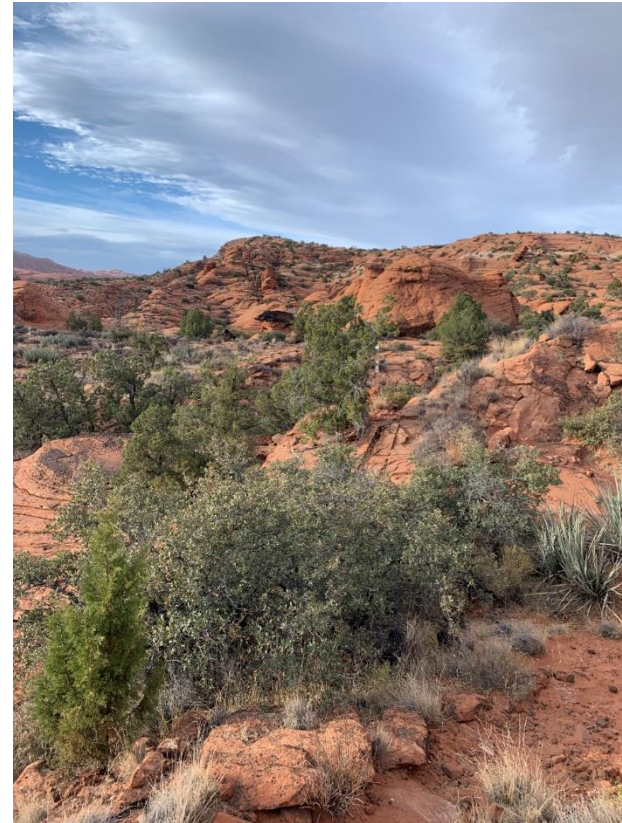


Recreation Impact Monitoring



View from Gila

FALL 2020 WINTER 2021

SNOW CANYON & PARADISE CANYON

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Celeste Thomas, Research Assistants
Dave Maxwell, SUU GIS Lab Director

Desired Conditions



Butterfly



Petrified Dunes



Hidden Pinyon

Trails:

Trail width and depth* stable or declining

Unauthorized trails clearly marked as closed, re-vegetated, etc.

Trail nodes stable or declining

No off trail impacts; No proliferation of trails

No unauthorized trail access points

Recreational Activities:

No campfires in lowland zone

Recreation in lowland zones to occur on designated trails

Camping restrictions followed

Climbing restricted to designated areas

Upland Zone Uses:

Well defined trail not excessive or redundant

No trail proliferation

Minimal impacts from camping

Impacts short-term

Note: recreation impact monitoring is focused on the lowland zone

Plants:

Nonnative weeds controlled

No human caused plant destruction

Perennial plant population maintained

Vegetative ground cover stable or increasing

Non-native animals:

Pets on leash* (this assessment and enforcement is through a volunteer patrol)

Feral animals controlled

No unmanaged domestic livestock

General Habitat Conditions

Intact cryptobiotic crust

Soils maintained

Boundary fences, signs, markers, etc. intact*

Seasonal closures enforced

No human-induced tortoise mortality*

Refuse:

No recreational human waste or liter

No non-recreational (construction) trash*

Prohibited or heavily restricted activities:

Motorized vehicles on designated roads only

No paintball activities

No target shooting

Methods

Field

- Hiked 11/7, 11/17, 11/20, 11/21, 11/25, 12/2, 12/7, 12/29, 1/4, 1/13, 1/20, 2/8, 2/9, 2/22, 2/23, 2/26, & 3/29
 - Stop every 1/4 mile for interval data
 - Recorded visual disturbance impacts
 - Recorded severe erosion & notable conditions
- Data recorded in ARC GIS Collector App



Chuckwalla



Gecko



Halfway Wash



Paradise Rim

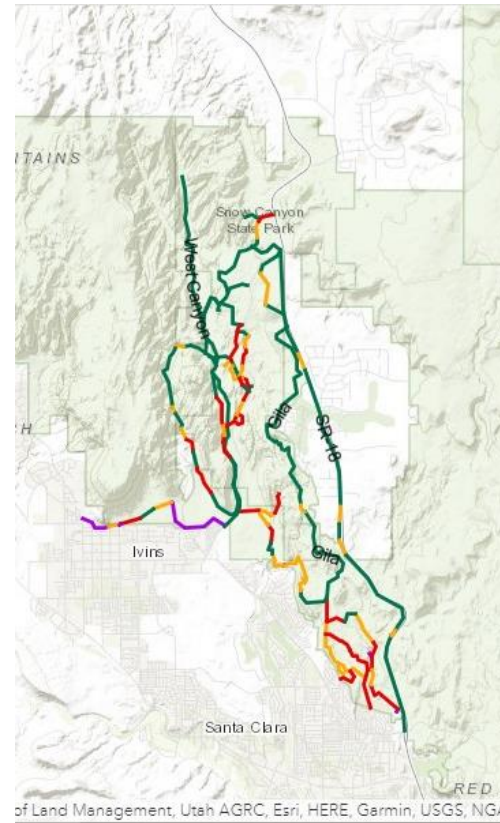
Consistency & Analysis

- Data downloaded into ArcPad 10.1 and analyzed
- Inter-rater reliability check through systematic analysis of photos and data points in ARCGIS.
- Analysis of interval and visual disturbance patterns in excel
- Hot Spot Analysis of points

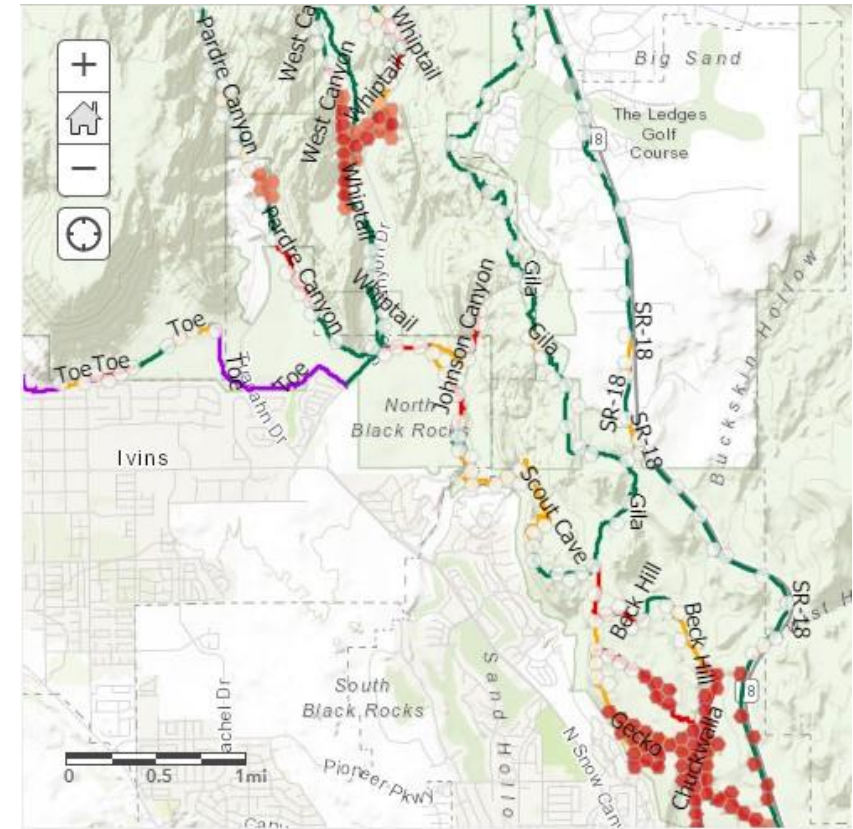
Analysis Progression



Data Points



Line Analysis



Hot Spot Analysis

Overall Results



Padre Canyon



Padre Canyon near Toacahn

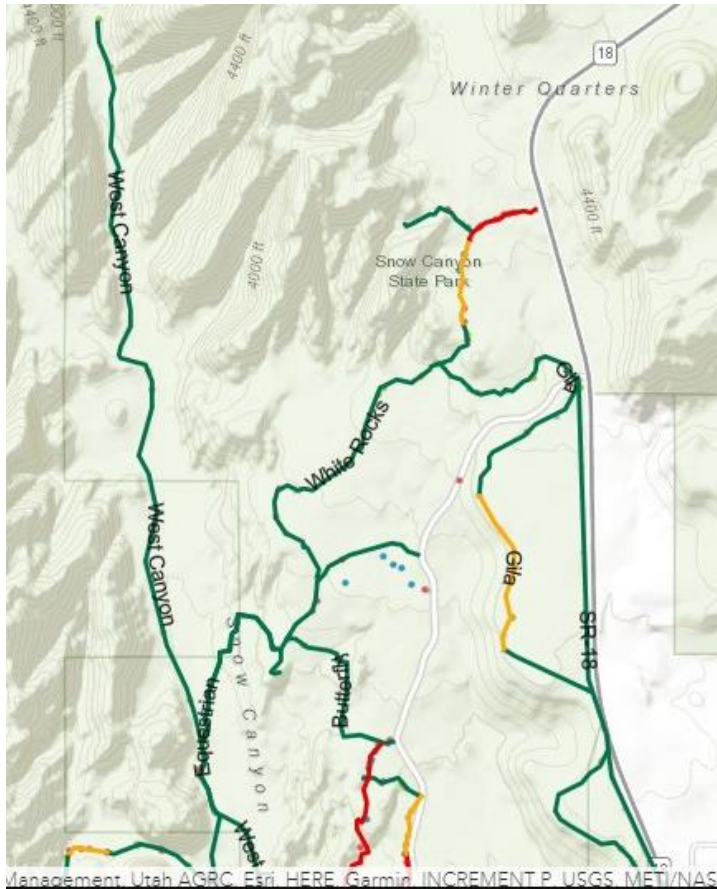
Monitoring Summary (n=294 data points)	2014	2017	2020
Trails	17	22	24
Miles	22.4 miles	38.7 miles	43.6
Visual Disturbance photos	113	163	419
Visual Disturbance photos with more than five impacts or severe impacts	29 (26%)	64 (39%)	158 (38%)
ATV evidence	0	1	0
Evidence of climbing outside designated areas.	0	0	0
Dumping sites	0	0	0
Evidence of paintball or shooting	0	0	0
Graffiti or vandalism	1	1	3
Unsigned impact areas	78%	79%	82%
Nodes	48	57	103
Campfire remains	0	0	0
Uses	Hiking, mountain biking, equestrian, and climbing	Hiking, mountain biking, equestrian, climbing	Hiking, mountain biking, equestrian, climbing

Impacts are visible, numerous (>5), and/or established and hard to erase. The red trails do not meet desired conditions, and have severe impacts.

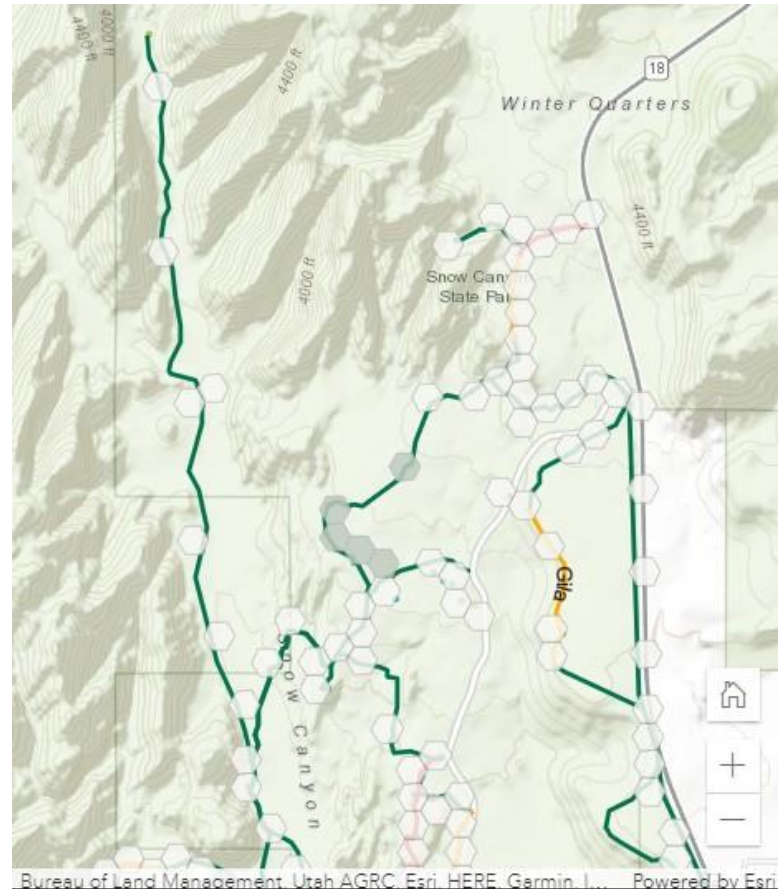
Impacts are visible, but not dominate. The yellow trails do not meet desired conditions, but the impacts are comparatively moderate. 3-5 Visual Disturbances recorded at intervals.

No impacts visible at interval photos. The green trails are relatively in good shape and closest to meeting desired conditions.

Snow Canyon North



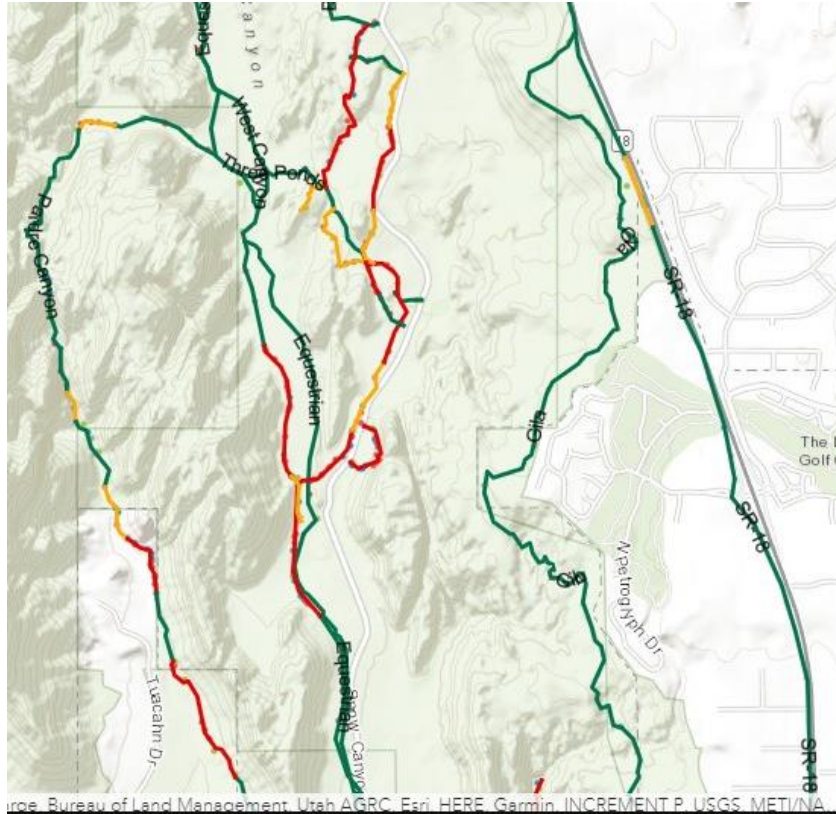
1/4 mile line severity analysis



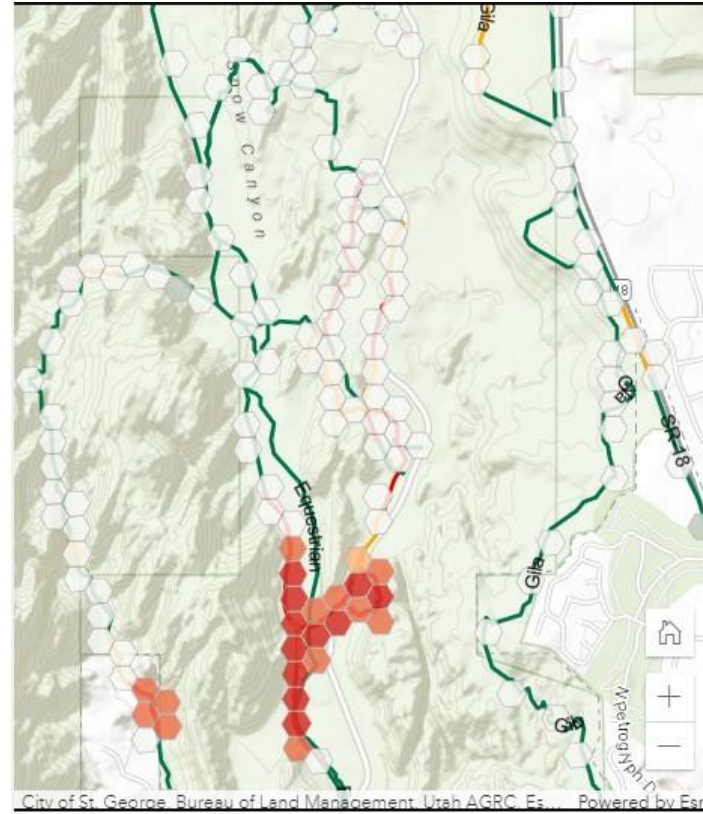
Hot spot analysis

Trail (mi)	2014 VD	2017 VD	2020 VD
West Canyon (3.9)	X	1	27
White Rocks Amphitheater (.5)	X	12	22
White Rocks (1.7)	X	4	2
Butterfly (.7)	7	10	7
Gila (7.5)	1	20	37
SR18 (7.3)	X	X	20

Snow Canyon Upper Middle Trails



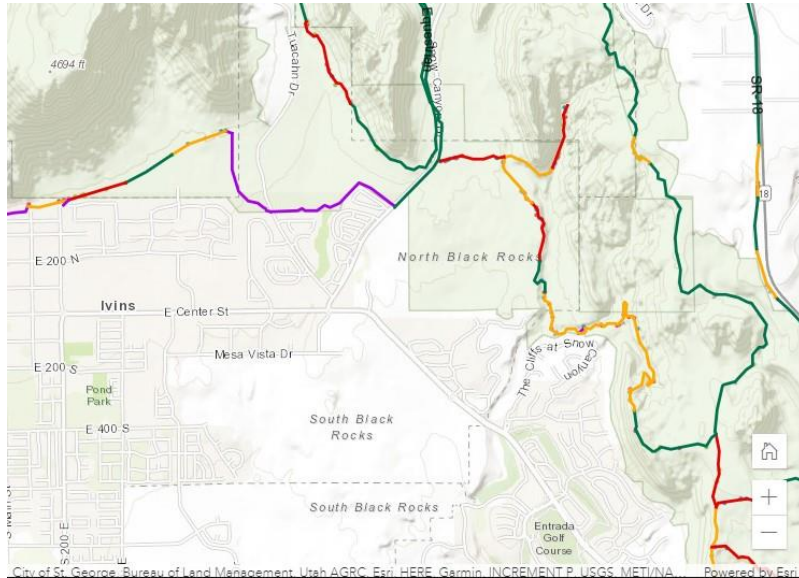
¼ mile line severity analysis



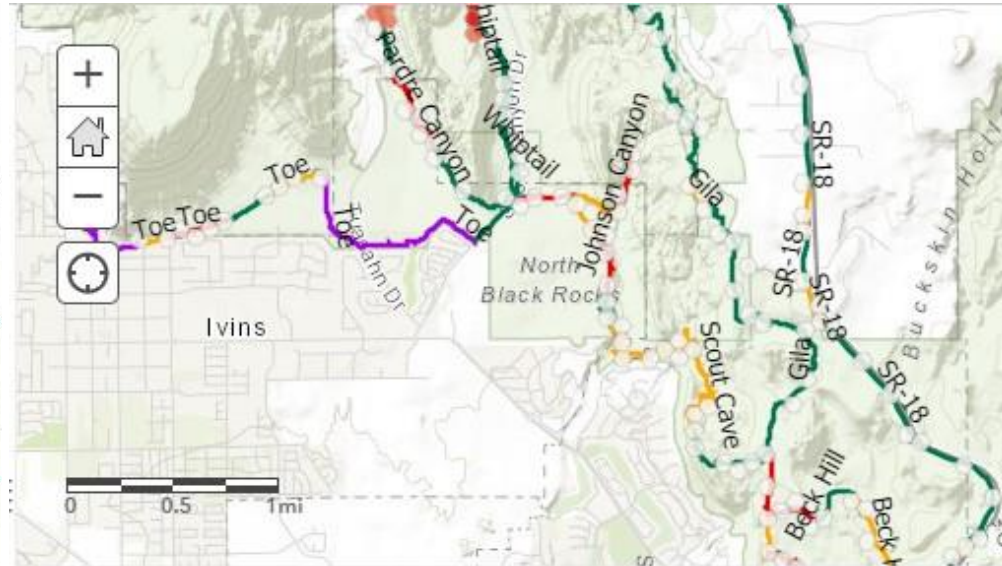
Hot spot analysis

Trail (mi)	2014 VD	2017 VD	2020 VD
Petrified Dunes (.6)	6	0	10
Whiptail (3.1)	4	7	50
Three Ponds (1.7)	X	x	5
Padre Canyon (3.2)	11	14	38
Hidden Pinyon (.7)	4	5	5
Pioneer Names (.3)	>10	>10	17

Snow Canyon Lower Middle Trails



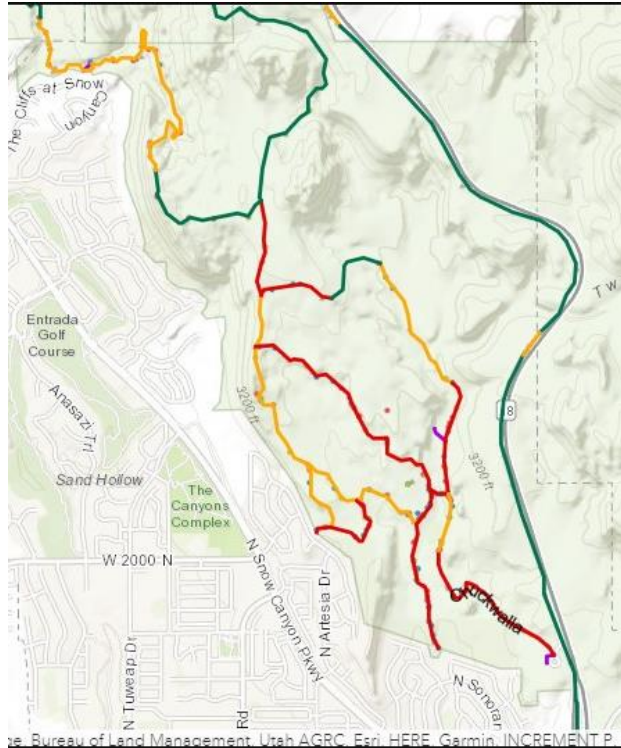
¼ mile line severity analysis



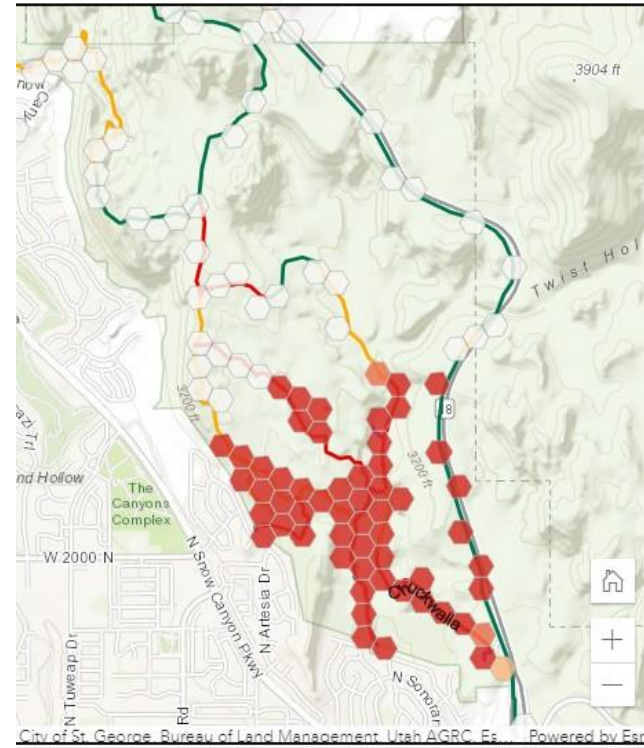
Hot spot analysis

Trail (mi)	2014 VD	2017 VD	2020 VD
Johnson Canyon (.9)	9	11	16
Toe Trail (1.4)	>10	>10	X
Scout Cave (2.8)	>10	16	17
Beck Hill (1.4)	12	5	27

Paradise Canyon Trails



¼ mile line severity analysis



Hot spot analysis

Trail (mi)	2014 VD	2017 VD	2020 VD
Paradise Rim (1.2)	15	26	28
Turtle Wall (.9)	14	17	27
Gecko (.3)	X	3	5
Gap (.4)	2	2	14
Chuckwalla (.9)	14	>15	32
Halfway Wash (1)	>15	>15	23

Analysis of Desired Conditions

Desired Conditions Being Met

Camping restrictions followed

- In the monitored area, no campfire remains were found

Climbing restricted to designated areas

- Climbing was retained at Chuckwalla and at designated areas in Snow Canyon. There were several unauthorized access trails near climbing areas in Snow Canyon

No recreational human waste or litter

- No litter was found

Motorized vehicles on designated roads only

- No vehicle tracks were found

No paintball activities

- No paintball remnants found

No target shooting

- No target shooting evidence found

No non-recreational (construction) trash

- No signs of dumping

Desired Conditions NOT Met

Unauthorized trails clearly marked as closed, re-vegetated, etc.

- Unauthorized trails to view points and other attractions are common. 82% of visual disturbance points captured were unsigned.

No off trail impacts

- Every trail has off trail impacts

No proliferation of trails

- Every trail has social trails present

No unauthorized access points

- Every housing development has unauthorized access points

Recreation in lowland zones to occur on designated trails

- Social trails to view points and attractions are common

No human caused plant destruction

- Off trail impacts and nodes destroy plants

Intact cryptobiotic crust

- Some off trail impacts were in cryptobiotic crust

Discussion

- Impacts are increasing. Interval data points with more than five impacts or severe impacts went from 26% in 2014 to 39% in 2017 and stayed steady with 38% in 2020.
 - Recommendation: signage at trailheads giving clear expectations and reasons
- Use continues to be hikers, mountain bikers, climbers and equestrian.
 - Hikers/climbers caused the most off trail impacts in this area
 - Severe ratings were due to multiple routes throughout the trails listed.
 - People like to wander and take in views. Can routes be designated? Can routes to attractions (ie. rocks and view points) be designated? Is Snow Canyon having any positive results with raking to keep people on designated trails?
 - Re-sign and put in natural deterrents (ie. vertical mulch) in severe areas
 - Washes lead to multiple routes
- Trail maintenance & volunteer patrols are important management tools
 - 4% of data points reported severe erosion while 74% reported mild erosion. This shows trails are being maintained.
 - SUU is establishing Color Country Urban Rangers, a volunteer trail patrol who will work with Dr. Eastep to continue monitoring

Next Steps

- Resume more normal operations after a year of COVID-19 operations
- Zone 6 baseline is the priority for summer and fall (with Dr. Goonan and her Recreation Ecology students)
 - Update impact protocol to monitor severe impacts like dumping and large barren cores
 - Monitor closed trails
 - Include a protocol for climbing areas
- Color Country Urban Rangers is an ORPT special topics course in the fall
 - 7 students will learn to operate a volunteer organization in the first month, followed by recruiting volunteers to patrol for the next 10 weeks.
 - Monitoring will continue to include 2 practicum students each semester from the Outdoor Recreation Foundation course
 - Move to Arc GIS Field Maps and Survey 1 2 3 for collecting with pre-set ¼ mile markings

Refining

- Analysis of desired conditions
 - Recreation leads to impacts. Are the impacts a threat to the desert tortoise?
- Further analysis of data to understand use patterns
 - [Collector and ARCGIS Online](#)



White Rock Overlook 2017