

Teton Range Bighorn Sheep Working Group

RECOMMENDATIONS FROM THE TETON BIGHORN SHEEP AND
WINTER RECREATION COMMUNITY COLLABORATIVE LEARNING
PROCESS

Teton Range Bighorn Sheep and Winter Recreation Strategy



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EXECUTIVE SUMMARY

Bighorn sheep have occupied the Teton Mountain Range for thousands of years, but today this native population is small, isolated from other nearby populations, and at risk of local extinction. Management of the herd and its habitat is coordinated between Grand Teton National Park (GRTE), Wyoming Game and Fish Department (WGFD), Bridger-Teton National Forest (BTNF), and Caribou-Targhee National Forest (CTNF). The interagency Teton Range Bighorn Sheep Working Group was formed in the early 1990s to coordinate management and has been cooperatively working to conserve this population for three decades, through implementation of a strategic plan developed in 1996 ([TRBSWG 1996](#)). Together, the agencies have addressed several pressing issues for the population, including implementing habitat treatments, research, population monitoring, and mitigating disease risk. In addition to these issues, one of the top concerns identified in the strategic plan was the population's limited amount of winter habitat due to the historical loss of low-elevation winter range and migration routes. The Working Group has been particularly concerned about impacts of human disturbance on winter ranges for years and partnered with the University of Wyoming to conduct a research project from 2008-2010 to investigate this issue. Bighorn sheep avoided areas of winter recreation, even if those areas were otherwise relatively high-quality habitat ([Courtemanch 2014](#)). Avoidance behavior resulted in up to a 30% reduction in available high-quality habitat for some individuals. Individual bighorn sheep exposed to high levels of recreation exhibited increased daily movement rates and home range sizes compared to sheep exposed to low or no recreation. As winter backcountry recreation has increased in the Tetons, its impacts to bighorn sheep have grown.

In the fall of 2017, the Working Group began considering how to apply the results of this research to management of bighorn sheep in the Tetons. To aid in framing the issue and developing an outreach strategy, the Working Group contracted Resource Media (Kalispell, MT) who recommended a bottom-up, community-driven process to address this issue, instead of beginning with a traditional top-down government process. This recommendation was due to the clear indication that winter recreation in the Tetons holds deep emotional value for many people in the community, and that community engagement in the conversation was vital. Over nearly two years, the Working Group met with 80 community members in one-on-one or small group conversations on both sides of the range to learn their perspectives and interest in participating in a community-driven process. To engage the broader community on this topic, the Working Group planned a collaborative learning process that was open to all community members and integrated the following key elements into the design: shared learning, transparency, and collaborative development of community-supported solutions that meet agency policies.

The Working Group held five collaborative public workshops from February - June 2020. Three workshops were in-person and the last two were virtual due to state and federal social distancing guidelines related to the COVID-19 pandemic. One-hundred-fifty-eight individuals participated in at least one meeting, with 30% attending two or more of the in-person

meetings. The workshops included information-sharing from the Working Group and local experts on backcountry skiing as well as facilitated small group discussion and brainstorming on potential solutions. Participants were asked to come up with creative solutions and compromise for ways to maintain excellent recreation opportunities and a thriving bighorn sheep population. While specific areas of compromise on various solutions was hard to come by as part of this process, participants provided a wealth of information on specific high value areas for recreation, which totaled 57,266 acres. The Working Group combined this information with bighorn sheep biological data to form the basis for their recommendations. The Working Group met more than 25 times from July 2020 – September 2021 to intensively summarize, map, deliberate, prioritize, and craft recommendations that took into account all of the information shared during the collaborative process. The Working Group paid special attention to areas where bighorn sheep winter habitat overlapped with high value ski terrain and attempted to carve out solutions that balanced the two needs. This report aims to present a list of recommended management actions in a transparent and clear manner.

Through the collaborative process, the community identified 57,266 acres of high-value backcountry ski terrain in the Teton Range. A total of 45,278 acres of high-quality bighorn sheep winter habitat was mapped during previous research ([Courtemanch 2014](#)). Currently, 3% of this habitat is protected from human disturbance in the winter (two winter closures in GRTE). Bighorn sheep winter habitat is distributed across GRTE (79%), CTNF (16%), and BTNF (5%).

The public collaborative workshops produced a list of 202 ideas of potential solutions. The Working Group combined, packaged, and ranked these ideas into 68 potential management actions, which are outlined in this report. Scoring and ranking each action was based on its anticipated benefit to bighorn sheep and feasibility of implementation. Actions that were of high benefit to bighorn sheep and high feasibility received the highest scores. The actions were then grouped by management jurisdiction (GRTE, BTNF, CTNF, and non-geographical which would be implemented range-wide) and categorized as high, moderate, or low priority. The Working Group is recommending that the agencies consider moving forward with the high and moderate priorities, which total 62 management actions (some include multiple options to choose from for the same area). Some of the management actions span multiple jurisdictional boundaries. The specific recommended actions are detailed in this report and include increased public outreach and education, signage, enhanced monitoring of bighorn sheep and human use, habitat treatments with prescribed fire and wildland fire, new or expanded winter closures in some areas, areas to maintain current recreational access, designated travel routes, a citizen science project to help collect data, and experimental actions followed up with intensive monitoring.

Overall, implementing the recommended high and moderate priority management actions would result in 21,233 acres of new bighorn sheep winter habitat protections in the Teton Range (47% of winter habitat). Forty-seven percent (16,952 acres) of the high-quality habitat in GRTE would be protected, 49% (3,478 acres) on CTNF, and 38% (803 acres) on BTNF. Of these areas, 2,833 acres overlap with areas that were identified as high value ski terrain during the public collaborative process. Therefore, 5% of high value ski terrain would have human access

restricted. Conversely, 95% of identified high value ski terrain would remain open. Although some people may disagree with the extent of new winter closures that are recommended in this report, the Working Group put a tremendous amount of effort into locating closures in areas with the highest benefit to bighorn sheep and the lowest impact to high value ski terrain. In several cases, one or more designated travel routes are being recommended through closures to allow continued access on high value ski descents or traverse routes. Although the recommended management actions will not receive unanimous support from all members of the public, the Working Group worked very diligently to try to meet the community's shared objective of balancing bighorn sheep habitat needs with maintaining excellent winter recreation opportunities in the Teton Range.

INTRODUCTION

Bighorn sheep have occupied the Teton Mountain Range for thousands of years, but today this native population is small, isolated from other nearby populations, and at risk of local extinction. The population occupies high elevation areas of the Teton Mountain Range in Grand Teton National Park (GRTE), the Caribou-Targhee (CTNF), and the Bridger-Teton National Forest (BTNF). Management of the herd and its habitat is coordinated between the National Park Service, Wyoming Game and Fish Department (WGFD), and the U.S. Forest Service. To facilitate interagency management, the Teton Range Bighorn Sheep Working Group (hereafter Working Group) was formed in the early 1990s. The group is comprised of wildlife biologists from the above agencies and several other non-agency biologists with a long history of working with this population. In 1996, the Working Group finalized a strategic plan ([TRBSWG 1996](#)) to address threats to the population's persistence. One of the main issues identified in the plan was the critical importance of the population's small areas of remaining winter range. Over nearly three decades, the Working Group has successfully collaborated across agencies to address several pressing issues for the population, including habitat treatments, research, population monitoring, and mitigating disease risk. The Working Group has been engaged in projects that have channeled over \$1 million to conserve this small bighorn sheep population and its habitat.

Initial efforts to gather data on bighorn sheep winter habitat needs began in the mid-1990s when GRTE began a sheep ecology project and radio collared 16 bighorn sheep. Important winter ranges were identified through this effort and a winter closure was implemented on Prospectors/Mt Hunt in 2001. A closure of Static Peak had been implemented prior to that. Other important winter ranges in Avalanche Canyon, Doane Peak/Eagles Rest, Ranger Peak, Lower Webb Canyon, Elk Mountain/Owl Peak, and Forellen Peak in GRTE were also identified, but winter closures were not established as backcountry winter-use levels were relatively low at the time and thought to be unwarranted. With growing popularity of backcountry winter recreation, and an apparent increase in the numbers of people participating and the footprint affected by these activities, the Working Group turned its focus to evaluating the response of bighorn sheep to backcountry winter recreation and secured funding for a study which began in 2008. This research found that bighorn sheep avoided areas of backcountry winter recreation,

even if those areas were otherwise relatively high-quality habitat ([Courtemanch 2014](#)). Avoidance behavior resulted in up to a 30% reduction in available high-quality habitat for some individuals. Bighorn sheep avoided areas with both low and high recreation use. Individual bighorn sheep exposed to high levels of recreation exhibited increased daily movement rates and home range sizes compared to sheep exposed to low or no recreation.

Over the last several years, the Working Group has become increasingly concerned about additional emerging stressors and the population's long-term prospects for persistence. The population only holds 100-125 sheep and is, in fact, comprised of two distinct populations with apparently little genetic exchange between them or surrounding herds. This remnant population has lost its low-elevation winter ranges and migration routes. Current pressures such as expanding and increasing winter recreation, risk of respiratory disease introduction, competition with mountain goats, and climate change further threaten this already vulnerable population. The Working Group considers this population to be at a breaking point where management agencies must take additional conservation actions soon to secure important habitats and maintain/increase population size.

The Working Group convened a panel of seven nationally recognized bighorn sheep experts in March 2019 to provide peer-review of current research, management, and conservation efforts for bighorn sheep in the Teton Range. This panel included experts in bighorn sheep ecology, demographics, genetics, habitat, nutrition, population management, and epidemiology. Over the course of two days, this group reviewed the state of the knowledge for bighorn sheep in the Tetons and developed several recommendations related to specific issues facing the population's future persistence. A full description of these recommendations is provided in the ["Teton Range Bighorn Sheep Herd Situation Assessment" \(2020\)](#). The expert panel recommended that the highest priority short-term actions should be: 1) mountain goat removal; **2) engage the public to address human disturbance on bighorn sheep winter ranges**, and 3) enhance the quality of bighorn sheep demographic data collection. This document summarizes the efforts by the Working Group to engage the community around the concern of human disturbance on bighorn sheep winter ranges in the Tetons. Largely as a result of the expert panel's recommendations, the Working Group embarked on a multi-year public collaborative process to engage the community in developing solutions to balance winter recreation and bighorn sheep habitat needs in the Tetons. This document describes the collaborative process, the outcomes of that process, and a list of recommendations from the Working Group of proposed management actions. This was not intended to be a decision-making process, but rather an opportunity for the public and the Working Group to learn from each other and collaboratively develop possible solutions to this issue. This document provides options for consideration by agencies to pursue through their appropriate decision-making processes.

COLLABORATIVE PROCESS BACKGROUND

During fall 2017, the Working Group contracted Resources Media (Kalispell, MT) to help develop an outreach strategy to move forward on management planning related to winter recreation and bighorn sheep in the Tetons. Resource Media recommended that the Working Group develop a bottom-up, community-driven process to address this issue, instead of beginning with a traditional top-down government process. This recommendation was due to the clear indication from the community that winter recreation in the Tetons holds deep value and emotional worth for many people, and that community engagement in bighorn conservation was vital.

To begin this community process, members of the Working Group gathered information to better understand general community attitudes and perspectives by conducting over 45 one-on-one or small group “coffee cup” conversations with about 80 diverse and influential individuals from December 2017 – November 2019. The purpose of these conversations was to gauge community awareness of the plight of Teton Range bighorn sheep and learn about their perspectives and concerns regarding bighorn sheep winter habitat needs and winter backcountry recreation. We met with influential individuals and groups that represented an array of interests, including backcountry skiing (including various generations and stances), commercial guiding, ski resorts, ski patrol, the outdoor industry, wildlife conservation, and hunting. We also met with state- and county-level elected officials. The key themes identified during these conversations are summarized in the [“Teton Range Bighorn Sheep Herd Situation Assessment” \(TRBSWG 2020\)](#).

After these small group conversations, it was clear that we needed to increase awareness of this issue and engage more community members to help develop potential solutions to balance bighorn sheep winter habitat needs and backcountry recreation in the Tetons. To achieve this goal, the working group organized the Teton Range Bighorn Sheep and Recreation Community Collaborative Learning Process in 2020. Collaborative learning is a relatively new tool being used to address complex conservation issues. Its key elements are the following: open to all, shared learning, transparent, and collaborative development of community-supported solutions that meet agency policies. The goal of the process was to generate viable potential solutions that were community-supported and could be considered by land management agencies for potential implementation.

APPROACH

The Working Group planned a series of three community workshops to be held at the Snow King Conference Center in Jackson between mid-February and early March (Table 1, [Appendix A](#)) to engage the public on the topic of balancing bighorn sheep winter habitat needs and backcountry winter recreation. The workshops were designed to build on one another, and participants were encouraged to attend all three to fully engage in the process. Dr. Jessica Western from the Ruckelshaus Institute at the Haub School, University of Wyoming, was hired

to design and facilitate the collaborative learning process. Dr. Western designed this process to engage the local public to identify community-based ideas and solutions that balance the winter habitat needs of bighorn sheep and backcountry winter recreation opportunities. A meeting of partner agency leaders and the Working Group was scheduled to follow the three community meetings in early March with a final public meeting in April to report back to the public on actions that would move forward and the timeline.

Table 1. Overview of community collaborative workshop dates, themes, specific topics, number of attendees, and outcomes.

Workshop Date	Theme	Topics	Number of Attendees	Outcome
February 13, 2020	Identify community interests and concerns	• Introduction to the collaborative process • History of bighorn sheep in the Tetons and main conservation issues • History and importance of backcountry skiing in the Tetons • Attendees brainstormed lists of interests, values, and issues that should be considered in this process	60	• Workshop 1 - Interests (List of 96 interests and values) • Workshop 1 - Issues (list of 117 issues)
February 20, 2020	Identify conceptual solutions	• More detailed information on Teton bighorn sheep ecology and impacts from winter recreation • Perspectives from winter recreationists on this issue • Attendees worked in small groups to come up with conceptual solutions to the issue of balancing bighorn sheep habitat needs and winter recreation access	58	• Workshop 2 - Conceptual Solutions (List of 99 possible solutions)
March 5, 2020	Identify geographical solutions	• Review detailed information on Teton bighorn sheep and impacts from winter recreation • Attendees reviewed maps of bighorn sheep winter habitat and winter recreation routes • Attendees worked in small groups to come up with specific geographical solutions to balance bighorn sheep habitat needs and winter recreation access • Attendees identified specific areas of high value ski terrain	112	• Workshop 3 - Geographic Solutions (List of 202 potential geographical solutions in specific areas) • See also preliminary maps at https://www.tetonsheep.org/process
June 5, 2020 (virtual)	Continue discussing	• Same as March 5 meeting	~30	• Included in Workshop 3 solutions

Workshop Date	Theme	Topics	Number of Attendees	Outcome
	geographic solutions			
June 16, 2020 (virtual)	Continue discussing geographic solutions	• Same as March 5 meeting	~30	• Included in Workshop 3 solutions

The three community workshops were held as planned. A total of 158 unique individuals attended the workshops. Twenty-three people attended all three workshops, 23 people attended two, and 112 people attended one. Attendees of these workshops were diverse and included the following stakeholder groups: conservationists, winter recreationists, commercial guides, hunters, elected officials, ski patrollers, and Jackson Hole Mountain Resort representatives. All of the workshops began with presentations from the working group about bighorn sheep and from the winter recreation community about the importance of recreation access in the Teton Range. The second half of each of the workshops was devoted to facilitated, small group discussion and brainstorming to develop potential solutions to balance bighorn sheep habitat needs and winter recreation access. Table 1 provides more detail about each of the workshops with links to the specific ideas generated by the small group discussions.

At the third meeting, there was insufficient time for groups to review the entire mountain range, refine their ideas, and attempt to reach small group consensus on any of them. As a result, the Working Group scheduled another public meeting to finish review of the maps and provide participants an opportunity to refine their input. However, public gatherings were restricted beginning in late March due to COVID-19, preventing such a meeting. In May, the Working Group decided to move forward in a different way to finish gathering information from the public and decided to hold two virtual meetings in June to accomplish this. However, the number of participants in these meetings were limited due to Dr. Western's virtual program capacity. The working group invited 46 people who had already attended at least two workshops to participate in virtual meetings on June 5th and June 16th, 2020. The virtual attendees considered the entire mountain range and generated additional ideas and solutions.

After the public workshop series concluded, the Working Group reviewed the list of potential solutions, digitized them in GIS, summarized and packaged solutions together, prioritized them for agency managers (see following section for methods), and developed this report to convey the working group's final recommendations to agency decision-makers and the public. This report is not a decision document and any decisions regarding recommended management actions will ultimately be made by the appropriate federal or state agency.

Prioritization Process

Prioritization is a common process used in conservation planning to help guide decisions about where to focus limited resources. The prioritization tool developed by the Working Group is intended to help managers identify which conservation actions to pursue that maximize benefit for bighorn sheep and are generally supported by the community. The Working Group developed a prioritization matrix to score potential solutions ('actions') from the public meetings using a set of criteria that reflected a) the expected benefit of the action to bighorn sheep in the Teton Range and b) the feasibility of implementing the action. We developed separate matrices for actions that were tied to a geography and those that were non-geographic or more general in nature. We considered geographic-based actions our primary recommendations and non-geographic actions as complementary to those actions. For the place-based (i.e. geographic) actions, each criterion was composed of five elements (see Figures 1 and 2) and scored on a scale from 1 -5 (Table 2). The impact or benefit to bighorn sheep was evaluated using five key elements that are defined in Figure 1. The feasibility or ease with which a project could be implemented was evaluated using five different elements that are defined in Figure 2. Two types of geographically based actions were considered: 1) Those that prioritize bighorn sheep conservation and 2) those that prioritize maintenance of recreation access. Because these two types of actions in some cases had opposing benefits for bighorn sheep or implementation feasibility, the scoring for some of the elements was reversed (Table 2). For example, an action prioritizing conservation in an area heavily used by bighorn sheep would receive a high score for the ranking element "Level of Bighorn Sheep Use", but an action prioritizing recreation access in the same area would receive a low score for that ranking factor.

Members of the Working Group scored each action and their scores were averaged to obtain the overall score for each element. Then scores for each element were added together to obtain an overall score for the criterion. Possible scores for each criterion ranged from 5 to 25. We only recommended actions that had high scores for feasibility or benefit to bighorn sheep and determined the cutoff score for either criteria would be 15 (the mid-point of the range of possible scores).

We divided actions into four different priority-classes (i.e. quadrants) for recommendation based on the score for each criterion 1) Highest priority (green) actions where both benefit to bighorn sheep and feasibility scores are > 15 ; 2) Moderate priority (yellow) actions where benefit to bighorn sheep score is > 15 ; 3) Moderate priority actions where feasibility is >15 and; 4) Non-priority (red) actions where both benefit to bighorn sheep and feasibility scores are ≤ 15 . We created scatterplots for each management jurisdiction (Bridger Teton NF, Caribou-Targhee NF, Grand Teton NP), to illustrate the scores of both criteria for each action (Figures 5, 7, & 9).

Benefit to bighorn sheep

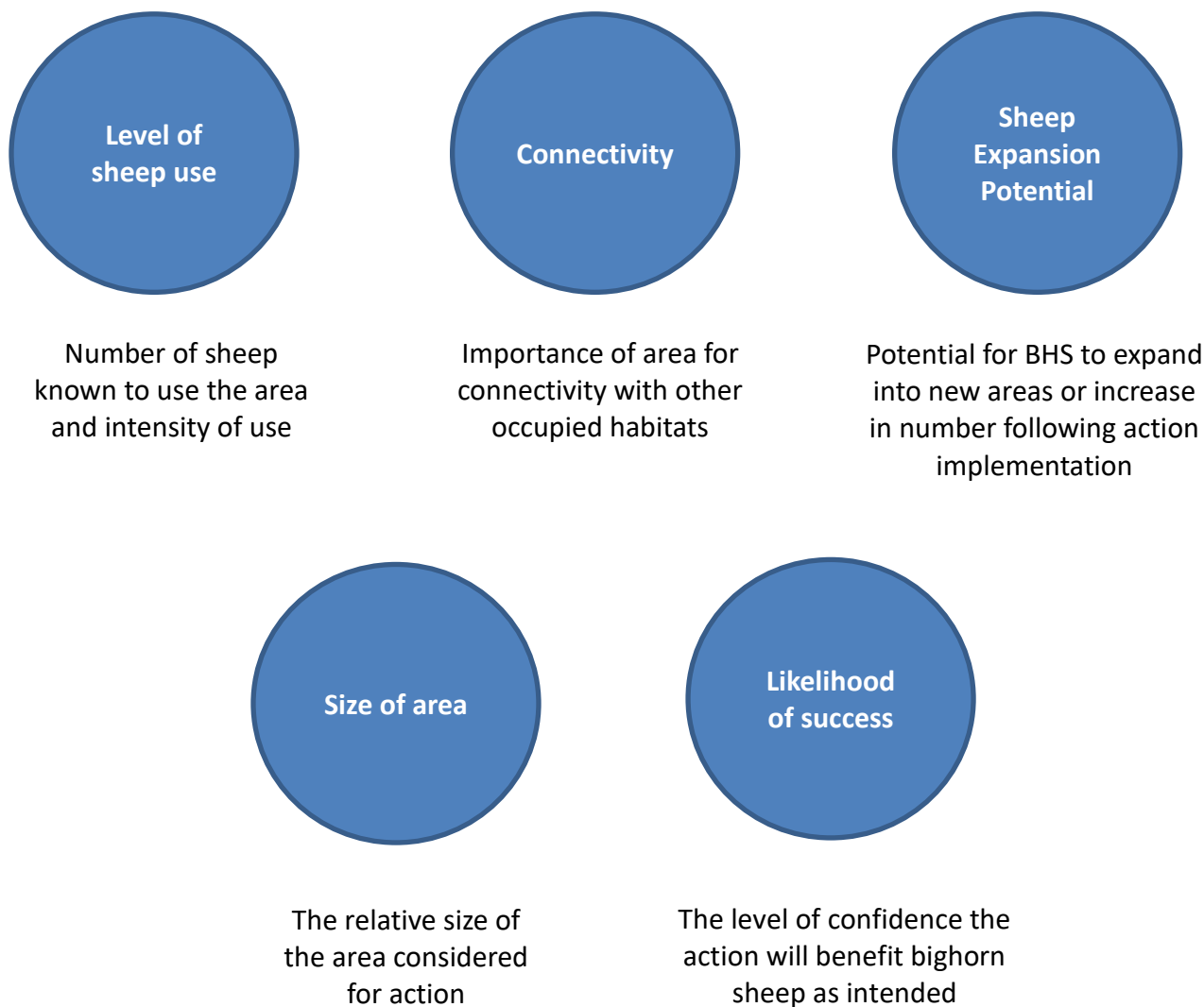


Figure 1. Elements used to assess the benefit of actions for bighorn sheep in the prioritization process.

Feasibility

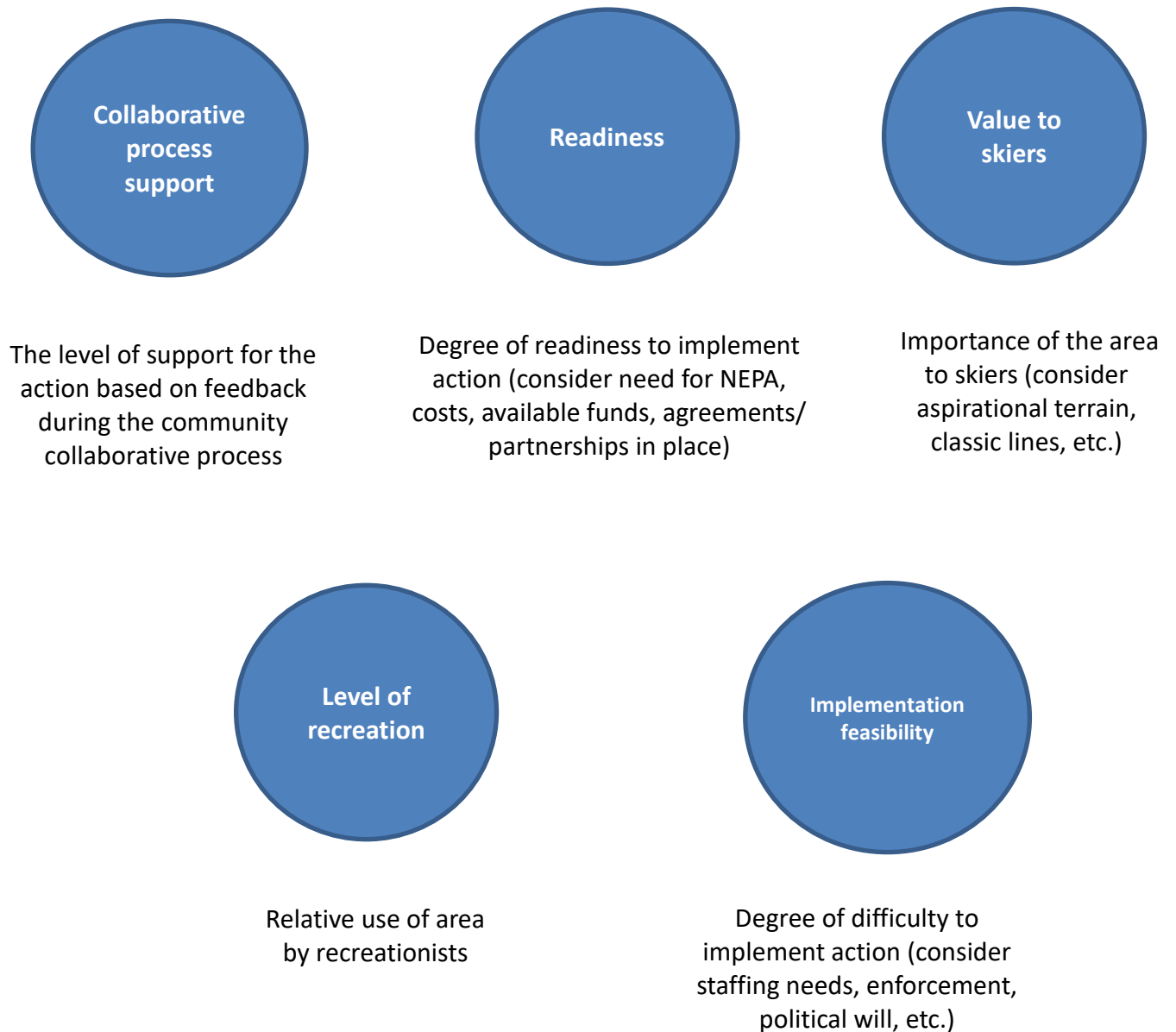


Figure 2. Elements used to assess implementation feasibility of actions in the prioritization process.

Table 2. Ranking scheme for elements used to score geographic actions, with respect to whether actions prioritize bighorn sheep or maintenance of recreation access.

Criteria/Element	Actions prioritizing benefits to bighorn sheep		Actions prioritizing maintenance of recreation access	
Benefit to Bighorn Sheep				
Score	1	5	1	5
Level of Use [†]	Areas with the lowest level and bighorn sheep intensity of use	Areas with the highest level and intensity of bighorn sheep use	Areas with the highest level and intensity of recreational use	Areas with the lowest level and intensity of recreational use
Connectivity [†]	Areas with lowest connectivity	Areas with highest connectivity	Areas with highest connectivity	Areas with lowest connectivity
Expansion potential [†]	Actions with the least potential to promote expansion	Actions with the highest potential to promote expansion	Actions with the highest potential to promote expansion	Actions with the least potential to promote expansion
Size of Area [†]	Smallest areas	Largest areas	Largest areas	Smallest areas
Likelihood of Success	Actions WG members had low confidence will be successful in benefitting bighorn sheep	Actions WG members had high confidence will be successful in benefitting bighorn sheep	Actions WG members had low confidence will be successful in benefitting bighorn sheep	Actions WG members had high confidence will be successful in benefitting bighorn sheep
Feasibility				
Score	1	5	1	5
Collaborative Process Support	Actions with low perceived community support	Actions with high perceived community support	Actions with low perceived community support	Actions with high perceived community support
Readiness	Actions with a long implementation timeframe	Actions with a short implementation timeframe	Actions with a long implementation timeframe	Actions with a short implementation timeframe
Value to Skiers [†]	Action areas with a relatively high value to skiers	Action areas with a relatively low value to skiers	Action areas with a relatively low value to skiers	Action areas with a relatively high value to skiers
Level of Recreation [†]	Areas with relatively high levels of recreation	Areas with relatively low levels of recreation	Areas with relatively low levels of recreation	Areas with relatively high levels of recreation
Implementation Feasibility	Actions with many challenges to implementation	Actions with few challenges to implementation	Actions with many challenges to implementation	Actions with few challenges to implementation
[†] Actions that prioritize bighorn sheep were scored differently (in reverse) from actions that prioritize recreation access for these elements				

Non-geographic Actions

For the non-geographic) actions, each criterion was composed of three elements (see Figure 3) and scored on a scale from 1 -5 (Table 3). The impact or benefit to bighorn sheep was evaluated using three key elements that are defined in Figure 3. The feasibility or ease with which a project could be implemented was evaluated using three different elements that are defined in Figure 4.

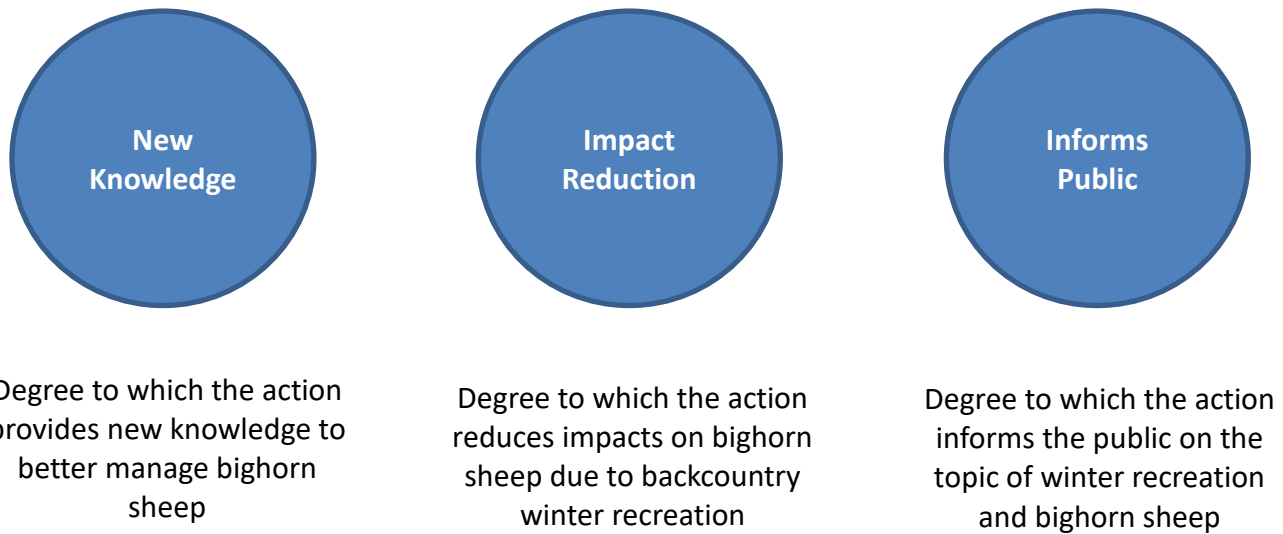


Figure 3. Elements used to assess the benefit of non-geographic actions for bighorn sheep in the prioritization process.

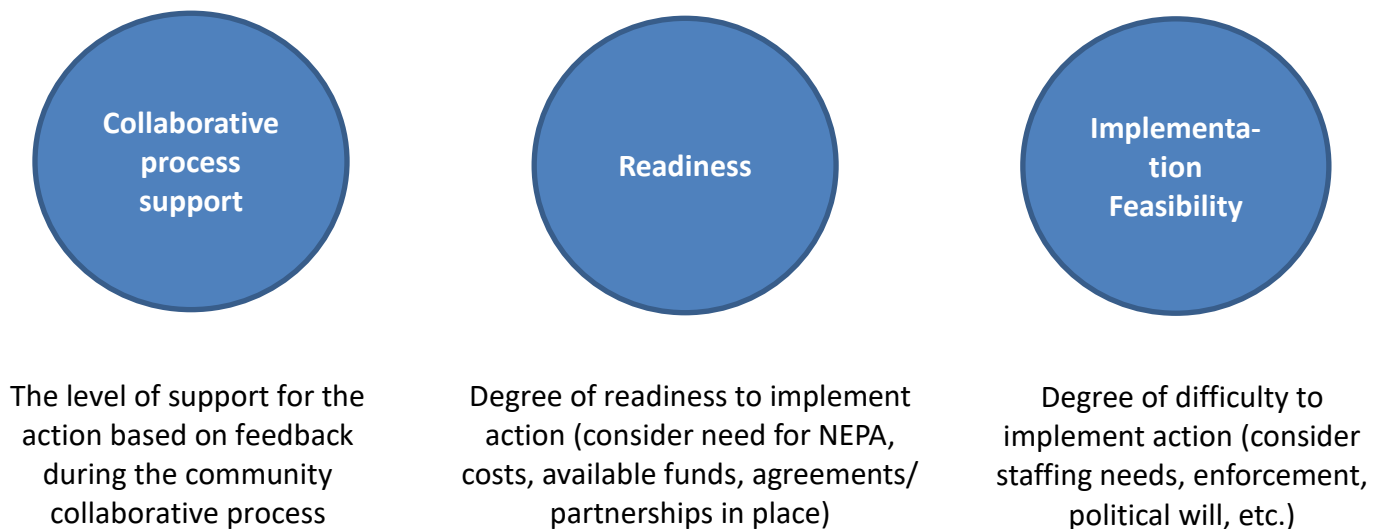


Figure 4. Elements used to assess implementation feasibility of non-geographic actions in the prioritization process.

Table 3. Scoring scheme for elements used to score non-geographic actions

Criteria/Element	Benefit to Bighorn Sheep	
Score	1	5
New Knowledge	Actions with the <i>lowest</i> potential to build new knowledge	Actions with the <i>highest</i> potential to build new knowledge
Impact Reduction	Actions with the <i>lowest</i> potential to reduce recreation impact	Actions with the <i>highest</i> potential to reduce recreation impact
Informs Public	Actions with the <i>least</i> potential to inform the public	Actions with the <i>highest</i> potential to inform greatest number of people
Feasibility		
Collaborative Process Support	Actions with <i>low</i> perceived community support	Actions with <i>high</i> perceived community support
Readiness	Actions with a <i>long</i> implementation timeframe	Actions with a <i>short</i> implementation timeframe
Implementation Feasibility	Actions with <i>many</i> challenges to implementation	Actions with <i>few</i> challenges to implementation

Members of the Working Group independently scored each non-geographic action and their scores were averaged to obtain the overall score for each element. Then scores for each element were added together to obtain an overall score for the criterion. Possible scores for each criterion ranged from 5 to 15. We only recommended actions that had high scores for feasibility or benefit to bighorn sheep and determined the cutoff score for either criteria would be 7.5 (the mid-point of the range of possible scores).

We divided actions into four different priority-classes (i.e. quadrants) for recommendation based on the score for each criterion 1) Highest priority (green) actions where both benefit to bighorn sheep and feasibility scores are > 7.5; 2) Moderate priority (yellow) actions where benefit to bighorn sheep score is > 7.5; 3) Moderate priority actions where feasibility is >7.5 and; 4) Non-priority (red) actions where both benefit to bighorn sheep and feasibility scores are ≤ 7.5. We created a single scatterplot to illustrate the scores of both criteria for each action (Figures X).

RECOMMENDED ACTIONS

Summary

The public collaborative workshops produced a list of 202 ideas of ideas for potential solutions. The Working Group combined, packaged, prioritized, and ranked these ideas into 68 potential management actions, which are outlined in this section by management jurisdiction as well as non-geographical solutions which would be applied range-wide across all jurisdictions. Overall,

there are 38 high priority actions, 24 moderate priority, and 6 low priority described in this section.

Through the collaborative process, the community identified 57,266 acres of high value backcountry ski terrain in the Teton Range. A total of 45,278 acres of high quality bighorn sheep winter habitat was mapped during previous research (Courtemanch 2014). Currently, 3% of this habitat is protected from human disturbance in the winter (two winter closures in GRTE). No bighorn sheep winter habitat is currently protected on BTNF or CTNF. Bighorn sheep winter habitat is distributed across GRTE (79%), CTNF (16%), and BTNF (5%) (Table 4).

Overall, implementing the recommended high and moderate priority management actions outlined in this section would result in 21,233 acres of new bighorn sheep winter habitat protections in the Teton Range (47% of winter habitat) (Table 4). Forty-seven percent (16,952 acres) of the high-quality habitat in GRTE would be protected, 49% (3,478 acres) on CTNF, and 38% (803 acres) on BTNF. Of these areas, 2,833 acres overlap with areas that were identified as high value ski terrain during the public collaborative process. Therefore, 5% of high value ski terrain would have human access restricted (Table 4). Conversely, 95% of identified high value ski terrain would remain open.

Table 4. Summary of the quantity and distribution of bighorn sheep winter habitat, current winter habitat protections, quantity of high value backcountry ski terrain, and percent of bighorn sheep habitat and high value backcountry ski terrain that would be affected by implementing the high and moderate priority actions by land management jurisdiction in the Teton Range.

Jurisdiction	Quantity of high-quality bighorn sheep winter habitat (acres)	Percent (%) of total high-quality bighorn sheep winter habitat	Percent (%) of bighorn sheep winter habitat currently protected from human disturbance	Percent (%) of bighorn sheep winter habitat that would be protected from human disturbance with implementation of high and moderate actions	Quantity of high-value backcountry ski terrain (acres) identified during public collaborative process	Percent (%) of high-value backcountry ski terrain that would have restricted winter access with implementation of high and moderate actions
GRTE	36,068	79%	4%	47%	28,268	9%
CTNF	7,098	16%	0%	49%	20,664	< 1%
BTNF	2,112	5%	0%	38%	8,334	1%
Total	45,278	100%	3%	47%	57,266	5%

Grand Teton National Park Actions

Based on the prioritization methods described above, the Working Group proposes 14 'highest priority' actions (Quadrant 1 in Figure 5) - high benefit for bighorn sheep and high feasibility, four moderate priority actions with high benefit to bighorn sheep (Quadrant 2 in Figure 5), and eight moderate priority actions with high feasibility (Quadrant 4 in Figure 5) in Grand Teton National Park (Table 5). Three suggested actions are not being recommended (Quadrant 3 in Figure 5).

Previous research conducted on bighorn sheep in the Teton Range classified 36,068 acres of high-quality winter habitat in Grand Teton National Park. Current winter closures protect 4% of high-quality winter habitat in Grand Teton National Park from human disturbance. The proposed management actions (highest priority and moderate priority) would protect 47% of high-quality winter habitat in Grand Teton National Park. The remaining 53% of high-quality habitat exists primarily in areas that are highly valued by winter recreationists (e.g. Mt Moran), sparsely occupied by bighorn sheep at the present time, or currently challenging for humans to reach during winter. Public participants in the Collaborative Learning Process identified 28,268 acres of highly valued skiing in Grand Teton National Park, of which 9% would be closed to human access during the winter if all the proposed management actions were implemented.

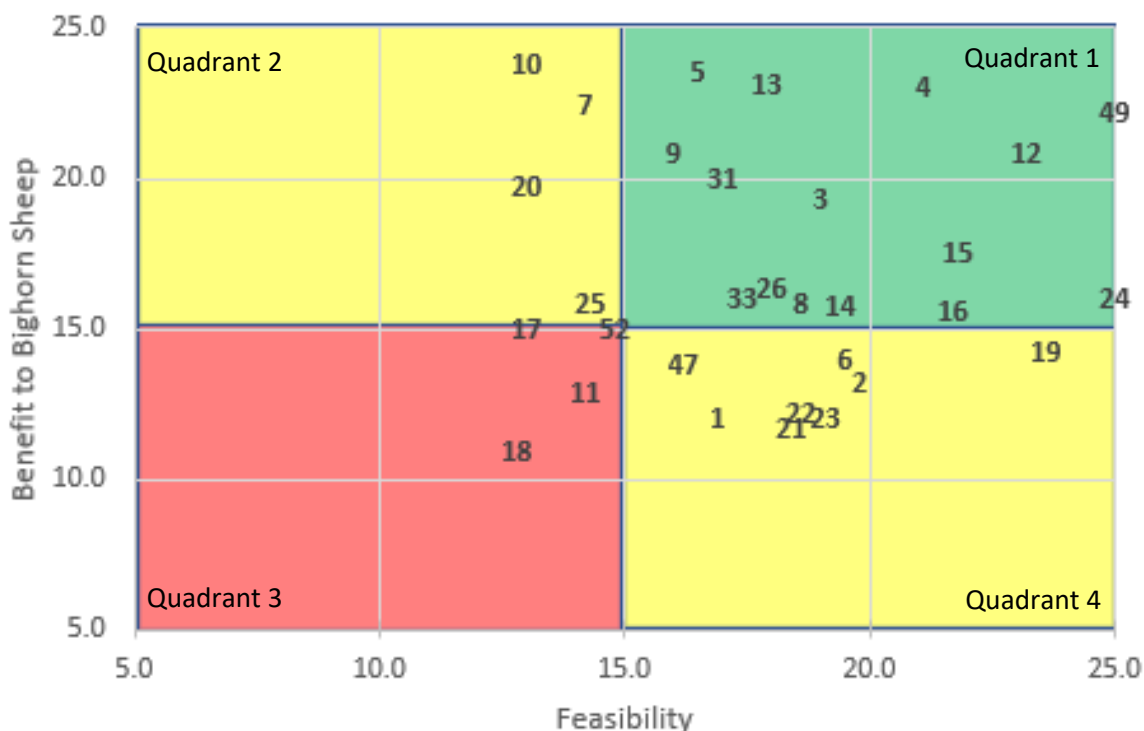


Figure 3. Scatterplot of Working Group's rankings for proposed actions in Grand Teton National Park. Actions in the green quadrant are highest priority actions, actions in the yellow quadrants are moderate priority actions, and actions in the red quadrant are not being pursued by the Working Group. Points are represented as the map numbers that correspond to the actions in the table above (Table 5) and figures below (Figures 6 and 7 below).

Table 5.Total Criterion Scores for Actions Identified for Grand Teton National Park.

Map Number	Description	Benefit to Bighorn Sheep	Implementation Feasibility
Quadrant 1: High Benefit for Bighorn Sheep, High Feasibility			
5	New bighorn sheep winter closure in the Ranger/Doane Peak area	23.5	16.5
13	Expand bighorn sheep habitat winter closure in the Mt Hunt/Prospectors area	23.1	17.9
4	New bighorn sheep winter closure in Elk/Owl Mountain wintering complex	23.0	21.1
12	Install signage and enhance education at the Top of the Banana Couloir	20.8	23.2
9	New bighorn sheep winter closure in the area northeast of Snowdrift Lake	20.8	16.0
31	New bighorn sheep winter closure around 'The Wall'	20.0	17.0
3	New bighorn sheep winter habitat protections on Forellen Peak	19.3	19.0
15	Maintain ski access to east faces above Jackson Lake	17.5	21.8
33	New closure Mt. Meek to Fossil Mountain (primarily on CTNF with small portion in GRTE) -See CTNF section for map	17.0	17.6
26	Maintain existing ski routes on Albright Peak (Omega Couloir, SE Routes, and SE/East Face)	16.3	18.0
24	Maintain existing ski access to Wimpy's Knob, Mavericks, and 25 Short	16.0	25.0
8	New bighorn sheep winter closure in the Dartmouth Basin/Ice Flow Lake area	15.8	18.6
14	Maintain ski traverse access between Owl Creek and Moose Creek over Moose Basin Divide	15.7	19.4
16	Maintain ski access on Mt Moran	15.6	21.7
Quadrant 2: High Benefit for Bighorn Sheep, Lower Feasibility			
10	Expand bighorn sheep habitat protections on Static Peak	23.8	13.0
7	New bighorn sheep winter closure in the Veiled Peak/Mt Wister area	22.4	14.2
20	Implement a closure with several designated routes to allow continued skiing access to popular runs on southerly aspects of North Fork Avalanche Canyon while creating a relatively large area of undisturbed winter range for bighorn sheep.	19.75	13
25	Monitor skier and bighorn sheep activity on Death Canyon Shelf	15.8	14.3
Quadrant 4: Lower Benefit for Bighorn Sheep, High Feasibility			
19	Maintain ski and mountaineering access to high peaks area in and adjacent to Garnet Canyon	14.2	23.6
6	New bighorn sheep winter closure in the area around the Cleaver	14.0	19.5
47	New closure on SW side of Cody Peak (See BTNF section for map and description)	13.8	16.2
2	New bighorn sheep winter closure on Survey Peak	13.2	19.8
22	Maintain ski traverse access between South Fork of Avalanche Canyon and Alaska Basin	12.2	18.6

Map Number	Description	Benefit to Bighorn Sheep	Implementation Feasibility
23	Maintain ski access to Mt Wister	12.0	19.1
1	Wildland fire use in area around Survey Peak	12.0	16.9
21	Maintain designated route (traverse) between North Fork of Avalanche Canyon and South Fork of Cascade Canyon	11.7	18.4
Quadrant 3: Lower Benefit to Bighorn Sheep, Low Feasibility			
17	Develop new winter trailhead at South Jenny or String Lake	15.0	13.0
11	New bighorn sheep winter closure in the area around Middle Granite Arch	12.9	14.2
18	Move trailhead from Death Canyon to Sawmill Ponds Overlook	10.9	12.8

Grand Teton National Park – North

Management Recommendations & Bighorn Sheep Winter Habitat

Management Recommendations & Winter Recreation

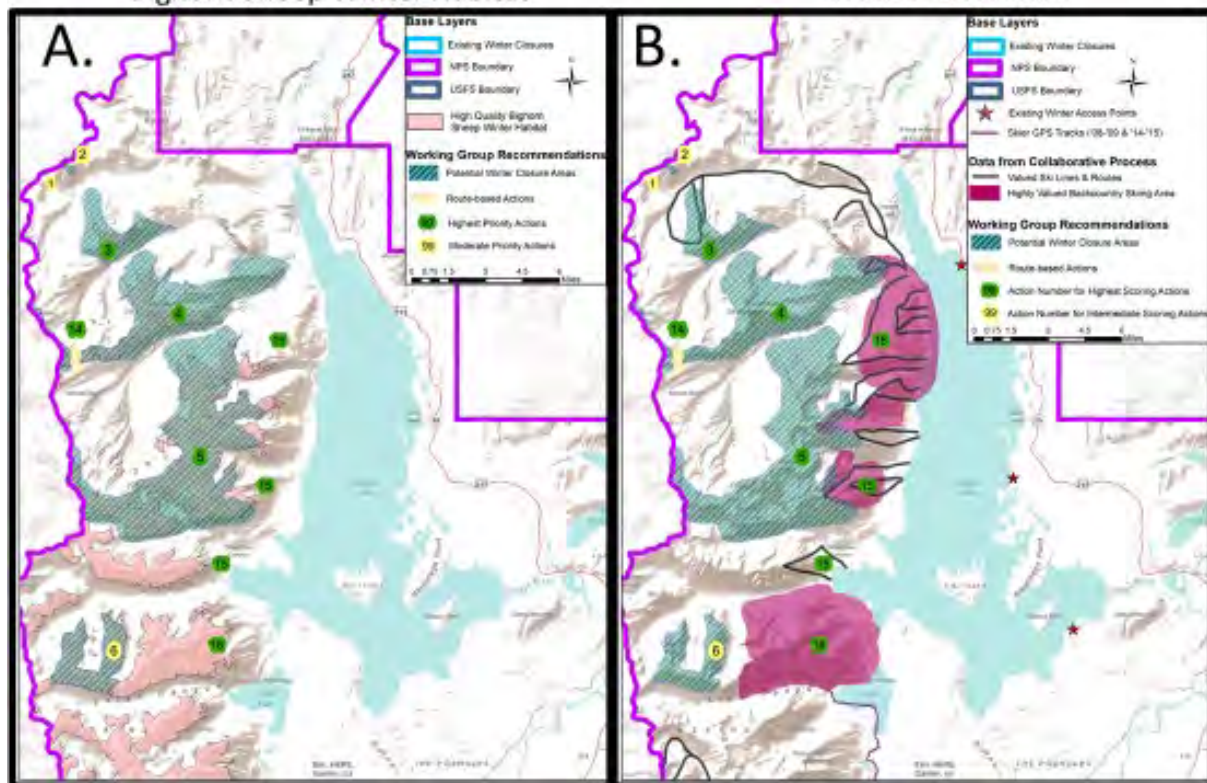


Figure 4. Highest- and moderate-priority proposed management actions relative to bighorn sheep winter habitat (Panel A) and important areas and routes for back-country skiing (Panel B) in Grand Teton National Park. Label numbers correspond to action numbers in the Table 5 (above) and the labels are color-coded to indicate the priority of the actions, with green being highest priority and yellow being moderate priority. Low priority actions are not mapped.

Grand Teton National Park – South

Management Recommendations & Bighorn Sheep Winter Habitat

Management Recommendations & Winter Recreation

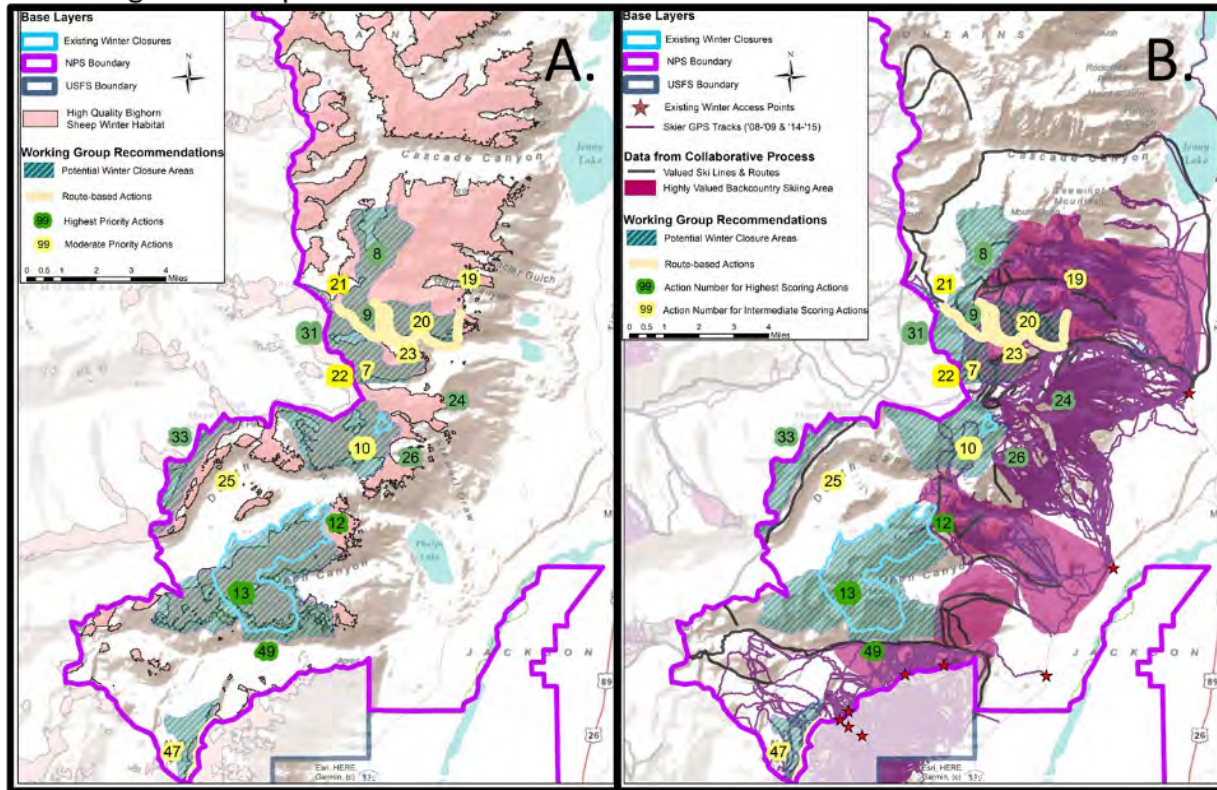


Figure 5. Highest- and moderate-priority proposed management actions relative to bighorn sheep winter habitat (panel A) and important areas and routes for back-country skiing (panel B) in Grand Teton National Park. Label numbers correspond to action numbers in the Table 5 (above) and the labels are color-coded to indicate the priority of the actions, with green being highest priority and yellow being moderate priority. Low priority actions are not mapped.

Grand Teton National Park Quadrant 1 - Highest Priority Actions

This section summarizes and illustrates 14 highest priority proposed management actions for Grand Teton National Park. Summaries are organized by the quadrant their prioritization scores fall into, and within quadrants are arranged by their 'benefit to bighorn sheep' scores. The highest priority proposals include maintaining access in five areas, seven new closures, one expanded closure, and one location for improved signage.

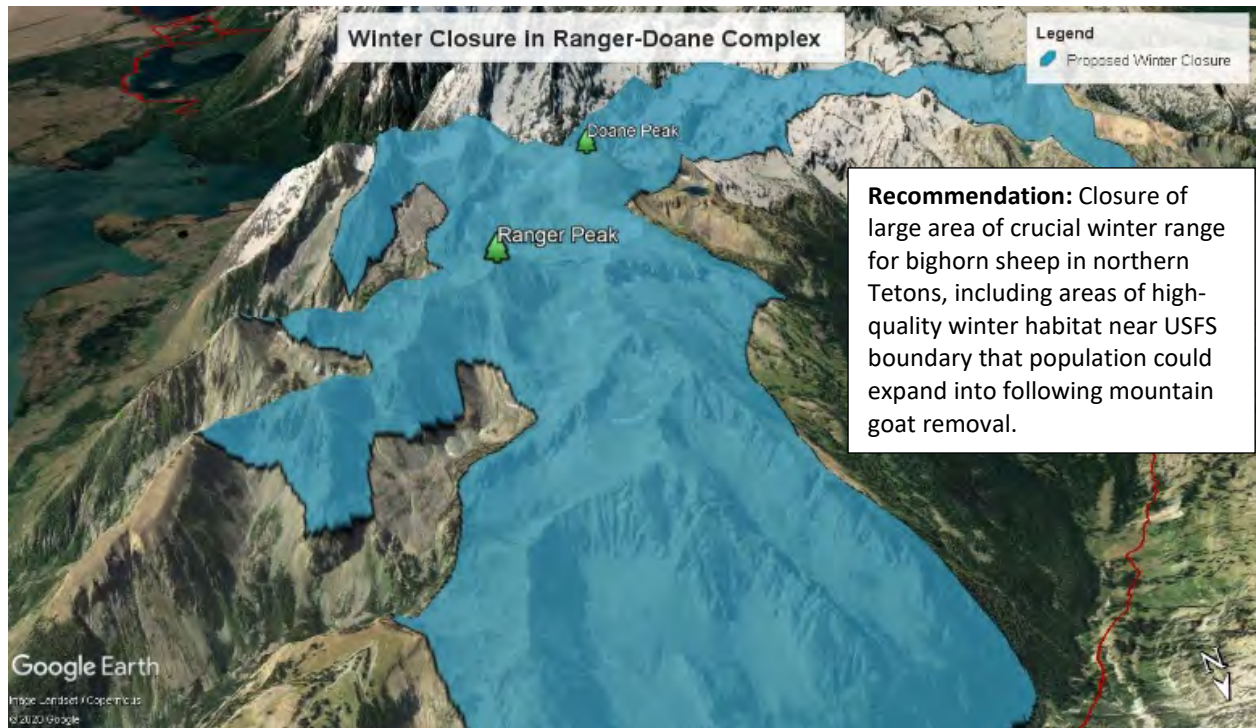
Three new closures are proposed in the north end of the Teton Range. These include two large closures encompassing Ranger, Doane, and Eagles Rest Peaks (Action 5) and the south facing wall of Webb Canyon extending from the lower cliffs to Red Mountain including the Elk/Owl

Mountain complex (Action 4) and a smaller area closure on Forellen Peak (Action 3). These areas comprise the bulk of the winter habitat available to the northern population of bighorn sheep. A popular traverse between Owl Canyon and Webb Canyon across Moose Basin Divide would be retained via a designated ski route (Action 14) through the closure. Reproduction and recruitment in this population is higher than the southern population. Providing secure winter habitat for this population, where there is currently no protection, is essential for maintaining current population numbers and distribution. Currently, winter recreation levels are relatively low in this area compared to portions of the southern Tetons, although there is high potential for use to increase as recreationists seek out more remote and secluded locations for backcountry forays. The proposed closures are configured in such a way that access to the east faces above Jackson Lake (Action 15) would be maintained, with a few exceptions. The most notable exception is that Ranger Peak and the upper section of Falcon Canyon would not be accessible. Additionally, the apexes of several identified ski lines would no longer be accessible, though this impacts a very small amount of the skiing offered by the lines. Access to high-value ski routes on Mt Moran (Action 16), including the Skillet Glacier, Triple Glacier, the Northeast Ridge and Sickly Couloir would be retained.

In the south, an expansion of the existing Prospectors/Mt Hunt closure (Action 13) is proposed as a highest priority action, as well as four new closures. Three of these closures abut each other to form a contiguous closed area but were scored as separate actions to provide managers flexibility in prescribing management actions. These closures include the upper reaches of North Fork Avalanche Canyon around 'The Wall' (Action 31), the northern side of upper North Fork Avalanche Canyon (Action 9), and the area in Cascade Canyon west of the High Peaks, including Dartmouth Basin and the Iceflow Lake Basin (Action 8). The last closure includes the upper Death Canyon Shelf and the associated peaks along GTNP/CTNF boundary between Fox Creek Pass and Mt. Meek Pass (Action 33). Also proposed as highest priority actions is the maintenance of access to highly-valued ski terrain on Wimpy's Knob, Mavericks, and 25 Short (Action 24) including runs that descend into the south fork of Avalanche and ski runs descending from the summit of Albright Peak (Action 26).

To address accidental incursion into the existing Prospectors/Mt Hunt closure at the top of the Banana Couloir new signage is proposed. This location is within an area that is managed as wilderness. Any new signage would need to comply with National Park Service guidance for sign messaging and placement in wilderness.

5. NEW WINTER CLOSURE IN RANGER/DOANE WINTERING COMPLEX



Opportunities

- ✓ Protects important bighorn sheep winter range in an area with strong potential for increasing winter recreation.
- ✓ Preserves winter habitat for bighorn sheep to expand into following mountain goat removal
- ✓ Protect large contiguous area.

Challenges

- ✗ Parts of this area have gained popularity among backcountry skiers in recent years.
- ✗ Public support for habitat protections in only a portion of the winter ranges.
- ✗ Small portion of recommended closure spans administrative boundary into Caribou-Targhee National Forest.
- ✗ Ensuring compliance will be difficult due to remote backcountry location and will primarily rely on recreationists doing the right thing and self-enforcing.
- ✗ Robust public information campaign would be needed to provide education.
- ✗ Time/personnel needed to post and maintain signs at primary access points to educate recreationists.

13. EXPAND EXISTING WINTER CLOSURE IN THE MT HUNT/PROSPECTORS WINTERING COMPLEX



Opportunities

- ✓ Remove disturbance from the periphery of important bighorn sheep winter range.
- ✓ Facilitate bighorn sheep use of peripheral areas.
- ✓ Support for expansion during collaborative process.
- ✓ Currently very little recreation activity in these areas.
- ✓ Boundary designed to allow continued access to known ski lines.
- ✓ High-value ski runs on Olive Oyl the Banana Couloir are not impacted by the proposed closure.

Challenges

- ✗ Optics of a large area with restricted human access.
- ✗ Some members of ski- community expressed interest in removing existing closure.
- ✗ Ensuring compliance will be difficult due to remote backcountry location and will primarily rely on recreationists doing the right thing and self-enforcing.
- ✗ Robust public information campaign would be needed to provide education.
- ✗ Time/personnel needed to post and maintain signs at primary access points to educate recreationists.

4. NEW WINTER CLOSURE ON ELK/OWL MOUNTAIN WINTERING COMPLEX



Opportunities

- ✓ Protects a large area of important winter habitat with minimal impacts to recreation.
- ✓ Not identified as a highly valued area for skiing.
- ✓ We propose to allow a moderately-popular ski traverse that crosses proposed closure at Moose Basin Divide (see action # 14).

Challenges

- ✗ Two ski runs identified during the collaborative process in Lower Webb Canyon would no longer be accessible to skiers.
- ✗ Ensuring compliance will be difficult due to remote backcountry location and will primarily rely on recreationists doing the right thing and self-enforcing.
- ✗ Robust public information campaign would be needed to provide education.
- ✗ Time/personnel needed to post and maintain signs at primary access points to educate recreationists.

12. INSTALL SIGNAGE AND ENHANCE EDUCATION AT THE TOP OF THE BANANA COULOIR



Opportunities

- ✓ Reduce accidental disturbance on important bighorn sheep winter range without reducing recreation opportunities.
- ✓ Cost-effective option to build awareness of disturbance impacts on bighorn sheep and inform recreating public about existing closure.

Challenges

- ✗ Area is Recommended Wilderness and managed as wilderness.
- ✗ Signage will require maintenance by NPS staff throughout ski season.

9. NEW WINTER CLOSURE IN AVALANCHE CANYON NORTHEAST OF SNOWDRIFT LAKE



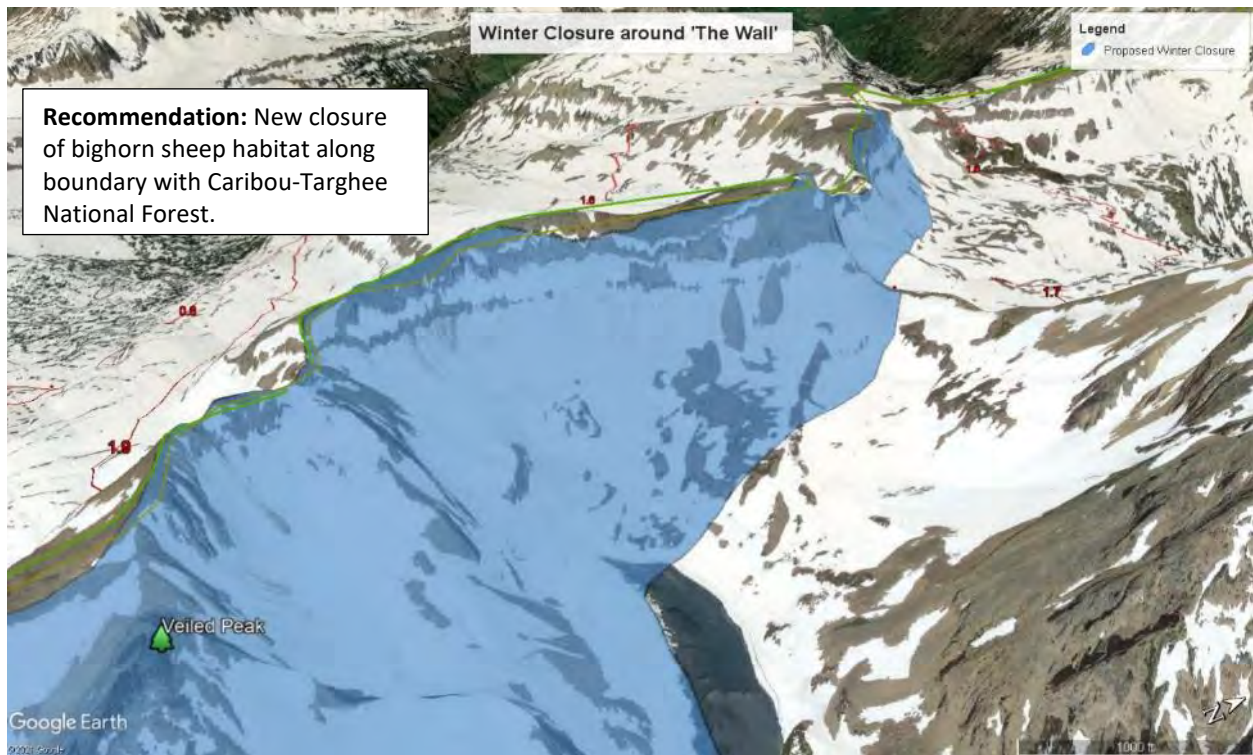
Opportunities

- ✓ Protects a patch of heavily-used sheep habitat that is generally not considered high quality skiing.
- ✓ Does not impede recreation access for most of Avalanche Canyon.
- ✓ Closure boundary allows a ski-traverse route between Avalanche and Cascade Canyons to be completed without entering closure (see action # 21).

Challenges

- ✗ One ski run will no longer be accessible to humans during the winter.
- ✗ Emotional connection of ski community with Avalanche Canyon.
- ✗ Ensuring compliance will be difficult due to remote backcountry location and will primarily rely on recreationists doing the right thing and self-enforcing.
- ✗ Robust public information campaign would be needed to provide education.
- ✗ Time/personnel needed to post and maintain signs at primary access points to educate recreationists.

31. NEW WINTER CLOSURE IN UPPER AVALANCHE CANYON AROUND 'THE WALL'



Opportunities

- ✓ This area was not identified as highly valued skiing during the collaborative process.

Challenges

- ✗ Effectiveness depends on lack of disturbance on adjacent habitat in Caribou-Targhee National Forest.
- ✗ Ensuring compliance will be difficult due to remote backcountry location and will primarily rely on recreationists doing the right thing and self-enforcing.
- ✗ Robust public information campaign would be needed to provide education.
- ✗ Time/personnel needed to post and maintain signs at primary access points to educate recreationists.

3. NEW WINTER CLOSURE AREA ON FORELLEN PEAK



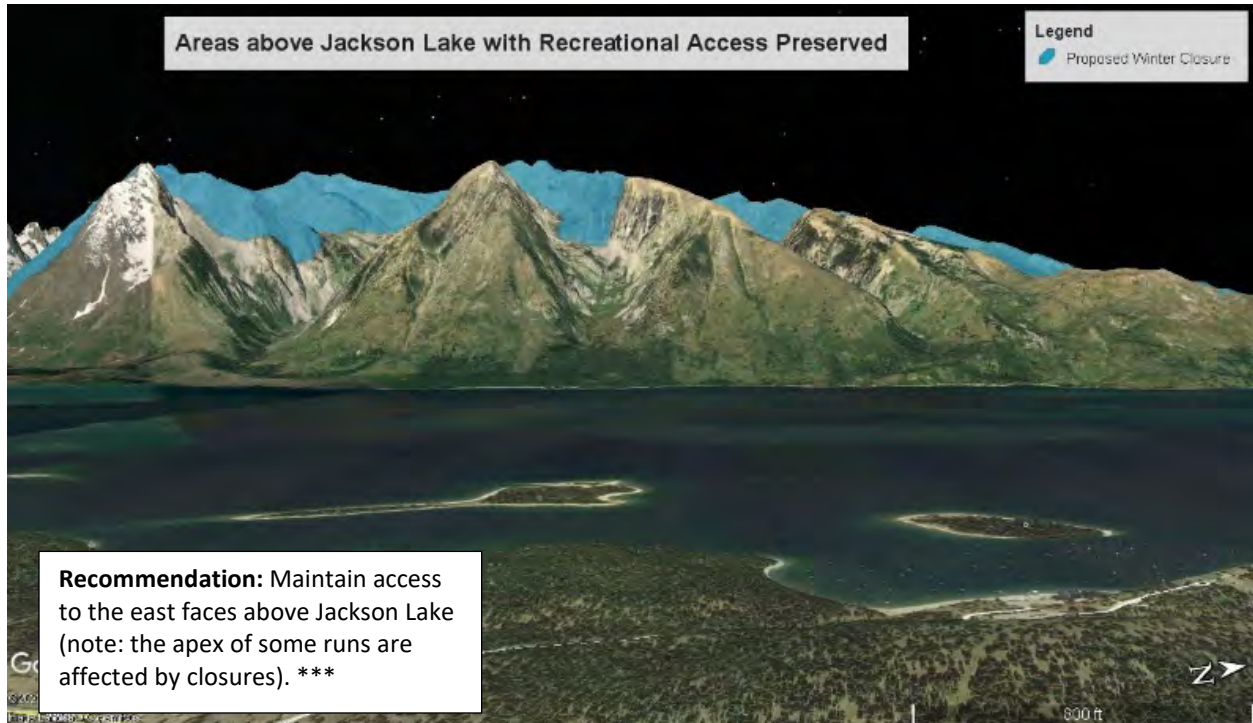
Opportunities

- ✓ Current low recreational use due to remoteness.
- ✓ Relatively small area that winters high proportion of Northern sheep population.

Challenges

- ✗ Low-level, historic use by NPS employees staying at Upper Berry cabin.
- ✗ Closure will eliminate access to several ski runs identified during the collaborative process.
- ✗ Ensuring compliance will be difficult due to remote backcountry location and will primarily rely on recreationists doing the right thing and self-enforcing.
- ✗ Robust public information campaign would be needed to provide education.
- ✗ Time/personnel needed to post and maintain signs at primary access points to educate recreationists.

15. MAINTAIN RECREATION ACCESS TO EAST FACES ABOVE JACKSON LAKE



Opportunities

- ✓ Preserves recreational opportunities in large area that is highly valued for skiing and of low-value to bighorn sheep (in winter).

Challenges

- ✗ Several popular routes in area abut important bighorn sheep habitat.
- ✗ Ensuring compliance will be difficult due to remote backcountry location and will primarily rely on recreationists doing the right thing and self-enforcing.
- ✗ Robust public information campaign would be needed to provide education.
- ✗ Time/personnel needed to post and maintain signs at primary access points to educate recreationists.

26. MAINTAIN EXISTING SKI ROUTES ON ALBRIGHT PEAK (OMEGA COULOIR, SE ALBRIGHT ROUTE, AND EAST OR SE FACE)



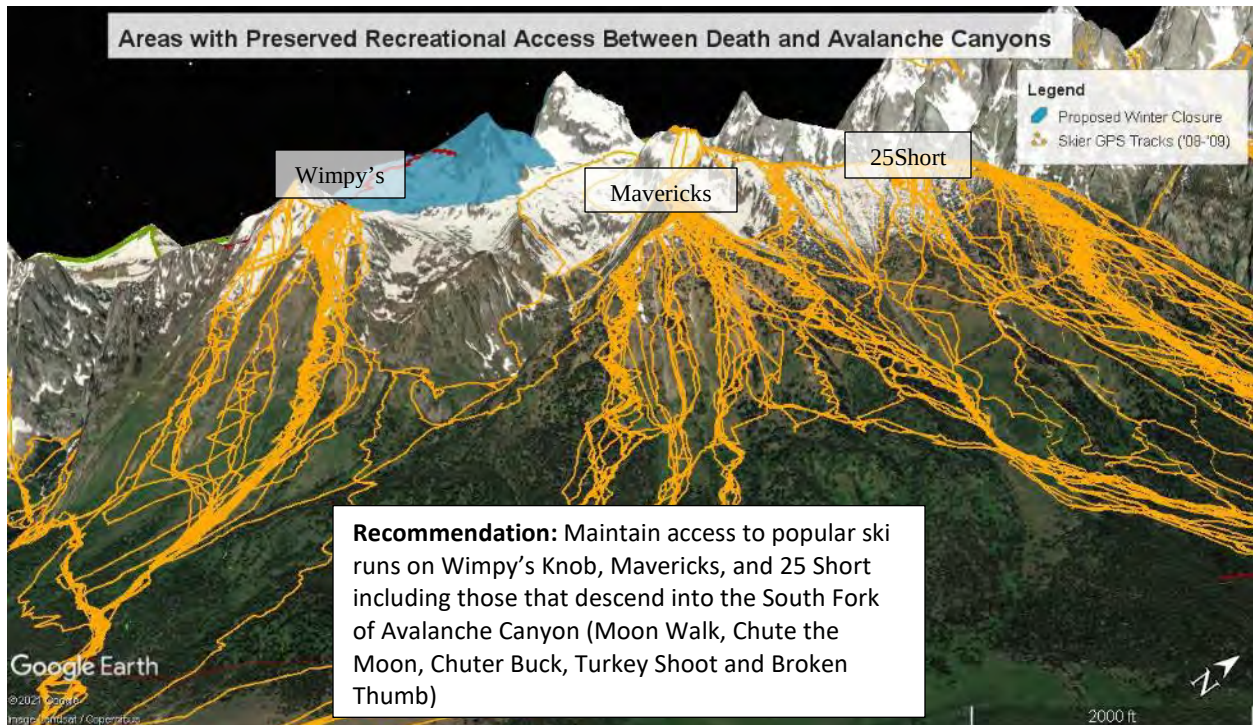
Opportunities

- ✓ Strong show of compromise to recreationalists by allowing continued access in bighorn sheep winter habitat.

Challenges

- ✗ Allows continued disturbance in important, occupied bighorn sheep winter range.

24. MAINTAIN EXISTING SKI ACCESS TO WIMPY'S KNOB, MAVERICKS, AND 25 SHORT



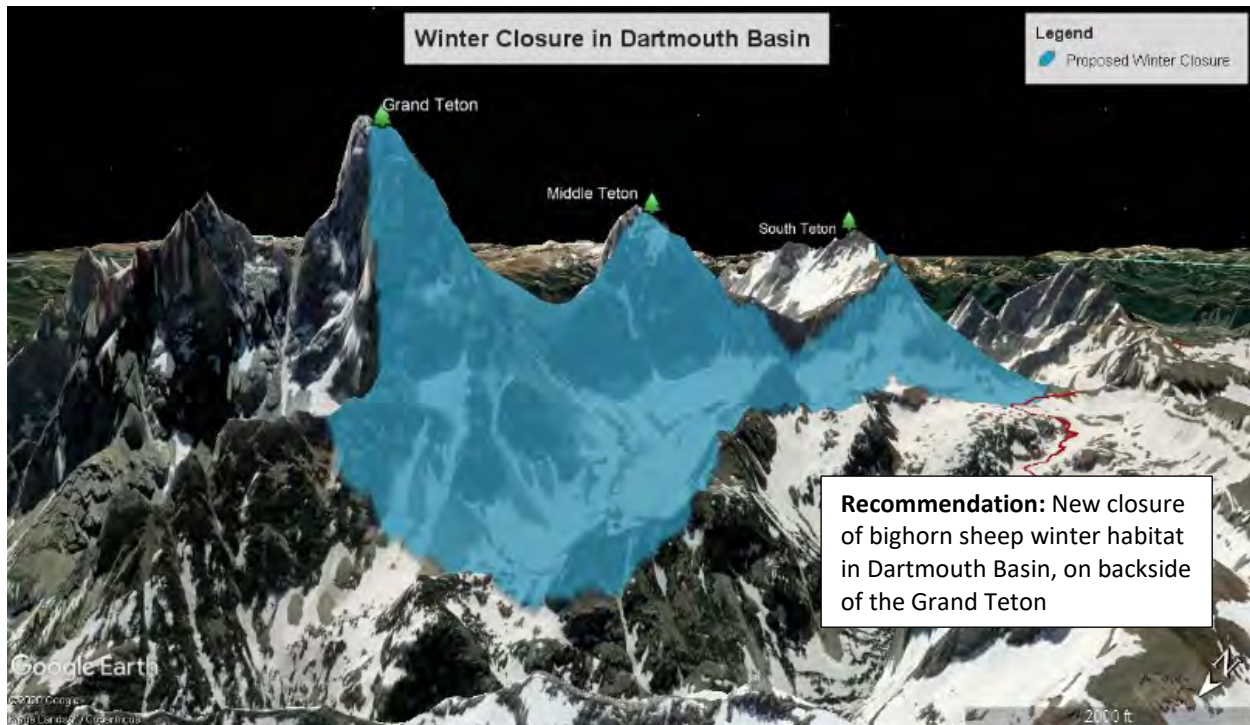
Opportunities

- ✓ Continues to provide recreational access to extremely popular area for backcountry skiing.
- ✓ Shows compromise to recreationalist by allowing continued access in bighorn sheep winter habitat.

Challenges

- ✗ Continues to sacrifice winter bighorn sheep habitat around Albright Peak and Stewart's Draw.

8. NEW WINTER CLOSURE IN THE DARTMOUTH BASIN/ICE FLOW LAKE AREA



Opportunities.

- ✓ Set aside high-quality winter habitat for bighorn sheep expansion.
- ✓ The area currently receives little recreational use.

Challenges

- ✗ Will close some aspirational ski terrain that is valued but rarely skied.
- ✗ Area is high-quality winter habitat but is not heavily used by bighorn sheep.
- ✗ Ensuring compliance will be difficult due to remote backcountry location and will primarily rely on recreationists doing the right thing and self-enforcing.
- ✗ Robust public information campaign would be needed to provide education.
- ✗ Time/personnel needed to post and maintain signs at primary access points to educate recreationists.

14. MAINTAIN SKI ROUTE BETWEEN OWL CREEK AND MOOSE CREEK VIA MOOSE BASIN DIVIDE



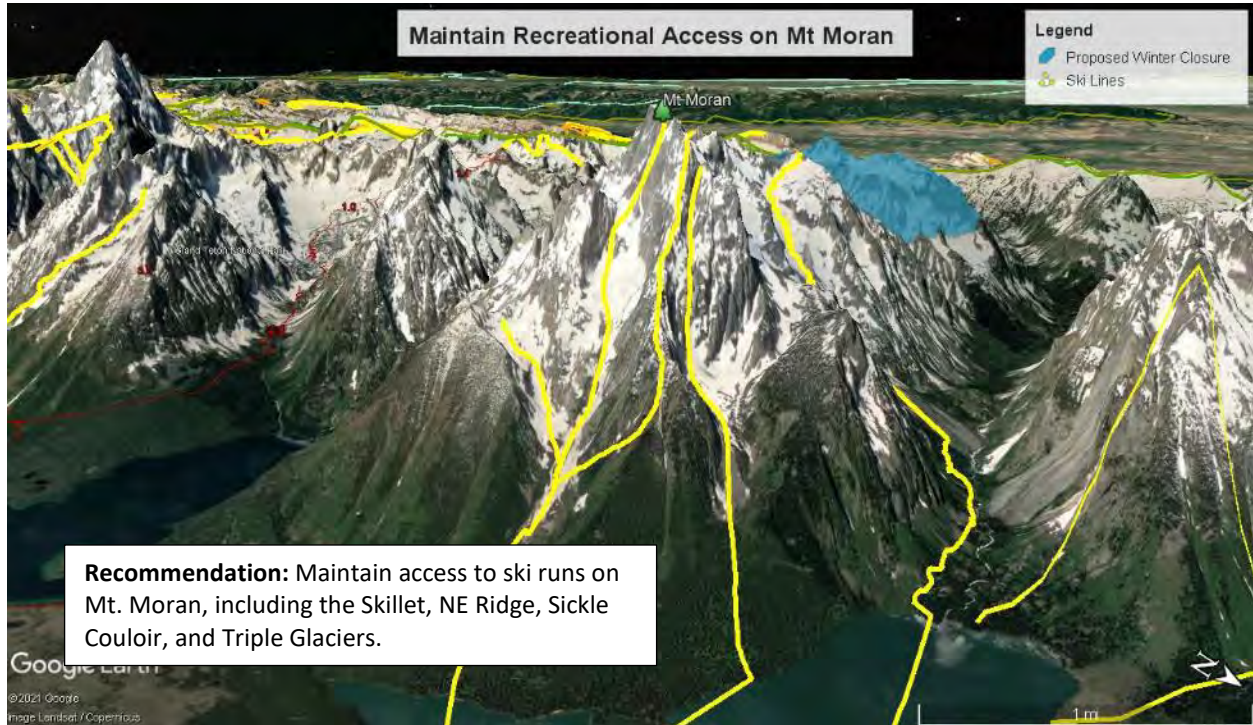
Opportunities

- ✓ Short path through proposed closure allows completion of multi-day ski traverse.
- ✓ Disturbed area will be relatively small proportion of proposed closure.

Challenges

- ✗ Allows disturbance in occupied bighorn sheep winter range.

16. MAINTAIN SKI ACCESS ON MT MORAN



Opportunities

- ✓ Provides winter recreational opportunities in large swath of aspirational ski terrain that can be skied in variety of conditions.

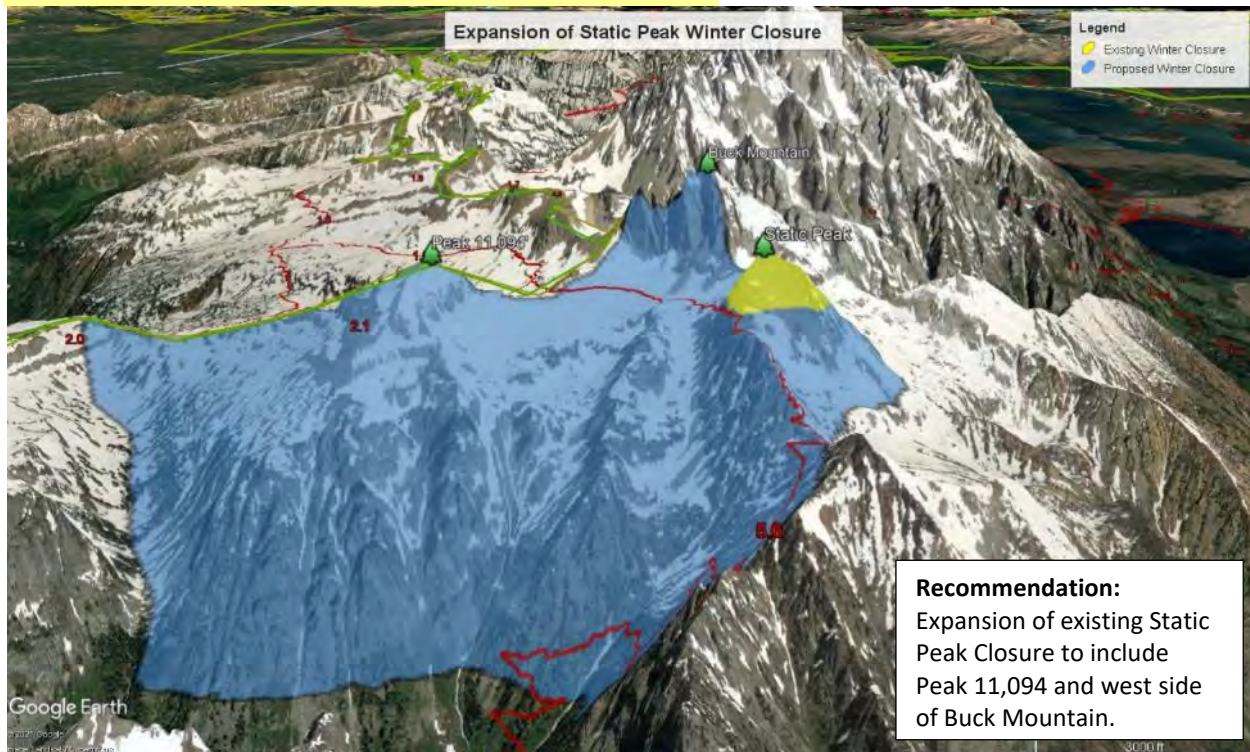
Challenges

- ✗ Area is occupied winter range for small number of bighorn rams.
- ✗ Area has potential for expanded use by bighorn sheep in future years and allowing recreation use may prevent/disrupt that.

Grand Teton National Park Quadrant 2 - Moderate Priority Actions with High Benefit to Bighorn Sheep

This section summarizes and illustrates three moderate priority management action proposals with high benefit to bighorn sheep. These actions include expanding the existing Static Peak closure (Action 10), implementing a new closure in the Veiled Peak / Mt Wister area (Action 7) and monitoring skier and bighorn sheep activity on Death Canyon Shelf to improve understanding of how each uses the area in winter (Action 25).

10. EXPANSION OF EXISTING STATIC PEAK CLOSURE



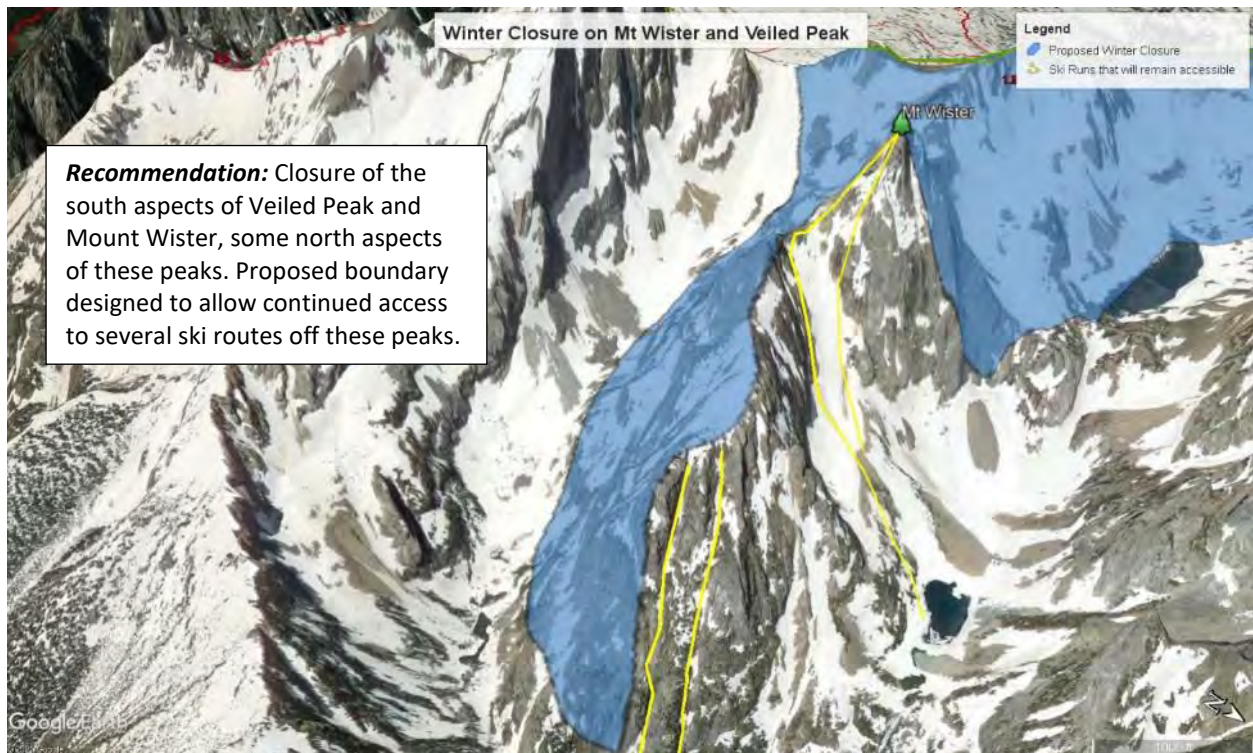
Opportunities

- ✓ Enhances effectiveness of closure.
- ✓ Provides necessary expansion to existing closure without cutting off recreation access to any ski routes identified during public process.

Challenges

- ✗ Large area in midst of zone that is heavily used and cherished by ski-community.
- ✗ Ensuring compliance will be difficult due to remote backcountry location and will primarily rely on recreationists doing the right thing and self-enforcing.
- ✗ Robust public information campaign will be needed to provide education.
- ✗ Time/personnel needed to post and maintain signs at primary access points to educate recreationists.

7. NEW WINTER CLOSURE IN VEILED PEAK/MT WISTER AREA



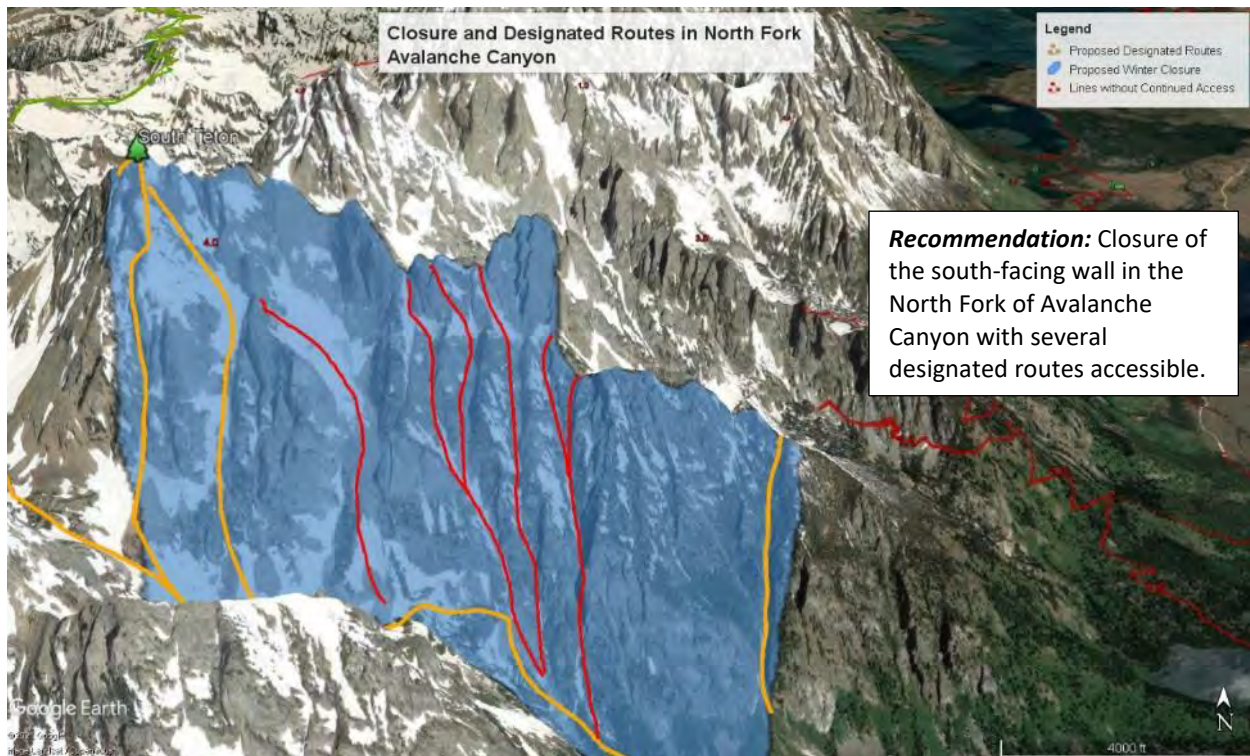
Opportunities

- ✓ Protect habitat for segment of population whose winter range is entirely unprotected and is in area that will see increased recreation in future.
- ✓ Reduce disturbance in important wintering areas for bighorn sheep while maintaining recreational access to several highly-valued ski-runs (see action #23).

Challenges

- ✗ The area is highly valued ski-terrain despite receiving relatively little recreational use.
- ✗ Ensuring compliance will be difficult due to remote backcountry location and will primarily rely on recreationists doing the right thing and self-enforcing.
- ✗ Robust public information campaign would be needed to provide education.
- ✗ Time/personnel needed to post and maintain signs at primary access points to educate recreationists.

20. DEVELOP EXPERIMENTAL MANAGEMENT OF BACKCOUNTRY WINTER RECREATION IN AVALANCHE CANYON



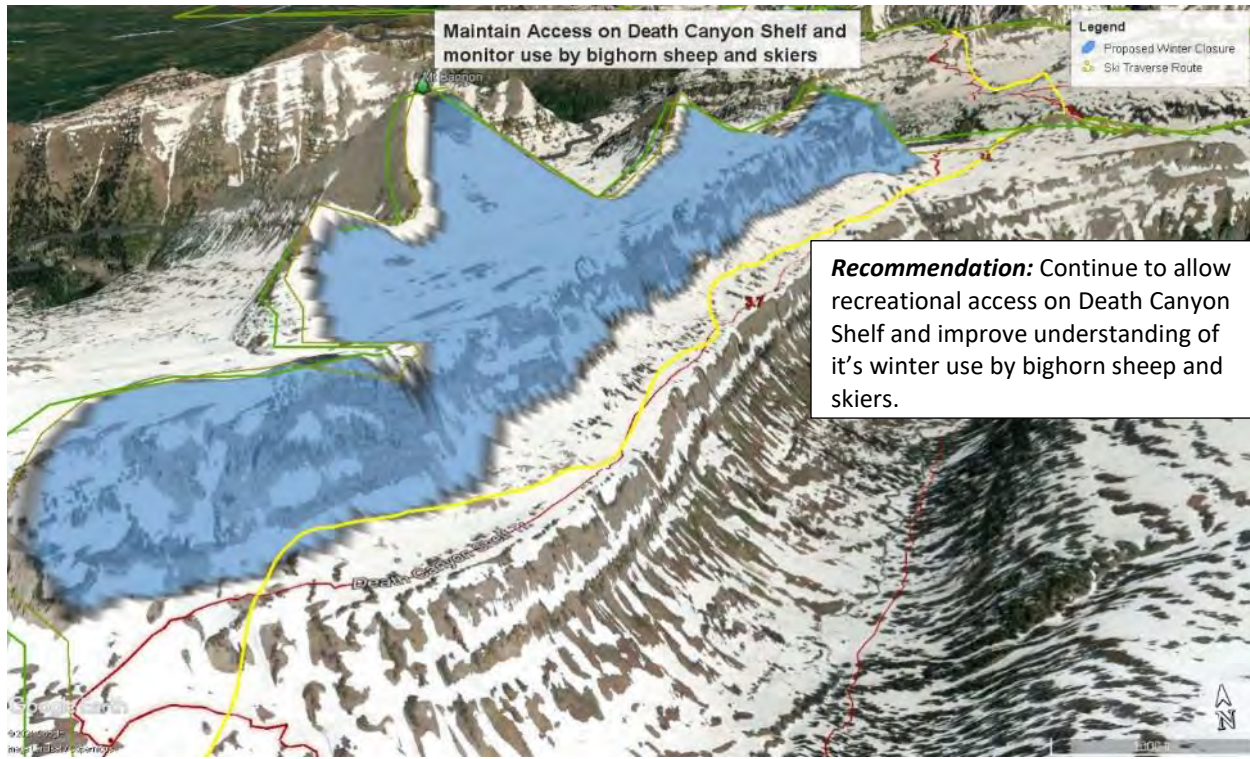
Opportunities

- ✓ Action represents a compromise, since the area provides very important wintering habitat for bighorn sheep and is considered highly valued and aspirational terrain by backcountry skiers and riders.
- ✓ Potential to maintain winter recreational opportunities while also reducing impact of recreation on bighorn sheep.
- ✓ Maintains access via designated route to highly valued terrain off the South Teton (Amora Vida and SE Couloir) and Shadow Peak (4-hour Couloir).
- ✓ Maintains access via designated route to north and east facing runs off Nez Perce (East and West Hourglass and Sliver) and Shadow Peak.

Challenges

- ✗ Curtails access to a portion of the south wall of Avalanche Canyon between the Southeast Couloir and the 4-hour Couloir.
- ✗ The Nugget Couloir, a popular run, off Nez Perce would not be accessible.
- ✗ Given experimental nature, potential for success is unknown.
- ✗ Will require active monitoring to ensure compliance and continued occupancy by bighorn sheep.
- ✗ Will require an intensive education campaign to make backcountry recreationists aware of areas that are open.

25. MAINTAIN ACCESS ON DEATH CANYON SHELF/MONITOR SKIER AND BIGHORN SHEEP USE



Opportunities

- ✓ Chance to learn more about bighorn sheep and recreational use of this area during winter

Challenges

- ✗ Area is extremely remote and difficult to access for monitoring during winter.
- ✗ Additional costs and staff time to design and implement monitoring effort.

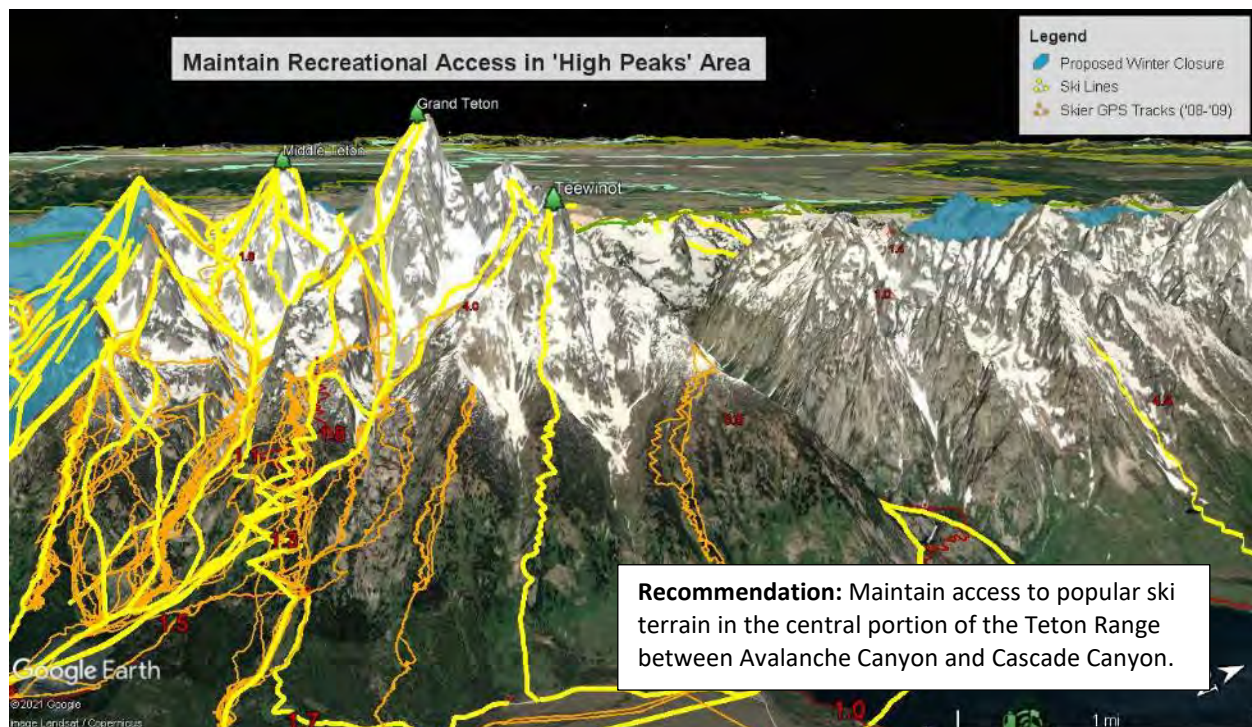
Grand Teton National Park Quadrant 4 - Moderate Priority Actions with High Feasibility

This section summarizes and illustrates eight moderate priority management action proposals with high feasibility. Within this quadrant actions are arranged by their expected benefit to bighorn sheep.

Two closures are proposed in the northern end of the Teton Range, including one around 'The Cleaver' (Action 6) and one on Survey Peak (Action 2). Also proposed in the northern end of the range is the opportunistic use of wildland fire to improve bighorn sheep habitat in the Survey Peak area (Action 1).

In the southern end of the range, we propose a management zone for the North Fork of Avalanche Canyon which combines a closure of the southerly aspects in the drainage with four designated routes to maintain access to the most valued or heavily-used runs in the zone. Additionally, a new closure is proposed on the west face of Cody Peak (Action 47) that will primarily impact skiers accessing the area from Jackson Hole Mountain Resort (See BTNF section for map of this action). We propose maintaining access to the 'High Peaks' area from Garnet Canyon to lower Cascade Canyon (Action 19), the ski traverse from South Fork Avalanche Canyon to Alaska Basin (Action 22), and certain aspects of Mt Wister. Also proposed is a designated route from North Fork Avalanche Canyon to South Fork Cascade Canyon.

19. MAINTAIN RECREATIONAL ACCESS TO HIGH PEAKS AREA IN AND ADJACENT TO GARNET CANYON



Opportunities

- ✓ Provides winter recreational opportunities in large swath of the Tetons' most aspirational ski terrain.
- ✓ Strong show of compromise to recreationalists by allowing continued access in bighorn sheep winter habitat.

Challenges

- ✗ Sacrifices bighorn sheep winter range and is prime area for bighorn sheep to expand into in future years.

6. NEW WINTER CLOSURE AROUND THE CLEAVER/MAIDENFORM PEAK



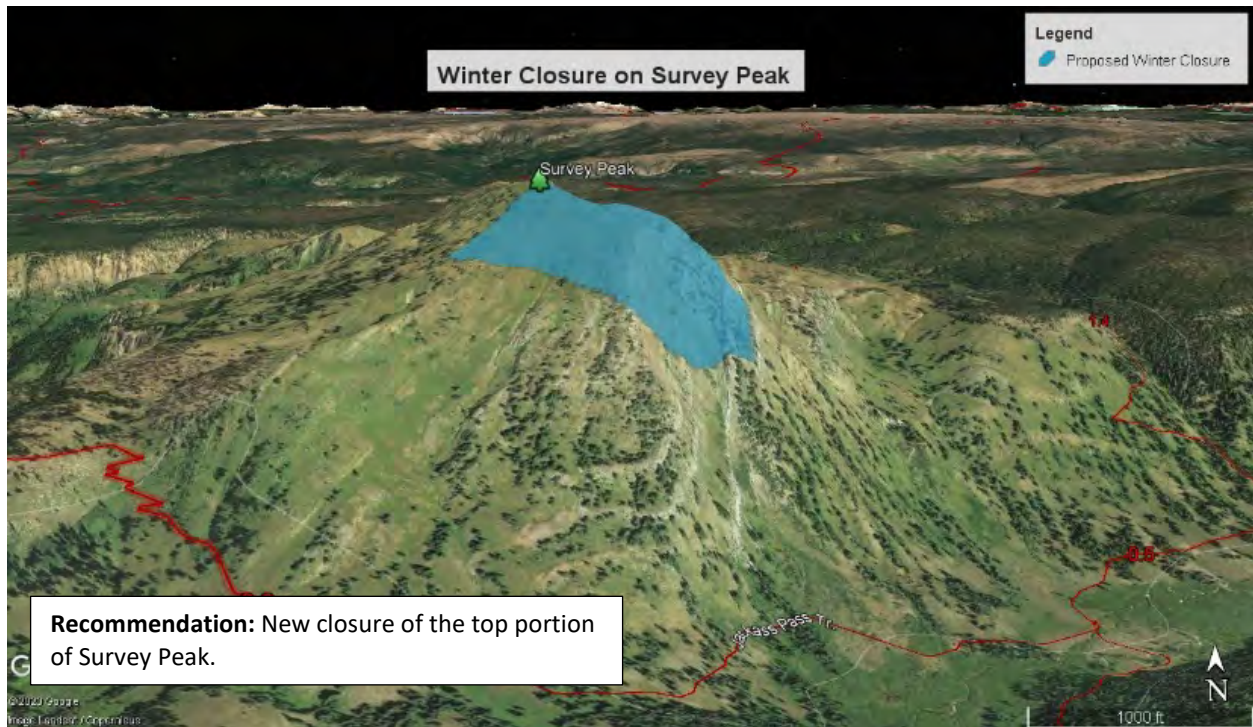
Opportunities

- ✓ Prevents disturbance in areas used by rams.
- ✓ Maintains current level of bighorn sheep use.
- ✓ High level of community support.
- ✓ Minimal impact to recreation.

Challenges

- ✗ Belief by some of the public that closure is not necessary because the area sees very little use.
- ✗ Ensuring compliance will be difficult due to remote backcountry location and will primarily rely on recreationists doing the right thing and self-enforcing.
- ✗ Robust public information campaign would be needed to provide education.
- ✗ Time/personnel needed to post and maintain signs at primary access points to educate recreationists.

2. NEW WINTER CLOSURE ON SURVEY PEAK



Opportunities

- ✓ Improve habitat security for bighorn sheep.
- ✓ Maintain existing sheep use and allow for increased use.
- ✓ Not identified as high-value location for backcountry recreation.
- ✓ Currently low-level winter recreation in this area.

Challenges

- ✗ Effectiveness of closure will require Caribou-Targhee National Forest to implement closure on its portion of Survey Peak.
- ✗ Ensuring compliance will be difficult due to remote backcountry location and will primarily rely on recreationists doing the right thing and self-enforcing.
- ✗ Robust public information campaign would be needed to provide education.
- ✗ Time/personnel needed to post and maintain signs at primary access points to educate recreationists.

23. MAINTAIN ACCESS ON MT. WISTER TO NE SNOWFIELD



Opportunities

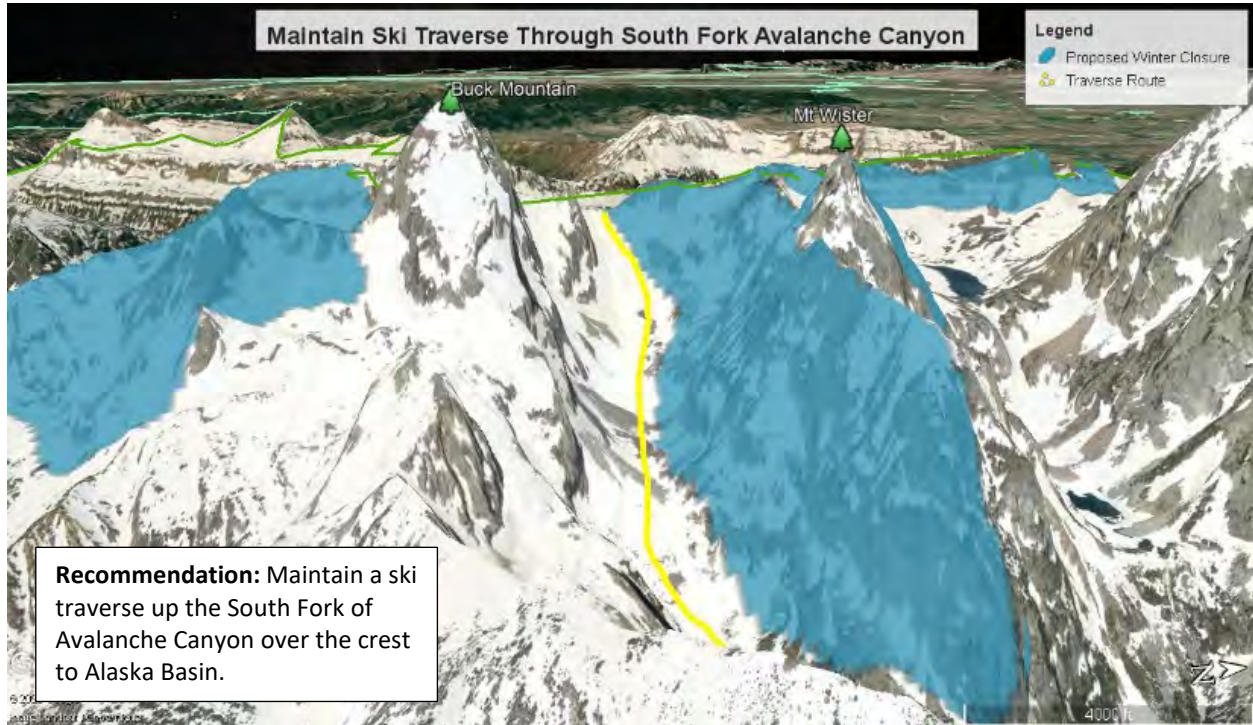
- ✓ Strong show of compromise to recreationalists by allowing continued access in bighorn sheep winter habitat.

Challenges

- ✗ Allows continued disturbance in important, occupied bighorn sheep winter range.
- ✗ Regular approach route for Cham Chutes is cut off by closure and skiers would have to find alternate approach.

22. MAINTAIN SKI ROUTE BETWEEN SOUTH FORK OF AVALANCHE CANYON AND ALASKA BASIN

Closure boundaries designed to facilitate continued use of ski traverse.



Opportunities

- ✓ Strong show of compromise to recreationalists by allowing continued access in bighorn sheep winter habitat.

Challenges

- ✗ Allows continued disturbance in important, occupied bighorn sheep winter range.

21. MAINTAIN SKI ROUTE BETWEEN NORTH FORK OF AVALANCHE CANYON AND SOUTH FORK OF CASCADE CANYON



Opportunities

- ✓ Strong show of compromise to recreationalists by allowing continued access in bighorn sheep winter habitat.

Challenges

- ✗ Allows continued disturbance in important, occupied bighorn sheep winter range.

1. WILDLAND FIRE USE IN AREA AROUND SURVEY PEAK

Opportunities

- ✓ Management of a natural fire ignition could achieve resource objectives for bighorn sheep habitat.
- ✓ Allows fire to function in its natural role on the landscape.
- ✓ Potential to restore an area of historical bighorn sheep winter habitat in the Teton Range.
- ✓ One of the only a few areas where expansion of bighorn sheep winter habitat is a possibility, which would provide a high degree of benefit for this herd.

Challenges

- ✗ Given Wilderness setting must rely on natural fire ignition.
- ✗ Uncertainty associated with managing a wildland fire use event, including political consequences.
- ✗ Cross-boundary location would require good coordination between NPS and USFS.

Caribou-Targhee National Forest Proposed Actions

The Working Group proposes a total of 17 management actions on Caribou-Targhee National Forest (CTNF) (Table 6). Of these, there are 13 highest priority actions (Quadrant 1 in Figure 8) and four moderate priority actions (Quadrants 2 and 4 in Figure 8). Of the moderate priority actions, one fell into Quadrant 2 (which is high benefit to bighorn sheep but lower feasibility) and three fell into Quadrant 4 which is lower benefit to bighorn sheep but high feasibility (Figure 8). There were no actions that fell into Quadrant 3 (low benefit to bighorn sheep and low feasibility).

Previous research conducted on bighorn sheep in the Teton Range classified 7,098 acres of high-quality winter habitat in CTNF's portion of the Teton Range (Courtemanch 2014). Currently, there are no bighorn sheep winter range protections in place on CTNF in the Teton Range. **The proposed management actions described in this section would protect 49% (3,478 acres) of the high-quality Teton bighorn sheep winter habitat on CTNF.** The remaining 51% of high-quality habitat exists primarily in areas that are either highly valued by winter recreationists, sparsely occupied by bighorn sheep at the present time, or currently too challenging for humans to reach during the winter. For these reasons, the additional 51% of high-quality bighorn sheep winter habitat is not being considered for management actions at this time. Public participants in the Collaborative Learning Process identified 20,664 acres of highly valued skiing areas on CTNF in the Teton Range. If all of the proposed management actions were implemented, **<1% of highly valued skiing areas would be closed to human access** on CTNF in the Teton Range.

Table 6. Scores and rankings for actions identified for Caribou-Targhee National Forest

Map Number	Action Description	Benefit to Bighorn Sheep	Implementation Feasibility
Quadrant 1: High Benefit for Bighorn Sheep, High Feasibility			
5	New closure between Camp Lake and South Bitch Creek (connects with closure in GRTE)	23.5	16.5
39	Maintain access for Baldy Knoll area	23.3	24.0
40	Maintain access for Taylor Mountain	22.8	24.0
34	New closure on south-facing slopes in Fox Creek	21.4	19.2
42	New closure on west side of Rendezvous Mountain and portion of upper Moose Creek (in updated version change to 47 and update score – 42 is included in 47)	19.8	17.6
31	New closure from Hurricane Pass south along the Teton Crest, including Battleship Mountain	19.8	16.8
36	Maintain access (designated route) from South Fork Teton Canyon to Hurricane Pass	19.5	21.5
32	New closure of low and mid elevation sheep winter ranges in Darby Canyon	19.5	18.0
38	Maintain access for Treasure Mountain and Table Mountain	19.0	17.3
28	New closure on the west side of Red Mountain	18.8	20.0

Map Number	Action Description	Benefit to Bighorn Sheep	Implementation Feasibility
30	Habitat treatment (prescribed fire) in historical bighorn sheep habitat in Teton Canyon	18.8	21.5
33	New closure Mt. Meek to Fossil Mountain	17.0	17.6
35	New closure south-facing slopes in upper Moose Creek	17.0	17.8
Quadrant 2: High Benefit for Bighorn Sheep, Lower Feasibility			
29	New closure on of south-facing slopes in Teton Canyon and North Fork Teton Canyon from mineral lick to national park boundary	18.0	11.5
Quadrant 4: Lower Benefit for Bighorn Sheep, High Feasibility			
22	Maintain access (designated route) between South Fork of Avalanche Canyon and Alaska Basin (connects to GRTE)	12.2	18.6
37	Maintain access (designated descent routes) in North Fork Teton Canyon	14.8	20.0
2	New closure on Survey Peak (connects with closure in GRTE)	13.2	19.8

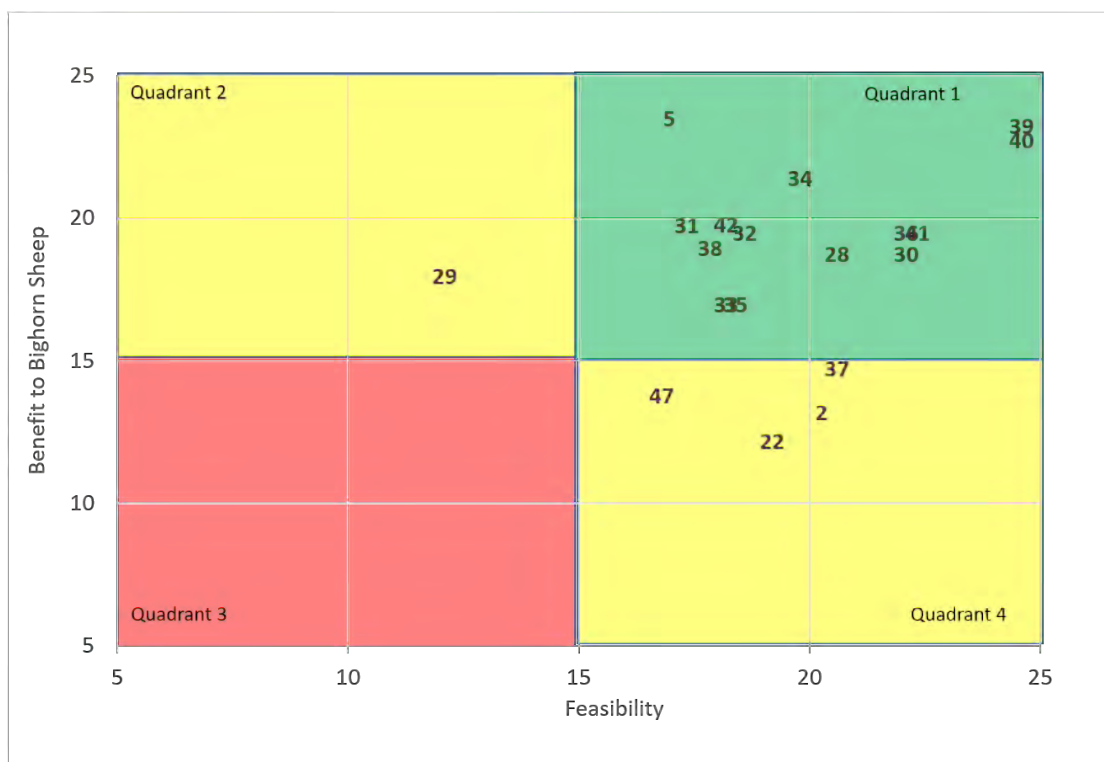


Figure 6. Scatterplot of Working Group's rankings for proposed actions in Caribou-Targhee National Forest. Actions in green quadrant are highest priority actions, actions in yellow quadrants are moderate priority actions, and actions in red quadrant are not being pursued by the Working Group. Points are represented as the map numbers that correspond to the actions in the table above (Table 6) and figures below (Figure 9 and 10).

Caribou-Targhee National Forest– North

Management Recommendations & Bighorn Sheep Winter Habitat

Management Recommendations & Winter Recreation

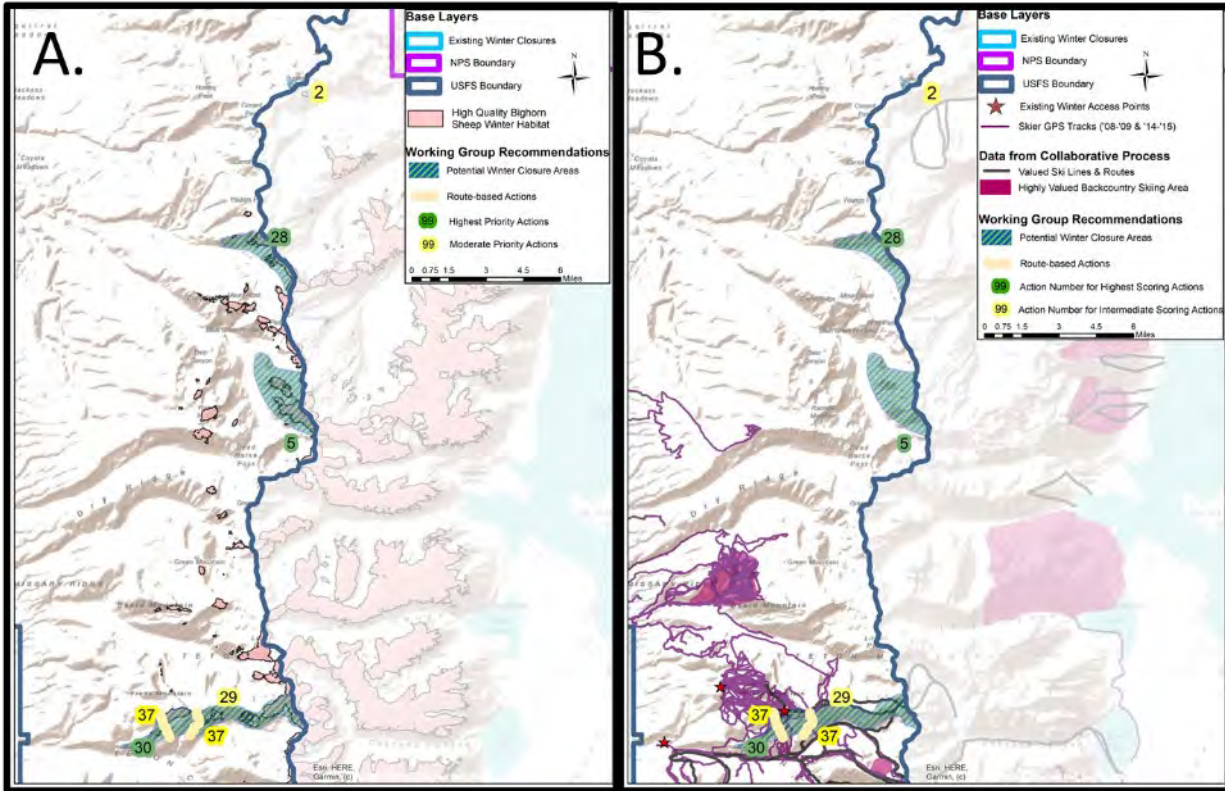


Figure 7. Highest- and moderate-priority proposed management actions relative to bighorn sheep winter habitat (panel A) and important areas and routes for back-country skiing (panel B) in the Caribou-Targhee National Forest. Label numbers correspond to action numbers in the Table 6 (above) and the labels are color-coded to indicate the priority of the actions, with green being highest priority and yellow being moderate priority. Low priority actions are not mapped.

Caribou-Targhee National Forest– South

Management Recommendations & Bighorn Sheep Winter Habitat

Management Recommendations & Winter Recreation

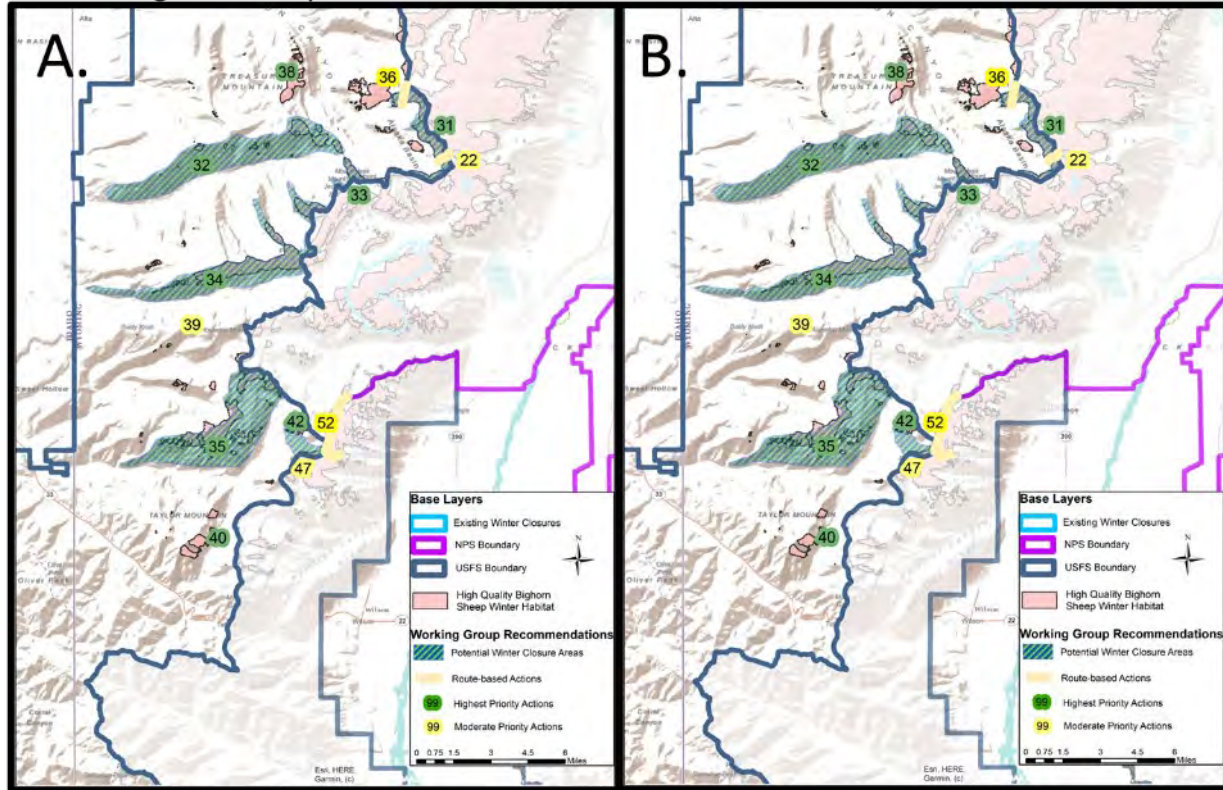


Figure 8. Highest- and moderate-priority proposed management actions relative to bighorn sheep winter habitat (panel A) and important areas and routes for back-country skiing (panel B) in the Caribou-Targhee National Forest. Label numbers correspond to action numbers in the Table 6 (above) and the labels are color-coded to indicate the priority of the actions, with green being highest priority and yellow being moderate priority. Low priority actions are not mapped.

Caribou-Targhee National Forest Highest Priority Actions

Summary

This section summarizes and illustrates the highest priority proposed management actions for the Caribou-Targhee National Forest. There are **13 proposed actions** in this category that were ranked highest because they provide high benefit for bighorn sheep and have high implementation feasibility (minimal impact on current winter recreation). Of these 13 proposed actions, there are eight proposed closures, one proposed designated travel route, one habitat treatment, and three areas for maintaining recreation access. None of these proposed actions are expected to impact winter motorized recreation because they are either located in Wilderness or on south-facing, steep, rocky slopes.

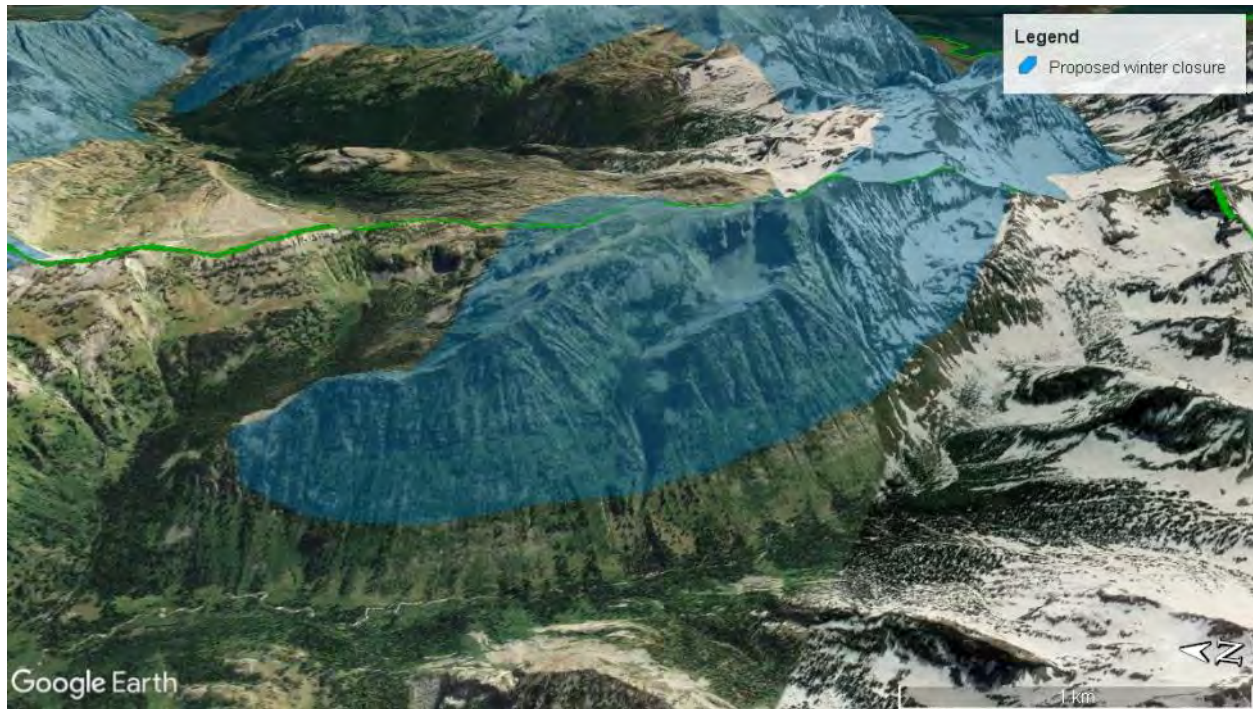
Caribou-Targhee National Forest provides important low and mid-elevation bighorn sheep winter habitat, which is not present elsewhere in the herd. Bighorn sheep use these areas during most winters, but they are especially important during mild winters and during the early and late winter season time periods. These main habitat areas would be protected through proposed closures on south-facing slopes in Moose Creek, Fox Creek, and Darby Creek. Currently, there is very little winter recreation occurring in these proposed closures, but they have a high potential for increased recreation in the near future. These closures would provide secure habitat for bighorn sheep into the future and would have minimal impact on current recreation use.

Caribou-Targhee National Forest also provides important high elevation bighorn sheep winter habitat, mostly along the border with Grand Teton National Park. There is high value bighorn sheep habitat in the northern Teton Range as well as connected, wind-blown habitat along the Teton Crest between Fossil Mountain and Table Mountain. The Teton Crest area is especially important as a movement corridor that allows bighorn sheep to move between winter habitat areas without having to travel through deep snow. There are several proposed closures in this area to protect this important movement corridor and winter habitat. There is one designated travel route proposed that would allow continued recreation access for people traversing the Teton Range.

Through this process, three popular and high value winter recreation areas were identified where maintaining recreation access would have little or no impact to bighorn sheep. These areas are Taylor Mountain, Baldy Knoll, Treasure Mountain, and Table Mountain. Maintaining access (essentially, no action) to these areas is included as part of these recommendations.

These proposed actions also include the planned Teton Canyon fuels reduction and habitat improvement project. This project was widely supported by both bighorn sheep advocates and winter recreationists during the public collaborative process.

5. NEW WINTER CLOSURE BETWEEN CAMP LAKE AND SOUTH BITCH CREEK



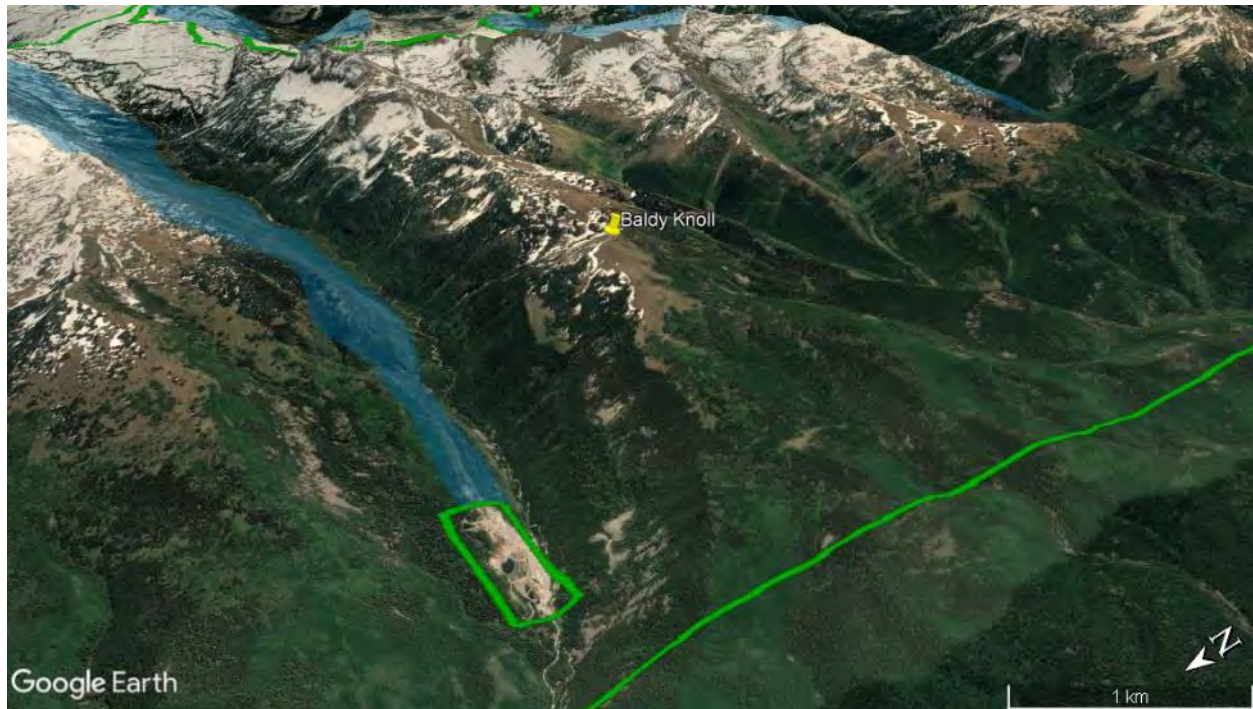
Opportunities

- ✓ Protects bighorn sheep winter range in an area with potential for increasing winter recreation.
- ✓ Connects to a proposed closure in the Doane/Ranger Peak area of Grand Teton National Park, providing additional benefit.
- ✓ Minimal impact to current recreation.
- ✓ Minimal financial costs, except for public information campaign.

Challenges

- ✗ Remote backcountry area that will be difficult to enforce and will mostly rely on recreationists self-enforcing.
- ✗ Robust public information campaign would be needed to provide education.
- ✗ Signs would be needed at main access points to educate recreationists.

39. MAINTAIN ACCESS FOR BALDY KNOLL AREA



Opportunities

- ✓ Maintaining recreation in this area causes minimal to no impact to bighorn sheep winter habitat.
- ✓ Popular and high value winter recreation area.
- ✓ No financial costs.

Challenges

- ✗ Future monitoring of recreation should occur to ensure recreation is not expanding into adjacent bighorn sheep winter habitat areas.

40. MAINTAIN ACCESS FOR TAYLOR MOUNTAIN



Opportunities

- ✓ Maintaining recreation in this area causes minimal impact to bighorn sheep winter habitat. There is a small area of bighorn sheep winter habitat on Taylor Mountain, but it has been unoccupied for several decades and is not well connected to other habitat areas.
- ✓ Popular and high value winter recreation area.
- ✓ No financial costs.

Challenges

- ✗ Future monitoring of bighorn sheep occupancy in this area should occur. If bighorn sheep recolonize this area in the future, habitat protections should be considered.

34. NEW WINTER CLOSURE ON SOUTH-FACING SLOPES IN FOX CREEK



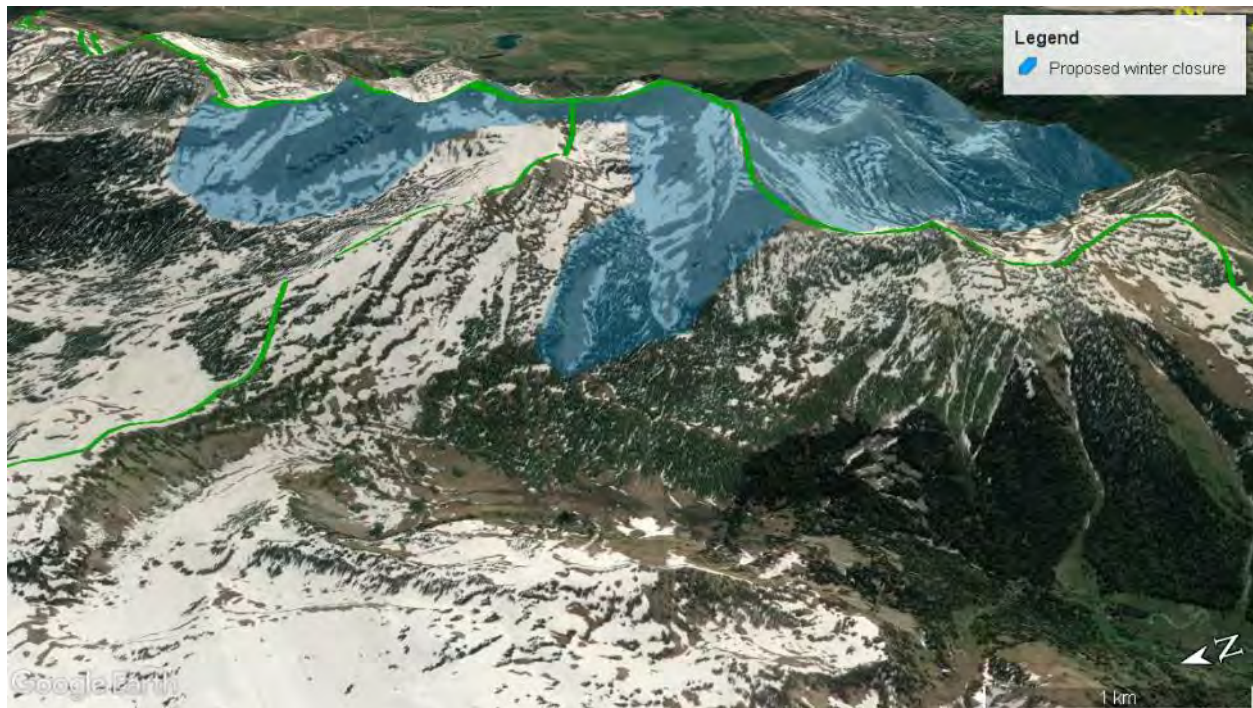
Opportunities

- ✓ Protects very high value bighorn sheep winter habitat at low and mid-elevation. Fox Creek provides some of the best remaining low and mid-elevation winter habitat for bighorn sheep in the Teton Range.
- ✓ Currently very minimal winter recreation on Fox Creek's south-facing slopes.
- ✓ Would protect this bighorn sheep winter habitat from the high potential of expanding winter recreation in the future.
- ✓ Low value winter recreation area.
- ✓ Proposed closure would not include the creek bottom, enabling continued recreation access along the creek corridor.

Challenges

- ✗ Moderate financial costs to sign the area, provide education, and conduct enforcement.

47. NEW WINTER CLOSURE ON WEST SIDE OF RENDEZVOUS MOUNTAIN AND UPPER PORTION OF MOOSE CREEK



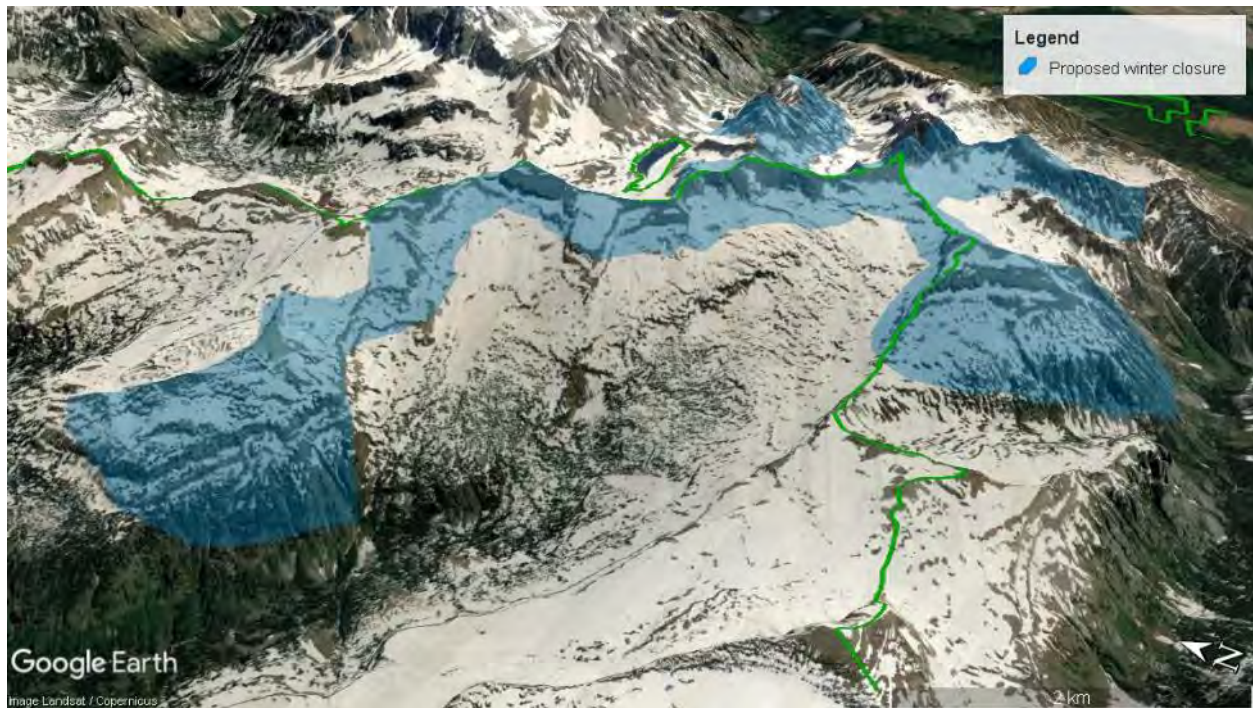
Opportunities

- ✓ Protects very high value bighorn sheep winter habitat and an important movement corridor between Rendezvous Mountain and low elevation habitat in Moose Creek.
- ✓ Low value winter recreation area that currently has very minimal recreation use.
- ✓ Would protect bighorn sheep winter habitat from the high potential of expanding winter recreation in this area in the future.
- ✓ Connects with adjacent closure on Bridger-Teton National Forest and Grand Teton National Park, providing additional benefit for bighorn sheep.

Challenges

- ✗ Moderate financial costs to sign the area, provide education, and conduct enforcement.

31. NEW WINTER CLOSURE FROM BATTLESHIP MOUNTAIN TO HURRICANE PASS ALONG TETON CREST TO UPPER SOUTH FORK TETON CREEK



Opportunities

- ✓ Protects very high value bighorn sheep winter habitat and an important movement corridor along the Teton Crest.
- ✓ Low value winter recreation area that currently has very minimal recreation use.
- ✓ Would protect bighorn sheep winter habitat from the high potential of expanding winter recreation in this area in the future.
- ✓ Connects with adjacent closure in Grand Teton National Park, providing additional benefit for bighorn sheep.

Challenges

- ✗ Moderate financial costs to sign the area, provide education, and conduct enforcement.
- ✗ Ensuring compliance will be difficult due to remote backcountry location and will primarily rely on recreationists doing the right thing and self-enforcing.

36. MAINTAIN ACCESS WITH A DESIGNATED ROUTE FROM SOUTH FORK TETON CANYON TO HURRICANE PASS



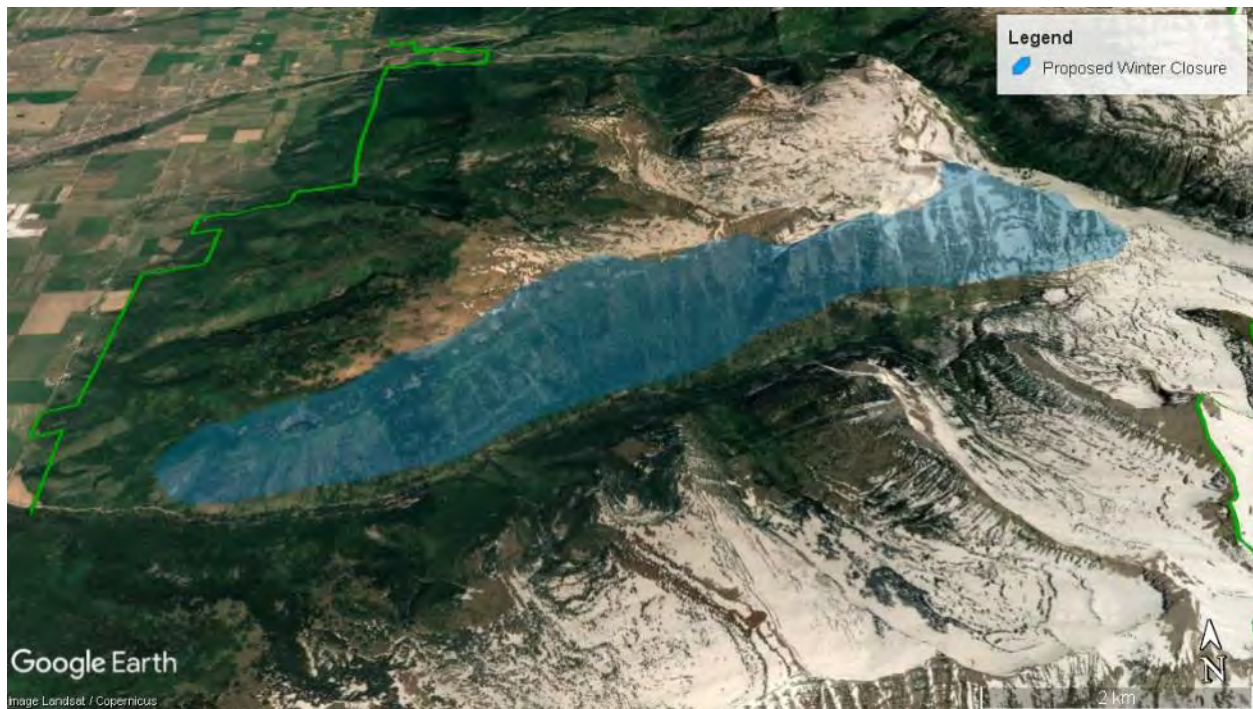
Opportunities

- ✓ Allows for continued recreation use along a designated travel route passing through the proposed closure. This is a popular recreation traverse point between Alaska Basin and Hurricane Pass.
- ✓ Concentrates human activity along one travel route, which provides predictability and decreases disturbance to bighorn sheep in a very high value habitat and movement area.
- ✓ Allows for continued recreation along a highly value route.
- ✓ The majority of people who enjoy these types of traverse routes in the Teton Range are also conservationists and generally longer-term residents of the area. They are willing to self-enforce and respect bighorn sheep habitat needs.
- ✓ Would protect bighorn sheep winter habitat from the high potential of expanding winter recreation in this area in the future.

Challenges

- ✗ Moderate financial costs to sign the area and provide education.
- ✗ Ensuring compliance will be difficult due to remote backcountry location and will primarily rely on recreationists doing the right thing and self-enforcing.

32. NEW WINTER CLOSURE OF SOUTH-FACING SLOPES IN DARBY CREEK



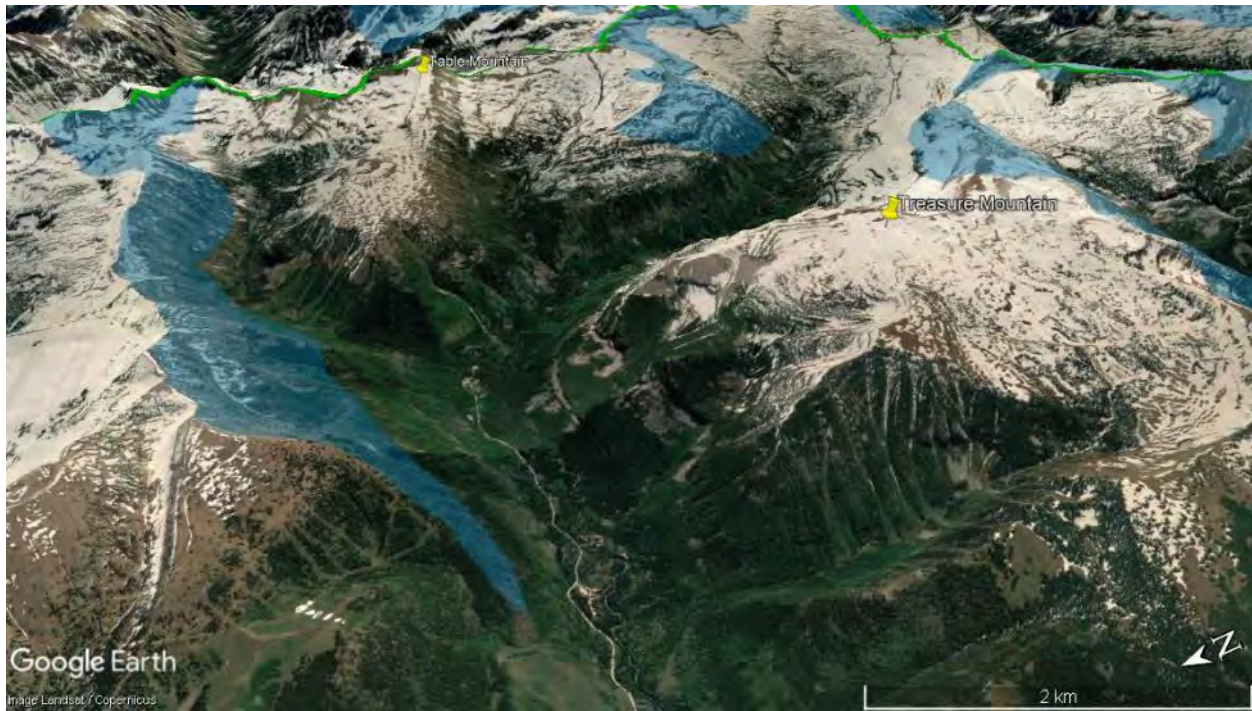
Opportunities

- ✓ Protects very high value bighorn sheep winter habitat at low and mid-elevation. Darby Creek provides some of the best remaining low and mid-elevation winter habitat for bighorn sheep in the Teton Range.
- ✓ Currently very minimal winter recreation on Darby Creek's south-facing slopes.
- ✓ Would protect this bighorn sheep winter habitat from the high potential of expanding winter recreation in the future.
- ✓ Low value winter recreation area.
- ✓ Proposed closure would not include the creek bottom or the primary travel route that skiers use from the trailhead to The Wedge, enabling continued recreation access along the bottom of the drainage.

Challenges

- ✗ Moderate financial costs to sign the area, provide education, and conduct enforcement.

38. MAINTAIN ACCESS FOR TREASURE MOUNTAIN AND TABLE MOUNTAIN



Opportunities

- ✓ Maintaining recreation in these areas causes minimal impact to bighorn sheep winter habitat.
- ✓ Popular and high value winter recreation areas.
- ✓ No financial costs.

Challenges

- ✗ Future monitoring of bighorn sheep occupancy in this area should occur. If bighorn sheep recolonize this area in the future, habitat protections should be considered.

28. NEW CLOSURE ON THE WEST SIDE OF RED MOUNTAIN



Opportunities

- ✓ Protects very high value bighorn sheep winter habitat.
- ✓ Low value winter recreation area that currently has very minimal recreation use.
- ✓ Would protect bighorn sheep winter habitat from the high potential of expanding winter recreation in this area in the future.
- ✓ Connects with adjacent closure in Grand Teton National Park, providing additional benefit for bighorn sheep.

Challenges

- ✗ Moderate financial costs to sign the area, provide education, and conduct enforcement.
- ✗ Ensuring compliance will be difficult due to remote backcountry location and will primarily rely on recreationists doing the right thing and self-enforcing.

30. HABITAT TREATMENT (PRESCRIBED FIRE) IN HISTORICAL BIGHORN SHEEP WINTER HABITAT IN TETON CANYON



Opportunities

- ✓ High potential to restore an area of historical, low elevation bighorn sheep winter habitat in the Teton Range.
- ✓ One of the only areas where expansion of bighorn sheep winter habitat is a possibility, which would provide a high degree of benefit for this herd.
- ✓ Would improve habitat connectivity to an important natural mineral lick in lower Teton Canyon.
- ✓ This area currently receives a moderate level of winter recreation. People primarily access this area from Grand Targhee Resort. The area was not identified as a high value area by participants in the collaborative process, however representation from Teton Valley was low.
- ✓ NEPA is completed and signed for this prescribed burn project. Bighorn sheep funding group such as the Wyoming Wild Sheep Foundation are eager to fund this project.
- ✓ This project is expected to increase bighorn sheep use of this area, which would provide excellent bighorn sheep viewing opportunities for the public from the Teton Canyon road.

Challenges

- ✗ Prescribed fire is often difficult to implement due to weather and fuel moisture windows.
- ✗ This is a highly complex prescribed burn due to steep slopes, cliffs, and heavily forested areas above the burn unit.
- ✗ A prescribed burn in this area could make it more attractive to skiers due to less vegetation, therefore, some level of recreation management must accompany the habitat treatment.

33. NEW WINTER CLOSURE ALONG TETON CREST FROM MT. MEEK TO FOSSIL MOUNTAIN



Opportunities

- ✓ Protects very high value bighorn sheep winter habitat and an important movement corridor along the Teton Crest.
- ✓ Low value winter recreation area that currently has very minimal recreation use.
- ✓ Would protect bighorn sheep winter habitat from the high potential of expanding winter recreation in this area in the future.
- ✓ Connects with adjacent closure in Grand Teton National Park, providing additional benefit for bighorn sheep.

Challenges

- ✗ Moderate financial costs to sign the area, provide education, and conduct enforcement.
- ✗ Ensuring compliance will be difficult due to remote backcountry location and will primarily rely on recreationists doing the right thing and self-enforcing.

35. NEW WINTER CLOSURE OF SOUTH-FACING SLOPES IN MOOSE CREEK



Opportunities

- ✓ Protects very high value bighorn sheep winter habitat at low and mid-elevation. Moose Creek provides some of the best remaining low and mid-elevation winter habitat for bighorn sheep in the Teton Range, especially in late winter.
- ✓ Currently very minimal winter recreation on Moose Creek's south-facing slopes.
- ✓ Would protect this bighorn sheep winter habitat from the high potential of expanding winter recreation in the future.
- ✓ Low value winter recreation area.
- ✓ Proposed closure would not include the creek bottom, enabling continued recreation access along the bottom of the drainage.

Challenges

- ✗ Moderate financial costs to sign the area, provide education, and conduct enforcement.

Caribou-Targhee National Forest Moderate Priority Actions

Summary

This section summarizes and illustrates the moderate priority proposed management actions for the Caribou-Targhee National Forest. There are four proposed actions in this category. These fell into the moderate priority category either due to lower benefit to bighorn sheep or lower implementation feasibility (more impact to winter recreation). Of these four proposed actions, there are two proposed closures and two proposed designated travel routes. One of these is a potential compromise offered for the Teton Canyon area (Action #37).

Two of these proposed actions are related to Teton Canyon. Teton Canyon is unique because it is known to be historical bighorn sheep winter range and contains a natural mineral lick. There have been recent, sporadic observations of bighorn sheep using Teton Canyon in the winter, however, its current habitat conditions are not ideal due to heavy conifer and shrub encroachment. The planned Teton Canyon fuels reduction and habitat improvement project (Action #30) in the high priority category above would greatly improve winter habitat conditions for bighorn sheep. However, there is increasing backcountry skiing use originating from Grand Targhee Resort that is occurring in this area of bighorn sheep habitat. This area was not identified during the public collaborative process as a high value backcountry ski area, however, there is a segment of the ski community who uses this area who may not have participated in the public meetings. Action #37 is presented in this section as a potential compromise between bighorn sheep habitat needs and allowing some continued winter recreation access on designated routes.

29. NEW WINTER CLOSURE OF SOUTH-FACING SLOPES IN TETON CANYON AND NORTH FORK TETON CANYON



Opportunities

- ✓ Protects high value bighorn sheep winter habitat at low and mid-elevations.
- ✓ Would protect this bighorn sheep winter habitat area from the high potential of expanding winter recreation in the future.
- ✓ Protects a bighorn sheep movement route to natural mineral lick.
- ✓ This closure would provide added benefit to the habitat treatments planned for this area for bighorn sheep. These habitat treatments are a unique opportunity to increase winter habitat for bighorn sheep.
- ✓ Proposed closure would not include the creek bottom, enabling continued recreation access along the bottom of the drainage and the groomed trail.
- ✓ Members of the public who participated in the collaborative public meetings did not identify this area as high value for backcountry skiing.
- ✓ Enforcement may be easier than in other areas due to high visibility of offenders by other members of the public and one exit point at the Teton Canyon winter trailhead.
- ✓ This proposed closure combined with the planned habitat treatment are expected to increase bighorn sheep use of this area, which would provide excellent bighorn sheep viewing opportunities for the public from the Teton Canyon groomed trail.

Challenges

- ✗ Would close some backcountry ski routes that are accessed from the Grand Targhee Resort boundary and drop into Teton Canyon.
- ✗ Likely to be opposed by the segment of the ski community that recreates here.
- ✗ Moderate financial costs to sign the area, provide education, and conduct enforcement.

22. MAINTAIN ACCESS WITH A DESIGNATED ROUTE BETWEEN ALASKA BASIN AND SOUTH FORK AVALANCHE CANYON IN GRAND TETON NATIONAL PARK



Opportunities

- ✓ Allows for continued recreation use along a designated travel route passing through the proposed closure. This is a popular recreation traverse point between Caribou-Targhee National Forest and Grand Teton National Park.
- ✓ Concentrates human activity along one travel route, which provides predictability and decreases disturbance to bighorn sheep in a very high value habitat and movement area.
- ✓ Allows for continued recreation along a highly value route.
- ✓ The majority of people who enjoy these types of traverse routes in the Teton Range are also conservationists and generally longer-term residents of the area. They are willing to self-enforce and respect bighorn sheep habitat needs.
- ✓ Would protect bighorn sheep winter habitat from the high potential of expanding winter recreation in this area in the future.

Challenges

- ✗ Moderate financial costs to sign trailheads and provide education.
- ✗ Ensuring compliance will be difficult due to remote backcountry location and will primarily rely on recreationists doing the right thing and self-enforcing.

37. COMPROMISE: MAINTAIN ACCESS WITH TWO DESIGNATED DESCENT ROUTES IN NORTH FORK TETON CANYON



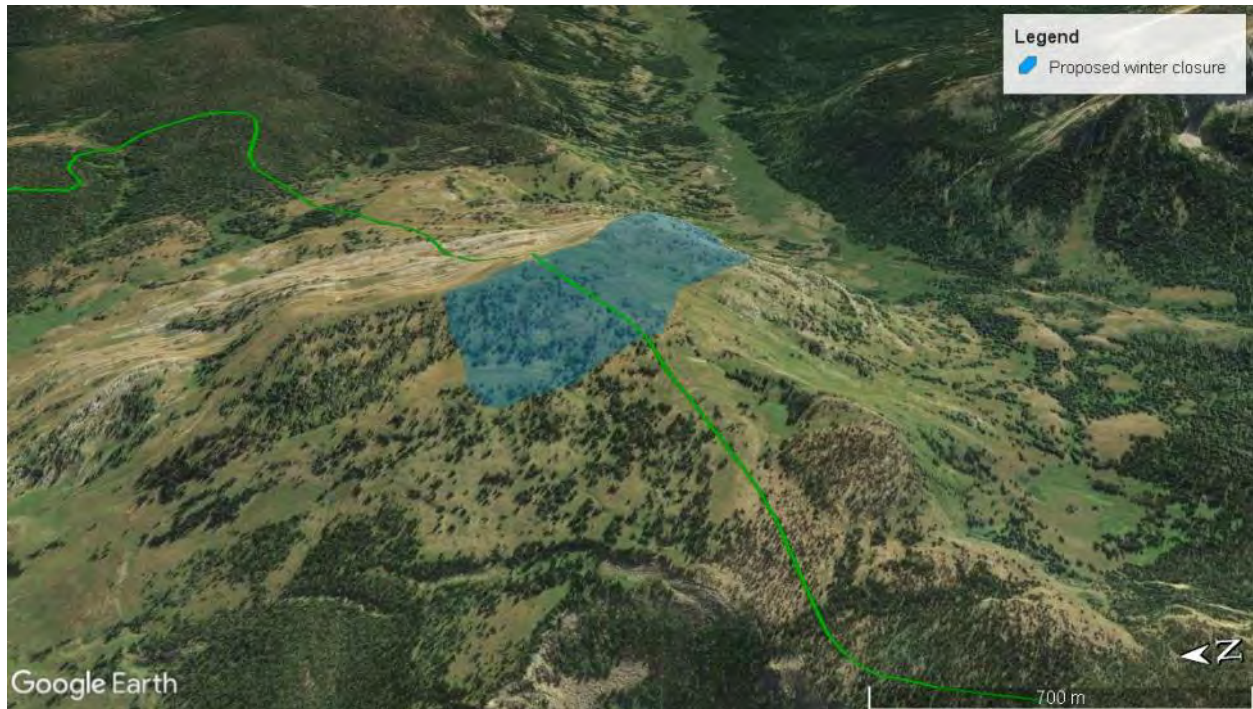
Opportunities

- ✓ This is a **potential compromise** with action #29 shown above.
- ✓ This combination of a new closure with two designated ski routes would protect high value bighorn sheep winter habitat at low and mid-elevations while allowing some skiing to continue.
- ✓ Would protect this bighorn sheep winter habitat area from the high potential of expanding winter recreation in the future.
- ✓ Still provides protection to a bighorn sheep movement route to natural mineral lick (one of only a few licks in the Teton Range).
- ✓ Would provide added benefit to the habitat treatments planned for this area for bighorn sheep. These habitat treatments are a unique opportunity to increase winter habitat for bighorn sheep.
- ✓ Members of the public who participated in the collaborative public meetings did not identify this area as high value for backcountry skiing, but it is gaining popularity with a certain segment of the ski community.
- ✓ Enforcement may be easier than in other areas due to high visibility of offenders by other members of the public and one exit point at the Teton Canyon winter trailhead.
- ✓ This proposed compromise, combined with the planned habitat treatment, are expected to increase bighorn sheep use of this area, which would provide excellent bighorn sheep viewing opportunities for the public from the Teton Canyon groomed trail.

Challenges

- ✗ Would close some backcountry ski routes that are accessed from the Grand Targhee Resort boundary and drop into Teton Canyon.
- ✗ May be opposed by the segment of the ski community that recreates here.
- ✗ Moderate financial costs to sign the area, provide education, and conduct enforcement.

2. NEW WINTER CLOSURE ON SURVEY PEAK



Opportunities

- ✓ Protects very high value bighorn sheep winter habitat.
- ✓ Would maintain existing sheep use and allow for increased use.
- ✓ Low value winter recreation area that currently has very minimal recreation use.
- ✓ Would protect bighorn sheep winter habitat from the potential of expanding winter recreation in this area in the future.
- ✓ Connects with adjacent closure in Grand Teton National Park, providing additional benefit for bighorn sheep.

Challenges

- ✗ Moderate financial costs to sign the area, provide education, and conduct enforcement.
- ✗ Relatively small, isolated area of winter habitat.
- ✗ Ensuring compliance will be difficult due to remote backcountry location and will primarily rely on recreationists doing the right thing and self-enforcing.

Bridger-Teton National Forest Actions

Based on the prioritization methods described above, the Working Group proposes five ‘highest priority’ actions (Quadrant 1 in Figure 11) - high benefit for bighorn sheep and high feasibility), two moderate priority actions with high benefit to bighorn sheep but low feasibility (Quadrant 2 in Figure 11), three moderate priority actions with high feasibility but low benefit to bighorn sheep (Quadrant 4 in Figure 11) in the Bridger-Teton National Forest (Table 7, Figure 12). One suggested action is not being recommended because it has low benefit to bighorn sheep and low feasibility (Quadrant 3 in Figure 11).

Previous research conducted on bighorn sheep in the Teton Range classified 2,112 acres of high-quality winter habitat in the Bridger-Teton’s portion of the Teton Range. Currently, no bighorn sheep winter range in is protected from human disturbance. The proposed management actions (highest priority and moderate priority) would protect 38% of high-quality winter habitat in the Bridger-Teton National Forest. The remaining 62% of high-quality habitat exists primarily in areas that are highly valued by winter recreationists (e.g. inbounds and side country areas at Jackson Hole Mountain Resort that receive intense skiing pressure already), sparsely occupied by bighorn sheep at the present time, or currently challenging for humans to reach during winter. Public participants in the Collaborative Learning Process identified 8,334 acres of highly valued skiing in the Bridger-Teton National Forest, of which 1% would be closed to human access during the winter if all the proposed management actions were implemented.

Table 7. Total Criterion Scores for Actions Identified for Bridger-Teton National Forest.

Map Number	Action Description	Benefit to Bighorn Sheep	Implementation Feasibility
Quadrant 1: High Benefit for Bighorn Sheep, High Feasibility			
49	Maintain access on North facing ski runs in Granite Canyon accessed from JHMR (Granite runs are within GRTE, but gates are in BTNF)	22.2	25.0
43	Install educational signage at out-of-bounds access points from JHMR	18.7	24.2
51	Maintain access on the Pyramid	17.2	23.4
53	Monitoring Resort-wide or BTNF-wide?	16.4	15.4
44	Signage at out-of-Park Boundary vicinity Peak 10,215	15.2	22.9
Quadrant 2: High Benefit for Bighorn Sheep, Lower Feasibility			
48	Wildland fire use in areas within or adjacent to bighorn sheep habitat on the BT portion of the Teton Range	18.0	14.0
45	New closure on East and southeast aspects to Peak 10,053 (Jensen Canyon area)	18.0	13.8
Quadrant 4: Lower Benefit for Bighorn Sheep, High Feasibility			
46	Fire/fuels treatment within Teton to Snake Project	15.0	20.0
52	Maintain access on the Martini Chutes	15.0	18.6
47	New closure on SW side of Cody Peak	13.8	16.2
Quadrant 3: Lower Benefit to Bighorn Sheep, Lower Feasibility			
50	Remove Jackson Hole Mountain Resort	0.0	0.0

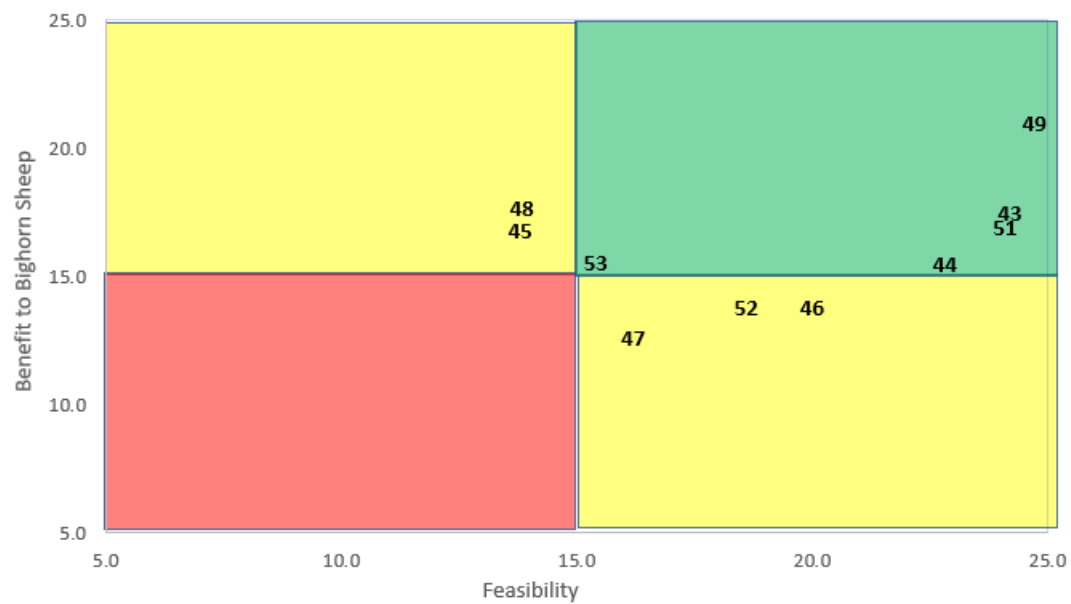


Figure 9. Scatterplot of Working Group's rankings for proposed actions in Bridger-Teton National Forest. Actions in green quadrant are highest priority actions, actions in yellow quadrants are moderate priority actions, and actions in red quadrant are not being pursued by the Working Group. Points are represented as the map numbers that correspond to the actions in the table above (Table 7) and figure below (Figure 12).

Bridger-Teton National Forest

Management Recommendations & Bighorn Sheep Winter Habitat

Management Recommendations & Winter Recreation

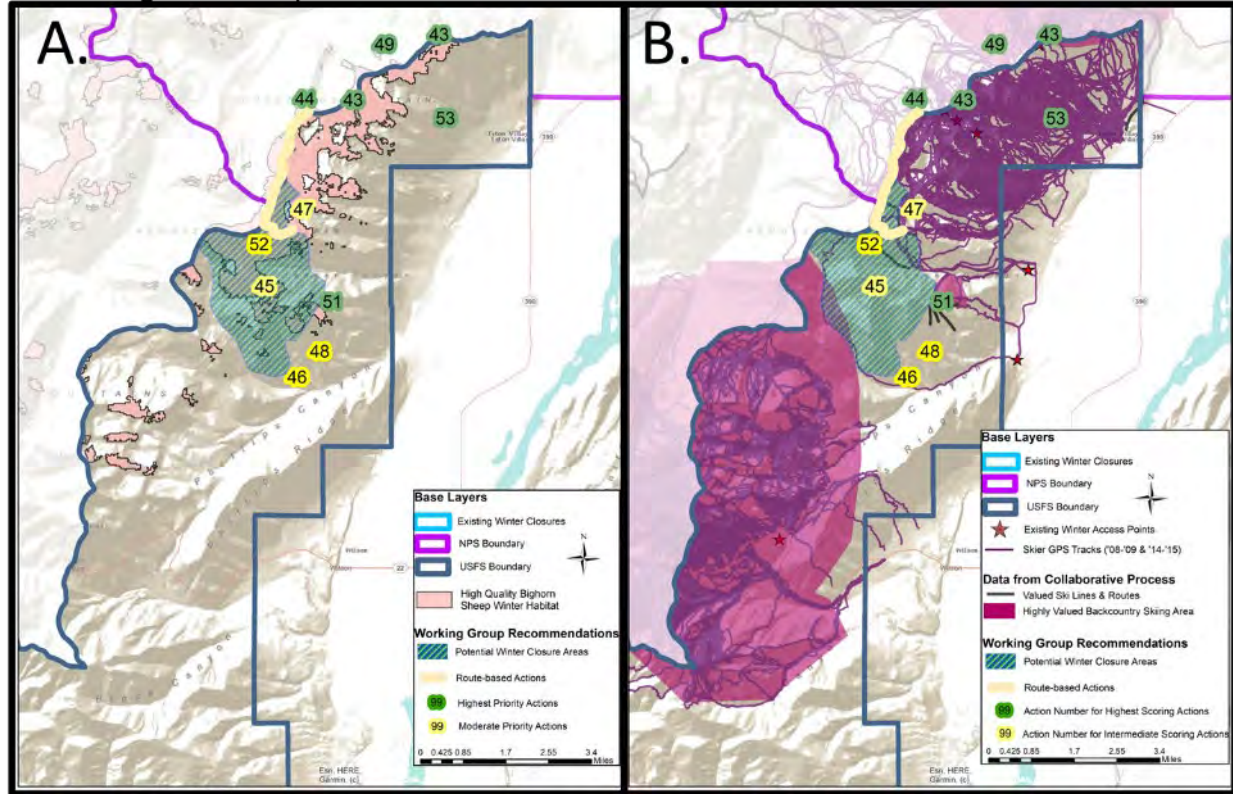


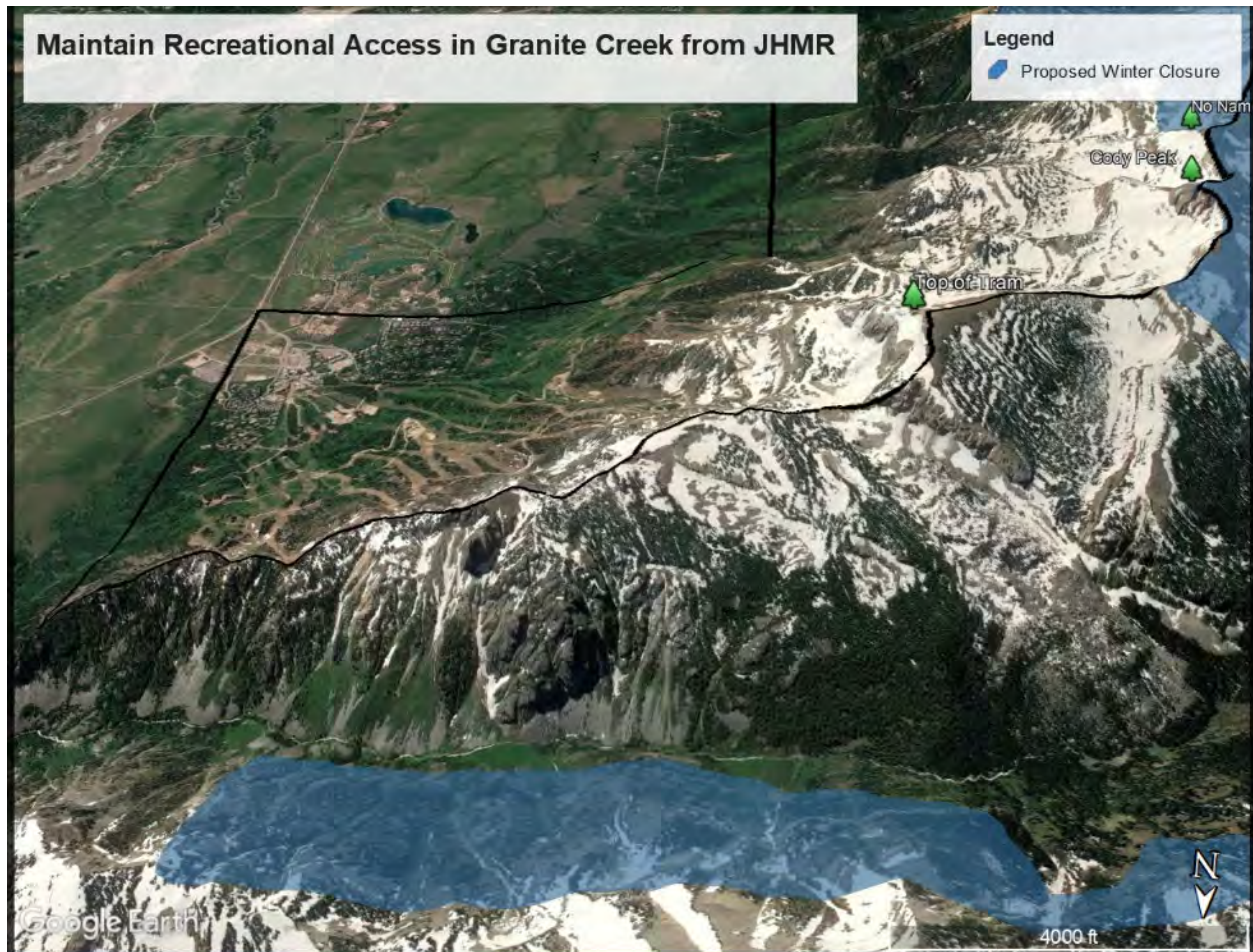
Figure 10. Highest- and moderate-priority proposed management actions relative to bighorn sheep winter habitat (panel A) and important areas and routes for back-country skiing (panel B) in the Bridger-Teton National Forest. Label numbers correspond to action numbers in the Table 7 (above) and the labels are color-coded to indicate the priority of the actions, with green being highest priority and yellow being moderate priority. Low priority actions are not mapped.

Bridger-Teton National Forest Quadrant 1 - Highest Priority Actions

This section summarizes and illustrates the highest priority proposed management actions for the Bridger-Teton National Forest. Summaries are organized by the quadrant their prioritization scores fall into, and within quadrants are arranged by their 'benefit to bighorn sheep' scores.

The highest priority actions on the Bridger-Teton National Forest include maintaining access in high-valued ski locations, installing educational signage including voluntary avoidance of high-value BHS habitat at Jackson Hole Mountain Resort exit gates, and monitoring of the sheep bands that use Rendezvous Peak to determine if accelerated management may be necessary in this area. Maintaining full ski access in Granite Canyon (in Grand Teton NP but accessed via gates on JHMR on the Bridger-Teton NF) and on the Pyramid will be important due to demonstrating reasonable approach to management options. Both locations are lower-value sheep habitats and would not present high value to sheep, and the restrictions on skiers are unwarranted. The opportunity to reach a high volume of skiers about the Teton Range Bighorn sheep, the conservation challenge to maintaining this herd, and presenting voluntary options for skiers to avoid certain areas will build public support and concern for this herd, potentially resulting in less disturbance in areas whether or not there is management closure in place. Monitoring of the distributional and abundance effects on the band of sheep that traditionally inhabits Rendezvous Peak will guide future action.

49. MAINTAIN ACCESS TO NORTH FACING RUNS IN GRANITE CANYON ACCESSED FROM THE JACKSON HOLE MOUNTAIN RESORT



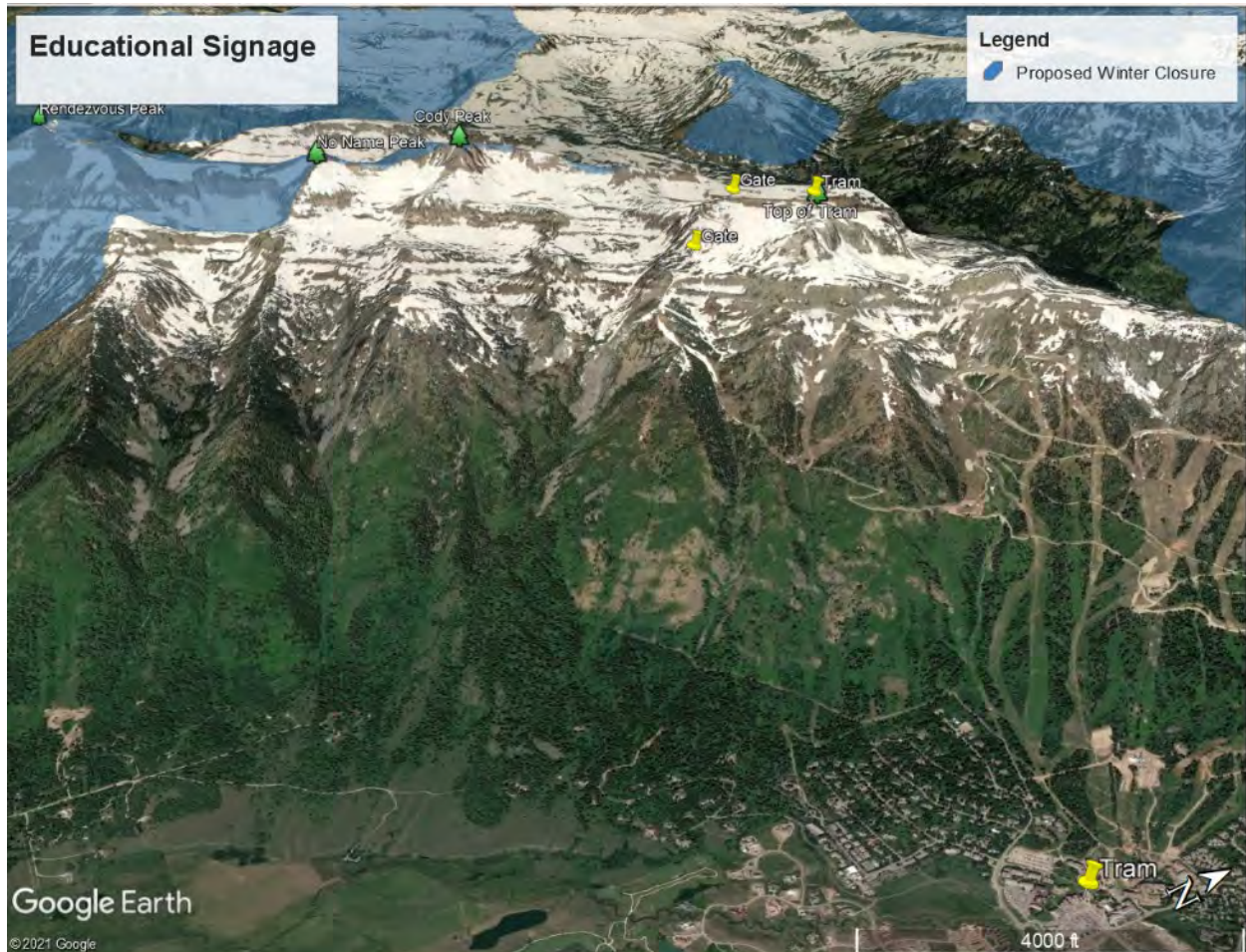
Opportunities

- ✓ These are high-valued and highly trafficked areas. These areas are steep, north-facing slopes that hold a lot of snow and are low-quality BHS habitat.
- ✓ Deliberately keeping access to these areas open shows expressed effort to maintain skiing access.

Challenges

- ✗ Educational opportunity exists to help skiers understand the functional differences and why certain areas are important to sheep and why others are not. Continued challenge to relay rationale and find support for connected actions or potential closures in other areas.

43. INSTALL EDUCATIONAL SIGNAGE AT OUT-OF-BOUNDS ACCESS POINTS FROM JHMR



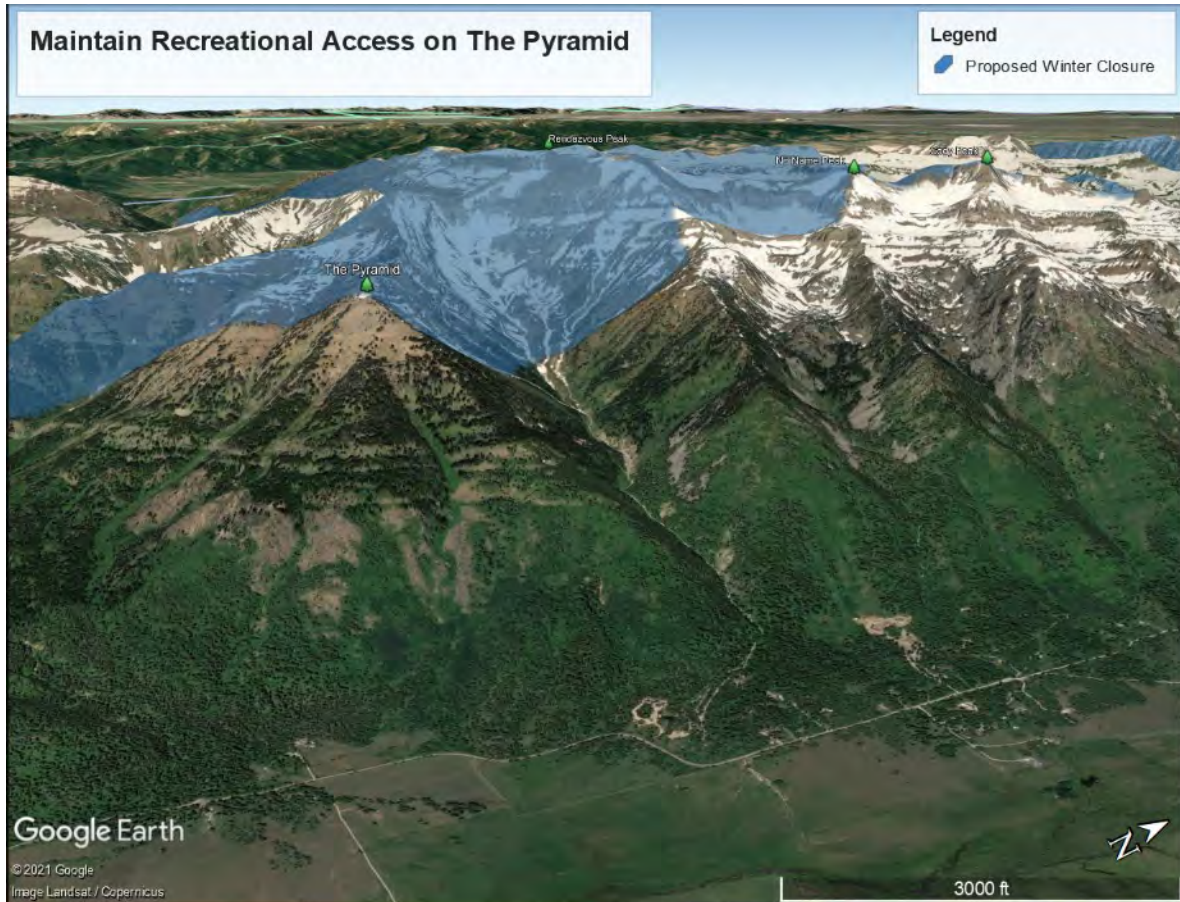
Opportunities

- ✓ Controlled exit points from JHMR provide great opportunity to reach high percentage of people who may be considering travelling in or near occupied sheep habitat.
- ✓ Kiosks already exist.
- ✓ JHMR and other non-profit or citizen partners may be predisposed to fund these efforts.
- ✓ Opportunity for JHMR to take lead on BHS conservation actions, showing intent.

Challenges

- ✗ Skiers may not voluntarily support restricting their behavior and opt to ski into sensitive areas regardless of information
- ✗ Infrastructure will need ongoing inspection and maintenance to ensure messages are accurate and to maintain physical integrity against weathering and wear and tear.
- ✗ May be difficult to monitor success.

51. MAINTAIN RECREATIONAL ACCESS ON THE PYRAMID



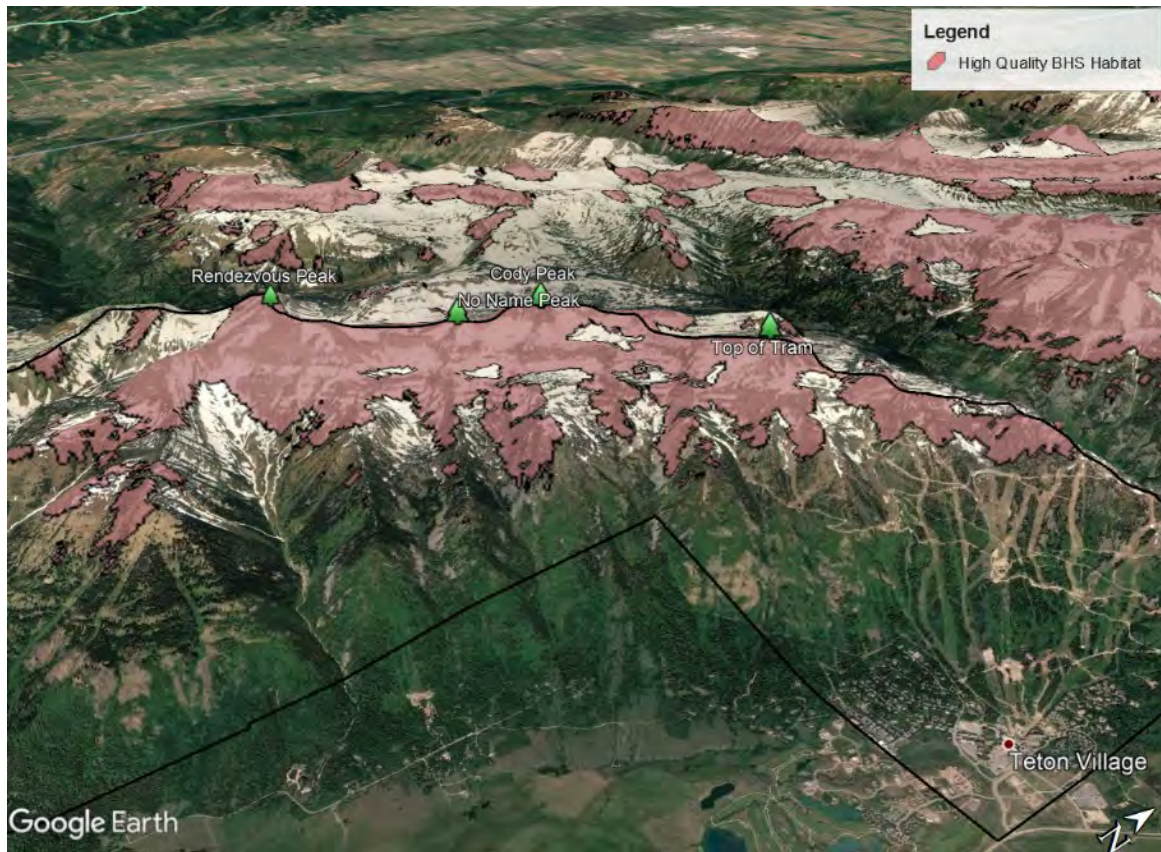
Opportunities

- ✓ Provide uninhibited access to an identified high-value ski route
- ✓ Build public support for proposed Upper Jensen canyon/Rendezvous Peak closure by providing access to specific location.

Challenges

- ✗ Challenges exist to highlight to the public the spatial difference or boundaries between this area of open access and potential closure area on Rendezvous Peak. “Knowing where the line is” on the ground may be difficult for some, and if not followed, disturbance to bighorn sheep could still occur.

53. MONITORING RESORT-WIDE OR BTNF-WIDE



Opportunities

- ✓ Establish data collection protocols and implementation schedules to collect data on side and backcountry skier patterns, distribution, and volume.
- ✓ Establish means of documenting bighorn sheep use of high-quality habitat within bounds, out of bounds, and near Rendezvous Peak to inform future management scenarios, including BTNF permitting of outfitter guide days. Information can guide annual JHMR operating plan parameters, including spatial distribution of permitted guided skiing.
- ✓ Establish meaningful and publicly understood appraisals of disturbance effect of skier patterns on Bighorn Sheep, proving up our commitment to providing sheep conservation measures with skiing access.

Challenges

- ✗ Establishing protocols and means of estimating skier distribution and volume may be difficult to nail down
- ✗ Depending on monitoring methods, may be expensive or time consuming
- ✗ Results could be vague or less than meaningful in an appraisal that would lead to concrete action
- ✗ Monitoring into the indefinite future without a plan can often lead to unclear outcomes
- ✗ Representing methods of monitoring and outcomes will require skill to reach constituents who are predisposed to reject scientific inference and management direction when counter to their values

44. SIGNAGE AT OUT-OF-PARK BOUNDARY VICINITY PEAK 10,215



Opportunities

- ✓ Signage at key skier route locations have high probability of being read by ski community.
- ✓ High-quality maps on signage will help people understand specific locations of concern.
- ✓ Opportunity to “explain the WHY” of areas of concern for bighorn sheep, and educational opportunity to share rationale and build support.
- ✓ JHMR and other non-profit or citizen partners may be predisposed to fund these efforts.
- ✓ Opportunity for JHMR to take lead on BHS conservation actions, showing intent.

Challenges

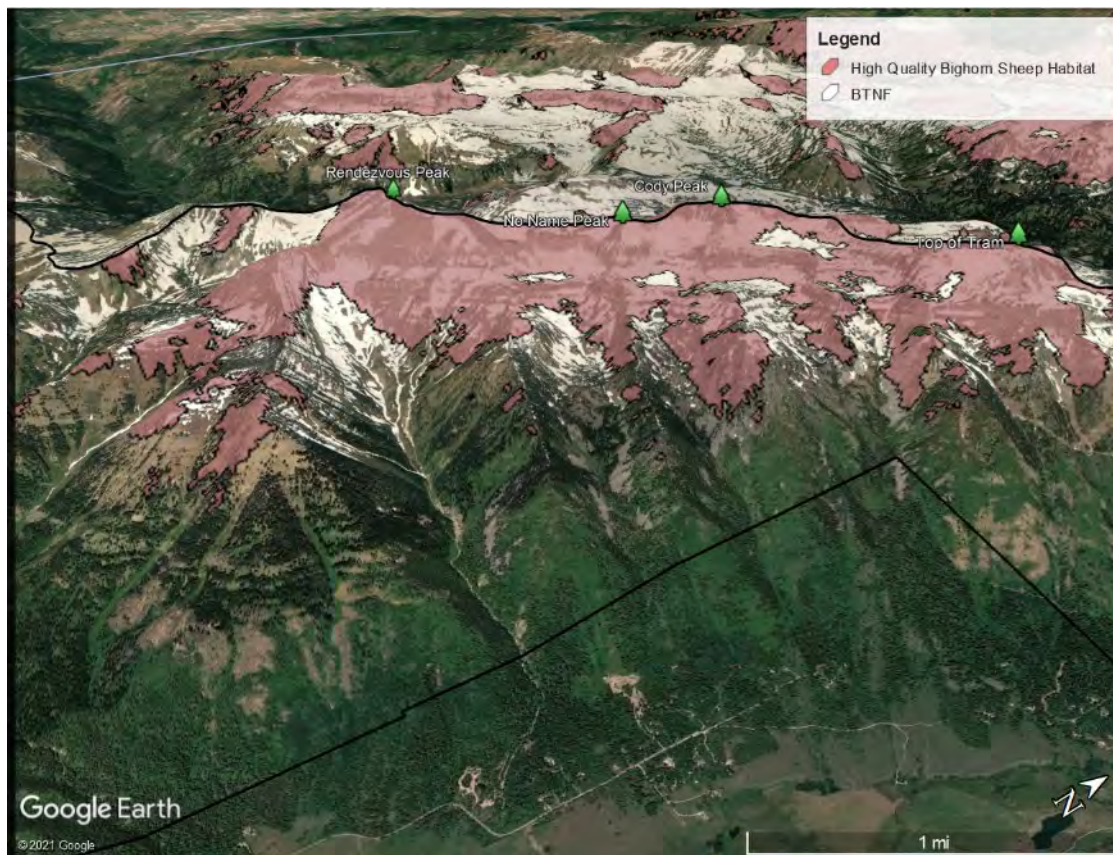
- ✗ Skiers may not voluntarily support restricting their behavior and opt to ski into sensitive areas regardless of information.
- ✗ Infrastructure will need ongoing inspection and maintenance to ensure messages are accurate and to maintain physical integrity against weathering and wear and tear.
- ✗ May be difficult to monitor success.

Bridger-Teton National Forest Quadrant 2 - Moderate Priority Actions with High Benefit to Bighorn Sheep

This section summarizes and illustrates the moderate priority proposed management actions for the Bridger-Teton National Forest. Summaries are organized by the quadrant their prioritization scores fall into, and within quadrants are arranged by their 'benefit to bighorn sheep' scores. The moderate priority actions with high benefit to bighorn sheep include wildland fire use to treat and improve bighorn sheep habitat, and new closure at the head of Jensen canyon on Rendezvous Peak 10,927.

The use of fire to improve bighorn sheep habitat is a widely accepted and effective means to improve habitat conditions and to re-establish areas that can be utilized by bighorn sheep as winter range. Opening conifer-encroached areas and converting the cover type to subalpine meadows can provide additional winter forage resources that are currently unavailable. Under action #48, any naturally started wildfire would be allowed to burn when specific safety and fire distribution criteria are met that would allow for treatment of these habitat types. Certainly, attention to the risk of undesirable fire spread and containment probabilities would be considered in any scenario. A winter habitat closure on Rendezvous Peak 10,927 would reduce unpredictable human disturbance in a known and occupied winter habitat patch. This group of sheep are the southern-most known bighorn sheep to winter in the Teton Range and occupy a relatively quiet and relatively undisturbed habitat zone in between extensive side country and backcountry skiing originating from JHMR to the north and extensive snowmobile and skiing activity generating from Teton Pass and Phillips Canyon to the south. A large amount of high-quality bighorn sheep habitat is already rendered ineffective in and around JHMR due to the volume of skiing that occurs there; this patch of habitat at the head of Jensen canyon is the key winter habitat remaining on the southern end of the range.

48. WILDLAND FIRE USE IN AREAS WITHIN OR ADJACENT TO BIGHORN SHEEP HABITAT ON THE BT PORTION OF THE TETON RANGE



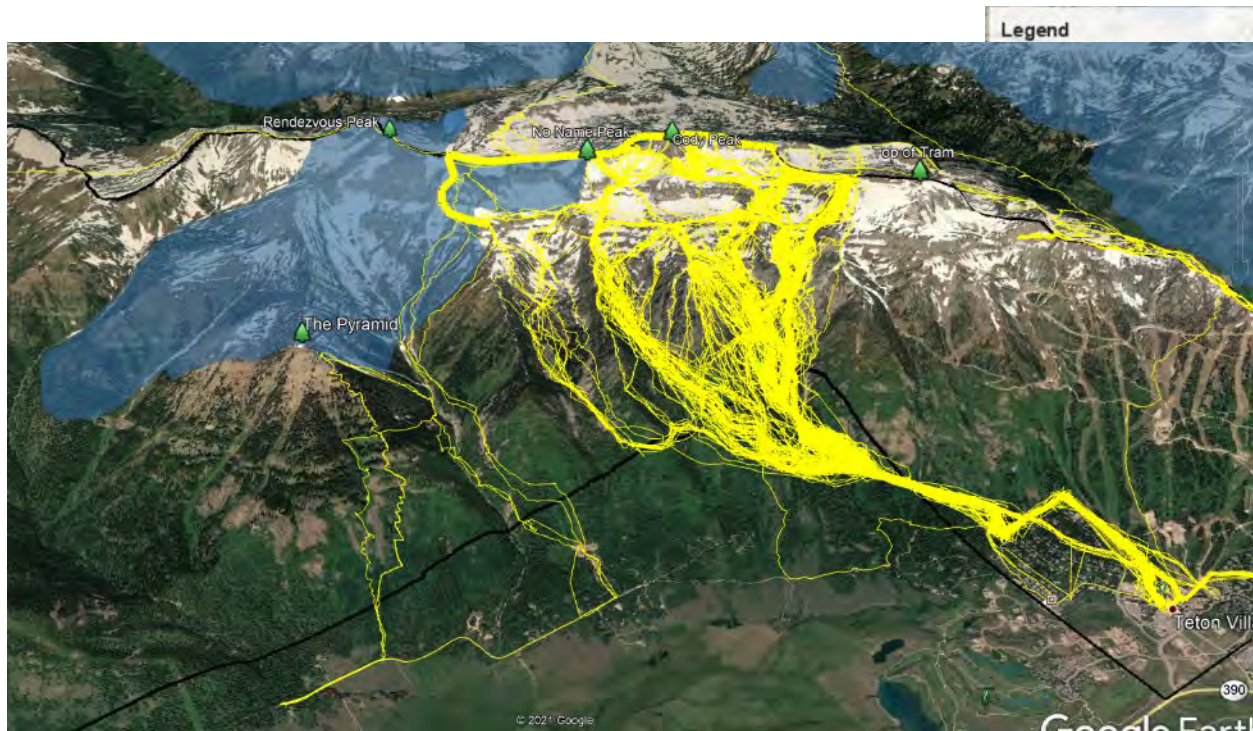
Opportunities

- ✓ Allowing selected natural start wildfires to burn in areas adjacent to or within high quality habitat would enhance winter habitat values by reducing conifer coverage.
- ✓ The southern end of this area has proximal bighorn sheep use in the winter and would have a higher probability of positive habitat effect on local bighorn sheep bands.

Challenges

- ✓ Opportunities to allow natural start wildfires to burn without full suppression may be very limited due to risk to JHMR, homes along Fish Creek Road, and other values.
- ✓ Public support for fire in this area may be difficult to find due to perceived risk.

45. NEW CLOSURE ON EAST AND SOUTHEAST ASPECTS TO RENDEZVOUS PEAK 10927 (JENSEN CANYON AREA)



Opportunities

- ✓ Protects very high value bighorn sheep winter habitat at high elevation, and the southern-most extent of occupied Bighorn Sheep habitat in the Teton Range. This area typically holds resident bighorn sheep in an area in between high use motorized access areas around Phillips Pass and the side country skiing south of Jackson Hole Mountain Resort.
- ✓ Would protect this bighorn sheep winter habitat from the high potential of expanding winter recreation in the future.
- ✓ While area does receive some skiing activity, in particular the Martini Chutes, the level of skiing is minimal relative to extensive areas to the north that are more easily accessible from JHMR.
- ✓ Proposed closure would exclude The Pyramid as well as No Name Peak and Ridge.

Challenges

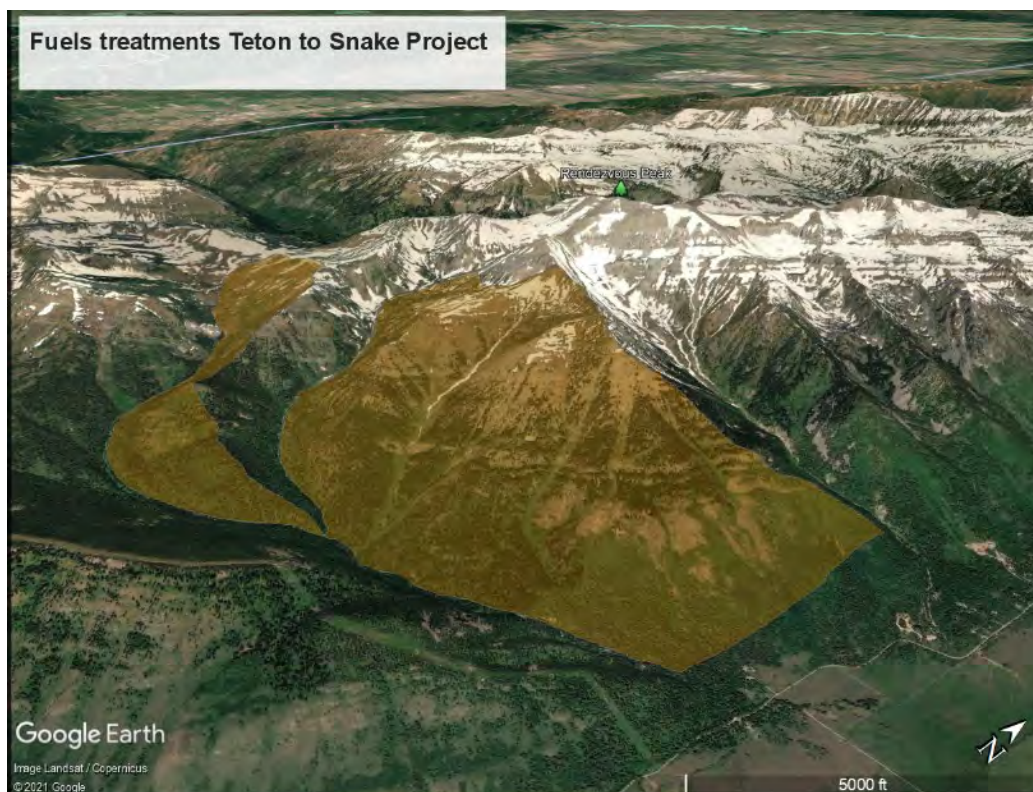
- ✗ Moderate financial costs to sign the area, provide education, and conduct enforcement.
- ✗ Public perception and reaction to closure, even if ski access trade-offs are small, would create a need for precise and consistent messaging and public engagement.

Bridger-Teton National Forest Quadrant 4 - Moderate Priority Actions with High Feasibility

This section summarizes and illustrates three moderate priority management action proposals with high feasibility. Within this quadrant actions are arranged by their expected benefit to bighorn sheep. These actions include prescribed fire and fuels treatments within the existing BTNF Teton to Snake project, maintaining access to the Martini Chutes on Rendezvous Peak if a closure is implemented on that peak, and a winter range closure on the Southwest side of Cody Peak.

Winter range habitat treatments through prescribed fire and fuels treatments would increase extent and availability of winter range for bighorn sheep. Maintaining access to the Martini chutes is a direct response to skier interest and value and would occur in the context of a closure of winter range habitat at the head of Jensen Canyon and Rendezvous Peak (Action #45). This compromise would allow for high-value ski terrain to be used while providing security for bighorn sheep in a known high-value and typically occupied habitat area. A winter range habitat closure on the SW side of Cody Peak would encompass and provide disturbance protection for any connectivity movements between the bighorn sheep that use Rendezvous Peak and other habitat islands to the north, including the head of Granite Canyon, and the Mount Hunt/Prospectors habitat complex.

46. FIRE/FUELS TREATMENT WITHIN TETON TO SNAKE PROJECT



Opportunities

- ✓ High potential to restore an area of historical, lower elevation bighorn sheep winter habitat in the Teton Range.
- ✓ These areas are already planned and have completed NEPA analysis, awaiting implementation.
- ✓ Support for reduction of conifer coverage and thinning of fuels has high probability of local public support due to reduction in wildfire risk to nearby homes.
- ✓ Expansion of winter range adjacent to Rendezvous Peak would increase the immediate winter area available to local band of bighorn sheep that occupy the area of relatively low recreational activity between Phillips canyon and JHMR side country, mitigating habitat effects on the southern-most extent of bighorn sheep winter habitat in the Teton Range.

Challenges

- ✗ Prescribed fire is often difficult to implement due to funding constraints and weather and fuel moisture windows.
- ✗ A prescribed burn in this area could make it more attractive to skiers due to less vegetation, therefore, some level of recreation management must accompany the habitat treatment.
- ✗ Opening conifers might attract more skiing activity, which could create an exacerbated conflict in space-use demands and further difficulty providing undisturbed winter range for bighorn sheep.

52. MAINTAIN ACCESS MARTINI CHUTES



Opportunities

- ✓ Providing Designated Access to Martini Chutes may help generate support for proposed winter closure on the high value Bighorn Sheep habitat on Rendezvous Peak and the head of Jensen Canyon.
- ✓ Concentrates human activity along one travel route, which provides predictability and decreases disturbance to bighorn sheep in a very high value habitat and movement area.
- ✓ Allows for continued recreation along a highly value route.
- ✓ Many people who enjoy these types of traverse routes in the Teton Range are also conservationists and generally longer-term residents of the area. They are willing to self-enforce and respect bighorn sheep habitat needs.
- ✓ Would protect bighorn sheep winter habitat from the high potential of expanding winter recreation in this area in the future.

Challenges

- ✗ It may be difficult for skiers to understand or comply with the specific spatial location of this designated route.
- ✗ Access to Martini chutes is dependent upon access along west side of ridge from No Name Peak, thus related to proposed new closure on SW of Cody Peak Action #47.
- ✗ Describing this open route may attract more skier activity than it currently receives.

47. NEW CLOSURE ON THE SOUTHWEST SIDE OF CODY PEAK



Opportunities

- ✓ Provide secure bighorn sheep habitat in an area of known movement and important connectivity areas for seasonal movements of bighorn sheep.
- ✓ Provide functional connectivity for southern-most group of Bighorn Sheep in the Teton Range on Rendezvous Peak.
- ✓ Potentially maintain access on ridgetop, so to not negatively affect access to Cody and No Name Peaks and differentiate between ridge top and closure of slopes below ridgetop. Maintaining access along ridge would connect with action 52 which provides access to the Martini Chutes on Rendezvous Peak.

Challenges

- ✗ Would restrict access to proposed access route to Martini Chutes on Rendezvous Peak, depending on specifics of closure.
- ✗ Would create access hardship to skiers attempting to access skiing on Cody and No Name Peaks from the ridge, depending upon specifics of closure.
- ✗ Difficulties in gaining public support, even with specifics that could allow transit.

Non-Geographic Actions

Numerous suggestions and potential actions identified by participants during the collaborative process were not tied to a specific geographic area. These actions were scored and ranked separately from the geographic actions based on prioritization methods described previously (p. 16 and Table 3). Although these actions can standalone, they are intended to be implemented in combination with geographic actions to enhance the effectiveness of the latter. The Working Group proposes 6 'highest priority' non-geographic actions (Quadrant 1 in Figure 13) with high benefit for bighorn sheep and high feasibility and 3 moderate priority actions with high benefit to bighorn sheep (Quadrant 2 or Quadrant 4 in Figure 13; Table 8). Two suggested actions are not being recommended (Quadrant 3 in Figure 13).

Table 8. Total Criterion Scores for non-geographic actions.

Num.	Action Type	Action Description	Benefit to Bighorn Sheep	Implementation Feasibility
1	Monitoring	Develop and implement a rigorous monitoring program that allows managers to assess the effectiveness of closures, bighorn sheep survival and other demographics and facilitate bighorn sheep management in an adaptive framework.	11.3	12.3
2	Information and education	Form an information and education group with agency personnel and interested members of the public (including NGOs, if interested) to identify and develop possible actions or content to build awareness of Teton Range bighorn sheep and their habitat needs.	11.1	11.7

Num.	Action Type	Action Description	Benefit to Bighorn Sheep	Implementation Feasibility
3	Agency coordination	Consider Interagency coordination on environmental compliance.	11.0	11.0
4	Visitor Management	Enhance enforcement of closures.	9.0	8.0
5	Wildlife Management	Timing of skiing (identify places to ski in spring that would not disturb sheep because they have other options)	9.0	8.0
6	Monitoring	Form a citizen science group to consider/develop possible projects to aid in monitoring of bighorn sheep and backcountry winter recreation.	7.8	9.8
7	Wildlife Management	Consider management alternatives, e.g. voluntary closures instead of mandatory, match timing of closures to when bighorn sheep needs/use (e.g. November closures where bighorn sheep go down in elevation)	7.0	11.0
8	Wildlife Management	Continue to address other issues with bighorn sheep (e.g. low genetic diversity, loss of low elevation habitat, evaluate hunting seasons, restore migration)	7.0	8.0
9	Visitor Management	Consider limits on the number of skiers (guided and unguided)	8.0	6.0
10	Monitoring	Evaluate the impact avalanche control on bighorn sheep	6.0	7.0
11	Wildlife Management	Feed the bighorn sheep	1.0	1.0

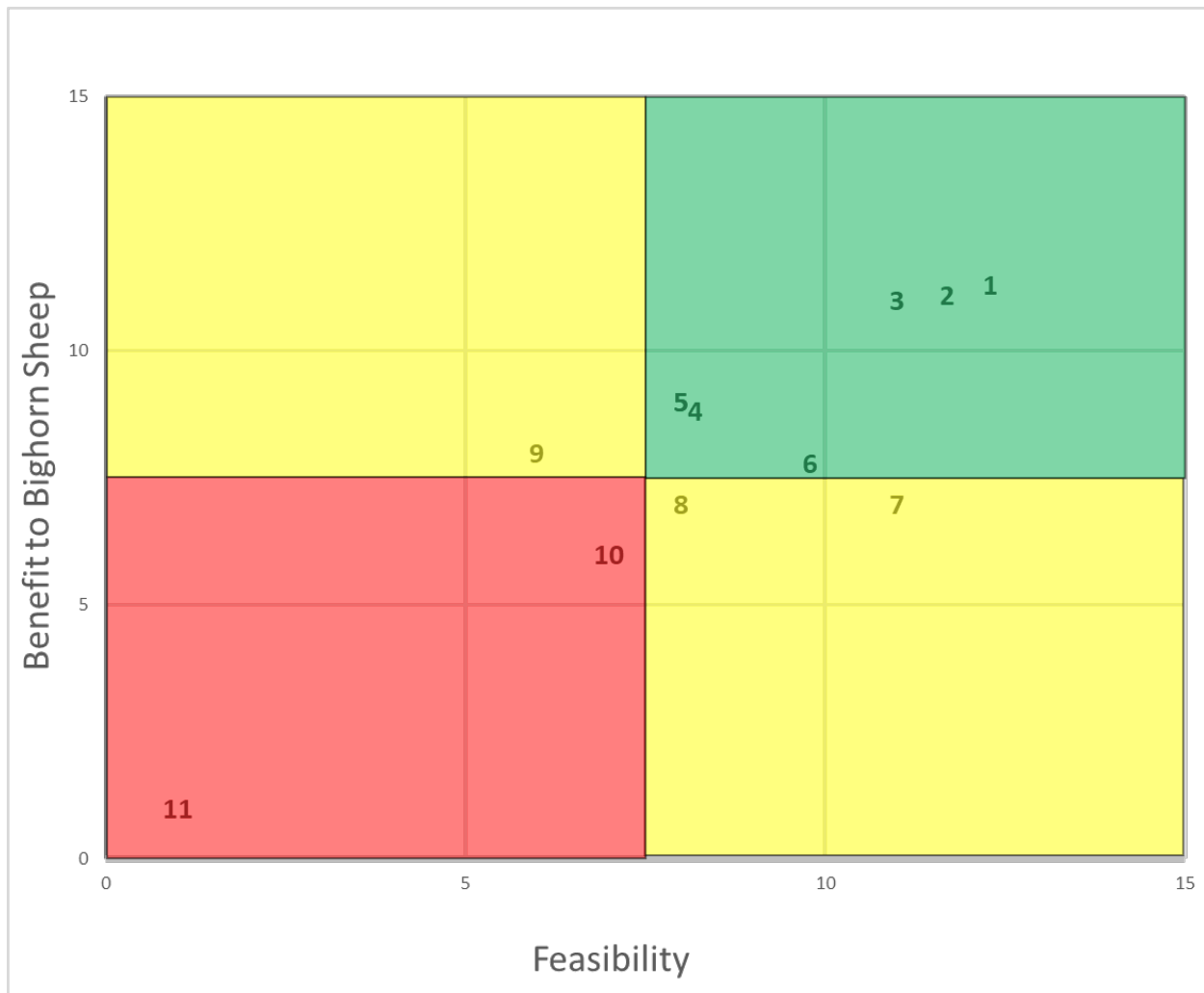


Figure 13. Scatterplot of Working Group's rankings for proposed non-geographic actions. Actions in green quadrant are highest priority actions, actions in yellow quadrants are moderate priority actions, and actions in red quadrant are not being pursued by the Working Group. Points are represented as the map numbers that correspond to the actions in the table above (Table 8).

Non-geographic Actions Quadrant 1 - Highest Priority Actions

There were six highest priority non-geographic actions. These include two actions related to monitoring bighorn sheep (Action 1, Action 6), one action related to an information and education campaign (Action 2), one action recommending cooperative environmental compliance among the different land management agencies (Action 3), one action to enhance enforcement of closures (Action 4), and one action to tailor timing of closures to sheep behavior (Action 5), and one action related to developing a citizen science monitoring program (Action 6).

1. Develop and implement a rigorous monitoring program

Develop and implement a rigorous, coordinated monitoring program that allows managers to assess the effectiveness of closures, bighorn sheep survival and other demographics and facilitate bighorn sheep management across jurisdictional boundaries in an adaptive framework.

Opportunities

- ✓ A well-designed monitoring program with key population performance indicators and thresholds could help the agencies identify in a timely way, when adjustments in management are needed.
- ✓ A shared program could allow the agencies to realize efficiencies.
- ✓ Opportunities to leverage funding may be possible.

Challenges

- ✗ Likely to be a significant investment of time and funding.
- ✗ Typical inherent (but not insurmountable) challenges to working across different jurisdictional boundaries with differing missions.
- ✗ May necessitate development of a Memorandum of Understanding or other cooperative work agreement.

2. Create information and education focus group

Form an information and education group with agency personnel and interested members of the public and NGOs, to identify and develop possible tools, actions, or content that builds awareness of Teton Range bighorn sheep and their habitat needs. Topics that participants in the collaborative process thought this group might tackle include, but are not limited to the following:

- Develop geo-enabled closure polygons and make available on mapping Apps such as Avenza, Fatmap, etc.
- Develop informational and education materials to increase awareness (e.g. new backcountry ethic, kiosk signage).
- Develop targeted signage and outreach messages for different user groups (i.e. locals vs visitors).
- Consider a Bighorn Sheep Ambassador Program.

- Develop audio content about the needs of wintering bighorn sheep that could be played for Jackson Hole Mountain Resort patrons while riding up the Tram.
- Communicate with the public through Apps (e.g. Avalanche Report).
- Develop a portal that facilitates sharing bighorn sheep GPS collar data in near real-time.
- Require winter backcountry users to attend bighorn sheep educational training to obtain sticker for the season.

Opportunities

- ✓ Provides a means for community engagement around bighorn sheep and backcountry winter recreation.
- ✓ Could enhance message consistency across agencies.
- ✓ Outcomes likely to raise awareness about the issue and help backcountry winter recreationists comply with winter closures.
- ✓ Could be fairly readily implemented with agency buy-in and support.
- ✓ May provide an avenue for cost-sharing of projects.

Challenges

- ✗ Given turnover in the visitor community, education will be a long-term effort.
- ✗ Most efficient/effective way to implement this idea may require a program coordinator supported by all the agencies.
- ✗ Reliance on existing agency personnel may not be practical due to competing priorities, workload concerns, and funding.
- ✗ Level of support from agency leadership is unknown.
- ✗ Currently unfunded.

3. Cooperative environmental compliance (NEPA), if needed.

If environmental compliance documentation is needed to implement actions, consider conducting the environmental review cooperatively (i.e. one compliance document for all the agencies).

Opportunities

- ✓ Potential to streamline compliance process (one document for multiple agencies).
- ✓ Consistent and transparent compliance process.

Challenges

- ✗ Cooperation could extend timeline for process.
- ✗ May necessitate a Memorandum of Understanding or other cooperative work agreement.

4. Enhance enforcement of closures

Consider placing more emphasis on enforcement of closures.

Opportunities

- ✓ Demonstrates agency commitment to wildlife in general and bighorn sheep in particular.
- ✓ A small amount of investment early on may go a long way towards building a culture of compliance.
- ✓ Opportunity for law enforcement personnel from the agencies to provide input on how to make this work (not shoot it down).

Challenges

- ✗ Moderate costs associated with increased level of backcountry patrol
- ✗ Difficulty covering a large, remote area.
- ✗ With a high degree of turnover in the backcountry community every year, will need to invest in this on a regular basis, likely annually.

5. Tailor closure timing to sheep behavior

Consider closures with flexible start or end dates to allow recreational use when bighorn sheep are not using areas.

Opportunities

- ✓ Could allow agencies to open areas to the public in spring when conditions do not warrant them remaining closed (similar to bike path closure adjacent to the National Elk Refuge).
- ✓ May help build tolerance or support among the backcountry community.

Challenges

- ✗ May only be appropriate for specific areas.
- ✗ Would require intensive monitoring of the bighorn sheep, which may not be supported by current funding levels, nor sustainable long-term.
- ✗ Alternatively, would require biologists to perform analyses to understand the relationship between bighorn sheep movements and weather/climate variable and then run analyses and make recommendations on an annual basis (currently unfunded)

6. Citizen Science

Consider forming a citizen science group to identify and develop possible citizen science projects to aid in monitoring of bighorn sheep and backcountry winter recreation. Some ideas participants of the collaborative process offered include:

- Develop an App to allow skiers to report bighorn sheep sightings and review observations when planning day trips (similar to the way avalanches are reported on javalanche.org).
- Develop program for skiers to provide snow measurements/modeling information.
- Monitor winter recreation using cell phone data.

Opportunities

- ✓ Provides a way for the public to contribute and enhance knowledge and awareness
- ✓ May be an opportunity to partner with existing citizen science efforts like Nature Mapping Jackson Hole
- ✓ Could be relatively low-cost method to collect specific types of data

Challenges

- ✗ Moderate time and funding investment to develop projects or cultivate a relationship with potential partners
- ✗ Programs involving volunteers require a significant investment of time to recruit, train, motivate, and supervise VIPs
- ✗ Time investment of agency personnel for data validation and QA/QC

Non-geographic Actions Quadrant 2 and 4 - Moderate Priority Actions

There are three proposed moderate priority non-geographic actions. Because there are so few moderate priority actions, quadrants 2 and 4 are combined for this summary. These actions include evaluating alternative actions to address the conflict between bighorn sheep and winter recreation in the Teton Range (Action 8), addressing other factors that impact bighorn sheep in the Teton Range (Action 9), and regulating the number of backcountry skiers in the Teton Range (Action 10)

7. Management Alternatives

Some participants suggested various alternatives to mandatory, season-long closures for management including voluntary closures and closures with nuanced start and end dates. Voluntary closures are not recommended by the Working Group for the reasons outlined below in the “Challenges” section, however they are ranked as moderate priority as an option for consideration if a mandatory closure is not feasible in a given circumstance. For the reasons outlined below, voluntary closures should not be perceived as an easy solution and may actually be more difficult to implement than mandatory closures and send mixed messages to the public about their importance.

Opportunities

- ✓ Agencies may be able to implement voluntary closures more quickly than mandatory closures.
- ✓ Voluntary approaches tend to work at a small scale where compliance can be easily monitored.
- ✓ Voluntary closures may be more broadly and quickly supported by the ski community than mandatory closures.
- ✓ Strong community support and commitment, from the local community members, key leaders, and NGOs, is generally needed for effective voluntary restrictions.
- ✓ Voluntary initiatives may be most helpful in raising awareness and educating the local community and stakeholders.
- ✓ Customized start and end dates for different closures that depend on bighorn sheep movement and habitat needs may be more highly supported by the ski community than standard closure dates.

Challenges

- ✗ May only be successful if there is full commitment from all stakeholders and if behavior and compliance with voluntary closure is monitored.
- ✗ May not achieve conservation objectives without compliance by a significant number of backcountry users (voluntary approach may fail to change backcountry user behavior).
- ✗ Research has shown that even low levels of backcountry skiing activity adversely impacts bighorn sheep, therefore would need high compliance to work.
- ✗ If not successful, there is a risk of losing public trust in agency decisions.
- ✗ No ability for law enforcement personnel to take action against perpetual offenders.
- ✗ May require similar (or more) investment of time and resources to build awareness, educate, motivate, and encourage backcountry users to comply.
- ✗ Remains a long-term commitment
- ✗ Perception that human disturbance to bighorn sheep must not be very serious because compliance is voluntary (delivers mixed messages to the public)
- ✗ Incorrect perception of voluntary initiatives as a quick fix, low-cost solution.
- ✗ Approaches that rely completely on self-policing or peer pressure for compliance may lead to polarization in the community.
- ✗ Nuanced start and end dates for different closures would be confusing for the public and would likely lead to more accidental incursions.
- ✗ Custom start and end dates for closures would require more intensive monitoring of bighorn sheep movements than has ever occurred. This would be very expensive and require extensive, ongoing capture and collaring of sheep for the long-term.

9. Address other issues affecting bighorn sheep

This suggestion was for the working group to continue to address the other challenges facing bighorn sheep like genetic diversity concerns, loss of low elevation winter habitat, evaluation of hunting seasons, and restoring migration.

Opportunities

- ✓ Represents a wholistic approach to management.
- ✓ Supports efforts currently underway to estimate population size and reassess the genetic status of the population using fecal DNA.
- ✓ Increases public engagement in WGFD hunting season setting process.

Challenges

- ✗ Limited time and funding often preclude working on issues that are not the highest priority.
- ✗ Much of the low-elevation habitat that bighorn sheep used historically has been permanently lost due to development.
- ✗ May involve interagency coordination outside of the Teton Range bighorn sheep working group and managers may disagree on desirability of migration restoration.
- ✗ Restoring migrations could expose Teton bighorn sheep to higher respiratory disease risk from domestic sheep and domestic goats.

10. Limits on the number of guided/unguided parties in areas important to bighorn sheep

Consider limits on the number of guided and unguided skiers/riders/other users in areas important to bighorn sheep.

Opportunities

- ✓ Could be a fair and consistent way to address backcountry recreation use areas in specific areas of concern.

Challenges

- ✗ May require conducting a broad recreation-use study first to understand use levels and patterns of activity.
- ✗ For permitted operations may not be able to address until the next prospectus.
- ✗ For permitted operations may require environmental compliance.
- ✗ May require significant time and agency resources to develop and implement a limited access (e.g. permit) system.

Conclusion

Bighorn sheep are an iconic species in the Teton Range and impacts from winter backcountry recreation are expected to significantly increase in the future as the popularity and spatial extent of recreation expands. Bighorn sheep are an integral component of the Teton Range's wildlife community with ecological, cultural, and historical significance. The bighorn sheep that reside in the range today are a relic of a much larger population that has occupied the area since the last ice age but is struggling today and is facing a substantial risk of local extinction without targeted and timely conservation actions by management agencies. Backcountry winter recreation in the Teton Range has a long and rich history and is also extremely important to the local community. The Working Group recognizes the importance of both wildlife and backcountry winter recreation to the community as well as the agencies' responsibility to maintain a viable population of bighorn sheep on the landscape.

The Working Group opted to take a bottom-up, community-based approach to addressing this issue instead of a traditional top-down, government-driven approach. From 2017 – 2020, the Working Group engaged with the community in several different ways, including one-on-one “coffee cup” conversations, small group conversations, targeted stakeholder group contacts, and a more formal public collaborative process with three in-person workshops and two virtual workshops to work collaboratively on this issue. This process was time-consuming, but succeeded in building awareness around this issue, initiating a community conversation, and facilitating information exchange and mutual learning among the public and with agencies. This led participants to a better understanding of the issues on all sides.

The Working Group recommends that the agencies consider moving forward with the high and moderate priorities outlined in this report, which total 62 management actions (although some span jurisdictional boundaries or include multiple implementation options). The recommended actions are a wide array of solutions, including increased public outreach and education, signage, enhanced monitoring of bighorn sheep and human use, habitat treatments with prescribed fire and wildland fire, new or expanded winter closures in some areas, areas to maintain current recreational access, designated travel routes, a citizen science project to help collect data, and experimental actions followed up with intensive monitoring. Overall, implementing the recommended high and moderate priority management actions would result in 21,233 acres of new bighorn sheep winter habitat protections in the Teton Range (47% of winter habitat). Forty-seven percent (16,952 acres) of the high-quality habitat in GRTE would be protected, 49% (3,478 acres) on CTNF, and 38% (803 acres) on BTNF. Of these areas, 2,833 acres overlap with areas that were identified as high value ski terrain during the public collaborative process. Therefore, 5% of high value ski terrain would have human access restricted. On the flipside, 95% of identified high value ski terrain would remain open. Although the recommended management actions will not receive unanimous support from all community members, the Working Group worked very diligently to try to meet the community's and agencies' shared objective of balancing bighorn sheep habitat needs with maintaining excellent winter recreation opportunities in the Teton Range.

Acknowledgements

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Literature

Courtemanch, A. B. 2014. [Seasonal habitat selection and impacts of backcountry recreation on a formerly migratory bighorn sheep population in northwest, WY, USA](#). MS Thesis, University of Wyoming, Laramie, WY. 120 pp.

Courtemanch, A.B., M.J. Kauffman, S. Kilpatrick, and S.R. Dewey. 2017. [Alternative foraging strategies enable a mountain ungulate to persist after migration loss](#). Ecosphere 8(6):e01855.

Teton Range Bighorn Sheep Working Group. 1996. [Strategic Plan for Managing Bighorn Sheep in the Teton Range](#) 24 pp.

Teton Range Bighorn Sheep Working Group. 2020. [Teton Range Bighorn Sheep Situation Assessment](#). 32 pp.

Whitfield, M.B. 1983. [Bighorn sheep history, distributions, and habitat relationships in the Teton Mountain Range, Wyoming](#). MS Thesis, Idaho State University, Pocatello, ID. 233 pp.

APPENDIX A – Process Matrix



Process Matrix

Teton Range Bighorn Sheep and Recreation Collaborative Process

Revised May 2020 due to Covid-19

Purpose: Engage public in a collaborative learning process that aims to identify community-based ideas and solutions that balance the winter habitat needs of Teton Range bighorn sheep and backcountry winter recreation opportunities.

Public Meeting Location: Grand Teton Ballroom, Snow King Resort, 400 E Snow King Ave, Jackson, WY

Date/Time	Meeting Type	Purpose	Outcome
February 13 6 to 9 pm	Public Meeting	Introduction process Share Information regarding recreation and bighorn sheep in the Teton Range. Identify Interests and values. Identify Issues	Initiate community conversation and provide background information on bighorn sheep ecology/issues and winter backcountry recreation in Tetons. Learn public's concerns and interests.
February 20 6 to 9 pm	Public Meeting	Share outcomes from Feb. 13 meeting. Deeper look at bighorn sheep ecology and concerns Share Information about issues. Identify conceptual solutions.	List of conceptual solutions.
March 5 6 to 9 pm	Public Meeting	Share outcomes from Feb. 20 meeting. Fine-tune list of potential solutions, with an emphasis on place-based geographic ideas for recreation and sheep.	Finalize list of public-generated ideas to be shared with the USFS, NPS and WGFD.
March 9 8 to 5 pm	USFS, NPS and WGFD Meeting	Identify implementation possibilities and strategies based on list of public generated solutions	Review public suggestions and identify possible actions to move forward. Provide a response to each public suggestion as to its feasibility for implementation.

Date/Time	Meeting Type	Purpose	Outcome
June 5 9 am to 12 pm	Public Meeting	Continue to work on geographic solutions, map by map.	Public works virtually with the Working Group to fine tune implementation options.
June 16 6 to 9 pm	Public Meeting	Continue to work on geographic solutions, map by map.	Public works virtually with the Working Group to fine tune implementation options.