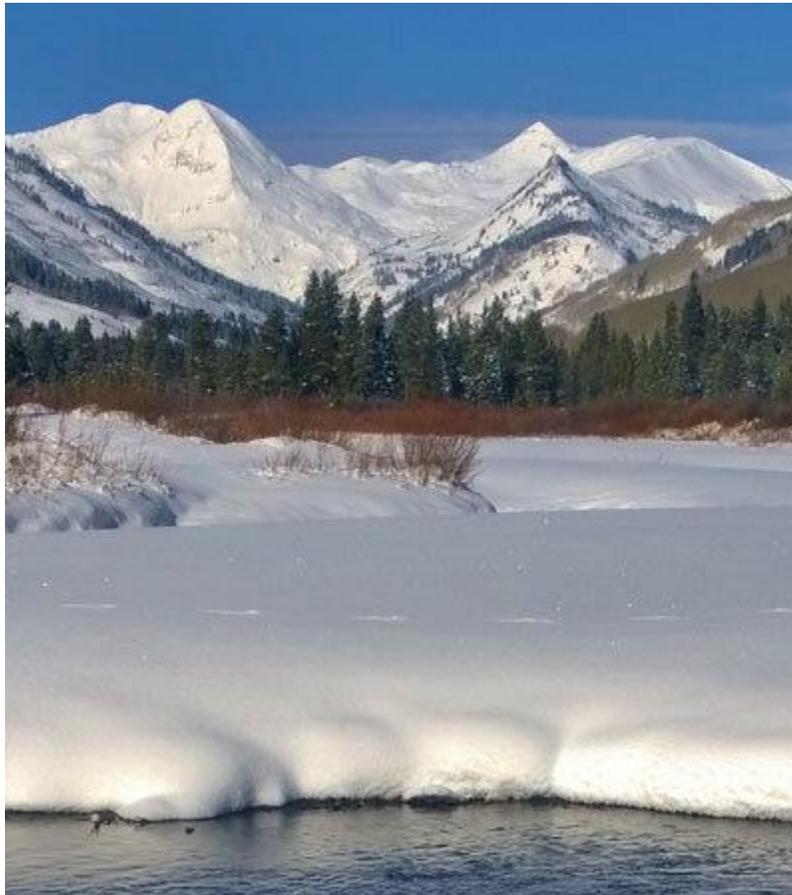


**Upper Gunnison Valley Winter Visitor Use Data Collection Initiative:**  
*Review and Reflections from Winter Seasons 2017/2018 to 2020/2021*



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## Executive Summary

The Upper Gunnison Valley, near Crested Butte, Colorado, is renowned for backcountry winter recreation. Winter recreation in the Upper Gunnison Valley (UGV) mainly occurs on United States Forest Service lands. Motorized, non-motorized, and mechanized recreation in the area is zoned by a winter travel management plan (WTMP), which the Forest Service developed more than twenty years ago (USDA, 2015). Since the agency's plan was developed, technological changes along with observed increased visitation to the backcountry have prompted members of the Crested Butte community to express interest in updating the WTMP. In addition to community interest, the United States Forest Service is mandated by Title 36 Code of Federal Regulations Part 212 Travel Management Subpart C-OSV-use to develop a system of routes and areas to provide for over-snow vehicle use for all winter use areas across the nation (USDA, 2015).

In anticipation of a future winter travel management planning process, local stakeholder groups approached Western Colorado University's Center for Public Lands to set up a visitor use study. This study, known as the Winter Recreation Data Collection Initiative (DCI), gathers data regarding backcountry recreation travel in the six major drainages near the Town of Crested Butte. Data about backcountry winter travel is collected through observations, camera technology, and surveys. The purpose of the DCI is to gather quantitative and qualitative data regarding backcountry use in the UGV in order to increase knowledge of winter recreational patterns and enhance stakeholder's ability to aid the USFS in the anticipated decision-making process of a new WTMP. Data was first collected in the 2017/2018 winter season and continues to be collected each winter.

This report will summarize the 2017/2018, 2018/2019, 2019/2020, and 2020/2021 winter seasons visitor use data. Avalanche risk data from Colorado Avalanche Information Center and snowfall data from Natural Resource Conservation Service snow telemetry sites have been incorporated into the data set to better understand environmental conditions with visitor use.

## Acknowledgements

This study has been a collaboration among many stakeholders including the Gunnison Ranger District of the United States Forest Service, the Town of Crested Butte and its council members, Silent Tracks, the Crested Butte Land Trust, Share the Slate, Western Colorado University School of Environment and Sustainability, and numerous community members. We would like to especially acknowledge Dr. Zachary Treisman for his statistical work and guidance for this study. Previous research leads and assistants at from the Center for Public Lands include Doug Shaw, Kendall Cox, Alex Stach, Cheryl Cwelich, Justin Sanchez, Christina Frank, Maxwell Sawyer, Sierra Richardson, and Bridget Goddard.

## Introduction

The Upper Gunnison Valley (UGV) near the Town of Crested Butte, Colorado is renowned for backcountry winter recreation. Certain characteristics of the valley, including long winters, heavy snowfall, and low temperatures have turned this former mining town into a tourist destination which thrives on its many outdoor opportunities. Winter recreation in the UGV mainly occurs on United States Forest Service (USFS) lands.

Motorized, non-motorized, and mechanized recreation in the area is zoned by USFS's Travel Management Rule (TMR), which the Forest Service developed more than twenty years ago. In 2005 the USFS first issued the (TMR) at the national level to address the increased motorized and non-motorized visitation to National Forests (Trails Work Consulting, 2016). Subpart C of the TMR originally allowed for local units to optionally designate and allow for over snow vehicle (OSV) use. Many concerns were raised about the lack of regulation for OSV use and in 2013, after a court ruling, subpart C was amended. The amendment declared that "a system of routes and areas to provide for over-snow vehicle use must be established for all winter use areas across the nation." Although this amendment became effective in 2015, it does not place a deadline for Forest Service units to complete the designations, whether it be on a current winter travel plan or a new one. The TMP designations are important to take note of because once they are completed delineated where motorized and non-motorized winter recreation can occur.

As of June 2017, there has been a Forest Plan Revision in process for the Grand Mesa, Uncompahgre, and Gunnison National Forests. The Forest Plan process has priority to be completed before the Gunnison Ranger District, which manages Forest Service lands around the UGV, will initiate a Winter Travel Management planning process. In the interim, the local community approached Western Colorado University's Center for Public Lands to develop, launch, and lead in a Winter Data Collection Initiative (DCI) to better understand visitor use patterns and help inform the anticipated winter travel planning process.

The DCI started in December 2017 and has compiled four consecutive winter seasons of visitor use data. Data about backcountry winter travel is collected through observations, camera technology, and surveys. The study area includes the six major drainages near the Town of Crested Butte, Colorado including: Kebler Pass, Slate River Valley, Washington Gulch, Gothic, Brush Creek, and Cement Creek. Data was first collected in the 2017/2018 winter season and continues to be collected each winter.

The purpose of the DCI is to gather quantitative and qualitative data regarding backcountry use in the UGV in order to increase knowledge of winter recreational patterns and enhance stakeholder's ability to aid the USFS in the anticipated decision-making process of a new WTMP. This report will look at four years' worth of DCI data, both camera observations and survey results, and include external data on avalanche risk rating and snowfall. This is first report to incorporate environmental factors into the analysis. Avalanche risk data is from Colorado

Avalanche Information Center and snowfall and temperature data is from Natural Resource Conservation Service snow telemetry sites around the UGV

## Methods

Data about backcountry winter travel is collected through camera technology and surveys. The study area includes the six major drainages near the Town of Crested Butte, Colorado including: Kebler Pass, Slate River Valley, Washington Gulch, Gothic, Brush Creek, and Cement Creek (image below). Data was first collected in the 2017/2018 winter season and continues to be collected each winter. The game cameras are placed in a location to count every disturbance of the infrared beam as recreationists head into the backcountry on lands managed by the U.S. Forest Service or Gunnison County. A user survey was also distributed throughout the Gunnison Valley via Survey Monkey in the 2017/2018, 2019/2020 and 2020/2021 winter seasons. The survey was created in 2017 to pair with camera data to understand more about user experience in the UGV backcountry.

## Trail Camera Overview

The DCI utilizes trail cameras placed at eight locations in the six major drainages used for backcountry travel in the UGV (Figure 1). Trail cameras are deployed in the beginning of December and capture images of trail use until the beginning of April. The cameras are motion activated and capture users as they come into view of the camera. The images are then downloaded to a computer, inspected, and categorized based on the type of recreation captured in the image.

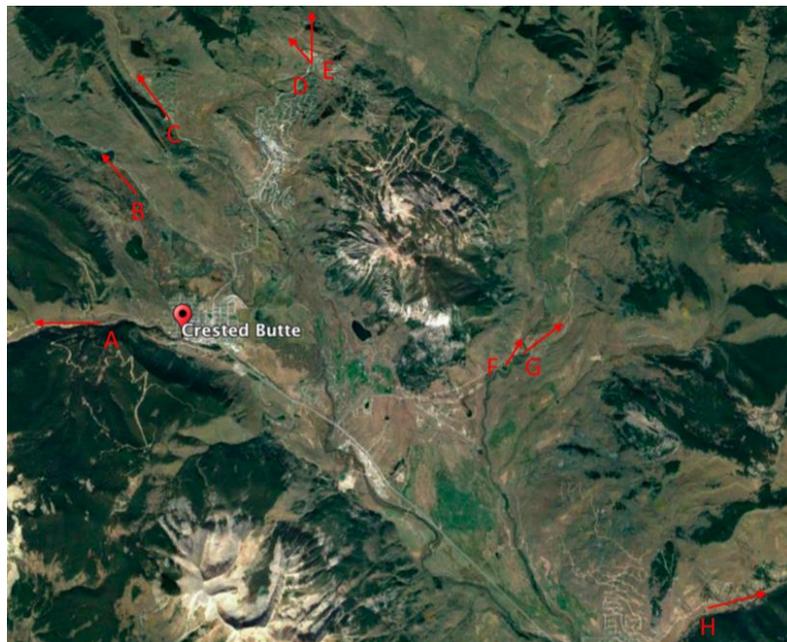


Figure 1. Location of Trailheads: A. Kebler Pass Trailhead B. Slate River Road Trailhead C. Washington Gulch Trailhead D. Snodgrass Trailhead E. Gothic Corridor Trailhead F. Brush Creek Trailhead G. Brush Creek Road (Only used in 2017/2018) H. Cement Creek Road Trailhead (Image: Google Earth, 2018).

The four recreation categories used to characterize use include motorized, non-motorized, hybrid, and mechanized. The USFS defines a motor vehicle as any vehicle which is self-propelled, other than a wheelchair or mobility device. Mechanized use refers to bicycles, and in this case over-snow bicycles. In this study, snow bikes were recorded as mechanized use. The non-motorized category includes any recreationist who does not use motorized or mechanized transportation. Hybrid users appear to be participating in multiple forms of recreation, typically identified by a snowmobile carrying skis or snowboards or pulling skiers.

These methods have been repeated with minimal variation since 2017. Out of a total of 3,583 days of potential data collection over four seasons, most locations recorded around 90% of utilization. There are several factors that have produced days with no data such as dead batteries, camera malfunction, snow covering the camera, or the camera being moved from the angle to see visitor use.

## External Data

Two external sources of data were included in this four-year analysis to explore how environmental conditions may influence visitor use: one, the Natural Resource Conservation Service National Water and Climate Center Snow Telemetry (SNOTEL) data on snow fall and temperature; and two, Colorado Avalanche Information Center (CAIC) daily avalanche risk rating by were selected. These were selected because of their potential impact on visitation. Avalanche risk levels can change day-to-day throughout the winter depending on snowpack, snow type, and temperature trends, potentially affecting when users choose to recreate. Similarly, to avalanche risk, changes in prescription and temperature may influence when and how people choose to recreate.

## Data Analysis

R Studio is a statistical computations software and was used for data analysis in this four-year comparison report. R was used to explore the relationships between user counts, snowfall, temperature and avalanche risk data. R can 1) run statistics-based tests to look for relationships within the data; 2) merge data with environmental condition factors, illuminating potential correlations; and 3) ask questions about daily, weekly, and monthly use compared to environmental factors. Nine questions were developed to guide the analysis:

1. How do trail visitor counts correlate to an increase in snowfall during the previous day(s)? (What patterns of snowfall yield the most visitors/changes in visitation?)
2. How does an increased avalanche risk impact the numbers of hybrid and motorized visitors to specific trailheads?
3. What combination of weather conditions yields the highest/lowest number of visitors?
4. Which days of the week have the highest number of visitors? Weekdays vs weekends?
5. How do visitation rates for different user groups vary seasonally?
6. Which days of the year are busiest?
7. Do different groups of users utilize the trail more during different times of the season?
8. What are the major trends in year-to-year visitation?
9. How do the days with the highest avalanche risk affect visitor rates?

## Community Survey

A digital survey about winter recreation was developed and distributed through the Gunnison Valley in 2017/2018 and then re-issued in 2019/2020 and 2020/2021. The survey is 20 questions and collects information on the visitation patterns of backcountry recreation, including types of backcountry use, amount of use, locations of use, perceptions of current management, perceptions of future management, general comments, and perception of current use. Only minimal personally identifiable information is collected on participants. These include age brackets (under 18; 18-24; 25-30; 31-40; 40-60; 60+), and general location of primary residence (Gunnison, Crested Butte South, Crested Butte, Mount Crested Butte, other in Gunnison; other in Colorado, out of state).

The survey is intended to gain feedback on user experience in the UGV and add to the overall baseline data of backcountry recreation for the DCI. In order to gain a broad and inclusive set of responses the survey was marketed with stakeholders, community groups, backcountry user groups, local news sources, local tourism associations, and recreation shops to reach as many winter backcountry participants as possible. Public input is key for understanding recreational patterns in the UGV and information from the survey is analyzed and shared publicly with stakeholders and community members.

## Results

### Total Visitor Count Comparison

Over the course of the 4-year study period, the total number of days of data collection has varied from year to year. In 2017-18, there was 606 days of data collection, compared to about 750 days the following two years, and the highest number of days with data from the most recent season – 989. While the decline in total users shown the first three seasons (2017-18: **23,879**; 2018-19: **23,824**; 2019-20: **22,313**) there was a large increase in the most recent season (2020-21: **44,051**) The initial decline is particularly notable given that in 2019-20, 134 more days of data were collected than in 2017-18, yet 1,566 fewer users were recorded. It is important to consider “Total Days with Data,” overall and at specific trailheads, when looking at the “Total Users.” One must consider the impact of the COVID-19 pandemic when looking into both the lower numbers of 2019-20 and the significant increase observed the following season. Data from the Outdoor Industry Association shows COVID-related impacts to participation in April, May and June of 2020 (OIA 2020).

**Total Days with Data**

<b><u>Trailhead</u></b>	<b>2017-18</b>	<b>2018-19</b>	<b>2019-20</b>	<b>2020-21</b>	<b><u>TOTAL</u></b>
Brush Creek TH	90	108	112	134	<b>444</b>
Brush Creek RD	41	*	*	89	<b>130</b>
Cement Creek	44	120	114	134	<b>412</b>
Gothic	84	121	117	129	<b>451</b>
Snodgrass	103	94	58	126	<b>381</b>
Washington Gulch	113	129	105	131	<b>478</b>
Slate River	112	118	108	130	<b>468</b>
Kebler Pass	60	110	126	116	<b>412</b>
<b><u>TOTAL</u></b>	<b>647</b>	<b>800</b>	<b>740</b>	<b>989</b>	<b>3,176</b>

Table 1. Four-year comparison showing the number of days that data was collected for each respective season.

**Total Users**

<b><u>Trailhead</u></b>	<b>2017-18</b>	<b>2018-19</b>	<b>2019-20</b>	<b>2020-21</b>	<b><u>TOTAL</u></b>
Brush Creek TH	1,388	911	979	1,998	<b>5,276</b>
Brush Creek RD	538	*	*	1,542	<b>2,080</b>
Cement Creek	780	2,523	2,418	4,615	<b>10,336</b>
Gothic	3,427	3,132	2,402	4,445	<b>13,406</b>
Snodgrass	5,776	5,203	3,661	10,364	<b>25,004</b>
Washington Gulch	4,355	2,450	2,532	4,781	<b>14,118</b>
Slate River	4,130	4,042	2,880	4,726	<b>15,778</b>
Kebler Pass	5,687	7,064	9,108	11,822	<b>33,681</b>
<b><u>TOTAL</u></b>	<b>26,081</b>	<b>25,325</b>	<b>23,980</b>	<b>44,293</b>	<b>119,679</b>

Table 2. Four-year comparison of total users. This table presents the total number of users in each year of the study.

Over the four years of data collection there are a few trends that can be identified for each trailhead as well as across different user groups. Kebler Pass saw an increase of total recreation visits each year, starting at 5,022 in 2017-18 and eventually growing to 11,882 in 2020-21. The four trailheads north of Crested Butte and Mount Crested Butte—Gothic, Snodgrass, Washington Gulch, and Slate River—had a decrease in users over the first three years, but then in 2020/21 all these trailheads nearly doubled the previous year’s count. Cement Creek counts increased the 2<sup>nd</sup> year, then fell in 2019/20, but then we recorded nearly double the number of users in 2020/21.

## Daily Average Visitor Comparison

### Average Daily Users

	2017/18	2018/19	2019/20	2020/21	Total
<b>Trailhead</b>					
Brush Creek TH	15.42	8.44	8.74	14.91	<b>11.88</b>
Brush Creek RD	13.12 *	*		17.33	<b>15.22</b>
Cement Creek	17.73	20.02	21.21	34.44	<b>23.35</b>
Gothic	40.8	25.88	20.53	34.46	<b>30.42</b>
Snodgrass	56.08	55.35	63.12	82.25	<b>64.20</b>
Washington Gulch	38.54	18.99	24.11	36.50	<b>29.53</b>
Slate River	36.87	34.25	26.66	36.35	<b>33.53</b>
Kebler Pass	94.78	64.21	72.29	101.91	<b>83.30</b>
<b>TOTAL</b>	<b>313.34</b>	<b>227.14</b>	<b>236.66</b>	<b>358.15</b>	<b>291.43</b>

Table 3. Four-year comparison of average daily users. This table represents the average users per day on all trailheads monitored by the WDCI.

Comparing the average use from 2017 season to 2020 season there is a decline in average daily users from around 313 in 2017-18 to the lower 200's in 2018-19 and 2019-20 seasons. This is followed by a large increase in daily average users in 2020/21 season. Kebler, Washington Gulch, Brush Creek (TH) and Gothic trailheads are observed to have taken a sharp decline in daily average users in the year following our initial study. Kebler increases linearly over the next two seasons, ending up having its highest average in the most recent season. In contrast, the other three trailheads increased the following year, but never reached as high an average as the 2017/18 WDCI. Cement Creek shows a linear growth in average users per day over the past 4 seasons. Snodgrass had almost the exact number of daily users the first two seasons, but then increased linearly the following two seasons. Only Gothic and Slate River show a decrease in users for more than two seasons in a row (2017 to 2019).

### Brush Creek Road

		Days with Data	Total Users	Non-motorized	Mechanized	Motorized	Hybrid
2018	Brush Ck Rd	41	538	488	18	28	4
2019	Brush Ck Rd	n/a	n/a	n/a	n/a	n/a	n/a
2020	Brush Ck Rd	n/a	n/a	n/a	n/a	n/a	n/a
2021	Brush Ck Rd	89	1,542	1,473	30	22	17
	<b>Totals</b>	<b>130</b>	<b>2,080</b>	<b>1,961</b>	<b>48</b>	<b>50</b>	<b>21</b>

Table 4. Brush Creek Road four-year total users' comparison table.

Observations on Brush Creek Road have been limited due to camera placement issues on private property. This camera is west facing, placed on a ranch sign, intended to count users as they leave the Brush Creek parking lot area and head north-east towards Teocalli and the Strand Hill area. The 2021 WDCI had more than double the “Days with Data” compared to the initial report, which will obviously affect the total users, with this most recent WDCI counting nearly three times the 2017/18 study. Note the decrease in motorized users, while increase in every other user type. Average users rose from **13.12** (2017/18) to **17.33** (2020/2021).

	Average Total Users	Average Non-motorized	Average Mechanized	Average Motorized	Average Hybrid
2018 Brush Ck Rd	13.12	11.9	0.44	0.68	0.09
2021 Brush Ck Rd	17.33	16.55	0.34	0.25	0.19

Table 5. Brush Creek Road four-year averages comparison table.

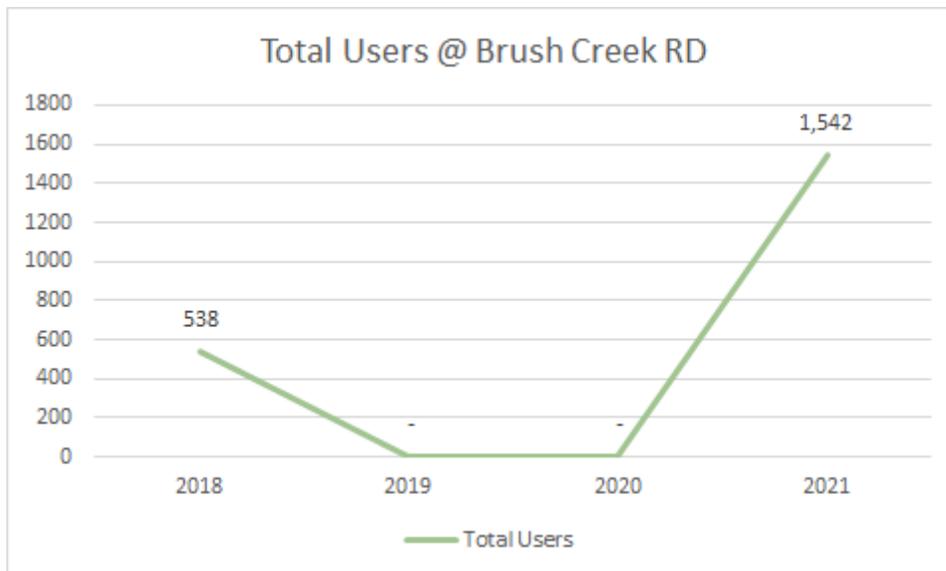


Figure 2. Graph representing the total number of users observed at the Brush Creek Road trailhead. There was no data collected at this location in the 2018/19 and 2019/20 iterations.

### Brush Creek Trailhead

		Days with Data	Total Users	Non-motorized	Mechanized	Motorized	Hybrid
2018	Brush Ck TH	90	1,388	1,368	18	2	0
2019	Brush Ck TH	108	911	886	9	10	6
2020	Brush Ck TH	112	979	954	23	1	1
2021	Brush Ck TH	134	1,998	1,974	23	1	0
	Totals	444	5,276	5,182	73	14	7

Table 6. Brush Creek Trailhead four-year total users’ comparison table.

This camera is located at the Brush Creek parking area, directly on the Brush Creek National Forest sign. This camera is north facing and is capturing users who are enjoying what is known in the summer time as the “Ditch Trail,” which runs along the backside of Mt. Crested Butte. Most of these users are cross-country skiers and dog walkers.

		Average Total Users	Average Non-motorized	Average Mechanized	Average Motorized	Average Hybrid
2018	Brush Ck TH	15.42	15.2	0.2	0.02	0
2019	Brush Ck TH	8.44	8.2	0.08	0.09	0.05
2020	Bursh Ck TH	8.74	8.52	0.2	0.008	0.008
2021	Brush Ck TH	14.91	14.73	0.17	0.007	0

Table 7. Brush Creek Trailhead four-year averages comparison table.

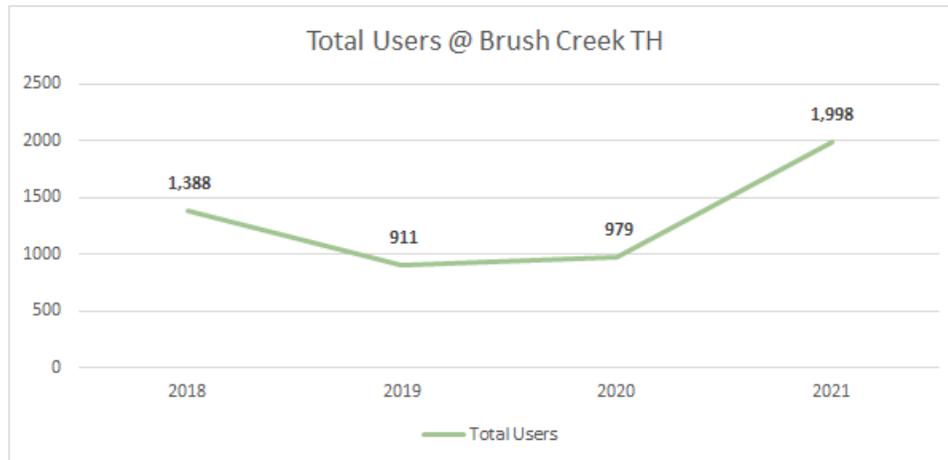


Figure 3. Graph representing the total number of users at the Brush Creek trailhead.

## Cement Creek

		Days with Data	Total Users	Non-motorized	Mechanized	Motorized	Hybrid
2018	Cement Creek	44	780	551	30	187	12
2019	Cement Creek	120	2,523	1,890	106	512	15
2020	Cement Creek	114	2,418	1,926	117	347	28
2021	Cement Creek	134	4,615	3,777	230	595	71
	<b>Totals</b>	412	10,336	8,144	483	1,641	126

Table 8. Cement Creek Trailhead four-year total users' comparison table.

Data from Cement Creek shows that the average total users at this trailhead per day has increased exponentially over the past 4 years, raising from **17.73** (2017/18) to **34.44** (2020/21). Motorized and hybrid users fluctuate, with both recording their highest total and average in the most recent season. Many more non-motorized users (compared to other years) counted in the 20/21 WDCI. Mechanized users show linear growth over the 4 years of study.

		Average Total Users	Average Non-motorized	Average Mechanized	Average Motorized	Average Hybrid
2018	Cement Creek	17.73	12.52	0.68	4.25	0.27
2019	Cement Creek	20.02	15.75	0.88	4.26	0.12
2020	Cement Creek	21.21	16.89	1.03	3.04	0.25
2021	Cement Creek	34.44	28.19	1.28	4.44	0.53

Table 9. Cement Creek Trailhead four-year averages comparison table.

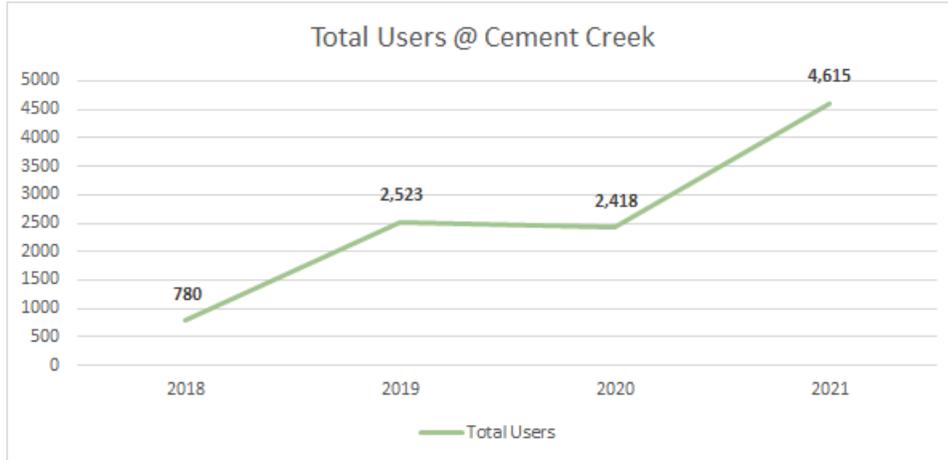


Figure 4. Graph representing the total number of users at the Cement Creek trailhead.

## Gothic

		Days with Data	Total Users	Non-motorized	Mechanized	Motorized	Hybrid
2018	Gothic Corridor	84	3,427	3,187	216	50	4
2019	Gothic Corridor	121	3,132	2,914	205	13	4
2020	Gothic Corridor	117	2,402	2,167	152	83	0
2021	Gothic Corridor	129	4,445	4,113	276	47	9
	<b>Totals</b>	451	13,406	12,381	849	193	17

Table 10. Gothic Trailhead four-year total users' comparison table.

The Gothic camera is placed near the Snodgrass trailhead parking area. This camera is placed facing NW, intended to capture users heading towards the Gothic/RMBL area. The initial 2017/18 study observed a high number and average of users, but then over the following two seasons there was a decline observed. Mostly non-motorized users (backcountry and xc skiers) and mechanized users (2.14 mechanized users per day in 2020/21).

		Average Total Users	Average Non-motorized	Average Mechanized	Average Motorized	Average Hybrid
2018	Gothic	40.8	37.94	2.57	0.6	0.05
2019	Gothic	25.88	24.08	1.69	0.11	0.03
2020	Gothic	20.53	18.52	1.3	0.71	0
2021	Gothic	34.46	31.88	2.14	0.36	0.07

Table 11. Gothic Trailhead four-year averages comparison table.

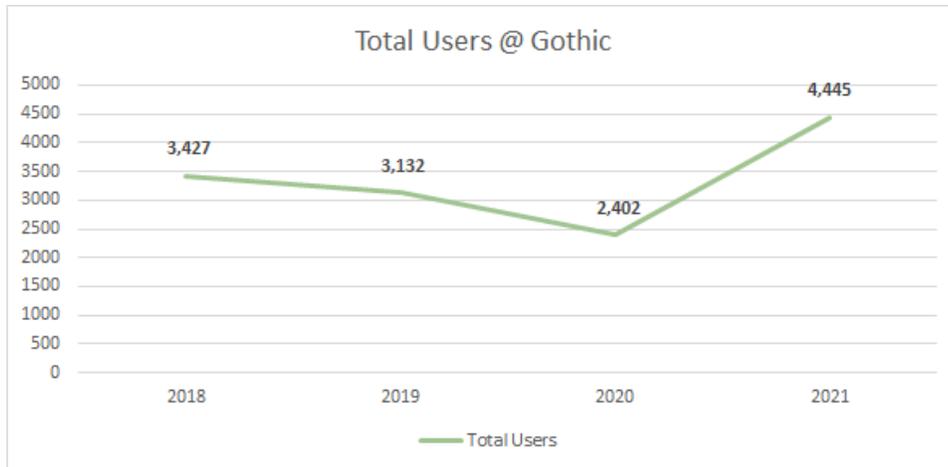


Figure 5. Graph representing the total number of users at the Gothic trailhead.

## Snodgrass

		Days with Data	Total Users	Non-motorized	Mechanized	Motorized	Hybrid
2018	Snodgrass	108	5,776	5,507	120	149	0
2019	Snodgrass	94	5,203	4,941	133	121	8
2020	Snodgrass	58	3,661	3,574	87	0	0
2021	Snodgrass	126	10,364	9,968	379	14	3
	<b>Totals</b>	<b>381</b>	<b>25,004</b>	<b>23,990</b>	<b>719</b>	<b>284</b>	<b>11</b>

Table 12. Snodgrass Trailhead four-year total users' comparison table.

The Snodgrass camera is placed just up the trail from the Snodgrass parking area. It is a west facing camera that is primarily counting non-motorized users (backcountry skiers) enjoying the Snodgrass mountain backcountry. Averages show growth from 2018/19 onward. Almost 20 more people per average using this trailhead in the most recent study. Decrease in motorized traffic. Increase in mechanized.

		Average Total Users	Average Non-motorized	Average Mechanized	Average Motorized	Average Hybrid
2018	Snodgrass	56.08	53.47	1.16	1.45	0
2019	Snodgrass	55.35	52.56	1.41	1.29	0.08
2020	Snodgrass	63.12	61.62	1.5	0	0
2021	Snodgrass	82.25	79.11	1.08	0.11	0.024

Table 13. Snodgrass Trailhead four-year averages comparison table.

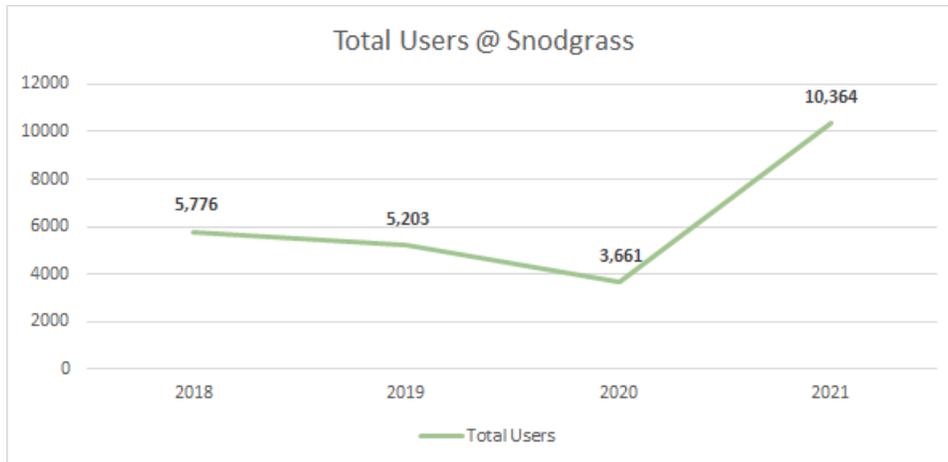


Figure 6. Graph representing the total number of users at the Snodgrass trailhead.

## Washington Gulch

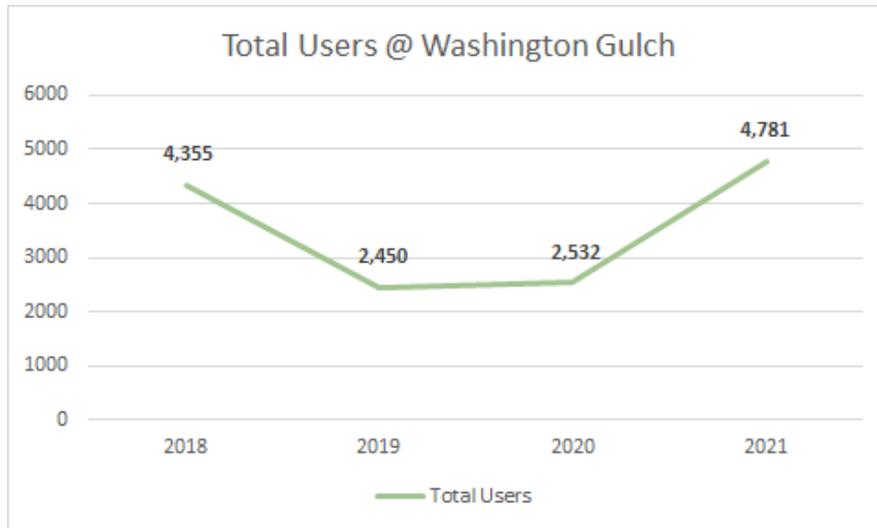
		Days with Data	Total Users	Non-motorized	Mechanized	Motorized	Hybrid
2018	Washington Gulch	113	4,355	3,185	47	735	388
2019	Washington Gulch	85	2,450	1,853	5	440	152
2020	Washington Gulch	105	2,532	1,920	19	432	161
2021	Washington Gulch	131	4,781	4,120	36	383	242
	<b>Totals</b>	434	14,118	11,078	107	1,990	943

Table 14. Washington Gulch Trailhead four-year total users' comparison table.

Washington Gulch trailhead shows a few interesting trends. A decrease in average total users for the three consecutive seasons, followed by sharp increase. Highest average of non-motorized use observed in 2020/21. Note the steady decrease in average motorized use in each season. In recent study the percentage of total users who are non-motorized is much higher (86%) compared to WDCI started (73%).

		Average Total Users	Average Non-motorized	Average Mechanized	Average Motorized	Average Hybrid
2018	Washington G	38.54	28.19	0.42	6.5	3.43
2019	Washington G	28.82	21.8	0.06	5.18	1.79
2020	Washington G	24.11	18.29	0.18	4.11	1.53
2021	Washington G	36.5	31.45	0.38	2.92	1.85

Table 15. Washington Gulch Trailhead four-year averages comparison totals.

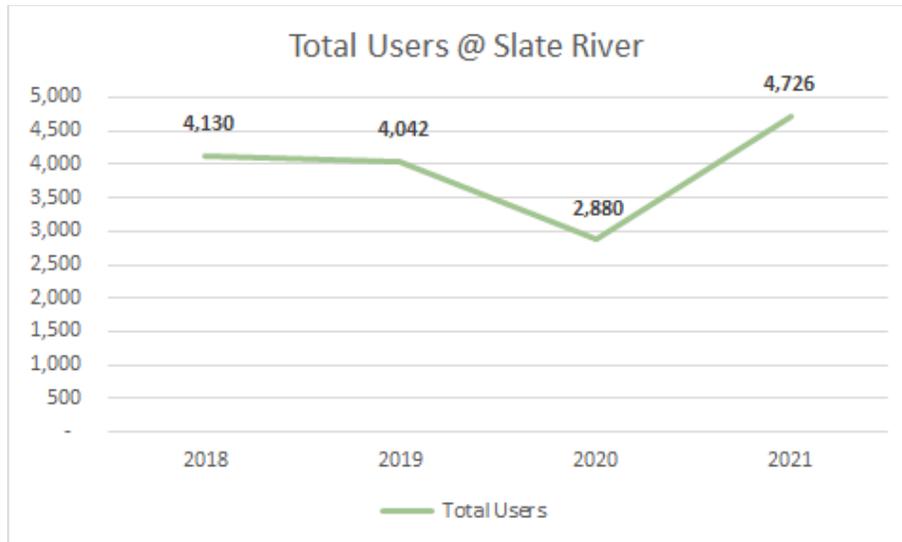


### Slate River

	Days with Data	Total Users	Non-motorized	Mechanized	Motorized	Hybrid
2018 Slate River Road	112	4,130	2,486	111	868	665
2019 Slate River Road	118	4,042	2,637	24	782	599
2020 Slate River Road	108	2,880	1,726	21	608	525
2021 Slate River Road	130	4,726	3,919	50	101	656
<b>Totals</b>	<b>468</b>	<b>15,778</b>	<b>10,768</b>	<b>206</b>	<b>2,359</b>	<b>2,445</b>

Slate River has the most consistent set of data of all the trailheads. Over 100 “Days with Data” for each season. The total users don’t have the same sort of variance as other trailheads. Slate River is the 2<sup>nd</sup> busiest (behind Kebler) trailhead for both motorized and hybrid use. Sharp decrease in motorized use observed in the 2020/21 study (note trend of decreasing motor and hybrid).

	Average Total Users	Average Non-motorized	Average Mechanized	Average Motorized	Average Hybrid
2018 Slate River	36.87	22.2	0.99	7.75	5.94
2019 Slate River	34.25	22.34	0.2	6.62	5.07
2020 Slate River	26.66	15.98	0.19	5.62	4.86
2021 Slate River	36.35	30.15	0.38	0.78	5.05

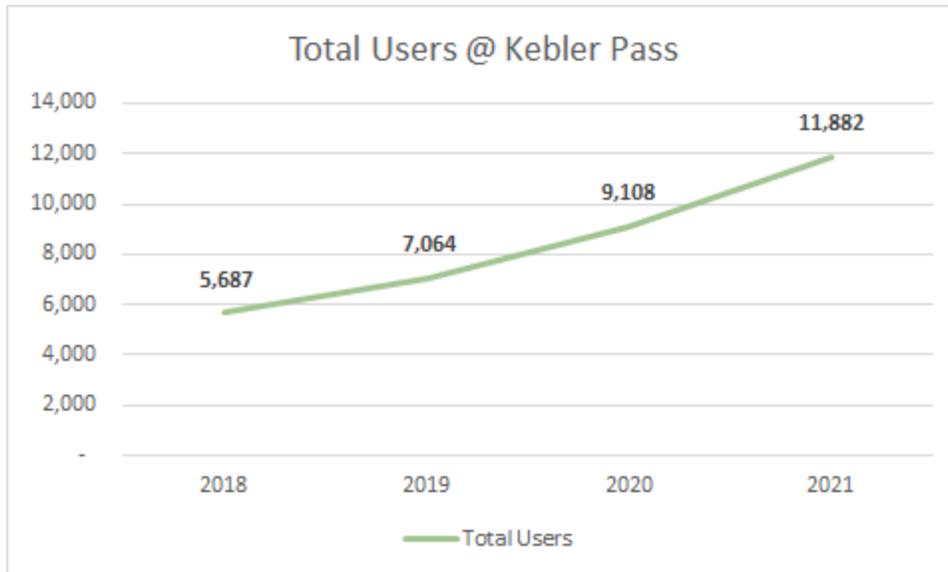


### Kebler Pass

		Days with Data	Total Users	Non-motorized	Mechanized	Motorized	Hybrid
2018	Kebler Pass	60	5,687	372	10	4,640	366
2019	Kebler Pass	110	7,064	260	24	6,358	422
2020	Kebler Pass	126	9,108	885	36	7,233	954
2021	Kebler Pass	116	11,882	504	51	10,499	768
	Totals	412	33,741	2,021	121	28,730	2,510

Kebler Pass is the one trailhead that has a clear distinction of observing more motorized and hybrid users than any other location in the WDCI. A growth of around 2,000 more users is observed each season, starting from around 5,700 (2017/18) to close to 12,000 in the most recent iteration of this database. Linear increase in mechanized users (not many, but growing each year). 954 hybrid users observed in 2019/20, the most on any trailhead for this category. Notice decrease in motorized users observed, then large increase this year. Hybrid and non-motorized users fluctuating.

		Average Total Users	Average Non-motorized	Average Mechanized	Average Motorized	Average Hybrid
2018	Kebler	94.78	6.2	0.16	77.33	6.1
2019	Kebler	64.21	2.36	0.22	57.8	3.84
2020	Kebler	72.29	7.02	0.29	57.4	7.57
2021	Kebler	101.91	4.34	0.44	90.6	6.62



## Statistical Analysis (R-Studio) Results.....

### Conclusion

The total visitor trends for winter recreation in the UGV backcountry, over the past four data collections seasons, has fluctuated, initially on a slightly decrease trend, but then recording a higher total and average on the most recent season than any previous. There are several nuances with not only the data collection seasons themselves but outside factors that could be influencing visitors have been inconsistent over the four seasons. This comprehensive report and statistical analysis completed on four years' worth of data is valuable for the sake of comparison.

### *Reflections: Looking back*

From the start of winter in 2017 to spring in 2021, the DCI has provided ample opportunity for learning. From study design to results, the DCI has helped to get a better understanding of winter recreation travel in the UGV. Each year has been fairly consistent in the dates of data collection and methods. This year's high number of days collecting data was only possible through the trial and error of previous researchers and their efforts in producing a consistent and thorough Standard Operating Procedure document. Notable differences in data collection across the years include the camera at Brush Creek Road, Snodgrass, and the end date of data collection for the 2019/2020 season. Also, the 2020/2021 season has the highest total days of data collection by 189 compared to the 2<sup>nd</sup> highest year (2018/19).

In the 2017/2018 season a camera was placed on a private fence that runs parallel to the Brush Creek Road where snow removal stops. This was an ideal setting to capture visitor use headed outbound on Brush Creek Road. The following year a camera was not up at Brush Creek Road because permission was not gained to use the fence on private property. For the 2020/2021

season, a camera was deployed across from the USFS Brush Creek Trailhead on a private landowner's property sign and will be analyzed in the corresponding end of season report.

Towards the end of the 2019/2020 season, a camera was stolen from the Snodgrass Trailhead leaving only 58 days of data collected instead of an average of 111 days that occurred at other camera locations. In addition, data for the 2019/2020 season occurred for an additional two weeks, to capture potential changes in visitor use due to COVID-19 global pandemic. All ski resorts in the state of Colorado, including Mt. Crested Butte Mountain Resort, closed on March 14 by the Colorado governor's office order due to the coronavirus pandemic. The global pandemic had effects on travel patterns locally, regionally, nationally, and internationally which may have shifted tourist visitation and backcountry recreation patterns.

One must also consider the influence of snow precipitation and its influence on a busy winter recreation season. Our statistical analysis in R-Studio will take a closer look at that and if it corresponds with higher/lower averages observed.

### *Looking forward*

It will be beneficial for this study to continue data collection as four years of data is a relatively small sample size to draw significant conclusions. There could also be value in continuing the DCI after the updated WTMP is implemented to monitor a new plan to see how it may impact visitor use. This could provide a “before” and “after” snapshot of different management strategies. Altogether the future of this study depends on the continued interest of the community it seeks to serve and funding.

The Center for Public Lands has been collaborating with other departments at Western to expand student and community learning. One exciting partnership with the Computer Science Department for both advanced data analysis with the R software and to explore the potential of using machine learning to process images collected from the game cameras. Each season the research lead and assistants go through thousands of images to count recreation use, which is extremely time intensive. Currently, Computer Science undergraduate students are working to explore the potential for a machine learning program that may be able to process images and determine user recreation categories.

Another opportunity to expand the DCI could include incorporating visitation data from the Tourism Association and municipalities metrics related to tourism in the Gunnison Valley. This could expand opportunities to learn about winter recreation travel to the UGV and its utilization by non-resident recreators.

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