

## **2.0 DESCRIPTION OF ALTERNATIVES**

NEPA regulations require that all reasonable alternatives be considered to ensure that proposed actions are well conceived and thoroughly evaluated (40 CFR 1502.14a). Reasonable alternatives include those that are practical or feasible from the technical and economic standpoint, using common sense, rather than those that are simply desirable (46 CFR 18027).

This chapter identifies and compares a reasonable range of alternatives for the Bridger Bowl MDP Proposal. A No Action alternative and three action alternatives, including the Proposed Action, are included within this range of alternatives. These alternatives have been developed in accordance with CEQ regulations to provide the decision-maker with a clear basis for choice (40 CFR 1502.14).

Chapter 2 also identifies and discloses the process used to develop alternatives, alternatives considered but eliminated, modifications to the Proposed Action, and all alternatives considered in detail. Chapter 2 includes a summary table comparing potential environmental consequences as a result of implementation of each alternative and measures proposed to mitigate these potential environmental effects. The Study Area for this analysis includes the current SUP area, those NFS lands proposed for SUP area expansion, and the private lands within and adjacent to the Bridger Bowl; it totals approximately 2,574 acres.

### **2.1 DEVELOPMENT OF ALTERNATIVES**

In the development of alternatives for this proposal, the Forest Service has utilized direction provided in the CEQ regulations, the Forest Service Manual, and the Forest Service Handbook (FSH 1909.15), as well as results from the public scoping process. According to NEPA regulations, an Environmental Impact Statement (EIS) must “explore and objectively evaluate all reasonable alternatives” related to the purpose and need of the project (40 CFR 1502.14). The range of alternatives presented in this Supplemental Draft EIS (SDEIS) is intended to:

- Provide clear choices for the decision-maker;
- Fulfill the purpose and need for the Proposed Action;
- Address significant issues; and
- Remain consistent with the goals, objectives, standards, and guidelines in the 1987 Forest Plan and other applicable laws, regulations, policies, and plans.

Alternatives to the Proposed Action were developed by the Forest Service Interdisciplinary Team (ID Team) in order to reduce or eliminate possible effects of the action as identified by significant issues raised during the scoping process. Where feasible, potential effects of the construction of specific elements or groups of elements within the Proposed Action were reduced or eliminated by making revisions to the Bridger Bowl MDP proposal. Including the Proposed Action, ten different alternatives were considered.

The ID Team then considered the feasibility of implementing the Bridger Bowl MDP under each of the ten alternatives by determining whether the alternatives could be feasibly implemented, if they would actually reduce impacts to the targeted resource areas, and if they would meet the Purpose and Need for the proposal. The Forest Supervisor of the GNF approved a range of four alternatives, including the No Action Alternative, for detailed analysis in the SDEIS. This range of alternatives is intended to respond to the significant issues raised during scoping.

## **2.2 ALTERNATIVES CONSIDERED BUT ELIMINATED**

### **2.2.1 REMOVAL OF P-2 LIFT AND CONSTRUCTION OF A SHORTENED SLUSHMAN LIFT TO AVOID IMPACTS TO INVENTORIED ROADLESS AREAS (IRAs)**

This alternative was identified to consider the effects of the reducing the lift system in the Slushman area, avoiding potential impacts to IRAs. The description of the current Proposed Action already indicates that no roads would be constructed to the proposed P-2 lift in the IRAs, and other impacts of the skiing and lifts are illustrated in the action alternatives. This alternative would not meet the project Purpose and Need for a lift system in the Slushman area for access to the ridge for avalanche control.

### **2.2.2 INCREASED SKI AREA CAPACITY THROUGH FACILITY UPGRADES WITHIN THE EXISTING SKI AREA, NO SUP EXPANSION**

This alternative was identified to assess the possibilities of expansion of facilities within the current ski area boundary. At the time of the 1999 DEIS, facilities were limited in the base area and in the ski terrain in general. Base area capacities have been increased on private lands to meet growing demand. To increase capacity for future demand and reduce existing congestion in the ski terrain, additional lift capacity could be developed; however, additional lift capacity within the existing SUP area would increase the number of persons on a ski trail, thus increasing skier density on existing trails. As a result, this alternative would not meet the Purpose and Need of maintaining “uncrowded” conditions.

### **2.2.3 CONSTRUCTION OF THE RIDGE ACCESS LIFT P-2 FURTHER TO THE SOUTH ABOVE THE PROPOSED SLUSHMAN LIFT**

This alternative was considered to reduce impacts of P-2 lift construction on the ridge area and responded to the issue of skier safety, which was raised during the scoping process. This alternative was not studied in detail in the 1999 DEIS because of avalanche safety concerns in the southern portion of the Slushman Bowl area and the cliff areas adjacent to the bowl. However, after comments to the 1999 DEIS were received, further study was completed in the Slushman Bowl. The alignment proposed in this SDEIS was found to better address previous construction and avalanche concerns, as well as skier circulation concerns.

### **2.2.4 CONSTRUCTION OF RIDGE ACCESS LIFT P-2 WITHOUT PUBLIC ACCESS**

This alternative was developed to address public concerns regarding additional ridge access by the public, which affects ski quality and safety. The P-2 lift would be constructed, but access

would be restricted to ski patrol for snow safety operations. Impacts to physical and biological resources from this alternative would be the same as the Proposed Action. Because of the similarities of this Alternative to others carried forward, this alternative was not analyzed in detail.

#### 2.2.5 CONSTRUCTION OF THE SLUSHMAN LIFT WITHOUT THE RIDGE ACCESS LIFT P-2

This alternative would allow the lift and trail development in the Slushman drainage to meet the Purpose and Need for additional diverse terrain, but would not allow for the construction of the P-2 lift. This alternative was considered in response to the issue of increasing terrain in the Slushman area while limiting public access to the ridge. Access to the ridge would continue to be allowed for hike-to backcountry skiers. Avalanche safety would continue as currently managed. This alternative was not studied in detail because it would have been difficult for the ski patrol to access the ridge above the proposed Slushman lift and ski terrain in a timely manner for adequate avalanche hazard reduction work, and the impacts to resources would be very similar to the Proposed Action since no tree clearing would be required for trails servicing the P-2 lift.

#### 2.2.6 CONSTRUCTION OF A CHAIRLIFT TO THE RIDGE

This alternative considered an aerial chairlift, rather than a surface lift to the ridge to reduce possible resource impacts, responding to vegetation and wildlife issues raised during scoping, and to make skier access to the ridge easier. This alternative was not analyzed further due to the lack of sufficient area at the proposed top terminal for skier unloading without major earthwork on the ridge. Additional concerns included the additional capacity the lift would provide to the ridge, as well as user safety due to high wind on the ridge.

#### 2.2.7 EXPANSION OF THE SKI AREA PERMIT FOR THE SLUSHMAN AND BRADLEY MEADOWS AREAS WITHOUT LIFTS

This alternative was developed to address the concern of increasing lift-served skiing outside of the current SUP area by allowing the expansion of the SUP area without the construction of lifts. The proposed expansion areas would be accessed by hiking along skier access trails. This alternative was not studied in detail because of snow safety concerns and skier evacuation concerns. Additionally, this alternative did not meet the Purpose and Need for the project, which includes the expansion of lift served skiing opportunities in order to better serve the public demand for less crowded conditions at Bridger Bowl.

### 2.3 MODIFICATIONS TO THE BRIDGER BOWL MDP PROPOSAL

Since the DEIS was issued in 1999, a number of facility upgrades and improvements have taken place at Bridger Bowl, both on private Bridger Bowl property and NFS lands. All of these recently completed projects have been analyzed as existing conditions in this SDEIS and are also considered in the analysis of cumulative effects. The 1997 Bridger Bowl MDP has been modified to reflect these recent changes and has been re-submitted to the Forest Service as the 2002 MDP. The 2002 MDP was modified in response to public comments from the 1999 DEIS. Therefore, the Proposed Action analyzed in this SDEIS represents the most current version of the

2002 MDP Proposal by Bridger Bowl, Inc. The following text outlines the recent changes to Bridger Bowl and how the 2002 MDP has been modified in response.

Additional changes to the Proposed Action have occurred in response to additional planning and physical and biological analysis undertaken since 2002. The previous 1999 DEIS options for the N-1 and N-2 chairlifts have been reviewed and consolidated into a single lift line that is specified as chairlift N-1 in this SDEIS. The N-2 lift and five associated trails proposed on private land in the 2002 MDP are no longer proposed as a reasonably foreseeable project. Four trails in the N-1 ski pod have been shortened and one trail has been removed from the Proposed Action because connecting trails to N-2 would no longer be necessary. Also, the proposed locations of the bottom terminals of the A-1 and A-2 chairlifts have been moved upslope of their original locations to avoid direct impacts to stream channels. The Proposed P-2 lift has been relocated further south to reduce potential tree clearing impacts and to improve skier circulation. Finally, the forest clearing for ski trail construction originally proposed in the 1999 DEIS has been re-evaluated and modified to reflect more accurate mapping of vegetation, streams, and wetlands within the Study Area.

## **2.4 ALTERNATIVES CONSIDERED IN DETAIL**

### **2.4.1 ALTERNATIVE 1**

Under Alternative 1, there would be no change to the existing SUP or its boundaries, and Bridger Bowl would continue to operate under the conditions of the 40-year SUP that was issued by the Forest Service in November 2002. The existing lifts, ski trails, and facilities at Bridger Bowl would also be maintained in their current condition under Alternative 1. The overall resort CCC of Bridger Bowl would remain unchanged at approximately 3,200 skiers as limited by the capacity of the lifts and terrain. The guest services capacity under existing conditions is 5,400; this is limited by the capacity of the wastewater treatment system and will not change upon completion of the new day lodge. Under Alternative 1, there would be no additional effects on the biological or human environment resulting from development of new facilities. Implementation of Alternative 1 would not meet the Purpose and Need for the Proposed Action; however, it must be analyzed to provide a baseline by which to compare the environmental consequences of the action alternatives. Refer to Figure 2-1 for a graphic representation of Alternative 1.

#### *Lifts*

Under Alternative 1, Bridger Bowl would continue to operate eight ski lifts. Any future lift replacements on NFS lands would require project-specific NEPA analysis and approval from the Forest Service.

#### *Trails*

The existing terrain at Bridger Bowl would be maintained under Alternative 1, including 69 named trails that provide approximately 407 acres of developed ski terrain. The existing trail network would continue to accommodate a range of skier abilities from beginner to expert. It is comprised of approximately 1.4 acres of beginner terrain, 97.2 acres of novice terrain, 57.6 acres

of low-intermediate terrain, 113.6 acres of intermediate terrain, 55.7 acres of advanced-intermediate terrain and 81.5 acres of expert terrain.

#### *Mountain Service Roads*

Under Alternative 1, Bridger Bowl would continue to operate its existing network of mountain service roads. The Bridger Bowl Study Area contains approximately 16 total miles of roads on NFS lands, Bridger Bowl private lands, and other private lands. Of this total, 8.6 miles are on NFS lands. No new road construction or obliteration projects would occur. Any future road construction or obliteration projects on NFS lands would require specific Forest Service approval.

#### *Support Facilities*

No new guest service facilities would be constructed on NFS lands under Alternative 1; however, construction of the new day lodge in the base area would continue.

**Figure 2-1: Alternative 1**

**Figure 2-2: Existing Land Allocations**

## 2.4.2 ALTERNATIVE 2

Alternative 2 is the Proposed Action as detailed in the 2002 Bridger Bowl MDP. If Alternative 2 is selected by the Forest Service, the 2002 Bridger Bowl MDP would be approved and would serve as the guidance document for the life of the SUP. Under Alternative 2, the guest services capacity would increase to 6,200 upon completion of the Limestone Chalet. However, the capacity of the lifts and terrain would only increase to 6,100, thus limiting the overall resort CCC of Bridger Bowl to 6,100.

In addition, the Bridger Bowl SUP boundary would be expanded to the north by 274 acres to include the Bradley Meadows area above the South Fork of Brackett Creek. The SUP boundary would also be expanded to the south into the Slushman Drainage area for an additional increase of 337 acres. In all action alternatives, the southeast portion of the SUP area would be adjusted to include the gun tower that Bridger Bowl currently uses for avalanche control work within their SUP area. This boundary adjustment would result in a net increase of 45 acres<sup>1</sup> to the Bridger Bowl SUP area. Refer to Figure 2-3 for a graphic representation of Alternative 2.

### **Connected Actions**

Under all action alternatives, additional development on private lands owned by Bridger Bowl could occur at a later time without a requirement for Forest Service approval or NEPA analysis. For purposes of disclosure, these project elements are described here and the effects of these connected actions are described in Chapter 3; however, they are not considered part of Bridger Bowl's site-specific NEPA proposal.

The portion of the Virginia City Lift located on private land is proposed for modification within its existing alignment. Bridger Bowl would shorten the length of the lift line and relocate the bottom terminal uphill to reduce congestion in the base area.

In addition to completion of the new day lodge, the Limestone Chalet is proposed on private lands at the base of the proposed N-1 lift. The Limestone Chalet would be 4,151 square feet in size and would provide 180 additional restaurant seats and 50 deck seats. At a turnover rate of 3.7 people per seat, the Limestone Chalet would accommodate approximately 800 people per day with necessary infrastructure, including an on-site septic system.

An additional 1.5 acres of parking would be constructed adjacent to the existing parking lot on private lands in the base area. The additional parking lot would bring Bridger Bowl parking areas to design capacity as governed by Bridger Canyon zoning restrictions. Although the parking would be constructed on private land, new lots would have a native or gravel surface and be built with appropriate erosion control and drainage provisions.

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<sup>1</sup> The proposed adjustment to the Bridger Bowl SUP area in the vicinity of the gun tower would result in a net increase of 45 acres to the SUP area. This is due to minor adjustments along this edge of the boundary, including the removal of approximately 16.7 acres from the current SUP area and the addition of approximately 61.4 acres for the inclusion of the gun tower. Refer to Figure 2-4 for additional information.

### *Lifts*

Under Alternative 2, Bridger Bowl would operate a total of 13 ski lifts, including 10 chairlifts and three surface lifts (see Figure 2-3). Bridger Bowl would increase the capacity of the lifts and terrain, as demand warrants, from 3,200 to 6,100. Two existing chairlifts would be modified or replaced in their existing alignments; Bridger and Deer Park chairlifts. The Alpine chairlift would be removed, and six new lifts would be constructed; P-2 and P-3 surface lifts; and S-1, A-1, A-2, and N-1 chairlifts.

Bridger Bowl would increase lift and trail capacity as demand warrants, therefore the development projects may be delayed in response to demand and financial considerations.

### *Trails*

Alternative 2 proposes the development of additional ski terrain in both the Bradley Meadows and the Slushman Drainage expansion areas. This would entail the creation of 16 new trails (S-1 through 7 and trails N-1 through 9). Under Alternative 2, the Bridger Bowl trail network would increase by approximately 96 acres to 85 trails on approximately 503 acres. The trail network would accommodate the entire range of skier abilities from beginner to expert, comprised of approximately 1.4 acres of beginner terrain, 97.2 acres of novice terrain, 58.6 acres of low-intermediate terrain, 120.5 acres of intermediate terrain, 66.3 acres of advanced-intermediate terrain, and 159 acres of expert terrain.

The 16 proposed trails would be constructed according to the Clearing with No Grading and the No Construction Activities construction techniques described in Section 2.4.5. Timber removal techniques would be consistent with Forest Service Standards and Guidelines. Trail alignments would follow natural fall lines to the greatest extent possible. Edges of the trails would be irregular to simulate natural forest openings consistent with providing a quality skiing experience and meeting visual quality objectives.

### *Mountain Service Roads*

Under Alternative 2, the road network within the study area would increase to a total of 17.7 miles, with 1.4 miles of new road proposed on NFS lands and 0.4 miles of new road proposed on private lands. All new roads would have a natural native surface and would be used to access lift terminals for summer maintenance and construction. In total, eight new road segments would be constructed to facilitate lift construction and maintenance access. Two new road segments would be constructed to the top of the proposed A-2 and N-1 chairlifts, five road segments to the bottom of N-1 (on private lands), A-1, A-2, P-3 and S-1 chairlifts, and one road segment to the bottom of the Limestone Chalet on private land. The roads would meet Forest Service standards and appropriate erosion control and drainage would be installed as described in Appendix D.

### *Utilities*

The increase in on-mountain guest services capacity would be accommodated by the existing wastewater treatment system plus the on-site septic system at the Limestone Chalet; together they would accommodate 6,200 skiers per day. Power for proposed project elements, including the new lifts, would be drawn from existing power lines currently installed for power to chairlifts on existing terrain and would be trenched within existing and proposed mountain access roads.

Additional power, domestic water, and wastewater treatment would be necessary for completion of the Limestone Chalet on adjacent private lands.

### *Forest Plan Direction and Consistency*

Alternative 2 would require several amendments to the GNF Forest Plan to create and/or maintain consistency with management direction. These four proposed amendments are summarized below and detailed in Appendix C.

- Change the management area designation in the Bradley Meadows area (217.3 acres) from MA 12 (with an emphasis on dispersed recreation and big game habitat) to MA 2 (with an emphasis on winter sports areas). Section 13 was acquired by the Forest Service in 1993 through a land exchange; this area currently has no management area designation. In addition to the change above, approximately 57 acres would also be allocated to MA 2 (Marlenee, 1999). The remainder of Section 13 would be designated to MA 12 to maintain habitat integrity.
- In conjunction with the SUP adjustment for the inclusion of the gun tower, change MA designations along the proposed southeast SUP boundary from MA 11 to MA 2 to ensure that all lands within the SUP area are designated MA 2. This would result in approximately four acres changing to MA 2. Approximately 17 acres would be removed from the SUP area and re-designated MA 11 as part of this proposal.
- In conjunction with the change in management area designation from 12 to 2, the Visual Quality Objective (VQO) for the Bradley Meadows area would also be amended to be consistent with MA 2 direction. As a result, the VQO for this area would change from *Retention* to *Partial Retention*.
- The elk habitat effectiveness index (HEI) is based on open road densities and cover availability. The Forest Plan standard for HEI is applied at the compartment level, since timber compartments are ecological units defined by topographic and hydrologic features, and generally encompass an area representative of elk summer range. It requires an HEI rating of at least 0.70. The Proposed Action includes timber compartments 504 and 515. Compartment 504 currently has an HEI of 0.54, while compartment 515 currently has an HEI of 0.50. The HEIs for timber compartments 504 and 515 are both below the minimum standard of 0.70 established in the Forest Plan. While road density would increase within the Study Area, it would not substantially alter the current HEI for compartment 504 or 515; however, a Forest Plan amendment is required to address the current substandard condition and enable the Proposed Action to be consistent with management direction.
- In timber compartment 504, the existing area of old growth is currently below the Forest Plan standard of 10 percent; current conditions only display 7.0 percent old growth within the compartment. Implementation of the Proposed Action would further reduce the percentage of old growth within the compartment from seven to 6.95 with construction of the project elements associated with the N-1 Lift and N trails.

**Figure 2-3: Alternative 2**

**Figure 2-4: Proposed Land Allocations**

### 2.4.3 ALTERNATIVE 3

Alternative 3 was developed by the Forest Service to reduce impacts to the Bridger IRAs surrounding Bridger Bowl by eliminating development in the Slushman Drainage area. None of the projects proposed under Alternative 3 would occur in the roadless area. Under Alternative 3, the guest services capacity for Bridger Bowl would increase from 5,400 to 6,200. The SUP area would be expanded by 274 acres to the north to include the Bradley Meadows areas. Expansion of the SUP area into the Slushman Drainage would not occur. The remainder of the project elements under Alternative 3 would be as described under Alternative 2. Refer to Figure 2-5 for a graphic representation of Alternative 3.

#### *Lifts*

Four new lifts would be constructed under Alternative 3; one surface lift (P-3), and three chairlifts (A-1, A-2, and N-1) for a total of 11 lifts. Bridger Bowl would increase the capacity of the lifts and terrain, as demand warrants, from 3,200 to 5,600. The Deer Park and Bridger lifts would be modified or replaced within their existing alignments. Under Alternative 3, the S-1 and P-2 lifts would not be constructed because there would be no expansion into the Slushman Drainage.

#### *Trails*

Alternative 3 proposes the development of nine new trails in the Bradley Meadows area. This would expand the developed trail network by approximately 52 acres for a total of 459 acres. The proposed trail network would have 78 developed trails, which would accommodate the entire range of skier abilities from beginner to expert. This would be comprised of approximately 1.4 acres of beginner terrain, 97.2 acres of novice terrain, 58.6 acres of low-intermediate terrain, 120.5 acres of intermediate terrain, 66.3 acres of advanced-intermediate terrain, and 114.4 acres of expert terrain.

#### *Mountain Service Roads*

Under Alternative 3, the road network within the study area would increase to a total of 17 miles, with 0.8 miles of new road proposed on NFS lands and 0.3 miles of new road proposed on private lands. All new roads would have a natural native surface and would be used to access lift terminals for summer maintenance and construction. Seven new road segments would be constructed to facilitate summer lift construction and maintenance access. Two new road segments would be constructed to the top of the proposed A-2 and N-1 chairlifts, four road segments to the bottom of N-1 (on private lands), A-1, A-2, and P-3 chairlifts, and one road segment to the bottom of the proposed Limestone Chalet. The roads would meet Forest Service standards, and appropriate erosion control and drainage would be installed according as described in Appendix D.

#### *Support Facilities*

The guest support facilities at Bridger Bowl would be the same under Alternative 3 as proposed under Alternative 2. Bridger Bowl would continue to operate the Jim Bridger Lodge and the Deer Park Chalet, as well as the new day lodge once it is completed.

## *Forest Plan*

Alternative 3 would require several amendments to the GNF Forest Plan to create and/or maintain consistency with management direction. These four proposed amendments are summarized below and detailed in Appendix C.

- Change the management area designation in the Bradley Meadows area (217.3 acres) from MA 12 (with an emphasis on dispersed recreation and big game habitat) to MA 2 (with an emphasis on winter sports areas). Section 13 was acquired by the Forest Service in 1993 through a land exchange; this area currently has no management area designation. In addition to the change above, approximately 57 acres would also be allocated to MA 2 (Marlenee, 1999). The remainder of Section 13 would be designated to MA 12 to maintain habitat integrity.
- In conjunction with the SUP adjustment for the inclusion of the gun tower, change MA designations along the proposed southeast SUP boundary from MA 11 to MA 2 to ensure that all lands within the SUP area are designated MA 2. This would result in approximately four acres changing to MA 2. Approximately 17 acres would be removed from the SUP area and re-designated MA 11 as part of this proposal.
- In conjunction with the change in management area designation from 12 to 2, the Visual Quality Objective (VQO) for the Bradley Meadows area would also be amended to be consistent with MA 2 direction. As a result, the VQO for this area would change from *Retention* to *Partial Retention*.
- The elk habitat effectiveness index (HEI) is based on open road densities and cover availability. The Forest Plan standard for HEI is applied at the compartment level, since timber compartments are ecological units defined by topographic and hydrologic features, and generally encompass an area representative of elk summer range. It requires an HEI rating of at least 0.70. The Proposed Action includes timber compartments 504 and 515. Compartment 504 currently has an HEI of 0.54, while compartment 515 currently has an HEI of 0.50. The HEIs for timber compartments 504 and 515 are both below the minimum standard of 0.70 established in the Forest Plan. While road density would increase within the Study Area, it would not substantially alter the current HEI for compartment 504 or 515; however, a Forest Plan amendment is required to address the current substandard condition and enable the Proposed Action to be consistent with management direction.
- In timber compartment 504, the existing area of old growth is currently below the Forest Plan standard of 10 percent; current conditions only display 7.0 percent old growth within the compartment. Implementation of the Proposed Action would further reduce the percentage of old growth within the compartment from seven to 6.95 with construction of the project elements associated with the N-1 Lift and N trails.

**Figure 2-5: Alternative 3**

#### 2.4.4 ALTERNATIVE 4

Alternative 4 was developed by the Forest Service to reduce potential impacts to wildlife and old growth forest by eliminating development in the Bradley Meadows area. Under Alternative 4, the guest services capacity for Bridger Bowl would increase from 5,400 to 6,200 as demand warrants with proposed expansions and upgrades, the same as in Alternatives 2 and 3. In addition, the Bridger Bowl SUP boundary would be expanded to the south by 337 acres to include the Slushman Drainage area. Expansion of the SUP area into the Bradley Meadows area would not occur. Refer to Figure 2-6 for a graphic representation of Alternative 4.

##### *Lifts*

Similar to Alternative 3, Bridger Bowl would operate 11 ski lifts, including nine chairlifts and two surface lifts under Alternative 4. Bridger Bowl would increase the capacity of the lift and trail system to 5,100. Four new lifts would be constructed under Alternative 4; one surface lift (P-2), and three chairlifts (A-1, A-2, and S-1). The replacement and/or modification of two existing lifts (Deer Park and Bridger) would be as described under Alternative 2. Under Alternative 4, the proposed N-1 and P-3 lifts would not be constructed because there would be no expansion into the Bradley Meadows area.

##### *Trails*

Alternative 4 proposes to develop seven new trails in the Slushman Drainage area, which would expand the developed trail network by approximately 45 acres for a ski area total of approximately 452 acres. The trail network would have 76 trails, which would accommodate a range of skier abilities from beginner to expert. This would be comprised of approximately 1.4 acres of beginner terrain, 97.2 acres of novice terrain, 57.6 acres of low-intermediate terrain, 113.6 acres of intermediate terrain, 55.7 acres of advanced-intermediate terrain, and 126.1 acres of expert terrain.

##### *Mountain Service Roads*

Under Alternative 4, the road network within the study area would increase to a total of 17.1 miles, with 0.9 miles of new road proposed on NFS lands and 0.3 miles of new road proposed on private lands. All new roads would have a natural native surface and would be used to access lift terminals for summer maintenance and construction. In total, five new road segments would be constructed to facilitate lift construction and summer maintenance access. One new road segment would be constructed to the top of the proposed A-2 chairlift, three road segments to the bottom of A-1, A-2, and S-1 chairlifts, and one road segment to the bottom of the proposed Limestone Chalet. The roads would meet Forest Service standards, and appropriate erosion control and drainage would be installed as described in Appendix D.

##### *Support Facilities*

Under Alternative 4, the guest support facilities at Bridger Bowl would be the same as proposed under Alternative 2. Bridger Bowl would continue to operate the Jim Bridger Lodge and the Deer Park Chalet, as well as the new day lodge once it is completed.

### *Forest Plan*

Only one Forest Plan amendment would be required under Alternative 4; this is relative to the boundary adjustments made to accommodate the gun tower. Approximately 17 acres of land would be removed from the SUP and re-designated MA 11, while another 4 acres would be added to the SUP area and designated MA 2. The remainder of the lands in the proposed Slushman Drainage expansion area is already MA 2, and the current SUP would be amended to expand the SUP to include approximately 337 acres to the south of the existing SUP, within the Slushman drainage basin.

**Figure 2-6: Alternative 4**

## 2.4.5 ASSUMPTIONS COMMON TO ALL ALTERNATIVES

### *Capacity*

The single most important parameter considered when planning guest support facilities at ski areas is the Comfortable Carrying Capacity (CCC). The CCC of a ski area is the number of skiers an entire resort can comfortably accommodate at any given time and still guarantee a pleasant recreation experience. A resort's CCC does not reflect the number of skiers on the mountain at one time. Rather, 70 to 85 percent of a mountain's total CCC are active skiers, including those on the trails, riding lifts, and waiting in lift lines. The remaining 15 to 30 percent are using guest service facilities or milling in areas near these facilities.

The calculation of the overall CCC of Bridger Bowl was based on capacities associated with the lift and trail network, support facilities (e.g., restaurant seats, sewage treatment plant, etc.), and parking. By definition, the calculated ski area CCC can not exceed the capacity of any of the major facility groups in the ski area (e.g., lift and trail capacity, restaurant capacity, parking capacity, etc.). The lift and trail capacity was determined using parameters such as uphill lift capacity, trail skier densities, trail acreage and capacity, lift type, hours of operation, and other planning parameters. The capacity of Bridger Bowl guest services was determined by evaluating the capacities of all support facilities in the base area, including parking. The ski area CCC does not consider previous skier visits, nor does it predict future visitation of the resort. The ski area CCC is a planning parameter by which other skier services can be designed. For example, the capacity of parking spaces, restaurant seats, utilities and infrastructure must be designed to accommodate the CCC for the ski area to operate efficiently. The overall balance of the existing ski area is evaluated by calculating the capacities of the resort's various facilities, as compared to the resort's CCC.

### *Skier Ability*

As used in this SDEIS, skier ability levels are defined based on the slope gradient of the ski trail, as shown in Table 2.4-1.

**Table 2.4-1  
Slope Gradient by Ability Level**

Skier Ability Level	Acceptable Slope Gradient (percent)
Beginner	8 to 12
Novice	12 to 25 (short pitches of 30)
Low Intermediate	25 to 30 (short pitches of 35)
Intermediate	30 to 40 (short pitches of 45)
Advanced Intermediate	40 to 50 (short pitches of 55)
Expert	over 50 (maximum of 80)

Source: SE Group

### *Construction*

Many of the direct effects analyzed in this SDEIS are related to the development of the proposed lifts and associated ski trails. The degree of environmental impacts associated with lift and trail construction varies considerably and is dependant on the type and location of construction techniques proposed. Assumptions for the amount of clearing and grading that would occur for specific activities proposed in the Action Alternatives are shown in Table 2.4-2. For analysis

purposes in this SDEIS, clearing widths and areas are considered “worst-case” assumptions. The final layout of lift and ski trail construction locations will be refined in the field during construction implementation. Therefore, actual disturbance from construction would not exceed the stated disturbance area and will likely be less.

**Table 2.4-2  
Grading Assumptions for the Bridger Bowl MDP Proposal**

<b>Project Component</b>	<b>Grading Assumption</b>
<b>Chairlift</b>	
Top Terminal Ground Disturbance	0.3 acre
Bottom Terminal Ground Disturbance	0.6 acre
<b>Surface Lift</b>	
Lift Terminal Ground Disturbance	0.1 acre
<b>Service Roads</b>	
Road Surface Width	20 feet
Ground Disturbance Width	30 feet
<b>Other Facilities</b>	
Buildings <sup>a</sup>	50-foot corridor
Parking Lot Expansion <sup>b</sup>	15-foot corridor

<sup>a</sup>“Worst case” estimate of clearing, grading, machinery operation, storage of spoils, etc.

<sup>b</sup> Represents a construction corridor surrounding the development footprint.

Four categories of construction techniques have been defined in order to provide an accurate analysis of the environmental impacts associated with this proposal. These construction techniques are used to characterize the impacts from all components of this proposal; they include construction of ski trails, lift terminals and towers, utilities (e.g., power, sewer, etc.), buildings, roads, and parking lots. The construction techniques for this proposal are as follows:

- **No Construction Activities:** Due to the large number of alpine meadows and the open nature of the alpine forests at Bridger Bowl, many of the proposed ski trails would require no construction activities to provide safe skiing. Proposed ski trails with no construction activities proposed would not cause direct impacts to resources. As a result, impact area calculations for this construction technique are not included in this analysis.
- **Clearing with No Grading:** This construction technique involves the removal of all trees within the proposed construction limits. Trees would be cut flush to the ground and stumps would not be removed. The soil surface would not be graded and the natural ground cover would be maintained. Downed timber would be removed over the snow to avoid ground disturbance. Merchantable timber would be decked within previously disturbed areas adjacent to existing roads. Slash and unmerchantable timber would be lopped and scattered or stacked and burned in accordance with Forest Service and State of Montana regulations. Tracked excavator equipment and/or explosives may be used in limited circumstances to remove rock outcrops, and some individual stumps.

- **Grading with No Clearing:** This technique would be used for the development of proposed buildings and lift terminals in non-forested areas where tree clearing would not be required. This technique would involve grading the soil surface for road construction and/or excavation of footings for buildings and lifts. Grading may include the use of explosives for the removal of bedrock or large boulders, or the use of excavators and bulldozers for earthmoving. After grading is complete, the soil surface would be revegetated, where appropriate, according to the Mitigation Measures in Table 2.6-1.
- **Grading with Clearing:** In this technique, all trees would be removed within the construction limits, stumps would be removed, and the surface would be graded. Grading would occur for parking lot and road construction and excavation of footings for buildings and lifts. Grading may include the use of explosives for the removal of bedrock or large boulders, or the use of excavators and bulldozers for earthmoving. After grading is complete, the soil surface would be revegetated, where appropriate, according to the Mitigation Measures in Table 2.6-1. The removal of felled trees would be accomplished with skidders or over the snow. Merchantable timber would be decked within previously disturbed areas adjacent to existing roads. Slash and unmerchantable timber would be lopped and scattered or piled and burned in accordance with Forest Service and State of Montana regulations.

Standard construction techniques would be used for building lift terminal structures. Lift tower footings would be excavated by track hoes or specialized construction machinery except in areas not easily accessible. In this case, footings would be constructed with hand-held tools. Concrete for footings and lift towers would be flown in by helicopter in situations where it could not be transported on the ground using existing and proposed roads. Standard and site-specific BMPs as well as mitigation measures would be implemented before and after construction.

In addition to the construction techniques outlined above, ski trail clearing would include edge treatments that are intended to reduce the visual impacts of trail clearing and to enhance the skiing opportunities along the trail edge. These prescriptions include:

- **Forest Edge Scalloping:** Creating a ski trail boundary to resemble an irregular sine wave to reduce visual impacts associated with straight trail edges. The limit of clearing boundary would not exceed a maximum distance of 30 feet inside or outside of the original planned trail edge.
- **Forest Edge Feathering:** Selectively removing trees along the limit of clearing boundary where appropriate, so that a hard line in the new trail-to-forest transition is not evident. The area to be thinned for forest edge feathering would be approximately 10 to 30 feet wide. Large trees would be selectively removed starting at the limit of clearing boundary, so that the tree density would decrease from the undisturbed forest to the ski trail boundary.

## 2.5 SUMMARY COMPARISON OF ALTERNATIVES

Table 2.5-1 presents a summary comparison of the alternatives, while Table 2.5-2 compares the environmental consequences of each alternative throughout the Study Area, which is approximately 2,574 acres. A detailed analysis of the environmental consequences of each alternative is presented in Chapter 4 of this SDEIS.

**Table 2.5-1  
Summary Comparison of Bridger Bowl Facilities by Alternative**

<b>MDP Components</b>	<b>Alternative 1</b>	<b>Alternative 2</b>	<b>Alternative 3</b>	<b>Alternative 4</b>
<b>SUP area (acres)<sup>a</sup></b>	1,122	1,778	1,441	1,504
<b>Ski Area Capacity (CCC)</b>	3,200	6,100	5,600	5,100
Guest Services Capacity	5,400	6,200	6,200	6,200
Lift and Terrain Capacity	3,200	6,100	5,600	5,100
<b>Lifts</b>				
Total Number of Lifts	8	13	11	11
<b>Trails</b>				
Total Number of Trails	69	85	78	76
<b>Trail Distribution by Ability Level</b>				
Beginner and Novice (acres)	99	99	99	99
Intermediate (acres)	227	245	245	227
Expert (acres)	81	159	114	126
Total (acres)	407	503	459	452
<b>Roads</b>				
Total miles within study area	15.9	17.7	16.9	17.0
Total miles on NFS lands	8.6	10	9.4	9.5
<b>Food Service</b>				
Total Number of Seats	1,430	1,610	1,610	1,610

<sup>a</sup> The SUP states that the permitted area is 1,042 acres in size. Based on analysis of the SUP area using GIS software, the SUP area is 1,122 acres in size. The updated GIS area of 1,122 acres was used in calculations for all proposed project elements.

**Table 2.5-2  
Summary Comparison of Potential Effects by Alternative within the Study Area**

Parameter	Alternative 1	Alternative 2	Alternative 3	Alternative 4
<b>Geology and Soil Resources</b>				
<i>Impacts to Soil Resources</i>				
Temporary Soil Impacts (ac.)	0.0	+57.3	+50.0	+19.5
Permanent Soil Impacts (ac.)	62.0	+7.0	+5.3	+5.4
<b>Total Soil Impacts (ac.)</b>	<b>62.0</b>	<b>+64.3</b>	<b>+55.3</b>	<b>+24.9</b>
<i>Sediment Yield to Streams</i>				
SF Brackett (tons/yr.)	89.8	+1.6	+1.6	+0.0
Upper Bridger (tons/yr.)	161.2	+3.5	+3.5	+2.4
Maynard (tons/yr.)	63.7	+2.5	+2.5	+1.3
Slushman (tons/yr.)	100.0	+1.5	+0.0	+1.5
<b>Totals (tons/yr.)</b>	<b>414.7</b>	<b>+9.1</b>	<b>+7.6</b>	<b>+5.2</b>
<b>Water Resources</b>				
<i>Road Characteristics</i>				
Road Network (mi.)	15.9	+1.8	+1.0	+1.1
Road Network Density (mi/mi <sup>2</sup> )	4.0	+0.4	+0.3	+0.3
Perennial Stream Crossings	5	+1	0	+1
Intermittent Stream Crossings	24	0	0	0
<i>Wetland Impacts</i>				
Impacts from Grading(ac.)	0.0	0	0	0
Impacts from Clearing (ac.)	0.0	-0.48	-0.48	0
<b>Total (acres)</b>	<b>0.0</b>	<b>-0.48</b>	<b>-0.48</b>	<b>0</b>
<b>Vegetation (Forest Cover)</b>				
Old Growth Forest Impacts (ac.)	182.9	-17.1	-17.1	-0.1
Mature Forest Impacts (ac.)	603.0	-26.1	-23.1	-7.6
Immature Forest Impacts (ac.)	184.6	-2.6	-0.5	-2.1
<b>Total Forest Cover Impacts (ac.)</b>	<b>970.5</b>	<b>-45.8</b>	<b>-41.3</b>	<b>-9.8</b>
Non-forest Cover Impacts	1,542.7	-13.2	-10.9	-9.5
<b>Total Vegetation Impacts (ac.)</b>	<b>2,513.2<sup>a</sup></b>	<b>-59.0</b>	<b>-51.6</b>	<b>-19.3</b>
<b>Wildlife</b>				
<i>Impacts to T &amp; E Species</i>				
Gray wolf	No Effect	No Effect	No Effect	No Effect
Bald Eagle	No Effect	No Effect	No Effect	No Effect
Grizzly bear	No Effect	No Effect	No Effect	No Effect
Canada lynx	No Effect	Likely to adversely affect lynx habitat.	Likely to adversely affect lynx habitat.	May affect, not likely to adversely affect individuals .
<i>Impacts to R1 Sensitive Species</i>	No effect	May impact individuals of certain species .	May impact individuals of certain species .	May impact individuals of certain species .
<i>Impacts to Game Species</i>	No effect	May impact individuals of certain species .	May impact individuals of certain species .	May impact individuals of certain species .

Parameter	Alternative 1	Alternative 2	Alternative 3	Alternative 4
<b>Fisheries</b>				
Impacts to Special-Status and T&E Listed Species	No Effect	No Effect	No Effect	No Effect
<b>Inventoried Roadless Areas</b>				
Impacts to IRAs	No Change	New SUP would include 101 acres of the IRA. No new roads would be built, 1.4 acres of trees would be cleared, and 0.7 acres of grading would take place in the IRA.	No Change	New SUP would include 101 acres of the IRA. No new roads would be built, 1.4 acres of trees would be cleared, and 0.7 acres of grading would take place in the IRA.
Impacts to Wilderness Characteristics	No Change	Lift & trails would reduce natural appearance of area. Level of solitude & remoteness would be diminished.	No Change	Lift & trails would reduce natural appearance of area. Level of solitude & remoteness would be diminished.
<b>Air Quality</b>				
	Compliance with state and Federal regulations.	Continued compliance with state and Federal regulations.	Continued compliance with state and Federal regulations.	Continued compliance with state and Federal regulations.
<b>Visual Resources</b>				
	Consistent with the VQO of Partial Retention assigned to the SUP area as viewed from BCR.	Expansion of SUP boundary to the north and change from MA 12 to MA 2 in this area would result in a change of VQO designation from Retention to Partial Retention. Consistent with assigned VQO when viewed from BCR.	Expansion of SUP boundary to the north and change from MA 12 to MA 2 in this area would result in a change of VQO designation from Retention to Partial Retention. Consistent with assigned VQO when viewed from BCR.	Would remain consistent with the VQO of Partial Retention assigned to the SUP area as viewed from BCR.
<b>Cultural Resources</b>				
	No impacts to NHRP-eligible resources.	No impacts to NHRP-eligible resources.	No impacts to NHRP-eligible resources.	No impacts to NHRP-eligible resources.
<b>Socio-Economic Resources</b>				
Environmental Justice	No disproportionate impacts to minority or low-income populations.	No disproportionate impacts to minority or low-income populations.	No disproportionate impacts to minority or low-income populations.	No disproportionate impacts to minority or low-income populations.

<sup>a</sup> Total vegetation cover does not equal the Study Area size because there are approximately 64 acres of open water and developed land that are not vegetated within this area.

## 2.6 MITIGATION MEASURES

NEPA and CEQ regulations require identification of all relevant, reasonable mitigation measures that could reduce the impacts of the project, even if those measures are outside the jurisdiction of the Forest Service. Therefore, the following list of mitigation measures are proposed for all of the action alternatives (i.e., alternatives 2, 3, and 4) to minimize and/or avoid impacts to resources or to enhance resource functions. These mitigation measures are specific to this project proposal and would enable implementation of project elements to meet the purpose and need in Chapter 1, while addressing resource issues. These mitigation measures would be incorporated into the project design and be included as permit or contract requirements. Local governments and state and federal agencies may require additional mitigation measures as conditions of permits.

**Table 2.6-1  
Mitigation Measures**

<b>Reference Code</b>	<b>Mitigation Measure Description</b>
<b>Vegetation Management</b>	
<b>VM-1</b>	Machine harvest or ground based yarding of trees will not occur on slopes greater than 35% unless the soil is frozen and/or covered by more than six inches of snow.
<b>VM-2</b>	Any unplanned skid trails or roads will be approved by the Forest Service prior to construction.
<b>VM-3</b>	To the extent possible, avoid placing any heavy machinery in wetlands. If heavy machinery needs to operate on wetland sites with saturated soils or standing water, provide pads (such as plywood) under the machinery that would be capable of supporting it from sinking into the soil surface.
<b>VM-4</b>	Where tree clearing in wetlands is unavoidable, the shrub component understory will be maintained in order to provide root systems necessary for stability and sediment filtration. Mechanical trimming of shrubs for skier safety would be allowed to the degree that their vigor and survival are maintained.
<b>VM-5</b>	Pre-project surveys will be conducted in and adjacent to areas to be disturbed for any new plant species added to the Forest Service Sensitive Plant Species list after the publication of this document as directed by a Forest Service biologist.
<b>VM-6</b>	Minimize the amount of vegetation manipulation in sensitive areas such as wetlands, stream environments, and important wildlife habitat features. Ski trails should avoid wetlands or cross as little wetlands as possible.
<b>Riparian Area Protection</b>	
<b>RP-1</b>	No tree clearing for ski trail construction is proposed in SMZs; however, one road crossing is proposed in alternatives 2 and 4. The road will cross the stream as close to perpendicular to the stream as possible. A 310 permit is required from the Gallatin Soil Conservation District for culverts installation in perennial streams.
<b>Revegetation</b>	
<b>RV-1</b>	All disturbed areas that have been regraded and re-topsoiled will be revegetated as soon as possible. All grass seed shall be free from noxious weeds. Seed shall be delivered to the site in sealed containers (bags) with the dealer's guaranteed analysis and blue tagged certification.
<b>RV-2</b>	Revegetated areas will be monitored at least every year by Bridger Bowl until the fifth year to ensure that monitoring performance standards are met. Monitoring will include both qualitative and quantitative approaches to assess the success of all runoff and erosion control measures and revegetation efforts. In addition, monitoring will take place after each spring during the peak of the snowmelt cycle (see Appendix D for detailed monitoring guidelines).

Reference Code	Mitigation Measure Description
<b>Streambank Protection</b>	
SP-1	Human created debris accumulations will be removed from streams to prevent reductions in stream channel stability and capability.
SP-2	Fertilizer application will be minimized in stream management zones (i.e., road or trail crossings). Manufacturer recommendations will be followed for minimum distances from water.
SP-3	Log landing and decking areas will be located out of the stream management zones.
<b>Wildlife</b>	
W-1	Helicopters may not fly above or land on the ridge from September 1 through October 31 to avoid disturbance to migrating raptors unless approved by the Bozeman District Ranger.
W-2	Wolverines and other scavengers may be attracted to human food sources such as garbage, which can result in mortality due to control of nuisance animals. Sanitation measures will be implemented by Bridger Bowl to prevent unwanted wildlife visitations to ski area facilities.
W-3	Due to the change in Management Area designation in the Bradley Meadows area from MA 12 to MA 2, the remaining portion of Section 13 will be designated MA 12 to maintain habitat integrity.
W-4	South Fork Brackett Creek Drainage will be precluded from motorized use to maintain habitat security.
W-5	If construction activities within and adjacent to streams and wetlands are scheduled to occur between June 1 – August 15, pre-construction surveys will be performed by a Forest Service approved wildlife biologist to determine if the streams and wetlands are being used by boreal toads for breeding and rearing. If boreal toads are observed appropriate BMPs will be developed by the Forest Service to minimize the potential for construction impacts during the June 1 – August 15 timeframe.
<b>Cultural Resources</b>	
CR-1	The project contractors are required to temporarily halt ground disturbing activities and notify the District Ranger in the event that subsurface cultural evidence or historical sites are encountered during project construction. An archaeologist will determine the significance of the materials and specify mitigation measures.
<b>Air Quality</b>	
AQ-1	All grading areas, including roadways, buildings, and lift terminal areas, will be sufficiently watered to prevent excessive amounts of dust. In the absence of natural precipitation, watering of these areas will occur at least daily with complete coverage.