Mountain Goats Impacts in the Mount Peale Research Natural Area

Prepared by Marc Coles-Ritchie, Grand Canyon Trust

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Abstract

The impacts of introduced mountain goats in the Mount Peale Research Natural Area, of the La Sal Mountains, were assessed by revisiting six sites that had initially been surveyed in 2015 by Wild Utah Project. Negative impacts of mountain goats were observed in the 2017 field surveys by Grand Canyon Trust, including bare ground (wallows, trails, trampling, etc.), broken alpine turf, browsed plants and soil erosion. In most cases the rare plants continue to be present at the sites where they were observed in 2015. One site did not have all the rare plants at the revisit; it is not clear if this was an actual change or a lack of detection. There was evidence of goat activity (fur and droppings) around the rare plants, which is cause for concern. For each of the six sites the condition class either stayed the same or declined from 2015 to 2017. While there may be some level of observer variability, the pattern of condition class decline, the field notes from the two sampling periods and the evidence on the ground point to deterioration in the condition of the sites as a result of mountain goats.

Introduction

Mountain goats were introduced into the La Sal Mountains in 2013 by the Utah Division of Wildlife Resources, even though they are not native to this mountain range. The goats are causing significant damage to the alpine vegetation, including rare plants, and the soil. We and others are very concerned about the impacts from this introduced species. The rare plants in the La Sal Mountain alpine setting are discussed by the US Forest Service here: https://www.fs.fed.us/wildflowers/Rare_Plants/conservation/success/LaSals_studies.shtml

Monitoring the impacts of mountain goats was done by Wild Utah Project at 73 sites in 2015 with a protocol that they developed. Grand Canyon Trust revisited six of those sites in 2017 and used the same protocol to assess the sites. The monitoring sites are 0.1 acre plots, with a radius of 37.2 m. Within the plot a search was done for the following rare plants:

- Alpine besseya (*Besseya alpina*)
- Baker's alpineparsley (*Oreoxis bakeri*)
- Blackheaded daisy (*Erigeron melanocephalus*)
- Dwarf mountain ragwort (*Senecio fremontii* var. *inexpectatus*)
- Eastwood's podistera (*Podistera eastwoodiae*)
- La Sal daisy (*Erigeron mancus*)

- Matted saxifrage (*Saxifraga bronchialis* var. *austromontana*)
- Sweetflower rockjasmine (*Androsace chamaejasme* var. *carinata*)

In addition, an assessment was made of the condition of the site, using the following classes, which are relative to natural condition:

0 = pristine
1 = little change
2 = significant change
3 = severe change
4 = excessive change

This document is a brief summary of the data from the revisits to get a sense for how conditions are changing as a result of the mountain goats being in the alpine area, and specifically the Mount Peale Research Natural Area.

We observed (see photos on subsequent pages) the following evidence of mountain goats in the Mount Peale Research Natural Area:

- Sightings of goats.
- Goat fur on plants and on the ground.
- Goat droppings – both winter and summer types.
- Wallows – where goats have dug into the soil and created bare patches of ground.
- Trails that seem to be goat trails because of fur and droppings along them.

There are numerous negative impacts from mountain goats including the following, which we observed in our 2017 field work:

- Broken and sheared alpine turf.
- Bare ground (including wallows) and soil erosion.
- Uprooted plants, especially graminoids.
- Browsed plants, some of which seem dead now.

Below are brief summaries of the six sites that were revisited in 2017, after the initial survey in 2015 by Wild Utah Project. The 2017 surveys were conducted by Grand Canyon Trust staff (Marc Coles-Ritchie) and volunteers (Emily Bishop, Sarah Dunn, Thomas Meinzen and Jonathan Barth). Appendix 1 has additional data about these sites.

Summary of Field Data

Site 23

This is a relatively flat area of alpine turf and rock. Two rare plants were observed at this site in both years: *Erigeron mancus* and *Androsace chamaejasme* var. *carinata*. The site class was 1 (little change) in 2015 and 2 (significant change) in 2017, so it seems that the site has been degraded in the past few years.

Site 24

This is a relatively flat area that is dominated by rock; recorded as talus/barren rock or subalpine rocky cover type. There were no rare plants observed at this site in either year. The condition class was recorded as 1 (little change) in both years. The abundance of rock (estimated to be over 90% cover in both years) makes this site less prone to change in condition.

Site 129

This site is relatively steep, with an approximate slope of 30%. The site was recorded as alpine turf, alpine turf-rock and subalpine rocky cover types. Over half of this site was estimated to be rock or bare ground. The rare plant *Oreoxis bakeri* was observed in both years. The site class was 0 (pristine) in 2015 and 1 (little change) in 2017, which suggests that this site condition has declined.

In 2017 we noted “broken clumps of soil and vegetation” but much of that was deemed to be natural due to the steep slope. There were also burrows, tunnels, goat fur and ground disturbance at this site.

Fig. 1. Overview of site 129 in 2017 (photo by M. Coles-Ritchie).

Fig. 2. The rare plant *Oreoxis bakeri* at Site 129 (photo by J. Barth).

Fig. 3. Uprooted plants at Site 129 (photo by J. Barth).

Fig. 4. Bare soil at Site 129 (photo by J. Barth).

Fig. 5. Goat fur at Site 129 (photo by J. Barth).

Site 135

This site has a slope of approximately 20%. The cover type is herbaceous alpine turf. The rare plant *Erigeron mancus* was observed at this site in both years. The condition class was recorded as 0 (pristine) in 2015 and 2 (significant change) in 2017, suggesting that the condition has deteriorated at this site. One reason for that decline is likely the hiking trail that was built across the site between 2015 and 2017, which has likely caused increased disturbance by humans in addition to the impacts of goats. In 2017 the following notes were recorded: "vegetation clumps torn up or upside down. Scat is common here. Trail through site is Mt Tuk trail." Goat fur, droppings and a goat trail were observed at the site in 2017. In addition, a pika and a yellowbelly marmot were observed in the talus slope at this site (Fig. 11).

Fig. 6. Overview of Site 135 in 2017 (photo by M. Coles-Ritchie).

Fig. 7. The rare plant *Erigeron mancus* at Site 135 in 2017 (by M. Coles-Ritchie).

Fig. 8. Uprooted plants at Site 135 (left photo by J. Barth; right photo by M. Coles-Ritchie).

Fig. 9. Goat fur at Site 135 (left photo by J. Barth; right photo by M. Coles-Ritchie).

Fig. 10. Goat droppings (summer on left and winter on right) at Site 135 (photos by J. Barth).

Fig. 11. Pika (left photo right-middle on rocks) and yellowbelly marmot (left photo background and right photo) at Site 135 (photos by J. Barth).

Site 150

This site has a slope of approximately 10%. The cover type is alpine turf-rock and talus/barren rock. The rare plants observed at this site in 2015 were: *Erigeron mancus* and *Androsace chamaejasme* var. *carinata.* In 2107 the rare plants observed were: *Erigeron mancus* and *Podistera eastwoodiae*. It is not clear if these are actual differences or discrepancies in plant identification. The condition class was 0 (pristine) in both years. This very rocky site is not vulnerable to impacts from goats or other disturbances.

Site 151

This site has a relatively flat slope and the cover type is alpine turf. About half of this site is vegetated and the other half is rock or bare ground. The rare plants observed at this site in 2015 were: *Erigeron mancus* and *Androsace chamaejasme* var. *carinata* and *Saxifraga bronchialis* var. *austromontana*. In 2017 the only rare plant observed was *Androsace chamaejasme* var. *carinata.*). It is not clear if the other plants are no longer present, or if they were not detected or identified. The condition class recorded in 2015 was 1 (little change) and in 2017 it was recorded as 2 (significant change) so it seems that conditions have declined at this site. In 2017 the following notes were recorded: "Goat scat, hair, and wallows, human faint use trail."

Mountain Goat Outside of Surveyed Sites

The evidence and impacts of mountain goats were also noted in areas outside the monitoring sites, and are represented in the photos below. The first three images show mountain goats in the distance.

Fig. 12. Mountain goats on hillside in the Mount Peale RNA (photo by Sarah Dunn).

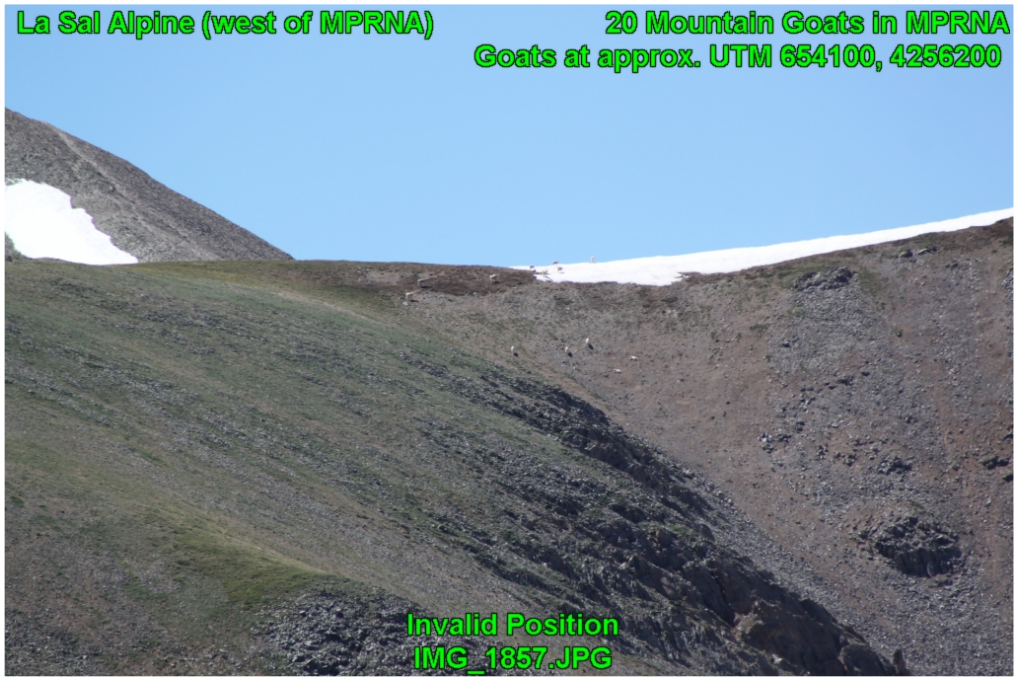

Fig. 13. Mountain goats, below ridge, in the Mount Peale RNA (photo by Sarah Dunn).

Fig. 14. Mountain goats on the snow in the Mount Peale RNA (photo by Sarah Dunn).

Fig. 15. Mountain goat wallows in Mount Peale RNA (photos by J. Barth).

Fig. 16. Mountain goat evidence (droppings, fur and wallow) in Mount Peale RNA (photos by J. Barth).

Figure 17. The rare plant *Erigeron mancus* beside mountain mountain goat droppings (left photo by J. Barth).

Fig. 18. Mountain goat fur in Mount Peale RNA (photos by J. Barth).

Appendix 1.

Data on vegetation and conditions of sites in the Mount Peale Research Natural Area from July 2015 (from Wild Utah Project) and June/July 2017 (from Grand Canyon Trust) related to impacts from mountain goats. The following rare plants were not observed at any of these sites in either year: *Besseya alpina*, *Erigeron melanocephalus* and *Senecio fremontii* var. *inexpectatus.*

Site ID	Year	Observers	X coord	Y coord	ERMA9	ANCHC	ORBA	POEA	SABRA2	Site Class	Site Class Name
23	2015	PF,CF,JS,BH,BS	653796	4257572	yes	yes	0	0	0	1	Little change
23	2017	E. Bishop, S. Dunn	653793	4257574	yes	yes	0	yes	0	2	Significant change
24	2015	PF,CF,JS,BH	653857	4257230	0	0	0	0	0	0	Pristine
24	2017	E. Bishop, S. Dunn	653859	4257228	0	0	0	0	0	0	Pristine
129	2015	MB, MC, MP, KB, DK	652600	4256002	0	0	yes	0	0	0	Pristine
129	2017	M. Coles-Ritchie, E. Bishop, J. Barth	652598	4256002	0	0	yes	0	0	1	Little change
135	2015	MB, DK, MP, KB	652672	4255749	yes	0	0	0	0	0	Pristine
135	2017	M. Coles-Ritchie, E. Bishop, J. Barth	652671	4255749	yes	0	0	0	0	2	Significant change
150	2015	PF,CF,JS,BH,BS	653838	4257334	yes	yes	0	0	0	0	Pristine
150	2017	E. Bishop, S. Dunn	653836	4257334	yes	0	0	yes	0	0	Pristine
151	2015	PF,CF,JS,BH	653819	4257537	yes	yes	0	0	yes	1	Little change
151	2017	E. Bishop, S. Dunn	653817	4257538	0	yes	0	0	0	2	Significant change

Plant Codes (from first line of Table):

ERMA9 = *Erigeron mancus;* ANCHC = *Androsace chamaejasme* var. *carinata;* ORBA = *Oreoxis bakeri;* POEA = *Podistera eastwoodiae;* SABRA2 = *Saxifraga bronchialis* var. *austromontana.*