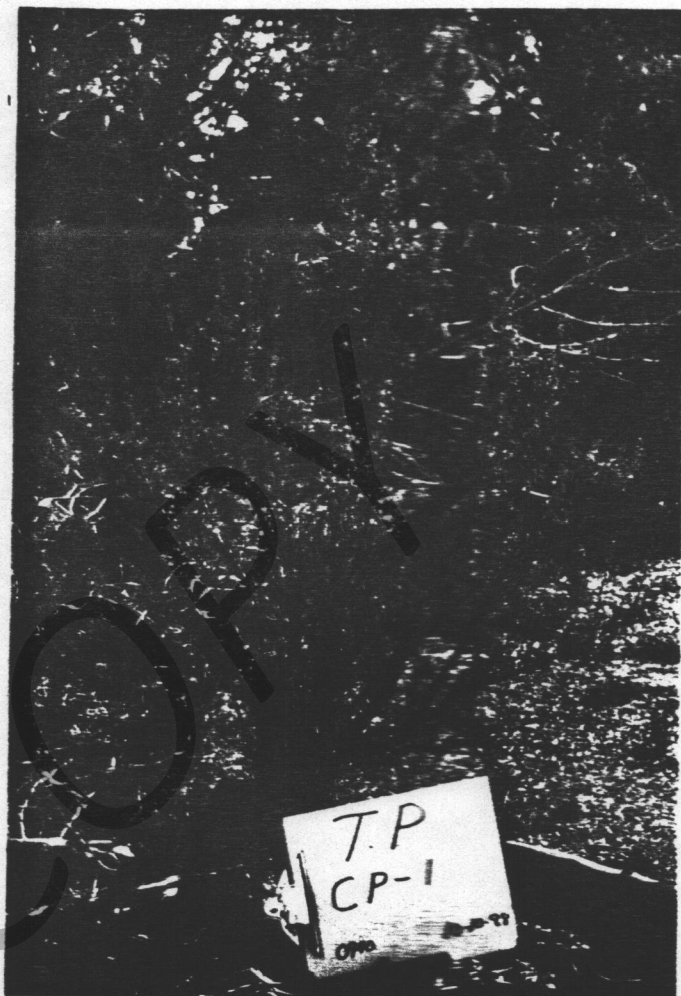


#5

Transect 1. Located in dense portion of Rosa stellata colony at east edge of road 2.0 miles north of end of first point.

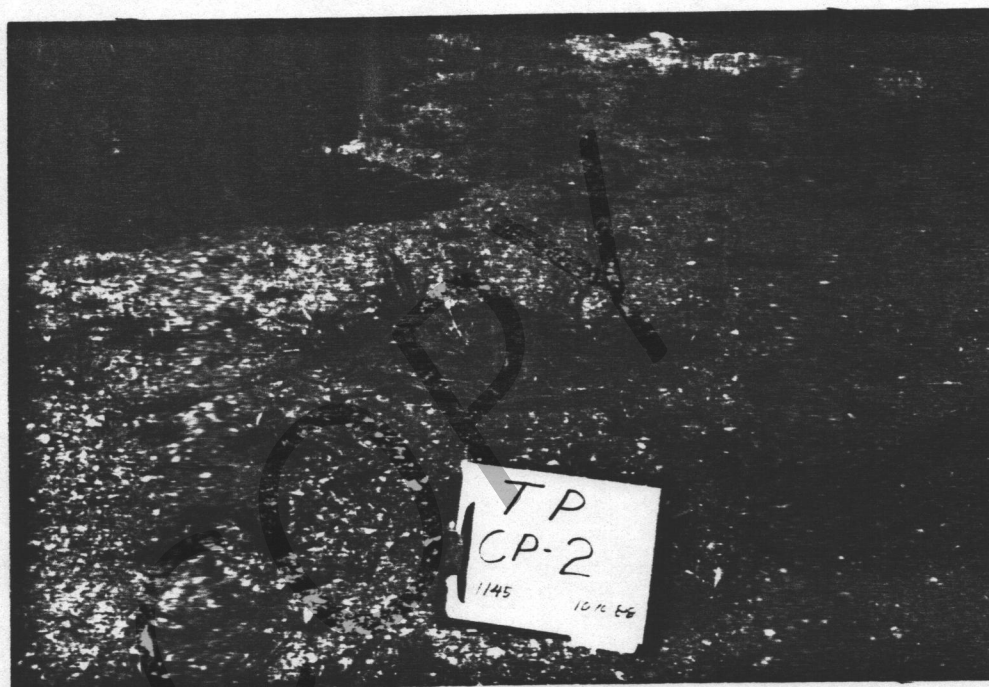


The thorny rose of Texas (Rosa stellata). It may be too well armed to be palatable to deer or cattle. It shows no evidence of ever being grazed in an area where even inferior shrubs have been severely damaged by grazing.



#1

Camera Point 1. A young cliffrose. It is located on east edge of road 1.6 miles south of boundary fence.



Camera Point 2. Penstemon (Penstemon pachyphyllus) colonizing denuded range. Located on west side of road south of first rim view point.



#3

Camera Point 3. Browse-lined Utah juniper.
It is located 85 feet east of road 5.0
miles south of boundary fence.



#2

Camera Point 4. Browse-lined cliffrose.
Located 40 feet west of road 3.0 miles
south of boundary fence.