



## Colorado Bighorn Sheep Monitoring 2022 Report



Prepared By:  
Mountain Studies Institute  
162 Stewart Drive, Suite A  
Durango, Colorado 81301  
[mountainstudies.org](http://mountainstudies.org)

**Completion Date:** March 31, 2022

**Cover Photo By:** Citizen scientist as part of the Colorado Bighorn Sheep Monitoring project.

**Authors:** Cassidy Powell, Jewell Coleman, Artemis Eyster, and Jeremy May  
Mountain Studies Institute, Silverton, CO

**Recommended Citation:** Mountain Studies Institute. (2022). Colorado Bighorn Sheep Monitoring 2021 Report. Retrieved from [www.mountainstudies.org/bighorn](http://www.mountainstudies.org/bighorn).

**Acknowledgements:**

We would like to thank all the volunteer citizen scientists for their work gathering and uploading data presented in this report.

## Executive Summary

This document presents updates on the Colorado Bighorn Sheep Monitoring Program (CBSMP). Specifically, this report highlights program efforts and observations of bighorn sheep in the San Juan Mountains. The observations analyzed in this report are recorded by citizen scientists and uploaded to iNaturalist (a widely used online platform for public data collection). Data show that bighorn sheep sometimes occupy domestic sheep grazing allotments and adjacent land. Mountain Studies Institute (MSI) recommends that the data in this report and all available data is considered by managing agencies when evaluating the suitability of domestic sheep grazing allotments.

The CBSMP has received funding from Backcountry Hunters and Anglers (BHA), Rocky Mountain Bighorn Society (RMBS), Great Old Broads for Wilderness, Patagonia, and MSI, as well as in-kind contribution from the United States Forest Service. MSI is an independent not-for-profit mountain research and education center established in 2002 in Silverton, Colorado. MSI develops science that people can use to address environmental issues facing the San Juan Mountains. Additional project information and observations can be viewed at [www.mountainstudies.org/bighorn](http://www.mountainstudies.org/bighorn). For more information, please contact Jewell Coleman at [jewell@mountainstudies.org](mailto:jewell@mountainstudies.org).

## Background

In the late 1800's bighorn sheep were abundant (estimated population of 1.5 to 2 million in North America) and widespread throughout the western United States (Seton, 1909, as cited in The Wildlife Society (TWS), 2015). Bighorns evolved in a variety of landscapes over tens of thousands of years and were the predominant ungulate in many mountain and canyon landscapes, meaning they were more common than deer and elk (TWS, 2014). This iconic species was nearly extirpated in the late 1800's by overgrazing, habitat fragmentation, unregulated hunting and diseases carried by domestic sheep and goats as a result of westward expansion (TWS, 2014 & 2015).

In the mid-1950s only about 25,000 bighorns remained in the continental United States (as cited in TWS, 2014). Translocations, which are often costly and sometimes dangerous, were successful in reestablishing herds in some historic ranges (LaRoe, 1995). Dedicated conservation efforts resulted in increasing the overall population of bighorns to approximately 70,000 in the 1990s (as cited in TWS, 2014). Since then, however, despite a variety of intensive conservation efforts throughout the West, the overall population has stagnated or declined to 80,000 in North America in 2014 (TWS, 2014). Many herds are small (less than 100 animals), isolated, and are at risk of developing problems related to lack of genetic diversity (Singer et. al, 2000, as cited in Pils & Wilder, 2018).

The bighorn population in Colorado follows the national trend. The Colorado Bighorn Sheep Management Plan (George et al., 2009) indicates that in the early 1990s bighorn sheep numbered approximately 7,230 and existed only in "isolated, remnant populations." By 1970

only about 2,200 remained (George et al., 2009). Following extensive translocation efforts in the 1970s and 1980s the statewide population grew to about 8,000 in 2001 but has since declined to an estimate of 7,485 (George et al., 2009; CPW).

Although past efforts of government agencies and conservation groups certainly brought bighorns back from the brink of extinction, bighorn populations have never significantly recovered, unlike other wild ungulates including deer and elk. In the western United States bighorns currently number less than 5% of their estimated historic population. The long-term sustainability of the species is uncertain, making them a sensitive species in the Rocky Mountain Region and a Species of Conservation Concern (SCC) in many national forests where they occur (USFS; Abeyta et al., 2017).

Current scientific consensus (based on more than 70 peer reviewed journal articles) is that the major threat and limiting factor to expanding bighorn populations is a respiratory disease complex caused by a combination of pathogens carried by domestic sheep and goats (TWS, 2015). While multiple bacterial species have been detected in the lungs of affected individuals, amassed evidence points to *Mycoplasma ovipneumoniae* as the primary causative agent of pneumonia epizootics in bighorn sheep (TWS, 2015)

Respiratory disease from pathogens transmitted from domestic sheep and goats has caused all-age die-offs and markedly reduced lamb recruitment in herds in Colorado and throughout the West (TWS, 2015; George et al., 2009). Reduced lamb recruitment can also occur in herds with low grade infection without suffering major die-offs (George et al., 2009). Thus, negative effects of a single disease event can last for decades in a herd, resulting in chronic decline or stagnation (Pils & Wilder, 2018). In addition, there is currently no effective vaccine or medical treatment available for domestic or wild sheep (Wehausen et al., 2011)— making removal of chronic carriers by capture and testing the only effective management strategy for infected herds. Capturing bighorns can cause mortality or compromised health, and the practice still leaves the healthy members of the herd at risk for another exposure (Kock et al., 1987).

Separation of bighorns from domestic sheep is the current foundation of science-based management efforts and necessary for full recovery of the species (Kamath et al., 2019). In Colorado, bighorn sheep are listed as a species of greatest conservation need in CPW's State Wildlife Action Plan (SWAP) (CPW, 2015). In addition, nearly all of the threats facing bighorns relate to pathogen transmission by livestock (CPW, 2015, Chapter 5 - Table 7). The current Western Association of Fish and Wildlife Agencies recommendations explain that the best protection for maintaining bighorn sheep herds is to maintain total spatial or temporal separation of domestic and bighorn sheep (WAFWA, 2012). Furthermore, the WAFWA guidelines recommend that, "Land management agencies that regulate or are responsible for domestic sheep or goat grazing allotments, trailing routes, vegetation management, use as pack stock, or any other uses involving domestic sheep or goats should only authorize such use(s) outside of occupied wild sheep range" (WAFWA 2012, p. 12). To get an idea of the scale of separation that is necessary, the guidelines recommend a minimum of 9 air miles of separation when considering buffer zones as a method of separation but recognizes that even this distance

is not always adequate for allowances for bighorn foray activities (WAFWA 2012, p. 14). In addition to bighorns entering domestic sheep allotments stray domestic sheep create a considerable risk of interaction with bighorns (WAFWA 2012, p.13), particularly in the late fall before the strays die in deep snow and while bighorn rams are spread out foraging.

## Purpose

Monitoring potential interactions between bighorn and domestic sheep is critical to managing public lands in Southwest Colorado to ensure the health of our bighorn populations. Although, the Colorado Bighorn Sheep Management Plan 2009-2019 acknowledged that, “Interaction between bighorn sheep (*Ovis canadensis*) and domestic sheep is a significant management issue for bighorn populations in Colorado” (George, 2009, p. 63), land management agencies lack the funding to effectively monitor these interactions. Furthermore, the USFS cited a lack of data in delaying their decision on the future of domestic livestock grazing in the Weminuche Wilderness (Simino, 2021).

The purpose of the Colorado Bighorn Sheep Monitoring Program (CBSMP) is to train and equip ‘citizen scientists’ to collect data that can help the U.S. Forest Service (USFS) and Colorado Parks and Wildlife (CPW) record observations of bighorn and domestic sheep in Colorado with an initial emphasis on the southwest corner of the state, especially the San Juan Mountains. This report highlights the program efforts and volunteer observations on the SJNF, RGNF, and GMUGNF.

## Method



Approximately 1,100 domestic sheep in a Bighorn Sheep Summer Range located in the USFS Bear Creek Domestic Sheep Allotment (Appendix A, 13). Photo taken by citizen scientists as part of the Colorado Bighorn Sheep Monitoring project.

Starting in 2018, MSI and partners have trained volunteer citizen scientists to submit observations of bighorn and domestic sheep to iNaturalist.org. Photos are linked with a time stamp and coordinates of where the photo was taken with the exception of some historic, pre-smart-phone observations that exist on iNaturalist. In addition to reporting sightings online, observers are asked to immediately report critical sightings (such as bighorns near domestic sheep) to the appropriate CPW wildlife

biologists. A trailhead sign with a contact number and information on how to submit observations is attached in Appendix C. This sign is from the SJNF but the same sign was used in the RGNF and GMUNF with the designated contact number for those regions. Though the program started in the San Juan Mountains, it is now state-wide. Study design, scope, and language (such as on trailhead signs) were developed with input and approval from CPW and USFS specialists to collect objective data.

*Agency Participation:*

SJNF, RGNF, the GMUGNF, and CPW have collaborated with the CBSMP and domestic sheep grazing advocates in developing agreeable, objective language for trailhead signs. FS partners have also contributed by printing and placing some of the trailhead signs. Please see Appendix B for additional information on where signs are installed, updated, or pending installment.

CPW is responsible for responding to critical sightings reported by volunteers. The trailhead signs list the phone numbers of the four regional CPW terrestrial biologists so that volunteers can immediately report critical sightings, such as bighorn sheep in proximity to domestic sheep.

*Non-Agency Participation:*

Volunteer groups including The Great Old Broads for Wilderness, particularly the Northern and Southern San Juan broadbands; BHA; and RMBS have partnered with MSI on the CBSMP. Since starting this program in 2018, MSI and our partners continue to recruit and train volunteers from the community. Volunteer training was held online in 2020 and 2021 due to Covid-19. An online training video was created and is publicly available at MSI's project landing page at [www.mountainstudies.org/bighorn](http://www.mountainstudies.org/bighorn). Additionally, general recreationalists are informed of the project and invited to participate by rack card flyers distributed at stores, events, and trailhead signs throughout the SJNF, RGNF, and part of the GMUGNF.

## Results

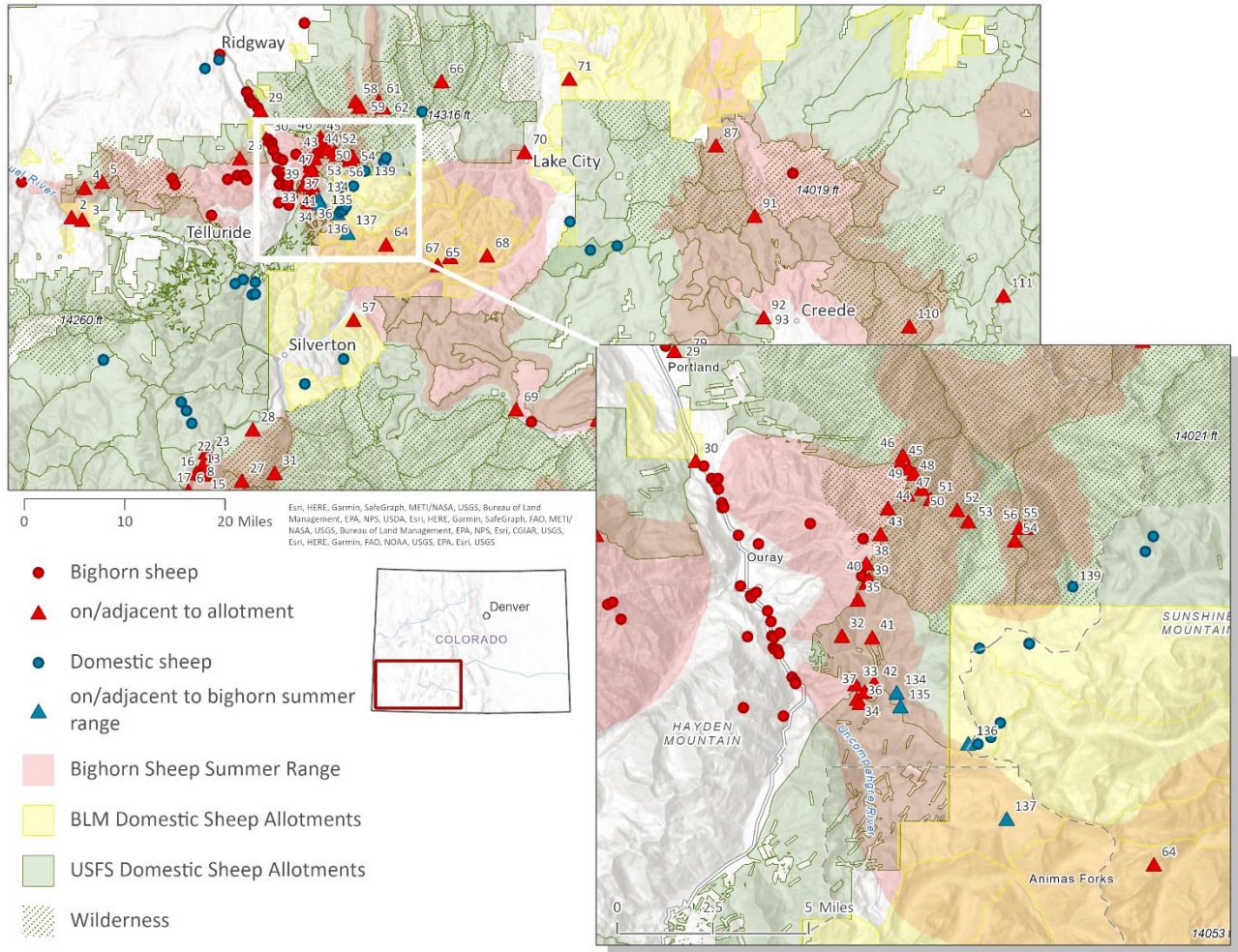
Observations, core bighorn ranges, grazing allotments, trail information, and public land types are available on an interactive map found at [www.mountainstudies.org/bighorn](http://www.mountainstudies.org/bighorn). While this map is updated periodically, all observations, updated in real time, are publicly available at iNaturalist.org under the “Colorado Bighorn Sheep Monitoring” project page. Results are also summarized and delivered to the public, regional districts, CPW, and project partners via this report.

While the CBSMP didn’t start until 2018, iNaturalist data exists prior to 2018, allowing us to include historic data in our study. As an iNaturalist project, all observations of bighorn sheep, domestic sheep, and domestic goats observed in the state of Colorado uploaded to iNaturalist are added to the CBSMP project. All included, the CBSMP project has had over 1,397 observers who have contributed more than 2,163 observations across Colorado. The number of observations has grown in recent years, as shown below in Table 1.

**Table 1.** CBSMP observations available on iNaturalist. This data was exported from iNaturalist on March 14, 2023. Eight observations were excluded due to absence of observation date information.

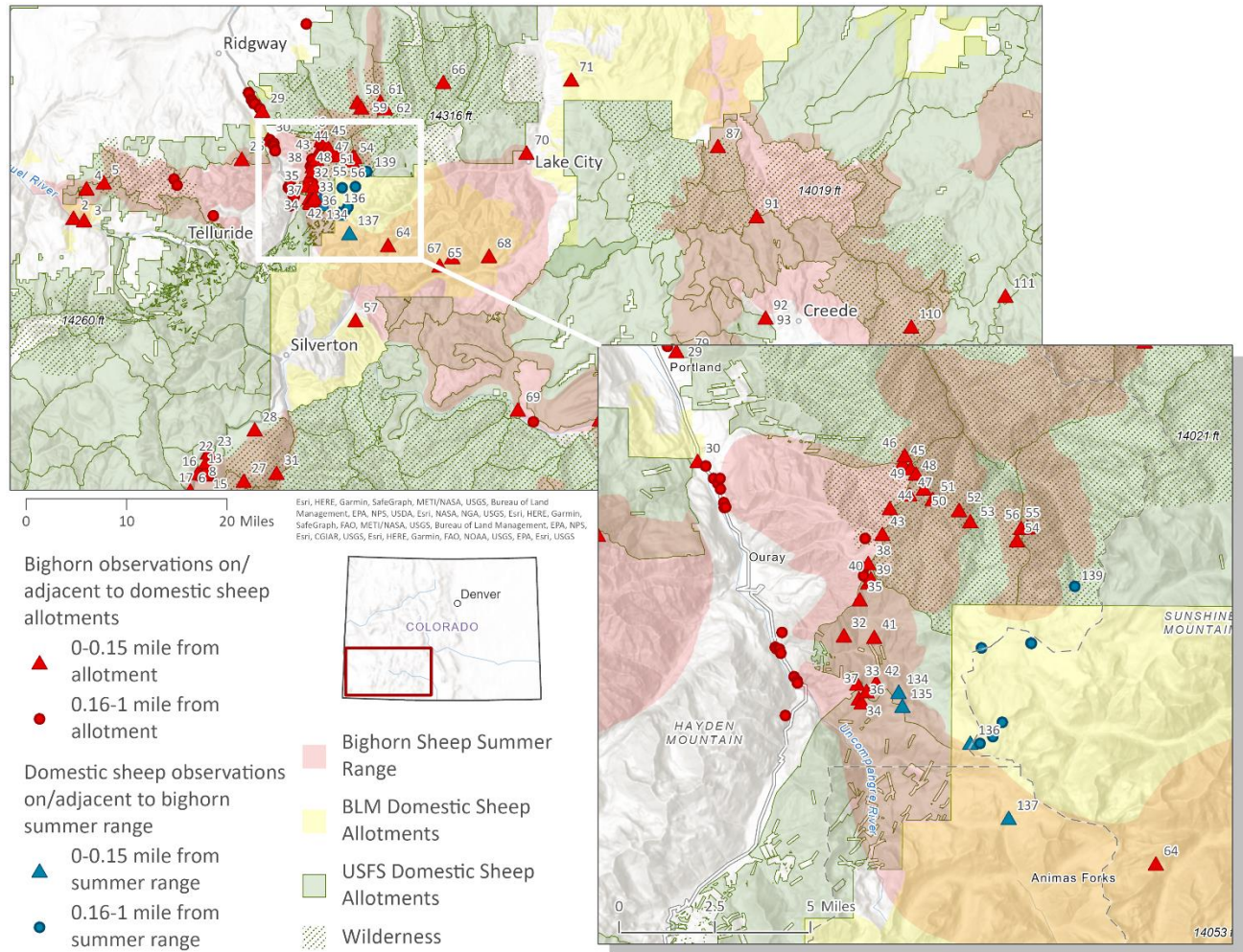
Year(s)	1971-2014	2015	2016	2017	2018	2019	2020	2021	2022	Total
All observations	196	49	83	103	179	254	311	405	400	1980
Observations in SW CO	8	1	5	6	15	30	56	80	47	248

This report focuses on the 248 observations made in southwest Colorado (bounded by latitude 38.2 and longitude -106.25). Observations are numbered in Figures 1 and 2 if they are determined to be significant. Significant observations include (1) bighorn sheep on or adjacent to (<0.15 mile) a domestic sheep allotment, (2) domestic sheep on bighorn summer range, or (3) a noteworthy observer comment (e.g. noting domestic sheep near bighorn sheep, stray domestic sheep, or foraging bighorn sheep). Bighorn forays are defined as “any short-term movement of an animal away from, and back to, its herd’s core home range” (Pils & Wilder, 2018, p. 6). Using these criteria, 139 observations were determined to be significant, numbered, and displayed in Appendix A.



**Figure 1.** Bighorn and domestic sheep observations in Southwest Colorado (248 in total). Significant observations are numbered from left to right. All numbered (significant) observations are detailed in Appendix A and shown alone in Figure 2. To view all Colorado observations on an interactive map visit [MountainStudies.org/Bighorn](https://MountainStudies.org/Bighorn) or see live updates at [iNaturalist.org/projects/colorado-bighorn-sheep-monitoring](https://iNaturalist.org/projects/colorado-bighorn-sheep-monitoring)





**Figure 2.** Significant and noteworthy bighorn and domestic sheep observations in Southwest Colorado (139 total). Significant observations include (1) bighorn sheep on or adjacent to (<0.15 mile) a domestic sheep allotment, (2) domestic sheep on bighorn summer range, or (3) a noteworthy observer comment. Other observations include bighorn sheep adjacent to (0.16-1 mile) domestic sheep allotments. Significant observations are numbered from left to right and are detailed in Appendix A. To view all Colorado observations on an interactive map visit [MountainStudies.org/Bighorn](https://MountainStudies.org/Bighorn) or see live updates at [iNaturalist.org/projects/colorado-bighorn-sheep-monitoring](https://iNaturalist.org/projects/colorado-bighorn-sheep-monitoring)

There are 23 observations of bighorn sheep in SW Colorado on or within 0.15 miles of an active domestic sheep allotment in 2022 (Table 2). Bear Creek, a USFS (GMUG) sheep and goat allotment in the Ouray Ranger District, has the most observations of bighorn sheep. The distribution of observations on Bear Creek allotment is shown in Figure 2. There are six additional noteworthy observations recorded in 2022. Four of these observations are in the Uncompahgre Wilderness within the boundaries of the USFS domestic sheep allotment (3 bighorn sheep, 1 domestic sheep), as well as two observations adjacent to this allotment. Approximately 1,100 grazing domestic sheep were observed on the Bear Creek allotment on August 29, 2022 (Appendix A, 13), falling in the middle of the dates of bighorn observations in/adjacent to the Bear Creek allotment. One noteworthy observation in 2022 includes a single foraging ram well outside CPW mapped range near Antelope Creek (Appendix A, 32).

Table 2. Bighorn sheep observed on or adjacent to active domestic sheep allotments in 2022 and total.

Management	Allotment	# of 2022 observations on or within 0.15 mile	All observations on or within 0.15 mile
Bureau of Land Management	Barkeley Draw Common	1	1
	Lee Lands	0	2
	Maggie Gulch	0	1
	Grizzly Gulch	0	1
	Lower Burrows	0	2
	Lake Fork	0	1
	Hellgate	0	1
	Red Cloud	0	1
	Tracy Common	0	1
Norwood Ranger District	Ruffner S&G	0	1
Columbine Ranger District	Cascade Reservoir	0	8
	Little Molas/West Needles	5	15
	Vallecito	0	1
	Johnson Creek	1	1
Ouray Ranger District	Corbett Creek C&H	1	2
	Baldy C&H	0	3
	Bear Creek S&G	4	8
	Miners Creek-Poughkeepsie S&G	1	2
	Green Mountain C&H	0	2
	Big Blue/Fall Creek/Little CIM	0	1
	Crystal Peak/Lower Elk S&G	0	1
Gunnison Ranger District	West Willow/Cebolla-Rough	0	1
	Mineral Creek	1	1
	West Fork	0	1
	East Fork San Juan River	2	5
Divide Ranger District	Crooked Creek	0	2
	Park	2	5

	Bristol	0	2
	Texas	0	1
	Shallow	1	1
	Wishbone	1	2
	Goose Creek	1	1
	Roaring Fork	1	1
	Blue Park	0	5
	Halfmoon-Monument	0	1
	Mesa	0	1
	Natural Arch	0	2
	La Garita	0	1
	Indianhead	1	1
	Canon	0	1
Conejos Peak Ranger District	Archuleta	0	1
	Platoro	0	1
	Alamosa	0	1
	Lake Fork	3	6
	Conejos Canyons	0	4
	Platoro	0	2

## Conclusions and Next Steps

Collected opportunistically by volunteers, these results represent a limited picture of bighorn and domestic sheep distribution and interactions. Even so, the significant observations highlight the importance of considering bighorn and domestic sheep interactions in determining science-based land use policy and management. Data show that bighorn sheep sometimes occupy domestic sheep grazing allotments and adjacent land. MSI recommends the USFS and BLM consider the data in this report and all available data in the suitability of grazing allotments.

MSI intends to continue expanding citizen scientist monitoring as it has proven effective in gathering useful data. Future efforts will involve placing and updating trailhead signs at trailheads including but not limited to those shown in Appendix B, further public outreach, and volunteer recruitment. MSI is currently in conversation with the Gunnison Field Office in pursuing participation from the BLM to expand signage to relevant BLM trailheads in Southwest Colorado and with the Ouray Ranger District in pursuing permission to expand signage in the Ouray Ranger District.

## References

- Abeyta, D., Christensen B., Huber A. (2017). Species at Risk Report. Ashley National Forest Assessment. Retrieved from [https://www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/fseprd564556.pdf](https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd564556.pdf)
- Colorado Parks and Wildlife (CPW). (n.d.). Rocky Mountain Bighorn Sheep. Retrieved from <https://cpw.state.co.us/bighorn>
- Colorado Parks and Wildlife (CPW). (2015). State Wildlife Action Plan. Retrieved from <https://cpw.state.co.us/aboutus/Pages/StateWildlifeActionPlan.aspx>
- Colorado Parks and Wildlife (CPW). (2022). Bighorn Sheep and Goat Data. Retrieved from [https://cpw.state.co.us/Documents/Commission/2023/January/Item.10-Bighorn\\_Sheep\\_and\\_Goat\\_data.pdf](https://cpw.state.co.us/Documents/Commission/2023/January/Item.10-Bighorn_Sheep_and_Goat_data.pdf)
- George, J. L. (Ed.). (2009). *Colorado Bighorn Sheep Management Plan 2009-2019*. Colorado Division of Wildlife, Department of Natural Resources. Retrieved from <https://cpw.state.co.us/Documents/WildlifeSpecies/Mammals/ColoradoBighornSheepManagementPlan2009-2019.pdf>
- Kamath, P. L., Manlove, K., Cassirer, E. F., Cross, P. C., & Besser, T. E. (2019). Genetic structure of *Mycoplasma ovipneumoniae* informs pathogen spillover dynamics between domestic and wild Caprinae in the western United States. *Scientific reports*, 9(1), 1-14. Retrieved from <https://doi.org/10.1038/s41598-019-51444-x>  
<https://www.nature.com/articles/s41598-019-51444-x>
- Kock, M. D., Jessup, D. A., Clark, R. K., Franti, C. E., & Weaver, R. A. (1987). Capture methods in five subspecies of free-ranging bighorn sheep: an evaluation of drop-net, drive-net, chemical immobilization and the net-gun. *Journal of Wildlife Diseases*, 23(4), 634-640.
- LaRoe, E. T. (Ed.). (1995). *Our living resources: a report to the nation on the distribution, abundance, and health of US plants, animals, and ecosystems*. Government Printing Office.
- Mountain Studies Institute. (n.d.). Colorado Bighorn Sheep Monitoring Resources. Retrieved from <https://www.mountainstudies.org/s/Sheep-pasture-rotations-2021.docx>
- Pils, A., Wilder, J., U.S. (2018). *Risk Analysis of Disease Transmission between Domestic Sheep and Goats and Rocky Mountain Bighorn Sheep*. United States Department of Agriculture, Forest Service. Retrieved from [https://www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/fseprd592628.pdf](https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd592628.pdf)
- Simino, J. (2021). Weminuche EIS Response . Columbine Ranger District File Code: 1950. November 5, 2021.
- The Wildlife Society (TWS). (2014). Fact Sheet, Impacts of Disease on Bighorn Sheep Management. Retrieved from [http://wildlife.org/wp-content/uploads/2014/11/TWS\\_FactSheet\\_BighornSheep\\_FINAL\\_2014.11.13.pdf](http://wildlife.org/wp-content/uploads/2014/11/TWS_FactSheet_BighornSheep_FINAL_2014.11.13.pdf)
- The Wildlife Society and American Association of Wildlife Veterinarians Joint Issue Statement. (2015). *Domestic Sheep and Goats Disease Transmission Risk to Wild Sheep*. Retrieved from [http://wildlife.org/wp-content/uploads/2015/03/WS-DS\\_DiseaseTransmission\\_TWS-AAWV\\_JointStatement\\_APPROVED.pdf](http://wildlife.org/wp-content/uploads/2015/03/WS-DS_DiseaseTransmission_TWS-AAWV_JointStatement_APPROVED.pdf)
- U.S. Forest Service. (n.d.). *Sensitive Species List*. Region 2 - land & resource management. Retrieved from <https://www.fs.usda.gov/detail/r2/landmanagement/?cid=stelprdb5390116>
- Wehausen, J. D., Kelley, S. T., & Ramey, R. R. (2011). Domestic sheep, bighorn sheep, and respiratory disease: a review of the experimental evidence. *California Fish and Game*, 97(1), 7-24.
- Western Association of Fish and Wildlife Agency (WAFWA). (2012). *Recommendations for Domestic Sheep and Goat Management in Wild Sheep Habitat*. Retrieved from [https://www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/stelprdb5385708.pdf](https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5385708.pdf)

### Appendix A

**Appendix A:** Significant observations in SW Colorado belong to one of three categories. (1) Bighorn sheep on or adjacent to (<1 mile) an active domestic sheep allotment (highlighted pink), (2) domestic sheep on bighorn summer range (highlighted blue), and (3) bighorn sheep on or adjacent to (<1 mile) to a vacant domestic sheep allotment. Two noteworthy observations outside of SW Colorado limits are included. For ease of view, 2022 sightings are in bold.

ID on Map	Date	Species	Allotment Details	Observer Comments
<b>1</b>	<b>9/26/2022</b>	<b>Bighorn Sheep</b>	<b>Barkeley Draw Common</b>	<b>Observed on south side of Naturita Canyon near Redvale, CO.</b>
2	3/18/2016	Bighorn Sheep		The female bighorn sheep was grazing between the road and the side of the mountain.
3	4/23/2020	Bighorn Sheep		
4	7/12/2020	Bighorn Sheep	RUFFNER S&G	A single bighorn sheep near a band of domestic sheep and one domestic goat. Location is within the boundary of the USFS Ruffner domestic sheep grazing allotment.
5	9/30/2020	Bighorn Sheep		I was on Whipple Mtn, bighorn on ridge about .75 mi north. Pic under exposed and poor res - appears darker than thru binocs.
6	8/15/2021	Bighorn Sheep	CASCADE RESERVOIR	
7	10/7/2021	Bighorn Sheep	CASCADE RESERVOIR	
8	10/10/2018	Bighorn Sheep	CASCADE RESERVOIR	
9	10/7/2021	Bighorn Sheep	CASCADE RESERVOIR	
10	10/7/2021	Bighorn Sheep	CASCADE RESERVOIR	
11	10/7/2021	Bighorn Sheep	CASCADE RESERVOIR	
12	10/7/2021	Bighorn Sheep	CASCADE RESERVOIR	
13	5/20/2017	Bighorn Sheep	CASCADE RESERVOIR	
14	9/1/2020	Bighorn Sheep	LITTLE MOLAS/WEST NEEDLES	
15	9/1/2020	Bighorn Sheep	LITTLE MOLAS/WEST NEEDLES	Around mile mark 55 on 550

16	9/15/2021	Bighorn Sheep	LITTLE MOLAS/WEST NEEDLES	
17	4/11/2022	<b>Bighorn Sheep</b>	<b>LITTLE MOLAS/WEST NEEDLES</b>	
18	4/21/2017	Bighorn Sheep	LITTLE MOLAS/WEST NEEDLES	Three rams licking chemicals/salt from highway surface.
19	8/18/2022	<b>Bighorn Sheep</b>	<b>LITTLE MOLAS/WEST NEEDLES</b>	
20	3/31/2022	<b>Bighorn Sheep</b>	<b>LITTLE MOLAS/WEST NEEDLES</b>	<b>Three rams along Hwy 550 near Coal Bank Pass.</b>
21	8/22/2017	Bighorn Sheep	LITTLE MOLAS/WEST NEEDLES	
22	9/13/2018	Bighorn Sheep	LITTLE MOLAS/WEST NEEDLES	One ram slightly south of the Coalbank summit.
23	9/1/2020	Bighorn Sheep	LITTLE MOLAS/WEST NEEDLES	
24	9/1/2020	Bighorn Sheep	LITTLE MOLAS/WEST NEEDLES	
25	8/13/2022	<b>Bighorn Sheep</b>	<b>LITTLE MOLAS/WEST NEEDLES</b>	<b>Observed crossing US 550 while driving southbound south of coalbank.</b>
26	7/23/2021	Bighorn Sheep		14 ewes/lambs observed 7/23 morning. Likely the entire herd. No domestics nearby.
27	10/23/2020	Bighorn Sheep	LITTLE MOLAS/WEST NEEDLES	I saw two female bighorn sheep today on top of N Twilight Peak in the south San Juan Mountains, CO.
28	10/8/2021	Bighorn Sheep	LITTLE MOLAS/WEST NEEDLES	

29	3/27/2019	Bighorn Sheep		
30	12/31/2022	Bighorn Sheep		2 rams, 2 female bighorn in Cty Rd 14 at 11:30 this morning. Very nonchalant about cars and appeared to be eating salt in road
31	4/23/2022	Bighorn Sheep	LITTLE MOLAS/WEST NEEDLES	
32	9/28/2022	Bighorn Sheep	BEAR CREEK S&G	Watched from 7-8am from Hayden Trail; 7 individuals north of Bear Creek; exact location is questionable as my photograph and where I thought I observed the BH doesn't match satellite image.
33	6/28/2022	Bighorn Sheep		Viewed through spotting scope from Hayden Trail. Able to count 8 ewes and 3 lambs.
34	7/8/2021	Bighorn Sheep	MINERS CREEK-POUGHKEEPSIE S&G	Ewes and lambs, total of 9 individuals. Were still present next morning, 7/9/21.
35	7/10/2021	Bighorn Sheep	BEAR CREEK S&G	2 rams, both about the same horn size. Observed from 1.5 mi away. They were meandering northward and were not visible the next morning.
36	9/27/2022	Bighorn Sheep	MINERS CREEK-POUGHKEEPSIE S&G	Observed from 7-11am from Hayden Trail as (what I witnessed in binoculars was 9 individuals/possibly 2 lambs, but photos reveal only) 6 individuals made their way to top of knoll. In case you aren't convinced the shiny white spots are bighorn, I have included a photo of some individuals silhouetted on ridgeline
37	7/21/2022	Bighorn Sheep	BEAR CREEK S&G	Eleven ewes with eight lambs.
38	9/11/2021	Bighorn Sheep		11 ewes and lambs. No domestics nearby.
39	7/23/2021	Bighorn Sheep	BEAR CREEK S&G	Single ewe bedded on ridgetop between Portland Creek drainage and subbasin of Bear Creek drainage. Unclear if she was associated with herd of 15 feeding in Portland Creek basin.
40	9/10/2021	Bighorn Sheep	BEAR CREEK S&G	5 ewes. No domestics nearby.
41	9/26/2022	Bighorn Sheep	BEAR CREEK S&G	Likely 6 individuals one of which is lamb based upon behavior. Viewed from Hayden Trail.
42	7/10/2021	Bighorn Sheep	BEAR CREEK S&G	Ewes and lambs, total of 16 counted on 7/10 evening but they were moving quickly and the entire herd was never visible at once. The next morning 7/11 I was able to see the entire herd out feeding, and then counted 18 individuals. I suspect some of these 18 were the 9 I saw on the south face of the same ridge two days earlier, but if so they definitely picked up some individuals that were not visible 7/8-7/9 (I had excellent views of the entire face they were on 7/8-9). The individuals seen on 7/10-11 were moving from west to east. Pic above is digiscoped through an 80x spotting scope at roughly 1.25 mi. I was at ~12,500' on top of ridge between Horsethief and Bear Creek Trails.
43	9/4/2021	Bighorn Sheep	BIGHORN S&G	4 ewes. No domestics nearby.
44	8/28/2022	Bighorn Sheep		4 ewes; 1 lamb @ ~12,500 ft west of ridge at top of Disappointment Gulch; north of 12,714ft peak. Watched from noon until 13:00. No collars.

45	9/6/2020	Bighorn Sheep	BALDY C&H	About half of a herd of approximately 30 ewes and lambs along the Difficulty Creek Trail (#214). The herd split and the other half went downhill.
46	7/30/2021	Bighorn Sheep	BALDY C&H	5 ewes and lambs, moving south and eventually to same pasture as nearby large herd but they did not end up joining that herd, as best I could tell. No domestics nearby that I could see.
47	6/26/2020	Bighorn Sheep	BIGHORN S&G	
48	7/23/2021	Bighorn Sheep		herd of 19 lambs and ewes observed on 7/23 morning, still present in same location 7/24 morning. No domestics nearby, and specifically no domestics in the Dexter Creek upper basin from 7/23 noon to 7/24 11am.
49	7/30/2021	Bighorn Sheep	BIGHORN S&G	15 ewes and lambs, in the exact same spot I saw 15 ewes and lambs on 7/23. No domestics nearby.
50	8/27/2022	<b>Bighorn Sheep</b>	<b>BIGHORN S&amp;G</b>	<b>12 individuals total with 3 lambs. Watched from 17:00 to 18:00 as they moved uphill. I have seen BH in this location two other summers.</b>
51	6/26/2020	Bighorn Sheep	BIGHORN S&G	
52	7/31/2021	Bighorn Sheep	BIGHORN S&G	8 ewes/lambs. Possibly part of the same group as the 4 ewes I saw slightly downslope in this same general area the night before. No domestics nearby.
53	7/30/2021	Bighorn Sheep	BIGHORN S&G	4 ewes. No domestics nearby.
54	7/10/2021	Bighorn Sheep	BIGHORN S&G	Ewes and lambs, total of 12 individuals at least, possibly more. I was ~2.8 mi away and they were blending in well with mostly bare rock, so it was hard to be certain I had entire herd in view at any one time. I should also say it would have been hard to distinguish a small ram from a ewe, but the size of the herd and the presence of some lamb-size small individuals (at least 2) strongly suggested a female group. They were meandering slowly toward north. I could not see them next morning (staring into sun glare).
55	7/31/2021	Bighorn Sheep	MIDDLE FORK-WETTERHORN S&G	12 ewes/lambs, presumably same herd seen the morning before. They had moved slightly upslope and appeared to be about to move over the ridge into Wildhorse Creek drainage area. As of 7/30 evening, there was a herd of domestic sheep about 1.5 miles away in the upper Cow Creek drainage. These bighorns appeared to be moving out of the Cow Creek drainage into the Wildhorse Drainage, away from the domestics. Also they were far above the domestics in terms of elevation and did not seem in imminent danger of coming into contact. Also there was quite a bit of habitat relatively inhospitable to domestics - very little of the Middle Canyon or Blackwall Mountain area is likely to be good for domestics.
56	7/30/2021	Bighorn Sheep	MIDDLE FORK-WETTERHORN S&G	7ewes/lambs. Presumably part of the same group as seen on same face 7/31 morning. Domestic sheep herd seen 7/30 evening, about 1.5 miles away in upper Cow Creek.
57	6/27/2021	Bighorn Sheep	Maggie Gulch	Saw two crossing the road
58	7/20/2020	Bighorn Sheep	GREEN MOUNTAIN C&H	
59	7/20/2020	Bighorn Sheep	GREEN MOUNTAIN C&H	



60	11/23/2021	Bighorn Sheep	VALLECITO	Carcass of mature bighorn ram found next to Vallecito Reservoir shoreline on November 17, 2021. Left horn was freshly broken off approximately 2 inches from skull. Ram may have been hit by car on CR 501 and ran to shoreline before expiring.
61	9/5/2021	Bighorn Sheep	MIDDLE FORK-WETTERHORN S&G	9 ewes. Nearest domestics to my knowledge at the time would be one basin east (East Fork Basin) and the domestics were heading further away/east into Fall Creek basin.
62	8/19/2020	Bighorn Sheep	MIDDLE FORK-WETTERHORN S&G	3 Bighorn rams NE flank of Mount Redcliff west of Middle Fork Cimarron Creek at approx 11,500 elevation moving uphill
63	8/31/2022	Bighorn Sheep	JOHNSON CREEK	<b>I only saw one sheep. It was the heavily wooded area just south of the creek crossing at mile 7 along Vallecito. Because of the woods, I couldn't see if there was more than one. The one I saw was definitely not a big Billy. I tried to get a photo but it slipped away into the trees.</b>  <b>But there were tons of tracks along the trail, going in both directions, for about 1/2 a mile south of the creek crossing in the west side of the creek (Amherst Mountain side). I didn't cross the creek so I don't know if there were tracks on the other side.</b>
64	7/13/2016	Bighorn Sheep	Grizzly Gulch	
65	8/10/2016	Bighorn Sheep	Lower Burrows	
66	7/30/2020	Bighorn Sheep	BIG BLUE/FALL CREEK/LITTLE CIM	
67	6/29/2013	Bighorn Sheep	Red Cloud	Herd of 6 below us on ridge, 13,000', 10 AM, storm approaching
68	7/13/2020	Bighorn Sheep	Lower Burrows	
69	9/26/2018	Bighorn Sheep	CANON	11 Ewes and 8 kids
70	5/25/2020	Bighorn Sheep		
71	8/3/2021	Bighorn Sheep	Lake Fork	
72	7/18/2018	Bighorn Sheep	HOSSICK CANYON/MIDDLE FORK	Sheep are on the W side of the Hossick Lake cirque approx 200m from camera.
73	7/17/2018	Bighorn Sheep	HOSSICK CANYON/MIDDLE FORK	Sheep are on the crag approximately 200m NW of Hossick Lake.
74	7/17/2018	Bighorn Sheep	HOSSICK CANYON/MIDDLE FORK	Sheep are on the crag approximately 200m NW of Hossick Lake.
75	7/17/2018	Bighorn Sheep	HOSSICK CANYON/MIDDLE FORK	Sheep are on the crag approximately 200m NW of Hossick Lake.
76	6/12/2019	Bighorn Sheep		10 rams
77	5/28/2019	Bighorn Sheep	CROOKED CREEK	

78	8/3/2022	Bighorn Sheep	HOSSICK CANYON/MIDDLE FORK	Bighorn sheep near the summit of Sugarloaf mountain in Weiminuche wilderness.
79	6/30/2012	Bighorn Sheep	PARK	
80	2/3/2021	Bighorn Sheep		
81	3/13/2022	Bighorn Sheep	PARK	
82	10/3/2021	Bighorn Sheep	PARK	
83	8/29/2018	Bighorn Sheep	BRISTOL	
84	11/11/2020	Bighorn Sheep	TEXAS	
85	9/30/2020	Bighorn Sheep	BRISTOL	
86	5/11/2022	Bighorn Sheep		
87	10/29/2022	Bighorn Sheep	MINERAL CREEK	
88	7/22/2019	Bighorn Sheep	DEADMAN TURKEY	At top of Fourmile Falls - This is the best I can do on the location since my camera had GPS encoding off.
89	8/26/2018	Bighorn Sheep	DEADMAN TURKEY	
90	5/23/2022	Bighorn Sheep		
91	7/30/2020	Bighorn Sheep		6 active bighorn sheep bedding sites with scat.
92	10/11/2014	Bighorn Sheep		
93	10/11/2014	Bighorn Sheep		
94	9/29/2022	Bighorn Sheep	SHEEP MOUNTAIN	
95	3/28/2021	Bighorn Sheep	WEST FORK	
96	5/24/2019	Bighorn Sheep	EAST FORK SAN JUAN RIVER	
97	5/4/2018	Bighorn Sheep	SHEEP MOUNTAIN	3 bighorn sheep on Wolfcteeek Pass.
98	5/24/2019	Bighorn Sheep	EAST FORK SAN JUAN RIVER	4 individuals, one was tagged
99	4/10/2022	Bighorn Sheep	EAST FORK SAN JUAN RIVER	
100	4/29/2020	Bighorn Sheep	EAST FORK SAN JUAN RIVER	Big Horn Sheep grazing on a hillside below Wolf Creek Pass
101	10/8/2022	Bighorn Sheep	GOOSE CREEK	
102	5/27/2019	Bighorn Sheep	SHEEP MOUNTAIN	
103	1/6/2022	Bighorn Sheep	EAST FORK SAN JUAN RIVER	
104	11/3/2021	Bighorn Sheep	ROARING FORK	
105	8/12/2019	Bighorn Sheep	BLUE PARK	Six bighorns: 3 ewes, 2 yearlings, 1 lamb.
106	7/9/2019	Bighorn Sheep	BLUE PARK	9 ewes and one lamb near top of ridge between Spring Gulch and Bellows Creek, as viewed from Pooltable Road.
107	1/22/2021	Bighorn Sheep		Herd of 18+
108	8/4/2020	Bighorn Sheep	BLUE PARK	
109	11/15/2019	Bighorn Sheep	BLUE PARK	

110	8/9/2012	Bighorn Sheep	HALFMOON-MONUMENT	
111	7/25/2012	Bighorn Sheep	MESA	
112	8/14/2021	Bighorn Sheep	ARCHULETA	
113	6/13/2021	Bighorn Sheep	PLATORO	2 full grown big horn sheep with 3 lambs i believe
114	6/2/2020	Bighorn Sheep	ALAMOSA	
115	4/29/2022	<b>Bighorn Sheep</b>	<b>LAKE FORK</b>	
116	5/8/2022	<b>Bighorn Sheep</b>	<b>LAKE FORK</b>	
117	5/31/2019	Bighorn Sheep	LAKE FORK	saw 14 sheep total, 4 were rams. some of the rams had full curls on horns. all looked very healthy. at South Fork of Conejos trailhead on Rio Grande National Forest.
118	5/20/2022	<b>Bighorn Sheep</b>	<b>LAKE FORK</b>	
119	7/19/2018	Bighorn Sheep	LAKE FORK	
120	10/3/2019	Bighorn Sheep	LAKE FORK	
121	8/29/2018	Bighorn Sheep	CONEJOS CANYON	5 adults, 5 babies
122	10/3/2019	Bighorn Sheep	CONEJOS CANYON	
123	5/26/2021	Bighorn Sheep	BANCOS	
124	5/24/2021	Bighorn Sheep	CONEJOS CANYON	
125	5/23/2020	Bighorn Sheep	CONEJOS CANYON	13 total. 4 rams.
126	7/29/2010	Bighorn Sheep	PLATORO	Photo shows one of the ewes. I did see 3 ewes 3 lambs and 1 unknown on this ridge with spotting scope.
127	4/3/2019	Bighorn Sheep	NATURAL ARCH	Seen from 2+ miles with spotting scope.
128	4/3/2019	Bighorn Sheep	NATURAL ARCH	
129	11/25/2019	Bighorn Sheep		6 rams 6 ewes 5 lambs seen
130	6/1/2022	<b>Bighorn Sheep</b>	<b>INDIANHEAD</b>	<b>Not the best photo. 5 bighorn sheep rams seen.</b>
131	7/4/2019	Bighorn Sheep	Hellgate	Up atop the Hell's Gate formation. There were 7 total in this family group.
132	7/3/2021	Bighorn Sheep		5 rams
133	11/25/2019	Bighorn Sheep	Tracy Common	
134	8/29/2022	<b>Domestic Sheep</b>		<b>West slope of South Fork Bear Creek. Band of ~1100 sheep covering entire slope and onto ridge</b>
135	8/31/2020	Domestic Sheep		Domestic sheep herd about 2 mi nw of Oh Point, above S Fork Bear Creek. Herd started at top of ridge but then moved down into trees above creek. I was 1 mile se of herd
136	8/5/2021	Domestic Sheep		Herd of several hundred domestic sheep, grazing just below Odom Pt. Herders tent in upper right. Pic taken from approx 1/2 mi away.
137	8/31/2020	Domestic Sheep		Domestic sheep along Engineer Pass Rd, on slope below Horseshoe Lake.
138	7/28/2020	Domestic Sheep		

139	7/30/2021	Domestic Sheep	<p>Herd of domestic sheep seen in this patch of trees in upper Cow Creek. Herd was clearly on the west side of the drainage. I saw dozens of individuals but did not have entirety of herd in view. Movement seemed to be minimally upslope (to the west/northwest) and minimally downcanyon (to the north/northwest). The herd was not visible 7/31 morning, but I was in a slightly different location that afforded me an even more obstructed view of the patch of trees they were in. This location puts them 1.5 miles from a group of 12 bighorns on the uppermost slopes of the northernmost part of the Blackwall Mountain ridge (these bighorns were moving from Cow Creek side of Blackwall Mtn to the Wildhorse Creek side).</p>
-----	-----------	----------------	--

## Appendix B

**Appendix B:** Trailhead sign status in CPW contact areas (Durango, Monte Vista, Montrose, and Gunnison).

Trailhead	Status	Updated
<b>Durango Area</b>		
<b><u>Columbine RD San Juan NF Sign Locations:</u></b>		
1. Molas Pass Colorado Trail TH	2021 sign	9/3/2021
2. Andrews Lake Crater Lake Trail TH	2021 sign	9/3/2021
3. Purgatory Flats Trail TH	2021 sign	9/3/2021
4. Elk Creek Trail TH at train tracks	2021 sign	9/12/2021
5. Needle Creek Trail TH at train tracks	2018 sign - needs to be updated	
6. Missionary Ridge Lime Mesa Trail TH	2018 sign - needs to be updated	
7. Lemon Reservoir Endlich Mesa Trail TH	2018 sign - needs to be updated	
8. Lemon Reservoir Transfer Park TH	2021 sign	9/2/2021
9. Vallecito Reservoir Pine River Trail TH	2021 sign	9/2/2021
10. Vallecito Reservoir Vallecito Creek Trail TH	2021 sign	9/2/2021
11. Vallecito Reservoir East Creek TH?	2021 sign	9/2/2021
12. Middle Mountain Cave Basin Trail TH	2021 sign	9/2/2021
13. Middle Mountain end of road at Tuckerville	2021 sign	9/2/2021
14. Bayfield Office Front Desk	2018 sign - needs to be updated	
15. Durango PLC Front Desk	2018 sign - needs to be updated	
<b><u>Expanded Coverage:</u></b>		
Little Molas CG and Colorado Trail TH	No sign	
Ice Lake Basin TH	No sign	
La Plata Canyon Kenebec Pass TH	No sign	
Hermosa Creek Lower Hermosa TH	No sign	
Little Sand Trail? (591)	No Sign	7/15/2021
Poison Park Trailhead	Yes	7/15/2021
Middle Fork of the Piedra	Yes	7/15/2021
<b>Monte Vista Area</b>		
<b><u>Conejos Peak RD Trailheads:</u></b>		
Red Lake TH	2018 Old Sign	8/30/2021
Chama Basin	Yes	9/16/2021
Treasure Creek	Unknown	
Elk Creek TH	Yes	9/16/2021
Three Forks	Unknown	
South Fork Conejos	Unknown	
Twin Lakes	Unknown	
Tobacco Lake	Unknown	
Conejos Peak	Unknown	
Adams Fork	Unknown	
Crater Lake	<b>Unknown</b>	
CDNST	Yes	9/16/2021
<b><u>Conejos Area:</u></b>		
Ruybalid Trail	No sign	
South Fork of the Conejos TH	No sign	
Duck Creek TH	No sign	
Crater Lake TH	No sign	

Summit Peak TH (Treasure Creek)	No sign	
Los Pinos TH	No sign	
<b>Additional Trails per Dale Gomez:</b>		
Hope Creek Trailhead	2021 Sign	7/10/2021
Ivy Creek Trailhead	2021 Sign	7/10/2021
Hanson's Mill Trailhead (leading to Wheller Monument)	2021 Sign	7/10/2021
<b>Creede Area:</b>		
Pole Creek TH, trail# 820	No sign	
Lost Trail TH, trail# 821	No sign	
Spring Creek TH, road #547	No sign	
Carson TH, road# 518	No sign	
Bristol Head TH, road# 532	No sign	
Miners Creek TH, road# 803	No sign	
Rat Creek TH, road# 505	No sign	
West Willow TH at Equity mine, road# 503	No sign	
<b>Kiosks:</b>		
Alamosa Canyon	Unknown	
Conejos Canyon	Unknown	
<b>Trailhead</b>	<b>Status</b>	<b>Updated</b>
<b>Montrose Area</b>		
<b>Ouray District Trailheads:</b>		
1. Dexter Creek TH (CO 14)	2021 sign-metal	8/2022
2. Horsethief TH (CO 14)	2021 sign-metal	8/2022
3. Cutler Creek TH (CO 14A)	2021 sign-metal	8/2022
4) Courthouse Trail (Cow Creek Rd)	2021 sign-metal (sign removed)	8/2022
5) Stealey Mtn TH (Cow Creek Rd)	2021 sign-metal (sign missing)	8/2022
6) Cow Creek TH (Cow Creek Rd)	2021 sign-metal (sign broken)	8/2022
7) Bear Creek trailhead (Hwy 550)	2021 sign-metal	8/2022
8) Base of Engineer Pass Road (Hwy 550)	2021 sign-metal	8/2022
9) Wetterhorn Basin TH (End of W Fork Rd)	2021 sign-metal	8/2022
10) West Fork of the Cimarron	2021 sign-metal	8/2022
11) Middle Fork of the Cimarron	2021 sign-metal (sign missing)	8/2022
<b>Norwood District Trailheads:</b>		
1) Whipple Mtn TH off of Last Dollar Road (near the high point)	2021 sign-metal	9/3/2021
2) Deep Creek/Whipple Mtn TH off of Last Dollar Road (parking area, just north of the airport)	2021 sign-metal	9/3/2021
3) Eider Creek TH off of CR617 (Mill Creek Rd)	2021 sign-metal	9/3/2021
4) Deep Creek TH off of CR617 (Mill Creek Rd)	2021 sign-metal	9/3/2021
5) Jud Wiebe TH off of Aspen St in Telluride	2021 sign-metal	9/3/2021
<b>Gunnison Area</b>		
<b>BLM Potential Sign Locations:</b>		
Continental Divide Stony Pass CDT TH	No Sign - Awaiting Approval	
Cunningham Gulch Highland Mary Lakes TH	No Sign - Awaiting Approval	


### Appendix C

Appendix C: A trailhead sign in the San Juan National Forest.



## Citizen Science—You Can Help





## Share Your Observations!



Please report any sightings of bighorn sheep, especially if near domestic sheep, to CO Parks & Wildlife at 970.375.6714. Provide exact location and photos if possible. Upload photos to the free iNaturalist app or to iNaturalist.org.



Detailed observation instructions



For more info



Tip: Take a photo of this sign to keep the information