



# High Alpine Recreation Study

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## Acronym Glossary

BLM – Bureau of Land Management

CPHE – Colorado Department of Public Health and Environment

CNHP – Colorado Natural Heritage Program

COTREX – Colorado Trail Explorer

CPW – Colorado Parks and Wildlife

GIS – Geographic information systems

GMUG – Grand Mesa, Uncompahgre and Gunnison National Forests

GPD – Gunnison’s prairie dog

GPS – global positioning system

HUC – Hydrologic unit code

IMP – importance index number

MCA – Multi-criteria analysis

MSI – Mountain Studies Institute

NHD – National hydrography dataset

NWI – National Wetlands Inventory

OHV – off-highway vehicle

OW – Outstanding Waters

PCA – Potential conservation area

SGCN – Species of greatest conservation need

SJMA – San Juan Mountains Association

SJNF – San Juan National Forest

USFS – United States Forest Service

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## Introduction and Background

In recent years, outdoor recreation has increased substantially in Colorado (Kohler, 2023; Tann, 2024). Stories from Colorado news outlets such as Summit Daily News and Denver Post outline staggering visitation numbers and economic growth in the Front Range, neither of which are expected to decline as outdoor recreation activities continue to gain popularity (Kohler, 2023; Tann, 2024). Meanwhile, comprehensive reviews of scientific literature highlight how this increased recreation pressure without a similar increase in infrastructure and education can result in significant damage (Salesa & Cerdà, 2020; Schafft et al., 2021). Similar increases in recreation in southwestern Colorado have many stakeholder groups and land managers assessing current infrastructure and improvement opportunities. This report is a product of the efforts initiated by the Central San Juans High Alpine Resiliency and Recovery Roadmap stakeholder group to improve the outdoor recreation economy while preserving the natural resources and beauty in the high alpine areas of Dolores, San Juan, Hinsdale, Gunnison, Ouray, San Miguel counties (Figure 1). This is accomplished by identifying actionable improvements related to infrastructure, safety, communications, sustainability, restoration, and preservation projects.

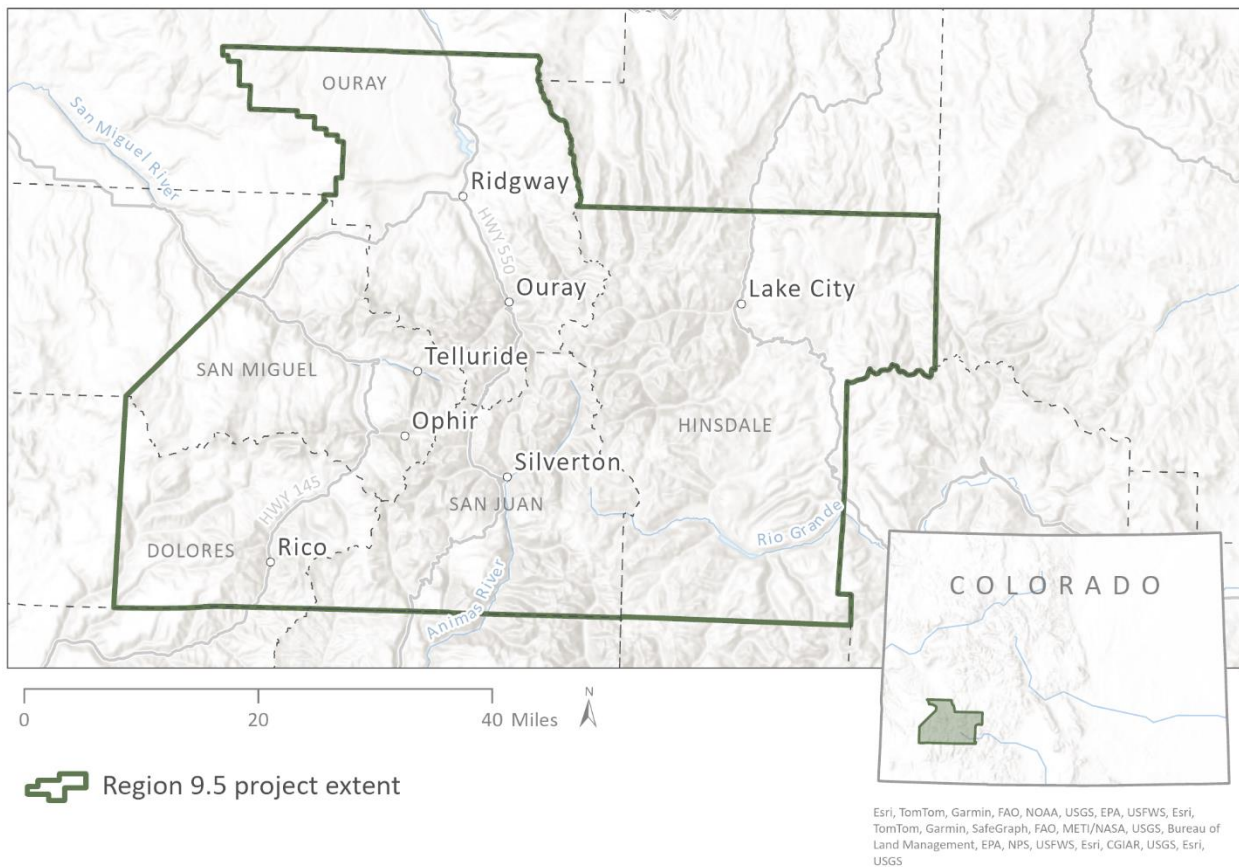


Figure 1. Map of project extent, including San Juan County and the high elevation portions of Dolores, San Miguel, Ouray and Hinsdale counties in southwest Colorado.

## Objectives

1. Provide a geospatial assessment of current infrastructure and natural resources to better inform a holistic management plan for the High Alpine region.
2. Create a multi-layer geodatabase that identifies areas where recreation is underserved by infrastructure, and where recreation may negatively impact natural or cultural resources.

## Methods

### Data Collection

The technical team at Mountain Studies Institute (MSI) started by compiling an extensive list of relevant spatial data in three major categories: recreational use, environmental, and infrastructure. Data was sourced from national and statewide datasets as well as local partners. This included a request from the Town of Silverton for access to Strava's databases, downloads from the Recreation Information Database and LANDFIRE, and visualization of San Juan Mountains Association's trail visitor counts (Strava, 2024; Recreation.gov, 2024; San Juan Mountains Association, 2023).

Once a clear list of data was compiled, we thoroughly examined each dataset to understand its limitations and how it could be used in combination with other datasets to provide complementary or additive information. The MSI team frequently consulted with the Region 9 and 10 Economic Development team and local partners throughout this process to be sure that we were accessing and compiling the best available data.

A [web map](#) has been made available so users can interact with the data that was compiled for this analysis. To view the data, click on "open in Map Viewer" in the top left corner. To view layers, click on the "layer" icon in the left window. From there users can see the categories for use and infrastructure data, as well as the environmental sensitivity analysis and its inputs. Select the drop-down arrow to see the data in each of these categories. To turn a layer on or off, hover the cursor over the layer and select the eye icon (some layers are defaulted off).

### *Recreation use data collection*

Recreational use data was collected from two sources: Strava and San Juan Mountains Association (Table 1). Strava is an app and global social media platform used by millions of people to track activities such as hiking, running and mountain biking with the GPS in a cellphone or a watch (<https://www.strava.com/about>). Users have the option to share their activities publicly or privately. All data from publicly shared activities are compiled into a large database available to municipal staff upon request for planning purposes. The Town of Silverton requested this data for the entire project area. The most useful data product available for our purposes is the Origins and Destinations dataset, which uses a hexagonal grid to visualize the total number of activities started within a 200-acre area. This provides insight into the busiest trailheads in the project area, regardless of their management or if they are officially recognized trailheads/recreation areas. Although this dataset is one of the most robust for recreation available, it does have biases towards more consistent and non-motorized recreators. Some of these data gaps are covered by our local partners at the San Juan Mountains Association.

San Juan Mountains Association (SJMA) is a non-profit organization based in Durango, Colorado, who “promotes the exploration and protection of public lands in Southwest Colorado through stewardship and conservation education for people of all ages” (San Juan Mountains Association, n.d.). Through a variety of seasonal programs, SJMA staff monitors recreation use at popular trailheads across the San Juan Mountains. These staff track the number of visitors they encounter each day, and the data is compiled into a list of locations with visitor counts. Data is available from 2021 to 2023.

Table 1. Recreation use data considered in the analysis.

<b>Dataset</b>	<b>Source</b>	<b>Description</b>
Strava origins	<a href="#">Strava</a>	Hike, run, mountain bike and e-bike activity origins from 2019 to May 2024 (Strava, 2024).
Trail visitor counts	<a href="#">San Juan Mountains Association</a>	Visitor tallies collected by SJMA staff at popular trailheads from 2021 to 2023 (San Juan Mountains Association, 2023).

### *Infrastructure data collection*

Multiple datasets were combined to create the most accurate representation of infrastructure across the project area (Table 2). Federal recreation data and recreation points from the Bureau of Land Management (BLM) were aggregated and overlaid on the trails and trailheads data from Colorado Parks and Wildlife (CPW). Hinsdale County provided supplemental information about the location of toilets and interpretive trails. Despite our best efforts, large data gaps still exist, particularly for infrastructure types other than trailheads and campgrounds. Toilets, parking areas, interpretive sites and other types are largely underrepresented in these datasets.

Table 2. Infrastructure data considered in the analysis.

<b>Dataset</b>	<b>Source</b>	<b>Description</b>
Federal recreation data	<a href="#">Recreation.gov</a>	Recreation areas, facilities and campgrounds on federally managed land, including information about type, stay limits and reservations (Recreation.gov, 2024).
Recreation points	<a href="#">BLM</a>	Represents BLM National Recreation Sites (Bureau of Land Management, 2024).
Trailheads and trails	<a href="#">CPW</a>	Data collected from the COTREX project for the Colorado Trail System (Colorado Trail Explorer, 2024).
Hinsdale County infrastructure points	Hinsdale County	Toilets and interpretive trails provided by Hinsdale County Commissioner Kristie Borchers and Town of Lake City Trustee Henry Woods (Borchers & Woods, 2024).

### *Environmental data collection*

Environmental data was collected from various sources (Table 3) to assess sensitivity to recreation pressure through a multi-criteria analysis (MCA). The MCA is discussed further in the Geospatial Analysis section.

Vegetation type and biodiversity significance were included in the MCA to capture areas sensitive to trampling, erosion and the spread of invasive species. Off-trail and off-road travel is nearly inevitable where

trails and roads exist, increasing the potential for negative impacts to these vegetation communities (Anderson et al., 2015; Barros et al., 2020).

The State of Colorado maintains a list of Species of Greatest Conservation Need, including tier 1 and tier 2 species. Tier 1 species have the greatest conservation need in Colorado (Colorado Parks and Wildlife, 2015). For this analysis, habitat ranges for all tier 1 species that exist within the project area were considered in the analysis. Tier 2 species were excluded due to time limitations and to prevent heavily biased results toward wildlife habitat. Although the American beaver (*Castor canadensis*) is not a tier 1 species, observations were included in the analysis due to the significant role they play in geomorphology, hydrology, water quality, and aquatic ecology (Brazier et al., 2021).

Surface drinking water importance was considered in this analysis to understand where recreation pressure could have the greatest impact on drinking water. National Hydrography Dataset Flowlines and Outstanding Waters reaches were considered in the same vein, acknowledging that recreation can impact rivers and streams through soil compaction, erosion, sedimentation, and fecal contamination (Cooke T & Xia, 2020).

Wetland data was aggregated from various sources with duplicate occurrences removed. Wetland systems play key roles in hydrologic processes including flood attenuation, water quality improvement, groundwater recharge, and flow maintenance during drier conditions (Bullock & Acreman, 2003). These systems also provide critical habitat and maintain diverse ecological communities but are particularly sensitive to impact (Chimner & Cooper, 2024; Nayak & Bhushan, 2022).

Table 3. Environmental data considered in the analysis.

<b>Dataset</b>	<b>Source</b>	<b>Description</b>
Vegetation type	<a href="#">LANDFIRE</a>	Existing vegetation type, generated in 2023 (LANDFIRE, 2023).
Biodiversity significance	<a href="#">CNHP</a>	CNHP’s best estimate of the primary area required to support the long-term survival of targeted species or natural communities (Colorado Natural Heritage Program, 2024).
Species activity	<a href="#">CPW</a>	Overall range, migration corridors, concentration areas, critical resources, etc. for wildlife species across Colorado. Tier 1 species of greatest conservation need were selected from this dataset (Colorado Parks and Wildlife, 2023).
American beaver observations	<a href="#">iNaturalist</a>	Point locations of American beaver observations (iNaturalist, 2023).
Watershed condition classification	<a href="#">USFS</a>	Represents data on watershed condition in HUC-12s with at least 5% of their land managed by the USFS (U.S. Forest Service, 2020).
Surface drinking water importance	<a href="#">USFS</a>	A watershed index of surface drinking water importance, a watershed index of forest importance to surface drinking water, and a watershed index to highlight the extent to which development, fire, insects and disease threaten forests that are important for surface drinking water (Lilja, 2014).
Outstanding Waters	<a href="#">CDPHE</a>	Stream reaches with Outstanding Waters designation and their tributaries, which “must meet specific criteria, including exceptional water quality, recreational or ecological significance, and a need for protection beyond

Flowlines	<a href="#">National Hydrography Dataset</a>	state water quality standards.” (Water Quality Control Division, 2024). Streams and rivers (U.S. Geological Survey, 2003).
Wetlands	<a href="#">National Wetlands Inventory</a>	Wetland type and extent using a biological definition of wetlands, based on arial imagery interpretation (U.S. Fish and Wildlife Service, 2018).
Wetlands and Fens	GMUG, SJNF	Fen status based on arial imagery delineation and field verification (Johnston et al., 2012; San Juan National Forest et al, 2018)).
Potential Fens	<a href="#">CNHP</a>	Fen status based on arial imagery delineation and field verification (Colorado Wetland Information Center, 2019).

## Geospatial Analysis

We compiled and synthesized the environmental data using a multi-criteria analysis (MCA) within the geographic information system (GIS) ArcPro. MCA combines multiple geospatial datasets by first creating a unified ranking system based on their value in achieving a certain goal and then adding the rankings across raster space (Greene et al., 2011). A conceptual model of the data used in this analysis and a conceptual outcome is shown in Figure 2. In the case of this analysis, the goal was to identify locations within the project area most sensitive to recreation impacts.

Steps for conducting the MCA included: compiling a comprehensive set of environmental sensitivity data in 30-meter grid raster format (any vector data was processed and converted), assigning a categorical rank from 1-5 based on peer-reviewed literature within each dataset, and combining all datasets using a raster calculator within a GIS model to sum cell values across datasets and then normalized before the final output.

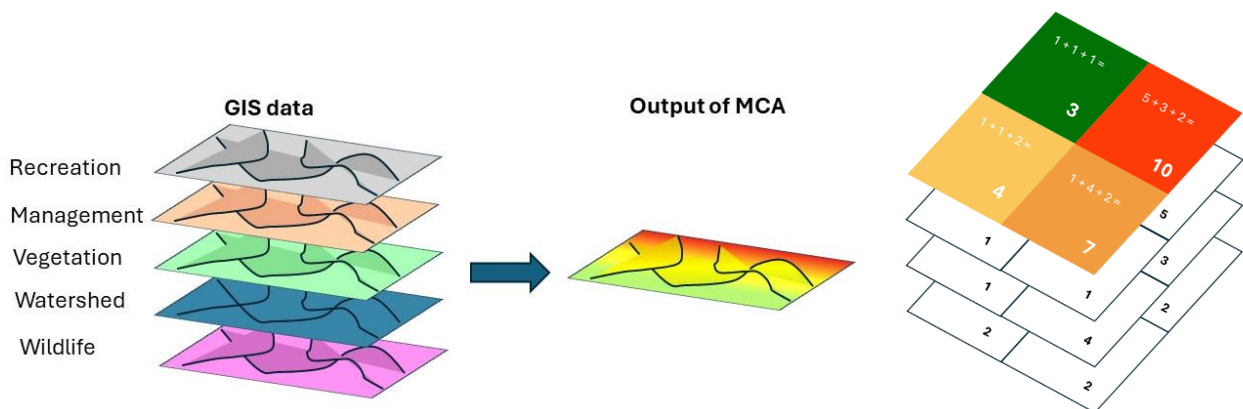


Figure 2. Conceptual model of a GIS-based MCA. Multiple data layers are overlaid in GIS space. They are in raster format, which can be thought of as a grid of cells that makes up a picture, like a television. Each grid cell is given a categorical rank between 1 and 5 based on scientific literature. These values are then added in GIS space to create the output of the MCA, where red indicates a high priority, yellow a medium priority, and green is a low priority.

### Ranking data

Environmental sensitivity to recreation pressure was determined for each dataset based on recent scientific literature. Data were ranked on a scale from 1 to 5, with 5 being the most sensitive and 1 being a neutral

value. Most data were in a vector format, meaning they were either polygons, points or lines with associated attribute tables relating supplementary data to locations on a map. Vector data was converted to a raster format for analysis. For example, the white-tailed ptarmigan data was presented as polygons based on the time of year ptarmigan utilize the area: overall range and winter range. Based on a review of the literature, we determined that winter range should have the highest score (5), and overall range should have a lower score (4) as stress to ptarmigan populations is highest during the winter season. After ranking each polygon accordingly, these data were converted into a 30- by 30-meter raster.

“Empty” or no-data areas, such as the space between polygons that indicate biodiversity significance, were given the neutral value of 1. Some data were excluded from the analysis as cited literature indicated that their environmental value is not impacted by recreation, leaving a total of 12 major categories of ranked datasets utilized in this analysis.

### **Vegetation type, LANDFIRE**

All alpine vegetation types that exist in the project area were selected from the LANDFIRE dataset, including Rocky Mountain alpine dwarf-shrubland, Rocky Mountain alpine fell-field, Rocky Mountain alpine turf and Rocky Mountain alpine bedrock and scree (NatureServe, 2018).

Rocky Mountain alpine dwarf-shrubland, Rocky Mountain alpine fell-field and Rocky Mountain alpine turf	Ranking = 5
Recreation in alpine ecosystems contributes to the loss of species richness and presence of native species and leads to greater soil compaction (Barros et al., 2020; Crisfield et al., 2012). Trampling of alpine vegetation may also inhibit future regeneration of native plant species (Crisfield et al., 2012).	
Rocky Mountain Alpine bedrock and scree	Ranking = 3
This vegetation type has only “sparse cover of forbs, grasses, lichens and low shrubs” (NatureServe, 2018). Otherwise, these areas are covered by bedrock and scree, which are less sensitive to recreation impacts than vegetation and can provide more durable surfaces for travel.	

### **Biodiversity significance, CNHP**

This polygon dataset created by the Colorado Natural Heritage Program (CNHP) represents their best estimates of the primary area required to support long-term survival of targeted species or natural communities. They classified the biodiversity significance, protection urgency and management urgency of 138 potential conservation areas (PCAs) in the Region 9.5 study area. The PCA classifications focus on biological and physical factors (Colorado Natural Heritage Program, 2017).

Biodiversity significance was used to assign values to each PCA. Recreation tends to have a negative impact on biodiversity, as it can reduce species richness in alpine ecosystems (Crisfield et al., 2012) and contribute to the spread of invasive species (Anderson et al., 2015). There are five classifications within this category:

B1: Outstanding biodiversity significance	Ranking = 5
B2: Very high biodiversity significance	Ranking = 4
B3: High biodiversity significance	Ranking = 3
B4: Moderate biodiversity significance	Ranking = 2
B5: General biodiversity interest	Ranking = 1
All other areas	Ranking = 1

### Species activity, CPW

The list below shows species within the project area that have been classified as Tier 1 species on CPW's list of Species of Greatest Conservation Need (SGCN) in the 2015 State Wildlife Action Plan. All species data within this dataset include information about overall range (for terrestrial species) or HUC-12 presence (for aquatic species), which were given a value of 4 for this analysis. Some species data included additional information about winter range and production areas, and these locations were given the value of 5. Where winter range, production area or overall range overlapped for the same species, the lower value was erased and removed so as not to double-count the importance of a single area. Species whose habitat covered the entire project extent and species whose habitat does not overlap with the project extent were not included in the analysis.

Boreal toad ( <i>Anaxyrus boreas boreas</i> ) overall range		Ranking = 4
The boreal toad ( <i>Anaxyrus boreas boreas</i> ) was once common across the southern Rocky Mountains but has since experienced extreme population declines due to chytrid fungus and habitat loss. Over the last two decades, CPW has developed research and management plans for reintroducing the boreal toad (Colorado Parks and Wildlife, n.d. Boreal Toad). Recreation can impact this species, especially in riparian areas and along the edges of lakes and ponds where vegetation trampling occurs, as well as possible reduction in water quality and fecal contamination. Early life stages of the boreal toad are susceptible to trampling, causing direct mortality. While the mode of spread of the chytrid fungus is not known, it is possible that it can be transported on surfaces like muddy boots worn by recreationalists (Loeffler, 2001).		
Northern leopard frog ( <i>Lithobates pipiens</i> ) HUC-12 presence		Ranking = 4
Recreation infrastructure and high levels of use can degrade sensitive wetlands, lakes and rivers that are home to the northern leopard frog ( <i>Lithobates pipiens</i> ). Additionally, the northern leopard frog is directly threatened by the introduction of predatory fish for recreational fishing. Degraded water quality associated with recreation is also a concern, especially in ponds used for breeding and overwintering (Smith & Keinath, 2007).		
Burrowing owl ( <i>Athene cunicularia</i> ) breeding range		Ranking = 4
The burrowing owl ( <i>Athene cunicularia</i> ) requires active prairie dog populations to excavate burrows. The primary threats to the owl's population include habitat loss through the eradication of prairie dogs, pesticides, vehicular traffic and habitat loss on winter range. Recreational shooting of prairie dogs has indirect, negative impacts on burrowing owl populations (McDonald et al., 2004).		
Gunnison sage-grouse ( <i>Centrocercus minimus</i> )	Production area	Ranking = 5
	Winter range	Ranking = 4
The primary threats to the Gunnison sage-grouse include habitat loss and fragmentation (through urbanization, mining and energy development, agriculture, etc.), disease, predation and grazing. Although research on impacts from recreation is lacking, experts have postulated that recreation could negatively affect sage-grouse in a number of ways. The most likely impact could be from disturbance, which may cause immediate behavior changes such as the abandonment of nests and changes in feeding habits (Gunnison Sage-grouse Rangewide Steering Committee, 2005).		
Southern white-tailed ptarmigan ( <i>Lagopus leucura altipetens</i> )	Winter range	Ranking = 5
	Overall range	Ranking = 4
The white-tailed ptarmigan ( <i>Lagopus leucura</i> ) lives in alpine terrain. Recreation activities in summer and winter create environmental stressors for the ptarmigan, such as negative impacts to vegetation due to off-trail travel, overuse of preferential areas, and noise or air pollution. Impacts from poorly managed roads and trails, such as erosion and dewatering of wetlands, can greatly impact winter range. Additionally, over-snow travel such as snowmobiles and skiing can have significant impacts on ptarmigan while they inhabit their winter range. Energy reserves are low during this time, and disturbances that encourage ptarmigan to flee feeding and roosting areas require them to expend critical amounts of		

energy. Snowmobiles compact the snow and may crush willows, which provide important food sources and roost areas for ptarmigan. Also, the compaction of snow along winter trails allows predators to travel further into ptarmigan winter range (Seglund et al., 2018).	
Bluehead sucker ( <i>Etheostoma cragini</i> ) HUC-12 presence	Ranking = 5
Like other native fish species in the project area, the bluehead sucker ( <i>Etheostoma cragini</i> ) is threatened by habitat loss and fragmentation and the introduction of non-native species. Water quality and sedimentation have significant impacts on habitat. Road construction and alteration or overuse of riparian areas can also impact the bluehead sucker's habitat (Ptacek et al., 2005).	
Colorado River cutthroat trout ( <i>Oncorhynchus clarkia pleuriticus</i> ) HUC-12 presence	Ranking = 5
Primary threats to the Colorado River cutthroat trout ( <i>Oncorhynchus clarkia pleuriticus</i> ) include habitat loss through mining and agriculture, and the introduction of non-native trout species impacting resiliency and fertility. Habitat fragmentation is also a concern for cutthroat trout that live high in the watershed, as barriers (impassable culverts, stream desiccation, or reaches without suitable habitat) often restrict populations to small reaches. These populations may lack genetic diversity and are at risk of environmental events such as post-fire debris flows and variation in precipitation and discharge (Young, 2008).	
American pika ( <i>Ochotona princeps</i> ) overall range	Ranking = 5
The American pika ( <i>Ochotona princeps</i> ) has become a well-known victim of climate change. While climate change is contributing to warming temperatures and changing precipitation patterns in mountainous regions of the western U.S., their already limited habitat is shrinking (Erb et al., 2011). Many trails pass through Pika habitat in this project area (Colorado Trail Explorer, 2024; Colorado Parks and Wildlife, 2023). Interactions with hikers have been shown to reduce foraging time. Foraging time is also reduced at warmer temperatures, which are becoming more frequent as climate change worsens. This could lead to reduced overwinter food storage, which may affect the survival of the animal (Stafl & O'Connor, 2015).	
Fringed myotis ( <i>Myotis thysanodes</i> ) overall range	Ranking = 5
The fringed myotis bat ( <i>Myotis thysanodes</i> ) movement and population dispersion are limited by high elevation mountains. Bats at roosting sites are very sensitive to disturbance. These bats often roost in abandoned mines or caves, and the exploration of these areas for recreation can have significant impacts on their life history (Keinath et al., 2004).	
Gunnison's prairie dog ( <i>Cynomys gunnisoni</i> ) overall range	Ranking = 5
Primary threats to Gunnison's prairie dog (GPD, <i>Cynomys gunnisoni</i> ) include range degradation, plague, shooting, and oil and gas development. Recreation can have impacts on GPD's habitat, especially in areas where recreational shooting of prairie dogs is popular (Western Association of Fish and Wildlife Agencies, 2007).	
Lynx ( <i>Lynx canadensis</i> ) potential habitat	Ranking = 5
Reintroduction of Canada Lynx ( <i>Lynx canadensis</i> ) has been successful and San Juan populations are thought to be stable. However, they are listed as threatened under the Endangered Species Act. In 2008, the Forest Service adopted the Southern Rockies Lynx Amendment in which they commit to adopting management practices that preserve lynx habitat primarily consisting of higher-elevation spruce-fir forest (USDA Forest Service, 2008). Lynx are vulnerable to habitat loss from stand-replacing wildfire, beetle kill, and human development activities (USDA Forest Service, 2015).	
Spotted bat ( <i>Euderma maculatum</i> ) overall range	Ranking = 5
The main threats to the spotted bat ( <i>Euderma maculatum</i> ) are habitat alteration, over-collection of individuals, toxic chemicals and roost loss. These animals are very sensitive to human disturbance and may abandon an area as a result of human activities such as rock climbing or cave exploration, which impact their roost sites. Additionally, conversion or loss of wetlands will negatively impact this, and many other bat species (Luce & Keinath, 2007).	

White-tailed prairie dog ( <i>Cynomys leucurus</i> ) overall range	Ranking = 5
The primary threats to the white-tailed prairie dog ( <i>Cynomys leucurus</i> ) are plague, eradication campaigns, recreational shooting and habitat loss. Like the Gunnison's prairie dog, recreation can impact the white-tailed prairie dog's habitat, and their populations are especially vulnerable in areas where recreational shooting is popular (Pauli et al., 2006).	
Wolverine ( <i>Gulo gulo luscus</i> ) potential habitat	Ranking = 3
Wolverine ( <i>Gulo gulo luscus</i> ) do not currently live in Colorado, so their potential habitat doesn't have as high a value as other SGCN (Colorado Parks and Wildlife, n.d.-b. Wolverine). The Colorado General Assembly recently passed SB24-171 which authorizes the reintroduction of the species by CPW. Wolverines are adapted to rugged, high-elevation terrain with harsh winter conditions (Inman et al., 2013). Significant portions of the project area are very suitable habitat for wolverines whether they naturally migrate from northern regions or are reintroduced. They are listed as a threatened species and CPW is in the process of developing a reintroduction plan (Blevins, 2022).	

**Beaver, iNaturalist**

iNaturalist is a non-profit organization that has created a mobile app for citizen scientists “sharing biodiversity information to help each other learn about nature.” It can also be used to identify species by uploading photos to the app (Seltzer, 2024). When a user submits an observation, it is verified by participating experts and added to the dataset with a geographic location. was American beaver observations were downloaded and vetted by the MSI team, who removed any observations that showed clearly abandoned ponds. A 100-meter buffer placed around each observation point approximated the territory a beaver with an established complex will utilize for harvesting and travel (Boyle & Owens, 2007).

Observations of ponds, dams and individuals ( <i>Castor canadensis</i> )	Ranking = 4
Beavers have important beneficial impacts on hydrologic, geomorphologic and ecological processes (Brazier et al., 2021) and the wetland habitat they create is sensitive to recreation disturbance. However, unlike fens, wet meadows and peat accumulating wetlands, wetlands associated with beaver complexes will be “maintained” by beaver barring their removal or death. Dam removal or destruction due to recreation expansion, protection of recreation facilities, or heavy foot traffic can also have significant impacts on the surrounding landscape (Brazier et al., 2021).	

**Watershed condition classification, US Forest Service**

The watershed condition classification dataset represents watershed function at the HUC-12 scale in watersheds that are managed by the USFS across 5% or more of the land area. The USFS defines watershed condition as, “the state of the physical and biological characteristics and processes within a watershed that affect the soil and hydrologic functions supporting aquatic ecosystems” (Potyondy et al., 2011). HUC-12s in this dataset fall into one of three categories: functioning properly, functioning at risk or impaired function (U.S. Forest Service, 2020). Properly functioning watersheds provide high biotic integrity, are resilient to disturbance, exhibit high connectivity to floodplains and subsurface flow, provide ecosystem services, and maintain long-term soil productivity. Functional at-risk watersheds exhibit these characteristics to a degree but may be less resilient to disturbance due to undesirable impacts from human activity. Nonfunctional watersheds have crossed a threshold where some or all these characteristics are no longer present. It would take substantial intervention to address the sources of degradation in a nonfunctional watershed (Potyondy et al., 2011). However, none of the watersheds in the project area are in the nonfunctional category.

Functioning properly	Ranking = 2
Watersheds that are functioning properly are less sensitive to impact than watersheds whose processes are altered (Lane et al., 2023; Miralles-Wilhelm et al., 2023).	
Functioning at risk	Ranking = 4

**Surface drinking water importance, U.S. Forest Service**

This dataset contains two categories of data: the importance of forests to surface drinking water, and the threat to drinking water based on potential disturbance in each watershed (Lilja, 2014). The metric of greatest relevance to our analyses is the importance index number (IMP) which combines the average annual drinking water yield within a HUC-12 watershed with the population of downstream users. These IMP values fall on a scale from 0 to 100, where higher values indicate greater demand on the watershed for drinking water (Mack et al., 2022).

IMP1 > 75	Ranking = 3
IMP1 ≤ 75 and > 50	Ranking = 2
IMP1 ≤ 50	Ranking = 1

**Outstanding waters, Colorado Department of Public Health and Environment and Flowlines, National Hydrography Dataset**

“For a waterway to qualify for outstanding waters (OW) designation, it must meet specific criteria, including exceptional water quality, recreational or ecological significance, and a need for protection beyond state water quality standards.” Tributaries to OW designated reaches are included as well (Colorado River District, 2023). Streams were buffered by 15 meters (30 meters across) so cells appear on the 30x30 meter raster output. This dataset was combined with the National Hydrography Dataset (NHD) flowlines, and NHD flowlines were erased where OW reaches overlapped.

River segments with OW designation or reaches that are a tributary to an OW segment	Ranking = 4
All other river segments	Ranking = 3

**Wetlands, National Wetlands Inventory**

Fens, peat accumulating wetlands, and wetlands identified by CNHP and the USFS that overlapped with this dataset were removed and ranked separately (see below). National Wetlands Inventory (NWI) riverine wetlands that overlap with buffered OW/NHD flowlines were also removed so they weren’t counted twice. In addition to their sensitivity to impact, wetland degradation often has a disproportionately large impact at the landscape scale due to the critical roles these systems play in hydrologic and ecological processes (Acreman & McCartney, 2009; Allen et al., 2020; B. L. Bedford & Preston, 1988; Gibbs, 2000).

Freshwater ponds and lakes	Ranking = 3
Riverine	Ranking = 4
Freshwater emergent	Ranking = 4
Freshwater forested/shrubland	Ranking = 4

**Fens, San Juan National Forest, Grand Mesa and Uncompahgre National Forests, Colorado Natural Heritage Program**

The Colorado Natural Program (CNHP) potential fens dataset formed the core of the wetland data, supplemented by other fen and wetland data collected by the San Juan and Grand Mesa and Uncompahgre National Forests. The National Wetland Inventory dataset filled in all remaining data gaps. Data from CNHP and the National Forests were used as the primary data sources as these regional-level inventories included extensive field verification efforts and extended the wetland classification system to include fens. Fens – ancient groundwater-fed wetlands that accumulate peat – provide critical ecosystem services at multiple landscape scales and prove more sensitive to impact than other wetland types (B. Bedford & Godwin, 2003; Chimner & Cooper, 2024; Trettin et al., 2020).

San Juan National Forest	
Fen	Ranking = 5
Peat accumulating wetland	Ranking = 4
Possible fen	Ranking = 4
Wetland	Ranking = 4
Grand Mesa and Uncompahgre National Forests	
Field verified fens	Ranking = 5
Wetland/potential fen	Ranking = 4
Colorado Natural Heritage Program	
Confirmed fen	Ranking = 5
Peat accumulating wetland	Ranking = 4
Potential fen	Ranking = 4

## Results

### Environmental sensitivity and infrastructure

The MCA indicated several areas with high sensitivity to recreation impacts, particularly in San Juan County and the eastern parts of Dolores and San Miguel Counties (Figure 3). These areas provide habitat for many wildlife species, have high concentrations of fens and wetlands, and are home to large swaths of alpine vegetation. The data that informs these results has been added to a web map, which can be viewed [here](#). Instructions on how to navigate this map can be found in the Methods section.

The infrastructure data symbolized by infrastructure type displayed over the MCA results begin to tell the story of where infrastructure already exists and may be meeting recreation demands, and where additional infrastructure may be needed to reduce impacts to natural resources. Infrastructure points are largely clustered around popular roadways and towns. Over 70% of the infrastructure points in this dataset are trailheads. Only 11 bathrooms, three parking areas and two staging areas are included in this dataset, although more certainly do exist. Limitations of this data will be outlined in the discussion section.

Specific areas of interest include the mountains east and west of the town of Rico and Lizard Head Pass in Dolores County; the mountains surrounding the town of Telluride in San Miguel County; Iron-ton and Blue Lakes in Ouray County; much of San Juan County, including the South Mineral drainage, the Highland Mary Lakes area, Molas Pass and Coal Bank Pass; and the areas surrounding Sunshine and Redcloud peaks, as well as the Uncompahgre and Matterhorn Peaks in Hinsdale County.

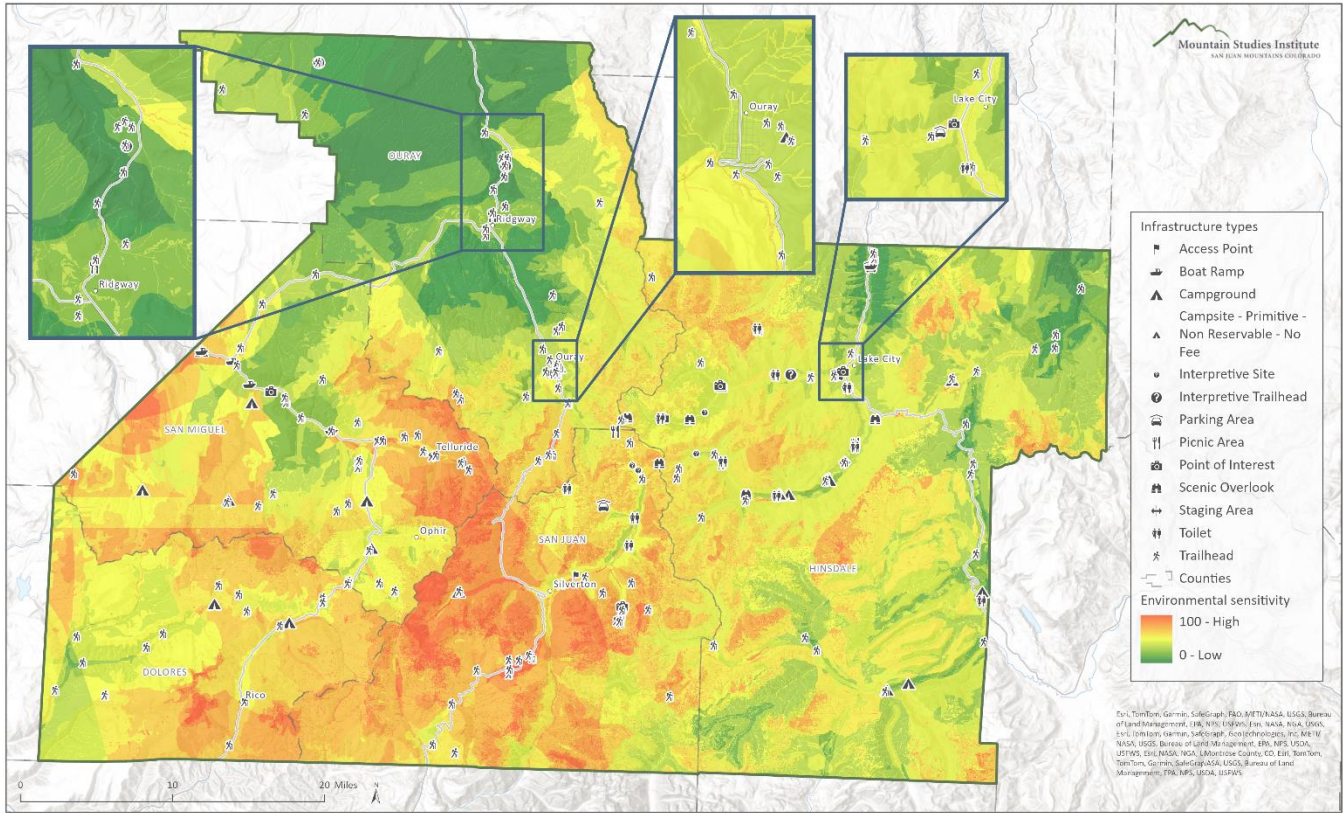


Figure 3. Results of the environmental sensitivity MCA and recreation infrastructure points across the project area.

### Recreation use and infrastructure

Strava tracks human-powered (with the exception of e-bikes) activities using a GPS in the user’s phone or watch. The organization uses 200-acre hexagons with a graduated color scheme to indicate areas of high use (Figure 4). Based on this, it appears that users start their Strava activities in towns, at popular access points along highways, and at well-known trailheads in the project area. The areas with the highest Strava use are in and around the town of Telluride in San Miguel County; the Blue Lakes Trailhead, the town of Ouray and the town of Ridgeway in Ouray County; Coal Bank Pass, Molas Pass, the Ice Lake Trailhead and the town of Silverton in San Juan County; and the trailheads for Sunshine, Redcloud and Handies Peaks in Hinsdale County.

Trailhead contact tallies from San Juan Mountains Association largely agree with the Strava data, showing high use areas at popular trailheads. In addition to the previously mentioned areas, SJMA’s data also shows a high number of visitors at Animas Forks in San Juan County. Animas Forks is a popular destination for off-highway vehicle (OHV) users. Strava is not intended for this user group.

The symbology for infrastructure points is simplified on this map (Figure 4) to improve readability of the underlying recreation use data. A similar map with labeled points and an associated table can be found in Appendix A. The table includes additional details about each point.

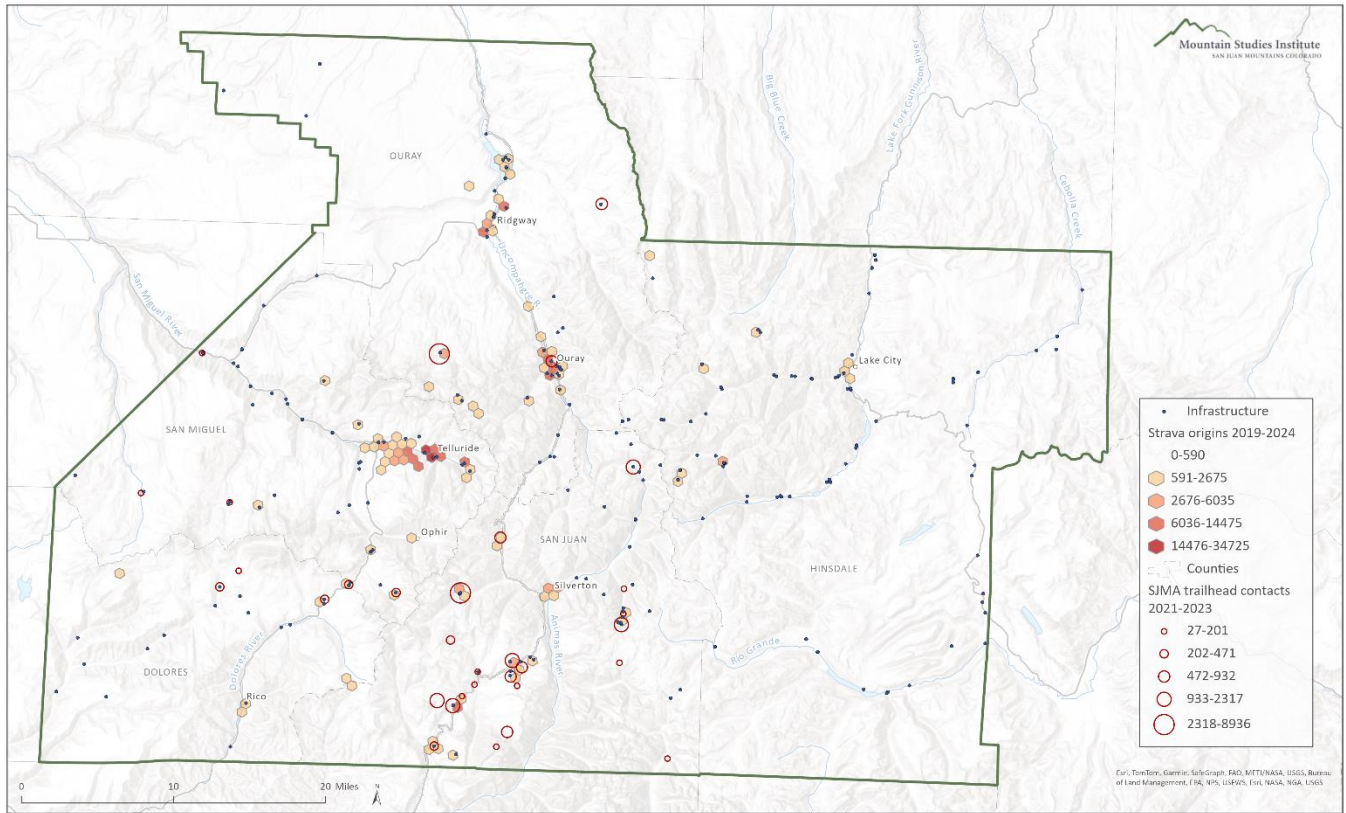


Figure 4. Recreational use data from Strava and SJMA are compared to infrastructure points. A map with labeled infrastructure points and an associated table can be found in Appendix A.

## Discussion

### High Use Areas of Interest

Specific parts of the project area have been highlighted as high use areas of interest because they are highly sensitive to recreation pressures and display high recreation use. Use the [interactive map](#) to explore other locations in the project area. A summary of recreation pressures and factors contributing to environmental sensitivity in each of these focus areas can be found in Table 4.

#### *Dolores County*

##### **Upper Hermosa – Bolam Pass**

The Bolam Pass area is popular for hiking, running, mountain biking and dirt biking (Figure 5). The Colorado Trail passes over Bolam Pass, bringing many thru-hikers every summer. This area is popular for dispersed camping and OHV/Jeep use.

There is high biodiversity significance at Hermosa Point and along Hermosa Creek (Colorado Natural Heritage Program, 2024). There are numerous fens and wetlands at Bolam Pass (San Juan National Forest et al., 2018; Colorado Wetland Information Center, 2019; U.S. Fish and Wildlife Service, 2018). Hermosa Creek and its tributaries are designated Outstanding Waters (Water Quality Control Division, 2024). Alpine

vegetation grows at high elevations (LANDFIRE, 2023). This area provides habitat for cutthroat trout, the fringed myotis bat, lynx and pika (Colorado Parks and Wildlife, 2023).

An inventory of existing infrastructure is needed for the Bolam Pass area. Efforts to quantify the amount of motorized use in this area would paint a more comprehensive picture of recreation use.

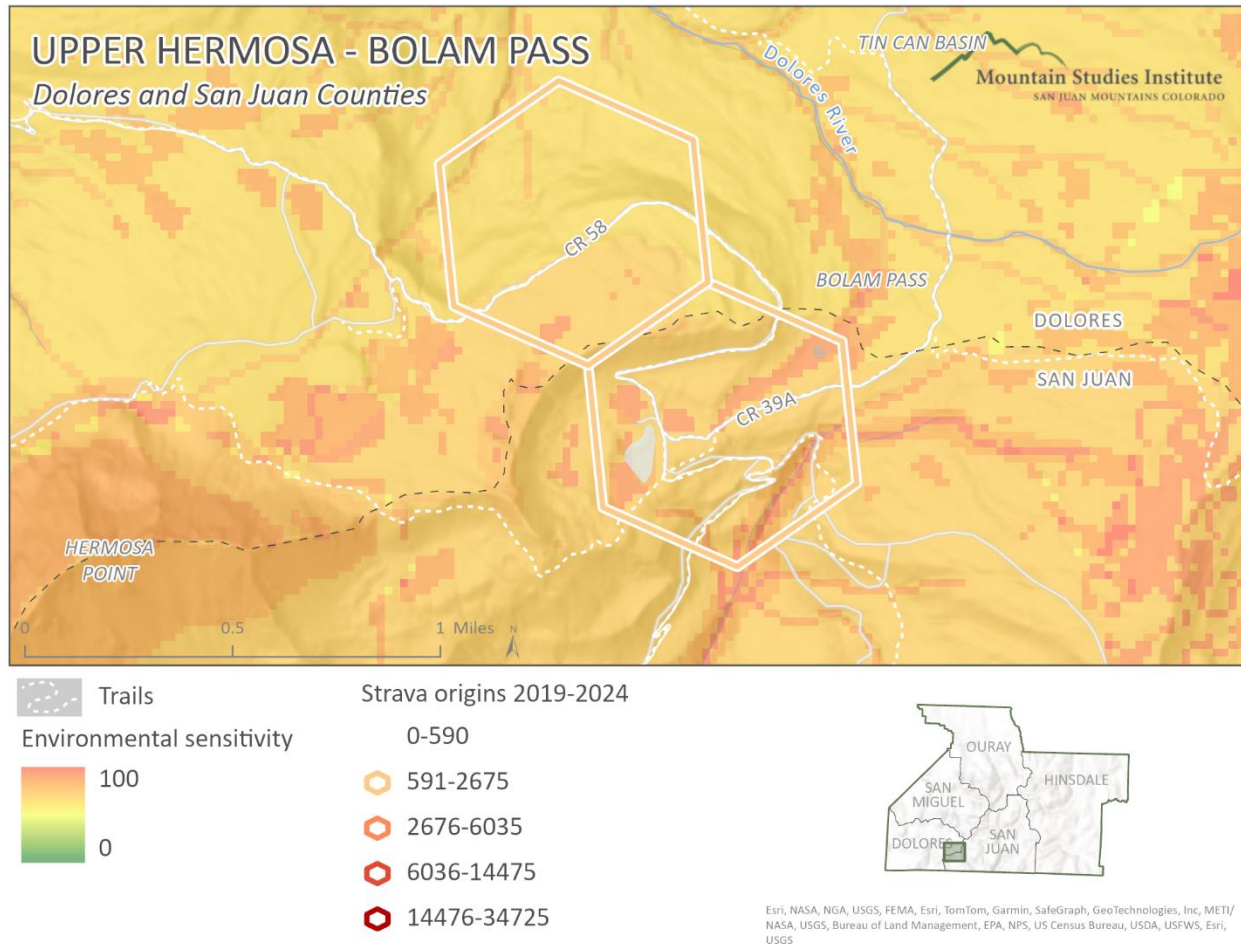


Figure 5. Environmental sensitivity, infrastructure and recreational use at Bolam Pass.

### Lizard Head Pass

Lizard Head Pass is a popular access point to the Lizard Head Wilderness with several trailheads on both sides of CO-145 (Figure 6; Strava, 2023). The MCA identified a highly sensitive area southeast of Cross Mountain as well as surrounding El Diente Peak (just out of view in Figure 6). These areas possess high biodiversity significance, according to CNHP (Colorado Natural Heritage Program, 2024) and host a number of fens (Colorado Wetland Information Center, 2019; Johnston et al., 2012; San Juan National Forest et al, 2018), wetlands (U.S. Fish and Wildlife Service, 2018) and alpine vegetation (LANDFIRE, 2023). The headwaters of the Dolores River, which sustain a cutthroat trout population, begin in this zone as well and the area is home to the fringed myotis bat, lynx, pika, ptarmigan (winter range and overall range) and potential wolverine habitat (Colorado Parks and Wildlife, 2023).

A comprehensive inventory of existing infrastructure is needed for Lizard Head Pass, including parking areas, bathrooms, and interpretive sites, before any conclusions regarding the balance between users and infrastructure can be made. More information is also needed about recreational use and potential impact, especially concerning mechanized travel on the east side of CO-145 at Lizard Head Pass and winter recreational use along the entire CO-145 corridor, from Rico in Dolores County to Mountain Village in San Miguel County. Winter recreators travel in different areas, at different speeds, and are not confined to summer trails, all of which may have different impacts on wildlife and vegetation than summer recreation. Snow compaction in heavily traveled areas may also impact sensitive species and vegetation.

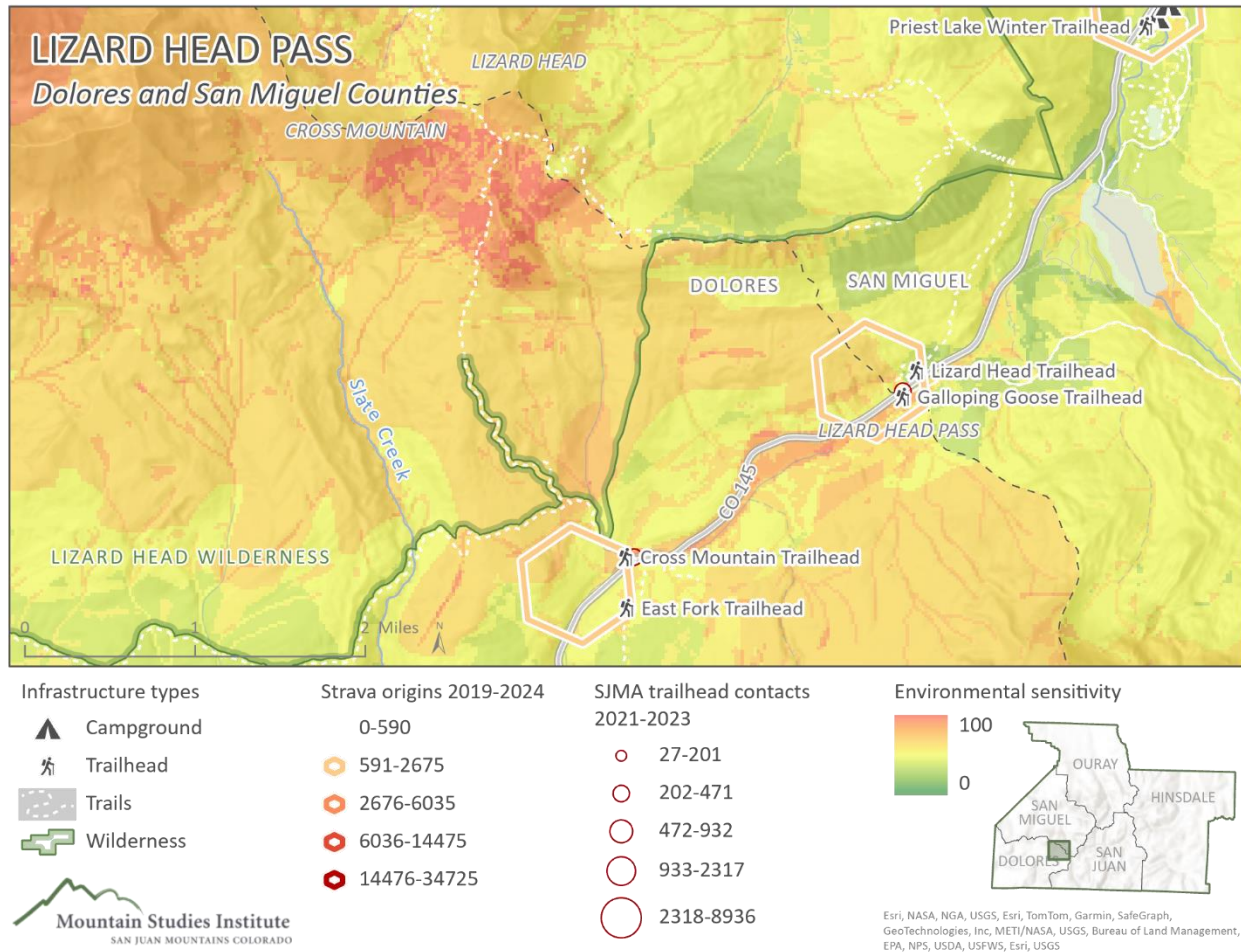


Figure 6. Environmental sensitivity, infrastructure and recreational use at Lizard Head Pass in Dolores and San Miguel Counties.

### Hinsdale County

#### Handies, Sunshine and Redcloud Peaks

The Burrows Park, Upper Lake Fork and American Basin trailheads provide popular access points for the 14,000-foot peaks southwest of Lake City in Hinsdale County (Strava, 2023). The Handies Peak and Redcloud Peak Wilderness Study Areas sandwich County Road 30 in this area (Figure 7). The area identified by the MCA as highly sensitive to recreation pressure around Redcloud Peak is likely due to the presence of very high biodiversity significance (Colorado Natural Heritage Program, 2024). There are large swaths of alpine vegetation across the entire zone (LANDFIRE, 2023) and wetlands line the valley floors

(U.S. Fish and Wildlife Service, 2018). The headwaters of the Lake Fork of the Gunnison River, also in this area, are home to cutthroat trout, and the area also contains habitat for lynx, pika, ptarmigan (winter range and overall range) and potential wolverine habitat (Colorado Parks and Wildlife, 2023).

County Road 30, the primary access road for this zone, is part of the Alpine Loop, a scenic network of dirt roads that connect the towns of Lake City, Silverton and Ouray, traversing high mountain passes that is very popular with off highway vehicles (OHV) and Jeep users. This road is difficult and costly to maintain, but access along this road is critical for recreation opportunities. Interpretive signs along the Alpine Loop are worn out and need to be replaced. Although the American Basin trailhead does not have a toilet, there is a “wag bag station,” which provides materials to properly dispose of human waste in the backcountry (Borchers & Woods, 2024). A comprehensive assessment and quantification of OHV use is needed for this area.

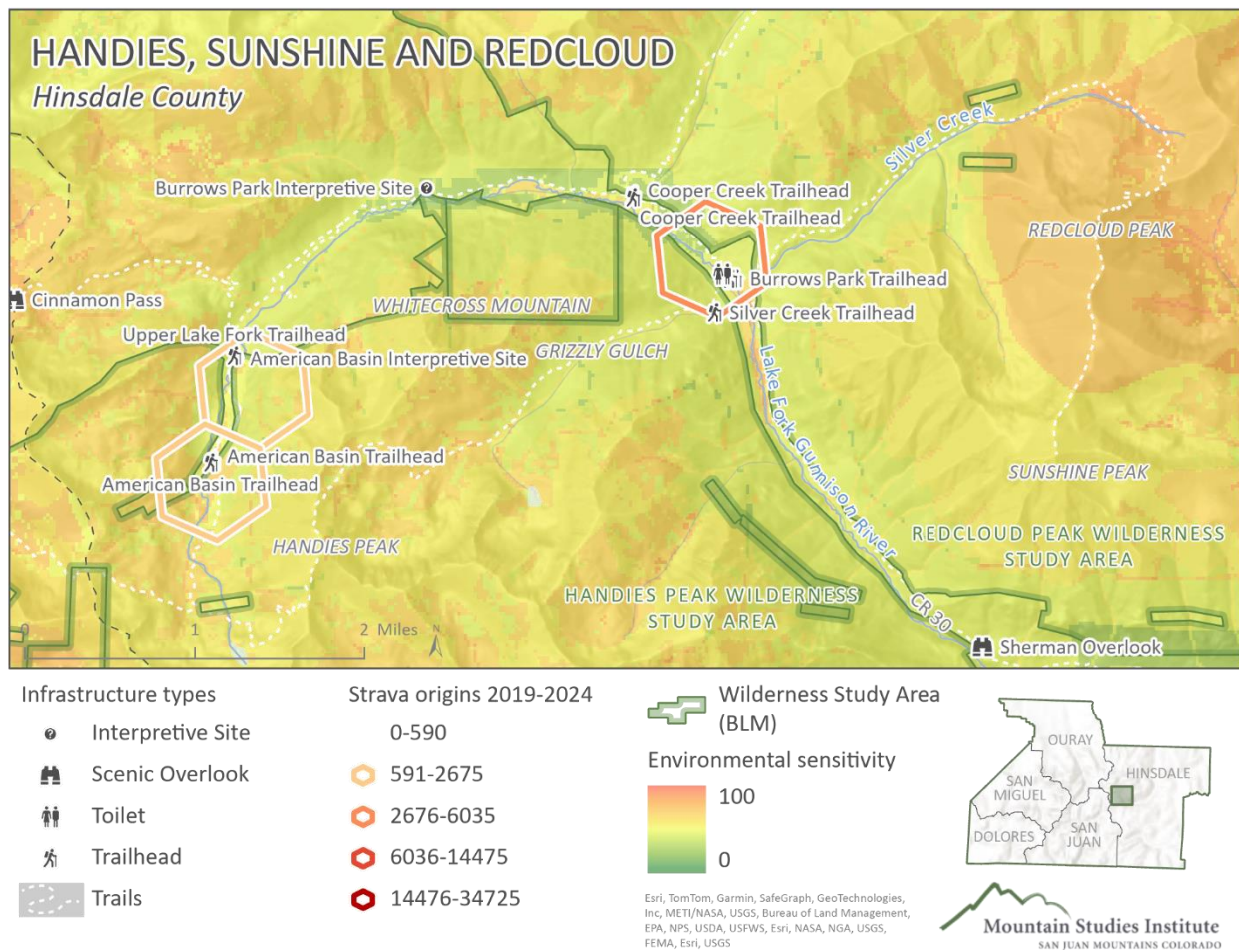


Figure 7. Environmental sensitivity, infrastructure and recreational use surrounding the Handies, Sunshine and Redcloud 14ers southwest of Lake City in Hinsdale County.

### Nellie Creek Trailhead

The Nellie Creek trail is used to access Uncompahgre Peak (Figure 8). County Road 23 is a rough four-wheel drive road that leads to the trailhead. Many visitors park several miles down the road and walk to the

trailhead because of the road conditions. There is a toilet at Nellie Creek trailhead that does not function well (Borchers & Woods, 2024).

Beavers have been observed east of Uncompahgre Peak (iNaturalist, 2023). There is very high biodiversity significance at Uncompahgre Peak and east to the Nellie Creek trailhead (Colorado Natural Heritage Program, 2024). Fens and wetlands surround Uncompahgre and Matterhorn Peaks (Johnston et al., 2012; Colorado Wetland Information Center, 2019; U.S. Fish and Wildlife Service, 2018). The East Fork of the Cimarron River, El Paso Creek and Big Blue Creek are all designated Outstanding Waters (Water Quality Control Division, 2024). There is ample alpine vegetation in this area (LANDFIRE, 2023). The North Fork Henson Creek and Silver Jack Reservoir – Cimarron River watersheds are functioning at risk (U.S. Forest Service, 2020). This area provides habitat for cutthroat trout, lynx, pika and ptarmigan (Colorado Parks and Wildlife, 2023).

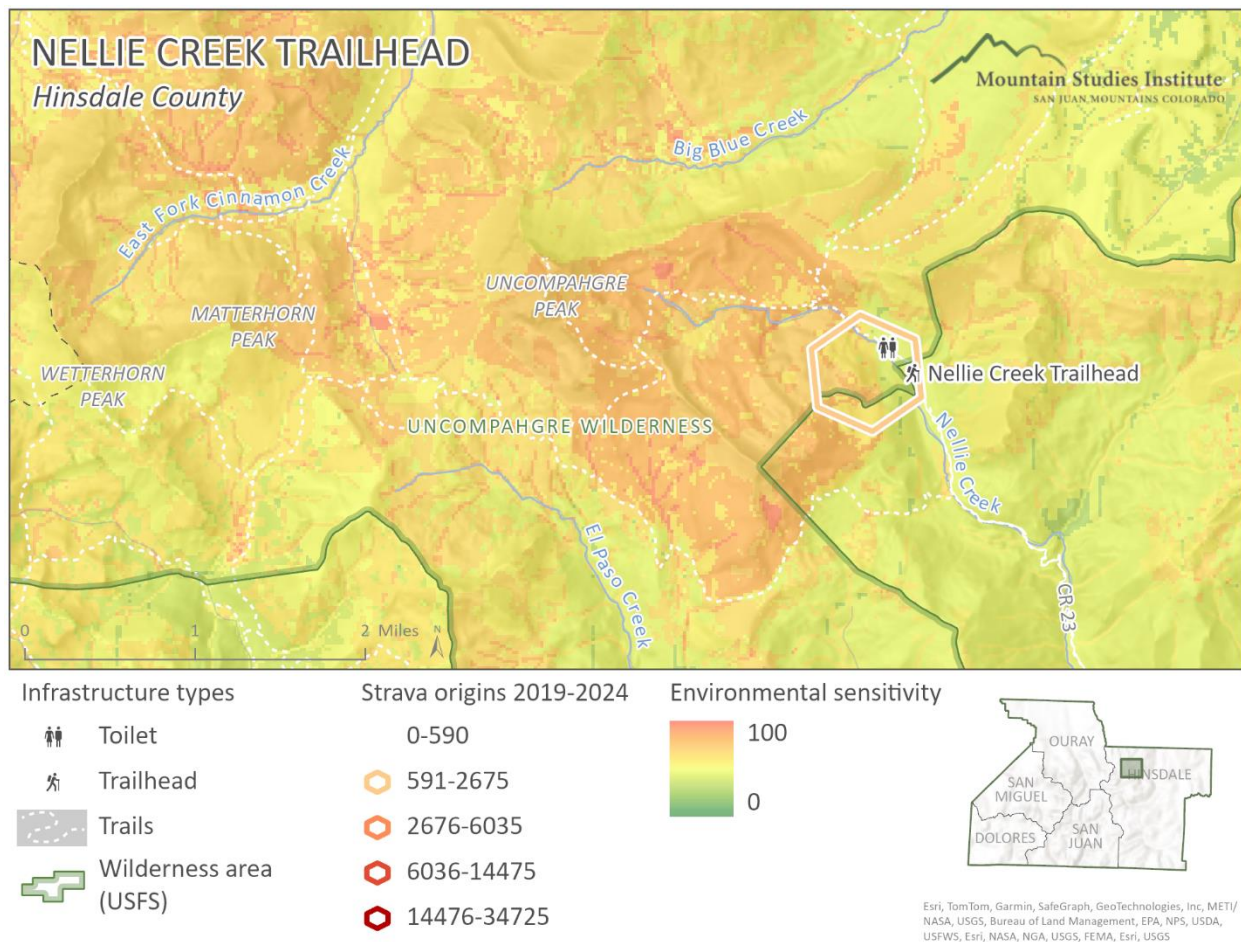


Figure 8. Environmental sensitivity, infrastructure and recreational use in the Nellie Creek area.

### Ouray County

#### Blue Lakes and Mount Sneffels

The Blue Lakes trail is the most popular trail on the Ouray District of the Grand Mesa, Uncompahgre and Gunnison (GMUG) National Forests (Figure 9; Rupani, 2023), so much so that the GMUG will begin

instituting a reservation system to limit day use and overnight camping at Blue Lakes. This decision aims to preserve natural resources in the area in response to high recreation use and to provide sustainable recreation access for the future (Perrin, 2024). This will ideally help mitigate impacts to water quality from human waste and trampling of sensitive alpine vegetation (LANDFIRE, 2023; Potyondy et al., 2011; Rupani, 2023).

While local and agency observations have identified high use in this area, with over 35,000 people visiting Blue Lakes each year, the Strava data does not reflect this pattern (Rupani, 2023; Strava, 2024). This suggests that the Strava data does not encompass a critical component of the hiking and running population that utilizes this zone. Many users of the Blue Lakes trail are tourists or travelers exploring the most popular San Juan Mountain areas and may not be frequent recreators or Strava users. The GMUG has begun developing a monitoring plan to track recreation use at Blue Lakes in accordance with the signed USFS decision (Perrin, 2024). If made available, this information would be useful for further analysis of recreational use. Additional information about existing infrastructure and capacity is also needed for further analysis.

The headwaters of the San Miguel River (Figure 9) were flagged as highly sensitive to recreation use. This watershed is classified as “functioning at risk,” which implies that the area may be less resilient to disturbance due to undesirable impacts from human activity (Potyondy et al., 2011). Additionally, the watershed provides drinking water for downstream populations which may be impacted by poor water quality and/or low water quantity (Lilja, 2014).

The highly sensitive area along the county line (Figure 9) also encompasses delicate alpine vegetation communities (LANDFIRE, 2023); moderate biodiversity significance, particularly in the Blue Lakes basin and Yankee Boy basin (Colorado Natural Heritage Program, 2024); and wetlands (U.S. Fish and Wildlife Service, 2018). The area also provides habitat for cutthroat trout, the fringed myotis bat, lynx, pika, ptarmigan and wolverine (Colorado Parks and Wildlife, 2023).

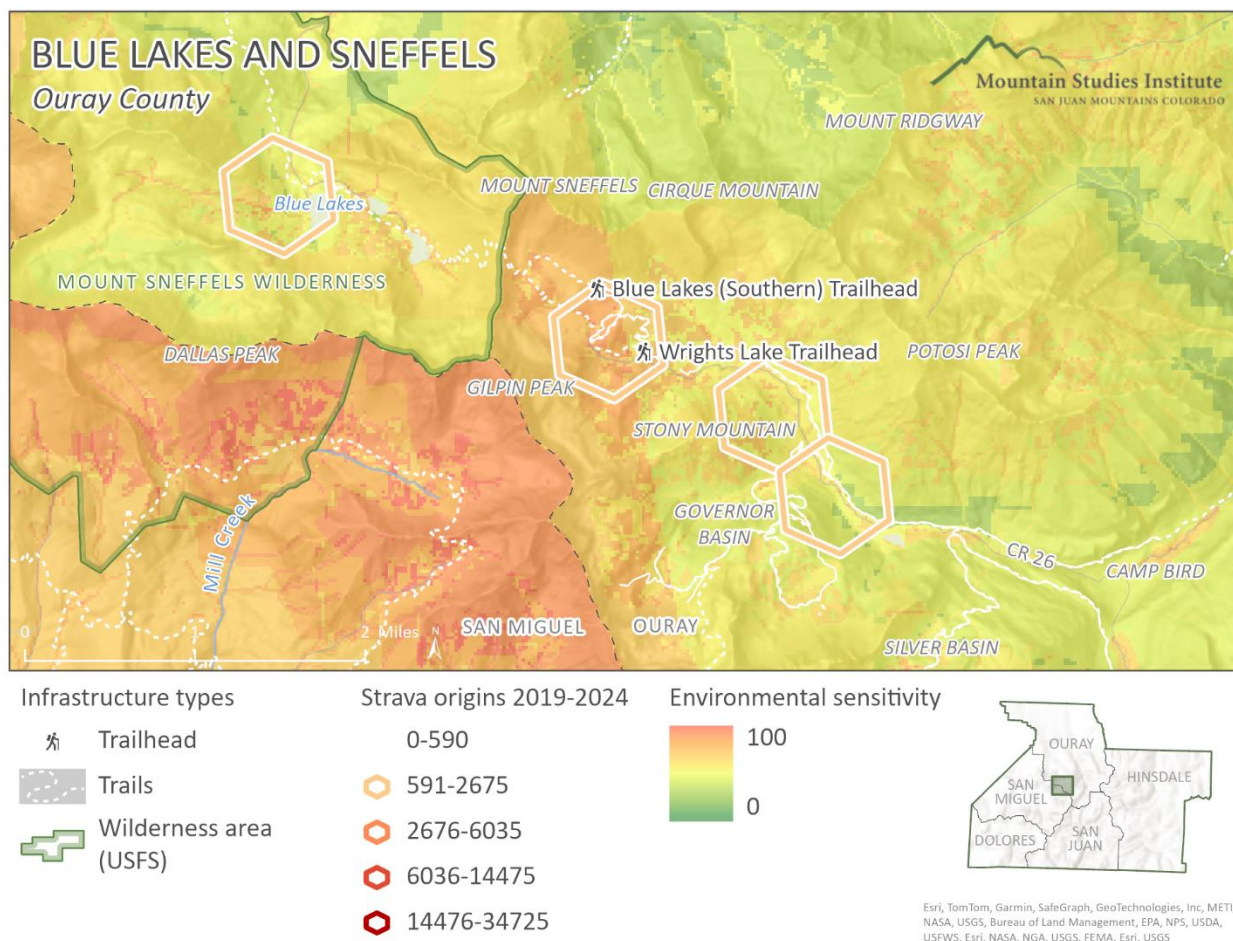


Figure 9. Environmental sensitivity, infrastructure and recreational use near the Blue Lakes and Mount Sneffels trailheads in Ouray County.

## San Juan County

### Cascade Creek

The Cascade Creek area, at the southern end of San Juan County, provides easy summer and winter access from Highway 550 for hiking, running, mountain biking and horseback riding (Figure 10). Cascade Creek also serves as a popular place to enjoy the water and has some of the easiest-to-access rock climbing and ice climbing in the County. A dirt road follows Cascade Creek upstream from the highway with limited dispersed camping along the way.

The MCA identified an area of high environmental sensitivity across the highway from Boyce Lake primarily due to beaver activity (iNaturalist, 2023) and confirmed fens (San Juan National Forest et al., 2018; Colorado Wetland Information Center, 2019). The bottom of the Cascade Creek drainage also received a highly sensitive designation due to high biodiversity significance (Colorado Natural Heritage Program, 2024), a large wetland complex (U.S. Fish and Wildlife Service, 2018), and an Outstanding Waters designation for Cascade Creek upstream of 550 and its tributaries (Water Quality Control Division, 2024). The area is also of high surface water importance (Lilja, 2014), although, the outlet of the Cascade Creek watershed, which is mostly east of Highway 550, has been flagged as functioning-at-risk because of poor

aquatic life, water quantity and soil conditions (U.S. Forest Service, 2020). This area provides habitat for cutthroat trout, the fringed myotis bat, lynx and pika (Colorado Parks and Wildlife, 2023).

The south-facing shoulder of Engineer Mountain, shown in Figure 10 just above the hairpin turn, is commonly used for backcountry skiing and sledding in the winter. Additional information is needed to understand the impacts of winter recreation in this area. Furthermore, an inventory of existing infrastructure is needed for this area along the highway and along the dirt road to the northwest of the hairpin turn.

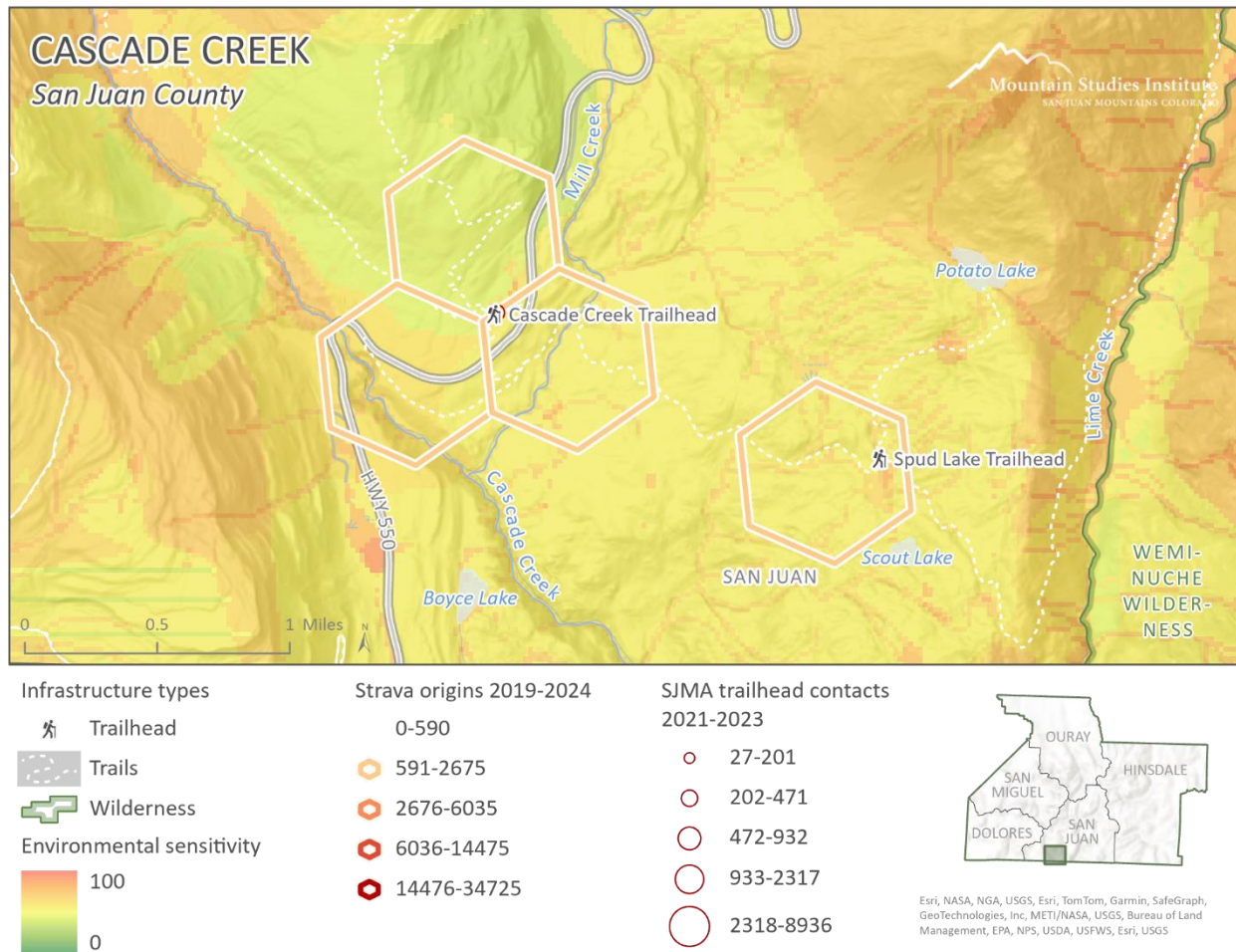


Figure 10. Environmental sensitivity, infrastructure and recreational use in the Cascade Creek area of San Juan County.

### Coal Bank and Molas Pass

The Highway 550 corridor, from Coal Bank Pass to Molas Pass in San Juan County constitutes part of the San Juan Skyway, a scenic byway (Figure 11). It not only serves as a popular access point for recreators, but also sees high visitation along the roadway and at pull-offs from visitors looking to appreciate the roadside beauty. Hikers, runners and mountain bikers utilize the many miles of trail along this highway to access peaks or piece together long trail loops that provide some of the most beautiful views in the San Juans. Mountain bikers often use the Engineer Mountain Trailhead (commonly known as the Pass Trail or Pass Creek Trail) to access longer descents around Engineer Mountain and shuttle cars along the highway to

complete the loop. The Colorado Trail intersects Highway 550 at Molas Pass, attracting a number of thru hikers each summer. The Weminuche Wilderness is commonly accessed along the Colorado Trail from Molas Pass or on the Andrews Lake Trail. There is some dispersed camping north of Molas Pass and along Lime Creek, south of Highway 550. Molas Lake, Little Molas Lake and Andrews Lake are popular for non-motorized watersports like paddleboarding and kayaking. Lime Creek is a popular spot for fishing. Andrew's Lake is also popular for fishing and has a wheelchair accessible path around part of the lake. In general, these are some of the easiest and most accessible hiking trails in the San Juans, which may contribute to the high level of use seen here. Winter recreation is also very popular in this area, including backcountry skiing, cross-country skiing, snowshoeing, sledding and snowmobile travel in designated zones. Potential impacts of winter recreation and the level of use in this area should be explored in a future study.

This high level of recreation use overlays a zone identified as sensitive to highly sensitive to recreation pressure. The Molas and Coal Bank area contains spectacular biodiversity, including a patch of high biodiversity significance near Andrews Lake, south of Highway 550, and northwest of Deer Creek (Colorado Natural Heritage Program, 2024). There are a number of fens (Colorado Wetland Information Center, 2019; San Juan National Forest et al., 2018) and wetlands (U.S. Fish and Wildlife Service, 2018) around Molas Pass and Andrews Lake. Large swaths of alpine vegetation span northwest of Deer Creek and Coal Creek and at Molas Pass, north of Highway 550 (LANDFIRE, 2023). Lime Creek and its tributaries, including Coal Creek, Deer Creek and Crater Creek, are designated Outstanding Waters (Water Quality Control Division, 2024), providing a home for cutthroat trout. The area also provides habitat for the fringed myotis bat, lynx and pika (Colorado Parks and Wildlife, 2023). White-tailed ptarmigan have winter range near Andrews Lake and Little Molas Lake (Colorado Parks and Wildlife, 2023).

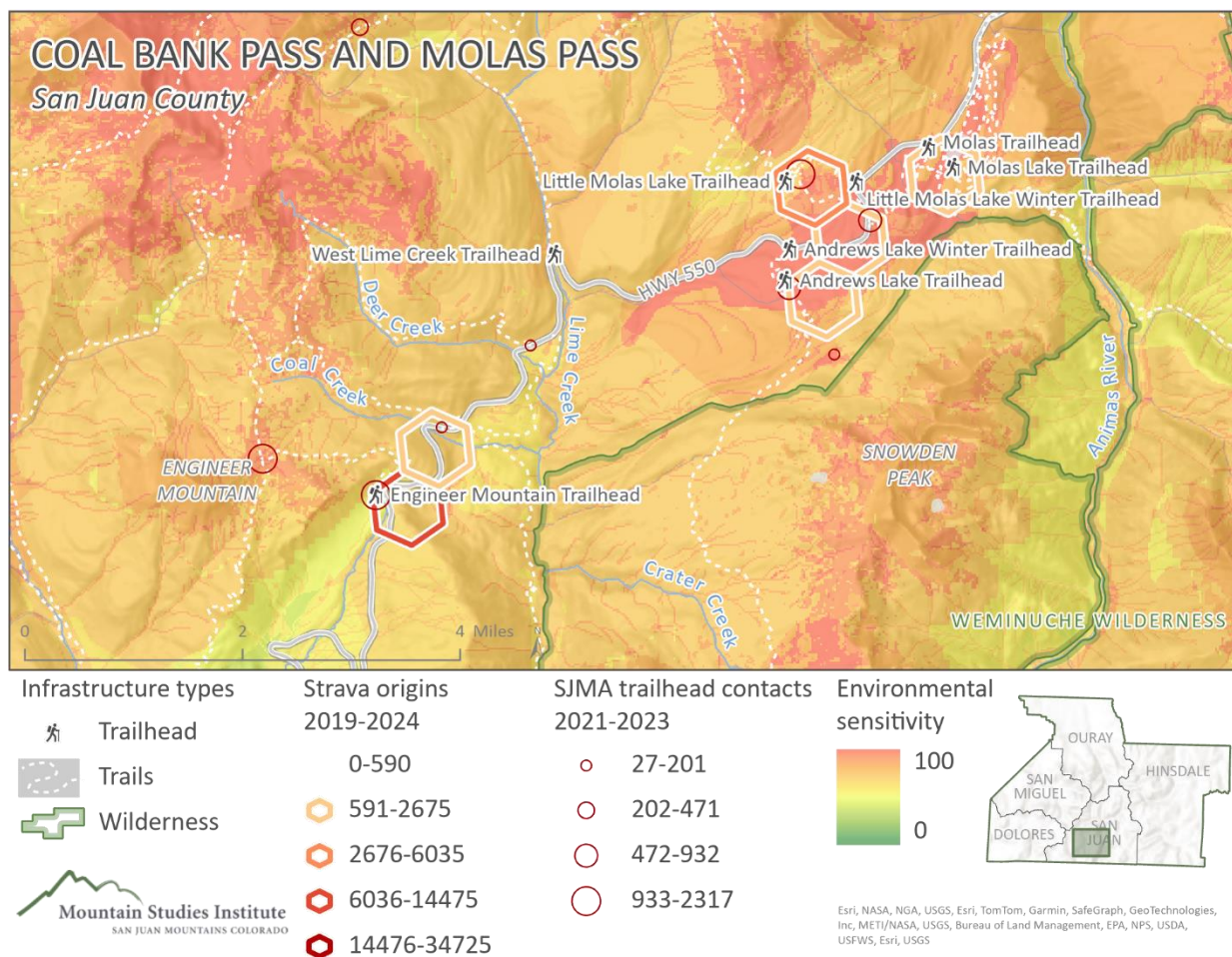


Figure 11. Environmental sensitivity, infrastructure and recreational use at Coal Bank and Molas Pass.

### Cunningham Gulch

Cunningham Gulch is another popular access point to the Weminuche Wilderness (Figure 12). The Colorado Trail and the Continental Divide Trail share a segment through this area of Weminuche Wilderness, often accessed using the Highland Mary trail or Cunningham Gulch trail. The Highland Mary Lakes area is popular for backpacking, hiking, running, fishing and the use of stock animals for thru-hiking and hunting. Outside of the Weminuche, four-wheel drive roads like Stony Pass are popular for OHV and Jeep users to access views of the San Juan Mountains and historic sites. There are a variety of mines and mining infrastructure remnants from hard-rock mining in the late 1800s and early 1900s, such as the mines and mill in Silver Lake Basin, the Old Hundred Gold Mine and the bunkhouse perched on the cliffs of Galena Mountain. There is dispersed camping along Cunningham Gulch, and Cunningham Creek is popular for fly fishing.

The kidney-shaped area of high sensitivity at Stony Pass (Figure 12) represents outstanding biodiversity significance (Colorado Natural Heritage Program, 2024). Fens and wetlands are abundant in the Highland Mary Lakes area, in Cunningham Gulch and along the headwaters of the Rio Grande (Colorado Wetland Information Center, 2019; San Juan National Forest et al., 2018; U.S. Fish and Wildlife Service, 2018). Cunningham Creek and other creeks in the Weminuche Wilderness are designated Outstanding Waters (Water Quality Control Division, 2024). Alpine vegetation is ample in this high-alpine terrain (LANDFIRE,

2023). The Cunningham Creek tributary to the Animas Watershed is functioning at risk, according to the U.S. Forest Service. This area is home to cutthroat trout, the fringed myotis bat (who's overall range creates the arc from Hazelton Mountain to Silver Lake to Mount Rhoda in Figure 12), pika and ptarmigan winter range along the bottom of Cunningham Gulch (Colorado Parks and Wildlife, 2023).

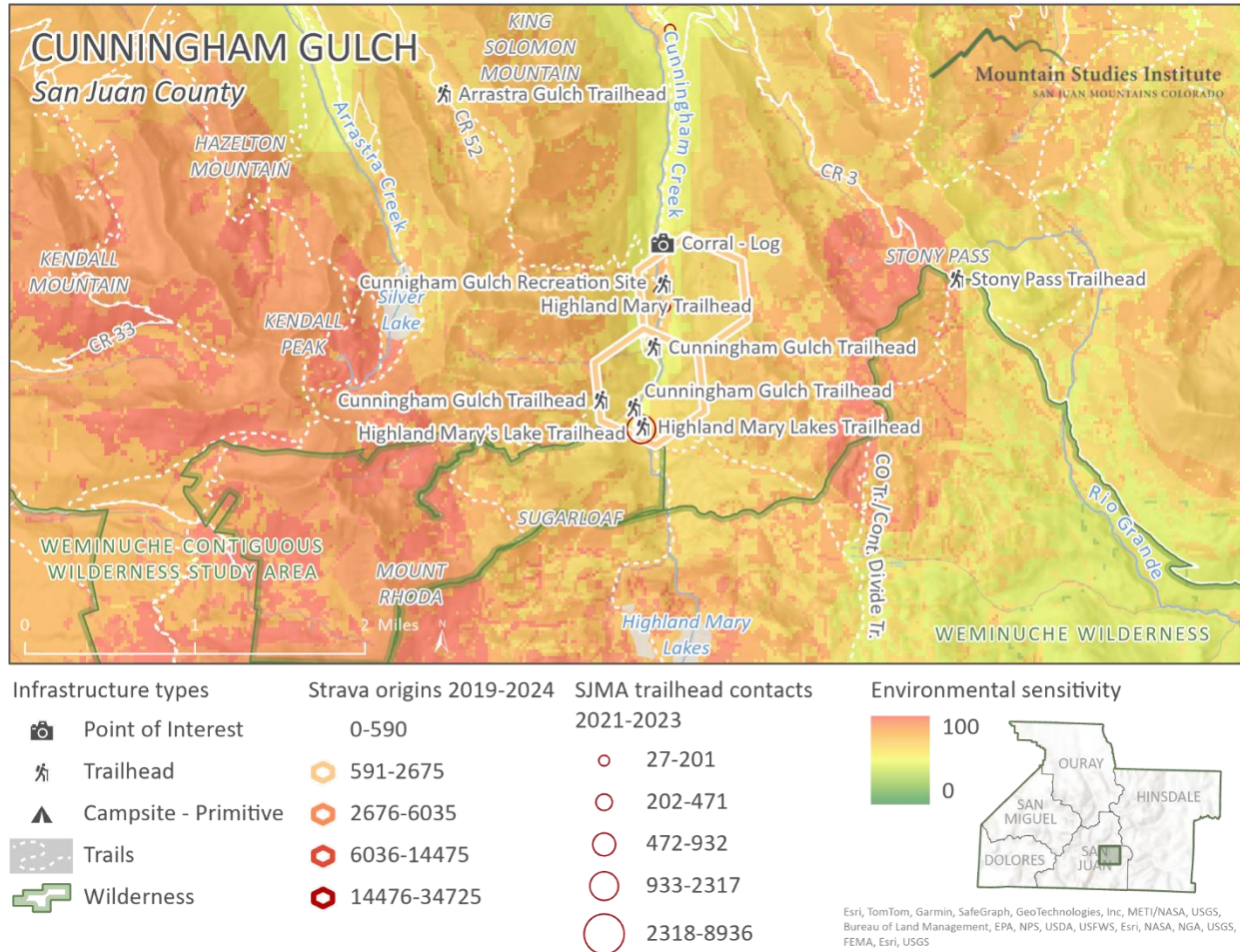


Figure 12. Environmental sensitivity, infrastructure and recreational use in Cunningham Gulch and the surrounding areas.

### Ophir Pass

The Ophir Pass Road (County Road 8) is a popular four-wheel drive road that roughly connects Silverton to the town of Ophir and Telluride (Figure 13). Of all the four-wheel drive roads and passes in the San Juans, this is one of the shortest, safest and most accessible. The OPUS Hut is a backcountry lodge near the top of Ophir Pass that attracts outdoor recreationists of all kinds and sleeps up to 20 people each night. In the summer, visitors can drive to OPUS and explore many miles of trails on day trips from the lodge. In the winter, visitors must ski or snowmobile in from Highway 550 or the town of Ophir, from the west. There are other cabin rentals in the area, such as the Artist Cabin at Chattanooga, which sleeps 6 people. The Columbine Lake trail is increasingly popular for hiking, running and even mountain biking and dirt biking, despite the steepness of the trail.

Similar to the Molas Pass/Coal Bank area, this recreation use overlays an area with very high biodiversity significance at Chattanooga and along Highway 550 at the Middle Fork of Mineral Creek (Colorado Natural Heritage Program, 2024). There are numerous fens and wetlands at Chattanooga and along Mineral Creek (Colorado Wetland Information Center, 2019; San Juan National Forest et al., 2018; U.S. Fish and Wildlife Service, 2018) and alpine vegetation covers the high mountain terrain on both sides of Highway 550 (LANDFIRE, 2023). The Mineral Creek watershed is functioning at risk, according to the U.S. Forest Service, due to poor aquatic biota, water quality and soil conditions (U.S. Forest Service, 2020). This area is home to cutthroat trout, the fringed myotis bat, lynx, pika and ptarmigan winter range at Chattanooga (Colorado Parks and Wildlife, 2023).

An inventory of overall existing infrastructure and motorized vehicle use along County Road 8, County Road 14 and the Columbine Lake trail is needed to better identify areas where use has overwhelmed the existing resources. Additional information is also needed to understand the impacts of winter recreation in this area.

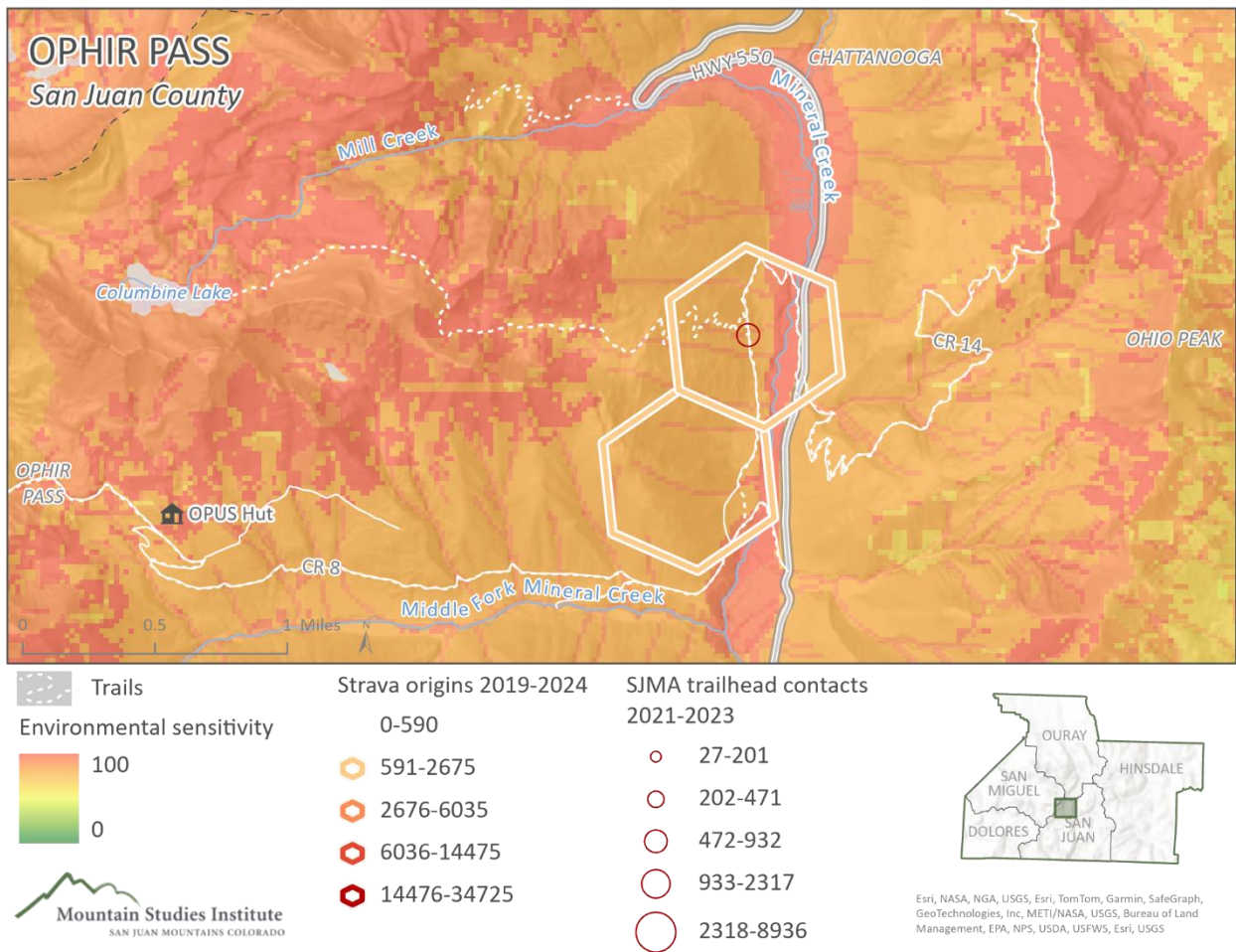


Figure 13. Environmental sensitivity, infrastructure and recreational use in the Ophir Pass area.

## South Mineral

South Mineral Creek is home to what is likely one of the most popular trailheads in the San Juan Mountains: the Ice Lake Trail, which is used by hikers, runners and backpackers to access the stunning alpine lake and its neighbor, Island Lake (Figure 14). Visitors can also drive to Clear Lake on a four-wheel drive road. There is a campground at the Ice Lake trailhead, and dispersed camping along South Mineral Creek on County Road 7. Unlike the similarly visited Blue Lakes area, no recreation management plan has been instituted.

The South Mineral corridor is home to beaver and an accompanying number of fens and wetlands (iNaturalist, 2023; Colorado Wetland Information Center, 2019; U.S. Fish and Wildlife Service, 2018). High biodiversity significance in the Ice Lake basin and along South Mineral Creek, the alpine vegetation sprawling across the above-tree line terrain surrounding the South Mineral corridor, and a function-at-risk designation for the Mineral Creek watershed contribute to the mosaic of highly sensitive areas identified by the MCA (Colorado Natural Heritage Program, 2024; LANDFIRE, 2023; Figure 14). This area also provides habitat for cutthroat trout, the fringed myotis bat, lynx, pika and ptarmigan winter range along South Mineral Creek (Colorado Parks and Wildlife, 2023).

The San Juan National Forest is watching this area closely as further management is needed to balance recreation opportunities with long-term natural resource sustainability. An inventory of dispersed camping along County Road 7 may be helpful for understanding the current level of overnight use in the area.

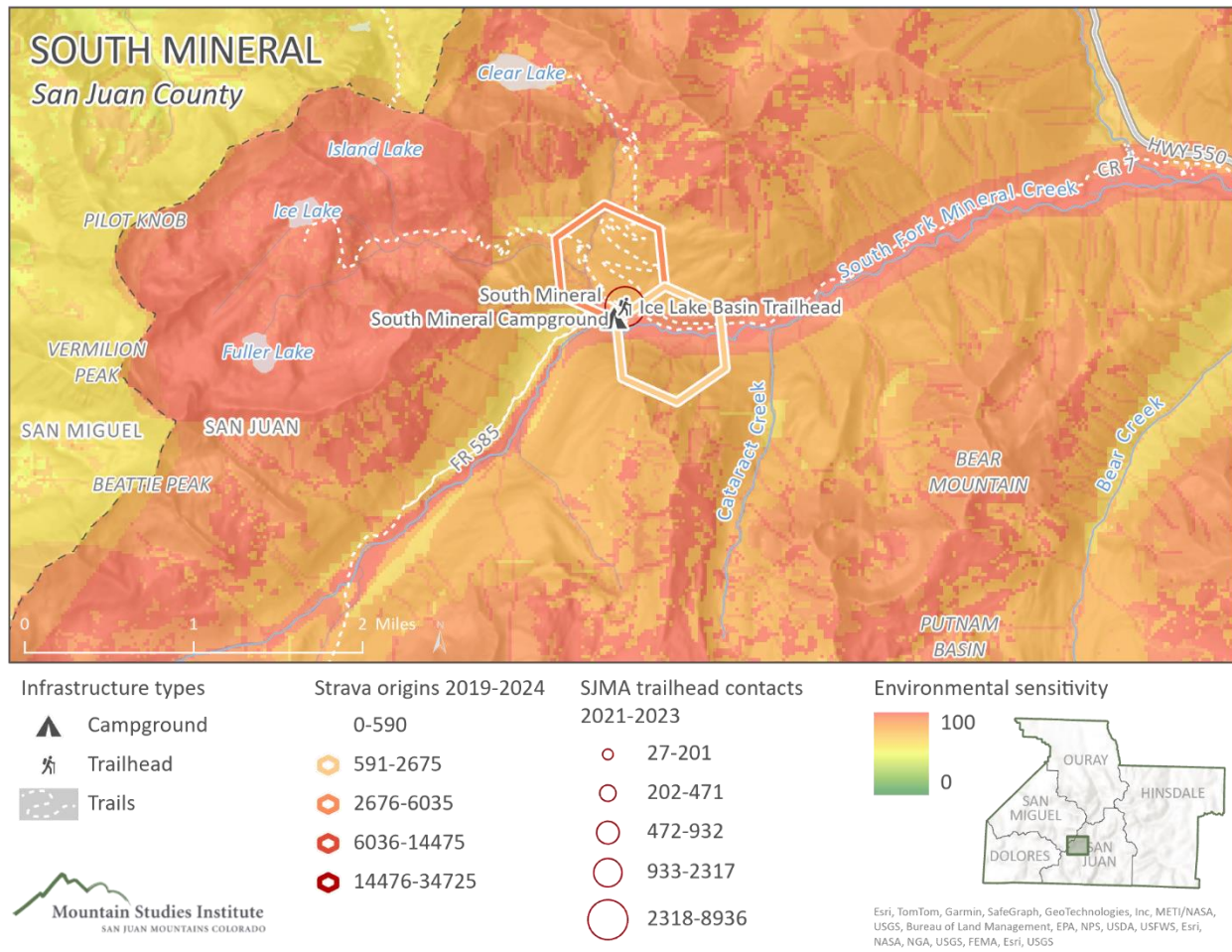


Figure 14. Environmental sensitivity, infrastructure and recreational use in the South Fork of Mineral Creek.

## Limitations

### *Recreation use*

Currently, there is no one dataset or combination of datasets that accurately quantify all recreation use in the project area. The dataset obtained from Strava provided the most comprehensive picture of recreation use the team had access to at the time. However, Strava comes with its own limitations. It is self-selecting, requires the use of a GPS watch or smartphone, and is typically used by experienced hikers, runners, cyclists, and winter backcountry travelers. For these reasons, the dataset may be missing many of the shorter efforts, trailhead wanderings, and use by recreators not on Strava. There are also recreational activities that do not require travel along a trail, such as sight-seeing and wildlife viewing, picnicking, swimming, reading interpretive signs, etc., which this dataset does not capture. Additionally, this dataset lacks information about many user groups such as OHV users, dirt bikers, horseback riders, and all winter recreators. Other local datasets may exist, but limited capacity among partners prevented them from sharing data for this project, especially since data acquisition occurred during the field season for many of these organizations (spring and summer).

San Juan Mountains Association's trailhead contacts data is an excellent complement to the Strava dataset, highlighting areas that are seeing the highest levels of use in the project area. However, the trailhead ambassadors are strategically stationed at trailheads that are known to be very popular so they can provide the most outreach about Leave No Trace ethics and respond to overuse issues on the trail and in surrounding areas. While their efforts are appropriately focused in the highest-use areas, exploring use in other areas is not a priority, therefore this dataset does not provide information about low- to mid-level recreation use.

### *Infrastructure*

Comprehensive infrastructure data for the project area was not achieved and will likely take official partnerships with federal and state partners. The best datasets the MSI team could find contained substantial gaps, which the team identified based on their institutional knowledge of the project area. Furthermore, the team couldn't find any data about the capacity of these infrastructure points, except for, in some cases, the number of campsites at a campground.

Molas and Coal Bank Passes present an excellent example of where there is an underrepresentation of infrastructure points (Figure 11). At Coal Bank Pass, there are two parking areas (one paved and one unpaved) at the Engineer Mountain Trailhead, an interpretive site and two toilets. At Andrews Lake there are two paved parking areas, two toilets and an interpretive site. At Molas Pass there is an interpretive site, a paved parking area and two toilets. At Little Molas Lake there is a campground, four toilets and two unpaved parking areas. However, the infrastructure dataset only shows seven trailheads in this area, leaving out all toilets, campgrounds, parking areas and interpretive sites. It is more difficult to identify areas where there may be an overrepresentation of infrastructure points in this dataset.

We could find no dataset that accurately captured dispersed camping areas (in undesignated sites, or in designated sites that do not require reservations) across the entire project area. A campsite survey is needed to quantify undesignated campsites, such as the ongoing effort by the San Juan National Forest to map undesignated campsites in high use areas in the Weminuche. The dataset also lacks information about bridges and water crossings. This information would provide greater understanding about the impact to watersheds and aquatic life along OHV routes that intersect streams and rivers.

### *Environmental sensitivity*

Colorado Parks and Wildlife is a great resource for wildlife habitat data, but the existing data is very coarse. Habitat for many of the tier 1 species of greatest conservation cover the entire project area, which spans an elevational gradient of thousands of feet with a variety of habitat types. CPW is currently in the process of developing a wildlife habitat sensitivity dataset, which will provide more detailed information about the habitat and movement of species. This dataset should be incorporated into the environmental sensitivity analysis in the future.

The scale of datasets that were included in the multi-criteria analysis have limitations when it comes to viewing and interpreting the output. For example, some of the wildlife habitat layers cover most of the project area while an individual fen or wetland may be only a few hundred square meters. The resolution of the output raster is a 30- by 30-meter grid, which is too coarse for some of the smaller-scale features like streams or fens to appear.

### **Further needs**

Information regarding recreation use from other user groups, particularly OHVs, would greatly enhance this analysis. Additional studies should be carried out to understand winter recreation use and its impacts on the environment, which could be very different from the impacts of summer activities. Local partners may be able to provide additional datasets given a longer timeline and requests being made during less busy times of year (fall and winter). There are other datasets that could be explored, such as cell phone use data. This data must be purchased by a local government for each county. This data set was explored for use in this project, but was too difficult to partition recreational users from vehicle transport in the same area and was not utilized. If counties decide to pay for this information, it should be incorporated in the future.

An inventory of recreation infrastructure is needed for the entire project area, including all public lands. Relevant information about capacity should be included for certain infrastructure types, such as campgrounds, bathrooms and parking areas. This could also be done on an as-needed basis for specific areas as agencies assess recreation use during planning processes. Similarly, there may be existing data that was not obtained due to a lack of capacity among local partners or discontinuity in data extent (ie. data only for one specific area). Some partners should be consulted again for infrastructure data. Other infrastructure types should also be considered. For example, Hinsdale County has implemented an inspection station at Lake San Cristobal to prevent the spread of aquatic nuisance species (Borchers & Woods, 2024). While difficult to track down, these unique infrastructure types are critical for tracking recreation management in the project area.

CPW's habitat sensitivity data should be incorporated into the multi-criteria analysis when it becomes available. This will provide more pertinent information about wildlife habitat.

### **Conclusion**

This study provides a geospatial analysis of recreation use, an assessment of environmental sensitivity to recreation pressure and an aggregation of recreation infrastructure data across the six-county project area (Figure 1). This information is used to visualize where recreation pressures are high and may threaten

surrounding natural resources (Figure 3), and where infrastructure may need to be inventoried or reassessed to suit the needs of recreation use (Figure 4). These results can be viewed on the [web map](#).

Information about recreational use came from Strava Metro and San Juan Mountains Association (Table 1). While these datasets provide excellent baseline data, they lack certain user groups, are restricted to certain areas, or are self-selecting. The four infrastructure datasets (Table 2) that were used in this study provide accurate information about trails and trailheads, but are under representative of many infrastructure types and quantities, such as toilets, parking areas, staging areas, and interpretive sites. Alpine vegetation, biodiversity, water quality and quantity, wildlife habitat, fens and wetlands were important drivers in determining how sensitive an area is to recreation pressure (Table 3).

Results of the analysis highlighted 10 focus areas: Lizard Head Pass; Handies, Sunshine and Redcloud Peaks; Cascade Creek; Blue Lakes and Mount Sneffels; Coal Bank and Molas Pass; Cunningham Gulch; Ophir Pass; South Mineral; Upper Hermosa – Bolam Pass and the Nellie Creek Trailhead. These areas were identified because they display a high level of sensitivity to recreation pressure and experience high recreational use (Table 4).

Table 4. Summary of high use areas of interest, their recreation pressures, and factors contributing to high sensitivity values.

<b>High use area of interest</b>	<b>Recreation pressures</b>	<b>Contributing factors to high sensitivity</b>
Upper Hermosa – Bolam Pass	Popular recreation activities: hiking, running, mountain biking, dirt biking, dispersed camping, OHV use Colorado Trail	Biodiversity significance Fens and wetlands Outstanding Waters Alpine vegetation Habitat: cutthroat trout, fringed myotis bat, lynx and pika
Lizard Head Pass	Access to Lizard Head Wilderness Winter recreation	Biodiversity significance Fens and wetlands Alpine vegetation Habitat: cutthroat trout, fringed myotis bat, lynx, pika, ptarmigan (winter range)
Handies, Sunshine and Redcloud Peaks	Access to 14ers Access to wilderness study areas OHV use along CR 30	Biodiversity significance Alpine vegetation Wetlands Habitat: cutthroat trout, lynx, pika, and ptarmigan (winter range)
Nellie Creek Trailhead	Access to Uncompahgre Peak for hiking and running	Beaver observations Biodiversity significance Fens and wetlands Outstanding Waters Alpine vegetation Watersheds functioning at risk Habitat: cutthroat trout, lynx, pika, and ptarmigan
Blue Lakes and Mount Sneffels	Popular activities: hiking, running, backpacking	San Miguel watershed functioning at risk Alpine vegetation Biodiversity significance Wetlands Habitat: cutthroat trout, fringed myotis bat, lynx, pika and ptarmigan
Cascade Creek	Popular activities: hiking, running, mountain biking, horseback riding, rock climbing	Beaver observations Fens and wetlands Biodiversity significance

		Outstanding Waters High surface water importance Watershed functioning at risk Habitat: cutthroat trout, fringed myotis bat, lynx and pika.
Coal Bank and Molas Pass	Popular activities: hiking, running, mountain biking, dispersed camping, backpacking, paddleboarding, kayaking, fishing San Juan Skyway Colorado Trail Access to the Weminuche Wilderness Molas, Little Molas and Andrews lakes	Biodiversity significance Fens and wetlands Alpine vegetation Outstanding Waters Habitat: cutthroat trout, fringed myotis bat, lynx, pika and ptarmigan (winter range)
Cunningham Gulch	Popular activities: hiking, running, fishing, backpacking, hunting, OHV use Access to the Weminuche Wilderness Access to the Colorado Trail and Continental Divide Trail Heritage sites	Biodiversity significance Fens and wetlands Outstanding Waters Alpine vegetation Watershed functioning at risk Habitat: cutthroat trout, fringed myotis bat, pika and ptarmigan (winter range)
Ophir Pass	OHV use on Ophir Pass OPUS Hut Columbine Lake trail	Biodiversity significance Fens and wetlands Alpine vegetation Watershed functioning at risk Habitat: cutthroat trout, fringed myotis bat, lynx, pika and ptarmigan (winter range)
South Mineral	Popular activities: hiking, running, dispersed camping, backpacking, fishing Ice Lake trail	Beaver observations Fens and wetlands Biodiversity significance Alpine vegetation Watershed functioning at risk Habitat: cutthroat trout, fringed myotis bat, lynx, pika and ptarmigan (winter range)

All 10 focus areas and other areas of interest in the project area require an inventory of existing recreation infrastructure. Information is also needed about the capacity of certain infrastructure types, such as toilets and parking areas. Further studies should be conducted to understand recreation use in the winter and how these impacts may pose different threats to natural resources. Certain infrastructure may not be available in the winter, which is also important to know. Additional data should be gathered from partners around the project area to quantify recreation use from groups other than runners, hikers and mountain bikers.

The findings from this study are intended to be shared publicly to inform recreation management planning that will maintain a thriving economy and protect vital resources in the high alpine region of the San Juan Mountains.

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# Appendix

## Appendix A

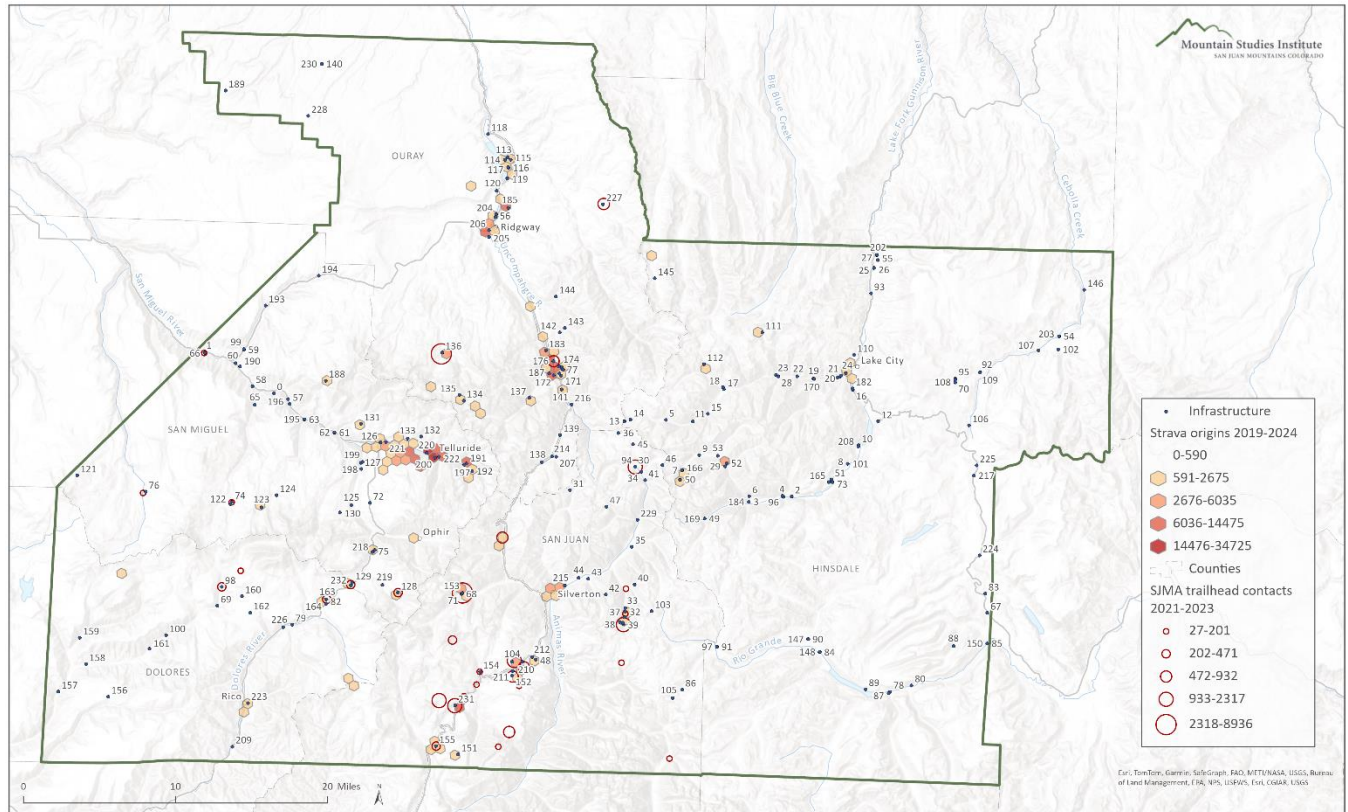


Figure 15. Recreational use data from Strava and SJMA are compared to infrastructure points, which are labeled with unique numbers. These numbers can be referenced in the following table for more information.

Table 5. Reference numbers for infrastructure points

COUNTY	LABEL	NAME	TYPE	BATHROOMS	SOURCE
Dolores	69	Burro Bridge	Campground	Unknown	(Recreation.gov, 2024)
	79	CAYTON CAMPGROUND	Campground	Unknown	
	82	Cross Mountain Trailhead	Facility	Unknown	
	98	Navajo Lake Trailhead	Trailhead	Unknown	(Colorado Trail Explorer, 2024)
	100	Geyser Spring Trailhead	Trailhead	no	
	156	Stoner Mesa Trailhead Upper	Trailhead	no	
	157	Gobble Trailhead	Trailhead	no	
	158	Willow Divide OHV Trailhead	Trailhead	no	
	159	Fish Creek Trailhead	Trailhead	no	
	160	Kilpacker Trailhead	Trailhead	no	
161	Johnny Bull Trailhead	Trailhead	no		
162	Calico Trailhead	Trailhead	yes		
163	Cross Mountain Trailhead	Trailhead	no		

	164	East Fork Trailhead	Trailhead	no	
	209	Scotch Creek Winter Trailhead	Trailhead	no	
	223	Argentine & Enterprise Winter Trailhead	Trailhead	no	
	226	Barlow Trailhead	Trailhead	no	
	232	Galloping Goose Trailhead	Trailhead	no	
Hinsdale	2	Bent Creek	Campground	Unknown	(Bureau of Land Management, 2024)
	3	Cataract Gulch (Sherman)	Access Point	Unknown	
	4	Mill Creek Rec. Site	Campground	Unknown	
	5	Roses Cabin	Point of Interest	Unknown	
	6	Sherman Overlook	Scenic Overlook	Unknown	
	7	American Basin Interpretive Site	Interpretive Site	Unknown	
	8	Cinnamon Pass ATV Staging Area	Staging Area	Unknown	
	9	Burrows Park Interpretive Site	Interpretive Site	Unknown	
	10	Red Mountain Gulch	Picnic Area	Unknown	
	11	Whitmore Falls Overlook	Scenic Overlook	Unknown	
	12	Lake San Cristobal Overlook	Scenic Overlook	Unknown	
	14	Uncompahgre Overlook	Scenic Overlook	Unknown	
	15	Rose Lime Kiln	Interpretive Site	Unknown	
	16	Lake City Ski Hill/Lake to Lake Trail	Access Point	Unknown	
	17	Capitol City Townsite	Point of Interest	Unknown	
	18	Capitol City Cemetery	Point of Interest	Unknown	
	19	Alpine Gulch Trail	Access Point	Unknown	
	20	Henson Creek ATV Staging	Staging Area	Unknown	
	21	Henson Hilton	Parking Area	Unknown	
	22	Henson Interpretive Site	Interpretive Site	Unknown	
	23	Pike Snowden Cabin	Point of Interest	Unknown	
	24	Lake City Ice Wall	Point of Interest	Unknown	
	25	Devil's Creek Parking	Parking Area	Unknown	
	26	Devil's Creek Bridge boat ramp	Boat Ramp	Unknown	
	27	Lake Fork Fishing Trail	Access Point	Unknown	
	28	Nellie Creek Toilet	Toilet	Unknown	
	29	Silver Creek Trailhead	Trailhead	Unknown	
	49	Cuba Gulch Trailhead	Trailhead	Unknown	
	50	American Basin Trailhead	Trailhead	Unknown	
	51	Williams Creek Trailhead	Trailhead	Unknown	
	52	Silver Creek Trailhead	Trailhead	Unknown	
53	Cooper Creek Trailhead	Trailhead	Unknown		
54	Powderhorn Park Trailhead	Trailhead	Unknown		
55	Devil's Creek Trailhead	Trailhead	Unknown		

67	Spring Creek Reservoir Picnic Site	Facility	Unknown	(Recreation.gov, 2024)
70	Deer Lakes (CO)	Campground	Unknown	
73	Williams Creek (CO)	Campground	Unknown	
78	THIRTY MILE	Campground	Unknown	
80	RIVER HILL	Campground	Unknown	
83	Bristol Head Campground	Campground	Unknown	
84	Ute Creek Trailhead #819	Facility	Unknown	
85	Texas Creek Summer Home Group Trailhead	Facility	Unknown	
87	Thirty Mile Trailhead #814	Facility	Unknown	
88	Road Canyon Boat Ramp	Facility	Unknown	
89	Rio Grande Reservoir Boating Site	Facility	Unknown	
90	Lost Trailhead #821	Facility	Unknown	
91	Pole Creek Trailhead #820	Facility	Unknown	
92	Brush Creek Winter Trailhead	Facility	Unknown	
93	Independence Gulch #234	Facility	Unknown	
95	Deer Lakes Day Use Area / Fishing Site	Facility	Unknown	
96	Mill Creek Campground (CO)	Campground	yes	
97	Pole Creek Trailhead	Trailhead	no	(Colorado Trail Explorer, 2024)
101	Cinnamon Pass ATV Staging Area	Trailhead	no	
102	Mineral Creek Trailhead	Trailhead	Unknown	
106	Tumble Creek Trailhead	Trailhead	no	
107	Rough Creek Trailhead	Trailhead	no	
108	Deer Lakes Trailhead	Trailhead	yes	
109	Brush Creek Trailhead	Trailhead	no	
110	Crystal Larson Trailhead	Trailhead	no	
111	Nellie Creek Trailhead	Trailhead	no	
112	Matterhorn Creek Trailhead	Trailhead	no	
145	Wetterhorn Trailhead	Trailhead	no	
146	Mason Family SWA Trailhead	Trailhead	yes	
147	Lost Trailhead	Trailhead	no	
148	Ute Creek Trailhead #819	Trailhead	yes	
149	Thirty Mile Trailhead #814	Trailhead	no	
150	Texas Creek Trailhead	Trailhead	no	
165	Williams Creek Trailhead	Trailhead	yes	
166	Upper Lake Fork Trailhead	Trailhead	no	
167	American Basin Trailhead	Trailhead	no	
168	Cooper Creek Trailhead	Trailhead	no	
169	Cuba Gulch Trailhead	Trailhead	no	
170	Alpine Gulch Trailhead	Trailhead	no	
180	Engineer Pass Trailhead	Trailhead	no	
181	Henson Creek ATV Staging Area	Trailhead	no	
182	Lake City Ski Hill Trailhead	Trailhead	no	
184	Cataract Gulch Trailhead	Trailhead	yes	
201	Devil's Creek Trailhead	Trailhead	no	
202	Lake Fork Trailhead	Trailhead	no	
203	Powderhorn Park Trailhead	Trailhead	no	
208	Red Mountain Gulch OHV Staging Area	Trailhead	seasonally	

	213	Burrows Park Trailhead	Trailhead	yes	
	217	Spring Creek Winter Trailhead	Trailhead	no	
	224	Bristol Head Winter Trailhead	Trailhead	no	
	225	Spring Creek Pass Trailhead	Trailhead	yes	
	233	Red Mtn. Gulch Day Use Area	Toilet	yes	
	234	Spring Creek Reservoir	Toilet	yes	
	236	Ute Town and Mill Site	Interpretive Trailhead		
	237	Grizzly Gulch Trailhead	Trailhead	yes	
	238	Grizzly Gulch toilet	Toilet	yes	
	239	Nellie Creek Trailhead toilet	Toilet	yes	
	240	Mill Creek Campground	Toilet	yes	
	241	Roundtop Mountain Park	Toilet	yes	
242	Rose's Cabin	Toilet	yes		
Ouray	13	Engineer Pass	Interpretive Site	Unknown	(Bureau of Land Management, 2024)
	56	Uncompahgre Riverway	Picnic Area	Unknown	
	64	Ridgway Area Trails	Trailhead	Unknown	
	77	AMPHITHEATER (CO)	Campground	Unknown	(Recreation.gov, 2024)
	113	Ridgway Marina Trailhead	Trailhead	yes	(Colorado Trail Explorer, 2024)
	114	Twin Fawn Trailhead	Trailhead	yes	
	115	Mear's Bay Trailhead	Trailhead	yes	
	116	Forest Discovery Trail	Interpretive Trailhead	yes	
	117	Wapiti Trailhead	Trailhead	yes	
	118	Enchanted Mesa Trailhead	Trailhead	no	
	119	Cookie Tree Trailhead	Trailhead	yes	
	120	Confluence Trailhead	Trailhead	yes	
	134	Wrights Lake Trailhead	Trailhead	no	
	135	Blue Lakes (Southern) Trailhead	Trailhead	no	
	136	Blue Lakes (Northern) Trailhead	Trailhead	yes	
	137	Weehawken Trailhead	Trailhead	no	
	138	Richmond Trailhead	Trailhead	no	
	139	Hayden Iron-ton Trailhead	Trailhead	no	
	140	Simms Mesa Interpretive Trail	Interpretive Trailhead	no	
	141	Bear Creek Trailhead	Trailhead	no	
	142	Horsethief Trailhead	Trailhead	no	
	143	Dexter Creek Trailhead	Trailhead	no	
	144	Baldy Trailhead	Trailhead	no	
	171	Portland Trailhead	Trailhead	no	
	172	Ice Park Trailhead	Trailhead	no	
	173	Upper Cascade Falls Trailhead	Trailhead	yes	
	174	Lower Cascade Falls Trailhead	Trailhead	no	
	175	8th Avenue Trailhead	Trailhead	no	
	176	Ouray Visitors Center Trailhead	Trailhead	yes	
	183	Silvershield Trailhead	Trailhead	no	
185	Ridgway Trailhead	Trailhead	no		

	186	Baby Bathtubs Trailhead	Trailhead	no	
	187	Box Canyon Trailhead	Trailhead	yes	
	189	Spring Creek Trailhead	Trailhead	no	
	204	Dennis Weaver Memorial Park Trailhead	Trailhead	no	
	205		Trailhead	no	
	206		Trailhead	Unknown	
	207	Gray Copper Trailhead	Trailhead	no	
	214	Ironton Park Trailhead	Trailhead	no	
	216	Engineer Pass OHV Staging Area	Trailhead	no	
	227	Vista Point Winter Trailhead	Trailhead	no	
	228	Elk Mountain Winter Trailhead	Trailhead	no	
	230	Dave Wood Trailhead	Trailhead	no	
San Juan	30	Animas Forks Rec Site	Interpretive Site	Unknown	(Bureau of Land Management, 2024)
	31	Corkscrew Restroom	Toilet	Unknown	
	32	Cunningham Gulch Recreation Site	Campsite - Primitive Point of Interest	Unknown	
	33	Corral - Log	Interpretive Site	Unknown	
	34	Lost Rec Site	Site	Unknown	
	35	Maggie Gulch Restroom	Toilet	Unknown	
	36	Mineral Point Rec Site	Picnic Area	Unknown	
	37	Cunningham Gulch Trailhead	Trailhead	Unknown	
	38	Cunningham Gulch Trailhead	Trailhead	Unknown	
	39	Highland Mary's Lake Trailhead	Trailhead	Unknown	
	40	Stony Pass Trailhead	Trailhead	Unknown	
	41	American Basin Trailhead	Trailhead	Unknown	
	42	Arrastra Gulch Trailhead	Trailhead	Unknown	
	43	Arrastra Gulch Trailhead	Trailhead	Unknown	
	44	Trail to Informational Kiosk, Silverton	Access Point	Unknown	
	45	Denver Pass Trailhead	Trailhead	Unknown	
	46	Cinnamon Pass	Scenic Overlook	Unknown	
	47	Eureka Gulch Parking Area	Parking Area	Unknown	
	48	Molas Lake Trailhead	Trailhead	Unknown	
		68	South Mineral Campground	Facility	
	71	South Mineral	Campground	Unknown	
	86	Bear Town Trailhead #787	Facility	Unknown	
	94	Animas Forks	Facility	Unknown	
	103	Stony Pass Trailhead	Trailhead	no	(Colorado Trail Explorer, 2024)
	104	Little Molas Lake Trailhead	Trailhead	yes	
	105	Beartown Trailhead	Trailhead	no	
	151	Spud Lake Trailhead	Trailhead	no	
	152	Andrews Lake Trailhead	Trailhead	yes	
	153	Ice Lake Basin Trailhead	Trailhead	no	
	154	West Lime Creek Trailhead	Trailhead	no	
	155	Cascade Creek Trailhead	Trailhead	no	

	177	Highland Mary Trailhead	Trailhead	no	
	178	Highland Mary Lakes Trailhead	Trailhead	no	
	179	Cunningham Gulch Trailhead	Trailhead	no	
	210	Little Molas Lake Winter Trailhead	Trailhead	no	
	211	Andrews Lake Winter Trailhead	Trailhead	no	
	212	Molas Trailhead	Trailhead	no	
	215	Silverton OHV Staging Area	Trailhead	no	
	229	Eureka Gulch OHV Trailhead	Trailhead	yes	
	231	Engineer Mountain Trailhead	Trailhead	no	
	235	Eureka	Toilet	yes	
San Miguel	0	Tram Site	Point of Interest	Unknown	(Bureau of Land Management, 2024)
	1	Caddis Flats	Campground	Unknown	
	57	M 59 River Trail	Trailhead	Unknown	
	58	Down Valley Park	Boat Ramp	Unknown	
	59	Leopard Creek Trail	Trailhead	Unknown	
	60	Placerville	Boat Ramp	Unknown	
	61	Deep Creek	Boat Ramp	Unknown	
	62	M 59 River Trail Upper	Trailhead	Unknown	
	63	M 59 River Trail Middle	Trailhead	Unknown	
	65	Fall Creek	Campground	Unknown	
	66	Caddis Flats	Boat Ramp	Unknown	
	72	Sunshine	Campground	Unknown	(Recreation.gov, 2024)
	74	Woods Lake	Campground	Unknown	
	75	MATTERHORN CABIN	Campground	Unknown	
	76	LONE CONE CABIN	Campground	Unknown	
	81	MATTERHORN	Campground	Unknown	
	99	Leopard Creek Trailhead	Trailhead	Unknown	(Colorado Trail Explorer, 2024)
	121	Lone Cone Peak Trailhead	Trailhead	no	
	122	Woods Lake SWA Trailhead	Trailhead	no	
	123	Rock of Ages Trailhead	Trailhead	no	
	124	Wilson Mesa West Trailhead	Trailhead	no	
	125	Ames Trailhead	Trailhead	no	
	126	Galloping Goose North Trailhead	Trailhead	no	
	127	Ilium Trailhead	Trailhead	no	
	128	Hope Lake Trailhead	Trailhead	no	
	129	Lizard Head Trailhead	Trailhead	yes	
	130	Wilson Mesa East Trailhead	Trailhead	no	
	131	Deep Creek Trailhead	Trailhead	no	
132	Mill Creek Trailhead	Trailhead	no		
133	Eider Creek Trailhead	Trailhead	no		
188	Whipple Mountain Trailhead	Trailhead	no		
190	Angell Lode Trailhead	Trailhead	no		
191	Marshall Creek Trailhead	Trailhead	no		
192	Via Ferrata East Trailhead	Trailhead	no		
193	Whiskey Charlie 62 South Trailhead	Trailhead	no		
194	Whiskey Charlie 62 Trailhead North	Trailhead	no		

195	M59 River Trailhead	Trailhead	no
196	M59 River North Trailhead	Trailhead	no
197	Valley View Trailhead	Trailhead	no
198	Coal Chutes Loop West Trailhead	Trailhead	no
199	Coal Chutes Loop East Trailhead	Trailhead	no
200	Bear Creek Trailhead	Trailhead	no
218	Priest Lake Winter Trailhead	Trailhead	no
219	Trout Lake Trestle Trailhead	Trailhead	no
220	Mahoney Trailhead	Trailhead	no
221	Lawson Trailhead	Trailhead	no
222	Telluride Town Park Trailhead	Trailhead	yes