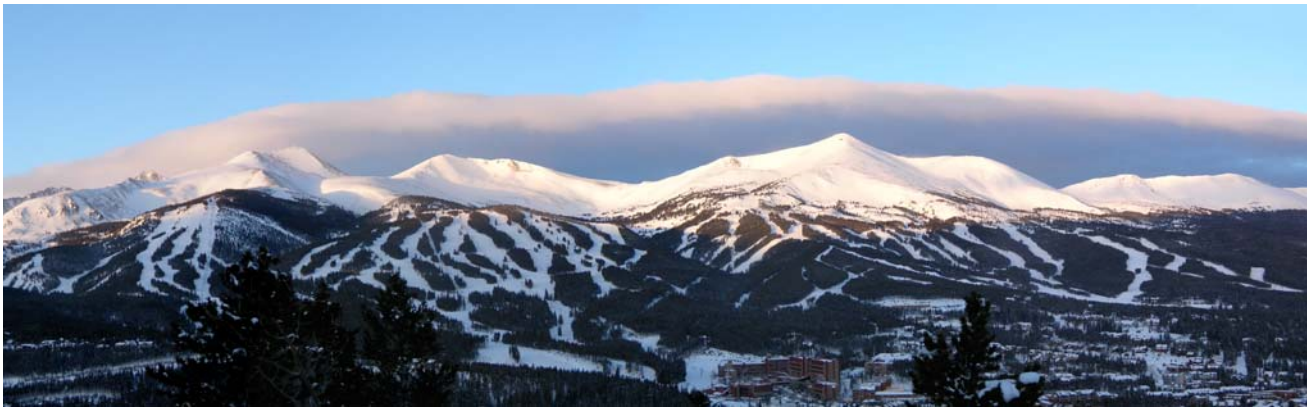
BRECKENRIDGE SKI RESORT



PEAK 6 PROJECT
FINAL ENVIRONMENTAL IMPACT STATEMENT

AUGUST 2012

USDA Forest Service
White River National Forest
Dillon Ranger District

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ABSTRACT

FINAL ENVIRONMENTAL IMPACT STATEMENT

FOR THE

BRECKENRIDGE SKI RESORT
PEAK 6 PROJECT

WHITE RIVER NATIONAL FOREST
SUMMIT COUNTY, COLORADO

AUGUST 2012

Lead Agency: USDA Forest Service

Responsible Official: Scott Fitzwilliams, Forest Supervisor
White River National Forest

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Abstract: This Final Environmental Impact Statement has been prepared to analyze and disclose the estimated environmental effects of implementation of the Breckenridge Ski Resort Peak 6 Project. Breckenridge Ski Resort is located on the White River National Forest in Summit County, CO and operates in accordance with the terms and conditions of a Special Use Permit, which is administered by the United States Forest Service. The proposed Peak 6 development encompasses approximately 550 acres of lift-served and hike-to skiing. The terrain would be accessed by a two lift configuration (a lower and an upper lift) and by traversing from the existing Imperial Express lift to the north. In addition, two facilities would be constructed to accommodate guests—a top terminal ski patrol/warming hut at the top of the upper Peak 6 lift and a restroom facility at the junction of the upper and lower Peak 6 lifts. The upper lift would allow skiers to round-trip the Peak 6 terrain without leaving the pod. With the development of the proposed Peak 6 lifts and associated terrain, the Comfortable Carrying Capacity at BSR would increase by 1,250 guests, from 14,920 to 16,170 guests. A Forest Plan Amendment is proposed to amend the 2002 Forest Plan Canada lynx Standard "ALL S1."

Components of the Proposed Action are detailed in Chapter 2: Alternative 2 – Proposed Action.

This Final Environmental Impact Statement discusses the Purpose and Need for the Proposed Action; alternatives to the Proposed Action; potential direct, indirect, and cumulative impacts of implementing each alternative; and project design criteria. Three alternatives are analyzed in detail in the Final EIS: Alternative 1 (No Action); Alternative 2 (the Proposed Action); and Alternative 3.

Appeals: The decision documented in the Record of Decision is subject to appeal pursuant to 36 CFR 215.11. Any appeal of this decision must be fully consistent with 36 CFR 215.14, "Content of Notice of Appeal," and it must be received within 45 days of the date of publication of the legal notice in the Glenwood Post Independent.

The written notice of Appeal must be sent to:

Appeal Deciding Officer
USDA Forest Service
Region 2, Rocky Mountain Region
740 Simms
Golden, CO 80401

Executive Summary

EXECUTIVE SUMMARY

The proposed improvements analyzed in this document constitute a federal action, which has the potential to affect the quality of the human environment on public lands administered by the United States Department of Agriculture Forest Service (Forest Service). Therefore, these projects must be analyzed pursuant to the National Environmental Policy Act of 1969 (NEPA). Under NEPA, Federal Agencies must carefully consider environmental concerns in their decision making processes and provide relevant information to the public for review and comment.

The Forest Service has prepared this Final Environmental Impact Statement (FEIS) in compliance with NEPA and other relevant federal and state laws and regulations. This FEIS contains analyses consistent with NEPA, Council on Environmental Quality (CEQ) regulations, and Forest Service policy. It discloses potential direct, indirect, and cumulative environmental effects on the human and biological environment anticipated to result with implementation of the Proposed Action or an additional action alternative. Furthermore, it is intended to ensure that planning considers the environmental and social values of the project area and that potential resource conflicts are minimized or avoided.

A. SUMMARY OF THE PURPOSE AND NEED FOR THE PROPOSED ACTION

The proposed projects were specifically planned to better accommodate existing daily visitation levels, and maintain the desired skiing experience with comfortable terrain capacities. It is not anticipated that the proposal would elicit increases in peak day visitation. The full text of the Purpose and Need is stated in Chapter 1. The following seven statements summarize the Purpose and Need:

- Purpose #1: Better accommodate current daily visitation levels.
- Purpose #2: Reduce skier congestion on Breckenridge Ski Resort's (BSR) existing Intermediate and Advanced-Intermediate terrain network and associated lifts.
- Purpose #3: Reduce waiting time for lifts at BSR.
- Purpose #4: Disperse Intermediate and Advanced-Intermediate skiers more efficiently across the entire skiable terrain network.
- Purpose #5: Provide additional lift-served terrain to accommodate the existing terrain distribution deficit.
- Purpose #6: Provide additional hike-to access servicing advanced ability levels.
- Purpose #7: Provide sufficient infrastructure in pods to serve guests.

B. SUMMARY OF THE ALTERNATIVES ANALYZED IN THE FEIS

In addition to the No Action Alternative (analyzed in this document as Alternative 1), two action alternatives are analyzed.

ALTERNATIVE 1 – NO ACTION

By definition, the No Action Alternative represents a continuation of existing management practices without changes, additions, or upgrades to existing conditions.

ALTERNATIVE 2 – PROPOSED ACTION

The Proposed Action includes traditional downhill and hike-to skiing on Peak 6 accessed by a two lift configuration (a lower and an upper lift), as well as two service facilities to accommodate guests.

Terrain

- Approximately 550 acres of proposed traditional downhill and hike-to skiing.
- Seven below-treeline trails, totaling approximately 68 acres (the only terrain type that will require tree clearing and grading).
- 339 acres of above-treeline terrain, 235 of which would be lift-served by the new Peak 6 lifts, and 104 acres of which will be accessed by the existing Imperial Express SuperChair.
- Of the lift-served terrain, 182 acres (45 percent) are Intermediate, 62 acres (15 percent) are Advanced-Intermediate, and 163 acres (40 percent) are Expert.
- 143 acres of hike-to, Expert only terrain; the hike from the top terminal of the upper Peak 6 lift to the Peak 6 summit would take approximately 15 minutes.

Lifts

- A two lift configuration is analyzed in this FEIS to service the proposed Peak 6 terrain.
- The upper Peak 6 lift would be installed as a detachable, six-person chairlift. The lift would have a slope length of approximately 6,000 feet, a vertical rise of approximately 1,550 feet, and a design capacity of 3,000 people per hour (pph).
- The lower Peak 6 lift would be installed as a fixed-grip, four-person chairlift. The lift would have a slope length of approximately 2,600 feet, a vertical rise of approximately 350 feet, and a design capacity of 2,000 people per hour (pph).

Guest Services

- To accommodate guests using the Peak 6 lifts and terrain, restroom facility would be located at the junction of the Peak 6 lifts.

- The restroom facility would be approximately 1,200 square feet in size and would include composting toilets.
- A ski patrol/warming hut would be constructed at the top terminal of the upper Peak 6 lift, approximately 500 square feet in size.

Comfortable Carrying Capacity

- The Proposed Action would better accommodate current daily visitation levels without increasing peak day visitation.
- The Proposed Action would increase BSR's CCC by 1,250 guests, increasing BSR's CCC from 14,920 to 16,170 guests (25 percent of the "Core Season" at BSR exceeds 16,000 daily skier visits).

Non-Significant Forest Plan Amendment of Standard ALL S1

- A non-significant Forest Plan amendment would remove the applicability of Canada lynx Standard ALL S1 to this project decision.[*]

ALTERNATIVE 3

Alternative 3 includes trail and lift development within BSR's currently developed lift and terrain network, as well as a proposed skiing pod immediately north of Peak 7.

Terrain

- Approximately 326 acres of newly accessible terrain on Peaks 6½, 7, 8, 9, and 10.
- Approximately 280 acres of lift-served terrain, within the existing developed trail network, of which 48 acres (17 percent) are Low-Intermediate, 69 acres (25 percent) are Intermediate, 13 acres (5 percent) are Advanced-Intermediate, and 150 (54 percent) are Expert.
- 150 acres would be above-treeline, served by the Imperial Express SuperChair.
- An additional 46 acres of hike-to terrain would be accessible on Peak 6½.

Lifts

- Three chairlifts would be upgraded within the existing lift and terrain network—Colorado SuperChair, C-Chair and A-Chair.
- The proposed Peak 6½ area would be serviced by a high-speed detachable, four- (or six-) person chairlift with a design capacity of 2,400 pph and a length of 3,950 feet.

[*] Standard ALL S1 is contained in the Southern Rockies Lynx Management Direction Record of Decision, which amended the 2002 Forest Plan for lynx direction.

Guest Services

- Not applicable.

Comfortable Carrying Capacity

- Alternative 3 would increase CCC by 1,490 guests, increasing BSR's CCC from 14,920 to 16,410 guests.

Non-Significant Forest Plan Amendment of Standard ALL S1

- A non-significant Forest Plan amendment would remove the applicability of Canada lynx Standard ALL S1 to this project decision.

C. PROJECT DESIGN CRITERIA AND CONSERVATION MEASURES INCORPORATED INTO ALTERNATIVES 2 AND 3

In order to minimize potential resource impacts from construction and implementation of any approved projects, Project Design Criteria (PDC) and conservation measures have been incorporated into Alternatives 2 and 3. Table 2-4 in this FEIS lists the PDC that would be incorporated into the action alternatives. In addition, conservation measures have been developed to minimize impacts to Canada lynx and the Breckenridge community and are included on pages 2-17 through 2-20 of the FEIS.

D. PUBLIC INVOLVEMENT

On January 18, 2008, a scoping notice was mailed to approximately 150 community residents, interested individuals, public agencies, and other organizations. The scoping package provided a brief description of the Proposed Action, the Purpose and Need for action, preliminary issues raised, and an illustrative map. This notice was specifically designed to elicit comments, concerns, and issues pertaining to the Proposed Action. A legal notice was published in the Glenwood Post Independent, and a Notice of Intent (NOI) to prepare an Environmental Impact Statement was published in the Federal Register, on January 18, 2008. A public open house was held on January 30, 2008, at the Mountain Thunder Lodge in Breckenridge. Following media coverage of the proposal, other individuals obtained copies of the scoping package at the open house or sent requests to the Dillon District Ranger for information. In addition, the scoping package was posted on the WRNF website. An e-mail address was provided for submitting electronic comments.

One hundred eighty-five letters scoping were received, and the Forest Service Interdisciplinary Team categorized each substantive comment in a comment disposition. Resource issues and indicators are identified in Chapter 1, a summary of resource issues is provided below. The issues are analyzed in Chapter 3 – Affected Environment and Environmental Consequences.

Additionally, as part of the Forest Service public outreach effort, a site visit on snow was held at BSR on April 22, 2010, with key project participants to better understand issues, concerns, and potential alternatives.

On June 10, 2011, a Notice of Availability was published in the Federal Register for the DEIS. The DEIS was released for public review and comment for a 45-day comment period which extended through July 27, 2011. On July 22, 2011, a second Notice of Availability extended the DEIS comment period to August 26, 2011. During the comment period, a summer site visit was held at BSR on July 14, 2011, to allow the public to view the proposed project areas during non-snow conditions and provide comments to the Forest Service. In response to the DEIS, approximately 900 comments were received from interested parties. From these letters, substantive comments were extracted and entered into a database; comments were linked to specific commenters and resource issues. Substantive comments are addressed in the Response to Comments (RTC) document.

PEAK 6 TASK FORCE

The January 2008 scoping process generated social and community oriented comments from the public. The Forest Service determined that several of the social and community issues were beyond the scope of the DEIS and FEIS and the Forest Service did not possess the expertise in these subject areas to adequately address these concerns (e.g., baseline conditions and effects to social services). Therefore, in August 2008, BSR, the Town of Breckenridge, Summit County Government, and the Breckenridge business community formed a “Task Force” to review the social and community oriented comments received by the Forest Service.

The Task Force met approximately every two weeks between August 2008 and March 2009 to discuss the social issues, including: employee recruitment/retention, affordable housing, healthcare and social services, traffic, and parking. The public was invited to attend each meeting with an opportunity to ask questions and voice additional concerns. The Task Force presented its findings to the public on March 11, 2009.

The Task Force findings were provided to the Forest Service for review, and are presented in their respective sections in Chapter 3 – Affected Environment and Environmental Consequences. In addition, Town of Breckenridge, Summit County Government, and BSR signed a Memorandum of Understanding (MOU) to formalize the findings of the Task Force and provide options to address social concerns within the community. The Forest Service has incorporated the MOU into the FEIS Appendix E as a reference document and mechanism to address additive social impacts imposed upon the community as a result of the potential selection of an action alternative.

E. SUMMARY OF RESOURCE ISSUES ADDRESSED

Based on the results of public scoping, the Forest Service identified specific areas of public concern. Each of the following issue statements includes a list of indicators (see Chapter 1) which were identified as a means of measuring or quantifying the anticipated level of impact on a particular resource.

HUMAN ENVIRONMENT

Quality of Life

Implementation of the proposed projects could affect the quality of life for residents of the Upper Blue River Basin, including Town of Breckenridge.

Recreation, Mountain Operations and Guest Services

Recreation Issue #1: Proposed projects within BSR's SUP area have the potential to affect the recreational experience at the ski area.

Recreation Issue #2: Development of the Peak 6 skiing pod, including the installation of chairlifts and guest service facilities, would remove existing backcountry terrain within BSR's SUP area. Converting the Peak 6 pod to a lift-served skiing experience would alter the distribution of backcountry acreage immediately accessible from the ski area's operational boundary.

Recreation Issue #3: Development of proposed projects outside the existing operational boundary would increase BSR's requirement for snow safety management and potentially increase opportunities for access to the west side of the Tenmile Range.

Traffic, Parking and Ski Area Access

Proposed projects may generate measurable increases in daily/seasonal visitation, thereby affecting traffic movement and volumes within the Town of Breckenridge, on Highway 9 between Frisco and Breckenridge, and on construction/maintenance access roads proximate to the ski area. Parking capacities may also be affected by proposed projects.

Scenery

Development of proposed projects, including associated infrastructure, would be visible from Highway 9 and the Town of Breckenridge.

Cultural Resources

Implementation of proposed projects and associated ground disturbance may affect previously unidentified cultural and heritage resources within the SUP area.

Social and Economic Resources

Implementation of the proposed projects could potentially alter certain socioeconomic characteristics of Summit County, including demand for Town/County housing (in compliance with Executive Order 12898), by increasing total annual visitation.

Noise

Snow management and avalanche control through the use of explosives on Peak 6 has the potential to generate additional noise audible in the Peak 7 neighborhood and Town of Breckenridge.

BIOLOGICAL ENVIRONMENT

Vegetation

Plant communities (including Threatened, Endangered, and Sensitive [TES] species and regionally important plants) may be altered as a result of the proposed projects.

Wildlife

Development of proposed projects, including associated infrastructure, would necessitate vegetation removal and would increase human presence. Increased use of the area, loss of habitat, and habitat fragmentation could disrupt terrestrial wildlife, including TES species and Management Indicator Species (MIS) that may utilize habitat within BSR's SUP area.

Forest Health

Due to the mountain pine beetle (MPB) outbreak that is currently affecting Colorado forests, the majority of lodgepole pine within the SUP area is either dead or may be dead within several years. Proposed projects could take advantage of tree stands that will be affected by MPB or could remove tree species other than lodgepole pine.

Water Resources

Implementation of terrain modifications associated with proposed projects (vegetation removal, grading, utility installation/burial, road reconstruction, and facilities construction) has the potential to affect stream and riparian health.

Waters of the U.S., including Wetlands

Identified wetlands throughout the project area could be temporarily and/or permanently affected by construction and implementation of proposed projects.

Air Quality

Short-term, construction related activity, as well as potential increases in vehicular traffic related to increased annual visitation could negatively impact air quality in the region.

Geology and Soil Resources

Proposed ground disturbance and snowmaking may (individually and/or collectively) affect erosion and slope hazards.

F. SUMMARY COMPARISON OF DIRECT AND INDIRECT ENVIRONMENTAL CONSEQUENCES

Table 2-6 (pages 2-34 through 2-57) found in Chapter 2 includes a summary comparison of environmental consequences, by resource, for Alternatives 1, 2 and 3. Detailed information on affected environment and environmental consequences for each resource considered in this analysis can be found in Chapter 3.

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LIST OF ACRONYMS

AADT	Average Annual Daily Traffic
AAQS	Ambient Air Quality Standards
ADT	Average Daily Traffic
AF	Acre feet
AMI	Area Median Income
AMSL	Above Mean Sea Level
APE	Area of Potential Effect
BA	Biological Assessment
BE	Biological Evaluation
BEIG	Built Environment Image Guide
BMP	Best Management Practice
BSR	Breckenridge Ski Resort
BTRT	Boreal Toad Recovery Team
CAA	Clean Air Act
CDA	Connected Disturbed Area
CDOT	Colorado Department of Transportation
CDOW	Colorado Division of Wildlife
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CFS	Cubic Feet per Second
CH_4	Methane
CNHP	Colorado National Heritage Program
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
CPTSB	Colorado Passenger Tramway Safety Board
CRCT	Colorado River Cutthroat Trout
CWA	Clean Water Act
dB	Decibel
dBA	Decibel measured on the A scale
dbh	Diameter at Breast Height
DRD	Dillon Ranger District
DSH	Diurnal Security Habitat
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
EO	Executive Order
ESA	Endangered Species Act
FIRC	Family and Intercultural Resource Center
FIS	International Ski Federation

FPCA	Forest Plan Consistency Analysis
FSH	Forest Service Handbook
FSM	Forest Service Manual
FTE	Full-time-equivalent
GHG	Greenhouse Gas
GIS	Geographic Information System
HUC	Hydrologic Unit Code
ID Team	Interdisciplinary Team
LAA	Likely to Adversely Affect
LAU	Lynx Analysis Unit
LCAS	Lynx Conservation and Assessment Strategy
LRMP	Land and Resource Management Plan
LWD	Large Woody Debris
MA	Management Areas
MAII	May Adversely Impact Individuals
mg/l	Milligrams per liter
µg	Micrograms
MIS	Management Indicator Species
MM	Management Measures
MOU	Memorandum of Understanding
MPB	Mountain Pine Beetle
N_2O	Nitrous oxide
NAAQS	National Ambient Air Quality Standards
NDIS	Natural Diversity Information
NE	No Effect
NEPA	National Environmental Policy Act
NFS	National Forest System
NHPA	National Historic Preservation Act
NI	No Impact
NRHP	National Register of Historic Places
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxide
NOI	Notice of Intent
NRHP	National Register of Historic Places
O_3	Ozone
OAHP	Office of Archeology and Historic Preservation
PDC	Project Design Criteria
PEM	Palustrine Emergent
$PM_{2.5}$	Particulate Matter under 2.5 microns
PM_{10}	Particulate Matter under 10 microns
PPH	People Per Hour

PSD	Prevention of Significant Deterioration
PSS	Palustrine Shrub/Scrub
R2	Region 2
ROD	Record of Decision
SFE	Single Family Equivalent
SHPO	State Historic Preservation Officer
SIO	Scenic Integrity Objective
SMS	Scenery Management System
SO_2	Sulfur Dioxide
SRLMD	Southern Rockies Lynx Management Direction
SUP	Special Use Permit
TES	Threatened, Endangered, and Sensitive species
TMDL	Total Maximum Daily Load
TOC	Threshold of Concern
USACE	US Army Corps of Engineers
USC	United States Code
USCA	United States Code Annotated
USDA	United States Department of Agriculture
USFS	US Forest Service
USFWS	US Fish and Wildlife Service
USGS	US Geological Survey
VMP	Vegetation Management Plan
VPD	Vehicles Per Day
WCPH	Watershed Conservation Practices Handbook
WIZ	Water Influence Zone
WOUS	Waters of the United States
WRNF	White River National Forest

Chapter 1
Purpose and Need

1. PURPOSE AND NEED

A. INTRODUCTION

The proposed improvements analyzed in this document constitute a federal action, which has the potential to affect the quality of the human environment on public lands administered by the United States Department of Agriculture Forest Service (Forest Service). Therefore, these projects must be analyzed pursuant to the National Environmental Policy Act of 1969 (NEPA). Under NEPA, Federal Agencies must carefully consider environmental concerns in their decision making processes and provide relevant information to the public for review and comment.

The Forest Service has prepared this Final Environmental Impact Statement (FEIS) in compliance with NEPA and other relevant federal and state laws and regulations. This FEIS contains analyses consistent with NEPA, Council on Environmental Quality (CEQ) regulations, and Forest Service policy. It discloses potential direct, indirect, and cumulative environmental effects on the human and biological environment anticipated to result with implementation of the Proposed Action or an additional action alternative. Additionally, it is intended to ensure that planning considers the environmental and social values of the project area and that potential resource conflicts are minimized or avoided. The document is organized into eight chapters:

- Chapter 1 – Purpose and Need: includes information on the history of the project proposal, the purpose of and need for the project, and the proposal for achieving that Purpose and Need. Chapter 1 also details how the Forest Service informed the public of the proposal and how the public responded.
- Chapter 2 – Description of Alternatives: provides a detailed description of the No Action Alternative, the Proposed Action, and an alternative (Alternative 3) that was formed in response to significant issues raised during scoping. This discussion also includes alternatives considered but eliminated from further analysis, and project design criteria. Finally, Chapter 2 provides a summary table of the environmental consequences anticipated with each alternative.
- Chapter 3 – Affected Environment and Environmental Consequences: provides a description of the affected environment (i.e., existing conditions) by resource area, and describes the environmental effects of implementing the No Action Alternative, Proposed Action and Alternative 3. Chapter 3 is organized by resource topic.
- Chapter 4 – Consultation and Coordination: provides a list of preparers and agencies consulted during the development of this FEIS.
- Chapter 5 – References: provides complete references for documents cited within this FEIS.

- Chapter 6 – Figures: provides the maps, figures, visual simulations, and perspectives used throughout the analysis.
- Chapter 7 – Glossary: provides a definition of technical and non-technical terms used throughout this FEIS.
- Chapter 8 – Index: provides a list and page number of frequently used terms throughout this FEIS.
- Appendices – includes: (A) Cumulative Effects Projects; (B) Forest Plan Consistency Analysis; (C) Response to Scoping Comments; (D) Alternative 2 and 3 Proposed Forest Plan Amendment; (E) Memorandum of Understanding (MOU) between the Town of Breckenridge, Summit County Government and Breckenridge Ski Resort (BSR); (F) Federal, State, and Local Agency Comment Letters on the DEIS; and (G) U.S. Fish and Wildlife Service Biological Opinion.

Additional documentation, including more detailed analyses of project area resources, may be found in the project administrative record located at the Dillon Ranger District office of the White River National Forest (WRNF).

B. BACKGROUND

BSR is located on the Dillon Ranger District of the WRNF, approximately 85 miles west of Denver, the largest metropolitan area in Colorado (refer to Figure 1 – Vicinity Map). BSR is accessed from the Colorado Front Range via Interstate 70 and Colorado State Highway 9. BSR opened to the public for lift-served Alpine skiing in 1961 and has since become the most frequently visited ski resort in the United States with skier visits over 1.6 million annually.[1]

BSR is owned and operated by Vail Resorts, Inc. under a Special Use Permit (SUP) from the Forest Service. The terms of the SUP require the preparation of a Master Development Plan (MDP), which identifies goals and opportunities for future management of the ski area on National Forest System (NFS) lands. An MDP was prepared and submitted by BSR and approved through a Forest Service Decision Notice in 1981. In subsequent years, the 1981 MDP was amended several times and culminated with the *2007 Breckenridge Ski Resort Master Development Plan* (2007 MDP).[2] The 2007 MDP includes a list of

[1] Breckenridge Ski Resort, 2010b

[2] Ski area MDPs are conceptual in nature and contain desired conditions, objectives, and rationale for the comprehensive development of federal lands within the SUP boundary *and* adjacent private lands. MDPs are *accepted* by the Forest Service and provide a framework for identifying and prioritizing potential projects to be subsequently carried forward into a NEPA review and analysis.

proposed projects that, if approved, could be implemented in five to ten years.[3] The major component of the 2007 MDP is the proposal for lift-served skiing on Peak 6. Currently, BSR includes developed, lift-served skiing on approximately 1,825 acres across peaks 7, 8, 9 and 10 on the Tenmile Range.[4] Also included in the 2007 MDP is a suite of lift upgrades for existing lifts, new lifts, and several terrain network improvements within the developed ski area boundary. The Peak 6 development project was proposed by BSR to the Forest Service, and was subsequently accepted and adopted as the Forest Service's Proposed Action for this project, as it most effectively addresses the needs of the Forest Service and BSR.

Revised in 2002 through the WRNF Land and Resource Management Plan (2002 Forest Plan) revision process, the BSR SUP boundary increased in size to include Peak 6 and a portion of Peak 5. The 2002 Forest Plan revision process also reduced the number of acres for BSR allocated under the 8.25 Management Area Prescription: Ski Areas – Existing and Potential. The area was reduced compared to the previous Forest Plan allocation, but continued to contain the BSR SUP boundary in its entirety. In 2006, an agreement between BSR and the Breckenridge Nordic Center resulted in an additional modification to the SUP boundary, increasing the BSR SUP area acreage from 5,553 to 5,756 acres.

C. RELATIONSHIP TO PREVIOUS ANALYSES AND APPROVALS

This FEIS is consistent with and incorporates by reference several documents which are related to the management of BSR on NFS lands, including:[5]

- 1994 Breckenridge Ski Resort Snowmaking System Addition, Environmental Assessment, Decision Notice and Finding of No Significant Impact;
- 1998 Breckenridge Ski Resort Peaks 7 and 9 Facilities Improvements Plan, Environmental Assessment, Decision Notice and Finding of No Significant Impact;
- 2002 Breckenridge Ski Resort Peak 9 Lifts and Facilities Improvements Plan, Environmental Assessment, Decision Notice and Finding of No Significant Impact;
- 2002 White River National Forest Land and Resource Management Plan;

[3] The 2007 MDP was prepared by SE Group and includes an assessment of existing conditions and constraints at BSR as well as future plans to address the opportunities and constraints. SE Group is also the Prime Consultant for the preparation of this FEIS. Per 46 Fed. Reg. 18026 (March 23, 1981), as amended, *Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations* 17a., disclosure statements indicating the Prime Consultant and all sub-consultants do not have financial or other interest in the outcome of the project are included in the Project File. The Forest Service has determined that no conflict of interest exists with SE Group and its sub-consultants in the preparation of this FEIS; therefore, SE Group and its sub-consultants were not disqualified from preparing the FEIS.

[4] The Tenmile Range approximately extends from Frisco, CO (Peak 1) south to Breckenridge, CO (Peak 10). Developed, lift-served terrain considered in this analysis does not include inter-trail tree islands or hike-to terrain. Therefore, the total differs from the BSR website: www.breckenridge.com. (Breckenridge, 2010d)

[5] These documents are part of the project record for this FEIS and are available for review at the Dillon Ranger District in Silverthorne, CO.

- 2002 White River National Forest Land and Resource Management Plan Final Environmental Impact Statement;
- 2003 Breckenridge Ski Resort Restaurant Water System Upgrade and Replacement, Country Boy/Eldorado Trail Snowmaking, Relocation of the Peak 7 Restaurant Site, and Mid-Station Unload on the Independence SuperChair, Environmental Assessment, May 2003 Decision Notice and Finding of No Significant Impact;
- 2003 Breckenridge Ski Resort Restaurant Water System Upgrade and Replacement, Country Boy/Eldorado Trail Snowmaking, Relocation of the Peak 7 Restaurant Site, and Mid-Station Unload on the Independence SuperChair, Environmental Assessment, October 2003 *Supplemental* Decision Notice and Finding of No Significant Impact; and
- 2005 Breckenridge Ski Resort Peak 8 Summit Lift and 6 Chair Replacement, Environmental Assessment, Decision Notice and Finding of No Significant Impact.

D. PURPOSE AND NEED FOR THE PROPOSED ACTION

To address growth in the Colorado, national, and international skier markets and meet guest expectations (which are measured annually through guest surveys), BSR must continue to develop and improve on-mountain and base area facilities across the resort.[6] The development of additional facilities at BSR is in direct response to demonstrated user demand as evidenced by historic and current skier visitation. The proposed projects were specifically planned to better accommodate existing daily visitation levels, and maintain the desired skiing experience with comfortable terrain capacities. It is not anticipated that the proposal would elicit increases in peak day visitation.[7]

The 2002 Forest Plan anticipates that population growth in Colorado, and along the Front Range in particular, will contribute to increased annual skier visitation.[8]

In terms of annual visitation, BSR has fluctuated between the most visited and second most visited ski resort in the United States over the past decade, making it consistently one of the busiest mountain resorts in North America. Between the 1995/96 and 2009/10 seasons, BSR averaged 1.5 million annual visits, and reached a record 1.65 million visits in the 2006/07 season. In the past five seasons, BSR has averaged 1.6 million skier visits.[9] While this is testament to BSR's strong position in the Rocky Mountain skier market, consistently approaching (and in some cases, surpassing) 1.6 million annual visits does not come

[6] Base area facilities at BSR are on private lands and not subject to Forest Service review. Therefore, the alternatives were developed and analyzed to focus on projects proposed on NFS lands.
[7] This analysis makes this assumption based on: a review of past visitation data that includes additional built infrastructure improvements; the current guest experience on these peak days being diminished; Interstate 70 and constraints to weekend day skiers; and weekday flexible work schedules increasing mid-week visitation. In addition, a visitation management conservation measure is included in Chapter 2 to address daily skier visits and proactively manage against peak day skier visit increases.
[8] USDA Forest Service, 2002b
[9] Breckenridge Ski Resort, 2010b

without consequence with regards to the quality of the guest experience. Parameters used to measure the quality of guest experience include peak day visitation, lift-line wait times, and skier densities on trails.[10] Historically, peak visitation days (in excess of 18,500 skiers, or approximately 25 percent above the Comfortable Carrying Capacity [CCC]) would occur only on holidays and over vacation periods (i.e., Christmas week and spring break), with the intervals between the peaks experiencing average or below average visitation levels.[11] An analysis of daily visitation data over the past decade identifies a trend whereby guests now arrive several days prior to the peak periods, as well as stay a number of days beyond. Essentially, this trend shows an increase in the number of visits during the historically lower non-peak periods. It has led to increased annual visitation, although peak day visitation has not increased measurably over the past seven seasons. Generally, as daily visitation increases, the quality of the recreational experience decreases as trails become crowded, lift-line wait times become longer than guest expectations, and food service capacities become constrained.

Observations made by WRNF and BSR staff, as well as guest survey data, reveal that high trail densities and long lift-lines are primarily associated with three periods: peak visitation days, average days during key egress periods, and new snow days in areas of off-piste lift-served terrain.[12] Furthermore, guest survey results from 2010 indicate that BSR received below average ratings for lift-line wait times from guests, typically when the CCC was exceeded. A terrain distribution analysis (Table 1-1) compares BSR's existing skier distribution with the regional skier market.

[10] The terms "skier," "skiing," "ski," and "skiable" as used within this FEIS are expressly inclusive of all forms of Alpine on-snow recreation including: snowboarding, telemark skiing, adaptive skiing, and other forms of allowable on-snow sliding.

[11] Comfortable Carrying Capacity (CCC) is a planning tool used to determine the optimum level of utilization that facilitates a pleasant recreational experience. This is a planning figure only and does not represent a regulatory cap on visitation. CCC is used to ensure that the various aspects of a resort's facilities are designed and sized to work in harmony, that capacities are equivalent across facilities and sufficient to meet anticipated demand. CCC is based on factors such as vertical transport and trail capacities.

[12] "Piste" is a term borrowed from French vernacular meaning skiing terrain that provides a traditional, groomed, prepared sliding surface. "Off-piste" therefore refers to skiing terrain that is left in a natural Alpine snow condition, receives very infrequent grooming (if any) and presents natural, variable surface conditions and textures.

Table 1-1:
Lift-Served Terrain Distribution by Ability Level – Existing Condition

Skier Ability Level		Trail Acreage	BSR Skier Distribution[a]	Central Rockies Skier Market
●	Beginner	2.8	1%	5%
●	Novice	106.6	15%	15%
■	Low-Intermediate	403.4	38%	25%
■	Intermediate	402.0	29%	35%
◆	Advanced-Intermediate Traditional Bowl Skiing	 175.7 173.4	9%	15%
◆	Expert Traditional Bowl Skiing	 217.9 342.7	7%	5%
	Total	**1,824.5**	**100%**	**100%**

[a] BSR Skier Distribution is based on terrain capacity
Source: Breckenridge Ski Resort, 2007

This analysis indicates a shortage of Beginner, Intermediate, and Advanced-Intermediate terrain. Hike-to terrain is also growing in demand as evidenced by the number of skiers hiking to the summit of Peak 8 from the top of the Imperial Express SuperChair.

Given the current visitation rates, guest experiences, and terrain distribution concerns, there is a need for:

- Better accommodation of current daily visitation levels;
- Reduced skier congestion on BSR's existing Intermediate and Advanced-Intermediate terrain network and associated lifts;
- Reduced waiting time for lifts at BSR;
- Efficient dispersal of Intermediate and Advanced-Intermediate skiers across the entire skiable terrain network;
- Additional lift-served terrain to accommodate the existing terrain distribution deficit;
- Additional hike-to access servicing advanced ability levels; and
- Sufficient infrastructure in pods to serve guests.[13]

[13] The term "pod" is defined as a lift and the terrain that is serviced by that lift.

E. SUMMARY OF THE ACTION ALTERNATIVES

The projects analyzed in this FEIS are designed to accommodate the existing daily skier visitation at BSR. Currently, BSR exceeds 16,000 daily skier visits on 25 percent of "Core Season" days.[14] The action alternatives (discussed below) respond to the Purpose and Need for the project and would make the CCC more commensurate with existing visitation levels. The proposed projects are within BSR's SUP boundary.

This FEIS was assembled to enable the Responsible Official to determine whether or not all, portions of, or alternatives to the Proposed Action will be approved for implementation on NFS lands within the BSR SUP area. Any approved projects are anticipated to be implemented over the next one to seven years, depending on the type of project.

As described below under "Public Involvement," the Proposed Action was introduced to the public in January 2008 when this project was scoped. The scoping notice indicated that the Proposed Action was being considered at that time, but that additional alternative actions could be considered as well in the EIS planning process. Alternative 3 is thus a logical outgrowth of the scoping process and based on public concerns.

A summary of the action alternatives is provided here, with a detailed description presented in Chapter 2.

ALTERNATIVE 2 – PROPOSED ACTION

The proposed Peak 6 development encompasses approximately 550 acres of lift-served and hike-to skiing. The terrain would be accessed by a two lift configuration (a lower and an upper lift) and by traversing from the existing Imperial Express lift to the north. In addition, two facilities would be constructed to accommodate guests—a top terminal ski patrol/warming hut at the top of the upper Peak 6 lift and a restroom facility at the junction of the upper and lower Peak 6 lifts. The upper lift would allow skiers to round-trip the Peak 6 terrain without leaving the pod. With the development of the proposed Peak 6 lifts and associated terrain, the CCC at BSR would increase by 1,250 guests, from 14,920 to 16,170 guests. A Forest Plan Amendment is proposed to amend the 2002 Forest Plan Canada Lynx Standard ALL S1.[15]

[14] This analysis primarily considers the recreation resource during the period when the ski area is fully functioning (i.e., all trails and lifts are operational). This "Core Season" is most appropriate for analysis in that during the early and late season periods, not all of the resort is operational and the quantitative metrics used within this analysis would not display an accurate comparison. Normal natural snowfall combined with present snowmaking capabilities do not typically allow the ski area to become fully operational until approximately December 20th each season. In addition, April typically experiences much lower than average visitation (averaging approximately 7,000 skier visits per day) due to BSR's reliance upon destination guests (who book vacations primarily within the Core Season) and warm temperatures in the Colorado Front Range (which cause day-visitors to begin pursuing warm weather interests). For these reasons, the Core Season is defined as December 20th to March 31st annually.

[15] Standard ALL S1 is contained in the Southern Rockies Lynx Management Direction Record of Decision, which amended the 2002 Forest Plan for lynx direction.

Components of the Proposed Action and additional information about the Forest Plan amendment are detailed in Chapter 2: Alternative 2 – Proposed Action.

ALTERNATIVE 3

Alternative 3 was created to respond to several issues raised internally by the Forest Service and externally by the public during the scoping process. The issues include: wildlife habitat resources, preservation of live trees not affected by the mountain pine beetle, backcountry skiing, scenic integrity and viewsheds, soils and watershed resources, and quality of life for the Breckenridge community. The alternative includes trail and lift development within BSR's currently developed lift and terrain network, as well as a proposed skiing pod immediately north of Peak 7.

Alternative 3 would include the development of 326 acres of lift-served and hike-to terrain along with a new gladed skiing area (Peak 6½) immediately north of the existing ski area operational boundary. A new chairlift would be constructed to access this terrain. Twelve new trails would be constructed within the existing ski area operational boundary and three existing lifts would be upgraded—Colorado SuperChair, A-Chair and C-Chair. Snowmaking is proposed on 11 of the proposed trails within the existing operational boundary. Under this Alternative, BSR's CCC would increase by 1,490 guests, raising the BSR CCC from 14,920 to 16,410 guests. A trail grading project on *Four O'Clock* trail, continuing through *Crosscut* and *Lower Sawmill* trails is proposed to increase the efficiency of skiers circulating from Peak 8 to Peak 9. A Forest Plan Amendment is proposed to amend the 2002 Forest Plan Canada lynx Standard "ALL S1."

F. INTERAGENCY COORDINATION

In accordance with regulatory direction, and in furtherance of cooperative management among federal agencies charged with oversight of environmental and natural resources; federal, state, local, and tribal entities with a likely interest and/or jurisdiction in the Proposed Action were sent scoping notices and/or consulted prior to and throughout the NEPA process.

G. PUBLIC INVOLVEMENT

On January 18, 2008, a scoping notice was mailed to approximately 150 community residents, interested individuals, public agencies, and other organizations. The scoping package provided a brief description of the Proposed Action, the Purpose and Need for action, preliminary issues raised, and an illustrative map. This notice was specifically designed to elicit comments, concerns, and issues pertaining to the Proposed Action. A legal notice was published in the Glenwood Post Independent, and a Notice of Intent (NOI) to prepare an Environmental Impact Statement was published in the Federal Register, on January 18, 2008. A public open house was held on January 30, 2008, at the Mountain Thunder Lodge in Breckenridge. Following media coverage of the proposal, other individuals obtained copies of the scoping package at the

open house or sent requests to the Dillon District Ranger for information. In addition, the scoping package was posted on the WRNF website. An e-mail address was provided for submitting electronic comments.

Based on the 185 scoping letters received, a comment disposition was completed, which documents the Forest Service Interdisciplinary (ID) Team's categorization of each substantive comment. The comment disposition is a key component to the identification of issues and the formulation of potential alternatives to the Proposed Action.[16] Resource issues and indicators are identified below. The issues are analyzed in Chapter 3 – Affected Environment and Environmental Consequences.

As part of the Forest Service public outreach effort, a site visit on snow was held at BSR on April 22, 2010, with key project participants to better understand issues, concerns, and potential alternatives.

On June 10, 2011, a Notice of Availability was published in the Federal Register for the DEIS. The DEIS was released for public review and comment for a 45-day comment period which extended through July 27, 2011. On July 22, 2011, a second Notice of Availability extended the DEIS comment period to August 26, 2011. During the comment period, a summer site visit was held at BSR on July 14, 2011, to allow the public to view the proposed project areas during non-snow conditions and provide comments to the Forest Service. In response to the DEIS, approximately 900 comments were received from interested parties. From these letters, substantive comments were extracted and entered into a database; comments were linked to specific commenters and resource issues. Substantive comments are addressed in the Response to Comments (RTC) document.

PEAK 6 TASK FORCE

The January 2008 scoping process generated social and community oriented comments from the public. The Forest Service determined that several of the social and community issues were beyond the scope of the DEIS and FEIS and the Forest Service did not possess the expertise in these subject areas to adequately address these concerns (e.g., baseline conditions and effects to social services). Therefore, in August 2008, BSR, the Town of Breckenridge, Summit County Government, and the Breckenridge business community formed a "Task Force" to review the social and community oriented comments received by the Forest Service. The purpose of this Task Force, as stated in the *Operating Agreement and Protocols for the Peak 6 Task Force,* indicates:

> *"The Task Force was created in response to the comments received about the possible socio-economic impacts of a proposed expansion on Peak 6 during the NEPA Scoping process.*
>
> *While the impetus for the formation of the group was the proposed expansion, the members recognize that the socio-economic issues raised are broader community issues*

[16] The scoping comment disposition analysis is available in the Project File.

and cannot be addressed in an isolated discussion about Peak 6. These issues will need to be addressed from a perspective of the overall carrying capacity for the Breckenridge area and in consideration of the cumulative effects of the recent developments on and adjacent to Peaks 7 and 8. Therefore, the goals of the Task Force between October 2008 and January 2009 are as follows:

- *Identify the socio-economic issues that the ski area, town, and business community share with respect to growth, and identify a process for dealing with them holistically. Initially, the group has identified employee recruitment and retention, affordable housing, healthcare and social services, parking and transportation.*
- *Determine the specific range of possible impacts on these issues from a proposed Peak 6 expansion and possible measures to mitigate those impacts.*
- *Serve as a model to address broader community needs on an ongoing basis."*[17]

The Task Force met approximately every two weeks between August 2008 and March 2009 to discuss the social issues, including: employee recruitment/retention, affordable housing, healthcare and social services, traffic, and parking. The Task Force invited individuals within the community that possess expertise in their field to speak to that subject matter. Also, the public was invited to attend each meeting with an opportunity to ask questions and voice additional concerns. The Task Force presented its findings to the public on March 11, 2009.

The Task Force findings were provided to the Forest Service for review. Those findings are presented in their respective section in Chapter 3 – Affected Environment and Environmental Consequences. In addition, the Town of Breckenridge, Summit County Government, and BSR signed a Memorandum of Understanding (MOU) to formalize the findings of the Task Force and provide options to address social concerns within the community. The Forest Service will not make the MOU a condition of this project's approval, as the MOU addresses concerns beyond Forest Service jurisdictional limits and capabilities. However, the Forest Service has incorporated the MOU into the FEIS as Appendix E as a reference document and mechanism to address additive social impacts imposed upon the community as a result of the potential selection of an action alternative.

H. CHANGES TO THE PROPOSED ACTION AND EXISTING CONDITIONS RELEVANT TO THE DEIS AND FEIS SINCE PROJECT SCOPING

As stated above, the project was originally scoped, internally and externally, in 2008. Since that time, several changes have occurred that are relevant to the planning process. These are disclosed below with a brief discussion on how the change has affected the DEIS, FEIS and the analysis.

[17] Task Force, 2008

Modification to the Proposed Action: In 2010, BSR presented a modification request to the Forest Service to change the configuration of the chairlift in the Proposed Action. The project was originally scoped with the bottom terminal located in an existing patch cut to the north of the current operational boundary. The modification included an extension of the chairlift with a bottom terminal location in an inter-trail treeline immediately south of the *Monte Cristo* trail. The previous bottom terminal location became the proposed mid-station of the Peak 6 lift. Subsequent to the DEIS in 2011, BSR proposed to the Forest Service that the lift would be constructed with two chairlifts (one four-person and one six-person chairlift) in an alignment similar to that disclosed in the DEIS. In this FEIS, Proposed Action is analyzed as a two lift configuration (a lower and an upper lift). The top terminal of the proposed chairlift has not changed. With a two lift configuration the Proposed Action CCC would increase by 1,250 guests, from 14,920 to 16,170 guests. This change in the Proposed Action is reflected in all analyses within this FEIS. Other changes to the Proposed Action have occurred and are detailed in Chapter 2 – Proposed Action.

Re-classification of Existing Trails at BSR: In the summer of 2010, BSR changed the Advanced-Intermediate (blue/black) trail designations to either More Difficult (blue square) or Most Difficult (single black diamond) on the winter trail map and trail signs for the following runs:

- *Doublejack* (changed from More Difficult Advanced-Intermediate [blue/black] to Most Difficult [single black diamond])
- *Centennial* (changed from More Difficult Advanced-Intermediate [blue/black] to Most Difficult [single black diamond])
- *Crystal* (changed from More Difficult Advanced-Intermediate [blue square/black diamond] to Most Difficult [single black diamond])
- *Upper American* (changed from More Difficult Advanced-Intermediate [blue square/black diamond] to Most Difficult [single black diamond])
- *Upper Peerless* (changed from More Difficult Advanced-Intermediate [blue square/black diamond] to Most Difficult [single black diamond])
- *Upper Volunteer* (changed from More Difficult Intermediate [blue square] to Most Difficult [single black diamond]
- *Frostys Freeway* (changed from More Difficult Advanced-Intermediate [blue square/black diamond] to Most Difficult [single black diamond])
- *Upper Four O'Clock* (changed from More Difficult Advanced-Intermediate [blue square/black diamond] to Most Difficult [single black diamond])
- *Spruce* (changed from More Difficult Advanced-Intermediate [blue square/black diamond] to Most Difficult [single black diamond])

- *Dukes* (upper changed from More Difficult Advanced-Intermediate [blue square/black diamond] to Most Difficult [single black diamond]) and lower changed from More Difficult Advanced-Intermediate [blue square/black diamond] to More Difficult [blue square])

BSR also changed *Crosscut* from Easiest (green circle) to More Difficult (blue square). The impetus for these changes was to be consistent with the other Vail Resorts ski areas in Colorado which utilize the Easiest, More Difficult, Most Difficult and extreme terrain designations currently recognized by the Colorado Skier Safety Act and was based in part on feedback from the Forest Service to help less experienced skiers make the proper terrain choices (*Spruce* trail). BSR also assessed the slope gradient for each of these runs including average slope and steepest pitch. Generally, Vail Resorts uses the slope percent grade of mid 20 percent to mid 40 percent for More Difficult and mid 40 percent to mid 50 percent for Most Difficult terrain at the steepest pitch. Anything over the mid 50 percent grade generally would receive a double black diamond rating. Most of the re-classified trails that went to the More Difficult (single black diamond) rating are approximately mid 40 percent at the steepest pitch.

For the purposes of this analysis, the terrain ability levels and acreages have not changed since the project was scoped with the public. Furthermore, this FEIS applies a consistent slope analysis for both existing and proposed terrain. Therefore, the identified deficits of certain ability level capacities presented in the scoping notice are identical to what is presented in Table 1-1 and is analyzed in this FEIS.

The Forest Service allows a certain level of latitude for permittees to operate a ski area in a safe manner and in accordance with the SUP. The Forest Service works with permittees to ensure consistent decisions are being made in the best interest of the public. For example, skier accidents may happen more frequently on a certain trail, so the Forest Service and the permittee may work together to re-classify a trail to a higher ability level to encourage the more appropriate ability level skier to use a trail. Similarly, the ski area has the discretion to make an operational decision to allow areas of a trail to turn to moguls on a steep pitch. This creates slower skiing speeds on areas of a trail, while allowing the remainder of the trail to be rated at an appropriate ability level (e.g., skier's left side of the *Pioneer* trail is moguls on a steep, off fall-line pitch, and this operational decision allows the entire trail to be classified as an Intermediate ability level trail).

<u>New Backcountry Access Point on Peak 7</u>: In February 2011, a backcountry access point was added to the northern operational boundary along the upper portion of Peak 7. Evidence showed that skiers were frequently ducking the roped operational boundary at this location, which is a violation of the Colorado Skier Safety Act. The Forest Service made the decision to approve BSR's proposal to create an additional access point at this location to provide skiers with the appropriate information prior to exiting the

operational boundary. The Forest Service's goal is to provide consistent information and boundary management at BSR.[18]

I. ISSUES AND INDICATORS

Based on the results of public scoping, the Forest Service identified specific areas of public concern. Issues generally require in-depth analysis and disclosure, and are often utilized to generate alternatives. In some cases, they can be addressed by project design criteria or mitigation measures. Each of the following issue statements includes a list of indicators which were identified as a means of measuring or quantifying the anticipated level of impact on a particular resource. While some indicators are necessarily qualitative in nature, every effort was made to utilize indicators that are quantitative, measurable and predictable.

HUMAN ENVIRONMENT

Quality of Life

Implementation of the proposed projects could affect the quality of life for residents of the Upper Blue River Basin, including the Town of Breckenridge.

Study Area: Upper Blue River Basin

Indicator:

- Disclosure of quality of life impacts by resource/value, including: traffic, parking, public facilities, social services, employee housing, recreation, environmental, and overall community character

Recreation, Mountain Operations and Guest Services

Recreation Issue #1: Proposed projects within BSR's SUP area have the potential to affect the recreational experience at the ski area.

Study Area: Developed and undeveloped portions of BSR SUP area

Indicators:

- Quantification of existing and proposed terrain acreage and distribution by ability level
- Quantification of skier terrain densities under the existing and proposed conditions
- Quantification of lift-line wait times under existing and proposed conditions
- Description, and where possible, quantification of skier circulation across the ski area
- Quantitative analysis of existing and proposed guest service space and discussion of guest experiences
- Quantification (acreage) of skiing opportunities/effects due to mountain pine beetle

[18] Not directly related to this FEIS, BSR and the Forest Service also added a backcountry access point at the top of the Falcon SuperChair on Peak 10 in February 2011.

Recreation Issue #2: Development of the Peak 6 skiing pod, including the installation of chairlifts and guest service facilities, would remove existing backcountry terrain within BSR's SUP area. Converting the Peak 6 pod to a lift-served skiing experience would alter the distribution of backcountry acreage immediately accessible from the ski area's operational boundary.

Study Area: BSR SUP area and nearby NFS lands utilized for backcountry skiing

Indicators:

- Identification of Forest Service access points
- Narrative discussion of the existing backcountry experience within the BSR SUP area/8.25 Management Area and qualitative and quantitative analysis of backcountry access changes anticipated from the action alternatives.
- Extent and quantification (acres) of existing backcountry areas accessed through points within BSR's SUP area and through other points in the analysis area

Recreation Issue #3: Development of proposed projects outside the existing operational boundary would increase BSR's requirement for snow safety management and potentially increase opportunities for access to the west side of the Tenmile Range.

Study Area: BSR SUP area

Indicators:

- Quantification of areas susceptible to avalanche conditions
- Description of safety concerns and avalanche risk associated with the inclusion of additional terrain within BSR's operation boundary
- Quantification of increased potential to access west side of Tenmile Range from BSR's SUP area and its impact on Summit County Search and Rescue

Traffic, Parking, and Ski Area Access

Proposed projects may generate measurable increases in daily/seasonal visitation, thereby affecting traffic movement and volumes within the Town of Breckenridge, on Highway 9 between Frisco and Breckenridge, and on construction/maintenance access roads proximate to the ski area. Parking capacities may also be affected by proposed projects.

Study Area: Primary roadway networks accessing BSR and parking areas

Indicators:

- Historic and projected traffic counts for roadway networks to access BSR
- Comparison of anticipated winter traffic volumes with existing winter traffic volumes and the design capacities of roadway networks accessing BSR

- Quantification/documentation of anticipated impacts to proposed construction/maintenance access roads and effects to Peak 7 neighborhood residents
- Quantification of existing and proposed parking capacity for day and destination skiers within BSR parking lots
- Quantification of indirect effects to parking capacities within the Town of Breckenridge related to guests visiting BSR

Scenery

Development of proposed projects, including associated infrastructure, would be visible from Highway 9 and the Town of Breckenridge.

Study Area: BSR SUP area as visible from identified critical viewpoints

Indicators:

- Compliance with Forest Plan standards and guidelines for scenery management within the SUP area and from established critical viewpoints by meeting Scenic Integrity Objectives
- Description of infrastructure as it relates to landscape character
- Description of four identified critical viewpoints used in this analysis include:
  - Highway 9/Coyne Valley Road looking west/southwest
  - French Gulch Road/Wellington Road intersection looking west
  - Boreas Pass Road looking west
  - Highway 9 south of the Town of Breckenridge looking west/northwest
  - Additional renderings would be developed to include details of proposed structures after construction

Cultural Resources

Implementation of proposed projects and associated ground disturbance may affect previously unidentified cultural and heritage resources within the SUP area.

Study Area: BSR SUP area (Area of Potential Effect)

Indicators:

- Survey and document presence or absence of identified cultural resources
- Documentation of impacts to any potentially-eligible National Register of Historic Places (NRHP) sites

Social and Economic Resources

Implementation of the proposed projects could potentially alter certain socioeconomic characteristics of Summit County, including demand for Town/County housing (in compliance with Executive Order 12898), by increasing total annual visitation.

Study Area: Summit County, Colorado

Indicator:

- Potential effects to socioeconomic indicators in Summit County, including: population, employment, tax revenue, housing and affordable housing

Noise

Snow management and avalanche control through the use of explosives on Peak 6 has the potential to generate additional noise audible in the Peak 7 neighborhood and the Town of Breckenridge.

Study Area: Peak 7 Neighborhood/Town of Breckenridge

Indicator:

- Comparison of existing and proposed audible conditions (in decibels) related to snow management and safety

THE BIOLOGICAL ENVIRONMENT

Vegetation

Plant communities (including federally Threatened, Endangered, and Sensitive [TES] species and regionally important plants) may be altered as a result of the proposed projects.

Study Area: BSR SUP area

Indicators:

- Identification of any TES plant species present in the study area
- Quantification (acreage) of proposed ground disturbance and overstory vegetation removal effects by species
- Disclosure of impacts to TES plant species and overstory vegetation
- Identification and use of design criteria and best management practices (BMPs) to avoid contamination of the project area by noxious weeds

Wildlife

Development of proposed projects, including associated infrastructure, would necessitate vegetation removal and would increase human presence. Increased use of the area, loss of habitat, and habitat fragmentation could disrupt terrestrial wildlife, including TES species and Management Indicator Species (MIS) that may utilize habitat within BSR's SUP area.

Study Area: BSR SUP area, adjacent NFS lands, and any wildlife management areas, including the Swan River Lynx Analysis Unit (LAU) boundary and north-south wildlife travel corridors

Indicators:

- Quantification (acres) and qualification of *existing* wildlife habitat and *proposed alteration, fragmentation, or removal* of wildlife habitat, by species. Include specifically: lynx diurnal security habitat, winter forage habitat, and denning habitat
- Description of effects to lynx and elk from Highway 9 traffic
- Disclosure of effects to TES and MIS wildlife species
- Identification of effects within LAU boundaries in relation to the SUP area
- Quantification and qualification of compensatory mitigation for impacts to lynx habitat

Forest Health

Due to the mountain pine beetle (MPB) outbreak that is currently affecting Colorado forests, the majority of lodgepole pine within the SUP area is either dead or may be dead within several years. Proposed projects could take advantage of tree stands that will be affected by MPB or could remove tree species other than lodgepole pine.

Study Area: Summit County and specifically BSR SUP area

Indicators:

- Quantification (acreage) of lands affected by MPB (pure/mixed lodgepole pine)
- Quantification (acreage) and disclosure of regeneration potential
- Quantification (acreage) of impacts from proposed projects by stand type and regeneration
- Quantification (acreage/amount) and disclosure of impacts to legacy trees within the Peak 6 area

Water Resources

Implementation of terrain modifications associated with proposed projects (vegetation removal, grading, utility installation/burial, road reconstruction, and facilities construction) has the potential to affect stream and riparian health.

Study Area: BSR SUP area, including streams tributary to the Blue River

Indicators:

- Anticipated temporary and permanent changes in water yield (acre feet) and peak flows (cfs), and subsequent watershed effects
- Description of existing stream health conditions and water influence zone (WIZ) impacts, within the context of the following stream health metrics: bank stability, fine sediment, residual pool

depth, wood frequency, and macroinvertebrates. Evaluation of compliance with Watershed Conservation Practices Handbook and Forest Plan requirements

- Qualitative and quantitative discussion of existing surface drainage conditions within the context of Forest Plan Standard (3) for Management Area 8.25:
    - (3) Snow management, including snowmaking and snow-farming, will be conducted in a manner that prevents slope failures and gully erosion, as well as bank erosion and sediment damage in receiving channels.
- Quantification and discussion of existing drainage concerns and treatment areas, including areas of rilling and gullying
- Description of drainage management measures to maintain or improve stream health
- Quantity (acres) of impacts to WIZ
- Changes in connected disturbed area (CDA) (acres)
- Changes in channel network extension (length of connected channel)
- Quantification (acres) of ground disturbing activities located on highly erodible soils as it pertains to stream health

Waters of the U.S., including Wetlands

Identified wetlands throughout the project area could be temporarily and/or permanently affected by construction and implementation of the proposed projects.

Study Area: BSR SUP area

Indicators:

- Area of wetlands and riparian areas existent within the project area (acres/linear feet)
- Disclosure of wetland functions and values within the project area
- Description of wetland communities and riparian areas classifications and disclosure of anticipated temporary and/or permanent impacts (acres/linear feet)

Air Quality

Short-term, construction related activity, as well as potential increases in vehicular traffic related to increased annual visitation could negatively impact air quality in the region.

Study Area: SUP Area and Summit County

Indicators:

- Description of existing air quality in the study area
- Estimated increase in greenhouse gas emissions related to BSR vehicular traffic

- Compliance with local, state and federal regulations regarding air quality

Geology and Soil Resources

Proposed ground disturbance and snowmaking may (individually and/or collectively) affect erosion and slope hazards.

Study Area: Areas proposed for direct disturbance within the SUP area

Indicators:

- Analysis of increased erosion hazard due to ground disturbance
- Analysis of slope stability and geological constraints associated with project components

J. SCOPE OF THE ANALYSIS

Scope consists of the range of actions, alternatives, and impacts to be considered within this FEIS. Furthermore, it includes the spatial and temporal boundaries associated with the actions, alternatives, and impacts as the scope of the analysis relates to the Purpose and Need. Individual project elements are discussed in detail in Chapter 2 and illustrated in the alternative maps. A detailed scope of this environmental analysis is presented at the beginning of each resource section in Chapter 3. The study area is determined by individual resource analyses presented in Chapter 3 (e.g., the Watershed Resources analysis study area is spatially different from the Wildlife analysis study area). Contingent upon approval, construction of proposed projects could begin as early as the fall of 2012. It is important to note, that implementation of the projects could occur jointly, individually, and/or at different points in time.

The CEQ has regulations for implementing NEPA that require federal agencies to consider the following types of actions, alternatives, and impacts in an environmental document.[19]

ACTIONS

1. Connected Actions: actions that are dependent on each other for their utility.
2. Cumulative Actions: actions which, when viewed with other proposed actions, have cumulatively significant impacts and should therefore be discussed in the same impact statement.
3. Similar Actions: actions which, when viewed with other reasonably foreseeable or proposed actions, have similarities that provide a basis for evaluating their environmental consequences together.

ALTERNATIVES

1. No Action.
2. The Proposed Action.

[19] 40 CFR 1508.25

3. Other reasonable courses of action identified in response to substantive issues.
4. Mitigation measures (not in the Proposed Action).

IMPACTS

1. Direct impacts are caused by the action and occur at the same time and place.
2. Indirect impacts are later in time or farther removed in distance but are still reasonably foreseeable (i.e., likely to occur within the life of the project).
3. Cumulative impacts are the result of the incremental effects of any action when added to other past, present, and reasonably foreseeable future actions and can result from individually minor, but collectively significant actions taking place over an extended period of time.

K. CONSISTENCY WITH FOREST SERVICE POLICY

LAND AND RESOURCE MANAGEMENT PLAN CONSISTENCY

BSR's operations carried out on NFS lands must comply with management direction provided in the 2002 Forest Plan. The 2002 Forest Plan includes 33 separate Management Areas for different portions of the forest based on ecological conditions, historic development, and anticipated future conditions. All components of the Proposed Action (Alternative 2) and Alternative 3 fall within the 8.25 Management Area – Ski Areas (Existing and Potential), which directs:

> *"Facilities may be intensively used throughout the year to satisfy a variety of seasonal recreational demands…Protection of scenic values is emphasized through application of basic landscape aesthetics and design principles, integrated with forest management and development objectives…Transportation systems provide convenient access to National Forest System lands in key portal locations with adequate public parking, base facilities, and community infrastructure. Base areas that serve as entrance portals are designed as gateways to public lands. They are architecturally designed to blend with the forest setting and contain convenient facilities and services that provide for the needs of forest visitors."*[20]

As part of this analysis, the Alternatives and Purpose and Need were reviewed to determine consistency with the Forest-wide Goals and Objectives, as well as the specific Standards and Guidelines for Management Area 8.25. The 2008 Southern Rockies Lynx Management Direction (SRLMD) amended the 2002 Forest Plan with respect to Forest-wide and Management Area 8.25 Canada lynx standards and guidelines. The action alternatives were compared against pertinent Forest-wide and Management Area standards and guidelines. The standards and guidelines are analyzed in Chapter 3 and the determinations

[20] USDA Forest Service, 2002c p. 3-80

are presented in tabular format in Appendix B. A Forest Plan Amendment is proposed for the action alternatives.

The Purpose and Need is consistent with the 2002 Forest Plan General Recreation Standards and Guidelines. The 2002 Forest Plan acknowledges an increasing demand for recreation on the WRNF, and states:

> *"Satisfy demand for recreation services that are supplied by private-sector permittees at authorized sites or areas before new sites or areas are permitted."*[21]

The theme of Management Area 8.25 is discussed in the 2002 Forest Plan and states:

> *"Ski areas are developed and operated by the private sector to provide opportunities for intensively managed outdoor recreation activities during all seasons of the year. This management area also includes areas with potential for future development."*[22]

The 2002 Forest Plan Final Environmental Impact Statement (FEIS) states the following regarding Peak 6 terrain:

> *"North Barton [Peak 6] is located north of the Breckenridge Ski Area. Snow conditions are similar to other locations at the same elevations and aspects within the developed ski area. Bowl skiing at high elevations above treeline on the Tenmile Range is increasing in popularity. A designated access point allows skiers and snowboarders to reach these slopes from Breckenridge Ski Area. Skiing conditions at lower elevations are also similar to existing ski slopes at Breckenridge at the same elevations. Avalanche risk to the public is potentially high in some locations. The risk could be partially mitigated if the North Barton site was developed for skiing as part of the ski area."*[23]

Additionally, the 2002 Forest Plan FEIS states:

> *"Wider distribution of skiers at higher elevations on more remote terrain will reduce crowding at the existing base portals. Breckenridge is allowed to expand above treeline and to the north and south. Breckenridge will be able to reduce crowding and disperse skiers further from the existing base portals through development of new terrain."*[24]

L. DECISION FRAMEWORK

Based on preliminary internal Forest Service and external public scoping, and evaluation of the context and intensity factors contained in 36 CFR 1508.27, the Forest Service has determined that an EIS will be

[21] USDA Forest Service, 2002a p. 2-31
[22] Ibid. p. 3-80
[23] USDA Forest Service, 2002b p. 3-460
[24] Ibid. p. 3-475

necessary to review, analyze, and document the potential impacts to the human and biological environment anticipated to result from the implementation of the proposed projects. This FEIS is a disclosure rather than a decision document and its purpose is to provide sufficient environmental analysis to support the Record of Decision (ROD), which is released in conjunction with this FEIS.

Based on the analysis documented within this FEIS, the Responsible Official, the Forest Supervisor for the WRNF, will decide whether to select Alternative 2 (Proposed Action), Alternative 3, or the No Action Alternative. The Forest Supervisor is not required to choose either an action alternative or the No Action Alternative described herein, but may select components of an action alternative or develop an entirely new alternative created from components of each. In addition to determining which alternative to select, the Forest Supervisor will also determine any required Project Design Criteria (PDC), conservation measures, mitigation measures, and BMPs. The Forest Supervisor may also require additional PDC, conservation measures, mitigation measures, and/or BMPs not discussed within this document.

In compliance with Forest Service Handbook 1909.15 chapter 18, the Forest Service will continually review the relevancy of the analysis and subsequent decision for new and changed conditions as any approved projects are advanced for implementation. The analysis presented in this FEIS is based on the best available science.

M. OTHER NECESSARY PERMITS, LICENSES, ENTITLEMENTS AND/OR CONSULTATION[25]

The Forest Service decision would apply only to NFS lands analyzed within this FEIS. However, other federal, state, and local entities may also have jurisdiction. Decisions by jurisdictions to issue or not issue approvals related to this proposal may be aided by the analyses presented in this FEIS. While the Forest Service assumes no responsibility for enforcing laws, regulations, or policies under the jurisdiction of other governmental agencies, Forest Service regulations require permittees to abide by applicable laws and conditions imposed by other jurisdictions. Subsequent to the DEIS, the Forest Service completed formal Section 7 Consultation with the U.S. Fish and Wildlife Service (USFWS). The USFWS issued a Biological Opinion, dated July 23, 2012, which is attached to this FEIS as Appendix G. In addition to requisite Forest Service approvals, consultation with the following entities, or permits, may be required to implement any approved projects:

- U.S. Army Corps of Engineers (USACE), Section 404 of the Clean Water Act Permit
- Colorado Department of Public Health and Environment
- Summit County Construction Permit

[25] Per 40 CFR 1502.25(b)

Chapter 2
Description of Alternatives

2. DESCRIPTION OF ALTERNATIVES

A. INTRODUCTION

Chapter 2 describes the alternatives considered within this environmental analysis and briefly summarizes the environmental consequences anticipated to result with the implementation of each. As required by the CEQ, the alternatives considered are presented in comparative form.[26] PDC, conservation measures and Best Management Practices (BMPs), designed to lessen or avoid impacts anticipated to occur as a result of implementation of any of the action alternatives, are also detailed.

NEPA requires that an environmental analysis examine a range of alternatives, which are reasonably related to the purpose of the project.[27] Both CEQ Regulations and Forest Service Handbook direction emphasize that alternatives must meet the "reasonableness" criteria in order to warrant detailed analysis. Alternatives that were considered within the analysis process, but were determined not reasonable, were eliminated from detailed study with a brief discussion of the rationale for their elimination.[28]

The issues raised during the scoping process (detailed in Chapter 1) were utilized as the basis for determining the need for alternatives to the Proposed Action.

B. ALTERNATIVES CONSIDERED IN DETAIL

In addition to the Proposed Action, a second action alternative (Alternative 3) and the required No Action Alternative are analyzed in detail within this FEIS. Subsequent to the release of the DEIS and during the preparation of this FEIS, modifications have been made to the Proposed Action in response to new information presented by the project proponent, as well as comments received on the DEIS. Alternative 2, including PDC and conservation measures, has been modified from how it was presented in the DEIS; the details of which are presented below.

ALTERNATIVE 1 – NO ACTION

As required by NEPA, a No Action Alternative has been included in this analysis for review alongside the action alternatives.[29] By definition, the No Action Alternative represents a continuation of existing management practices without changes, additions, or upgrades to existing conditions. Brief descriptions of existing on-mountain facilities and services are provided below. The No Action Alternative is depicted in Figure 2.

[26] 40 CFR 1502
[27] FSH 1909.15, Chapter 10, Section 12.33
[28] 40 CFR 1502.14(a)
[29] 40 CFR 1502.14(d)

The No Action Alternative provides a baseline for comparing the effects of the action alternatives. No new facilities or recreational opportunities would be approved under the No Action Alternative. Projects at BSR that have been previously-approved, but not yet implemented are analyzed in the Cumulative Effects sections of Chapter 3 and are detailed in Appendix A.

The following discussion is focused on existing facilities, operations, and opportunities relative to the action alternatives.

Terrain

The existing developed trail network at BSR accounts for a total of approximately 1,825 acres of skiable terrain, accommodates the entire range of skier ability levels from Beginner to Expert, and is comprised of 152 lift-served trails. In addition to the developed trail network, BSR maintains approximately 390 acres of managed hike-to skiing. Another approximately 2,600 acres of backcountry terrain is available within BSR's current SUP area and Management Area 8.25.[30]

Lifts

Under the No Action Alternative, BSR's lift network would remain in its current configuration. The lift network is composed of 29 chairlifts: 1 gondola, 2 detachable six-person chairlifts, 7 detachable four-person chairlifts, 1 fixed-grip triple chairlifts, 6 double chairlifts, 5 surface lifts, 1 T-Bar, 3 surface lifts, and 8 conveyor carpets.

ALTERNATIVE 2 – PROPOSED ACTION

Alternative 2 has been modified from what was presented in the DEIS. The changes are highlighted here and detailed below.

Modifications:

- The proposed chairlift in the DEIS was presented as a single, high-speed, six person configuration. BSR has proposed to the Forest Service that the lift would be constructed with two chairlifts (one four-person and one six-person chairlift) in an alignment similar to that disclosed in the DEIS.
- The 150-seat restaurant in the DEIS has been removed from consideration; however, BSR has requested the inclusion of a 1,200 square-foot bathroom facility in the same location.

[30] This analysis quantifies backcountry terrain that is within the BSR SUP area and 2002 Forest Plan Management Area 8.25.

Removals:

- Water and sewer lines to the restaurant have been eliminated from further analysis.
- The PDC requiring the wildlife closure rope line surrounding intertrail tree islands on Peak 6 has been eliminated from further analysis.

Additional PDC:

- A PDC to minimize scenery and alpine environment impacts from above treeline construction of the proposed power line to the top terminal of the Peak 6 lift is now a component of the Proposed Action.
- A PDC to minimize overstory vegetation removal during construction of ski trails, which could result in glading ski trails, is now a component of the Proposed Action.
- A PDC to address the Purpose and Need and guest expectations regarding grooming of intermediate terrain and daily operating hours on Peak 6 are now components of the Proposed Action.
- A PDC regarding the Peaks Trailhead parking that reiterates the monitoring and enforcement requirements from 1998 DN/FONSI is now a component of the Proposed Action.

Additional Lynx Conservation Measures:

- Refer to Section D, below, for details.

Additional Visitation Management Conservation Measure:

- Refer to Section D, below, for details.

The Proposed Action encompasses approximately 550 acres of proposed traditional downhill and hike-to skiing accessed by a two lift configuration. In addition, two service facilities would be constructed to accommodate guests—a ski patrol/warming hut would be located at the top of the new lift and a restroom facility with composting toilets would be developed at the junction of the two proposed lifts. Specific components of the Peak 6 proposal are detailed in the following paragraphs. The Proposed Action is depicted in Figure 3.

Based on detailed analysis and thorough consideration, the Forest Service has included a non-significant Forest Plan Amendment as a component of the Proposed Action (detailed below).

Terrain

The Proposed Action would include construction of seven below-treeline trails, totaling approximately 68 acres, on terrain that is located within BSR's existing SUP area north of the existing ski area in an area known as Peak 6. Lift-served, above-timberline terrain would provide approximately 339 additional acres

of Intermediate, Advanced-Intermediate, and Expert skiing. Of this total, approximately 235 acres would be lift-served by the Peak 6 lifts, and 104 acres would be lift-served by accessing the existing Imperial Express SuperChair. The increase in lift-served acreage gained from the Imperial Express SuperChair would be a result of moving the operational boundary to accommodate the Proposed Action.

The following summarizes proposed lift-served acreages by ability level:

Beginner:	0 acre
Novice:	0 acre
Low-Intermediate:	0 acre
Intermediate:	182 acres
Advanced-Intermediate:	62 acres
Expert:	163 acres

By hiking approximately 15 minutes to the summit of Peak 6 from the top of the upper Peak 6 lift, guests could access an additional 143 acres of Expert terrain (refer to Figure 3 for the hiking route and hike-to terrain). Table 2-1 provides a summary of lift-served and hike-to terrain for Alternative 2.

Table 2-1:
Lift-Served and Hike-To Terrain – Alternative 2

Terrain Type	Skiable Terrain (acres)	Project Component	
		Tree Clearing	Grading
Lift-served, Below-Treeline Trails	68	Yes	Yes[a]
Above-Treeline Accessed from Peak 6 Lifts	235	No	No
Above-Treeline Access from Imperial Express SuperChair	104	No	No
Total Lift-Served Terrain	*407*		
Hike-to Terrain	143	No	No
Total Terrain	**550**		

[a] Grading in specific areas, shown in orange on Figure 3, totals 12.6 acres.

A collector trail would return skiers from the Peak 6 terrain to the junction of the Peak 6 lifts. Creation of this ski trail would require tree removal and grading on approximately 17 acres to minimize side slopes and provide an appropriate skier egress on a consistent 10 percent grade (refer to Figure 3). The planned Peak 6 terrain and Peak 6 lifts would be accessed from the existing Independence SuperChair pod. The bottom terminal of the lower Peak 6 lift would be located in the inter-trail tree island between *Angel's Rest* and *Lincoln Meadows* trails, just above their confluence. Guests would also be able to access the lower Peak 6 lift bottom terminal from the top of the Peak 8 SuperConnect, Colorado SuperChair and Rocky Mountain SuperChair (all on Peak 8) via *Columbine* to *Pioneer* trails. To facilitate this access, two new trail segments would be created connecting between *Pioneer* and *Wirepatch* trails, and between *Wirepatch* and *Lincoln Meadows* trails (refer to Figure 3). Guests would egress from the Peak 6 trails and

connect back to the existing Peak 7 terrain via the *Monte Cristo* trail and the Independence SuperChair. A narrow access trail (approximately 10 feet wide created by selective tree removal) is proposed on a 10 percent slope from the top of the Independence SuperChair to the junction of the Peak 6 lifts. This access would not require any ground disturbance. The access trail would allow entrance to the Peak 6 terrain for more advanced ability level guests and would facilitate movement of guests skiing the natural glades on the south side of the new terrain who are routing back to the bottom terminal of the upper Peak 6 lift. Furthermore, by providing an access trail, this would potentially separate more advanced ability level guests from Intermediate ability level guests skiing in Peak 7.

Final trail design and construction would adhere to scenery and vegetation removal PDC included in Table 2-4.

Terrain Design Components and Terrain Management

To ensure consistent snow conditions above-treeline, BSR would construct and maintain several snow fences in key locations within the Peak 6 terrain, and on the north aspect of Peak 7. These fences would be similar to those currently in place throughout the resort (refer to Figure 3 for new snow fence locations). Additionally, avalanche control work would be routinely required on the new terrain above treeline (from the existing operational boundary on the north side of Peak 7 to the proposed northern operational boundary). Avalanche control work would primarily occur in the morning after storm events, similar to what is currently preformed above treeline on Peaks 7 and 8, and in accordance with the BSR Winter Operating Plan.

Backcountry Access

Forest Service access points are currently maintained allowing skiers to exit the BSR operational boundary to backcountry terrain north of the developed terrain network, and to the upper portions of Peaks 9 and 10. Access north of the proposed operational boundary would be maintained through designated Forest Service access points.

Lifts

As highlighted above, BSR has requested a two lift configuration be analyzed in this FEIS. The new configuration would have 0.3 acre less overstory vegetation removal compared to the amount disclosed and analyzed in the DEIS. Because this is a reduction and considered negligible, the Forest Service determined the FEIS need not analyze this acreage change through the resource analyses. In addition, the two lift configuration would have negligible differences with respect to ground disturbance due to the change from one mid-station analyzed in the DEIS to two lift terminals now considered in the Proposed Action.

The upper Peak 6 lift would be installed as a detachable six-person chairlift. The lift would have a slope length of approximately 6,000 feet, a vertical rise of approximately 1,550 feet, and a design capacity of 3,000 people per hour (pph). Ground disturbance (grading) would be required for the installation of the top and bottom terminals. This lift would be a bottom drive lift to minimize disturbance above treeline. The proposed power line to the top terminal would also provide power to the ski patrol/warming hut. A PDC was added to the FEIS to minimize impacts to the alpine environment and scenic resource from above treeline construction (refer to Table 2-4). In addition, final lift design and construction would also adhere to other scenery PDC included in Table 2-4.

The proposed upper lift top terminal location was selected based on four primary criteria:

1. The elevation would allow efficient dispersal of Intermediate through Advanced-Intermediate skiers across the entire skiable terrain network (down mountain and laterally to the north and south), while maintaining appropriate egress gradients for Intermediate skiers.
2. The above-treeline location would provide additional lift-served Advanced-Intermediate terrain to accommodate the existing terrain distribution deficit of Advanced-Intermediate terrain.
3. The elevation would allow expedited hike-to access to the upper reaches of Peak 6 Expert terrain. Expert skiers would also have the ability to hike to the top elevation boundary of the ski area SUP boundary and ski the bowls to the north and south of Peak 6.
4. The natural bench location at an elevation of 12,293 feet would accommodate the top terminal and ski patrol/warming hut with minimal site disturbance. Additionally, this site would reduce the visibility of the top terminal when compared to other locations that meet the Purpose and Need.

The upper Peak 6 lift bottom terminal location would allow guests to remain within the Peak 6 terrain and round-trip ski the Peak 6 terrain.

The lower Peak 6 lift would be installed as a fixed-grip four-person chairlift. The lift would have a slope length of approximately 2,600 feet, a vertical rise of approximately 350 feet, and a design capacity of 2,000 people per hour (pph). Ground disturbance (grading) would be required for the installation of the top and bottom terminals. The lower Peak 6 lift would be constructed as a top drive lift. Final lift design and construction would adhere to scenery PDC included in Table 2-4.

The lower Peak 6 lift would:

1. Eliminate the need for a substantial access trail from the top of the Independence SuperChair to the junction of the Peak 6 lifts (as described above, a narrow access trail, not requiring grading, is included in the Proposed Action).[31]
2. Allow for guests to primarily access the lower Peak 6 lift from three existing Peak 7 trails (*Lincoln Meadows*, *Angel's Rest*, *Monte Cristo*) and distribute skiers accessing this lift via the Independence SuperChair on three trails as opposed to one trail. This location would also allow skier access from Peak 8.

Guest Services Facilities

A restroom facility would be located at the junction of the Peak 6 lifts. The restroom facility would be approximately 1,200 square feet in size and would include composting toilets. Power to the facility would spur from the junction of the proposed Peak 6 lifts. Remaining effluent from the composting toilets would be hauled off-site, as necessary.

A ski patrol/warming hut would be constructed and maintained at the top terminal of the Peak 6 lift. The ski patrol/warming hut would be similar to the T-Bar ski patrol building in exterior appearance and would be approximately 500 square feet in size.

Final design and construction of the facilities would adhere to scenery PDC included in Table 2-4.

Construction Practices

To gain access to implement the Alternative 2 project components, BSR would utilize existing timber roads within the Breckenridge Nordic Center SUP area and reconstruct and extend decommissioned roads (8,100 linear feet) within the South Barton timber sale areas (refer to Figure 3). Reconstructing road segments would allow the proper construction equipment to access proposed trails, the junction of the Peak 6 lifts site, and the restroom facility. Specific roads were selected to avoid stream crossings. Moreover, the Proposed Action could be constructed without a new stream crossing. A road spur approximately 1,200 feet in length would be reconstructed from the existing Peak 7/8 mountain access road to the lower lift bottom terminal site. This road spur would also serve as a skier access trail during the ski season. No road construction is proposed to the upper lift top terminal location. In total, 1.8 miles of road would be constructed or reconstructed for this project.

Trails would be constructed by flush cutting and/or stump grinding, except areas designated for full grading activities. Power is necessary at the top terminal of the upper Peak 6 lift. A buried power line

[31] The original BSR proposal included an access trail requiring grading from the top of the Independence SuperChair.

would be installed using a vibrating plow, which would minimize soil disturbance.[32] The power line would extend from the previously-approved Peak 7 Restaurant up the existing mountain access road to the proposed road spur and connect to the lower lift bottom terminal. From its intersection with the proposed egress trail, it would extend to the proposed junction of the Peak 6 lifts. The power line would continue up proposed ski trails, avoiding stream channels and wetlands, exit the treeline, and continue to the upper lift top terminal location via the concave topographic feature on the south side of Peak 6 (refer to Figure 3).

The proposed lift towers would be transported to the site by helicopter. The upper lift top terminal and ski patrol/warming hut infrastructure would also be transported by helicopter and/or over the snow with snowcats and assembled on-site, thereby eliminating the need for an up-mountain access road. The foundations of the top terminal and the ski patrol/warming hut would be dug with an excavator that would also be transported via helicopter or over the snow with snowcats. This practice was utilized for the construction of the Imperial Express top terminal and is expected to be effective for the construction of the upper Peak 6 lift top terminal and warming hut. The concrete for the foundations of these structures would be flown via helicopter to the site.

Comfortable Carrying Capacity

The Proposed Action was specifically planned to better accommodate current daily visitation levels and was not designed to elicit increases in peak day visitation. The existing CCC at BSR is 14,920 guests; however, currently, 25 percent of the "Core Season" at BSR exceeds 16,000 daily skier visits.[33] The Alternative 2 projects would have an incremental CCC of 1,250 guests, increasing BSR's CCC from 14,920 to 16,170 guests.

Non-Significant Forest Plan Amendment of Standard ALL S1

A non-significant Forest Plan amendment would remove the applicability of Canada lynx Standard ALL S1 to this project decision.[34] In conjunction with the preparation of the FEIS, the Forest Service has prepared a Forest Plan Consistency Analysis (FPCA) for each of the standards and guidelines prescribed in the 2002 Forest Plan.

[32] This construction technique is common practice in utility line installation. This technique is less impactful than traditional trenching.

[33] This analysis primarily considers the recreation resource during the period when the ski area is fully functioning (i.e., all trails and lifts are operational). This "Core Season" is most appropriate for analysis in that during the early and late season periods, not all of the resort is operational and the quantitative metrics used within this analysis would not display an accurate comparison. Normal natural snowfall combined with present snowmaking capabilities do not typically allow the ski area to become fully operational until approximately December 20th each season. In addition, April typically experiences much lower than average visitation (averaging approximately 7,000 skier visits per day) due to BSR's reliance upon destination guests (who book vacations primarily within the Core Season) and warm temperatures in the Colorado Front Range (which cause day-visitors to begin pursuing warm weather interests). For these reasons, the Core Season is defined as December 20th to March 31st annually.

[34] Standard ALL S1 is contained in the Southern Rockies Lynx Management Direction Record of Decision, which amended the 2002 Forest Plan for lynx direction.

In the preparation of the FPCA, the applicability and relevance of each standard/guideline to the project was assessed. Through this detailed assessment, it was determined by the WRNF Forest Supervisor that the 2002 Forest Plan Canada lynx Standard ALL S1 is not currently being met under the existing condition and that this Standard is currently unable to be met in the future, with or without further development at BSR. The Canada lynx Standard ALL S1 states (not including footnotes):

> *New or expanded permanent developments and vegetation management projects must maintain habitat connectivity in an LAU and/or linkage area.*

Detailed information regarding the Forest Plan Consistency Analysis and reasoning behind the decision to include the non-significant Forest Plan amendment is provided in Chapter 3I – Wildlife and Appendix D.

Monitoring

Future implementation monitoring would be required with any approved projects and will assess if the projects were implemented as approved, and continue to ensure compliance with 2002 Forest Plan direction. Routine implementation monitoring is a part of the administration of all SUPs and involves input from Forest Service specialists.

ALTERNATIVE 3

Alternative 3 includes trail and lift development within BSR's currently developed lift and terrain network as well as a proposed skiing pod immediately north of Peak 7. This alternative responds to several issues raised internally by the Forest Service, and externally by the public during the scoping process, including:

- Wildlife habitat resources
- Preservation of live trees not affected by the mountain pine beetle
- Backcountry skiing access
- Scenic integrity and viewsheds
- Soils and watershed resources
- Quality of life for the Breckenridge community

Based on detailed analysis and thorough consideration, the Forest Service has included a non-significant Forest Plan Amendment as a component of the Proposed Action.

Terrain

Alternative 3 trails are detailed in the following section.[35] Proposed lift-served acreages by ability level are summarized below:

Beginner:	0 acre
Novice:	0 acre
Low-Intermediate:	48 acres
Intermediate:	69 acres
Advanced-Intermediate:	13 acres
Expert:	150 acres

A summary of Alternative 3 lift-served and hike-to terrain is summarized in Table 2-2 below with project components. Final trail design and construction would adhere to scenery PDC included in Table 2-4.

Table 2-2:
Lift-Served and Hike-To Terrain – Alternative 3

Trail Number	Skiable Terrain (acres)	Project Component			
		Clearing	Grading	Glading	Snowmaking
1 (Peak 6½)	97	Yes	No	Yes	No
2	6.2	Yes	Yes	No	Yes
3	4.3	Yes	No	No	Yes
4	2.1	Yes	No	No	Yes
5	1.5	Yes	No	No	Yes
6	3.2	Yes	No	No	Yes
7	2.2	Yes	No	No	Yes
8 (Sawmill)		Yes	No	No	No
9	2.1	Yes	No	No	Yes
10	1.8	Yes	No	No	Yes
11	4.9	Yes	No	No	No
12	1.4	Yes	No	No	Yes
13	1.8	Yes	No	No	Yes
14	1	Yes	No	No	Yes
15 (Above-Treeline Accessed by Imperial Express)	150	No	No	No	No
Total Lift Served Terrain	*280*				
16 (Peak 6½ Hike-To)	46	No	No	No	No
Total Terrain	**326**				

[35] Descriptions are organized by "Peak" at BSR and are not chronological in accordance with Figure 4.

Within Developed Ski Terrain

New trail segments have been planned on Peaks 8, 9 and 10 that would provide 33 acres of additional terrain to skiers. Specifically, 6 acres of Low-Intermediate ability level, 14 acres of Intermediate ability level, and 13 acres of Advanced-Intermediate ability level terrain would be created via overstory vegetation removal within existing tree islands and timber stands. All trails within the developed trail network, with the exception of the proposed trail on the north side of Peak 10, would include the installation of snowmaking infrastructure and would typically receive approximately 18 inches of machine-produced snow annually. New snowmaking infrastructure would connect to existing snowmaking infrastructure. Snowmaking would also be extended to include coverage necessary to connect new trails to existing trails that currently have snowmaking (refer to Figure 4). In total, Alternative 3 includes approximately 41 acres of additional snowmaking coverage. The additional trail segments contained within Alternative 3 are described by trail number, which correspond to the numeric indicators depicted on Figure 4.

Peak 8

- Trail 2: a 6-acre, Low-Intermediate ability level trail connecting *Claimjumper* to *Northstar* trails; Trail 2 would require grading on the entire trail, with the exception of a small wetland area, to remove terrain undulations
- Trail 3: a 4-acre, Intermediate ability level trail connecting *Claimjumper* to *Northstar* trails
- Trail 4: a 2-acre, Intermediate ability level trail connecting *Northstar* to *Dukes* trails
- Trail 5: a 2-acre, Advanced-Intermediate ability level trail connecting *Dukes* to *Little Johnny* trails
- Trail 6: a 3-acre, Intermediate ability level trail connecting *Southern Cross* and *Lower Psychopath* trails
- Trail 7: a 2-acre, Advanced-Intermediate ability level trail between *Tiger* and *Southern Cross* trails

Peak 9

- Trail 9: a 2-acre, Intermediate ability level trail connecting *Briar Rose* and *Sizzler* trails
- Trail 10: a 2-acre, Intermediate ability level trail connecting *Briar Rose* and *Sizzler* trails

Peak 10

- Trail 11: a 5-acre, Advanced-Intermediate ability level trail northwest of the Falcon SuperChair top terminal down to *Upper Lehman* trail
- Trail 12: a 1-acre, Advanced-Intermediate ability level trail connecting *Doublejack* and *Cimarron* trails

- Trail 13: a 2-acre, Advanced-Intermediate ability level trail connecting *Doublejack* and *Cimarron* trails
- Trail 14: a 1-acre, Advanced-Intermediate ability level trail connecting *Doublejack* and *Flapjack* trails

Skier Circulation from Peak 8 to Peak 9

The installation of the Peak 8 SuperConnect has improved the flow of skiers from Peak 9 to Peak 8. However, known deficiencies remain in circulating skiers from Peak 8 to Peak 9. Currently, the majority of guests ski to Peak 9 by way of *Four O'Clock*, *Crosscut* and *Lower Sawmill* trails. These existing trails have sections that are too flat (less than 3 percent grade) in places, and too steep in other areas (35 to 45 percent grades). The *Four O'Clock* trail would be re-graded and widened, continuing through *Crosscut* and *Lower Sawmill* trails (Trail 8 on Figure 4). The upgrades would improve these existing trails where the maximum grade would be 20 percent and a minimum grade of 10 percent. Additionally, this project would increase the minimum width on *Four O'Clock* trail from 50 feet to 120 feet, *Crosscut* trail from 90 feet to 120 feet, and *Lower Sawmill* trail from 30 feet to 60 feet.

This grading project crosses Sawmill Creek near the existing C-Chair bottom terminal. At the crossing location, the proposed grade would be approximately 30 feet above the existing grade. To accommodate this fill, a retaining wall would be constructed on each side of Sawmill Creek for the width of the ski trail. A skier bridge measuring approximately 100 feet wide and 40 feet long would be constructed to span Sawmill Gulch at this location. The final design and construction of the proposed bridge and ground disturbance would adhere to scenery PDC included in Table 2-4.

Peak 6½ Developed Ski Terrain

A new groomable, gladed skiing area (Trail 1) would be located immediately north of the existing Peak 7 terrain area *Ore Bucket* beyond the current operational boundary. Access to this terrain would be gained from Peak 7 via *Angels Rest* and *Monte Cristo* trails. Timber in portions of the new ski terrain would be thinned up to 50 percent. Some areas are naturally gladed and would not require tree removal. The terrain would include approximately 900 feet of vertical and 97 acres of lift-served skiing. Intermediate ability level terrain would total 55 acres, while the remainder of the terrain would be Low-Intermediate accounting for 42 acres. The northern boundary would include a 20-foot clearing corridor to clearly demarcate the operational boundary within the gladed terrain.

By moving the existing operational boundary, and opening this terrain, the north side of upper Peak 7 would become lift-served Expert ability level terrain (Trail 15) from the Imperial Express (150 acres). In addition, the north side of Peak 7 to the summit and a portion of Peak 6½ (Trail 16) would become hike-to terrain (46 acres).

Terrain Design Components and Terrain Management

To ensure consistent snow conditions above-treeline, BSR would construct and maintain a snow fence on the north-facing side of upper Peak 7, similar to those currently in place throughout the resort. Avalanche control work would be required on the new terrain above treeline. The work would primarily occur in the morning after weather events, similar to what is currently preformed above tree line on Peaks 7 and 8.

Backcountry Access

Forest Service access points currently exist from the BSR operational boundary to backcountry terrain north of the developed terrain network, and to the upper portions of Peaks 9 and 10. Under Alternative 3, access north and south of the proposed operational boundary would be maintained through designated access points.

Lifts

Within Developed Terrain

Three chairlifts would be upgraded within the existing lift and terrain network—Colorado SuperChair, C-Chair and A-Chair.

The Colorado SuperChair, installed in 1986, would be upgraded in its current location and alignment from detachable four-person chairlift to a detachable six-person chairlift. The design capacity of the lift would increase from 2,800 to 3,000 pph.

C-Chair, installed in 1972, would be upgraded in a similar alignment from an existing fixed-grip, two-person lift to a high-speed, detachable, four-person lift. The bottom terminal would be relocated approximately 150 feet south of the current location at an elevation of 9,980 feet to provide for improved skier circulation as guests circulate from Peak 8 to Peak 9. The top terminal would be relocated approximately 225 feet northwest of the existing location at an elevation of 11,248 feet. The design capacity of the lift would increase from 1,130 to 2,000 pph. The lift upgrade/realignment would be implemented with minimal tree removal and take advantage of the many natural and existing opening along the current lift corridor. Power to the top terminal would be supplied from the Peak 9 Restaurant.

A-Chair, installed in 1971, would be upgraded as originally analyzed and approved in the 2002 DN/FONSI.[36] Due to the age of this past approval, A-Chair is being reanalyzed in Alternative 3 to meet the Purpose and Need of this project. The realignment and upgrade of A-Chair would utilize the existing bottom terminal site, as well as the lower half (2,700 feet) of the current lift alignment. A load/unload mid-station would be constructed approximately 50 feet uphill of the existing mid-station unload. From the mid-station, the lift would angle toward the west and follow a new alignment for approximately 2,700 feet to a top terminal situated between the existing *Briar Rose* and *Cashier* trails just above the *Union*

[36] USDA Forest Service, 2002c

traverse. Upgrading A-Chair with detachable technology would increase the lift's uphill design capacity from 1,600 to 2,400 pph.

Peak 6½ Lift

The 97 acres of lift-served skiing in the proposed Peak 6½ area would be serviced by a high-speed detachable, four- (or six-) person chairlift with a design capacity of 2,400 pph and a length of 3,950 feet. The bottom terminal would be positioned to allow skier access from Peak 7 via *Angels Rest* and *Monte Cristo* trails. The top terminal would be located at approximately treeline, such that it avoids avalanche and visual concerns. Construction of the top terminal would occur via helicopter, as no access road to the top terminal is proposed. Power would be trenched to the top terminal by paralleling the lift alignment.

Comfortable Carrying Capacity

Alternative 3 would have a CCC of 1,490 guests, increasing BSR's CCC from 14,920 to 16,410 guests.

Construction Practices

Power for the Peak 6½ lift would be supplied to the bottom terminal location from the T-Bar bottom terminal via the Peak 7/8 road. From the bottom terminal, power would be buried along the lift-line to the top terminal, and would be bored beneath stream channels. Temporary construction access would also occur along the lift-line to clear timber within the skiing pod.

Proposed trails within the developed ski area boundary would be accessed for trail clearing via existing mountain access roads and temporary access spurs. All temporary access would be promptly re-vegetated in accordance with project PDC included in Table 2-4. Cleared overstory vegetation would be chipped on-site and/or hauled off-site.

Trails would be constructed by flush cutting and/or stump grinding, except areas designated for full grading activities.

Snowmaking on proposed trails would include 40-foot temporary disturbance corridor in accordance with project PDC.

Non-Significant Forest Plan Amendment of Standard ALL S1

A non-significant Forest Plan amendment would remove the applicability of Canada lynx Standard ALL S1 to this project decision. In conjunction with the preparation of the FEIS, the Forest Service has prepared a FPCA for each of the standards and guidelines prescribed in the 2002 Forest Plan.

In the preparation of the FPCA, the applicability and relevance of each standard/guideline to the project was assessed. Through this detailed assessment, it was determined by the WRNF Forest Supervisor that the 2002 Forest Plan Canada lynx Standard ALL S1 is not currently being met under the existing

condition and that this Standard is currently unable to be met in the future, with or without further development at BSR. The Canada lynx Standard ALL S1 states (not including footnotes):

> *New or expanded permanent developments and vegetation management projects must maintain habitat connectivity in an LAU and/or linkage area.*

Information on the non-significant Forest Plan amendment is provided in Chapter 3I – Wildlife and Appendix D.

Monitoring

Future implementation monitoring would be required with any approved projects and will assess if the projects were implemented as approved, and continue to ensure compliance with 2002 Forest Plan direction. Routine implementation monitoring is a part of the administration of all SUPs and involves input from Forest Service specialists.

C. APPLICABILITY OF ACTION ALTERNATIVES TO THE PURPOSE AND NEED

The Purpose and Need for the Proposed Action is stated in Chapter 1. Table 2-3 provides a cross-reference of the Purpose and Need and the individual projects identified in the action alternatives to meet the Purpose and Need components. By definition, the No Action Alternative does not include action components to address the Purpose and Need; therefore, the No Action Alternative is omitted from Table 2-3.

Table 2-3:
Applicability of the Purpose and Need to the Alternatives

Purpose Statement	Alternative 2 – Proposed Action	Alternative 3
Purpose #1: *Better accommodation of current daily visitation levels.*	◆ Development of 550 acres of terrain and two new lifts	◆ Developed of 326 acres terrain, one new chairlift, three upgraded chairlifts
Purpose #2: *Reduced skier congestion on BSR's existing Intermediate and Advanced-Intermediate terrain network and associated lifts.*	◆ 182 acres of lift-served Intermediate terrain ◆ 62 acres of lift-served Advanced-Intermediate terrain	◆ 69 acres of lift-served Intermediate terrain ◆ 13 acres of lift-served Advanced-Intermediate terrain
Purpose #3: *Reduced waiting time for lifts at BSR.*	◆ Two new lifts (primarily the new six-person chairlift)	◆ New four- or six-person chairlift ◆ Upgrade of Colorado SuperChair to six-person chairlift ◆ Upgrade of C-Chair to four-person chairlift ◆ Upgrade of A-Chair to four-person chairlift
Purpose #4: *Disperse Intermediate and Advanced-Intermediate skiers more efficiently across the entire skiable terrain network.*	◆ New terrain and chairlifts	◆ New four- or six-person chairlift ◆ Upgrade of Colorado SuperChair to six-person chairlift ◆ Upgrade of C-Chair to four-person chairlift ◆ Upgrade of A-Chair to four-person chairlift ◆ Grading project on *Sawmill* and *Lower Crosscut* trail connecting Peaks 8 and 9
Purpose #5: *Provide additional lift-served terrain to accommodate the existing terrain distribution deficit.*	◆ 407 acres of lift-served terrain proposed, including: 182 acres of Intermediate terrain and 62 acres of Advanced-Intermediate terrain to address the existing distribution deficit	◆ 279 acres of lift-served terrain proposed, including: 69 acres of Intermediate terrain and 13 acres of Advanced-Intermediate terrain to address the existing distribution deficit
Purpose #6: *Additional hike-to access servicing advanced ability levels.*	◆ 143 acres of hike-to terrain proposed	◆ 46 acres of hike-to terrain
Purpose #7: *Sufficient infrastructure in pods to serve guests.*	◆ Restroom facility ◆ Top terminal ski patrol/warming hut	◆ Not-applicable

D. PROJECT DESIGN CRITERIA AND CONSERVATION MEASURES INCORPORATED INTO ALTERNATIVES 2 AND 3

In order to minimize potential resource impacts from construction and implementation of any approved projects, Project Design Criteria (PDC) and conservation measures have been incorporated into Alternatives 2 and 3 (Table 2-4).

PDC are devised in the pre-analysis and analysis phases to reduce environmental impacts and comply with applicable laws and regulations. They include, but are not limited to, BMPs, standards and guidelines, and standard operating procedures.

PDC were designed by the Forest Service and specialists involved in this analysis. The potential effects of implementing the Proposed Action and Alternative 3 (provided in Chapter 3) were analyzed with these PDC applied.

PDC come from Federal, State, and local laws, regulations and policies; forest plans, scientific research and from experience in designing similar projects. The majority of the PDCs are considered common practices which ski area managers have historically used in alpine and sub-alpine environments to prevent or decrease potential resource impacts. They are highly effective methods that can be planned in advance and adapted to site conditions, as needed.

Conservation measures have been developed to reduce impacts to Canada lynx and the Breckenridge community.

CONSERVATION MEASURES

Canada Lynx

Alternative 2:

To reduce potential impacts to lynx diurnal security habitat (DSH) and winter foraging habitat (WFH) outside of the proposed Peak 6 terrain network, BSR will establish a continuous line of bumblebee rope (yellow and black rope) along the left side of the Peak 6 trail pod collector trail to discourage skiers from exiting the proposed ski area boundary and skiing through the trees north and east of the developed terrain to the Siberian Loop of the Nordic system. This roped line represents the new ski area operational boundary. Access north of the proposed operational boundary would be maintained through designated Forest Service access points. The conifer stands below the egress trail contain lynx foraging habitat and DSH. Wildlife closure signs will be installed approximately every l00 feet along the length of the boundary. Forest Service regulations permit skiers to leave and return to the operational part of ski areas only through designated backcountry access points. No access point is available below tree line in the Peak 6 expansion area.

Alternative 3:

To reduce potential impacts to lynx DSH and WFH outside of the proposed Peak 6½ terrain network, establish a continuous line of bumblebee rope along the skier's left edge of the development area/operational boundary back to the existing ski area to discourage skiers from exiting the proposed ski area boundary and skiing through the trees north and east of the developed terrain to the Siberian Loop of the Nordic system. This roped line represents the new ski area operational boundary. Access north of the proposed operational boundary would be maintained through designated Forest Service access points. Wildlife closure signs will be installed approximately every l00 feet along the length of the boundary. Forest Service regulations permit skiers to leave and return to the operational part of ski areas only through designated backcountry access points. No access point is available below tree line in the Peak 6 expansion area.

Alternatives 2 and 3:

Colorado Revised Statute (CRS) 33-44-109 is consistent with these regulations. Under the CRS 33-44-l 09, it is a violation for skiers to enter any trail or area that has been closed by the ski area operator with a rope and/or "Closed" sign, within or adjacent to the ski area. Other than skier access through the backcountry access point that would be developed for access north of the proposed BSR operational boundary (i.e., north of the Alternative 2 or 3 terrain proposed to be developed), skiers ducking the signed rope closure constitutes an illegal activity. Bumblebee rope will be installed/removed shortly before the start/end of each ski season to avoid entanglement of antlered big game.

During the Endangered Species Act Section 7 Consultation process with U.S. Fish and Wildlife Service (USFWS) process, Vail Resorts proposed to initiate a lynx and wildlife conservation fund to be administered by the National Forest Foundation (NFF). Vail Resorts' proposal to NFF, which was incorporated as Conservation Measures in the USFWS Biological Opinion, have been incorporated herein as requirements of Alternative 2 and Alternative 3. The intent is to establish a fund that can be used for habitat improvements in Summit County, Colorado and as voluntary mitigation for Alternative 2 and Alternative 3. Vail Resorts and the Forest Service anticipate that the fund would become self-sustaining, available for contribution by others, and be able to fund additional lynx and wildlife conservation projects. Potential projects include purchase of conservation easements, matching funds for grants, habitat improvements, additional studies, and education efforts. The details of the conservation measures include:

- A monetary contribution by Vail Resorts of $300,000, paid to the fund over the course of four years subsequent potential approval of Alternative 2 or 3. $200,000 of the funds would be used for specific projects, and the balance of the funds allocated to future projects. The specific projects and contribution would be: $100,000 for road decommissioning projects approved in the WRNF Travel Management Plan, and $100,000 for completion of the WRNF lynx/recreation study. The remaining $100,000 would be used for general lynx related studies, education, habitat improvement projects, etc.

In order to monitor the impacts of incidental take as identified in the Biological Opinion (available in Appendix G), the Federal agency or any applicant must report the progress of the action and its impact on the species to the USFWS as specified in the incidental take statement. The monitoring and reporting shall include:

- The Forest Service shall develop a snowshoe hare monitoring plan to track anticipated impacts of Alternative 2 or 3. The monitoring plan shall include habitat inventory of the proposed development area below tree line, and the area between the new development boundary and the permit boundary below tree line, winter tracking surveys, and summer pellet counts to estimate snowshoe hare population density.
- Winter tracking will provide skier intrusion pattern and frequency, presence/absence of snowshoe hares, and activity trends during pre- and post-implementation.
- Summer pellet counts shall incorporate sound scientific methods for estimating population density within the monitoring area. Summer pellet counts will provide information about whether habitats impacted during the winter months become repopulated during the spring and summer.
- The monitoring plan shall be initiated one season prior to beginning ground disturbing activities and continue for at least five years beyond full operation within the new development area. After five years, the Forest Service and the USFWS will assess the monitoring data. If no conclusion can be reached based on the initial five-year monitoring period, the monitoring period may be extended for an additional five years at discretion of the Forest Service and the USFWS.
- The Forest Service shall, provide the USFWS with an annual report, no later than March 31, of each year, consistent with 50 CFR 13.45. The report shall provide the initial sampling and data collected for each year. At the end of the first five-year monitoring period. The Forest Service shall provide the USFWS a written report of its findings. If additional monitoring is required, similar reporting shall be required and reported as during the initial monitoring period.

Visitation Management

Subsequent to the DEIS, BSR proposed a strategy to the Forest Service to address visitation management at BSR, including peak day visitation concerns raised by the public, Town of Breckenridge and Summit County Government. The Forest Service cannot require BSR to implement specific measures to address visitation; however, the Forest Service can monitor the results of measures taken by BSR and determine if the measures are successful or unsuccessful. The conservation measure proposed by BSR, which the Forest Service is incorporating as a component of Alternative 1, 2 and 3, includes:

- BSR and USFS will meet semi-annually, once pre-season and once post-season, to discuss means and methods of managing peak skier visitation. The pre-season meeting will be held as part of the Joint Annual Business Meeting referred to in Section III.C of the BSR Special Use Permit and

will be held before the beginning of each winter season. Discussions at the pre-season meeting may include specific means and methods to manage skier visitation by BSR, and adaptive management techniques proposed for addressing resort impacts, pressure points and evolving skier behavior. Means and methods considered may include the following, as appropriate:

- Off duty employee pass/access restrictions (which may include managing demand for employee parking)
- Lift access management (which may include actions like implementing season pass restrictions or adjusting lift operating hours)
- Travel demand management (which may include actions like promoting additional car pool incentives or adjusting operations of BSR-operated parking and transportation systems)
- Parking and transportation (in coordination with The Town of Breckenridge ("TOB") as contemplated in Section 4 of the Memorandum of Understanding (the "MOU") among BSR, TOB, and Summit County)

- The post-season meeting will be held following the end of winter season operations and may include a discussion of BSR's compliance with the MOU, a review of skier visitation, operations and impacts, and specific means and methods to manage skier visitation implemented by BSR.

PROJECT DESIGN CRITERIA AND CONSERVATION MEASURE RESPONSIBILITY

Responsibility for ensuring that required PDCs and conservation measures are implemented rests with BSR and the Forest Service. In all cases, the ultimate enforcement mechanism for implementation of the specified PDC and conservation measures would be the Record of Decision for the FEIS, and would extend to the Forest Service Special Use Permit Administrator, the District Ranger and the Forest Supervisor.

Table 2-4:
Project Design Criteria and Best Management Practices

RECREATION
Address the Purpose and Need and guest expectations regarding grooming of Intermediate ability level terrain on Peak 6 to the greatest extent practicable. The Forest Service shall review BSR's annual Winter Operating Plan to consider the amount of terrain BSR intends to groom each season.
Address the Purpose and Need and guest expectations regarding daily operating hours by opening the Peak 6 terrain concurrent with other base area lifts. The Forest Service shall review BSR's annual Winter Operating Plan to consider the operating hours of the Peak 6 lifts and the timing of daily avalanche control efforts.
Grooming machine refueling tanks located at the junction of the two proposed Peak 6 lifts will be reviewed for spill prevention to meet requirements of the State of Colorado, if necessary.
Location and installation of winch cat anchors and an avalauncher to manage and control Peak 6 terrain shall be a component of the snow safety plan and reviewed by the Forest Service.
The Forest Service will work with Summit County and the Town of Breckenridge to investigate the possibility of creating public access onto NFS lands with public trailhead parking in a location jointly determined to be feasible and appropriate. Such trailhead and access may require additional NEPA analysis.
TRAFFIC, PARKING AND SKI AREA ACCESS
Construction vehicle access to the project area via Ski Hill Road/County Road 3.
Manage use of existing skier parking supply through pricing, issuing permits, coordinated transit service and pedestrian access improvements. Encouraged visitors to park once for the ski day and evening.
Peaks Trailhead parking would be monitored and enforced in accordance with measures stated in the 1998 EA which states, "1. To prevent alpine skiers from depleting the limited parking available at the Peaks trail parking area on CR 3, north of the proposed Peak 7 base area, BSR will erect appropriate signs appealing to alpine skiers and snowboarders to respect back country users by not parking at the Peaks trail parking area while alpine skiing/riding. 2. BSR will instigate a monitoring program to assess compliance. If determined necessary by the Forest Service, BSR will fund law enforcement to ensure compliance. 3. Additionally, BSR will support the Forest Service in future efforts designed to reduce resource impacts currently occurring on the Peaks trail including, if necessary, financing construction of a new trailhead and connecting section of trail as determined by the Forest Service."
SCENERY
Construct facilities including structures, lift components, and bridges with materials which blend with the landscape character, as is practicable, and meet FSM 2380 policy for color and reflectivity, which is 4.5 on the Munsell neutral value color scale. Building designs will be submitted to the Forest Service for review and approval through the White River Design Process.
Follow FSM guidelines (Section 2380) and Built Environment Image Guide (BEIG) guidelines: • The scenic character will be protected through appropriate siting of buildings and the use of low-impact materials and colors (e.g., indigenous construction materials, such as stone and wood, as well as low-reflective glass and roofing materials). • Remain in context with the landscape (i.e., rustic, craftsman, and country lodge styles). • Architecture, materials, and colors should follow the Forest Service's Built Environment Image Guide (BEIG). Additionally, Forest Service Handbook No. 617, "National Forest Landscape Management for Ski Areas, Volume 2, Chapter 7," refers recommended colors for ski areas on page 37 of that handbook. The colors are darker colors; greens, browns, navy blue, grays and black.

Table 2-4:
Project Design Criteria and Best Management Practices

Avoid straight edges where removing trees. The edges of lift-lines, trails and structures, where the vegetation is removed, need to use a variable density cutting (feathering) technique applied to create a more natural edge that blends into the existing vegetation. Edges should be non-linear, and changes in tree heights along the edges of openings should be gradual rather than abrupt. Soften hard edges by selective removal of trees of different ages and heights to produce irregular corridor edges where possible. Lynx habitat values and quantity take priority, when applicable.
Cut stumps as low as possible to the ground to avoid safety hazard and to meet scenery objectives.
Re-grade to restore a natural terrain appearance. Blend site grading disturbance into the existing topography to achieve a natural appearance and minimize cuts and fills at the transition with proposed grading and existing terrain.
Bury utilities per 2002 Forest Plan Standard.
Minimize overstory vegetation removal during construction of ski trails, which could result in glading ski trails. Vegetation removal should not occur beyond analyzed trail widths.
Ground disturbance above treeline associated with the installation of the buried power line will adhere to strict disturbance area and revegetation conditions. These conditions will promote prompt more successful restoration of the corridor. Prior to implementation, these conditions will be reviewed and approved by the Forest botanist, soil scientist and landscape architect.
Re-vegetate all disturbed areas after the site has been satisfactorily prepared. Repeat seeding until satisfactory re-vegetation is accomplished. Reseed with a native seed mixture using a variety of native seed grasses, wildflowers and forbs.
Meet reflectivity guidelines when constructing Facilities or structures, including buildings, lift terminals and chairs. This includes any reflective surfaces (metal, glass, plastics, or other materials with smooth surfaces), that do not blend with the natural environment. They should be covered, painted, stained, chemically treated, etched, sandblasted, corrugated, or otherwise treated to meet the solar reflectivity standards. The specific requirements for reflectivity are as follows: Facilities and structures with exteriors consisting of galvanized metal or other reflective surfaces will be treated or painted dark non-reflective colors that blend with the forest background to meet an average neutral value of 4.5 or less as measured on the Munsell neutral scale.
Meet the Built Environment Image Guide (BEIG) and Accessibility Guidelines when constructing all facilities including buildings, lift components, and bridge structures.
The Forest Service encourages BSR to construct the restroom facility and ski patrol/warming hut facility to meet a LEED or LEED equivalent rating of gold.
CULTURAL RESOURCES
Although site-specific surveys have been conducted, if undocumented historic and/or prehistoric properties are located during ground disturbing activities or planning activities associated with approved construction activities, address as specified in 36 CFR 800.11 concerning Properties Discovered During Implementation of an Undertaking.
FOREST HEALTH
Prior to construction, identify and flag trees meeting the definition of a legacy tree (refer to Chapter 6 – Glossary). Preserve these trees to the greatest extent practicable.
VEGETATION
Through project design construction impacts to known moonwort aggregations that may contain sensitive plant species would be minimized on a site by site basis by avoiding work within known moonwort aggregations at Breckenridge Ski Resort.

Table 2-4:
Project Design Criteria and Best Management Practices

Minimize overstory vegetation removal during construction of ski trails, which could result in glading ski trails. Vegetation removal should not occur beyond analyzed trail widths.
Ground disturbance above treeline associated with the installation of the power line will adhere to strict disturbance area and revegetation conditions. These conditions will promote prompt more successful restoration of the corridor. Prior to implementation, these conditions will be reviewed and approved by the Forest botanist, soil scientist and landscape architect.
Except as noted within descriptions of individual project components requiring tree removal, "flush cut" all new ski trails, individual tree removal, lift corridors, and lift terminal sites. With this method, cut stumps to a height of 4 inches or less from the ground surface; the process may also include stump grinding. This trail preparation method avoids the need to disturb the remaining stumps and/or surrounding soils, thereby minimizing overall ground disturbance and existing vegetation and assisting re-vegetation efforts.
Prior to ground-disturbing activities, BSR must submit a Re-vegetation Plan for review and approval by the Forest Service. This plan must identify a methodology for determining success criteria that would be, at a minimum, consistent with the Forest Plan requirements.
Re-vegetate disturbed areas with native plants. Use, if available, genetically local (at the ecological subsection level) seeds. Seed mixtures and mulches will be noxious weed-free. To prevent soil erosion, non-persistent, non-native perennials or sterile perennials may be used while native perennials become established. The Forest Service must approve the seed mixtures prior to implementation. BSR must provide the Forest Service with annual re-vegetation monitoring reports detailing the successful or unsuccessful re-establishment of vegetation on all disturbed areas. BSR will submit annual re-vegetation monitoring reports for a duration of at least five years subsequent to initial ground disturbing activities or until the annual re-vegetation monitoring report determines successful re-vegetation has been achieved.
Effective ground cover (mulch) upon completion of ground disturbing activities shall meet minimum level of the pre-treatment habitat type.
Adequately mark tree clearing limits to minimize mistakes in clearing limits during construction.
Efforts should be made to retain or transplant seedlings and saplings to other areas to maintain vegetation cover (with regards to lodgepole pine mortality)
Any Engelmann spruce that is felled must be either removed from the area or treated (within one year after felling) to prevent the buildup of spruce bark beetle. Treatments can include burning, burying or peeling the bark off felled Engelmann spruce.
Prior to ground disturbing activities, demarcate sensitive plants to ensure impacts are avoided to the greatest extent practicable.
Prior to ground disturbing activities for the lifts in Alternative 2, both lift alignments would be surveyed for threatened, endangered and Region 2 sensitive botanical species.
NOXIOUS WEEDS
Complete a noxious weeds risk assessment and have approved by the Forest Service prior to implementation of any authorized ground disturbing activities.
Clean construction equipment prior to entry onto NFS lands.
Treat travel routes accessing the project area for noxious weeds prior to and during project construction. Travel routes include ski area access roads, after leaving county administered roads.
Monitor and treat any new infestations for a minimum of three years after project completion.

Table 2-4:
Project Design Criteria and Best Management Practices

WILDLIFE
During construction, contractors are required by Summit County code to provide a bear proof container on site for all edible and food related trash in order to minimize conflicts with black bears. No food products or food containers can be thrown in the larger roll-off type dumpsters.
Confine all construction activities to daylight hours, excluding emergencies.
Construction workers are prohibited from bringing dogs on site during construction.
Store/keep no food/drink in construction worker vehicles. Keep all windows closed and doors locked on all vehicles to prevent bear entry.
If boreal owl nest trees associated with active territories occur within impact areas during the construction season, direct mortality of eggs and/or nestlings could be avoided by conducting tree removal in potential nesting habitat outside of the May 21 to July 15 nesting (with eggs/young) period.
If three-toed woodpecker nest trees associated with active territories occur within impact areas during the construction season, direct mortality of current year recruitment could be avoided by conducting tree removal in potential nesting habitat outside of the March 14 to July 15 nesting period.
If olive-sided flycatcher nest trees occur within impact areas during the construction season, direct mortality of eggs and/or nestlings could be avoided by conducting tree removal in potential nesting habitat outside of the June 1 and July 15 nesting period.
If American marten den trees or logs associated with active territories occur within impact areas during the construction season, direct mortality of current year recruitment could be avoided by conducting tree removal in potential denning habitat outside of the March 1 to June 15 period.
Egg and altricial young mortality could be avoided for boreal owls, three-toed woodpeckers, olive-sided flycatchers, and American martens (and virtually all other wildlife considered herein) by conducting forest clearing outside of the broader March 1 to July 15 nesting/den period.
Retain snags for nesting structures where snags are underrepresented. Conduct this activity where is doesn't pose a safety concern to skiers.
To protect fish eggs and spawning gravels, work on stream crossings and ground disturbance areas approaching the WIZ should be restricted to the relatively low flow construction season period between August 1 and September 31.
Re-vegetate any loss of riparian vegetation caused by construction activities immediately after construction with native vegetation, willow cuttings, and/or native, certified, weed free seed.
Maintain wildlife habitat function of willows proximate to the Peak 6 ½ lift top terminal by avoiding grooming activities in willowed areas to the greatest extent practicable until an adequate snow depth covers the tops.
WATER RESOURCES
Connected disturbed areas could be mitigated, and additional sediment controls that could result in improved stream health may be implemented concurrently with on-mountain construction (this may be necessary for the project to be in compliance with Watershed Conservation Practices Handbook).
Prior to approved construction activities on NFS lands, prepare the following plans for Forest Service approval: • Grading • Erosion control • Pre-construction erosion control/drainage management plans • Post-construction re-vegetation plans

Table 2-4:
Project Design Criteria and Best Management Practices

To maintain or improve stream health, BSR and the Forest Service will utilize BSR's Mountain Drainage Plan. Prior to ground disturbing activities, BSR will submit drainage measures from the Drainage Management Plan to the Forest hydrologist for review and acceptance. Implement agreed-upon drainage measures prior to, or concurrent, with ground disturbing projects.
Trails would be constructed by flush cutting and/or stump grinding, except areas designated for full grading activities. If stump removal is necessary, BSR must submit a location map with areas for stump removal designated to the Forest hydrologist and soil scientist for review and acceptance. Flush-cut and leave all stumps and root wads intact within sensitive areas such as the WIZ.
Before grading, remove existing topsoil resources, either by machine or by hand, and stockpiled in an area where soils storage will not cause a resource impact. Subsequent to the grading activities, re-spread, mulch and re-seed topsoil for use in the final restoration of the site.
Keep heavy equipment out of streams, except to cross at designated points, build crossings, or do restoration work, or if protected by at least 1 foot of packed snow
Design and construct water bars to discharge surface runoff originating within the proposed ski trails away from the WIZ and into well vegetated areas, effectively disconnecting disturbed areas from the stream channel.
When appropriate, the downstream end of water bars will encourage sediment separation and dispersion of flow by using straw bales and fiber logs or other appropriate.
Construct erosion control measures such as water bars immediately after construction of the ski trail; inspect water bars during the first snowmelt period following construction.
Immediately following completion of approved ground disturbing activities and seeding, mulch with weed-free straw, wood chips, bark, jute mat, etc. all areas of ground disturbance.
Where construction crosses a stream channel, route the channel through a flexible hose around the area of disturbance. To protect the channel from scour where the water is reintroduced to the stream, temporarily place rocks in the channel.
Store fuel, oil and other hazardous materials in structures placed on impermeable surfaces with impermeable berms designed to fully contain the hazardous material plus accumulated precipitation for a period at least equal to that required to mitigate a spill.
Continue annual monitoring in Cucumber Creek and South Barton near disturbance areas to ensure increased levels of zinc and cadmium do not occur.
Alternative 2
To maintain stream health in the Cucumber Creek watershed, disconnect 1.85 acres of existing disturbed surface area by redirecting two ski trail water bars away from the creek's WIZ.
To maintain stream health in the Cucumber Creek watershed disconnect an additional 3.2 acres of ski trail by directing drainage that originates from the upper Monte Cristo trail away from WIZ.
To maintain stream health in the Cucumber Creek watershed disconnect approximately 2.8 acres of existing roads (*Pioneer*, *Wirepatch*, *Lincoln Meadows*, and *Angels Rest)* by discharging road-side ditch flows in well forested areas, away from WIZ.

Table 2-4:
Project Design Criteria and Best Management Practices

Alternative 3
To maintain stream health in the Jones Gulch watershed restore hill slope and disconnect 14.3 acres of the *Columbia* and *American* ski runs: Drainage channel runs through the middle of the ski slope on *Columbia* (slope ≈ 40 ft/100 ft) causing severe erosion and down-cutting. Pipe lower and middle sections of this drainage channel and connect to the existing pipe under *American*.
To maintain stream health in the Jones Gulch watershed, enlarge and improve existing detention pond at the downstream end of the *American* pipeline.
To maintain stream health in the Sawmill Creek watershed disconnect 5.9 acres of graded connected terrain, located approximately 300 feet south of the Peak 8 SuperConnect top terminal. The drainage channel shows evidence of severe incision (~3 feet deep), supplying additional sediment to the stream channel network. Restore drainage channel and install two to three check dams within the upper section; protect lower section of drainage channel with 8-inch riprap; evaluate installation of sediment pond before discharging into WIZ.
Restore the Sawmill drainage channel by installing two to three check dams within the upper section and protecting the lower section of drainage channel with 8-inch riprap.
To maintain stream health in the Cucumber Creek watershed disconnect 1.85 acres of currently disturbed area by redirecting two water bars on *Angels Rest* and *Wirepatch*, away from the creek's WIZ (in other words, changing the direction to where the water bars currently drain).
To maintain stream health in the Lehman Gulch watershed, fell trees into the intertrail islands that exist within the WIZ to improve LWD density. In addition, scatter cut branches on trails or piled along the edge of ski runs.
To maintain stream health in the Cucumber Gulch watershed, fell trees into the intertrail islands that exist within the WIZ to improve LWD density. In addition, scatter cut branches on trails or piled along the edge of ski runs.
To maintain stream health in the Cucumber Gulch watershed, water bars must be designed and constructed to discharge surface runoff originating within the proposed and improved ski trails away from the WIZ and into well vegetated areas, effectively disconnecting disturbed areas from the stream channel. When appropriate, the downstream end of water bars will include BMPs that encourage sediment separation and dispersion of flow, such as straw bales and fiber logs. Water bars and associated BMPs must be constructed immediately after construction of the ski trail; inspect water bars during the first snowmelt period following construction
To maintain stream health in the Cucumber Gulch watershed, discourage guests from skiing the interior of intertrail islands in the WIZ to promote maximum vegetative growth in the riparian areas.
To maintain stream health in the Cucumber Gulch watershed, identify and reclaim areas where vegetation could be re-established, particularly in the WIZ.
To maintain stream health in the Cucumber Gulch watershed, disconnect a minimum of 14 acres of graded connected terrain and a minimum of 4,000 feet of roads.
To maintain stream health in the Cucumber Gulch watershed, capture and re-route a minimum of 15 AF during the snowmelt period; to offset the increase in yield produced under Alternative 3. Capturing and re-routing basin yield in excess of the minimum 15 AF would assist in improving long-term stream health.
Pipe lower and middle sections of the drainage channel running through *Columbia* trail and connect to the existing pipe under *American*. Enlarge and improve existing detention pond at the downstream end of pipeline.

Table 2-4:
Project Design Criteria and Best Management Practices

WATERS OF THE U.S., INCLUDING WETLANDS
During final submittal of construction plans and in the field, where possible, avoid and minimize wetland impacts.
Temporarily place construction spoils in upland areas in locations that will not migrate to wetland areas.
Keep heavy equipment out of wetlands and stream channels during construction.
Stockpile topsoil during construction and replace in order to preserve the wetland seed bank.
Preserve and replant woody vegetation (e.g., Salix) and plant additional hydrophytic woody and herbaceous vegetation where necessary in order to speed the recovery of the wetland community.
Within wetlands, install snowmaking infrastructure in a manner that prohibits or impedes groundwater movement along the snowmaking line to maintain wetland hydrology. Periodically space impervious structures/substances (e.g., clay collars) within the linear disturbance of affected wetland areas. In addition, compact trench backfill to prohibit the diversion of subsurface flows within the pipeline corridor.
Complete work within stream channels and wetlands when hydrologic flows are reduced.
Flush-cut and leave stumps and root wads intact within sensitive areas such as wetlands.
Apply BMPs for all ground disturbing activities to avoid sediment migration from ground disturbance into wetlands.
Identify and flag wetlands proximate to potentially disturbed areas prior to the initiation of approved construction related activities. Clearly define construction limits and avoid any identified wetlands.
Restore wetland crossings upon completion of construction.
To minimize ground disturbance within wetlands, remove overstory tree vegetation by hand.
Re-vegetate with removed shrubs and mats of herbaceous cover (carefully stockpiled on-site) and appropriate high altitude wetland seed species as soon as possible after the disturbance. Monitor for five years to ensure successful re-vegetation of any impacted montane wetland areas.
Use bulkheads/box structures to minimize disturbance area from side casting and trench width.
Use fabric or hay layers to protect existing vegetation from stockpiled dredged material and to mark existing contours.
Alternative 3
To minimize impacts to wetlands within the Peak 6½ gladed terrain, remove overstory vegetation over-the-snow.
To minimize ground disturbance within wetlands, lift upgrades should use existing terminal and tower locations where appropriate.
Construct the *Sawmill* trail bridge and footers outside the wetland. If construction disturbance occurs during bridge installation, rehabilitate the wetland to the existing condition.

Table 2-4:
Project Design Criteria and Best Management Practices

AIR QUALITY
To the extent feasible, promptly install site improvements to reduce the potential for dust emissions. Keep the area disturbed by clearing, earth moving, or excavation activities to a minimum at all times, allowing improvements to be implemented in sections.
Water, as necessary and practicable, grading areas, including lift terminal areas, to prevent excessive amounts of dust. In the absence of natural precipitation, watering of these areas should occur, as practicable.
The Forest Service encourages the expansion of the free shuttle bus service for skiers and workers.
The Forest Service encourages the use of low-sulfur or alternative fuels in construction vehicles.
Prohibit unnecessary idling of construction vehicles.
GEOLOGY AND SOIL RESOURCES
Prior to construction, submit a detailed site erosion control plan to the Forest Service soil scientist and hydrologist for review and approval. This plan must include the following components: • Silt fences, straw bales, straw wattles, and other standard erosion control BMPs shall be employed to contain sediment onsite. • Jute-netting or appropriate erosion-control matting on steep fill slopes to protect soils and enhance conditions for vegetation re-establishment.
Meet requirements for ground cover, as a combination of re-vegetation and mulch applications, for the one and two years following completion of ground disturbing activities.
Prompt re-vegetation upon project completion is required. BSR must submit annual re-vegetation monitoring reports
Use existing and proposed roads for construction and routine maintenance of the proposed project components.
Use surface netting in conjunction with mulching to reduce the erosion hazard.
Maintain vegetative buffers adjacent to intermittent or perennial drainages and wetlands, to the extent possible. Where avoidance is not possible, minimize impacts in sensitive areas. Hand-fell timber where necessary.
In all areas where grading or soil disturbance will occur, stockpile topsoil and re-spread following slope grading and prior to re-seeding.
Avoid soil-disturbing activities during periods of heavy rain, runoff or wet soils.
Areas determined to have been compacted by construction activities may require mechanical sub-soiling or scarification to the compacted depth to reduce bulk density and restore porosity.
When logging over the snow, conditions should allow for 1 foot of packed snow to be continuous (i.e., not patchy) and competent enough so that wheeled or tracked vehicles do not break through. When logging over frozen ground, a minimum of 3 inches of continuous frozen ground should be present.
Prior to implementation of the Sawmill grading project in Alternative 3, submit an engineered design plan and drainage management plan to the Forest Service and Town of Breckenridge for review and approval (if located on subject property).
To divert water off the cleared areas and into the more stable forest areas, closely space water bars on trails.
Where appropriate, stock pile and re-spread top-soil to improve re-vegetation success.

E. DESIGN COMPONENTS AND ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

During the course of this NEPA process, one specific alternative (Alternative 3) to the Proposed Action was developed for full analysis and review. Additionally, throughout the planning stages, specific elements of the Alternative 2 projects were revised and modified. These modifications were the result of ground-truthing each project component by mountain planning and environmental specialists, as well as lift engineers, surveyors, and BSR mountain operations personnel. These modifications reflect how improved, up-to-date information helped create a proposal which responds well to resources present within the project area and is sensitive to the underlying concerns of the community.

Several substantial design components were considered but eliminated from further detailed analysis prior to BSR's submission of their Peak 6 proposal to the Forest Service and the initiation of this EIS process. These planning concepts were eliminated from further review for several reasons including environmental impacts, prohibitive cost, and technical constraints. The following section presents a brief synopsis of the design and project elements considered and the rationale for their elimination.

F. DESIGN COMPONENTS CONSIDERED BUT ELIMINATED

GLADING TREES ON PEAK 6 RATHER THAN CONSTRUCTING TRADITIONAL TRAILS

Under this design, the terrain below treeline on Peak 6 would be gladed rather than cleared and maintained as distinct trails. Impacts to wildlife and habitat resulting from tree thinning and dispersed skier use typical of a gladed area were determined to be more wide-spread than impacts from developed trails and concentrated skier use. Overall glading on Peak 6 was eliminated based on impacts to wildlife and habitat. However, the Forest Service has included a PDC in this FEIS requesting BSR consider glading terrain and/or simply minimizing vegetation clearing to the greatest extent practicable within analyzed trail clearing widths. This is different from glading a larger area that would have greater wildlife impacts.

TERMINATING THE PROPOSED LIFT BELOW TREE LINE

The bottom terminal of the upper Peak 6 lift would have been constructed in the same location in which it is currently proposed. The top terminal would have been constructed just below tree line, in the same proposed alignment to avoid impacts to scenery resources. Construction of the top terminal below treeline would result in the loss of the majority of the 235 acres of lift service skiing above treeline, as well the majority of proposed trails below treeline. A comment was also raised that requested the Forest Service consider a mid-unload at treeline to accommodate Intermediate ability level guests. Again, due to the topography of the terrain, an unload at tree-line would reduce the available lift-served terrain. However, after additional consideration and review of comments on the DEIS, the Forest Service determined

traverse trails could be constructed below treeline to the north and south from a potential top terminal at treeline. Traverse trails, with slopes at ten percent to the north and south, would require additional grading and soil disturbance to allow guests to ski to the northern and southern portions of the Peak 6 trails. The north and south traverse trails would also reduce the skiable acreage for Intermediate and Advanced-Intermediate guests. Therefore, after due consideration, the lack of lift-served terrain would not reasonably meet the Purpose and Need to improve the distribution of Intermediate and Advanced-Intermediate ability levels. For this reason, this design component was considered but eliminated from consideration.

INSTALLING A SURFACE LIFT

Designing the Peak 6 lifts as a surface lift, similar to the T-Bar on Peak 8, would decrease the carrying capacity of the lift. The currently proposed six-person detachable chairlift (providing the majority of the lift capacity of the Peak 6 pod) has a design capacity of 3,000 pph, whereas a surface lift is only designed to convey 1,200 pph. In addition, a surface lift similar to the T-Bar is difficult to load and ride for guests inexperienced with this type of lift (e.g., destination visitors). To serve Intermediate ability level guests, the loading efficiency could be reduced by 20 percent. This would not reasonably meet the Purpose and Need to better accommodate existing visitation levels and to reduce lift-line wait times. A comment was raised to provide two side-by-side surface lifts to provide a higher capacity. Two surface lifts would have similar loading concerns as presented above.

MOVING OR DECREASING TRAILS ON PEAK 6

In order to preserve habitat below tree line on Peak 6, moving the collector trail uphill toward tree line or removing some trails to reduce trail density was considered. To allow the terrain above treeline to remain lift-served, trails would be necessary as shown on Figure 3. Furthermore, the proposed acreage and capacities meets the Purpose and Need, and a reduction was determined to not reasonably meet the Purpose and Need while responding to wildlife concerns.

AVOID IMPACTS TO LEGACY TREES

Comments were received on the DEIS stating that the Peak 6 project should avoid the clearing of legacy trees. In reviewing the GPS locations of the legacy trees on Peak 6 it was determined that all legacy trees could not be avoided and still meet the Purpose and Need for intermediate terrain. This is due to a band occurring at treeline that would eliminate several below treeline trails, and therefore render a portion of the above treeline terrain ineffective. The PDC remains from the DEIS that BSR would “preserve legacy trees to the greatest extent practicable.”

ROAD TO THE UPPER PEAK 6 LIFT TOP TERMINAL LOCATION

To accommodate more efficient access to the top terminal location for construction and maintenance a road to the top terminal was considered. A road would have accommodated the construction of a top-

drive chairlift that is more energy efficient (approximately 20 percent) when compared to a bottom drive lift. However, in order to construct a road, a considerable amount of ground disturbance (cut and fill slopes) would be required, both above and below treeline. This disturbance would be visible from viewpoints within the Breckenridge community and would be inconsistent with 2002 Forest Plan forest-wide alpine guideline (2) to minimize new roads, trails, and livestock driveways in alpine ecosystems. The Forest Service has determined that the top terminal could be constructed without a road.

G. ALTERNATIVES CONSIDERED BUT ELIMINATED

The following section summarizes alternatives which were considered but eliminated from detailed analysis, and the rationale for their elimination.

PROVIDING SNOWCAT SKIING ON PEAK 6

A snowcat skiing alternative would have provided shuttle access to Peak 6 skiing. Cat skiing was eliminated for two primary reasons: snowcat access would not meet the Purpose and Need of decreasing lift-lines or dispersing users, (generally a commercial snowcat holds up to 12 people per ride) and, the effect of dispersed activity below tree line would have the same, or worse, effects on wildlife habitat, particularly lynx, as compared to the effect of developed trails.

CREATING ADVANCED SKIING OPPORTUNITIES WITHIN THE EXISTING OPERATIONAL BOUNDARY

Comments were received from the public that encouraged the Forest Service to explore skiing opportunities for advanced ability level skiers on the north side of Peak 10, next to the *Doors* and *Windows* and *Twin Chutes* on the north side of Peak 9, and next to *Mach I* trail on Peak 8. Respondents recommended clearing vegetation in these areas to increase the availability and appeal of terrain. The majority of this terrain is already being skied by advanced ability level visitors, with the exception of the stand of timber adjacent to *Mach I* trail. The Forest Service determined that clearing vegetation in these areas would not sufficiently increase skier utilization and address the Purpose and Need. Furthermore, the majority of this terrain is rated as Expert ability level and would not accommodate Intermediate and Advanced-Intermediate skiers.

In addition, recommendations to provide a lift to the *Snow White* area (approximately 145 acres) were made by the public to increase the utilization of this terrain. With a lift, this terrain would still be rated as Expert ability level due to the steep pitch at the top (68 percent slope) and an average slope of 40 percent in the area. *Snow White* terrain was eliminated from detailed analysis due to the lack of appropriate ability level terrain to meet the Purpose and Need.

The cirque between Peaks 8 and 9 was also recommended by the public as a potential alternative to the Proposed Action; however this terrain seldom holds snow to maintain a snow surface and would be difficult to access.

MARKETING PEAK 6 AS A BACKCOUNTRY DESTINATION

There was a recommendation to not develop Peak 6 terrain and instead have BSR market this terrain as available backcountry terrain to its guests. The Forest Service considered an option to keep Peak 6 as is (backcountry terrain within the SUP area) and is analyzed as the No Action Alternative. Based on current and projected use data, approximately 300 to 900 trips per season occur in the Peak 6 area and it is anticipated to grow in the future depending on weather patterns and other factors. This opportunity does not adequately meet the Purpose and Need and was therefore eliminated from detailed analysis.

H. COMPARISON OF ALTERNATIVES

Table 2-5 provides a comparison of project elements associated with each alternative.

Table 2-5:
Summary Comparison of Alternatives

	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3
TOTAL GUEST CAPACITY (GUESTS)			
Comfortable Carrying Capacity	14,920	16,170	16,410
PROPOSED GUEST CAPACITY INCREASE (GUESTS)			
Comfortable Carrying Capacity	0	1,250	1,490
TOTAL TERRAIN (ACRES)			
Special Use Permit Area	5,756	5,756	5,756
Ski Area Operational Boundary Area	3,125	3,945	3,428
Lift-Served Terrain	1,825	2,232	1,949
Hike-To Terrain	390	533	436
Backcountry Terrain within the SUP Area and Management Area 8.25	2,631	1,811	2,328
PROPOSED TERRAIN INCREASES (ACRES)			
Lift-Served Terrain	0	407	280
Lift-Served, Above-treeline Terrain	0	339	150
Lift-Served, Below-treeline Terrain	0	68	130
Lift-Served, Below-treeline Traditional Trails	0	68	33
Lift-Served, Below-treeline Gladed Trails	0	0	97
Hike-To Terrain	0	143	46
PROPOSED LIFT SPECIFICATIONS			
Quantity of New Lifts	0	2	1
Carrier Capacity (people per chair)	N/A	4 and 6	4
Uphill Capacity (pph)	N/A	2,000 and 3,000	1,200
Length (slope feet)	N/A	2,600 and 6,000	3,850
Terrain Served from New Lifts (acres)	N/A	303	97
LIFT UPGRADES SPECIFICATIONS			
Quantity of Lifts Upgrades	0	0	3
A-Chair Carrier Capacity (people per chair)	3	3	4
A-Chair Uphill Capacity (pph)	1,600	1,600	2,400

Table 2-5:
Summary Comparison of Alternatives

	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3
C-Chair Carrier Capacity (people per chair)	2	2	4
C-Chair Uphill Capacity (pph)	1,100	1,100	2,000
Colorado SuperChair Carrier Capacity (people per chair)	4	4	6
Colorado SuperChair Uphill Capacity (pph)	2,800	2,800	3,000
PROPOSED GUEST SERVICES FACILITIES			
Restroom Facility (sq ft)	0	1,200	0
Ski Patrol/Warming Hut Area (sq ft)	0	500	0
PROPOSED ACCESS ROADS			
New Access Road Construction (linear feet)	0	1,200	0
Reconstructed Timber Sale Road (linear feet)	0	8,100	0
PROPOSED SNOWMAKING			
Coverage (acres)	0	0	41
Water Diversions (acre feet)	0	0	30

I. SUMMARY COMPARISON OF DIRECT AND INDIRECT ENVIRONMENTAL CONSEQUENCES

Per direction provided in 40 CFR 1502.14, Table 2-6 provides a comparison of environmental impacts by alternative.

Table 2-6:
Summary Comparison of Direct and Indirect Environmental Consequences

Alternative 1	Alternative 2	Alternative 3
QUALITY OF LIFE		
Issue: Implementation of the proposed projects could affect the quality of life for residents of the Upper Blue River Basin, including the Town of Breckenridge.		
Indicator: Disclosure of quality of life impacts by resource/value, including: employee housing, social services, traffic, parking, recreation, environmental, and overall community character		
Traffic and Parking: The Town of Breckenridge operates at capacity approximately 20 days per year. Some increase in the number of days at capacity is anticipated with the 0.75% growth in visitation. During these periods some people feel that the level of congestion is unacceptable.	Traffic and Parking: Some increase in number of days at capacity is anticipated with the 2.0% growth in visitation. During these periods some people feel that the level of congestion is unacceptable.	Traffic and Parking: Some increase in number of days at capacity is anticipated with the 1.25% growth in visitation. During these periods some people feel that the level of congestion is unacceptable.
Public Facilities: The current level of service would be maintained, which is generally considered acceptable.	Public Facilities: The current level of service would be maintained, which is generally considered acceptable.	Public Facilities: The current level of service would be maintained, which is generally considered acceptable.
Social Services: The current level of service would be maintained, which is generally considered acceptable.	Social Services: The current level of service would be maintained, which is generally considered acceptable.	Social Services: The current level of service would be maintained, which is generally considered acceptable.
Employment: There would be no newly created employment opportunities at BSR over the next ten years as a result of selection of the No Action Alternative.	Employment: Over the two-year construction period, 105 full-time jobs would be created. Approximately 30 new employees would be necessary at BSR with implementation and operation of the Alternative 2 projects.	Employment: Over the seven-year construction period, 325 fulltime jobs would be created. Approximately 2.5 new employees would be necessary at BSR with implementation and operation of the Alternative 3 projects
Employee Housing: There is a current deficit of employee housing. Future projects are anticipated to relieve the deficit.	Employee Housing: Adding 30 new candidates for employee housing to the current deficit of employee housing could be viewed as adverse. However, the 30 additional employment positions at BSR, resulting from the Proposed Action, could be accommodated in BSR's existing workforce housing at Breckenridge Terrace or other properties.	Employee Housing: Adding 2.5 new candidates for employee housing to the current deficit of employee housing could be viewed as adverse. However, the 2.5 additional employment positions at BSR, resulting from Alternative 3, could be accommodated in BSR's existing workforce housing at Breckenridge Terrace or other properties.

Table 2-6:
Summary Comparison of Direct and Indirect Environmental Consequences

Alternative 1	Alternative 2	Alternative 3
Town and Community Character: Maintenance of the Town's historic appearance is regulated through Town policies. With BSRs projected growth in visitation of 0.75% annually, the number of days the ski resort operates at full capacity would likely increase. Visitors and residents who feel that the Town's quaint character is affected by congestion on peak days may find the increase in peak days unacceptable.	Town and Community Character: Maintenance of the Town's historic appearance is regulated through Town policies. With BSRs projected growth in visitation of 2.0% annually, the number of days the ski resort operates at full capacity would likely increase. Visitors and residents who feel that the Town's quaint character is affected by congestion on peak days may find the increase in peak days unacceptable.	Town and Community Character: Maintenance of the Town's historic appearance is regulated through Town policies. With BSRs projected growth in visitation of 1.25% annually, the number of days the ski resort operates at full capacity would likely increase. Visitors and residents who feel that the Town's quaint character is affected by congestion on peak days may find the increase in peak days unacceptable.
BSR: Existing terrain would be maintained; visitors would continue to experience long lift-line wait times approximately 27% of the Core Season. On approximately one out of four days, guests could experience wait times generally ranging from 10 to 25 minutes on the majority of out-of-base lifts. This level of service is acceptable to some visitors and unacceptable to others.	BSR: The proposed Peak 6 terrain would be developed. It is anticipated that shifting skiers away from the Comparison Pods would result in a reduction of lift-lines, compared to Alternative 1, by approximately 30% on the Design Day of 16,000 guests (i.e., a ten-minute lift-line would become seven minutes). This level of service is acceptable to some visitors and unacceptable to others.	BSR: Internal terrain developments and the Peak 6½ lift would increase terrain within BSR. Compared to the No Action Alternative, lift-line wait times on Beaver Run would reduce by approximately 20%, the Colorado SuperChair by roughly 50%, A-Lift by 60%, C-Chair 30% and Mercury by 15%. This level of service is acceptable to some visitors and unacceptable to others.
Backcountry Terrain within the SUP Area: Current use patterns in 2,631 acres of adjacent terrain would be maintained. Current users would likely approve of the maintained level of use, whereas people who are not able to access/use this unmaintained terrain, within the SUP area, may be disappointed.	Backcountry Terrain within the SUP Area: Backcountry terrain within the SUP area would be reduced by 820 acres, completely eliminating backcountry use of the Peak 6 area. Users who gain new access to this area would likely be pleased with terrain maintenance and lift service in the area, while existing backcountry users would disapprove of the development.	Backcountry within the SUP Area: Backcountry within the SUP area would be reduced by 303 acres, eliminating a portion of the backcountry use on Peak 6. Users who gain new access to a portion of the terrain on Peak 6 would likely be pleased. However, existing backcountry users would disapprove of the development.
Other Recreation: Recreation opportunities would be maintained in the area surrounding the Town of Breckenridge and Blue River communities. Levels of use would be anticipated to increase in proportion to population growth.	Other Recreation: Recreation opportunities would be maintained in the area surrounding the Town of Breckenridge and Blue River communities. Levels of use would be anticipated to increase in proportion to population growth.	Other Recreation: Recreation opportunities would be maintained in the area surrounding the Town of Breckenridge and Blue River communities. Levels of use would be anticipated to increase in proportion to population growth.

Table 2-6:
Summary Comparison of Direct and Indirect Environmental Consequences

Alternative 1	Alternative 2	Alternative 3
Scenery: Maintain compliance with Low and Very Low SIO designations. The existing trails and infrastructure are consistent with what many people expect to see at a ski area. However, some people find the developed visual character of trails and infrastructure undesirable.	Scenery: Proposed trail and lift clearings and infrastructure projects **would not meet the Forest Plan guideline of Low SIO**. Trail design includes PDCs to minimize scenic impacts. Since the proposed upper Peak 6 lift top terminal would be visible from many viewpoints, coloration would assist in reducing the scenery impact to the greatest extent practicable, but would still only meet a Very Low SIO, which does not meet the Forest Plan. The existing trails and infrastructure, plus additional developments on Peak 6, are consistent with what many people expect to see at a ski area. However, some people find an increase in the developed visual character of trails and infrastructure undesirable.	Scenery: Maintain compliance with Low and Very Low SIO designations. The existing trails and infrastructure are consistent with what many people expect to see at a ski area. However, some people find the developed visual character of trails and infrastructure undesirable.
Forest Health: No additional tree removal would occur as a result of the No Action Alternative. However, BSR would continue to implement projects in the VMP to improve forest health during and after the MPB epidemic.	Forest Health: Approximately 12 acres of mixed conifer and mixed lodgepole would be cleared along with 70 acres of spruce fir. No pure lodgepole stands would be cleared. Due to the current outbreak in MPB, some people disapprove of any removal of healthy forest vegetation, particularly spruce and fir. “Legacy trees” would be left standing where possible.	Forest Health: Approximately 73 acres of glading and 16 acres of clearing would occur in the spruce/fir forest type. Approximately 42.5 acres of clearing and glading would occur in the lodgepole pine/mixed conifer/mixed lodgepole pine forest types. Approximately 5.3 acres glading would occur in lodgepole pine stands. Some people view any removal of spruce/fir forest as further impairment to forest health due to the MPB outbreak. “Legacy tree” removal in the project area would be avoided where possible.
Wildlife Habitat: The existing wildlife and habitat would persist.	Wildlife Habitat: Approximately 385 acres of terrain would be developed above treeline (285 acres lift-served, 100 acres hike-to) and 65 acres of terrain below treeline. Although wildlife would persist in the area, these developments would reduce the availability of certain habitat types.	Wildlife Habitat: Approximately 280 acres of terrain would be developed requiring 131 acres of tree removal. 33 acres of tree removal would occur within the existing operational boundary, removing lower quality wildlife habitat. Although wildlife would persist in the area, these developments would reduce the availability of certain habitat types.

Table 2-6:
Summary Comparison of Direct and Indirect Environmental Consequences

Alternative 1	Alternative 2	Alternative 3
RECREATION, MOUNTAIN OPERATIONS AND GUEST SERVICES		
Recreation Issue #1: Proposed projects within BSR's SUP area have the potential to affect the recreational experience at the ski area.		
Indicator: Quantification of existing and proposed terrain acreage and distribution by ability level (%)		
Beginner: 2.8 acres (1%) Novice: 106.6 acres (15%) Low-Intermediate: 403.4 acres (38%) Intermediate: 402.0 acres (29%) Advanced-Intermediate: 349.1 acres (9%) Expert: 560.6 acres (7%)	Beginner: 2.8 acres (1%) Novice: 106.6 acres (13%) Low-Intermediate: 403.4 acres (33%) Intermediate: 584.0 acres (36%) Advanced-Intermediate: 410.9 acres (10%) Expert: 724.0 acres (8%)	Beginner: 2.8 acres (1%) Novice: 106.6 acres (14%) Low-Intermediate: 451.8 acres (39%) Intermediate: 470.2 acres (30%) Advanced-Intermediate: 361.9 acres (9%) Expert: 710.9 acres (7%)
Indicator: Quantification of skier terrain densities under the existing and proposed conditions		
Existing Condition/No Action Trail Densities (% of Target): Silverthorne: 135 Lower Sundown: 263 Four O'Clock: 121 Springmeier: 103 Swinger: 90 Crescendo: 128 Claimjumper: 55 Pioneer: 64 Monte Cristo: 21	Proposed Action Trail Densities (% of Target): Silverthorne: 120 Lower Sundown: 235 Four O'Clock: 82 Springmeier: 97 Swinger: 85 Crescendo: 121 Claimjumper: 52 Pioneer: 64 Monte Cristo: 21	Alternative 3 Trail Densities (% of Target): Silverthorne: 138 Lower Sundown: 268 Four O'Clock: 82 Springmeier: 97 Swinger: 85 Crescendo: 121 Claimjumper: 52 Pioneer: 64 Monte Cristo: 21

Table 2-6:
Summary Comparison of Direct and Indirect Environmental Consequences

Alternative 1	Alternative 2	Alternative 3
Existing Condition Egress Densities (% of Target): Silverthorne: 135 Lower Sundown: 263 Four O'Clock: 124 Springmeier: 146 Swinger: 127 Crescendo: 181 Claimjumper: 78 Pioneer: 32 Monte Cristo: 11 No Action Alternative Egress Densities (% of Target): Silverthorne: 129 Lower Sundown: 252 Four O'Clock: 108 Springmeier: 128 Swinger: 111 Crescendo: 158 Claimjumper: 68 Pioneer: 83 Monte Cristo: 28	Proposed Action Egress Densities (% of Target): Silverthorne: 115 Lower Sundown: 224 Four O'Clock: 103 Springmeier: 122 Swinger: 106 Crescendo: 151 Claimjumper: 65 Pioneer: 127 Monte Cristo: 127	Alternative 3 Egress Densities (% of Target): Silverthorne: 123 Lower Sundown: 241 Four O'Clock: 108 Springmeier: 128 Swinger: 111 Crescendo: 158 Claimjumper: 68 Pioneer: 96 Monte Cristo: 96

Table 2-6:
Summary Comparison of Direct and Indirect Environmental Consequences

Alternative 1	Alternative 2	Alternative 3
Indicator: Quantification of lift-line wait times under existing and proposed conditions		
Existing Condition/No Action (Design Day [min]): QuickSilver Super6: 10 Mercury SuperChair: 7 A-Chair: 5 C-Chair: 10 Beaver Run SuperChair: 10 Colorado SuperChair: 12 Rocky Mountain SuperChair: 5 Independence SuperChair: 10 6-Chair: 10 Imperial Express SuperChair: 7 T-Bar: 7	Proposed Action (Design Day [min]): QuickSilver Super6: 10 Mercury SuperChair: 5 A-Chair: 5 C-Chair: 10 Beaver Run SuperChair: 5 Colorado SuperChair: 10 Rocky Mountain SuperChair: 3.5 Independence SuperChair: 10 6-Chair: 10 Imperial Express SuperChair: 4.5 T-Bar: 7	Alternative 3 (Design Day [min]): QuickSilver Super6: 10 Mercury SuperChair: 6 A-Chair: 2 C-Chair: 7 Beaver Run SuperChair: 8 Colorado SuperChair: 6 Rocky Mountain SuperChair: 3.5 Independence SuperChair: 10 6-Chair: 10 Imperial Express SuperChair: 7 T-Bar: 7
Indicator: Discussion, and where possible, quantification of skier circulation across the ski area		
Existing Condition/No Action (min): Peak 7 to 10: 84 Peak 10 to 7: 27	Proposed Action (min): Peak 7 to 10: 79 Peak 10 to 7: 27	Alternative 3 (min): Peak 7 to 10 (Option 1): 74 Peak 7 to 10 (Option 2): 65 Peak 10 to 7: 27
Indicator: Quantitative analysis of existing and proposed guest service space and discussion of guest experiences		
Peak 7: 480 square feet Peak 8: 22,300 square feet Peak 9: 13,800 square feet Peak 10: 12,100 square feet With the exception of the Ten Mile Station on Peak 10, the remainder of the on-mountain facilities at BSR are limited in space, and therefore the guest experience can be diminished.	Alternative 2 would provide a 1,200-square foot restroom facility at the junction of the upper and lower lifts. At the upper Peak 6 lift top terminal, a ski patrol/warming hut building would provide 500 square feet of ski patrol and guest service space.	No additional on-mountain guest service facilities are proposed.

Table 2-6:
Summary Comparison of Direct and Indirect Environmental Consequences

Alternative 1	Alternative 2	Alternative 3
Indicator: Quantification (acreage) of skiing opportunities/effects due to mountain pine beetle		
Multiple variables would be considered prior to opening terrain affected by mountain pine beetle; however, the potential acreage would be: Beginner: 13 acres Novice: 36 acres Low-Intermediate: 27 acres Intermediate: 21 acres Advanced-Intermediate: 11 acres Expert: 15 acres	Alternative 2 would not take advantage of additional acreage due to mountain pine beetle effects.	Of the acreage presented in Alternative 1, approximately 19.4 acres would be development under Alternative 3.
Recreation Issue #2: Development of the Peak 6 skiing pod, including the installation of lifts and a restroom facility, would remove existing backcountry terrain within BSR's SUP area. Converting the Peak 6 pod to a lift-served skiing experience would alter the distribution of backcountry acreage within the SUP area immediately accessible from the ski area's operational boundary.		
Indicator: Identification of backcountry access points		
The Forest Service and BSR currently provide six backcountry access points. These points would be maintained with Alternative 1.	Access to areas north and south of BSR would be maintained. An access point would be re-located on the proposed northern operational boundary.	Access to areas north and south of BSR would be maintained. An access point would be re-located on the proposed northern operational boundary.
Indicator: Narrative discussion of the existing backcountry experience within the BSR SUP area and qualitative and quantitative analysis of backcountry access changes anticipated from the action alternatives		
The backcountry offers a sense of adventure, solitude and self-awareness that simply cannot be experienced when skiing in-bounds at a developed ski area. Backcountry terrain within the BSR SUP boundary totals approximately 2,631 acres. Alternative 1 would not affect the backcountry experience or the available quantity of area.	Under Alternative 2, the existing backcountry experience within the Peak 6 portion of BSR's current SUP area would be eliminated. Backcountry terrain within the BSR SUP area would be reduced by 820 acres. Backcountry terrain on Peaks 9 and 10 would remain unchanged.	Under Alternative 3, the existing backcountry experience within the Peak 6½ portion of BSR's current SUP area would be eliminated. Backcountry terrain within the northern portion of BSR's SUP area on Peak 6½ would be reduced by 303 acres. Backcountry terrain on Peaks 9 and 10 would remain unchanged.
Indicator: Extent and quantification (acres) of existing backcountry areas accessed through points within BSR's SUP area and through other points in the analysis area		
Current backcountry within the BSR SUP area totals 2,631 acres. The Peak 6 area was accessed by approximately 300 skiers in 2009/10 from the *Ore Bucket* access point.	Under Alternative 2, 1,811 acres of backcountry would be available within the BSR SUP area.	Under Alternative 3, 2,328 acres of backcountry would be available within the BSR SUP area.

Table 2-6:
Summary Comparison of Direct and Indirect Environmental Consequences

Alternative 1	Alternative 2	Alternative 3
Recreation Issue #3: Development of proposed projects outside the existing operational boundary would increase BSR's requirement for snow safety management and potentially increase opportunities for access to the west side of the Tenmile Range.		
Indicator: Quantification of areas susceptible to avalanche conditions		
Areas within the BSR operational boundary that are currently susceptible to avalanche conditions would continue to be controlled and maintained under the No Action Alternative.	Approximately 482 acres of the Proposed Action terrain would be above-treeline and would be susceptible to avalanche conditions. BSR's Snow Safety Plan could address these proposed areas and manage the additional acreage in a similar manner as existing conditions and the No Action Alternative.	Approximately 180 acres of Alternative 3 terrain would be above-treeline and would be susceptible to avalanche conditions. BSR's Snow Safety Plan could address these proposed areas and manage the additional acreage in a similar manner as existing conditions and the No Action Alternative.
Indicator: Description of safety concerns and avalanche risk associated with the inclusion of additional terrain within BSR's operation boundary		
No new safety concerns and/or avalanche risk.	BSR's Snow Safety Plan would address safety concerns and avalanche risk. The upper Peak 6 lift top terminal is located in a "Red Zone," which means that it is highly vulnerable to avalanches. However, that is the classification if no control work is performed. Performing daily stability control work will significantly reduce the projected avalanche return period.	BSR's Snow Safety Plan would address safety concerns and avalanche risk. The Peak 6½ lift top terminal, located below Peak 6½ and its ropeway are situated beyond the reach of avalanches with return periods of 30 to 100 years. Performing daily stability control work will significantly reduce the projected avalanche return period.
Indicator: Quantification of increased potential to access west side of Tenmile Range from BSR's SUP boundary and its impact on Summit County Search and Rescue		
No changes from existing conditions. Several people each year decide to (primarily illegally) ski the west side of the Tenmile Range.	Installation of the upper Peak 6 lift and increase of BSR's ski area operational boundary to the Peak 6 summit carries with it increased potential for skiers *illegally* accessing the west side of Tenmile Range from the SUP area.	Issues related to accessing the west side of the Tenmile Range under Alternative 3 would be the same as for Alternative 2.

Table 2-6:
Summary Comparison of Direct and Indirect Environmental Consequences

Alternative 1	Alternative 2	Alternative 3
TRAFFIC, PARKING AND SKI AREA ACCESS		
Issue: Proposed projects may generate measurable increases in daily/seasonal visitation, thereby affecting traffic movement and volumes within the Town of Breckenridge, on Highway 9 between Frisco and Breckenridge, and on construction/maintenance access roads proximate to the ski area. Parking capacities may also be affected by proposed projects.		
Indicator: Historic and projected traffic counts for roadway networks to access BSR		
The 2009 traffic counts at Highway 9 and Tiger Road recorded 18,200 VPD which is expected to increase to 30,000 VPD by 2030. The 2009 traffic counts at Highway 9 and Boreas Pass Road recorded 10,400 VPD which is expected to increase to 16,700 VPD by 2030.	Same as under the No Action.	Same as under the No Action.
Indicator: Comparison of anticipated winter traffic volumes with existing winter traffic volumes and the design capacities of roadway networks accessing BSR		
2009 traffic counts at Highway 9 and Tiger Road ski area traffic as 5.8% of annual average traffic at Tiger Road and 2.5% of annual average traffic at Boreas Pass Road. At a projected skier per day growth rate of 0.75%, skier traffic under the No Action Alternative is anticipated to decrease by 2030 to 4.1% of annual average traffic at Tiger Road and 1.8% of annual average traffic at Boreas Pass Road. In 2010, the DHV was exceeded during peak hours on peak visitation days. As residential growth continues at 2% annually and growth in visitation occurs at 0.75% annually, it is anticipated that the number of peak days each season would increase, resulting in more days when peak traffic hours would exceed the DHV on Highway 9.	2009 traffic counts at Highway 9 and Tiger Road ski area traffic as 5.8% of annual average traffic at Tiger Road and 2.5% of annual average traffic at Boreas Pass Road. At a projected skier per day growth rate of 0.75%, skier traffic under the No Action Alternative is anticipated to decrease by 2030 to 4.1% of annual average traffic at Tiger Road and 1.8% of annual average traffic at Boreas Pass Road. In 2010, the DHV was exceeded during peak hours on peak visitation days. As residential growth continues at 2% annually and growth in visitation occurs at 0.75% annually, it is anticipated that the number of peak days each season would increase, resulting in more days when peak traffic hours would exceed the DHV on Highway 9.	2009 traffic counts at Highway 9 and Tiger Road ski area traffic as 5.8% of annual average traffic at Tiger Road and 2.5% of annual average traffic at Boreas Pass Road. At a projected skier per day growth rate of 0.75%, skier traffic under the No Action Alternative is anticipated to decrease by 2030 to 4.1% of annual average traffic at Tiger Road and 1.8% of annual average traffic at Boreas Pass Road. In 2010, the DHV was exceeded during peak hours on peak visitation days. As residential growth continues at 2% annually and growth in visitation occurs at 0.75% annually, it is anticipated that the number of peak days each season would increase, resulting in more days when peak traffic hours would exceed the DHV on Highway 9.

Table 2-6:
Summary Comparison of Direct and Indirect Environmental Consequences

Alternative 1	Alternative 2	Alternative 3
Indicator: Quantification/documentation of anticipated impacts to proposed construction/maintenance access roads and effects to Peak 7 neighborhood residents		
Since 2007, the BreckConnect Gondola and limited parking at the Peak 8 base area have minimized visitors accessing the ski area using Ski Hill Road.	Since 2007, the BreckConnect Gondola and limited parking at the Peak 8 base area have minimized visitors accessing the ski area using Ski Hill Road. Construction access would occur via Ski Hill Road to County Road 3, and vehicular impacts to the majority of the Peak 7 neighborhood would be avoided.	Since 2007, the BreckConnect Gondola and limited parking at the Peak 8 base area have minimized visitors accessing the ski area using Ski Hill Road. Construction access would occur within the existing ski area.
Indicator: Quantification of existing and proposed parking capacity for day and destination skiers within BSR parking lots		
Under the No Action Alternative 4,090 parking spaces are provided in ski area, Town lots, and on-street parking.	Under the No Action Alternative 4,090 parking spaces are provided in ski area, Town lots, and on-street parking.	Under the No Action Alternative 4,090 parking spaces are provided in ski area, Town lots, and on-street parking.
Indicator: Quantification of indirect effects to parking capacities within the Town of Breckenridge for day and destination skiers within town, related to guests visiting BSR		
Peak day visitation would be consistent with Table 3C-4 which currently shows adequate parking spaces to accommodate peak day capacities.	Peak day visitation would be consistent with Table 3C-4 which currently shows adequate parking spaces to accommodate peak day capacities.	Peak day visitation would be consistent with Table 3C-4 which currently shows adequate parking spaces to accommodate peak day capacities.
SCENERY		
Issue: Development of proposed projects, including associated infrastructure, would be visible from Highway 9 and the Town of Breckenridge.		
Indicator: Compliance with Forest Plan standards and guidelines for scenery management within the SUP area and from established critical viewpoints by meeting Scenic Integrity Objectives		
Existing facilities and ski area clearings are consistent with the current SIO of *Low* and *Very Low*.	Proposed trail and lift clearings and infrastructure projects **would not meet the Forest Plan guideline of Low SIO**. Trail design includes PDCs to minimize scenic impacts. The proposed upper Peak 6 lift top terminal would be visible from many viewpoints, but summer coloration and non-reflective materials would assist in blending with the surrounding landscape but still does not meet the *Low* SIO (because it is located above treeline).	The majority of proposed projects are within the developed lift and trail network of the ski area boundary. Therefore, these incremental additions to the trail and lift network are not anticipated to be visually perceptible. The Peak 6½ lift and trail glading project would be located in an area designated with the *Low* SIO. Trail glading would minimize the visual distinction and would replicate areas on the Tenmile Range that are have been thinned in the past 200 years by fire. The Peak 6½ lift top terminal is located at treeline at the toe of steep slopes. This would help disguise the top terminal to meet the *Low* SIO.

Table 2-6:
Summary Comparison of Direct and Indirect Environmental Consequences

Alternative 1	Alternative 2	Alternative 3
Indicator: Infrastructure should imitate landscape character with natural appearing materials and colors to minimize impacts to the scenery		
Lack of a unifying architectural design theme is evident and in some cases, materials, colors, and architectural styles are of a low aesthetic quality. Lift towers and terminals are of non-reflective materials and colors. Colors of buildings are painted to blend with the surrounding landscape.	Lack of a unifying architectural design theme is evident and in some cases, materials, colors, and architectural styles are of a low aesthetic quality. Lift towers and terminals are of non-reflective materials and colors. Colors of buildings are painted to blend with the surrounding landscape.	Lack of a unifying architectural design theme is evident and in some cases, materials, colors, and architectural styles are of a low aesthetic quality. Lift towers and terminals are of non-reflective materials and colors. Colors of buildings are painted to blend with the surrounding landscape.
Indicator: Discussion of four identified critical viewpoints		
The four visual simulations from identified critical viewpoints display the developed character of the BSR existing operational and development boundary within their SUP.	The four visual simulations from the identified viewpoints display the Proposed Action in context with the remaining developed character of the existing operational and development boundary. The Proposed Action would incrementally add to the overall developed character and would add two additional structures (each of which would be visible) above treeline. Design criteria and the larger tree islands on Peak 6 would reduce the aesthetic impacts of the Proposed Action.	The four visual simulations from the identified viewpoints display Alternative 3 in context with the remaining developed character of the existing operational boundary. Peak 6½ would be an incremental scenery impact beyond the existing operational and development boundary, but the gladed terrain would blend better with the surrounding landscape compared to traditional trail development. All other vegetation removal and lift upgrades/realignments would occur within the current operational boundary, resulting in less perceptible effects.
CULTURAL RESOURCES		
Issue: Implementation of proposed projects and associated ground disturbance may affect previously unidentified cultural resources within the SUP area.		
Indicator: Survey and document presence or absence of identified cultural resources		
Two newly discovered historic sites were recorded, one newly recorded isolated find, two previously recorded isolated artifacts, and one previously recorded isolated feature were found within the APE.	All inventory reports were submitted to the SHPO in completion of the NHPA Section 106 process. SHPO concurrence regarding this project was received on August 31, 2010.	Same as Alternative 2.
Indicator: Documentation of impacts to potentially-eligible National Register of Historic Places (NRHP) sites		
Implementation of Alternative 1 would have “no effect” on any known NRHP listed or eligible historic properties.	Implementation of the Proposed Action was determined to have “no effect” on any known NRHP listed or eligible historic properties. Written concurrence was received from the SHPO on August 31, 2010.	Implementation of the Proposed Action was determined to have “no effect” on any known NRHP listed or eligible historic properties. Written concurrence was received from the SHPO on August 31, 2010.

Table 2-6:
Summary Comparison of Direct and Indirect Environmental Consequences

Alternative 1	Alternative 2	Alternative 3
SOCIAL AND ECONOMIC RESOURCES		
Issue: Implementation of the proposed projects could potentially alter certain socioeconomic characteristics of Summit County, including demand for Town/County housing (in compliance with Executive Order 12898), by increasing total annual visitation.		
Indicator: Potential effects to socioeconomic indicators in Summit County, including: population, housing and affordable housing, employment, and expenditures		
Population: Under the No Action Alternative, Summit County's population is projected to increase by 2.14% per year to 43,943 permanent residents by 2025. Resort visitation is expected to increase at 0.75% annually under the No Action Alternative.	Population: Alternative 2 would result in 30 new employees (FTE 9.3 employees), a percentage of which are assumed to relocate into the County (primarily seasonally). Despite these new employees, Summit County's population growth would remain the same as is projected for the No Action Alternative at 2.14% per year through 2025. Alternative 2 is expected to result in increases in resort visitation at a rate up to 2.0% annually.	Population: Alternative 3 would result in eight new employees (FTE 2.5 employees), a percentage of which are assumed to relocate into the County (primarily seasonally). Despite these new employees, Summit County's population growth would remain the same as is projected for the No Action Alternative at 2.14% per year through 2025. Alternative 3 is expected to result in increases in resort visitation at a rate of 1.25% annually.
Housing: BSR currently provides the full amount of employee housing that is currently required, and BSR has committed to maintaining adequate housing for BSR employees into the future. Currently, there is a scarcity of community workforce housing, which is projected to continue in the future. Approximately 1,861 (or 23% of total) single family equivalents remain to be built within the Town of Breckenridge.	Housing: BSR currently provides the full amount of employee housing required. The existing scarcity of workforce housing, is projected to continue in the future.	Housing: BSR currently provides the full amount of employee housing required. The existing scarcity of workforce housing, is projected to continue in the future.

Table 2-6:
Summary Comparison of Direct and Indirect Environmental Consequences

Alternative 1	Alternative 2	Alternative 3
Employment: BSR directly offers 2,217 year-round and seasonal full-time and part-time *positions* or the equivalent of 804 FTEs. It is estimated that employment within BSR directly accounts for approximately 9% of Summit County's employment. When BSR visitors' total expenditures are included, it is estimated that BSR accounts for approximately 16% of Summit County's total employment. At the end of the ten-year projection period, the No Action Alternative is projected to generate 295 additional FTEs on an ongoing basis.	Employment: Alternative 2 construction activity is projected to generate a cumulative total of 105 FTEs, over a two-year period. Alternative 2 will result in the creation of 30 new job positions within BSR. At the end of the ten-year projection period, Alternative 2 is projected to generate 813 FTEs on an ongoing basis, regionally.	Employment: Alternative 3 construction activity is projected to generate a cumulative total of 328 FTEs over a seven-year period. Alternative 3 will result in the creation of eight new job positions within BSR. At the end of the ten-year projection period, Alternative 3 is projected to generate 498 FTEs on an ongoing basis.
Revenue: BSR generates $94.4 million in personal income in Summit County. BSR (winter) visitors currently generate over $375 million in annual expenditures, generating a total over of over 4,260 FTEs throughout Colorado (direct and secondary impact).	Revenue: Alternative 2 construction activity is projected to generate over $7.5 million in economic activity, over a two-year period. At the end of the ten-year projection period, Alternative 2 is projected to generate 813 FTEs and $97.4 million in annual dollar activity—on an ongoing basis.	Revenue: Alternative 3 construction activity is projected to generate over $60 million in economic activity, over a seven-year period. At the end of the ten-year projection period, Alternative 3 is projected to generate $58.8 million in annual dollar activity—on an ongoing basis.
NOISE		
Issue: Snow management and avalanche safety through the use of explosives on Peak 6 has the potential to generate additional noise audible in the Peak 7 neighborhood and Town of Breckenridge.		
Indicator: Comparison of existing and proposed audible conditions (in decibels) related to snow management and safety		
Within the Peak 7 neighborhood, average ambient noise levels during the baseline test were measured to be approximately 45 dBA, with an existing peak of 74 dBA.	The peak observed sound level due to avalanche control explosive work on Peak 6, as measured in the Peak 7 neighborhood on Slalom Drive, was 67 dBA.	Same as Alternative 2.

Table 2-6:
Summary Comparison of Direct and Indirect Environmental Consequences

Alternative 1	Alternative 2	Alternative 3
VEGETATION		
Issue: Plant communities (including Threatened, Endangered, and Sensitive [TES] species and regionally important plants) may be altered as a result of the proposed projects.		
Indicator: Identification of any threatened, endangered or Region 2 sensitive (TES) plant species present in the study area		
There are currently no Endangered plant species listed for Forest Service Region 2 in the WRNF. Potential habitat for the Threatened Penland alpine fen mustard (*Eutrema penlandii*) exists at BSR at higher elevations; however, no occupied habitat was located or observed. The updated Region 2 sensitive plant species list contains 32 plant species that were determined to be present or potentially present on the WRNF. No occupied habitat was located or observed for any Region 2 sensitive plant species.	Identical to Alternative 1.	Identical to Alternative 1.
Indicator: Quantification (acreage) of proposed ground disturbance and overstory vegetation removal effects by species		
No alteration of habitat occupied by any Threatened, Endangered or R2 sensitive plant species would occur under the No Action Alternative. Overstory vegetation removal is discussed in Chapter 3J – Forest Health.	No alteration of habitat occupied by any Threatened, Endangered or R2 sensitive plant species would occur under the Proposed Action. A total of 339 acres of new ski terrain would be made available to users, with approximately 25 acres of this new terrain being potential habitat for *Draba weberi*. Overstory vegetation removal is discussed in Chapter 3J – Forest Health.	No alteration of habitat occupied by any Threatened, Endangered or R2 sensitive plant species would occur under Alternative 3. Approximately 2 acres of habitat containing common *Botrychium* species was identified within the study area at 19 separate sites. Alternative 3 would result in direct impacts to 15 of the 19 *Botrychium* aggregation sites, or direct impacts adjacent the sites. Construction activities from Alternative 3 would directly impact approximately 8 acres of existing potential *Botrychium* habitat at BSR, mainly from new ski lift construction, ski lift relocation, snowmaking, snow fencing, grading, utility installation, and other infrastructure. Alternative 3 would include the clearing of approximately 45 acres of forest, which would result in the creation of 45 acres of new potential *Botrychium* habitat. Overstory vegetation removal is discussed in Chapter 3J – Forest Health.

Table 2-6:
Summary Comparison of Direct and Indirect Environmental Consequences

Alternative 1	Alternative 2	Alternative 3
Indicator: Disclosure of impacts to TES plant species and overstory vegetation		
No alteration of habitat occupied by any Threatened, Endangered or R2 sensitive plant species would occur under the No Action Alternative.	No alteration of habitat occupied by any Threatened, Endangered or R2 sensitive plant species would occur under the Proposed Action.	No alteration of habitat occupied by any Threatened, Endangered or R2 sensitive plant species would occur under Alternative 3.
Indicator: Identification and use of design criteria and BMPs to avoid contamination of the project area by noxious weeds		
The Annual Summer Construction Plan for BSR includes a discussion of invasive weed management.	The Annual Summer Construction Plan for BSR includes a discussion of invasive weed management.	The Annual Summer Construction Plan for BSR includes a discussion of invasive weed management.
WILDLIFE		
Issue: Development of proposed projects, including associated infrastructure, would necessitate vegetation removal and would increase human presence. Increased use of the area, loss of habitat, and habitat fragmentation could disrupt terrestrial wildlife, including TES species and Management Indicator Species (MIS) that may utilize habitat within BSR's SUP area.		
Indicator: Quantification (acres) and qualification of existing wildlife habitat and proposed alteration, fragmentation, or removal of wildlife habitat, by species. Include specifically lynx diurnal security habitat, winter forage habitat, and denning habitat		
No impacts would occur under Alternative 1. Existing conditions include: **Threatened and Endangered Species**: Uncompahgre fritillary butterfly, humpback chub, bonytail Colorado pikeminnow, razorback sucker, greenback cutthroat trout: No habitat or no additional depletions Canada lynx: Diurnal Security Habitat – 830 acres within and outside SUP area Winter Foraging Habitat – 900.7 acres Denning Habitat – 0.2 acre **Region 2 Sensitive Species:** Refer to Table 3I-6 for species with and without potential habitat **Management Indicator Species:** Refer to Table 3I-7 for species with and without potential habitat	**Threatened and Endangered Species**: Alternative 2 impacts to lynx habitat types would total 86.4 acres. Diurnal Security Habitat – values maintained Winter Foraging Habitat – 56.7 acres Denning Habitat – 0.0 acre **Region 2 Sensitive Species:** Determinations presented in Table 3I-13. **Management Indicator Species:** American Elk: 86.3 acres of habitat conversion American Pipit: 0.9 acre of disturbance Aquatic Macroinvertebrates: maintained with PDC Trout: 86.3 acres of stabilizing vegetation removed	**Threatened and Endangered Species**: Alternative 3 impacts to lynx habitat types would total 168.0 acres. Diurnal Security Habitat – values maintained Winter Foraging Habitat – 37.1 acres Denning Habitat – 0.0 acre **Region 2 Sensitive Species:** Determinations presented in Table 3I-13. **Management Indicator Species:** American Elk: 153.2 acres of habitat conversion American Pipit: 0.9 acre of disturbance Aquatic Macroinvertebrates: maintained with PDC Trout: 153.2 acres of stabilizing vegetation removed

Table 2-6:
Summary Comparison of Direct and Indirect Environmental Consequences

Alternative 1	Alternative 2	Alternative 3
Indicator: Description of effects to lynx and elk from Highway 9 traffic		
No impacts associated with Alternative 1.	Nineteen additional vehicle trips on Hoosier Pass over the No Action. No lynx linkages on Highway 9 north of BSR. Elk would not be measurably affected by additional vehicle trips.	Eight additional vehicle trips on Hoosier Pass over the No Action. No lynx linkages on Highway 9 north of BSR. Elk would not be measurably affected by additional vehicle trips.
Indicator: Disclosure of effects to TES and MIS wildlife species		
No impacts associated with Alternative 1.	**Threatened and Endangered Species**: Uncompahgre fritillary butterfly, humpback chub, bonytail Colorado pikeminnow, razorback sucker, greenback cutthroat trout: No Effect Canada lynx: Likely to Adversely Affect **Management Indicator Species:** Alternative 2 would meet Forest Plan direction.	**Threatened and Endangered Species**: Uncompahgre fritillary butterfly, humpback chub, bonytail Colorado pikeminnow, razorback sucker, greenback cutthroat trout: No Effect Canada lynx: Likely to Adversely Affect **Management Indicator Species:** Alternative 2 would meet Forest Plan direction.
Indicator: Identification of effects within LAU boundaries in relation to the SUP area		
No impacts associated with Alternative 1.	LAU boundary effects are presented in Table 3I-11.	LAU boundary effects are presented in Table 3I-15.
Indicator: Quantification and qualification of compensatory mitigation for impacts to lynx habitat		
No impacts associated with Alternative 1.	A monetary contribution by Vail Resorts of $300,000 for road decommissioning, the WRNF lynx/recreation study and general lynx related studies, education, habitat improvement projects, etc.	A monetary contribution by Vail Resorts of $300,000 for road decommissioning, the WRNF lynx/recreation study and general lynx related studies, education, habitat improvement projects, etc.

Table 2-6:
Summary Comparison of Direct and Indirect Environmental Consequences

Alternative 1	Alternative 2	Alternative 3
FOREST HEALTH		
Issue: Due to the mountain pine beetle (MPB) outbreak that is currently affecting Colorado forests, the majority of lodgepole pine within the SUP area is either dead or may be dead within several years. Proposed projects could take advantage of tree stands that will be affected by MPB or could remove tree species other than lodgepole pine.		
Indicator: Quantification (acreage) of lands affected by MPB (pure/mixed lodgepole pine)		
1,131 acres of the lodgepole pine, mixed conifer, and mixed-lodgepole pine forest types would be affected by MPB under Alternative 1. The effect would vary commensurate with the amount of lodgepole pine composing the stands.	Under Alternative 2, approximately 11.5 acres of clearing/grading would occur in mixed conifer and lodgepole pine stands susceptible to the MPB outbreak. Clearing would occur in one stand where lodgepole pine mortality due to MPB was recorded. The level of susceptibility of this stand to MPB mortality is moderate.	Under Alternative 3, approximately 40.2 acres of clearing and glading would occur in the lodgepole pine, mixed conifer, and mixed lodgepole pine forest types stands susceptible to the MPB outbreak. 5.3 acres of the vegetation impacts would be glading, which would be beneficial at the site scale reducing MPB activity. The level of susceptibility to MPB mortality is low to moderate.
Indicator: Quantification (acreage) and disclosure of regeneration potential		
Under Alternative 1, approximately 1,780 acres of forest stands within the ski area would continue to experience good natural regeneration. Implementation of the BSR Vegetation Management Plan (VMP) would improve regeneration potential in the remaining forested areas of the ski area.	Under Alternative 2, 79.8 acres of vegetation clearing would occur in forest stands which are currently experiencing good natural regeneration. Implementation of the BSR VMP would improve regeneration potential in the remaining forested areas of the ski area.	Under Alternative 3, approximately 103.3 acres of tree removal would occur to create ski trails in forest stands that are currently exhibiting relatively high levels of natural regeneration. 88.6 acres of the vegetation impact under Alternative 3 would be glading for new trails, which would not immediately be effected. Implementation of the BSR VMP would improve regeneration potential in the remaining forested areas of the ski area.
Indicator: Quantification (acreage) of impacts from proposed projects by stand type and regeneration		
Under Alternative 1, no new projects would be implemented, and no new impacts to forest stands would be expected.	Under Alternative 2, impacts by stand type and regeneration are displayed in Table 3J-3. Under Alternative 2, 79.8 acres of vegetation clearing would occur in forest stands which are currently experiencing good natural regeneration.	Under Alternative 3, impacts by stand type and regeneration are displayed in Table 3J-3. Under Alternative 3, approximately 103.3 acres of vegetation clearing would occur in forest stands that are currently exhibiting relatively high levels of natural regeneration.

Table 2-6:
Summary Comparison of Direct and Indirect Environmental Consequences

Alternative 1	Alternative 2	Alternative 3
Indicator: Quantification (acreage/amount) and disclosure of impacts to legacy trees within the Peak 6 area		
Under Alternative 1, no new projects would be implemented and no new impacts to legacy trees would be expected. Currently, legacy trees are located within a 50-acre band of spruce-fir on NFS lands in the Peak 6 area.	Under Alternative 2, legacy trees would continue to be located in the Peak 6 area. Under Alternative 2, legacy trees within the project area would be identified and preserved to the greatest extent practicable.	Under Alternative 3, legacy trees would continue to be located in the Peak 6 area (within and beyond the proposed operational boundary). Under Alternative 3, legacy trees within the glading project area would be identified and preserved to the extent practicable.
WATER RESOURCES		
Issue: Implementation of terrain modifications associated with proposed projects (vegetation removal, grading, utility installation/burial, road reconstruction, and facilities construction) has the potential to affect stream and riparian health.		
Indicator: Anticipated temporary and permanent changes in water yield (acre feet) and peak flows (cfs), and subsequent watershed effects		
No changes in water yield and peak flow would occur under Alternative 1. Water yield and peak flows would continue to resemble quantities presented in Table 3K-5.	Alternative 2 would affect the Cucumber Creek and South Barton Gulch watersheds. <u>Cucumber Creek:</u> *Water Yield*: 4.0 AF increase (0.3% relative to existing condition) *Peak Flows*: 0.2 cfs increase (1.3% relative to existing conditions) <u>South Barton Gulch:</u> *Water Yield*: 26.1 AF increase (1.5% relative to existing condition) *Peak Flows*: 0.6 cfs increase (3.7% relative to existing conditions)	Alternative 3 would cause the following increases in water yields and peak flows: <u>Lehman Gulch:</u> *Water Yield*: 14.2 AF increase (0.9% relative to existing condition) *Peak Flows*: 0.3 cfs increase (1.6% relative to existing conditions) <u>Jones Gulch:</u> *Water Yield*: 2.4 AF increase (0.4% relative to existing condition) *Peak Flows:* 0.0 cfs increase (0% relative to existing conditions) <u>Sawmill Gulch:</u> *Water Yield*: 7.4 AF increase (0.3% relative to existing condition) *Peak Flows*: 0.1 cfs increase (0.4% relative to existing conditions) <u>Cucumber Gulch:</u> *Water Yield*: 13.9 AF increase (1.0% relative to existing condition) *Peak Flows:* 0.3 cfs increase (1.6% relative to existing conditions)

Table 2-6:
Summary Comparison of Direct and Indirect Environmental Consequences

Alternative 1	Alternative 2	Alternative 3
		Cucumber Creek: *Water Yield*: 1.2 AF increase (0.1% relative to existing condition) *Peak Flows*: 0.1 cfs increase (0.4% relative to existing conditions) South Barton Gulch: *Water Yield*: 0.6 AF increase (0% relative to existing condition) *Peak Flows:* 0.0 cfs increase (0.1% relative to existing conditions)
Indicator: Discussion of existing stream health conditions and water influence zone (WIZ) impacts, within the context of the following stream health metrics: bank stability, fine sediment, residual pool depth, wood frequency, and macroinvertebrates. Evaluation of compliance with Watershed Conservation Practices Handbook and Forest Plan requirements		
No additional impacts to the WIZ would occur under Alternative 1. However, watersheds will continue to adjust to existing impacts, such as increased sediment loads originating in current CDAs. Additional resource damage is likely to occur as a consequence of these existing impacts. In addition, since Alternative 1 would have no direct or indirect effects, no affects to macroinvertebrates would occur.	Impacts to the WIZ account for 1.7 acres (1.6% of the currently forested WIZ) within the Cucumber Creek watershed. Forest clearing in South Barton Gulch's WIZ equals 4.2 acres, which represents 2.2% of the WIZ in this watershed. Construction and implementation of Alternative 2 would be consistent with the WCPH and should not adversely impact the health of Cucumber Creek and South Barton Gulch. With the implementation of proposed drainage management PDC for the two project area watersheds, the Proposed Action would meet Forest Plan direction for macroinvertebrate communities.	Lehman Gulch stream health was determined to be "diminished" for LWD. Alternative 3 proposes to remove an additional 1 acre of vegetation within the WIZ in this watershed, which would increase the cumulative removal of WIZ vegetation to 42 acres (or 21% of baseline conditions). Recruitment of coarse woody debris would be mitigated by felling trees into intertrail islands within the WIZ to improve LWD density. Jones Gulch was classified as At-Risk for the residual pool depth health metric. Alternative 3 proposes to clear 0.12 acre of WIZ trees. Although this is a relatively small area, it would bring the cumulative tree removal within the WIZ to more than 67 acres, or 60% of baseline conditions. Removal of additional WIZ vegetation could further increase the sediment load into the stream channel which would have degrading effects on the residual depth pool metric. A stream health survey was not conducted for Cucumber Gulch. However, this watershed has been heavily impacted by ski area development. Additional and new activities proposed under Alternative 3 for Cucumber Gulch would be fully off-set and therefore comply with the WCPH.

Table 2-6:
Summary Comparison of Direct and Indirect Environmental Consequences

Alternative 1	Alternative 2	Alternative 3
		With the implementation of proposed drainage management PDC. Alternative 3 would meet Forest Plan direction for macroinvertebrate communities.
Indicator: Qualitative and quantitative discussion of existing surface drainage conditions within the context of Forest Plan Standard (3) for Management Area 8.25:(3) Snow management, including snowmaking and snow-farming, will be conducted in a manner that prevents slope failures and gully erosion, as well as bank erosion and sediment damage in receiving channels		
BSR's Mountain Drainage Plan determined that 20% of the existing drainage features within BSR are in poor condition and require improvement. For example, the summer 2008 field inspection determined that 24% of the water bars within the Carter Gulch watershed were in poor condition. These water bars are key components of the ski trail drainage system, which includes flows originating from man-made snowmelt.	Alternative 2 does not include additional snowmaking coverage. Snow-farming that may occur within the Proposed Action terrain to ensure adequate snow coverage on proposed trails would be managed with the installation of water bars and drainage management features discussed in Table 2-4. Therefore, Alternative 2 would be consistent with Management Area 8.25 Standard and 3.	Additional snowmaking coverage proposed under Alternative 3 would not result in significant increases in peak flows and basin yields (refer to Table 3K-17 and Table 3K-18). It is not expected that the proposed snowmaking coverage would cause additional drainage concerns with strict application of PDCs.
Indicator: Quantification and discussion of existing drainage concerns and treatment areas, including areas of rilling and gullying		
The existing CDA totals approximately 208 acres. Most of the existing drainage concerns are located within the Jones Gulch (~23 acres) and Sawmill Gulch (~12 acres) watersheds. The Fall 2009 Report of BSR's Mountain Drainage Plan identified five sites within these watersheds that exhibit severe erosion and or sedimentation problems.	See Alternative 1 description.	See Alternative 1 description.

Table 2-6:
Summary Comparison of Direct and Indirect Environmental Consequences

Alternative 1	Alternative 2	Alternative 3
Indicator: Development and analysis of drainage management measures to maintain or improve stream health		
No drainage management measures would be implemented with Alternative 1.	Alternative 2 proposes to disconnect 7.9 acres of existing CDA within the Cucumber Creek watershed. This would off-set Alternative 2 impacts and "maintain" stream health in the Cucumber Creek watershed. Alternative 2 would grade 13.4 acres of terrain within the South Barton Gulch watershed as part of the proposed ski trails construction. This grading would not occur within 200 feet of the stream channel. In addition, water bars and sediment control PCDs would be constructed on the proposed ski trails to ensure surface runoff drains away from the WIZ. Implementation of PDCs would "maintain" stream health in South Barton Gulch watershed.	Proposed drainage management measures under Alternative 3 include restoration of severely eroded drainage channels and a minimum disconnection of 36.1 acres of existing CDA. Implementation of drainage management measures proposed under Alternative 3 would "maintain" stream health in the project area watersheds.
Indicator: Quantity (acres) of impacts to WIZ		
0.0 acre	6.7 acres	15.6 acres
Indicator: Changes in Connected Disturbed Area (CDA) (acres)		
No changes in CDA would occur under Alternative 1.	6.7 acres of proposed additional CDA. 7.9 acres of proposed mitigation of existing CDA.	10 acres of proposed additional CDA. A minimum of 36.1 acres of existing CDA would be disconnected.
Indicator: Changes in channel network extension (length of connected channel)		
No changes in channel network extension are anticipated to occur under Alternative 1.	No changes in channel network extension are anticipated to occur under Alternative 2.	No changes in channel network extension are anticipated to occur under Alternative 3.
Indicator: Quantification (acres) of ground disturbing activities located on highly erodible soils as it pertains to stream health		
No ground disturbing activities would occur under Alternative 1.	Ground disturbing activities (grading) would total approximately 29.3 acres. All of which would be located on soils with a low to moderate erodibility rating. With PDCs established during construction, effects to stream health should be minimized.	Ground disturbing activities (grading) would total approximately 41 acres. All of which would be located on soils with a low to moderate erodibility rating. With PDCs established during construction, effects to stream health should be minimized.

Table 2-6:
Summary Comparison of Direct and Indirect Environmental Consequences

Alternative 1	Alternative 2	Alternative 3
WATERS OF THE U.S., INCLUDING WETLANDS		
Issue: Identified wetlands throughout the project area could be temporarily and/or permanently affected by construction and implementation of proposed projects.		
Indicator: Area of wetlands and riparian areas existent within the project area (acres/linear feet)		
183.6 acres of Waters of the US (WOUS), including wetlands have been delineated within or adjacent the project area. 219,736 linear feet of stream channel was identified within or adjacent the project area.	Same as under the No Action.	After construction and rehabilitation of temporarily impacts wetlands, 183.2 acres of identified wetlands and 219,736 linear feet of identified stream channel would remain within the study area.
Indicator: Disclosure of wetland functions and values within the project area		
No effects to function and value of wetlands and riparian areas would occur under the No Action Alternative.	Temporary impacts to palustrine emergent wetlands (PEM) wetlands would affect these wetlands function and values over the short-term but would be rehabilitated and return to function within three to five years.	Temporary impacts to PEM, palustrine shrub/scrub (PSS) and PEM/PSS wetlands would affect these wetlands function and values over the short-term but would be rehabilitated and return to function within three to five years. Removal of PEM and PEM/PSS wetlands would remove wetland habitat and water resource function and value at these locations. However, due to the minor amount of permanent impacts, these values would be realized elsewhere in the study area.
Indicator: Narrative description of wetland communities and riparian areas classifications and disclosure of anticipated temporary and/or permanent impacts (acres/linear feet)		
There would be no impact to the 136 acres of PEM, 40 acres of PSS, PEM/PSS, 12 acres of FEN and 226,930 linear feet of WOUS, delineated within and adjacent the project area.	Installation of the power line would temporarily impacts to less than 0.1 acre of PEM wetland at the Cucumber Creek crossing.	Installation of the power line and snowmaking infrastructure would temporarily impact 0.32 acre of wetlands and 0.01 acre of riparian habitat. Additionally, trail grading would remove 0.15 acre of PEM and PEM/PSS wetlands from the project area. Development of Peak 6½ lift top terminal may cause indirect impacts to 0.5 acre of PSS wetlands.

Table 2-6:
Summary Comparison of Direct and Indirect Environmental Consequences

Alternative 1	Alternative 2	Alternative 3
AIR QUALITY		
Issue: Short-term, construction related activity, as well as potential increases in vehicular traffic related to increased annual visitation could negatively impact air quality in the region.		
Indicator: Narrative description of air quality in the study area		
It is anticipated that Summit County would continue to be classified as an attainment area for all monitored criteria pollutants and no additional air quality issues would be anticipated due to existing regulations, climate and topography.	No long-term air quality impacts are expected at BSR or adjacent NFS or Summit County lands as a result of the Proposed Action. Short-term impacts to air quality associated with the proposed projects would not result in changes from existing air quality.	No long-term air quality impacts are expected at BSR or adjacent NFS or Summit County lands as a result of Alternative 3. Short-term impacts to air quality associated with the proposed projects would not result in changes from existing air quality.
Indicator: Estimated increase in GHG emissions related to BSR vehicular traffic		
Long-term – 9.9% increase over existing condition. Under Alternative 1, construction-related air quality impacts would not occur.	Long-term – 24.2% increase over existing conditions. Short-term construction related GHG emissions are expected to contribute approximately 213.7 metric tons CO_2e to the local environment over the life of the project.	Long-term – 16.0% increase over existing condition. Short-term construction related GHG emissions are expected to contribute approximately 639.0 metric tons CO_2e to the local environment over the life of the project.
Indicator: Compliance with local, state and federal regulations regarding air quality		
No adverse impacts. No operational emissions would exceed ambient air quality standards. Predicted increases in CO and toxic air pollutants due to increased traffic would remain below local, state and federal regulations regarding air quality.	No adverse impacts. No operational emissions would exceed ambient air quality standards. Predicted increases in CO and toxic air pollutants due to increased traffic would remain below local, state and federal regulations regarding air quality.	No adverse impacts. No operational emissions would exceed ambient air quality standards. Predicted increases in CO and toxic air pollutants due to increased traffic would remain below local, state and federal regulations regarding air quality.

Table 2-6:
Summary Comparison of Direct and Indirect Environmental Consequences

Alternative 1	Alternative 2	Alternative 3
GEOLOGY AND SOIL RESOURCES		
Issue: Proposed ground disturbance and snowmaking may (individually and/or collectively) affect erosion and slope hazards.		
Indicator: Analysis of increased erosion hazard due to ground disturbance		
Because no ground disturbance is proposed under the No Action Alternative, there is no potential to increase the erosion hazard of soils within the SUP boundary as a result of implementation of this alternative.	Alternative 2 would result in 58 acres of tree removal and 28.4 acres of grading. 7.1 acres of clearing and/or grading would occur within soils with sever cut/fill slope stability, but none in soils with mass movement potential. Potential soil erosion would be reduced to a manageable level through the project design, re-vegetation of disturbed areas immediately following construction activities, and application of appropriate PDCs. None of the soils display high mass landslide movement potential.	Alternative 3 would result in 31.6 acres of 100% tree removal, 88.6 acres of 50% tree removal, and 40.6 acres of grading. 15.6 acres of clearing and/or grading would occur within soils with sever cut/fill slope stability, but not within soils with high mass movement potential.
Indicator: Analysis of slope stability and geological constraints associated with project components		
Because no ground disturbance is proposed under the No Action Alternative, no slope stability or geological constraints were identified as part of the No Action Alternative.	With implementation of PDC, no stability and geological constraints were identified within the study area.	Same as Alternative 2.

[a] Source: Town of Breckenridge, 2008

Chapter 3

Affected Environment and Environmental Consequences

3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

CEQ regulations direct agencies to succinctly describe the environment that may be affected by the alternatives under consideration.[37] As such, Chapter 3 describes the existing physical, biological, social, and economic components of the project area which have potential to be affected by implementing any of the alternatives (i.e., the Affected Environment). Each Affected Environment description is followed by an Environmental Consequences discussion that provides an analysis of the potential effects of implementation of each of the alternatives.

Chapter 3 is organized by resource area, and follows the organization of issues and resources requiring further analysis (and indicators) as presented in Chapter 1. Each resource section in Chapter 3 is organized in the following order:

SCOPE OF THE ANALYSIS

The scope of the analysis briefly describes the geographic area(s) potentially affected by the alternatives for each issue and its indicator(s). The scope of analysis varies according to resource area and may be different for direct, indirect, and cumulative effects.

AFFECTED ENVIRONMENT

The Affected Environment section provides a description of the environment potentially affected, as based upon current uses and management activities/decisions.

DIRECT AND INDIRECT ENVIRONMENTAL CONSEQUENCES

This section provides an analysis of direct and indirect environmental effects of implementing each of the alternatives, according to the issues or resources requiring additional analysis and indicators identified in Chapter 1. Cumulative effects are discussed separately.

Direct effects are caused by the action and occur at the same time and place. Indirect effects are caused by the action and occur later in time or are farther removed in distance, but are still reasonably foreseeable (i.e., likely to occur within the duration of the project).

CUMULATIVE EFFECTS

Cumulative effects are the result of the incremental direct and indirect effects of any action when added to other past, present, and reasonably foreseeable future actions, and can result from individually minor but collectively major actions taking place over a period of time.

[37] 40 CFR 1502.15

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

An irreversible commitment is a permanent or essentially permanent use or loss of resources; it cannot be reversed, except in the extreme long-term. Examples include minerals that have been extracted or soil productivity that has been lost. An irretrievable commitment is a loss of production or use of resources for a period of time. One example is the use of timber land for a logging road. Timber growth on the land is irretrievably lost while the land is a road, but the timber resource is not irreversibly lost because the land could grow trees in the near future. The Forest Service recognizes the fact that certain management activities will produce irreversible or irretrievable commitments of resources.

FOREST PLAN CONSISTENCY

In conjunction with each resource analysis presented in this chapter, a thorough review of the 2002 Forest Plan was conducted in order to determine consistency with standards and guidelines at the Forest and management area levels on the WRNF. The Forest Plan Consistency Analysis is contained in Appendix B of this document.

A. QUALITY OF LIFE

SCOPE OF THE ANALYSIS

The scope of this analysis focuses on the quality of life in the Town of Breckenridge and Upper Blue River Basin communities. During the public scoping process for this project, the public raised the following issues as having potential to impact the quality of life:

- Traffic and parking
- Public facilities (water, sewer, schools, etc.)
- Social services
- Employee housing
- Town character
- Breckenridge Ski Resort terrain
- Backcountry terrain
- Other recreation
- Scenery
- Forest health
- Wildlife

Some of the scoping comments received, raised broader community issues and are impractical to consider in an isolated discussion regarding the Peak 6 proposal. Therefore, to aid in considering these issues, a Task Force was developed in August 2008, which included members from BSR, the Town of Breckenridge, Summit County, and the Breckenridge business community (for details regarding Task Force meetings refer to the "Peak 6 Task Force" section in Chapter 1). The Task Force identified specific quality of life concerns that BSR, the Town and County, and business community share with respect to growth, and identified a process to treat these issues in a more comprehensive manner, which is identified in a signed Memorandum of Understanding (MOU). The MOU is attached to the FEIS as Appendix E. Each of the issues identified, and how they may be perceived within the Town of Breckenridge and the Upper Blue, are summarized in the following Affected Environment and Environmental Consequences sections.[38] Note, one individual's opinion of quality of life may be different from another's; therefore, this analysis presents a range of potential impacts to quality of life.

[38] Details regarding Task Force issues and results are contained within the project file.

Many of these issues are addressed in further detail in the corresponding resource sections: Traffic, Parking and Ski Area Access, Scenery, Social and Economic Resources, Forest Health, Recreation, Mountain Operations and Guest Services, and Wildlife.

AFFECTED ENVIRONMENT

This section presents resources that contribute to the unique quality of life in the Town of Breckenridge and the Upper Blue communities. Breckenridge is a popular place to live and visit because of the lifestyle balance that the community and alpine environment afford.[39] To maintain the quality of life in the Town of Breckenridge, the character of the community should be in balance with managing a sustainable ski resort.[40] This balance is affected by the number of visitors, residents and the capacity of the Town.[41] Maintaining the character of the community was identified as a primary consideration for future planning and developments in the Town of Breckenridge.[42] Balancing transportation infrastructure is complicated by the extreme difference in the permanent resident population of 3,406 and the influx of visitors during the ski season and certain summer weekends, which can reach over ten times the permanent population.[43]

Town Infrastructure

Over the past decade, the Town of Breckenridge has experienced annual population growth of over 2 percent and annual skier visitation has increased an average of approximately 1.6 percent per year. These changes have resulted in increased use of Town infrastructure, particularly during the week and between holiday periods. Currently, the Town of Breckenridge is at approximately 75 percent of potential residential and commercial build-out.[44] The Town is capable of accommodating typical weekday and weekend use at levels which most people feel is acceptable. However, when the Town reaches capacity (approximately 20 days per year) some residents and visitors feel the resulting congestion in traffic, parking, and use of public facilities is undesirable. In addition, as the population and visitation increase, there is a greater demand for social services and employee housing. All of these social factors have the potential to affect the Town and community character.

Traffic and Parking

Highway 9 is the only access route to the Town of Breckenridge. Average daily traffic counts reveal that vehicular use in the summer months is often as busy as during the winter. Highway 9 generally operates at an acceptable level of service; although, traffic management is required approximately 20 days per year.[45] During the following periods, the Town of Breckenridge operates at capacity: the week of

[39] Town of Breckenridge, 2011
[40] Town of Breckenridge, 2002
[41] Task Force, 2009
[42] Ibid.
[43] Town of Breckenridge, 2009b
[44] Town of Breckenridge, 2008a
[45] Town of Breckenridge, 2008; Task Force, 2009

Christmas and New Years, Martin Luther King, Jr. and Presidents' Day weekends, Spring Break and peak weekends in July and August. During these periods some residents and visitors find the congestion on Highway 9 is unacceptable.[46] In addition, traffic within the Town of Breckenridge can make the Town feel crowded during peak visitation periods. Several projects (Park Avenue improvements and widening Highway 9) have improved congestion in the study area. However, despite the improved circulation, the width of roadways affects the character of the community as well as landscape scenery and some individuals prefer that improvements be kept to a minimum.

A parking agreement between BSR and the Town states that BSR is committed to providing a minimum of 2,500 parking spaces for winter recreational visitors, which includes the two Gondola parking lots and the satellite parking lots. Despite this agreement, parking in free, on-street parking spaces can be limited during peak visiting times. To reduce street congestion and parking space demand, BSR and the Town encourage people to park once in a lot at the beginning of their ski day and leave their vehicle in that location for the day. Currently, residential, employee and visitor parking is adequate at 3,710 parking spaces (refer to Table 3C-4) for the majority of the year.

Public Facilities

Public facilities such as water, sewer, energy and schools generally meet the current level of demand from the community.[47] The current level of service provided by these facilities was not raised as a concern, and therefore is thought to be acceptable to most individuals.

With a continuing effort to incorporate water conservation methods, Town water/wastewater services are expected to accommodate build-out of the Town and unincorporated areas that rely on Breckenridge water and wastewater treatment facilities. The Breckenridge Sanitation District has a capacity of 3 million gallons per day (MGD) at the main plant in Farmer's Korner. The Iowa Hill Water Reclamation Facility was expanded to 3 MGD in 2009. These facilities are designed to accommodate existing and future peak season flows. Additionally, the District operates three small plants in the Upper Blue Basin. Incremental improvements would be required to accommodate build-out capacity.[48]

The Red, White & Blue Fire District currently maintains a seven minute or less response time within the Breckenridge area, including the ski area, Blue River and adjacent areas of unincorporated Summit County. The District's goal is to maintain this level of service.

Currently, Xcel Energy provides electricity to approximately 11,000 customers in the Breckenridge area. With continued growth, Xcel estimates that in the future, additional electrical feeder lines may be

[46] Town of Breckenridge, 2008
[47] Ibid.
[48] Ibid.

necessary. As new lines are required, Xcel would attempt to locate addition lines with minimal impacts to scenery resources, and whenever possible, locate lines underground.

None of the schools that service Breckenridge are at capacity. With the addition to the high school in 2006, and an option to expand Upper Blue Elementary, school buildings are anticipated to be able to accommodate build-out of the community.[49]

Social Services

Social services is a broad topic that includes public health services, family services, child care and other services provided by the County, the Town of Breckenridge, and non-profits in the County. Social services such as the Community Care Clinic and food bank provide services to individuals living in the community who cannot afford health insurance and/or sufficient food to maintain a healthy and comfortable lifestyle. These services are being used by current BSR employees. Depending on many factors including, but not limited to, the economy and seasonal demand, local providers may not be able to meet community needs throughout the year.

Employment

BSR is the primary driver of local, regional, national and international visitation to Summit County and the Town of Breckenridge (refer to Chapter 3F – Social and Economic Resources for more detail). BSR visitor expenditures drive employment within the Town as well as Summit County. Overall, economists estimate that the average number of Summit County-based employment positions supported by BSR visitor expenditures is 3,250 (at BSR and within the economic sector that provides goods and services to resort visitors). On this basis, BSR's total economic impact accounts for approximately 16 percent of Summit County's total employment. While many people support BSR's position within Summit County's economy, others view the seasonal employment, as well as the growth the resort has stimulated, as detrimental to the character and qualities of the Town of Breckenridge.

Employee Housing

There is an existing deficit of workforce housing in Breckenridge which may be exacerbated with continued growth in visitation and the population. The deficit requires a greater number of workers to commute into Town for employment. Although BSR provides the full amount of employee housing that would be required at build-out of all projects, rental units for seasonal employees at or below 60 to 80 percent of the average median income level are in high demand (refer to Chapter 3F – Social and Economic Resources for more detail).[50] The deficiency of affordable housing affects the ability of the community to sustain local workers.

[49] Ibid.
[50] Task Force, 2009

Currently, approximately 45 percent of people who work in the Town of Breckenridge live there. It is a high priority of the Town to keep at least 45 percent of employees working in the Town of Breckenridge, living in the Town to keep the community sustainable. Additionally, this ratio sustains the community character, whereas an increase in second home ownership would correspondingly increase the number of vacant houses in the community.[51]

Town and Community Character

The Town of Breckenridge combines historic mountain charm with exceptional recreation opportunities. Preserving the character and the safe and friendly atmosphere of the Breckenridge area is a primary issue. At the same time, because tourism supports the economic viability and livelihood of local residents, it is important to the Town that world class amenities are maintained both at the resort and within the surrounding area.[52] The Town has identified development policies to maintain the built environment and preserve the historic appearance. Nevertheless, on days when the ski resort is operating at full capacity (18,500+ visitors; refer to Chapter 3B – Recreation, Mountain Operations and Guest Services), some visitors and residents feel the Town's quaint character is negatively affected despite the historic appearance.[53]

Environmental

Residents and visitors value the natural environment for its recreation opportunities, scenery, and wildlife habitat. Many individuals believe the quality and quantity should be maintained or even improved where possible. Development policies in the Town of Breckenridge are aimed to preserve the natural surroundings that residents and visitors value.

Breckenridge Ski Resort Terrain

The developed trail network at BSR includes approximately 1,825 acres of lift-served Beginner, Novice, Intermediate, Advanced-Intermediate and Expert ability level terrain. The ski area operational boundary where overall development has occurred includes 3,125 acres. BSR is known for a wide variety of lift-served terrain spread across four Peaks (7 through 10). In recent years, hike-to terrain has also become more popular with resort visitors; BSR maintains hike-to terrain on Peaks 7, 8 and 9. BSR's core market is intermediate-level guests and families; however, the wide variety of maintained terrain at BSR appeals to a broad range of guest demographics and ability levels. For a variety of reasons, including ski area operations, terrain location, and weather (snow, wind, visibility, etc.), not all terrain within BSR's operational boundary is open at all times. During periods when terrain closures occur, visitors seek other terrain options that are available. Some skiers find open terrain options suitable, while other skiers feel terrain closures diminish their recreation experience. Additionally, comments were received regarding

[51] Ibid.
[52] Town of Breckenridge, 2008
[53] Task Force 2009; Town of Breckenridge, 2002

BSR's avalanche control work lasting into the ski area operational hours, sometimes until eleven o'clock in the morning. Terrain closures due to extended avalanche control work affect some skier's recreation experience at BSR and quality of life.

BSR has averaged 1.6 million annual skier visits over the last five seasons with a record high of 1.65 million visits in 2006/07 season. While this is testament to BSR's strong position in the Rocky Mountain skier market, this level of visitation has consequences with respect to the quality of the guest experience. Currently, BSR exceeds 16,000 daily skier visits approximately 24 percent of the Core Season and the guest experience is diminished. Peak days—days in excess of 18,500 guests—are experienced during holidays and Spring Break in March. During these high visitation periods (days above 16,000 skier visits), the recreational experience provided by BSR is degraded as trails become congested, lift-line wait times are long, and facilities feel crowded.[54]

Backcountry Terrain

Backcountry terrain is undeveloped terrain on the Forest that is allocated within specific management areas for various levels of dispersed and motorized/non-motorized uses. In Summit County, backcountry terrain is especially valued for the snow conditions that are provided long after ski area snow conditions have diminished. Typically backcountry terrain is utilized by those who are familiar with the specific topography of the area and the associated/inherent risk, on new snow days, or when good snow conditions justify the amount of physical exertion that is required. Backcountry areas are common and widespread across the Forest.

Backcountry terrain within the SUP boundary and Management Area 8.25 but outside the operational boundary is accessible through backcountry access points on Peaks 7, 9 and 10 or by entering the SUP area from a NFS trailhead outside BSR's operational boundary. Approximately 2,631 acres of backcountry terrain is accessible within the SUP boundary and Management Area 8.25 from BSR's backcountry access points. Backcountry terrain within the SUP area is popular for the sense of adventure, solitude and self-awareness it requires, and also because a portion of the access routes can be reached by riding a chairlift.

The Breckenridge Nordic Center' SUP area is located north of BSR's SUP area on the lower portion of Peaks 7, 6 and 5. The Nordic Center offers groomed and un-groomed Nordic trails for skate and classic skiers as well as a snowshoe trail network. The Breckenridge Nordic Center requires a separate day or season pass to use the trail system and attracts a wide range of users, from beginner to expert, who want to experience the natural setting, solitude and/or exercise. Other Nordic centers are also available within Summit County.

[54] Refer to the Recreation analysis for in depth discussion of visitation and the recreation experience.

Other Recreation

Recreation is an important attraction for both residents and visitors to the Town of Breckenridge and the Upper Blue River communities.[55] In addition to downhill skiing, Nordic skiing, snowshoeing and ice skating are also popular winter recreation activities in the area and hiking, mountain biking, nature walks, fishing, golfing and water activities are popular in the summer.[56] Many of these recreation opportunities are available from dispersed trailheads throughout the Tenmile range, within BSR's SUP area, within the Breckenridge Nordic Center SUP area or at the recreation center located in the Town of Breckenridge. In addition to the physical activities offered in the area, music, art and film programs are popular attractions throughout the year, as are visitors enjoying the scenery.

Scenery

The ski area and base areas have incrementally developed on the east side of the Tenmile Range since 1961 as skiing has gained in popularity and the residential and tourism population has grown. Historic development on NFS lands at BSR has involved clearing of trails, grading, and construction of lifts, roads, and buildings on Peaks 7 through 10. Changes in vegetative patterns and developed facilities are visible from NFS lands within the permit area and numerous Breckenridge locations.

Over the last decade, changes to the built environment have included: the construction of the Peak 7 terrain in 2002, with 165 acres of clearing and the installation of the Independence SuperChair; installation of the Imperial Express SuperChair in 2005 which includes a top terminal on Peak 8 at 12,840 feet; and installation of the BreckConnect Gondola in 2007 extending across private, Town and NFS lands from the Gondola parking lots to the bases of Peak 7 and 8. These infrastructural developments incrementally contribute to the heavily altered visual character of the BSR SUP boundary, but are consistent with the *Very Low* Scenic Integrity Level (SIO) designation for the BSR SUP area, as identified in the 2002 Forest Plan.

Base area developments including Crystal Peak Lodge and the Grand Lodge at the base of Peak 7, One Ski Hill Place in the Peak 8 base area, and residential, commercial and institutional development within and adjacent to the Town have contributed to the developed nature of Breckenridge. The base area structures at Peaks 7 and 8 reach five stories and over 70 feet in height. These structures can be seen from many viewpoints in and around the Town of Breckenridge.

Forest Health

The Tenmile Range is dominated by Engelmann spruce, subalpine fir and alpine tundra at the higher elevations and lodgepole pine with small patches of aspen and mountain meadows at the lower elevations. Summit County has been experiencing heavy mortality of mature lodgepole pine due to a mountain pine

[55] Town of Breckenridge, 2008
[56] Town of Breckenridge, 2009

beetle epidemic since 2003. Within lodgepole pine forests from Frisco to Red Tail Ranch, mortality rates due to mountain pine beetle are approaching an average of 80 percent of the basal area in stands with average diameter at breast height (dbh) greater than 7 inches. In that area, current projections show that 90 percent of the mature lodgepole pine is expected to die on federal and non-federal lands within the next three to five years. Within stands affected by the action alternatives, lodgepole pine mortality due to MPB ranges from 0 to 80 percent.[57] In stands where MPB was recorded, 30 and 80 percent of the stand is affected by MPB. Pure lodgepole pine, mixed lodgepole pine (50 to 90 percent lodgepole pine) and mixed conifer forest (less than 50 percent lodgepole pine) currently make up approximately 20 percent of the land within the SUP boundary. An October 2009 inventory identified 33 of the 74 forest stands in the BSR SUP area containing lodgepole pine averaging >5-inch diameter (dbh). All of the 33 stands exhibited active MPB infestations and mortality to some degree, totaling approximately 310 acres. These stands were assigned a level of susceptibility to MPB mortality ranging from low (6.0) to moderate risk (12.0). Based on saplings recorded during 2009 field surveys, as lodgepole pine in the SUP area dies off, regeneration by lodgepole pine, as well as some spruce and fir is anticipated. In stands where no natural regeneration was observed, BSR will consider supplemental plantings or seeding where appropriate to maintain forest cover throughout the SUP area, or where appropriate developing the area to accommodate skier recreation.

A narrow band of legacy (or ancient) trees (approximately 200) have been identified along timberline on Peak 6. These trees have characteristics indicative of advanced age: a very large diameter, are taller than the surrounding canopy layer, rounded crown tops, non-conical shape and sparse foliage.

Wildlife

The Town of Breckenridge is surrounded by streams, wetlands and forests on Town, private and NFS lands. Regardless of the land ownership, these resources provide habitat for a large variety of wildlife including some sensitive or threatened species (refer to Chapter 3I – Wildlife for detailed information on species and habitat present within the study area). While some species are rarely seen by humans, living in an area that provides wildlife habitat contributes to the unique quality of life found in the Town of Breckenridge and Summit County.

[57] In stands with lodgepole pine averaging 7 inches dbh or greater.

DIRECT AND INDIRECT ENVIRONMENTAL CONSEQUENCES

Table 3A-1:
Summary of Quality of Life Resource Effects by Issue and Indicator

Alternative 1	Alternative 2	Alternative 3
Issue: Implementation of the proposed projects could affect the quality of life for residents of the Upper Blue River Basin, including the Town of Breckenridge.		
Indicator: Disclosure of quality of life impacts by resource/value, including: employee housing, social services, traffic, parking, recreation, environmental, and overall community character		
Traffic and Parking: Town of Breckenridge operates at capacity approximately 20 days per year. Some increase in the number of days at capacity is anticipated with the estimated 0.75% growth in visitation. During these periods some people feel the level of congestion is unacceptable.	Traffic and Parking: Some increase in number of days at capacity is anticipated with the estimated 2.0% growth in visitation. During these periods some people feel the level of congestion is unacceptable.	Traffic and Parking: Some increase in number of days at capacity is anticipated with the estimated 1.25% growth in visitation. During these periods some people feel the level of congestion is unacceptable.
Public Facilities: The current level of service would be maintained, which is generally considered acceptable.	Public Facilities: The current level of service would be maintained, which is generally considered acceptable.	Public Facilities: The current level of service would be maintained, which is generally considered acceptable.
Social Services: The current level of service would be maintained, which is generally considered acceptable.	Social Services: The current level of service would be maintained, which is generally considered acceptable.	Social Services: The current level of service would be maintained, which is generally considered acceptable.
Employment: There would be no new employment opportunities created at BSR over the next ten years as a result of selection of the No Action Alternative.	Employment: Over the two-year construction period, 105 full-time jobs would be created. Approximately 30 new employees would be necessary at BSR with implementation and operation of the Alternative 2 projects.	Employment: Over the seven-year construction period 325 fulltime jobs would be created. Approximately 2.5 new employees would be necessary at BSR with implementation and operation of the Alternative 3 projects.
Employee Housing: There is a current deficit of employee housing. Future projects are anticipated to relieve the deficit.	Employee Housing: Adding 30 new candidates for employee housing to the current deficit of employee housing could be viewed as adverse. However, the 30 additional employment positions at BSR, resulting from the Proposed Action, could be accommodated in BSR's existing workforce housing at Breckenridge Terrace or other properties.	Employee Housing: Adding 2.5 new candidates for employee housing to the current deficit of employee housing could be viewed as adverse. However, the 2.5 additional employment positions at BSR, resulting from Alternative 3, could be accommodated in BSR's existing workforce housing at Breckenridge Terrace or other properties.

Table 3A-1:
Summary of Quality of Life Resource Effects by Issue and Indicator

Alternative 1	Alternative 2	Alternative 3
Town and Community Character: Maintenance of the historic appearance is regulated through Town policies. With BSR's projected growth in visitation of 0.75% annually, the number of days the ski resort operates at full capacity would likely increase. Visitors and residents that feel the Town's quaint character is affected by congestion on peak days may find the increase in peak days unacceptable.	Town and Community Character: Maintenance of the historic appearance is regulated through Town policies. With BSR's projected growth in visitation of up to 2.0% annually, the number of days the ski resort operates at full capacity would likely increase. Visitors and residents that feel the Town's quaint character is affected by congestion on peak days may find the increase in number of peak days unacceptable.	Town and Community Character: Maintenance of the historic appearance is regulated through Town policies. With BSR's projected growth in visitation of 1.25% annually, the number of days the ski resort operates at full capacity would likely increase. Visitors and residents that feel the Town's quaint character is affected by congestion on peak days may find the increase in number of peak days unacceptable.
BSR: Existing terrain would be maintained; visitors would continue to experience long lift-line wait times approximately 27% of the Core Season. On approximately one out of four days, guests could experience wait times generally ranging from 10 to 25 minutes on the majority of out-of-base lifts. This level of service is acceptable to some visitors and unacceptable to others.	BSR: The proposed Peak 6 terrain would be developed. It is anticipated that shifting skiers away from the Comparison Pods would result in a reduction of lift-lines, compared to Alternative 1, by approximately 30% on the Design Day of 16,000 guests (i.e., a ten-minute lift-line would become seven minutes). This level of service is acceptable to some visitors and unacceptable to others.	BSR: Internal terrain developments and the Peak 6½ lift would increase terrain within BSR. Compared to the No Action Alternative, lift-line wait times on Beaver Run would reduce by approximately 20%, the Colorado SuperChair by roughly 50%, A-Lift by 60%, C-Chair 30% and Mercury by 15%. This level of service is acceptable to some visitors and unacceptable to others.
Backcountry within the SUP Area: Current use patterns in 2,631 acres of backcountry terrain within the SUP area would be maintained. Current users would likely approve of the maintained level of use, whereas people who are not able to access/use this unmaintained terrain, within the SUP area, may be disappointed.	Backcountry within the SUP Area: Backcountry terrain within the SUP area would be reduced by 820 acres, completely eliminating backcountry use of the Peak 6 area. Users who gain new access to this area would likely be pleased with terrain maintenance and lift service in the area, while existing users of that terrain would disapprove of the development.	Backcountry within the SUP Area: Backcountry terrain within the SUP area would be reduced by 303 acres, eliminating a portion of the backcountry use on Peak 6½. Users who gain new access to a portion of the terrain on Peak 6 would likely be pleased. However, existing users of that terrain would disapprove of the development.
Other Recreation: Recreation opportunities would be maintained in the area surrounding the Town of Breckenridge and Blue River communities. Levels of use would be anticipated to increase in proportion to population growth.	Other Recreation: Recreation opportunities would be maintained in the area surrounding the Town of Breckenridge and Blue River communities. Levels of use would be anticipated to increase in proportion to population growth.	Other Recreation: Recreation opportunities would be maintained in the area surrounding the Town of Breckenridge and Blue River communities. Levels of use would be anticipated to increase in proportion to population growth.

Table 3A-1:
Summary of Quality of Life Resource Effects by Issue and Indicator

Alternative 1	Alternative 2	Alternative 3
Scenery: Maintain compliance with Low and Very Low SIO designations. The existing trails and infrastructure are consistent with what many people expect to see at a ski area. However, some people find the developed visual character of trails and infrastructure undesirable.	Scenery: Maintain compliance with Very Low SIO designation. The Peak 6 project would be inconsistent with the Low SIO designation. The existing trails and infrastructure, plus additional developments on Peak 6, are consistent with what many people expect to see at a ski area. However, some people find an increase in the developed visual character of trails and infrastructure undesirable.	Scenery: Maintain compliance with Low and Very Low SIO designations. The existing trails and infrastructure are consistent with what many people expect to see at a ski area. However, some people find the developed visual character of trails and infrastructure undesirable.
Forest Health: No additional tree removal would occur as a result of the No Action Alternative. However, BSR would continue to implement projects in the VMP to improve forest health during and after the MPB epidemic.	Forest Health: Approximately 12 acres of mixed conifer and mixed lodgepole, and 70 acres of spruce/fir would be cleared. No pure lodgepole stands would be cleared. Due to the current outbreak in MPB, some people disapprove of any removal of healthy forest vegetation, particularly spruce and fir. "Legacy trees" would be left standing where possible.	Forest Health: Approximately 73 acres of glading and 16 acres of clearing would occur in the spruce/fir forest type. Approximately 42.5 acres of clearing and glading would occur in the lodgepole pine/mixed conifer/mixed lodgepole pine forest types. Approximately 5.3 acres glading would occur in lodgepole pine stands. Some people view any removal of spruce/fir forest as further impairment to forest health due to the MPB outbreak. "Legacy tree" removal in the project area would be avoided where possible.
Wildlife Habitat: The existing wildlife habitat would persist.	Wildlife Habitat: Approximately 482 acres of terrain would be developed above treeline (339 acres lift-served, 143 acres hike-to) and 68 acres of terrain below treeline. Although wildlife would persist in the area, these developments would reduce the availability of certain habitat types.	Wildlife Habitat: Approximately 280 acres of terrain would be developed requiring 131 acres of tree removal. 33 acres of tree removal would occur within the existing operational boundary, removing lower quality wildlife habitat. Although wildlife would persist in the area, these developments would reduce the availability of certain habitat types.

Alternative 1 – No Action

Alternative 1 does not include any projects within BSR. This may positively impact those individuals that prefer the resort does not implement anymore projects; other individuals may perceive the lack of change as a negative impact to their quality of life. Under the No Action Alternative, population growth within Summit County's resident population is expected to average 2.14 percent. BSR's annual visitation would

be expected to increase more slowly than population growth because it would be less competitive within the Rocky Mountain skier market.

Town Infrastructure

Traffic and Parking

Although Highway 9 would continue to be the principal access route for day skiers, with the capacity improvements and the continuing multi-modal enhancements to the transport system, the number of days each season that are considered "congested" (currently 20 days), would remain about the same, even at build-out of the Town. This existing level of congestion would continue to be viewed as unacceptable to some residents, while other residents approve of the current situation. Visitors that find traffic an issue would likely choose a destination without these concerns in the future.

While adequate parking is provided within the town parking lots, the satellite parking lot, at overnight accommodations and on town streets, weekend parking demand would continue to be higher than other days of the week, with Saturdays in January and February in highest demand. Public transportation would continue to supplement transit and parking throughout the Town and County accommodating many community members' needs. Despite this option, some residents and visitors who prefer to drive may perceive the congested roadways, and limited parking, as undesirable. Readers should refer to Chapter 3C – Traffic, Parking and Ski Area Access for a more complete analysis on traffic effects.

Public Facilities

Public facilities, such as schools, the fire department, and water supply are not currently at capacity, and the current level of service is generally acceptable. The Summit County school system is expected to be able to accommodate build out of the community. Over time, with growth of the Town and ski area, some individuals are concerned that facilities may be overwhelmed or the current level of services would not be maintained. However, through agreements between the public facilities and the Town, County and residents, these facilities are likely to maintain or improve their level of service in the future.

Social Services

Continued growth in visitation to the overall community would result in added employees over the long-term. BSR will continue to contribute through the Summit Foundation in proportion to use by its employees. In the future, the level of service provided will need to be balanced with increased demands in social services in order to continue to provide services that are required within the community at an acceptable level.

Employment

No newly created employment opportunities are foreseeable at BSR over the next ten years as a result of the No Action Alternative. The current level of employment for resort operations would be appropriate for anticipated growth in visitation of 0.75 percent annually. Some individuals would appreciate BSR's

limited growth; other individuals would prefer that more employment opportunities be created where possible.

Employee Housing

BSR and other commercial entities would continue to provide the amount of housing or housing credits required by the Town of Breckenridge and Summit County. Several employee housing projects are currently in the planning or construction stages and, when complete, would help to accommodate the deficit of employee housing. The potential for vacancies in BSR employee housing to be filled by other area employees could be viewed as an improvement in the quality of life for those employees, as well as people who are concerned that the lack of available employee housing may preclude some employees.

Town and Community Character

As population growth occurs within the Town (projected at 2.14 percent annually independent of growth at BSR), construction would follow appropriate development policies to maintain the built environment and preserve the historic appearance of the Town of Breckenridge. Maintenance of the historic appearance would satisfy many visitors and residents attracted to the Town for its historic charm.

With BSR's projected growth in visitation of 0.75 percent annually, the number of days the ski resort operates at full capacity (18,500+ visitors; refer to Chapter 3B – Recreation, Mountain Operations and Guest Services) would likely increase; although the number of visitors on peak days is not anticipated to increase. Visitors and residents that feel the Town's quaint character is affected by congestion on peak days may find the increase in peak days unacceptable. Some individuals would feel that the town and community character is not affected by an increase in peak days.

Environmental

Breckenridge Ski Resort Terrain

Under the No Action Alternative, annual visitation at BSR is anticipated to maintain an average annual growth of 0.75 percent, reaching approximately 1.73 million in ten years. An increase in annual visitation would mean that the frequency of higher skier visit days would increase annually (e.g., current 10,000 skier visit days during the mid-week could become 11,000 skier days). The number of visitors on a Peak Day (18,500+) is not expected to increase.[58] Under the No Action Alternative, previously approved lift upgrades and installations on Peaks 8 and 9 could occur, but no new terrain would be developed. As a result, visitors would continue to experience long lift-lines approximately 27 percent of the Core Season. For visitors that are accustomed to, or unconcerned with, lift-line wait times, or those whose schedules allow visitation on less busy days, the experience at BSR would continue to be a positive one. Visitors that come to Breckenridge on weekends or holidays, and disapprove of longer lift-lines, would likely have

[58] Refer to Chapter 3B – Recreation, Mountain Operations and Guest Services for detailed discussion annual and peak day visitation.

a less desirable experience and may decide to ski elsewhere in the future. Readers should refer to Chapter 3B – Recreation, Mountain Operations and Guest Services for a more complete analysis on recreation effects.

Terrain closures due to ski area operations, terrain location and weather (snow, wind, visibility, etc.), would continue to occur within BSR's operational boundary. Some skiers find open terrain options suitable, while other skiers feel terrain closers diminish their recreation experience. Terrain closures due to extended avalanche control work also affect some skier's recreation experience at BSR and quality of life.

Backcountry Terrain

Current use patterns on 2,631 acres of backcountry terrain within the SUP boundary would be maintained. People who currently have access to this terrain would likely prefer the continued level of use, whereas some people who do not have the skills, equipment, or ability to ski unmaintained areas (by ski patrol and/or lift service) within the SUP area may be disappointed that the area would continue to be outside BSR's operational boundary.

Other Recreation

Under the No Action Alternative, the other recreation activities currently offered throughout the area surrounding the Town of Breckenridge and Blue River communities would continue to be available and levels of use would be anticipated to increase in proportion to population. Impacts from these increases is anticipated to be negligible as the area available for these activities is abundant; however, increased use of some trailheads to access these activities may affect some users and their experience.

Scenery

Under the No Action Alternative, no changes or modifications would be approved that would affect the scenic quality of the SUP area. Several previously-approved projects could be implemented, but they are not anticipated to alter the scenic environment. The clearing of trails, grading, and construction of lifts, roads, and buildings is compatible with the SIO of *Very Low*, and is generally what people expect to see at a ski area. Nonetheless, some people feel that it is undesirable to be able to see the buildings, lifts and linear nature of the trails from outside the ski area and would prefer a more natural landscape. Readers should refer to Chapter 3D – Scenery for a more complete analysis on visual effects.

Forest Health

No additional tree removal would occur as a result of the No Action Alternative. Upon further NEPA review and decision authority, BSR would implement projects from their Vegetation Management Plan to remove dead trees and establish re-vegetation, where possible, in an effort to rehabilitate the forest within the SUP area. Existing legacy trees would remain in the Peak 6 area. Those individuals that value those large, legacy trees would appreciate that these trees would be maintained. Readers should refer to Chapter 3J – Forest Health for a more complete analysis on forest health effects.

Wildlife

Although no wildlife, or habitat, would be affected under the No Action Alternative, the resident and visitor population is expected to continue to grow and the existing level of habitat disturbance and removal would persist. Some people may perceive the existing level of development within the community as an excessive disturbance to wildlife. Conversely, others would continue to perceive Summit County as a primarily natural area accessible to a wide demographic. The existing wildlife present in the area would likely persist. Readers should refer to Chapter 3I – Wildlife for a more complete analysis on effects to wildlife.

Alternative 2 – Proposed Action

Town Infrastructure

Traffic and Parking

Alternative 2 is not expected to affect population growth within the Town or surrounding communities, which are anticipated to continue to increase at approximately 2 percent annually. With implementation of the Proposed Action, visitation is be expected to be maintained at the same rate as population growth (2 percent increase annually). Highway 9 north and south of the Town of Breckenridge will continue to be the principal access routes for day skiers traveling by personal vehicles or transit buses. As stated in Alternative 1, on-going Highway 9 capacity improvements, parking management practices, and multi-modal transport improvements are anticipated to maintain current levels of daily service as the Town reaches build-out and day skier traffic grows within the projected range of Alternative 2.

Short-term, construction related vehicle trips on Ski Hill Road extending into a portion of the Peak 7 neighborhood would be generated by the Proposed Action (refer to Figure 8 Traffic and Parking). Construction traffic activity would be negligible between Town and the Peak 7/8 Base areas relative to the ambient volume on this road. For some individuals, any construction related traffic would be a viewed as a nuisance.

None of the Alternatives includes provisions for increased skier parking. However, peak day visitation is not anticipated to increase. Therefore, adequate parking capacity would be maintained into the future by encouraging guests to park once, by issuing parking permits, through pricing, transit services and pedestrian access. Some individuals may view the maintenance of current parking options as insufficient due to location, cost or availability; other people find the level of parking acceptable.

Public Facilities

As stated under the No Action Alternative, public services such as schools, the fire department and water supply are not currently at capacity and would be maintained to meet future demands. Xcel Energy would continue to upgrade and grow to meet increasing need of consumers.

Social Services

Employees generated by the Proposed Action are likely to be at or below 60 to 80 percent annual mean income (AMI), and as a result, could be in a position to require social services. The effect to the operation of services such as the Community Care Clinic and the Family and Intercultural Resource Center (FIRC) is not anticipated to be measurable; however, BSR's contributions would keep pace with the growth of the resort. BSR would continue to contribute to social services through the Summit Foundation.

Employment

Over the four-year construction period, development of the Proposed Action projects would temporarily create 105 full-time equivalent jobs. In addition, the operation and maintenance of the Alternative 2 projects could require up to 30 additional employees, depending on improved technology and operational decisions. Additional employment outside of the ski area would be anticipated.

Alternative 2 would stimulate the economy for two years during construction; however, it is the ongoing operation of BSR that would have a long-term impact on the Summit County and regional economies. Additional employment at BSR or in the region would be beneficial for those individuals who may be seeking employment in these industries, though the additional employees may be viewed as adverse due to their impacts on community services and infrastructure.

Employee Housing

During the two summer construction seasons associated with implementation of the Proposed Action, workers that do not have local housing would have access to BSR employee housing, which is generally reduced in occupancy to approximately 50 percent during the summer season. Therefore, no additional construction housing would be required.

Breckenridge Ski Resort provides the full amount of employee housing that would be required at build-out of all projects. The 30 additional employment positions at BSR resulting from the Proposed Action could be accommodated in BSR's workforce housing at Breckenridge Terrace or other properties. However, with the 2 percent growth rate of both population and visitation, additional housing and affordable housing would be required over the long-term. Vacancies in BSR employee housing could potentially be filled by other local employees. Despite the additional employee housing, the scarcity of rental units in the (60 to 80 AMI range) and affordable housing would likely persist; these deficiencies are difficult for some employees in the community.

Town and Community Character

As discussed under the No Action Alterative, as population growth occurs within the Town (projected at 2.14 percent annually), continued construction would follow appropriate development policies to maintain the built environment and preserve the historic appearance of the Town of Breckenridge. With the projected growth in BSR visitation of 2.0 percent annually under Alternative 2, the number of days the ski resort operates at full capacity (18,500+ visitors, refer to Chapter 3B – Recreation, Mountain

Operations and Guest Services) would increase as compared with the No Action Alternative. Visitors and residents that feel the Town's quaint character is affected by congestion on peak days may find the increase in number of peak days unacceptable.

Environmental

Breckenridge Ski Resort Terrain

Under the Proposed Action, annual visitation at BSR is anticipated to maintain an average annual growth of 2.0 percent, reaching approximately 1.95 million in ten years. An increase in annual visitation would mean that the frequency of higher skier visit days would increase annually, though the number of visitors on a Peak Day is not expected to increase. As stated in Chapter 1, the proposed projects were specifically planned to better accommodate existing daily visitation levels, and maintain the desired skiing experience with comfortable terrain capacities. It is not anticipated that the proposal would elicit increases in peak day visitation. This analysis makes this assumption based on: a review of past visitation data; the current guest experience on these peak days being diminished; Interstate 70 and constraints to weekend day skiers; and weekday flexible work schedules increasing mid-week visitation. In addition, a visitation management measure is incorporated into the Proposed Action (refer to Chapter 2, Section D).

In addition to previously approved lift upgrades and installations, the upper Peak 6 lift would be installed as a six-person, high-speed lift and the lower Peak 6 lift would be installed as a four-person, fixed-grip lift. The separate upper and lower lift configuration would allow guests to "round-trip" the portion of the terrain serviced by the upper lift. By offering Intermediate, Advanced-Intermediate and Expert ability level terrain, the Proposed Action is anticipated to entice people away from the "Comparison Pods" (refer to Chapter 3B – Recreation, Mountain Operations and Guest Services) such as Mercury, Beaver Run, Colorado, Rocky Mountain and Imperial. Shifting skiers out of lift-lines, wait times in the Comparison Pods are anticipated to be shortened by approximately 30 percent on days with 16,000 skier visits and fewer (i.e., a ten-minute lift-line would become seven minutes). Therefore, some visitors would feel that they received a better experience and would also be able to ski more vertical in the same amount of time when compared to current conditions. Visitors that recreate on less busy days, and are unconcerned or do not experience the crowding and lift-lines, may enjoy the additional terrain options.

Alternative 2 would create approximately 143 acres of hike-to Expert terrain. This additional hike-to terrain is anticipated to reduce terrain densities found at other hike-to Expert level areas around the resort—for example the Lake Chutes and the Windows, likely improving the hike-to experience for those visitors.

Terrain closures would continue to occur within BSR's operational boundary. The Peak 6 terrain would be subject to similar management and closures as currently occur in other upper elevation and above treeline terrain (such as the terrain served by the T-bar or Imperial SuperChair), including avalanche control work, end of day sweep, and visibility and weather closures. During periods when terrain closures

occur, visitors seek other terrain options that are available. Some skiers would continue to find other open terrain options suitable, while other skiers feel terrain closers diminish their recreation experience. Additionally, terrain closures due to extended avalanche control work also affect some skier's recreation experience at BSR and their quality of life.

Backcountry Terrain

Under Alternative 2, the existing backcountry experience within the Peak 6 portion of BSR's existing SUP area, approximately 820 acres, would be eliminated due to the installation of the lift, avalanche control, and development of terrain. Removing the Peak 6 portion of BSR's SUP area from Summit County's supply of backcountry terrain would directly impact a portion of skiers who value this area for the experience it presently offers, its proximity to the Town of Breckenridge, and its relatively easy access (compared to more remote backcountry options in the region). These skiers would be displaced to other backcountry terrain within the SUP area or other backcountry terrain located elsewhere in the WRNF.

Many visitors currently unprepared or unable to access this terrain would benefit from its development as a lift-served skiing experience.

Other Recreation

Under the Proposed Action, the other recreation activities currently offered throughout the area surrounding the Town of Breckenridge and Blue River communities would continue to be available. Tree removal in the Peak 6 pod may change some dispersed hiking use of that area (no developed hiking/biking trails cross the proposed Peak 6 pod area). Displaced hikers could move further north along the Tenmile Range to undisturbed forest; however, this change would be viewed as negative by some users. The levels of use would be anticipated to increase in proportion to population growth. Impacts from these increases is anticipated to be negligible as the area available for these activities is abundant; however, increased use of some trailheads to access these activities may affect some users and their experience.

Scenery

The Proposed Action project components are located in *Low* and *Very Low* SIO designation management areas, per the 2002 Forest Plan. The project components located in the *Very Low* SIO (refer to Chapter 3D – Scenery and Figure 9) would be consistent with that designation. Due to the above-treeline location of the top terminal and warming hut/ski patrol building (located in a SIO of *Low*), the structures would not meet the Forest Plan guideline of SIO of *Low*, but would be consistent with the SIO of *Very Low*. Because the top terminal of the proposed lift and Ski Patrol hut would be located approximately 250 feet below the summit of Peak 6, clearing would be necessary for the lift alignment and developed trail network, and as such, would be visible from identified critical viewpoints such as Highway 9, the Wellington Neighborhood, and the Boreas Pass Road Overlook. Although these developments would be consistent with what many people expect to see at the ski area, some people find the developed visual character of

trails and infrastructure undesirable. In any case, the Peak 6 project would increase the extent of visible development at BSR.

Forest Health

Under Alternative 2, there would be approximately 82 acres of tree removal for the construction of the proposed Peak 6 terrain, associated trails, roads and utilities. Approximately 12 acres of mixed conifer and mixed lodgepole would be cleared, along with 70 acres of spruce/fir. No pure lodgepole stands would be cleared. The proposed lift and trails would not negatively affect overall forest health or reduce the potential for natural regeneration in areas not proposed for development of ski area infrastructure. Tree clearing would reduce the overall forested acreage within the BSR SUP area, and remove healthy spruce/fir. Due to the current outbreak in mountain pine beetle, some people disapprove of the removal of any healthy forest, particularly spruce/fir.

Under Alternative 2, trees meeting the definition of a legacy tree would be identified and preserved to the greatest extent practicable through implementation of PDC; nonetheless, some of these large, mature trees would likely need to be removed. Removal of these trees would affect the quality of life for some people who value having these trees in the Peak 6 area.

Wildlife

Under Alternative 2, approximately 550 acres of new terrain is proposed. Of this, approximately 482 acres would be located above treeline (339 acres lift-served, 143 acres hike-to) and 68 acres below treeline. In addition, approximately 17 acres of overstory vegetation removal would occur for lift installation. Generally, increased use of the 550 acres within the Peak 6 area would affect wildlife habitat (for specific wildlife and habitat refer to Chapter 3I – Wildlife), therefore for certain people who value wildlife habitat, knowing that this habitat has been changed would affect their quality of life. This impact would be limited to the habitat on Peak 6.

Alternative 3

Town Infrastructure

Traffic and Parking

Alternative 3 is not expected to affect population growth within the Town or surrounding communities which would continue to increase at approximately 2 percent annually. With additional trail clearing, lift upgrades and improvements and the new lift on the north side of Peak 7, BSR is expected to increase visitation at approximately 1.25 percent annually. Highway 9 north and south of the Town of Breckenridge will continue to be the principal access routes for day skiers travelling by personal vehicles or transit buses. As stated in Alternatives 1 and 2, on-going Highway 9 capacity improvements, parking management practices and multi-modal transportation improvements are anticipated to maintain current levels of daily service as the Town reaches build-out and day skier traffic grows within the range of any

of the alternatives. Although these changes may relieve a portion of the congestion, some individuals perceive these changes as growth and development, which negatively affect their quality of life.

As discussed for Alternatives 2 and 3, none of the Alternatives include provisions for increased skier parking, and Peak Day visitation is not anticipated to increase in total guests per day (18,500+). Therefore, adequate parking capacity would be maintained into the future. Regardless, some individuals may view parking options as insufficient due to location, cost or availability, while other people find the current level of parking acceptable.

Public Facilities

No impacts to public facilities are anticipated beyond the need to accommodate the 2 percent growth in population and 1.25 percent annual growth in visitation. As stated under the No Action Alternative, public facilities such as schools, the fire department and water supply are not currently at capacity and would be maintained to meet future demands. Xcel Energy would continue to upgrade and grow in order to meet increasing need.

Social Services

Employees generated by Alternative 3 are likely to be at or below 60 to 80 percent AMI, and as a result, could be in a position to require social services. The effect to the operation of services such as the Community Care Clinic and the Family and Intercultural Resource Center (FIRC) is not anticipated to be measurable. BSR would continue to contribute to social services through the Summit Foundation.

Employment

Alternative 3 construction activity will generate approximately 325 full time equivalent jobs and $60 million in total dollar flows. These impacts would occur over a seven-year period (Years 1–7), primarily in the summer season. In addition, 2.5 new, permanent positions would be created at the resort.

Alternative 3 would stimulate the economy for seven years during construction. Long-term impacts from 2.5 additional permanent positions would be minimal, but beneficial for a few individuals seeking employment in these industries. As such, adverse effects on services and infrastructure in the community are likely to be negligible.

Employee Housing

During the seven summer construction seasons associated with implementation of Alternative 3, workers who do not have local housing would have access to BSR employee housing, which is generally reduced in occupancy to approximately 50 percent during the summer season. Therefore, no additional construction housing would be required. Additional employment positions may be viewed as adding 2.5 new candidates for employee housing. Due to the low number of positions added, effects would likely be seen as minor. Vacancies in BSR employee housing could be filled by other area employees.

Town and Community Character

As discussed under the No Action and Proposed Action alternatives, construction required to accommodate the expected 2 percent annual population growth would be required to follow appropriate development policies to maintain the built environment and preserve the historic appearance of the Town of Breckenridge. The historic appearance is a primary appeal to some visitors and these Town policies would help maintain that character. Despite this, some individuals feel that any growth within the community negatively affects the Town's character. With BSR's projected growth in skier visitation of 1.25 percent annually under Alternative 3, the number of days the ski resort operates at capacity (18,500+ visitors, refer to Chapter 3B – Recreation, Mountain Operations and Guest Services) would increase in comparison to the No Action Alternative. Visitors and residents who feel the Town's quaint character is affected by congestion on peak days may find the increase in the number of peak days unacceptable.

Environmental

Breckenridge Ski Resort Terrain

Annual visitation at BSR is anticipated to maintain average annual growth of 1.25 percent, with approximately 1.81 million visitors within ten years after project completion. With implementation of Alternative 3, and previously approved lift upgrades/installations, BSR's CCC would increase to approximately 16,500 skiers. Daily peak day skier visits (18,500+) are not anticipated to increase, but the frequency of the 18,500+ skier day could increase across the course of the season. Under Alternative 3, lift-line wait times on the Beaver Run would be reduced by approximately 20 percent, the Colorado SuperChair by 50 percent, A-Lift by 60 percent, C-Chair by 30 percent, and the Mercury SuperChair by 15 percent. Benefits to most guests would be 3-fold: 1) there would be less waiting in lift-lines, 2) more runs could be skied in the same amount of time, and 3) circulation would be improved. Visitors who recreate on less busy days, and are unconcerned or do not experience the crowding and lift-lines, may enjoy the additional terrain options.

Terrain closures would continue to occur within BSR's operational boundary. The Peak 6½ terrain would be subject to similar management and closures as currently occur in other upper elevation and above treeline terrain (such as the terrain served by Chair-6, the T-bar, or Imperial SuperChair), including avalanche control work, end of day sweep, and weather closures. During periods when terrain closures occur, visitors seek other available terrain options, which would likely include new trails 2 through 14 (refer to Figure 4). Some skiers would continue to find other open terrain options suitable, while other skiers feel terrain closers diminish their recreation experience. Additionally, terrain closures due to extended avalanche control work also affect some skier's recreation experience at BSR and their quality of life.

Backcountry Terrain

Under Alternative 3, backcountry terrain within the northern portion of BSR's SUP area (on Peaks 6½ and 6) would be reduced from 2,631 to 2,328 (a reduction of 303 acres). Backcountry terrain adjacent to

Peaks 9 and 10 would remain unchanged. This reduction in backcountry terrain within the 8.25 Management Area and SUP area may displace some users; but a portion of the popular terrain on Peak 6 would continue to offer backcountry experiences. Many users would benefit from terrain development and avalanche control in this area. Existing users may view development of this area as an adverse impact to their quality of life.

Other Recreation

Under Alternative 3, the other recreation activities currently offered throughout the area surrounding the Town of Breckenridge and Blue River communities would continue to be available. Development under Alternative 3 would primarily be confined to the existing operational boundary of BSR; therefore, no impacts from new trail construction are anticipated. The levels of use would be anticipated to increase in proportion to population growth. Impacts from these increases is anticipated to be negligible as the area available for these activities is abundant; however, increased use of some trailheads to access these activities may affect some users and their experience.

Scenery

Alternative 3 project components are located in the *Low* and *Very Low* SIO designations, per the 2002 Forest Plan. The project components located in the *Very Low* SIO (refer to Chapter 3D – Scenery and Figure 9) would be consistent with that designation. Due to the lack of above-treeline development and the glading of new terrain north of the existing operational boundary, Alternative 3 would be consistent with the SIO of *Low* where within the area with a Low SIO designation. Upgrades and improvements within the existing operational boundary would have little or no discernable impact to the observer. The Peak 6½ Pod proposed under Alternative 3 would increase the extent of development visible on the eastern side of the Tenmile Range from critical viewpoints such as Highway 9, the Wellington Neighborhood, and the Boreas Pass Road Overlook. Although these developments would be consistent with what many people expect to see at the ski area, some people find the developed visual character of trails and infrastructure undesirable. In any case, the Alternative 3 projects would increase the extent of visible development at BSR.

Forest Health

Under Alternative 3, tree removal would occur across 133 acres for the construction of lift-line corridors, ski trails and utility installations. Approximately 89 acres of tree removal would occur in the spruce/fir forest type (73 acres of thinning for gladed terrain and16 acres of tree clearing for traditional ski trails). In the lodgepole pine, mixed conifer and mixed lodgepole pine forest types, clearing and glading would occur across approximately 42.5 acres. In addition, 1 acre of willows would be removed. Although this tree removal would not affect forest health, some people view the removal of any spruce/fir forest as further impairment to forest health, particularly in light of the MPB epidemic.

Legacy tree removal in the project area would be avoided where possible. The loss of legacy trees would negatively affect some individuals' quality of life.

Wildlife

Use of the 280 acres of new ski terrain and tree removal across 131 acres of forest would affect wildlife habitat (for specific wildlife and habitat refer to Chapter 3I – Wildlife), therefore, for certain people who value wildlife habitat, knowing that this habitat has been changed would affect their quality of life. However, 33 acres of clearing would occur within the operational boundary and would affect lower quality wildlife habitat, than clearing outside the existing operational boundary. Wildlife currently using the area are expected to persist.

CUMULATIVE EFFECTS

Resources that affect quality of life generally overlap resources considered in detail in this FEIS. Therefore, in-depth analysis and cumulative effects for traffic and parking, social and economic resources (social services, employment and employee housing), recreation (BSR and backcountry terrain), scenery, forest health and wildlife are presented in individual sections in Chapter 3.

Forest Service decisions regarding development within the SUP area, and Town of Breckenridge decisions regarding BSR development on private lands, have cumulatively contributed to the community character of the Town of Breckenridge.

Scope of the Analysis

The effects analyzed in the cumulative effects section apply to all alternatives, including the No Action Alternative. For a detailed description of past, present, and reasonable foreseeable future projects, the reader is referred to Appendix A in this document. The following projects are expected to cumulatively have short- and long-term effects on the Town and community character.

Temporal Bounds

The temporal bounds for this cumulative effects analysis extend from the gold mining period which began in the mid-1800s through BSR's inception as a ski area in 1961 and into the foreseeable future in which BSR can be expected to operate.

Spatial Bounds

The Town of Breckenridge and Upper Blue communities contribute to the overall character of the community.

Past, Present, and Reasonably Foreseeable Future Projects

Quality of life in the Town of Breckenridge and Upper Blue communities has been affected by many past projects and developments. Resource specific cumulative effect analyses are located within Chapter 3 sections; however, the "sense of place" within the Town of Breckenridge and Upper Blue communities has been affected by past projects, and will continue to change. In general, these projects have sculpted the quality of life that many of the residents and visitors value today. To manage growth and

development, the Town has created a "Vision Plan" which includes many of the resource issues discussed in the Affected Environment and Environmental Consequences.[59] This Vision Plan and cumulative effects of past, present, and reasonably foreseeable future projects are addressed below.

- Historic Mining Activities
- Transportation Projects
- Breckenridge Ski Resort Projects
- Forest Health and Fuels Projects
- Forest Service Programmatic Projects
- Resort and Residential/Commercial Development Projects
- Weber Gulch Hut

The Town's historic past as a mining community in the "Rocky Mountain West" has affected much of the appearance of the built environment within the Town. While the high alpine location and finite developable private lands have limited residential growth within the town, new developments must still be carefully constructed to preserve the historic, small-town atmosphere.[60] The future of the Town of Breckenridge includes cohesion and diversity within the residential and visiting community. To sustain this community, year-round residents must be able to continue to afford to live and be able to find work in the Town of Breckenridge. No new workforce housing is proposed (or required) to be supplied under any of the Alternatives. Should there be additional vacancies in BSR employee housing identified by BSR, vacant units could be rented by area employees to increase occupancy and improve the housing supply in the future, maintaining the 45 percent of employees living in Town. This would help in the long-term sustainability of the Town.

Traffic and congestion have been identified by the public as affecting quality of life within the Town. BSR, the Town, County, and private sector will need to continue offering alternative modes of transportation to manage the increase in visitors and residents projected under any of the proposed alternatives (refer to Chapter 3C – Traffic, Parking and Ski Area Access for detailed analysis of the existing conditions and environmental consequences of the alternatives).

The Vision Plan identifies the presence of the Breckenridge Ski Resort as a recreation opportunity, which is deemed as a community value. The community also values the economic activity and employment provided by the ski area. Past development of the ski area has had an effect on environmental resources in Summit County. Present and future development of the ski area should be in balance with preservation of

[59] Town of Breckenridge, 2002
[60] Task Force, 2009

wildlife habitat, scenery, air and water quality, and undeveloped recreation opportunities on the WRNF. All of the projects identified above have the potential to positively or negatively affect one's quality of life within the Breckenridge community. Refer to specific resource sections for in depth analysis of effects of the alternatives and cumulative effects of projects in the area.

The Weber Gulch Hut is proposed to provide an opportunity to access and stay overnight in the backcountry year-round. Several of these types of huts are available in the area surrounding the Town of Breckenridge and Upper Blue River communities. This type of dispersed recreation is very popular with visitors and residents and would likely be viewed as a beneficial cumulative effect to recreation in the area.

Implementation of any of the alternatives, as well as other future developments would be examined for consistency of community goals such as the Town of Breckenridge Vision Plan. Although some growth and development is likely, these changes would generally maintain the existing characteristics valued by many residents and visitors.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

No irreversible and/or irretrievable commitment of resources have been identified that may impact the quality of life in association with the alternatives analyzed in this document.

B. RECREATION, MOUNTAIN OPERATIONS AND GUEST SERVICES

SCOPE OF THE ANALYSIS

This analysis addresses winter recreational opportunities available at, and adjacent to, BSR. The majority of BSR's on-mountain operations are conducted on public lands administered by the WRNF. Surrounding public lands are also available for recreation. Therefore, spatially, this recreation analysis considers terrain within the ski area operational boundary, backcountry terrain within the SUP area and 2002 Forest Plan Management Area 8.25, and backcountry terrain outside the SUP area—the first two of which have potential to be impacted by the action alternatives.

BSR's proximity to Colorado's Front Range communities, Denver International Airport, and Interstate 70 factors heavily into its distinction as one of the busiest ski areas in North America. BSR's accessibility helps define a diverse market—Front Range visitors who drive up and back in a single day, national/international destination guests, regional destination guests, and locals from within Summit County. BSR has recorded more annual skier visits than any ski area in the United States three out of the past four winter seasons.[61] This substantially contributes to the quality of the recreational experience at BSR and is fundamental to the Purpose and Need as described in Chapter 1 of this EIS.

A number of specific terms are used frequently within this analysis. The following section provides definitions for these terms and describes how this analysis considers each term (refer to Figure 5 for an illustrative representation):

- *Special Use Permit Boundary:* BSR's 5,756-acre Forest Service-administered Special Use Permit (SUP) boundary extends from Peak 5 to Peak 10—including developed (i.e., maintained), undeveloped (i.e., hike-to and off-piste) and backcountry terrain within the BSR SUP boundary (i.e., terrain beyond BSR's operational boundary; within the BSR SUP boundary and unmaintained by BSR).[62] The SUP boundary identifies the current and potential future extent of BSR's operations on public lands managed by the WRNF. As described in Chapter 1, BSR's SUP is within Management Area 8.25, which includes lands allocated in the 2002 Forest Plan for Existing and Potential Ski Areas.[63]
- *Ski Area Operational Boundary:* Within the SUP boundary, BSR identifies and maintains its ski area operational boundary, which defines the current extent to which ski patrol conducts snow safety activities and maintains a presence. BSR's current ski area operational boundary is

[61] BSR recorded the most skier visits in 2007, 2008 and 2010 and recorded the second most in 2009. This data does not include the 2010/11 season.
[62] "Off-piste" refers to terrain that is not a typical groomed trail and which presents natural and varying Alpine conditions. Off-piste terrain can be found inside the operational boundary (i.e., hike-to or lift-served).
[63] USDA Forest Service, 2002a

approximately 3,125 acres. The ski area operational boundary includes developed (i.e., maintained) and undeveloped (i.e., hike-to and off-piste) terrain, and excludes backcountry terrain.

- *Backcountry Terrain within the BSR SUP Boundary:* This analysis qualifies and quantifies backcountry terrain that is within the SUP boundary (and therefore Management Area 8.25) but beyond the current ski area operational boundary. This terrain is not controlled, patrolled or maintained. Backcountry terrain within the BSR SUP boundary totals approximately 2,631 acres. Backcountry terrain (e.g., Peak 6) can be accessed by users either from a chairlift and access point or by users hiking to backcountry terrain from outside the operational boundary. Backcountry terrain within the SUP boundary has been allocated for management as developed Alpine and/or Nordic skiing activities within the 2002 Forest Plan.
- *Backcountry Terrain outside the SUP Boundary:* All terrain that is beyond the SUP boundary and is not allocated as Management Area 8.25 and developed Alpine and/or Nordic skiing activities within the 2002 Forest Land.

Quantifying in-boundary terrain at BSR is a straight-forward process—GIS software is used to quantify the extent of skiable areas within the ski area operational boundary. The skiable terrain at BSR totals 1,825 acres.[64] For the purposes of this recreation analysis, the extent of backcountry terrain within the SUP area is quantified across the three alternatives analyzed.[65] Quantifying backcountry terrain beyond the SUP boundary, however, is complicated by the fact that the backcountry extends to the north, south and west along the Tenmile Range, as well as other areas of Summit County and beyond. This analysis does not attempt to quantify areas that someone may or may not ski in the backcountry.

While this analysis incorporates a variety of qualitative and quantitative tools to measure the quality of the recreational experience at BSR, the parameters which are most consequential include: Design Day, comfortable carrying capacity (CCC), Peak Day visitation, lift-line wait times, trail densities, and skier circulation.

This analysis primarily considers the recreation resource during the period when the ski area is fully functioning (i.e., most trails and lifts are operational). This "Core Season" is most appropriate for analysis in that during the early and late season periods, not all of the resort is operational and the quantitative metrics used within this analysis would not display an accurate comparison. Normal natural snowfall, combined with present snowmaking capabilities, do not typically allow the ski area to become fully

[64] This acreage total does not include tree islands that are undeveloped. Reason being, skier densities are based on terrain acreages and the amount of skiers using tree islands is negligible in relation to overall resort capacity. It must be noted that the skiable acreage analyzed in this document is different from the acreage identified by BSR on their website (www.breckenridge.com) for the aforementioned reason and/or mapping calculation differences.
[65] The Cumulative Effects analysis—at the conclusion of this section—discusses backcountry terrain in the larger context of Summit County.

operational until approximately December 20th each season. In addition, April typically experiences much lower than average visitation (averaging approximately 7,000 skier visits per day) due to BSR's reliance upon destination guests (who book vacations primarily within the Core Season) and warm temperatures in the Colorado Front Range (which cause day-visitors to begin pursuing warm weather interests). For these reasons, this recreation analysis considers skier visits at BSR from December 20 to March 31 (BSR's Core Season). Approximately 75 percent of BSR's annual visitation occurs between these dates, which accounts for approximately 60 percent of operating days. Another factor of this analysis is when the majority of visitation occurs at BSR. The primary visitation days at most ski areas in the United States, including BSR, include: Christmas through the New Year holiday (extending from December 20–January 7), Martin Luther King, Jr. Day holiday weekend (typically four days in January), President's Day holiday weekend (typically four days in February), and Spring Break (a two- to three-week period in March). Several other weekends have become major visitation weekends, including: Ullr Fest (typically three days in January) and the Snow Sculpture competition weekend (typically three days in January). In total, these events amount to 53 days during the season (approximately 35 percent of the overall season or 50 percent of the Core Season).

- *Design Day*: Given the many variables in determining the effects of the proposed activities, a Design Day has been developed for this analysis that establishes a consistent visitation level to evaluate current conditions and predicted effects. During the Core Season of 2009/10, Saturdays averaged approximately 16,000 guests. Across the entire season, Saturdays averaged approximately 15,800 guests.[66] A Design Day of 16,000 guests (visitation for approximately 24 percent of the Core Season) has been used in this analysis as a primary method to consistently compare the effects to lift-line wait times, trail densities and skier circulation across alternatives 1, 2 and 3. For most destination resorts in the Colorado market, the Design Day visitation level is typically reflective of the visitation level on approximately the tenth busiest day of the season (for BSR, the tenth busiest day is approximately 18,000 guests). Additionally, it represents a visitation level that is approximately 75 to 80 percent of "Peak Day" visitation, which is discussed below.
- *Comfortable Carrying Capacity (CCC):* CCC is a planning parameter used to determine the optimum level of daily utilization for a resort—one that facilitates a pleasant recreational experience without overburdening the resort's infrastructure. This is a planning figure only and does not represent a regulatory cap on visitation. CCC is used to ensure that capacities are balanced across the resort's facilities and are sufficient to meet anticipated demand. CCC is based on a comparison of uphill vertical lift supply to downhill vertical skiing demand. The accurate calculation of a ski area's CCC is an important metric, whereby other related skier service facilities can be evaluated and planned based on the proper identification of the CCC. The existing CCC at Breckenridge is 14,920 guests per day.

[66] The 2009/10 season skier visit total was approximately the five-year average for BSR skier visits.

- *Peak Day Visitation:* It is typical for ski areas to experience peak days during which skier visitation exceeds the CCC by as much as 25 percent. However, from a planning perspective, it is not recommended that a resort consistently exceed the CCC due to the resulting decrease in the quality of the recreational experience. In the case of BSR, the CCC of 14,920 is frequently exceeded, and peak days—defined as days in excess of approximately 18,500 guests—are experienced during holidays and Spring Break. During these high visitation periods the resort's recreational experience degrades as trails become crowded, lift-line wait times are long (in some cases exceeding 20 minutes—refer to the Lift Network Section), and food service facilities are over capacity.
- *Lift-line Wait Times:* For this analysis, lift-line wait times were calculated by recording time spent in representative (base area and Intermediate terrain) lift-lines throughout the course of the season and comparing the time spent in line with the visitation recorded during that day, which is balanced against the Design Day.
- *Trail Densities:* Within this analysis, trail densities are calculated based on photo-documentation of ski trails throughout the ski season and compared with the visitation recorded on that day, which is balanced against the Design Day. The metric used in this analysis for trail density is "skiers per acre." It is understood that certain trails within the ski area operational boundary receive more skier use due to a variety of factors, including but not limited to: ability level, fall-line or off fall-line, width, visibility at entrance, and the chairlift providing service. It is unrealistic to assume that all guests disperse ubiquitously across the operational boundary during the entire ski day and skiers per acre are similar on similar terrain (discussed in greater detail in Affected Environment).
- *Skier Circulation:* How guests move around a ski area is a function of skier circulation. Skier circulation affects the overall guest experience and is quantified in this analysis as a guest would migrate from one side of the ski area to the other and potentially back again.
- *Comparison Pods:* An assumption made for the Alternative 2 and 3 analyses is that the only portions of the existing resort that will see any noticeable difference in the recreational experience will be those that offer a similar ski experience found in Alternatives 2 and 3 (i.e., Intermediate and Advanced terrain that is accessible from detachable lifts). For example, the Novice terrain off of Quicksilver and the Expert terrain off of the T-Bar would likely not see any noticeable changes as a result of the Proposed Action, since skiers in those areas would not be likely to ski on the Intermediate level terrain on Peak 6. Five existing lift pods were selected for this analysis, as they currently offer a similar experience to the terrain that would become lift-served on Peak 6 and therefore would be most likely to experience noticeable/measurable changes (lift-lines + trail densities) as a result of the Proposed Action. In the analysis, these five lifts are the "the Comparison Pods," and combine for approximately 94 percent of BSR's Intermediate and Advanced terrain.

They include:

- Mercury SuperChair,
- Beaver Run SuperChair,
- Colorado SuperChair,
- Rocky Mountain SuperChair, and
- Imperial Express SuperChair.[67]

It is therefore assumed that it is the same skiers who currently regularly ride these five lifts, and ski on the associated terrain, who would also ski the Peak 6 lifts and terrain. The Comparison Pods for Alternative 3 include:

- Mercury SuperChair,
- A-Chair,
- C-Chair,
- Beaver Run SuperChair, and
- Colorado SuperChair.

AFFECTED ENVIRONMENT

BSR serves a broad range of guest demographics and ability levels. Its diverse terrain offerings cater to Beginner through Expert skiers; however, BSR's primary market is Intermediate-level guests and families. BSR draws guests from local, regional, national and international markets. Its distribution of guests correlates closely with the Rocky Mountain skier market, which is overwhelmingly Intermediate and Low-Intermediate in ability level (refer to Table 3B-4). The resort infrastructure (i.e., lifts and guest service facilities) and trails that support Intermediate guests generally display crowded conditions.

Annual Visitation

BSR maintains a roughly 60:40 ratio of destination to day-use guests, which is typical of a Colorado destination ski resort. Destination visitors spend multiple days at the resort and typically lodge in Breckenridge (or elsewhere within Summit County) and arrive by air (at Denver International Airport or Eagle County Regional Airport) or by vehicle for a multiple-day stay. Whereas, day-use visitors either live locally or drive from/to Colorado's Front Range communities (including, but not limited to, Denver, Boulder, Fort Collins, and Colorado Springs) within the same day.

[67] The Independence SuperChair terrain has a slightly different ability level (Low-Intermediate) that the Proposed Action would not offer. Therefore, the Independence SuperChair is not included as a Comparison Pod.

Table 3B-1 includes total annual skier visitation data for Colorado, Summit County, and BSR between the 1995/96 and 20010/11 seasons.

Table 3B-1:
Total Annual Skier Visitation in Summit County
Compared to the State of Colorado

Season	Annual Colorado Skier Visits	Annual Summit County Skier Visits	Annual BSR Skier Visits
2010/11	12,275,826	3,993,087	1,631,000
2009/10	11,862,478	3,780,969	1,608,031
2008/09	11,855,498	3,791,849	1,528,000
2007/08	12,540,603	4,125,483	1,630,108
2006/07	12,566,299	4,228,237	1,650,321
2005/06	12,533,108	4,171,169	1,619,043
2004/05	11,816,193	3,866,523	1,470,961
2003/04	11,250,761	3,557,043	1,402,055
2002/03	11,605,777	3,840,424	1,424,770
2001/02	11,128,131	3,695,077	1,468,518
2000/01	11,666,672	3,871,611	1,422,783
1999/00	10,892,263	3,660,812	1,444,365
1998/99	11,389,561	3,773,900	1,385,927
1997/98	11,979,719	3,586,500	1,300,883
1996/97	11,844,523	3,698,598	1,341,179
1995/96	11,387,058	3,632,867	1,357,790
Average Visitation	*11,787,154*	*3,829,634*	*1,480,358*

Note: 2011/12 Annual Skier Visit totals are not available.
Source: Breckenridge Ski Resort, 2010b, 2012; Colorado Ski Country USA, 2009,2012

During this time period, BSR averaged just less than 1.5 million annual visits, and reached a record 1.65 million visits in the 2006/07 season. Average annual growth at BSR during this time period was approximately 1.3 percent. Comparatively, Colorado and Summit County ski areas realized approximately 0.5 and 0.6 percent growth during this time period, respectively. Of more relevance, in the last five seasons, BSR has averaged 1.6 million annual skier visits. While this is testament to BSR's strong position in the Rocky Mountain skier market, averaging 1.6 million annual visits does not come without consequence with regard to the quality of the guest experience, and has obvious effects to lift-line wait times, trail densities, and guest services. BSR customer satisfaction surveys conducted between the 2002/03 and 2009/10 seasons indicate consistently low scores for "Lift Waits," "Trail Crowding," "Trail Variety," and "Available Seating."[68]

[68] Breckenridge Ski Resort, 2010c

Recent visitation data at BSR indicate an increase in total annual visitation without an associated increase in peak day volumes. Furthermore, an analysis of daily visitation data indicates that guests are now arriving several days prior to the peak periods and staying a number of days after the peak day. Essentially, this trend has the effect of smoothing out the "valleys" between peak days, resulting in an increase in total annual visitation. Peak day visitation has not increased measurably over the past several seasons.[69]

Daily Visitation

BSR daily skier visit data was examined in the preparation of this analysis, but is considered proprietary information and is not provided herein.

As presented in the Scope of the Analysis for this section, several different visitation days are analyzed within this EIS. The existing CCC for BSR is 14,920 guests.[70] As stated above, CCC is a planning tool, but does not reflect actual visitation. In the 2009/10 season, BSR exceeded the existing CCC approximately 27 percent of the Core Season days.[71] The "Design Day" of 16,000 skiers is considered to be the level of visitation that is commonly experienced at BSR (approximately 24 percent of the Core Season). Use of the Design Day in this analysis will allow a consistent visitation level to evaluate the effects.

As described in the Scope of the Analysis, peak days occur during the ski season and are considered days in excess of approximately 18,500 skier visits. On peak days, mountain operations begin to experience congestion with skier facilities and the guest experience is diminished in most cases.

Lift Network

BSR's lift network consists of 17 aerial chairlifts, 4 surface lifts, and 8 Beginner carpets. These lifts include (refer to Figure 5):

- Gondola: 1 (BreckConnect)
- Detachable Six-passenger High-speed Lifts: 2 (QuickSilver Super6, Independence SuperChair)
- Detachable Four-passenger High-speed Lifts: 7 (Rocky Mountain SuperChair, Colorado SuperChair, Peak 8 SuperConnect, Imperial Express SuperChair, Beaver Run SuperChair, Mercury SuperChair, Falcon SuperChair)
- Fixed-grip Triple Chair: 1 (A-Chair)
- Fixed-grip Double Chairlifts: 6 (5-Chair, 6-Chair, 7-Chair, Snowflake, E-Chair, C-Chair)

[69] Breckenridge Ski Resort, 2010b
[70] Breckenridge Ski Resort, 2007
[71] Breckenridge Ski Resort, 2010b

- T-Bars: 1 (Peak 8 T-Bar)
- Ropes: 1 (Telecord Rope Tow "Freeway Tow")
- Platters: 2 (Trygves Platter, Camelback Platter)
- Magic Carpets: 8 (Ski & Ride Carpet A, Ski & Ride Carpet B, Ski & Ride Carpet C, Ski & Ride Carpet D, Kinder Carpet, Castle Carpet, Ski & Ride Carpet 3, Ski & Ride Carpet 4)

Lift-Line Wait Times

Throughout the ski industry, expectations are that lift-lines wait times will be shorter now than in the past, as a function of the prevalence of high-speed/high-capacity lifts which enable access to more vertical feet of skiing throughout the day. In general, ski area planners consider five minutes to be an acceptable chairlift wait time, with eight to ten minutes representing the point at which guests begin to lose patience and feel that their experience has been degraded. As previously noted, guest surveys completed at BSR (dating back to the 2002/03 season), indicate that lift-line wait times and crowding are areas that the ski area needs to address.

BSR and the Forest Service have systematically observed lift-line conditions across average and peak days for the past several seasons. Table 3B-2 condenses these observations into ranges for Design Day and peak day lift-line wait times at key lifts—both out-of-base and high-alpine lifts. As previously defined, "Peak Days" are those in excess of 18,500 guests (approximately 125 percent of CCC). Data presented in Table 3B-2 demonstrates that many of the lift-line wait times are longer on Design Days and peak days than what is considered reasonable by guests visiting BSR. Photos 3B-1 through 3B-3 provide visual documentation of lift-lines at some of BSR's out-of-base and high-alpine lifts—correlating lift-lines with wait times. The lifts in Table 3B-2 are the primary lifts that have a measurable influence on BSR's CCC and that aid in the circulation of guests.

Table 3B-2:
Design and Peak Day Lift-Line Wait Times – Existing Condition

	Design Day	Peak Day
Out-of-Base Lifts		
Peak 7		
Independence SuperChair	5 to 15 min.	16 to 25 min.
Peak 8		
Rocky Mountain SuperChair	2 to 6 min.	7 to 13 min.
Colorado SuperChair	3 to 10 min.	11 to 20 min.
Peak 9		
Quicksilver Super6	5 to 15 min.	16 to 25 min.
Beaver Run SuperChair	5 to 10 min.	11 to 15 min.
Mercury SuperChair	5 to 10 min.	8 to 15 min.
High-Alpine Lifts		
T-Bar	3 to 8 min.	9 to 15 min.
Imperial Express	5 to 10 min.	11 to 20 min.
6-Chair	5 to 10 min.	11 to 15 min.

Source: White River National Forest et al., 2010

Photo 3B-1:
Independence SuperChair – 22-Minute Lift-Line Wait Time
(March 16, 2010 – Peak Day)

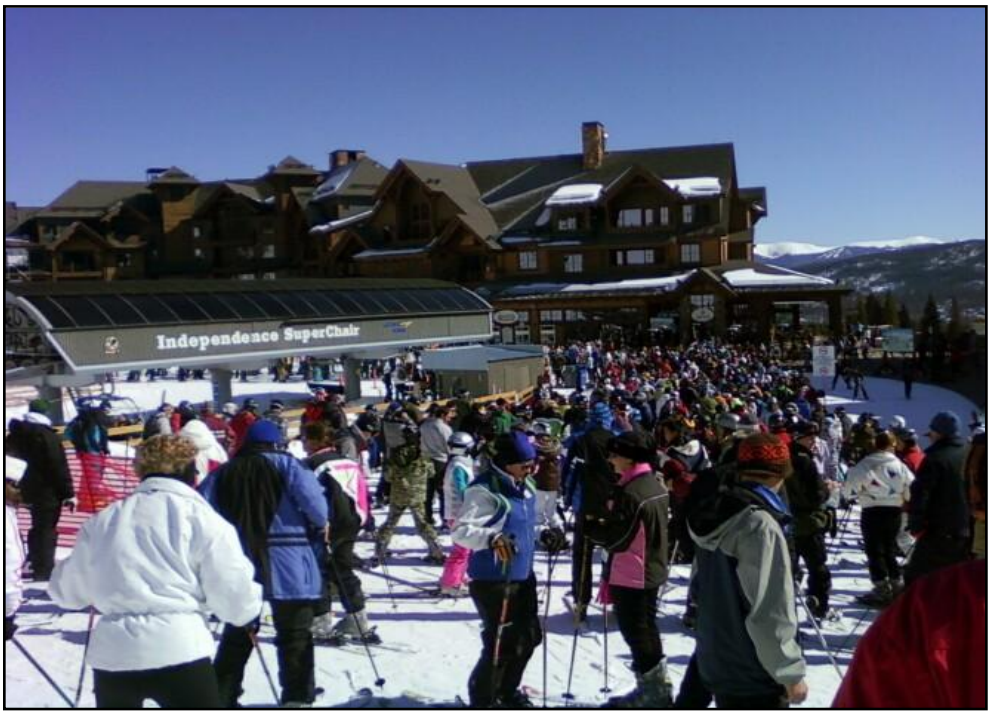


Photo 3B-2:
Colorado SuperChair – 14-Minute Lift-Line Wait Time
(March 16, 2010 – Peak Day)

Photo 3B-3:
6-Chair – 14-Minute Lift-Line Wait Time
(February 13, 2010 – New Snow)

Ski area planners refer to the total time that it takes a skier to make a single round trip on a given lift as "round trip interval." This is the total time required to wait in the lift-line, ride the lift, and then descend a chosen trail. The calculation of the round trip interval is important as it correlates directly to the total number of runs that a guest can accumulate across an entire day. The round trip interval has a direct affect on the quality of the recreation experience as most skiers (particularly those at Intermediate and above ability levels) strive to maximize their time spent actually skiing as opposed to waiting or riding lifts. Of all the factors that influence the round trip interval (including lift-line wait, lift ride, type of terrain, descent rate) the lift-line wait is the most influential. Since all other factors are more-or-less constant, the only way to reduce the round trip interval (and thereby increase the number of runs acquired in a day) in a given terrain pod is to reduce the lift-line wait time of a particular lift. Table 3B-3 displays the round trip interval times by lift.

Table 3B-3:
Round Trip Interval and Runs per Day – Existing Condition

Lift/Wait Time	Round Trip Interval (min.)	Runs per Day from Lift
QuickSilver Super6		
Planned Lift-line Wait Time (2 min)	24	10
Design Day Lift-line Wait Time (10 min)	32	8
Peak Day Lift-line Wait Time (20 min)	42	6
Mercury SuperChair		
Planned Lift-line Wait Time (7 min)	30	10
Design Day Lift-line Wait Time (7 min)	30	10
Peak Day Lift-line Wait Time (12 min)	35	9
A-Chair		
Planned Lift-line Wait Time (2 min)	28	9
Design Day Lift-line Wait Time (5 min)	31	8
Peak Day Lift-line Wait Time (10 min)	36	7
C-Chair		
Planned Lift-line Wait Time (10 min)	34	10
Design Day Lift-line Wait Time (10min)	34	10
Peak Day Lift-line Wait Time (12 min)	36	9
Beaver Run SuperChair		
Planned Lift-line Wait Time (10 min)	38	8
Design Day Lift-line Wait Time (10 min)	38	8
Peak Day Lift-line Wait Time (12 min)	40	7
Colorado SuperChair		
Planned Lift-line Wait Time (7 min)	27	11
Design Day Lift-line Wait Time (12 min)	27	11
Peak Day Lift-line Wait Time (15 min)	35	9

Table 3B-3:
Round Trip Interval and Runs per Day – Existing Condition

Lift/Wait Time	Round Trip Interval (min.)	Runs per Day from Lift
Rocky Mountain SuperChair		
Planned Lift-line Wait Time (5 min)	23	13
Design Day Lift-line Wait Time (5 min)	23	13
Peak Day Lift-line Wait Time (13 min)	31	10
Independence SuperChair		
Planned Lift-line Wait Time (3 min)	26	12
Design Day Lift-line Wait Time (10 min)	33	9
Peak Day Lift-line Wait Time (22 min)	45	8
6-Chair		
Planned Lift-line Wait Time (10 min)	24	15
Design Day Lift-line Wait Time (10 min)	24	15
Peak Day Lift-line Wait Time (15 min)	29	12
Imperial Express SuperChair		
Planned Lift-line Wait Time (5 min)	16	23
Design Day Lift-line Wait Time (7 min)	18	20
Peak Day Lift-line Wait Time (15 min)	26	14
T-Bar		
Planned Lift-line Wait Time (7 min)	21	17
Design Day Lift-line Wait Time (7 min)	21	17
Peak Day Lift-line Wait Time (15 min)	29	12

Note: Planned Lift-line Wait Time is based on data contained in the 2007 MDP (Breckenridge Ski Resort, 2007). Design and Peak Day Lift-line Wait Times are based on actual wait times recorded throughout the ski season (White River National Forest et al., 2010).

Terrain

The developed trail network at BSR accounts for approximately 1,825 acres of lift-served skiable terrain (refer to Figure 5). In addition to the developed trail network, BSR maintains approximately 391 acres of hike-to terrain within its ski area operational boundary (e.g., Lake Chutes, Windows). Finally, backcountry terrain is adjacent to, and accessible from, BSR's ski area operational boundary. Each of these types of terrain is addressed in detail within this section.

Lift-Served Terrain

BSR's lift served trail network is comprised of 152 trails. Lift-served terrain is immediately accessible after unloading from any of BSR's 17 aerial chairlifts, 4 surface lifts, or 8 Beginner carpets. (Note: this calculation does not include hike-to terrain.) Distribution of terrain by ability level for BSR's lift-served terrain is provided in Table 3B-4. Terrain ability levels presented in this section are based on the 2007

MDP, which are established according to slope angle. Note that several of BSR's trails are categorized as Advanced "Black" trails, and the 2007 MDP classifies those trails as Intermediate ability level trails (refer to the description in Chapter 1: Changes to the Proposed Action and Existing Conditions Relevant to the DEIS and FEIS Since Project Scoping).

Table 3B-4:
Lift-Served Terrain Distribution by Ability Level – Existing Condition

Skier Ability Level		Trail Acreage (acres)	BSR Terrain Distribution[a] (%)	Central Rockies Skier Ability Level (Market) (%)
●	Beginner	2.8	1	5
●	Novice	106.6	15	15
■	Low-Intermediate	403.4	38	25
■	Intermediate	402.0	29	35
◆	Advanced-Intermediate Traditional Bowl Skiing	 175.7 173.4	9	15
◆	Expert Traditional Bowl Skiing	 217.9 342.7	7	5
	Total	**1,824.5**	**100**	**100**

[a] BSR Skier Distribution is based on terrain capacity.
Source: Breckenridge Ski Resort, 2007

As evidenced in Table 3B-4, BSR has a shortage of Beginner, Intermediate, and Advanced-Intermediate terrain, and a surplus of Low-Intermediate and Expert terrain. When taken together, the Intermediate and Advanced ability levels represent 50 percent of the Central Rockies skier market. To meet that percentage, half of the capacity of the BSR (both lift and trail capacity) should serve Intermediate and Advanced-Intermediate ability level skiers. However, at BSR, slightly less than 40 percent (approximately 751 acres) of the resort terrain serves guests of these ability levels. This concept is further addressed in the "Trail Densities" section as well as in the Direct and Indirect Environmental Consequences.

A general discussion of terrain classifications within BSR's lift-served terrain network is provided below.

Beginner & Novice Terrain

At BSR, opportunities for first-time Beginners are limited to 2.8 acres of terrain immediately adjacent to the existing magic carpets at the base areas of Peaks 8 and 9. As they progress, Beginner skiers graduate to BSR's Novice terrain (over 106 acres) located proximate to the bottom of Peak 9, primarily on Silverthorne and additional terrain accessed by the QuickSilver Super6, and on Peak 8 using Chairs 5 and 7.

Low-Intermediate Terrain

BSR maintains approximately 403 acres of Low-Intermediate ability level terrain. In 2002, the addition of the Independence SuperChair on Peak 7 increased Low-Intermediate terrain at BSR by 86 acres. This ability level, combined with Intermediate terrain (discussed below), effectively took pressure off of popular Intermediate terrain across BSR thereby decreasing trail densities and lift-line wait times across the resort.[72] (Lift-line wait times and skier densities are discussed in greater detail elsewhere in this analysis.) However, as annual visitation and the frequency of 16,000 skier visit days has grown since 2002, so too have skier densities (presented below) across BSR's terrain network. Thus, as indicated in Table 3B-7, the resort continues to face a deficit of Intermediate terrain.

Intermediate Terrain

As presented in Table 3B-4, the majority of BSR's market is Intermediate ability level skiers. BSR currently maintains approximately 402 acres of Intermediate ability level terrain. Intermediate terrain is provided across Peaks 7, 8, 9 and 10. Peak 7 provides 57 acres of Intermediate terrain as is the most recent addition to BSR for Intermediate terrain. Each of the out-of-base lifts service Intermediate terrain, which contributes to longer lift-line wait times. In addition, all skiers using Expert ability level terrain must ski through Intermediate terrain to egress the resort. This condition also increases trail densities to a certain extent.

Advanced-Intermediate Terrain

Advanced-Intermediate terrain totals approximately 349 acres. This terrain is provided on traditional trails and in alpine bowls on Peaks 8, 9 and 10. The installation of the Imperial Express SuperChair in 2005, with a top terminal elevation of 12,840 feet, allows expedited access (lift-served and hike-to) to high-alpine terrain on the upper reaches of Peaks 7 and 8 (which previously were accessible only by hiking). This lift responded to the need to increase the amount of Advanced-Intermediate and Expert (discussed below), off-piste terrain. However, as indicated in Table 3B-7, additional lift-served Advanced-Intermediate terrain is still needed to meet BSR's desired terrain distribution.

Expert Terrain

BSR's high elevation (12,998 feet at the summit of Peak 8) lends itself to an assortment of high-alpine Expert terrain, which includes traditional trails, steeps, bowls, glades, and chutes. This totals approximately 561 acres of terrain. The above-treeline Expert terrain that the Imperial Express SuperChair serves has become increasingly popular with advances in ski technology and can experience significant crowding during busy time periods and on powder days.

[72] This analysis classifies *Crystal*, *Centennial*, and *Doublejack* on Peak 10 as Intermediate ability level terrain.

Hike-To Terrain

Hike-to terrain is managed within the ski area operational boundary (i.e., Ski Patrol conducts snow safety work and provides a presence), but requires hiking beyond the top terminal of the lift. This opportunity to go outside the "developed" terrain network is a critical component of BSR's terrain offerings. Hike-to terrain provides those who are willing to hike with a remote feel (i.e., less skied snow conditions) and the sense of "earning your turns" that is accompanied by the assurances of snow safety activities and a Ski Patrol presence. Depending on snow and weather conditions, the BSR Ski Patrol can open or close hike-to terrain throughout the season. BSR maintains approximately 390 acres of hike-to terrain, including:

- Summit of Peak 7
- Peak 8 – Lake Chutes and Snow White
- Peak 9 – Peak 9 Chutes and The Windows

Backcountry Terrain

Due to three primary factors, backcountry skiing has become increasingly popular in the last decade. First, while backcountry equipment (including telemark, split boards, and Alpine Touring [AT] gear) is comparatively more expensive than traditional skiing or riding gear, numerous manufacturers are producing it, and used gear is readily available, which gives people options when looking to add a dimension to their winter recreational opportunities. Second, backcountry safety equipment (including avalanche transceivers and newer products such as AvaLung® packs) has dramatically improved in the past decade, increasing reliability and ease of use for a larger audience. And third, the backcountry offers a sense of adventure, solitude and self-awareness that simply cannot be experienced when skiing inbounds at a developed ski area.

In Summit County, legal access to the backcountry from a ski area operational boundary (regardless of which ski area) is provided through designated backcountry access points (i.e., ducking a rope to exit the ski area operational boundary is illegal).[73] For example, from the top of the Imperial Express one can either hike to the summit of Peak 8 or traverse north to Peak 7; however, one cannot duck the rope and enter terrain that is outside of the established ski area operational boundary without using the appropriate backcountry access point. Likewise, if a skier wants to re-enter the ski area operational boundary from the backcountry, he or she must do so through an established access point. "Yo-yo skiing" the terrain outside the operational boundary, which means ducking a rope along BSR's ski area operational boundary to enter and exit such terrain, is not permitted.[74]

[73] Violating US Forest Service boundary management regulations and/or Colorado Skier Safety Act authority can lead to disciplinary action by law enforcement officials.
[74] "Yo-yo skiing" is defined as utilizing the developed lift network to gain access to backcountry terrain, skiing the unpatrolled, unmaintained terrain, and returning to the developed ski area and repeating the process.

Because of the knowledge required to access this terrain, it is typically only utilized by those who are familiar with the specific topography of the area and the associated, inherent risks. When deciding to exit the operational boundary through a designated backcountry access point, it is incumbent upon the individual to know the terrain, snow conditions, inherent risks, and, ultimately, to be responsible for his or her own safety. Summit County Search and Rescue, in some cases assisted by BSR Ski Patrol, provides emergency response to users who have become injured, lost, stranded or who go missing.

Backcountry Terrain within the BSR SUP Area vs. Backcountry Terrain beyond the BSR SUP Area

Backcountry is defined above in the Scope of the Analysis section. From the user's perspective, backcountry within and beyond the SUP area is identical; however, there are substantial administrative differences.

The 2002 Forest Plan places ski area SUPs (including undeveloped backcountry terrain) within a group of similar management areas called Category 8.

> *In Category 8, ecological conditions and processes are likely to be permanently altered by human activities beyond the level needed to maintain natural-appearing landscapes and ecological processes. These areas are generally small in scale. Ecological values are protected where they affect the health and welfare of human occupancy. Human activities are generally commercial in nature and directly or indirectly provide jobs and income. Motorized transportation is common.*[75]

Within Category 8, BSR's SUP area is identified in the 2002 Forest Plan as within Management Area (MA) 8.25: Ski Areas – Existing and Potential. On the WRNF, MA 8.25 includes existing resorts that have already been permitted and developed, as well as additional suitable terrain into which development is planned for the future.[76] While there is no dispute that backcountry terrain within the SUP area does, in fact, provide an experience with typical backcountry character, from an administrative perspective, this terrain—which is within the SUP area—has been specifically designated within the 2002 Forest Plan as appropriate for future lift-served, developed Alpine skiing opportunities.

Conversely, backcountry terrain beyond the SUP area—which is undeveloped terrain on the Forest that is allocated within specific management areas for various levels of dispersed and motorized/non-motorized uses—is found within Categories 1 through 7 of the 2002 Forest Plan.

[75] USDA Forest Service, 2002a p. 3-77
[76] Ibid. p. 3-80

Backcountry Terrain Accessible from BSR's Ski Area Operational Boundary

BSR Ski Patrol does not patrol, control or maintain any of the terrain beyond its roped and signed ski area operational boundary (refer to Figure 5). The terrain beyond the operational boundary rope is technically open, but the boundary is closed unless with the exception of the backcountry access point (refer to Photo 3B-4).

Photo 3B-4:
Ski Area Operational Boundary Rope/Signage on the Summit of Peak 8

Copper Mountain Resort and Interstate 70 are in the background

Six Forest Service access points (located on Peaks 7, 9 and 10) provide legal exits into the backcountry from BSR's ski area operational boundary. Note that BSR Ski Patrol does not "open" or "close" these Forest Service access points throughout the year—they remain open and it is incumbent upon the individual to understand his/her responsibilities in relation to snow and terrain conditions. These access points are established by the Forest Service and become an element of BSR's Boundary Management Plan, which is reviewed annually by the WRNF.

Currently, both backcountry skiers and skiers that choose to duck a boundary rope above the Breckenridge Nordic Center impact the recreation experience on the Siberian Loop. Backcountry skiers occasionally use the Siberian Loop to both gain access to backcountry terrain on the Tenmile Range and to egress from backcountry terrain on the Tenmile Range.

BSR's SUP area extends from Peak 10 to Peak 5 (refer to Figure 5). However, the ski area operational boundary extends from the southeast aspect of Peak 10 to the northern shoulder of Peak 7. This leaves

roughly 2,500 acres of backcountry within the SUP area. Backcountry terrain exists on Peak 10 (including Carter Bowl, Billy's Bowl, and the Ballroom) and on the northeast aspect of Peak 7, extending through Peaks 6 and 5. North of Peak 5 (and outside of the BSR SUP area) the eastern aspect of the Tenmile Range offers backcountry terrain on Peaks 4 through 1; however, this terrain is used less frequently than the Peak 6 backcountry due to difficult access, quality of terrain, and avalanche conditions.

On the western aspect of the Tenmile Range, backcountry terrain is seldom used due to high avalanche danger and severe wind scour; nonetheless, tracks are occasionally observed in the "SKY Chutes" throughout the season.[77] (For reference, the "Y" chute in the "SKY Chutes" is located on the western face of Peak 6.)

Peaks 6 and 5

Backcountry terrain on Peaks 6 and 5 (and some on the northern aspect of Peak 7) is unique due to its close proximity to the town of Breckenridge and BSR and relatively easy access (compared to more remote backcountry options in the region).[78] For these reasons it is a valuable recreational resource for members of the community and others who are familiar with this area.

Backcountry terrain on Peaks 5 and 6 can be accessed via three means (refer to Figure 5):

1. A Forest Service access point is located north of the Independence SuperChair's top terminal through the *Ore Bucket* trail. Accessing Peaks 6 and 5 via this route entails an approximate climb of 30 to 90minutes.
2. A Forest Service access point was installed in 2011 on the northern flank of Peak 7, and provides access to terrain on the north aspect of Peak 7 as well as to Peak 6½. This access point is reached by riding the Imperial Express and then skiing the saddle from Peak 8 to Peak 7.
3. From lower-elevation trailheads (e.g., the Peaks Trail) that are not affiliated with the ski area. This option requires an approximate climb of 60 to 180 minutes.[79]

Because climbing from lower elevations requires considerably more time and energy, the majority of Peak 5 and 6 users access this terrain from BSR's ski area operational boundary. Regardless of how they gain access to this terrain, there are two options for achieving the ridgeline: "switching back" up the bowl on Peak 6½ or taking the more direct route up the northern spine of Peak 6.

[77] Locally referred to as the "SKY Chutes" due to the shape of the three chutes resembling the letters S, K and Y from left to right as seen from the west.
[78] Because it is within the SUP area, this backcountry terrain is in Management Area 8.25, which, according to the 2002 Forest Plan, is administered for "winter sports activities and other intensively managed outdoor recreation opportunities for large numbers of national and international visitors in highly developed settings."
[79] When accessing Peaks 6 and 5, skiers need to cross the Breckenridge Nordic Center's SUP area. Signage on the groomed Nordic trails indicates that a trail pass from the Breckenridge Nordic Center is required.

Backcountry terrain on Peaks 5 and 6 is composed of steep pitches off the ridgeline, followed by a lower gradient open bowl (refer to Photo 3B-5). The Peak 6 Bowl offers a relatively consistent 700+/- vertical feet of skiing before it flattens out and transitions into glades through relatively dense stands of spruce and fir. The fact that accessing this terrain requires a physical commitment, and is unmaintained, must be considered when classifying the ability level. With that being said, backcountry terrain on Peaks 5 and 6 are presently composed of Expert open bowls, trees, and steep pitches found within the first 200 to 300 vertical feet of terrain off the ridgeline—particularly between Peaks 6 and 6½. Due to easier access and the quality of the terrain, Peak 6 has historically received higher use than Peak 5, which is steeper and more prone to avalanche activity.

Photo 3B-5:
Peak 6 Bowl

For the previous four seasons, BSR Ski Patrol has monitored the daily use of Peak 6 terrain by counting individual skiers and tracks, as well as by monitoring use of the Peak 7 access point at the top of the Independence SuperChair.[80] Assuming that Peak 6 is suitable for skiing starting on January 1 of each year, and BSR Ski Patrol monitored use through the close of the season (typically the third week in April), this provides roughly 110 days in which use was monitored. Annual and average daily use is included in Table 3B-5. Data was not collected in the 2010/11 season, but annual use increased based on observations made by ski patrol. In addition, a second access point was opened on Peak 7 providing

[80] BSR Ski Patrol has not collected use data for the upper Peak 7 access point (reached from the Imperial Express SuperChair) that was installed in February 2011.

access to the north (especially Peak 6½ and Peak 6). Again, based on visual observations made by ski patrol, use of this access point may increase use of the area as users are primarily "yo-yo" skiing Peak 6½ and returning to the operational boundary along *Ore Bucket*. This assumed increase in use could diminish the backcountry experience for some users in the area.

Table 3B-5:
Peak 6 Annual Use

Season	Annual Skiers	Average Daily Use
2009/10	300	2.7
2008/09	232	2.1
2007/08	127	1.1
2006/07	165	1.5

Source: Breckenridge Ski Patrol, 2010

Data provided by a member of the public via a comment letter on the DEIS includes the entire backcountry season on Peak 6 (not just during the BSR operational period). This data indicates that approximately 900 skier visits on Peak 6 occurred during the 2010/2011 backcountry ski season.[81] This information is based on personal observations.

Peak 6 Terrain Exposure and Weather Conditions

To determine the effects of wind and the severity of blowing and drifting snow events on Peak 6, BSR Ski Patrol began monitoring wind conditions (hourly average wind speed, maximum gust, and average direction) during the 2005/06 season using a remote weather station.[82] The weather station is located on the Peak 6 shoulder approximately 200 vertical feet below the summit of Peak 6, at an elevation of about 12,350 feet. Additional stations located at the Peak 8 Summit and on the T-bar ridge line were used for comparison.

Based on data collected, the mean wind speed on the summit of Peak 8 is approximately 26.6 mph. On the Peak 6 shoulder the mean wind speed is 12.0 mph. For comparison, the average wind speed on the T-Bar line is 14.9 mph. Mean wind speed on the Peak 6 shoulder is approximately 45 percent of the Peak 8 Summit, indicating that the Peak 6 shoulder is in a wind shadow much of the time.

Peaks 9 and 10

Backcountry terrain which can be accessed from BSR's ski area operational boundary on Peaks 9 and 10 includes Carter Bowl, Billy's Bowl and the Ballroom. Beyond that, backcountry terrain in the Fourth of July Bowl, which is accessed from the summit of Peak 10, is popular terrain—particularly in the late spring and even summer (Fourth of July Bowl is so named for its propensity to hold snow that enables people to ski it on the Fourth of July each year).

[81] Hollinshead, 2011
[82] Breckenridge Ski Resort, 2007

Skier Circulation

Portal Access/Egress

Out-of-base lift capacity is critically important to skier circulation, especially during the early morning hours when the majority of a resort's guests arrive at the base area portals and access the mountain. Likewise, end-of-day egress is important, as skiers exit the mountain—typically exiting through the same portal in which they initially accessed the ski area. At BSR, portal access/egress is especially important, given the resort's size and daily visitation.

BSR has three main portals—Peak 9, Peak 8, and Peak 7. Table 3B-6 includes the breakdown of morning access and afternoon egress by portal (refer to Figure 5).[83]

Peak 9 is used heavily by destination skiers (those staying in adjacent lodging) and lower ability level skiers. Both Peak 8 and Peak 7 are used largely by day skiers, as the BreckConnect Gondola connects existing parking lots in town with those portals. Peak 8 also has more lodging and terrain options than Peak 7. As a result, Peak 7 sees much less use than Peaks 9 and 8.

During the afternoon egress period, even fewer people use Peak 7, as it is inconvenient to download the gondola from Peak 7 (additionally, long waits can be expected, as guests have to wait for an empty cabin to arrive from the terminal at Peak 8). As such, the egress percentage for use of the Peak 7 portal drops to 5 percent, while it has a corresponding increase to 48 percent for Peak 8, with Peak 9 remaining the same at 47 percent. The implication of this is that guests use Peak 7 as an access portal but then use Peak 8 for the egress portal—downloading the gondola at Peak 8. This results in higher densities on egress trails heading back to Peak 8. Table 3B-6 also includes the breakdown of afternoon egress by portal.

Table 3B-6:
Access/Egress Role By Portal Based on Design Day – Existing Condition

Portal	Access		Egress	
	Guests (% of First Scans)	Design Day Guests	Estimated % of Guests	Design Day Guests
Peak 7	7	1,120	5	800
Peak 8	46	7,360	48	7,680
Peak 9	47	7,520	47	7,520
Total	*100*	*16,000*	*100*	*16,000*

Source: Breckenridge Ski Resort, 2010a

[83] Morning access occurs over a two-hour period. Information included in Table 3B-6 is according to electronic ticket scans—referred to as "first scans."

Notably, the BreckConnect Gondola—installed for the 2006/07 season—has changed circulation patterns between Peaks 8 and 9.[84] Whereas the majority (approximately 56 percent) of BSR's guests traditionally accessed the ski area through the Peak 9 portal prior to the installation of the BreckConnect Gondola, since the 2006/07 season, Peaks 7 and 8 have become the busiest access portals. In other words, more guests are now riding the BreckConnect Gondola and either exiting at the Peak 7 station or riding all the way to Peak 8, than those who access the mountain at Peak 9. As indicated in Table 3B-6, Peaks 7 and 8 combine for 53 percent of morning first access scans compared to 47 percent at Peak 9.

Trail density is a concern during the afternoon egress period on certain trails at all portals. This is a result of guests that use the upper portion (higher ability level terrain) of the ski area skiing down through primarily Intermediate trails during the egress period. Trails that receive greater use during the egress period and trails for reference with proposed conditions (Peak 7 trails) are documented below (Table 3B-7) with a guest total and skiers per acre approximation. The Peak 7 portal is only 5 percent, which is why the *Pioneer* and *Monte Cristo* trails have a low egress density, as guests have already migrated to Peaks 8 or 9 to leave the ski area at the end of the day.

Table 3B-7:
Egress Skier Densities on Design Day – Existing Condition

Primary Egress Trails	Minimum Width (ft.)	Skier Speed[a] (ft./min.)	Portal Guests (%)	Egress Density (guests/acre)	Reference Density[c] (guests/acre)	Difference from Reference (+/-)	Difference from Reference (%)
Peak 9							
Silverthorne	192	800	45	24	18	+6	135
Lower Sundown	118	800	30	26	10	+16	263
Peak 8							
Four O'Clock	122	800	20	17	14	+3	124
Springmeier	155	800	30	20	14	+6	146
Swinger	89	800	15	18	14	+4	127
Crescendo	125	800	30	25	14	+11	181
Claimjumper	97	800	10	11	14	-3	78
Peak 7							
Pioneer	148	800	60	4	14	-10	32
Monte Cristo[b]	74	800	10	1	14	-13	11

[a] "Skier speed" is not based on a pure rate of descent, but accounts for stops and breaks along the way that affect the total time it takes one to get from the top of a lift to the bottom. Thus, skier speed is an average when other factors are taken into consideration.
[b] Monte Cristo trail is included in the existing conditions analysis because this trail would be affected by the action alternatives.
[c] Reference Densities presented are within the range of skier densities by ability level presented in Table 3B-9.

[84] BreckConnect Gondola is discussed in further detail in Cumulative Effects

Guest Circulation throughout the Operational Boundary

Due to the size, topography, and orientation (i.e., on the eastern slope of the Tenmile Range) of the operational boundary, convenient skier circulation from Peaks 7 and 10 has always been an issue at BSR, with the primary constraint being the flow from Peak 8 to Peak 9 (refer to Figure 5). Even with adequate maps and directional signage, moving from one side of the ski area operational boundary to the other—particularly when moving from north to south (from the bottom of either Peak 7 or Peak 8 across to Peak 10)—can be confusing and time consuming for the average guest who may not be familiar with the area.

The south-north pattern was substantially improved with the installation of the Peak 8 SuperConnect in 2002; however, this only addressed south-north skier movement (i.e., from Peak 9 back to Peak 8). Currently, the majority of Intermediate ability level guests ski to Peak 9 by way of *Four O'clock*, *Crosscut* and *Lower Sawmill* trails. However, these existing trails are known for having both flat and steep sections that make them impractical for the use they receive.[85]

Table 3B-8 provides the average circulation times for guests travelling north-to-south (i.e., from Peak 7 and 10) and south-to-north (i.e., Peak 9 to Peak 7) across BSR on a Design Day. During peak days, skier circulation worsens as lift-line wait times and trail congestion increases. On current days below Design Day visitation, circulation from Peak 7 to 10 remains problematic due to the three lifts required for transport and the flat section of trail between Peak 8 and 9. *Note: this is based on a typical rate of descent; thus average circulation times can, and do, vary based on conditions, lift-line wait times, skier speed, and individual route selection.*

Table 3B-8:
Skier Circulation Between Peaks 7 and 10 on Design Day – Existing Condition

Starting Point	Destination	Approximate Duration (min)
Peak 7 Base Area	**Peak 10 – Bottom of Falcon**	
Independence SuperChair Lift-Line Wait Time		*10:00*
Bottom of Independence SuperChair	Top of Independence SuperChair	7:40
Top of Independence	Bottom of Colorado SuperChair	9:30
Colorado SuperChair Lift-Line Wait Time		12:00
Bottom of Colorado SuperChair	Top of Colorado	7:00
Top of Colorado SuperChair	Bottom of Beaver Run	12:40
Beaver Run SuperChair Lift-Line Wait Time		*10:00*
Bottom of Beaver Run SuperChair	Top of Beaver Run SuperChair	9:00
Top of Beaver Run SuperChair	Bottom of Falcon SuperChair	6:10
Total Time Commitment from Peak 7 across to Peak 10		***84:00***

[85] More advanced ability level guests (only Expert and Advanced-Intermediate terrain is available) can also ride E-Chair (a fixed-grip double chair) to access Peak 9.

Table 3B-8:
Skier Circulation Between Peaks 7 and 10 on Design Day – Existing Condition

Starting Point	Destination	Approximate Duration (min)
Peak 10 – Bottom of Falcon	**Peak 7 Base Area**	
Bottom of Falcon SuperChair	Peak 8 SuperConnect Bottom Terminal	5:30
Peak 8 SuperConnect Lift-Line Wait Time		*5:00*
Bottom of Peak 8 SuperConnect	Top of Peak 8 SuperConnect	9:00
Top of Peak 8 SuperConnect	Bottom of Independence SuperChair	7:30
Total Time Commitment from Peak 10 back to Peak 7		***27:00***

Source: SE Group, 2010b

Trail Densities

Intermediate terrain at BSR is used by Intermediate, Advanced-Intermediate and Expert ability level guests throughout the day due to the configuration of the mountain and how guests return to the base area. The calculation of a ski area's capacity is based, in part, on the reference number of skiers that can be accommodated, on average, on a typical acre of terrain (based on ability level classification) at any given time. The criteria for the range of trail densities for North American ski areas are listed below in Table 3B-9.

Table 3B-9:
Skier Density per Acre

Ability Classification	Trail Density (skiers/acre)	Reference Density (skiers/acre)
Beginner	25 to 40	30
Novice	12 to 30	18
Low-Intermediate	8 to 25	14
Intermediate	6 to 20	10
Advanced	4 to 15	7
Expert	2 to 10	3
Alpine Bowls	0.5	0.5

Source: Trail planning guidelines

Mountain planners calculate trail density for each lift pod by dividing the number of guests assumed to be on each trail by the acreage of available terrain for that lift pod.[86] This more general analysis was conducted in the 2007 MDP for general planning awareness. However, for this EIS, a more detailed trail density analysis has been prepared based on actual trail utilization and assumes that some trails receive more skier use than others (the 2007 MDP assumed all trails to be used equally). Due to site-specific conditions, certain trails function differently than others. For example, many destination guests who are

[86] A "pod" is defined by a lift and all of the terrain that is serviced by that lift.

unfamiliar with the mountain may prefer to ski on the trail immediately below the lift as a reference to return to the base. These trails (based on detailed visual observations) typically have higher skier densities that other nearby trails. *Pioneer* trail on Peak 7 is a useful example of this occurrence. This density analysis also recognizes that the majority of skier use occurs within the middle two-thirds of the trail. This is referred to as the "effective width" of skier use (refer to Photo 3B-7). The density analysis considers only the acreage associated with BSR's formally developed trail network.[87]

Table 3B-10 analyzes the same trails as the Egress Trail Density table (Table 3B-7) as they are the same trails that receive high trail densities and are representative trails of what BSR's Intermediate clientele skis. These trails were selected for this analysis to demonstrate the overall condition at BSR, while enabling the analysis to consider site-specific trail conditions that factor into trail density.

Table 3B-10:
Sample Design Day Trail Density – Existing Condition

Sample Trails	Minimum Trail Width (ft.)	Skier Speed[a] (ft./min.)	Trail Density (guests/acre)	Reference Density[b] (guests/acre)	Difference from Reference (+/-)	Difference from Reference (%)
Peak 9						
Silverthorne	192	800	24	18	+6	135
Lower Sundown	118	800	26	10	+16	263
Peak 8						
Four O'Clock	122	800	17	14	+3	121
Springmeier	155	800	14	14	+0	103
Swinger	89	800	13	14	-1	90
Crescendo	125	800	18	14	+4	128
Claimjumper	97	800	8	14	-6	55
Peak 7						
Pioneer	148	800	9	14	-5	64
Monte Cristo	74	800	3	14	-11	21

[a] Skier Speed is calculated based on average sliding speeds for Intermediate ability level guests at BSR and includes guests that ski and stop during their descent. This equates to an average speed of approximately 9 miles per hour along the entire trail length.
[b] Reference Density is in range presented in Table 3B-9 and can be considered a "comfortable" trail density (refer to Photo 3B-9).

[87] A resort's developed terrain network consists of its named, defined, lift-served, maintained (groomed) runs. These trails represent the baseline of the terrain at any resort, as they are where the majority of guests ski, and are usually the only place to ski during the early season, periods of poor or undesirable snow conditions, avalanche closures, and certain weather conditions. Typically, terrain outside of the developed network is primarily used by Advanced and Expert level skiers during periods of fresh powder, spring corn, and other desirable snow and weather conditions. As such, the developed terrain network represents a true reflection of acreage used by the average skier on a consistent basis, as well as the terrain used by virtually all skiers during the aforementioned conditions.

Table 3B-10 indicates that the two sample trails on Peak 9 are highly utilized by guests and could have densities exceeding their reference densities on a Design Day. On Peak 8 *Four O'Clock*, *Springmeier* and *Crescendo* have high trail densities on a Design Day. The trails presented in Table 3B-10 are not the only trails at BSR with higher than desired trail densities. Other Intermediate and Advanced-Intermediate trails have similar trail densities that contribute to the overall crowded trail experience at BSR. Many of the trails can experience much higher trail densities, which is a variable circumstance based on daily visitation, time of the day, weather conditions and trail conditions.

The model calculates the entire length of the trail, yet certain trail sections typically experience higher trail densities. For example, Photo 3B-6 depicts approximately 32 skiers per acre on a segment of *Four O'Clock* trail below the Vista Haus. This is an also example of the effective width of the trail being approximately two-thirds of the actual trail width.

Photo 3B-6:
Four O'Clock Trail – 32 Skiers/Acre
(March 6, 2010 – Design Day)

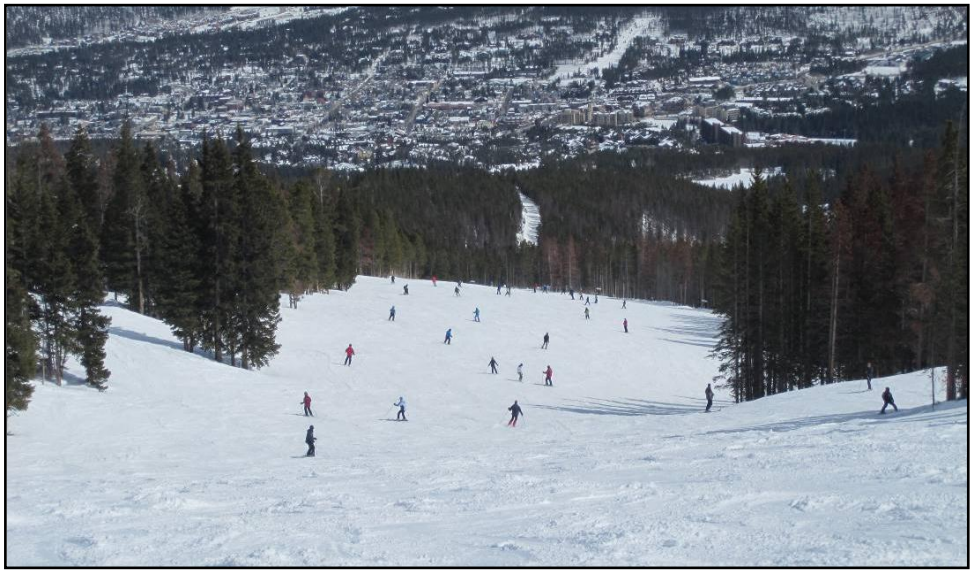


Photo 3B-7 is an example of the effective trail width being reduced in some portions of trails. Ski area mountain operations have made a conscious decision to allow the skier's left (photo right) side of the trail to "bump up" by not grooming it. *Pioneer* is classified as a Low-Intermediate trail, and if this steep pitch were to be groomed it could be a safety hazard for a Low-Intermediate ability level skier.

Photo 3B-7:
Pioneer Trail – 28 Skiers/Acre
(March 16, 2010 – Peak Day)

Photo 3B-8 is an example of an approximate reference density. *Springmeier* trail's reference density is 14 skiers per acre. This photo depicts approximately eight guests on approximately 0.5 acre. This photo was taken at 1:15 p.m. on a day with guest visitation below the CCC of 14,920 guests.

Photo 3B-8:
Springmeier Trail – 16 Skiers/Acre
(January 8, 2010 – Below CCC Day)

Photo 3B-9 is a representation of a Reference Density of approximately 14 skiers per acre.

Photo 3B-9:
Bonanza Trail – 12 Skiers/Acre
(January 30, 2010 – Design Day)

As with any ski area, certain trails, and particular sections of trails (e.g., at intersections) receive the highest densities. Due to BSR's popularity and the frequency days in excess of the CCC and Design Day, as well as peak days, the issues associated with high trail densities are exacerbated. Visual observations (made by WRNF and BSR staff) and guest survey data confirm that high trail densities at BSR are primarily associated with three periods:

1. peak days,
2. average days during key egress periods, and
3. new snow days in off-piste lift-served terrain.

During peak days, every component of BSR and the recreation experience is over-burdened, including: lift-line wait times, trail densities, guest services. Peak days are difficult to model because the overall pace of the Resort slows. For example, chairlifts are transporting the same amount of people as the capacity of the lifts is fairly fixed, yet the trails are more congested as guests may ski at a slower pace and may tend to stop on the trails more often. Trail densities during egress periods are analyzed above for the 16,000 skier day and are anticipated to increase or decrease as visitation increases or decreases. Days with new snow create crowded conditions on BSR's off-piste lift-served terrain. Many of the high-Alpine lifts that service this terrain are intentionally designed with lower lift capacities. This results in longer lift-line wait times at these lifts during popular days. Newer ski technologies allow guests to ski this terrain for

longer durations during the day, which keeps this terrain busy throughout the day. At BSR, a common comment from guests is that off-piste terrain is skied out very quickly and fresh snow is limited.

To offer some perspective on terrain densities across Summit and Eagle counties, Table 3B-11 compares average annual visitation to skiable acres at six major resorts to arrive at an "Annual Terrain Density" calculation. On the low end of the spectrum, Vail averaged over 1.6 million annual visits during the past five years, and its nearly 5,300 acres of skiable terrain shows the lowest Annual Terrain Density (i.e., skiable acreage ÷ average annual visitation) across Summit and Eagle counties, at just over 300. Conversely, on the high end of the spectrum, BSR's roughly 2,360 acres of skiable terrain have the highest Annual Terrain Density—approaching 700. In the middle of the spectrum, the four remaining resorts (Arapahoe Basin, Beaver Creek, Copper Mountain Resort and Keystone Resort) average approximately 445 annual skiers per acre of terrain. This is by no means an absolute or scientific measure of trail densities at these six ski areas. It assumes uniformity of skiers across all skiable terrain extending over an entire operating season, and does not account for variables such as terrain classification, weather, conditions, or peak periods. However, this does provide a proxy for which to measure the relative importance of terrain acreage in relation to total annual visitation, especially in the competitive Front Range market.

Table 3B-11:
Annual Terrain Density
Summit and Eagle County Ski Areas

	Approximate Skiable Acreage[a]	Five-Year Average Annual Visitation[b]	Annual Terrain Density (skiers/acre/year)
Arapahoe Basin	900	376,846	418
Beaver Creek Resort	1,815	908,226	500
Breckenridge Ski Resort	2,358	1,608,294	682
Copper Mountain Resort	2,450	964,196	394
Keystone Resort	2,290[c]	1,071,451	468
Vail Resort	5,289	1,615,022	305

[a] All acreage numbers are as advertised by each resort's website, and likely account for hike-to terrain in addition to lift-served terrain.
[b] 2005/06 through 2009/10
[c] Keystone Resort's approximate skiable acreage does not include approximately 858 acres of snowcat accessed terrain located on Independence and Bear mountains as this is extremely low-density terrain that is not heavily used.

Snow Safety

The purpose of BSR's snow safety program, as outlined in its Snow Safety Plan, is to provide safe access to avalanche prone terrain that would otherwise remain closed due to unstable, constantly changing snow conditions. A team of snow safety supervisors and technicians directly monitor and forecast the snow stability at BSR. The timing that terrain can be opened is related to the level of control work necessary on any given day, on-going weather conditions and the control (ski patrol) resources available. On certain days, some terrain may not be opened until 10 a.m. to 11 a.m. (or it may not open at all some days). These

specific days do not affect the seasonal averages with respect to skier visitation, terrain acreages, etc. and are not factored into this analysis.

BSR lies within an inter-continental snow climate, which is characterized by relatively low snowfall, cold temperatures, and a location considerably inland from coastal areas with low to very-low relative humidity. As a "Class A" Avalanche Hazard Ski Area, BSR is characterized by an everyday need for avalanche control evaluation. Eliminating the probability that snow slides will occur on a slope is a hazard evaluation that takes place daily. When the effects of snow and weather developments are projected into the future, the evaluation is a hazard forecast. A variety of different methods of avalanche control are employed in BSR's snow safety program, including:

- Hand thrown explosive charges (releases tension within the snowpack and tests for stability),
- Avalauncher shot explosive charges (using a nitrogen-based pressure system),
- Ski cutting (skiers carefully release stress within the snowpack by skiing in a traversing pattern),
- Protective skiing (skiing avalanche starting zones frequently, releasing small avalanches, and compacting various snow layers),
- Compaction (improves the strength and stability of the snowpack), and
- Closure (this is the last method of control).

BSR has a variety of terrain that ranges from an absence of hazard to highly hazardous areas capable of producing large destructive avalanches. With over 100 different avalanche hazard areas (slide paths), much attention is needed to mitigate hazard and provide safe access to all open terrain.

BSR can be divided into multiple hazard areas. Peaks 7, 8, 9 and 10 all have their own unique and separate avalanche hazard ratings. Any slope between 25 and 50 degrees can be considered a dangerous avalanche path.

Explosive control on Peak 10 is usually limited to the south side of Peak 10. Most of this terrain can easily be protected by ski cutting and public ski compaction. Some areas of Peak 10 need to be controlled before Peak 9 can open. Any north-facing slope that flows into Lehman Gulch may need control work, including: *The Burn*, *Grits*, *Spitfire*, *Corsair*, *Union Pitches*, and *Billy's Bowl*, any of which can cause an avalanche to slide into Peak 9 terrain.

Peak 9 includes hike-to terrain which lies above the lift served terrain. Without lift access, this terrain presents a higher hazard classification. Opening this terrain to the public requires extensive evaluation, rescue protocols and procedures. Explosives are commonly used in above treeline shoots, glades, and gullies. Terrain on the north side of Peak 9 below E-Chair can also produce avalanches. In the early

season, explosive use is common, though protective skiing is most common. Avalanche control on the north side of Peak 9 may cause a delay in the opening of Peak 8 terrain.

Peak 8 can be divided into three categories: developed trails below treeline; lift-served, high-alpine; and hike-to terrain. On developed trails, control work is limited and is mainly accomplished by ski cutting. Lift-served, high-alpine terrain requires an everyday evaluation prior to opening to the public. Explosive use is common throughout the season. All methods of avalanche control can be used. Hike-to terrain presents a higher classification of avalanche hazard on Peak 8. All control methods are used routinely, and explosives can be an everyday occurrence.

Peak 7 presents an inherently high level of avalanche hazard and exposure. Avalanche run-out areas present risks to snowmobiles, snowcats, lifts, and public traversing in low angle areas. All control methods are used routinely and explosives can be an everyday occurrence. Also an everyday hazard evaluation is made to determine the open or closed status of Peak 7 terrain.

On-Mountain Guest Services

On-mountain guest services are located across Peaks 7, 8, 9 and 10, as discussed below. Off-site and base area guest service facilities, located on private lands, are not discussed in detail herein. The Forest Service acknowledges that restaurants on private lands at the base of Peak 7, 8 and 9 provide additional seating capacity and other guest service facilities (e.g., restrooms). However, from a guest perspective, a difference remains between food service on-mountain and off-mountain. Therefore, this analysis focuses on on-mountain guest services. All square footages presented below are useable space, not necessarily the footprint of the building.

Peak 7

Limited services—namely restrooms and ski patrol—are currently available at the Peak 7 Warming Hut (480 square feet)—located at the top of the Independence SuperChair. No food service is offered at this facility. An on-mountain restaurant was previously-approved on Peak 7 at the previously-approved mid-unload of the Independence SuperChair. This project is discussed in greater detail below in Cumulative Effects.

Peak 8

Guest services are provided at three locations on Peak 8: 6 Hut, T-Bar Hut, and Vista Haus. The 6 Hut (500 square feet)—adjacent to the top of 6-Chair—is an older facility that primarily functions as a warming hut for the public. Restrooms were added to the hut during a recent renovation (2005) and the hut has become a popular ‘hang out’ location. The T-Bar Hut (800 square feet)—at the top of the T-Bar—functions as a warming hut with a ski patrol station. The Vista Haus (21,000 square feet)—at the top of the Colorado SuperChair—is over 20 years old and has limited outdoor guest seating. The Vista Haus provides 700 indoor seats and 125 outdoor seats. The Vista Haus (the only on-mountain restaurant on

Peak 8) is located at one of the most highly utilized areas of the mountain at the top of the Colorado SuperChair (which has the highest percentage of total lift usage).

Peak 9

Guest services are provided at two locations on Peak 9: Peak 9 Restaurant and Peak 9 Patrol Hut. Of these facilities, the Peak 9 Restaurant (11,000 square feet) is the only location that provides food service. The Peak 9 Restaurant provides 300 indoor seats and 10 outdoor seats. The Peak 9 Patrol Hut (2,800 square feet) includes "brown bag" lunch seating and ski patrol/first aid space.

Peak 10

Guest services on Peak 10 are provided at the Ten Mile Station (9,400 square feet), which is located between Peak 9 and 10. This is a very popular facility due to its location at the top of the QuickSilver Super6, and is utilized heavily by Ski School operations based out of Peak 9. This facility is modern, in excellent condition, and consistently meets guests' expectations from a quality standpoint. Moreover, due to its young age and architectural character, guests across the resort visit this restaurant facility. The Ten Mile Station provides 370 indoor seats and 250 outdoor seats. In addition to the Ten Mile Station, the Falcon's Aerie (2,700 square feet) provides ski patrol/first aid space as well as restrooms and a modest guest warming area.

DIRECT AND INDIRECT ENVIRONMENTAL CONSEQUENCES

Table 3B-12 provides a comparison summary of the Affected Environment and Environmental Consequences by issue and indicator statement. This table provides a side-by-side comparison to better understand the existing condition and how the three alternatives would affect that condition.

Table 3B-12:
Summary of Recreation Effects by Issue and Indicator

Existing Condition	Alternative 1	Alternative 2	Alternative 3
Recreation Issue #1: Proposed projects within BSR's SUP area have the potential to affect the recreational experience at the ski area.			
Indicator: Quantification of existing and proposed terrain acreage and distribution by ability level (%)			
Beginner: 2.8 acres (1%) Novice: 106.6 acres (15%) Low-Intermediate: 403.4 acres (38%) Intermediate: 402.0 acres (29%) Advanced-Intermediate: 349.1 acres (9%) Expert: 560.6 acres (7%)	Beginner: 2.8 acres (1%) Novice: 106.6 acres (15%) Low-Intermediate: 403.4 acres (38%) Intermediate: 402.0 acres (29%) Advanced-Intermediate: 349.1 acres (9%) Expert: 560.6 acres (7%)	Beginner: 2.8 acres (1%) Novice: 106.6 acres (13%) Low-Intermediate: 403.4 acres (33%) Intermediate: 584.0 acres (36%) Advanced-Intermediate: 410.9 acres (10%) Expert: 724.0 acres (8%)	Beginner: 2.8 acres (1%) Novice: 106.6 acres (14%) Low-Intermediate: 451.8 acres (39%) Intermediate: 470.2 acres (30%) Advanced-Intermediate: 361.9 acres (9%) Expert: 710.9 acres (7%)
Indicator: Quantification of skier terrain densities under the existing and proposed conditions			
Trail Densities (% of Reference): Silverthorne: 135 Lower Sundown: 263 Four O'Clock: 121 Springmeier: 103 Swinger: 90 Crescendo: 128 Claimjumper: 55 Pioneer: 64 Monte Cristo: 21 Egress Densities (% of Reference): Silverthorne: 135 Lower Sundown: 263 Four O'Clock: 124 Springmeier: 146 Swinger: 127 Crescendo: 181 Claimjumper: 78 Pioneer: 32	Trail Densities (% of Reference): Silverthorne: 135 Lower Sundown: 263 Four O'Clock: 121 Springmeier: 103 Swinger: 90 Crescendo: 128 Claimjumper: 55 Pioneer: 64 Monte Cristo: 21 Egress Densities (% of Reference): Silverthorne: 129 Lower Sundown: 252 Four O'Clock: 108 Springmeier: 128 Swinger: 111 Crescendo: 158 Claimjumper: 68 Pioneer: 83 Monte Cristo: 28	Trail Densities (% of Reference): Silverthorne: 120 Lower Sundown: 235 Four O'Clock: 82 Springmeier: 97 Swinger: 85 Crescendo: 121 Claimjumper: 52 Pioneer: 64 Monte Cristo: 21 Egress Densities (% of Reference): Silverthorne: 115 Lower Sundown: 224 Four O'Clock: 103 Springmeier: 122 Swinger: 106 Crescendo: 151 Claimjumper: 65 Pioneer: 127 Monte Cristo: 127	Trail Densities (% of Reference): Silverthorne: 138 Lower Sundown: 268 Four O'Clock: 82 Springmeier: 97 Swinger: 85 Crescendo: 121 Claimjumper: 52 Pioneer: 64 Monte Cristo: 21 Egress Densities (% of Reference): Silverthorne: 123 Lower Sundown: 241 Four O'Clock: 108 Springmeier: 128 Swinger: 111 Crescendo: 158 Claimjumper: 68 Pioneer: 96 Monte Cristo: 96

Table 3B-12:
Summary of Recreation Effects by Issue and Indicator

Existing Condition	Alternative 1	Alternative 2	Alternative 3
Indicator: Quantification of lift-line wait times under existing and proposed conditions			
Design Day (min): QuickSilver Super6: 10 Mercury SuperChair: 7 A-Chair: 5 C-Chair: 10 Beaver Run SuperChair: 10 Colorado SuperChair: 12 Rocky Mountain SuperChair: 5 Independence SuperChair: 10 6-Chair: 10 Imperial Express SuperChair: 7 T-Bar: 7	Design Day (min): QuickSilver Super6: 10 Mercury SuperChair: 7 A-Chair: 5 C-Chair: 10 Beaver Run SuperChair: 10 Colorado SuperChair: 12 Rocky Mountain SuperChair: 5 Independence SuperChair: 10 6-Chair: 10 Imperial Express SuperChair: 7 T-Bar: 7	Design Day (min): QuickSilver Super6: 10 Mercury SuperChair: 5 A-Chair: 5 C-Chair: 10 Beaver Run SuperChair: 5 Colorado SuperChair: 10 Rocky Mountain SuperChair: 3.5 Independence SuperChair: 10 6-Chair: 10 Imperial Express SuperChair: 4.5 T-Bar: 7	Design Day (min): QuickSilver Super6: 10 Mercury SuperChair: 6 A-Chair: 2 C-Chair: 7 Beaver Run SuperChair: 8 Colorado SuperChair: 6 Rocky Mountain SuperChair: 3.5 Independence SuperChair: 10 6-Chair: 10 Imperial Express SuperChair: 7 T-Bar: 7
Indicator: Discussion, and where possible, quantification (minutes) of skier circulation across the ski area			
Peak 7 to 10: 84 Peak 10 to 7: 27	Peak 7 to 10: 84 Peak 10 to 7: 27	Peak 7 to 10: 79 Peak 10 to 7: 27	Peak 7 to 10 (Option 1): 74 Peak 7 to 10 (Option 2): 65 Peak 10 to 7: 27
Indicator: Quantitative analysis of existing and proposed guest service space and discussion of guest experiences			
Peak 7: 480 square feet Peak 8: 22,300 square feet Peak 9: 13,800 square feet Peak 10: 12,100 square feet With the exception of the Ten Mile Station on Peak 10, the remainder of the on-mountain facilities at BSR are limited in space, and therefore the guest experience can be diminished.	Peak 7: 480 square feet Peak 8: 22,300 square feet Peak 9: 13,800 square feet Peak 10: 12,100 square feet With the exception of the Ten Mile Station on Peak 10, the remainder of the on-mountain facilities at BSR are limited in space, and therefore the guest experience can be diminished.	Alternative 2 would provide a 1,200-square foot restroom facility at the junction of the upper and lower Peak 6 lifts. At the top terminal of the upper lift, a ski patrol/warming hut building would provide 500 square feet of ski patrol and guest service space.	No additional on-mountain guest service facilities are proposed.

Table 3B-12:
Summary of Recreation Effects by Issue and Indicator

Existing Condition	Alternative 1	Alternative 2	Alternative 3
Indicator: Quantification (acreage) of skiing opportunities/effects due to mountain pine beetle			
Multiple variables would be considered prior to opening terrain affected by mountain pine beetle; however, the potential acreage would be: Beginner: 13 acres Novice: 36 acres Low-Intermediate: 27 acres Intermediate: 21 acres Advanced-Intermediate: 11 acres Expert: 15 acres	Multiple variables would be considered prior to opening terrain affected by mountain pine beetle; however, the potential acreage would be: Beginner: 13 acres Novice: 36 acres Low-Intermediate: 27 acres Intermediate: 21 acres Advanced-Intermediate: 11 acres Expert: 15 acres	Alternative 2 would not take advantage of additional acreage due to mountain pine beetle effects.	Of the acreage presented in Alternative 1, approximately 19.4 acres would be development under Alternative 3.
Recreation Issue #2: Development of the Peak 6 skiing pod, including the installation of chairlifts and restroom facility, would remove existing backcountry terrain with BSR's SUP area. Converting the Peak 6 pod to a lift-served skiing experience would alter the distribution of backcountry acreage immediately accessible from the ski area's operational boundary.			
Indicator: Identification of backcountry access points			
The Forest Service and BSR currently provide six backcountry access points.	These points would be maintained with Alternative 1.	Access to areas north and south of BSR would be maintained. An access point would be re-located on the proposed northern operational boundary.	Access to areas north and south of BSR would be maintained. An access point would be re-located on the proposed northern operational boundary.
Indicator: Narrative discussion of the existing backcountry experience and qualitative and quantitative analysis of backcountry access changes anticipated from the action alternatives			
The backcountry offers a sense of adventure, solitude and self-awareness that simply cannot be experienced when skiing in-bounds at a developed ski area. Backcountry terrain within the BSR SUP boundary totals approximately 2,631 acres.	Backcountry terrain within the BSR SUP boundary would total approximately 2,631 acres. Alternative 1 would not affect the backcountry experience or the available quantity of area.	Under Alternative 2, the existing backcountry experience within the Peak 6 portion of BSR's current SUP area would be eliminated. Backcountry terrain within the northern portion of BSR's SUP area on Peak 6would be reduced by 820 acres. Backcountry terrain on Peaks 9 and 10 would remain unchanged.	Under Alternative 3, the existing backcountry experience within the Peak 6½ portion of BSR's current SUP area would be eliminated. Backcountry terrain within the northern portion of BSR's SUP area on Peak 6½ would be reduced by 303 acres. Backcountry terrain on Peaks 9 and 10 would remain unchanged.

Table 3B-12:
Summary of Recreation Effects by Issue and Indicator

Existing Condition	Alternative 1	Alternative 2	Alternative 3
Indicator: Extent and quantification (acres) of existing backcountry areas accessed through points within BSR's SUP area and through other points in the analysis area			
	Current backcountry within the BSR SUP area totals 2,631 acres. The Peak 6 area was accessed by approximately 300 skiers in 2009/10 from the *Ore Bucket* access point.	Under Alternative 2, 1,811 acres of backcountry would be available within the BSR SUP area.	Under Alternative 3, 2,328 acres of backcountry would be available within the BSR SUP area.
Recreation Issue #3: Development of proposed projects outside the existing operational boundary would increase BSR's requirement for snow safety management and potentially increase opportunities for access to the west side of the Tenmile Range.			
Indicator: Quantification of areas susceptible to avalanche conditions			
Areas within the BSR operational boundary are currently susceptible to avalanche conditions are controlled and maintained.	Areas within the BSR operational boundary that are currently susceptible to avalanche conditions would continue to be controlled and maintained under the No Action Alternative.	Approximately 482 acres of the Proposed Action terrain would be above-treeline and would be susceptible to avalanche conditions. BSR's Snow Safety Plan would address these proposed areas and manage the additional acreage in a similar manner as existing conditions and the No Action Alternative.	Approximately 180 acres of Alternative 3 terrain would be above-treeline and would be susceptible to avalanche conditions. BSR's Snow Safety Plan would address these proposed areas and manage the additional acreage in a similar manner as existing conditions and the No Action Alternative.
Indicator: Description of safety concerns and avalanche risk associated with the inclusion of additional terrain within BSR's operation boundary			
N/A	No new safety concerns and/or avalanche risk.	BSR's Snow Safety Plan would address safety concerns and avalanche risk. The Alternative 2 Lift top terminal is located in a "Red Zone," which means that it is highly vulnerable to avalanches. However, that is the classification if no control work is performed. Performing daily stability control work will significantly reduce the projected avalanche return period.	BSR's Snow Safety Plan would address safety concerns and avalanche risk. The Alternative 3 lift top terminal, located below Peak 6½ and its ropeway are situated beyond the reach of avalanches with return periods of 30 to 100 years. Performing daily stability control work will significantly reduce the projected avalanche return period.

Table 3B-12:
Summary of Recreation Effects by Issue and Indicator

Existing Condition	Alternative 1	Alternative 2	Alternative 3
Indicator: Quantification of increased potential to access west side of Tenmile Range from BSR's SUP boundary and its impact on Summit County Search and Rescue			
Several people each year decide to (primarily illegally) ski the west side of the Tenmile Range.	No changes from existing conditions.	Installation of the Alternative 2 Lift and expansion of BSR's ski area operational boundary to the Peak 6 summit carries with it increased potential for skiers primarily *illegally* accessing the west side of Tenmile Range from the SUP area.	Issues related to accessing the west side of the Tenmile Range under Alternative 3 would be the same as for Alternative 2.

Table 3B-13 provides a comparison of projected annual visitation at BSR under Alternative 1, 2 and 3. "Year 1" is the first year after project implementation. The following paragraphs provide a discussion of how skier visit projections were estimated by alternative. Certain stated assumptions are imbedded into the projections to disclose how each alternative might result in a different annual visitation amount at BSR and have effects to the recreation experience, as well as other resources found in Chapter 3 of this FEIS. It is important to disclose: 1) projecting visitation is difficult and could be incorrect because visitation is dependent on many variables; 2) the Forest Service considered other projections; and 3) the Forest Service has concluded these projections are the most reasonable.

Alternative 1 – No Action does not include any projects that would address the Purpose and Need. Several previously-approved projects that could partially address the Purpose and Need are disclosed and analyzed in the Cumulative Effects section below and are being re-analyzed in Alternative 3. An erosion of market share would be anticipated compared to the existing condition, decreasing annual skier visit growth to +0.75 percent. Similar resorts in the Colorado ski resort market that have not met evolving guest expectations over the previous ten years have experienced decreasing average annual growth and/or declines in annual growth. Similar to past seasons, the Forest Service assumes BSR would continue similar resort marketing strategies of existing resort offerings and amenities under the No Action Alternative, which would contribute to the approximately 0.75 percent growth. Additional information is provided in the Project File.

Alternative 2 would create approximately 550 acres of lift-served and hike-to skiing. In addition, two facilities would be constructed to accommodate guests—a top terminal ski patrol/warming hut and a restroom facility at the junction of the upper and lower Peak 6 lifts. The Proposed Action includes projects that would meet the Purpose and Need to improve Intermediate terrain, reduce trail congestion and reduce lift-line wait times. Therefore, BSR's annual visitation would be expected to remain consistent with past average annual growth at BSR of up to 2.0 percent for the next ten years. Similar to past seasons and therefore past annual visitation growth, the Forest Service assumes BSR would continue similar resort marketing strategies with projects included in the Proposed Action. Furthermore, this average growth is similar to that projected for statewide population growth, the most accurate correlation to BSR visitation growth. Also, the 2002 Forest Plan projected ski area visitation growth at 2.5 percent annually; as such, 2.0 percent average annual growth is a downward adjustment from that projected Forest-wide in 2002.[88] By comparison, annual skier visitation for the U.S. as a whole has witnessed an average annual growth of 1.5 percent (759,000 annual visits) over the past ten winter seasons. Similarly, the Rocky Mountain region has experienced a 1.3 percent average annual growth in skier visitation (227,000 annual visits) over the same ten-year period.[89]

[88] USDA Forest Service, 2002b
[89] NSAA, 2010

Alternative 3 includes trail and lift development within BSR's currently developed lift and terrain network as well as a modified skiing pod immediately north of Peak 7. Alternative 3 includes projects that would partially meet the Purpose and Need, but would not address trail congestion. Therefore, some erosion in market share would be anticipated, decreasing annual visitation growth from approximately 1.5 to 2.0 percent (current growth), down to 1.25 percent. The upgrade of the Colorado SuperChair, A-Chair and C-Chair and the development of the Peak 6½ terrain pod would reduce lift-lines at certain lifts and provide limited new terrain offering; all contributing to continued annual visitation growth. Similar to past seasons and therefore past annual visitation growth, the Forest Service assumes BSR would continue similar resort marketing strategies with projects included in Alternative 3.

Table 3B-13:
BSR Projected Annual Visitation – Alternatives 1 through 3

Year	Alternative 1		Alternative 2		Alternative 3	
	Average Annual Growth Rate: 0.75%		Average Annual Growth Rate: 2.00%		Average Annual Growth Rate: 1.25%	
	Visitation Projection	Difference	Visitation Projection	Difference	Visitation Projection	Difference
	1,600,000	--	1,600,000	--	1,600,000	--
1	1,612,000	12,000	1,632,000	32,000	1,620,000	20,000
2	1,624,090	12,090	1,664,640	32,640	1,640,250	20,250
3	1,636,271	12,181	1,697,933	33,293	1,660,753	20,503
4	1,648,543	12,272	1,731,891	33,959	1,681,513	20,759
5	1,660,907	12,364	1,766,529	34,638	1,702,531	21,019
6	1,673,364	12,457	1,801,860	35,331	1,723,813	21,282
7	1,685,914	12,550	1,837,897	36,037	1,745,361	21,548
8	1,698,558	12,644	1,874,655	36,758	1,767,178	21,817
9	1,711,297	12,739	1,912,148	37,493	1,789,267	22,090
10	1,724,132	12,835	1,950,391	38,243	1,811,633	22,366
Total	***--***	***124,132***	***--***	***350,391***	***--***	***211,633***

Source: SE Group, 2010

Alternative 1 – No Action

As a true "no action alternative," Alternative 1 does not include any projects that would address the Purpose and Need. However, the Cumulative Effects analysis at the end of this chapter identifies previously-approved/unimplemented projects ("reasonably-foreseeable future actions") that BSR may choose to pursue regardless of which alternative is selected. The Cumulative Effects analysis discusses each alternative in the context of past, present and reasonably-foreseeable future actions.

Annual Visitation

Annual visitation at BSR is anticipated to maintain an average annual growth of 0.75 percent. As presented in Table 3B-13, Year 10 annual skier visits could be approximately 1,725,000 (an increase of approximately 124,000 over the current annual average of 1.6 million skier visits). As discussed in this section, annual visitation has less of an impact on the recreation resource and the guest experience than daily visitation. An increase in annual visitation would mean that the frequency of higher skier visit days would increase annually (e.g., current 10,000 skier visit days during the mid-week could become 11,000 skier days). But with the No Action Alternative, Peak Day skier visits (18,500+) are not anticipated to increase, but the frequency of the 18,500+ skier day could increase across the course of future seasons. Alternative 1 is anticipated to continue this trend based on a variety of factors, including:

- an erosion of market share (i.e., a reduction in annual average skier visit growth to 0.75 percent),
- the current guest experience on these peak days being diminished,
- Interstate 70 congestion and constraints to weekend day skiers,
- weekday flexible work schedules increasing mid-week visitation, and
- a visitation management conservation measure included in Chapter 2 to address daily skier visits and proactively manage against peak day skier visit increases.

Daily Visitation

Single day visitation is not anticipated to increase and over-burden the recreation resource. Moreover, the daily guest visitation experienced on weekends and holidays is not anticipated to increase; although, the mid-week days could experience increases as skiers begin to modify their visitation schedules. Current conditions presented in the Affected Environment would persist. Furthermore, the CCC would remain at 14,920 guests and would be exceeded by daily visitation approximately 27 percent of the Core Season.

Lift Network

The lift network at BSR would resemble existing conditions.

Lift-Line Wait Times

Guests would continue to experience long lift-lines at BSR during approximately 24 percent of the Core Season. On approximately one out of four days, guests could experience wait times generally ranging from 10 to 25 minutes on the majority of out-of-base lifts (lift-line wait times are heavily influence by various conditions, including weather, time of year, time of day, etc.). Guests generally begin to experience lift-lines at BSR at approximately 10,000 daily skier visits and this would continue with the No Action Alternative. As visitation continues to increase into the future, more days could approach and exceed the CCC and Design Day, further contributing to longer lift-line wait times across BSR.

Under the No Action Alternative, 10, 15 and sometimes 20+ minute lift-lines could be expected throughout the season, with average lift-line wait times getting progressively worse, as annual visitation continues to increase (refer to Table 3B-13). Lift-line waits would likely continue to receive below average ratings from guests during periods of higher visitation, typically when the CCC and the Design Day is exceeded.

Terrain

Lift-Served Terrain

Under Alternative 1, the lift-served trail network at BSR would continue to total approximately 1,825 acres, as identified in Table 3B-4. Deficiencies would be Beginner (4 percent), Intermediate (6 percent), and Advanced-Intermediate (6 percent). However, BSR would continue to provide a surplus in terrain capacity for Low-Intermediate (13 percent) and Expert (2 percent). Again, stated surpluses and deficiencies are based on planning criteria that does not account for variable conditions, including: weather, wind, snowfall, seasonal terrain availability, etc.

Mountain Pine Beetle

The October 2009 BSR forest stand survey (refer to Chapter 3J – Forest Health) identified approximately 2,154 acres of lodgepole pine, mixed lodgepole pine and mixed conifer forest within the SUP area. Of those, approximately 221 acres of forest containing lodgepole pine exhibited pine beetle mortality (refer to Figure 27). Based on regeneration potential within those stands, approximately 127 acres of forest would need to be partially or totally re-vegetated.

A slope analysis of these 127 acres revealed that after these trees succumb to mountain pine beetle and die, 123 acres would potentially be available for ski trail development (some areas would be unavailable for development because they are too flat for skiing). This terrain would provide 13 acres of potential Beginner ability level terrain, 36 acres of potential Novice ability level terrain, 27 acres of Low-Intermediate terrain, 21 acres of Intermediate ability level terrain, 11 acres of Advanced-Intermediate ability level terrain, and 15 acres of Expert ability level terrain.

As mortality occurs within these stands under the No Action Alternative, potential ski terrain could become available within the existing operational boundary. However, multiple variables must be considered prior to developing these areas as ski terrain:

- Installation of snowmaking infrastructure on south-facing trails;
- Appropriate skier management and operation s where new terrain would result in busy or awkward intersections;
- Ability to provide fall-line skiing;
- Capacity of existing or previously approved lifts servicing the additional terrain;

- Wind-scour as a result of not re-vegetating certain areas; and
- Overall skier experience of the potential terrain.
- If all of the Intermediate and Advanced-Intermediate terrain that would be created from lodgepole pine mortality were to be developed, BSR would continue to maintain a deficit of Intermediate and Advanced-Intermediate terrain.

Hike-To Terrain

No changes would occur to hike-to terrain within BSR's SUP boundary under Alternative 1. Hike-to terrain would continue to include approximately 390 acres.

Backcountry Terrain

Backcountry terrain (within or beyond the SUP area) would not be affected by the No Action Alternative. Access to, and use of, this terrain would continue to be primarily dictated by the position of Forest Service access points that are determined separate from this NEPA process. Backcountry within the BSR SUP boundary would continue to total approximately 2,600 acres. Use of the backcountry within the BSR SUP boundary is anticipated to increase, with potential for significant increases.

Skier Circulation

Portal Access/Egress

Under Alternative 1, it is expected that there would continue to be a shift in portal access favoring Peak 7. Access has grown at Peak 7 due to the installation of the BreckConnect Gondola. This trend is anticipated to continue as shown in Table 3B-14.

Table 3B-14:
Access/Egress Role By Portal Based on Design Day – Alternative 1

Portal	Access		Egress	
	Guests (%)	Guests	Estimated % of Guests	Guests
Peak 7	13	2,080	13	2,080
Peak 8	42	6,720	40	6,720
Peak 9	45	7,200	47	7,200
Total	*100*	*16,000*	*100*	*16,000*

Source: Breckenridge Ski Resort, 2010a

Due to an increase in the egress percentage for the Peak 7 portal (7 percent in existing conditions to 13 percent for the No Action Alternative), *Pioneer* and *Monte Cristo* would be expected to experience increases in skier densities during the egress period (Table 3B-15). *Pioneer* would increase from 4 to 12 skiers per acre, and *Monte Cristo* would increase from 1 to 4 skiers per acre. The shift in egress portal percentages would also affect the Peak 8 and 9 trails.

Table 3B-15:
Design Day Egress Skier Densities – Alternative 1

Primary Egress Trails	Minimum Width	Skier Speed	Portal Guests	Egress Density	Reference Density	Difference from Reference	Difference from Reference
	(ft.)	(ft./min.)	(%)	(guests/acre)	(guests/acre)	(+/-)	(%)
Peak 9							
Silverthorne	192	800	45	23	18	+5	129
Lower Sundown	118	800	30	25	10	+15	252
Peak 8							
Four O'Clock	122	800	20	15	14	+1	108
Springmeier	155	800	30	18	14	+4	128
Swinger	89	800	15	16	14	+2	111
Crescendo	125	800	30	22	14	+8	158
Claimjumper	97	800	10	10	14	-4	68
Peak 7							
Pioneer	148	800	60	12	14	-2	83
Monte Cristo	74	800	10	4	14	-10	28

Guest Circulation throughout the Operational Boundary

There would be no changes in skier circulation throughout the SUP area in Alternative 1. Currently, a typical guest may take 84 minutes to traverse from the base of Peak 7 to the bottom of the Falcon SuperChair on Peak 10. Across the season, this amount of time may grow slightly in the future as annual visitation increases and lift-line wait times increase (as documented in the Lift-Line Wait Times discussion, above).

Trail Densities

As no additional Beginner, Intermediate, or Advanced-Intermediate terrain would be constructed under the No Action Alternative, high trail densities would be expected to persist. Trail densities presented in Table 3B-10 could be expected into the future under the No Action Alternative, with overall densities expected to increase slightly, on average, due to increases in annual visitation.

Snow Safety

The purpose of BSR's snow safety program, as outlined in its Snow Safety Plan, will continue to be to provide safe access to avalanche prone terrain that would otherwise remain closed due to unstable, constantly changing snow conditions. No changes to the Snow Safety Plan would be necessary under the Alternative 1.

Search and Rescue

Alternative 1 would not alter the location of Forest Service access points along BSR's ski area operational boundary; nor would it affect access to the backcountry from BSR's ski area operational boundary. Therefore, there would not be any anticipated potential for increased search and rescue needs under this alternative.

Access to the West Side of the Tenmile Range

Under Alternative 1, BSR's current ski area operational boundary would remain in place. BSR Ski Patrol would not patrol, control or maintain any of the terrain that is beyond its roped and signed ski area operational boundary. There is currently legal access to the west side of the Tenmile Range from the ski area operational boundary only through an existing backcountry access point, and BSR Ski Patrol would continue to enforce that policy along with the WRNF, as appropriate and feasible.

On-Mountain Guest Services

From a resort-wide perspective, BSR would continue to lack space to accommodate the needs of the resort's existing visitation with notable deficits in space for lockers, rental, ski school, restaurant seating, restrooms, ski patrol, administration and storage.

Alternative 2 – Proposed Action

Annual Visitation

Visitation at BSR is anticipated to maintain average annual growth of up to 2.0 percent consistent with existing conditions. Compared to the No Action Alternative, the Proposed Action would meet the purpose and need with respect to guest expectations; whereas, the No Action Alternative would not and the guest experience would be diminished resulting in lower annual skier visit growth. As presented in Table 3B-13, Year 10 annual skier visits could be approximately 1,950,000 (an increase of approximately 350,000 over the current annual average of 1.6 million skier visits). As discussed in this recreation section, annual visitation has less of an impact on the recreation resource and the guest experience than daily visitation. An increase in annual visitation would mean that the frequency of higher skier visit days would increase annually (e.g., current 10,000 skier visit days during the mid-week could become 12,000 skier days and when compared to the No Action Alternative, 11,000 skier visit days during mid-week could become 12,000 skier days with implementation of the Proposed Action). But with the Proposed Action, Peak Day skier visits (18,500+) are not anticipated to increase in daily skier visits, but the frequency of the 18,500+ skier days could increase across the course of the season. Alternative 2 is anticipated to continue this trend based on a variety of factors. These factors include:

- a review of past visitation data that includes additional infrastructure improvements reveals this trend,
- the current guest experience on these peak days being diminished,

- Interstate 70 and constraints to weekend day skiers,
- weekday flexible work schedules increasing mid-week visitation,
- the ability of BSR to control pass restrictions for employees, and the opportunity to market lodging units differently during peak days, and
- a visitation management conservation measure included in Chapter 2 to address daily skier visits and proactively manage against peak day skier visit increases.

Daily Visitation

Single day visitation is not anticipated to increase and over-burden the recreation resource. The purpose and need is to better accommodate the current daily skier visits occurring at BSR and make the proposed CCC more in-line with that visitation level (16,000—a quantity of guests that already visit BSR approximately 25 percent of the year). Furthermore, as the Proposed Action addresses 16,000 skier visits, the remainder of the Core Season below 16,000 skier visits would also be positively affected by the increased CCC and increased terrain acreage. The CCC under the Proposed Action would increase to 16,170 skiers. It is assumed in the analysis that on days that exceed approximately 16,000 visitors, guests would not experience a noticeable change from the existing conditions (the No Action Alternative). However, on days at or below approximately 16,000 skier visits, a noticeable change would be experienced.

Peak 6 would provide a better distribution of skiers on Intermediate and Advanced terrain by attracting guests, who would otherwise be skiing the Comparison Pods, to the proposed Peak 6 lifts and terrain.

Lift Network

With the exception of the addition of two lifts on Peak 6, the lift network at BSR would resemble existing conditions. As described in Chapter 2, the Proposed Action would involve the installation of two lifts to allow guests to “round-trip” the upper lift. The previously approved upgrade of 6-Chair is addressed in Cumulative Effects below.

Lift-Line Wait Times

As discussed in the Affected Environment section, the round trip interval has a direct affect on the quality of the recreation experience, and is heavily influenced by the lift-line wait time. By offering Intermediate, Advanced-Intermediate and Expert ability level terrain, the Proposed Action is anticipated to attract people away from the “Comparison Pods.” The chairlifts providing access to the Comparison Pods are comprised of Mercury, Beaver Run, Colorado, Rocky Mountain and Imperial (refer to Table 3B-16). Because of a similarity of terrain, this analysis assumes a 5 percent reduction in demand of those lifts within the Comparison Pods.

Table 3B-16:
Round Trip Interval and Runs per Day – Proposed Action

Lift/Wait Time	Round Trip Interval (min.)	Runs per Day from Lift
QuickSilver Super6		
Alternative 1: Design Day Lift-line Wait Time (10 min)	32	8
Alternative 2: Design Day Lift-line Wait Time (10 min)	32	8
Peak Day Lift-line Wait Time (20 min) – *unchanged*	42	6
Mercury SuperChair (Comparison Pod)		
Alternative 1: Design Day Lift-line Wait Time (7 min)	30	10
Alternative 2: Design Day Lift-line Wait Time (5 min)	28	11
Peak Day Lift-line Wait Time (12 min) – *unchanged*	35	9
A-Chair		
Alternative 1: Design Day Lift-line Wait Time (5 min)	31	8
Alternative 2: Design Day Lift-line Wait Time (5 min)	31	8
Peak Day Lift-line Wait Time (10 min) – *unchanged*	36	7
C-Chair		
Alternative 1: Design Day Lift-line Wait Time (10 min)	34	10
Alternative 2: Design Day Lift-line Wait Time (10 min)	34	10
Peak Day Lift-line Wait Time (12 min) – *unchanged*	36	9
Beaver Run SuperChair (Comparison Pod)		
Alternative 1: Design Day Lift-line Wait Time (10 min)	38	8
Alternative 2: Design Day Lift-line Wait Time (5 min)	35	9
Peak Day Lift-line Wait Time (12 min) – *unchanged*	40	7
Colorado SuperChair (Comparison Pod)		
Alternative 1: Design Day Lift-line Wait Time (12 min)	32	9
Alternative 2: Design Day Lift-line Wait Time (10 min)	30	10
Peak Day Lift-line Wait Time (15 min) – *unchanged*	35	9
Rocky Mountain SuperChair (Comparison Pod)		
Alternative 1: Design Day Lift-line Wait Time (5 min)	23	13
Alternative 2: Design Day Lift-line Wait Time (3.5 min)	22	17
Peak Day Lift-line Wait Time (13 min)	31	10
Independence SuperChair		
Alternative 1: Design Day Lift-line Wait Time (10 min)	33	9
Alternative 2: Design Day Lift-line Wait Time (10 min)	33	9
Peak Day Lift-line Wait Time (22 min) – *unchanged*	45	7
6-Chair		
Alternative 1: Design Day Lift-line Wait Time (10 min)	24	15
Alternative 2: Design Day Lift-line Wait Time (10 min)	24	15
Peak Day Lift-line Wait Time (15 min) – *unchanged*	29	12

Table 3B-16:
Round Trip Interval and Runs per Day – Proposed Action

Lift/Wait Time	Round Trip Interval (min.)	Runs per Day from Lift
Imperial Express SuperChair (Comparison Pod)		
Alternative 1: Design Day Lift-line Wait Time (7 min)	18	20
Alternative 2: Design Day Lift-line Wait Time (4.5 min)	15	24
Peak Day Lift-line Wait Time (15 min) – *unchanged*	26	14
T-Bar		
Alternative 1: Design Day Lift-line Wait Time (7 min)	21	17
Alternative 2: Design Day Lift-line Wait Time (7 min)	21	17
Peak Day Lift-line Wait Time (15 min) – *unchanged*	29	12

Note: Planned Lift-line Wait Time is based on data contained in the 2007 MDP. Alternative 2 Design Day calculations are based on a 5% reduction in demand of the Comparison Pod as use transfers to the Proposed Action chairlift. Peak Day Lift-line Wait Times are based on actual wait times recorded throughout the ski season (USDA Forest Service, 2010 and SE Group, 2010) and would not change as a result of the Proposed Action.

It is anticipated that shifting skiers away from the Comparison Pods would result in a reduction of lift-lines by approximately 30 percent on the Design Day of 16,000 guests (i.e., a ten-minute lift-line would become seven minutes).[90]

The benefits to the recreational experience of shorter lift-lines are twofold. At BSR, lift-line length is consistently listed as an important factor in guest satisfaction (BSR customer satisfaction surveys conducted between the 2002/03 and 2009/10 seasons indicate consistently low scores for, among other things, "Lift Waits" and "Trail Crowding."). Second is the reduction in round trip interval time. A reasonable (and calculated) estimation is that there would be a reduction of one to three minutes per round trip on the Mercury, Beaver Run, Colorado, Rocky Mountain and Imperial SuperChairs (refer to Table 3B-16). While this may not appear significant, it can add up to the ability to ski two additional runs per day, which would result in a measurable improvement in the recreational experience. For comparison, the Alternative 1 average runs per day within the Comparison Pods would be 12 and the Alternative 2 average runs per day within the Comparison Pods would be 14. This would amount to an additional 7,200 vertical feet that a guest could ski within the Comparison Pods, compared to the No Action Alternative.

Table 3B-16 discloses impacts to the Design Day and Peak Day. However, days below the Design Day of 16,000 (75 percent of the Core Season) would also experience commensurate decreases in lift-line wait times. For example, on a 10,000 skier visit day where a guest might currently experience a seven-minute

[90] SE Group, 2010c

lift-line wait time, under the Proposed Action that lift-line would be approximately five minutes on a lift within the Comparison Pods. This would be a positive effect to the overall guest experience.

Terrain

Lift-Served Terrain

Under the Proposed Action, the lift-served trail network at BSR would increase by approximately 407 acres—from 1,825 acres to approximately 2,232 acres—as identified in Table 3B-17. The ski area operational boundary would increase to 3,945 acres, an increase of 820 acres. As discussed in the Affected Environment section (refer to Table 3B-7), BSR has a shortage of Intermediate and Advanced-Intermediate terrain, which, when taken together, represent 50 percent of BSR's market. However, at BSR, slightly less than 40 percent of the terrain (approximately 751 acres) serves guests of these ability levels. The proposed terrain on Peak 6—which is composed of both traditional and above-treeline terrain in the Intermediate and Advanced-Intermediate classifications (an additional 244 acres)—responds to BSR's identified terrain shortfalls. The addition of the Peak 6 lift-served terrain would increase BSR's Intermediate terrain to approximately 584 acres, which would provide terrain capacity commensurate with the skier market. Due to the anticipated operational management of the lift served terrain south of the top terminal of the upper Peak 6 lift, a portion of Advanced-Intermediate terrain would not be lift accessible from the upper Peak 6 lift. Rather, that terrain south of the top terminal of the upper Peak 6 lift would be accessed via the Imperial Express. Due to the long traverse necessary to access this terrain, these areas are classified as Expert ability level terrain (refer to Figure 6). Furthermore, by moving the operational boundary under the Proposed Action to the northern boundary of Peak 6, the north side of Peak 7, which is currently outside the operational boundary, would become lift served by the Imperial Express and would be within the operational boundary and be considered lift-served terrain (refer to Table 3B-17 for a breakdown of Expert ability level terrain). As mentioned on Figure 6, the lift-served terrain from the Imperial Express would total 104 acres.

Table 3B-17:
Lift-Served Terrain Distribution by Ability Level – Proposed Action

Skier Ability Level		Existing Trail Acreage (acres)	Existing BSR Skier Distribution (%)	Alternative 2 Trail Area (acres)	Alternative 2 BSR Skier Distribution (%)	Central Rockies Skier Market (%)
●	Beginner	2.8	1	2.8	1	5
●	Novice	106.6	15	106.6	13	15
■	Low-Intermediate	403.4	38	403.4	33	25
■	Intermediate	402.0	29	584.0	36	35
◆	Advanced-Intermediate Traditional Bowl Skiing	 175.7 173.4	9	 231.2 179.7	10	15
◆	Expert Traditional Bowl Skiing	 217.9 342.7	7	 262.4 461.6	8	5
	Total	**1,824.5**	**100**	**2,231.7**	**100**	**100**

Mountain Pine Beetle

Alternative 2 would not take advantage of pine beetle mortality with respect to areas of impact. Potential terrain due to mountain pine beetle activity would be identical to the No Action Alternative. The reader is referred to Chapter 3J – Forest Health for analysis of mountain pine beetle effects.

Hike-To Terrain

Alternative 2 would create approximately 143 acres of hike-to Expert terrain. This hike-to terrain would be anticipated to affect terrain densities found at other hike-to Expert level areas around the resort—for example the Lake Chutes, Snow White, and the Windows.

Alternative 2 responds to the growing demand for hike-to terrain (described in the Purpose and Need in Chapter 1) as evidenced by the number of skiers hiking to the summit of Peak 8 from the top of the Imperial Express SuperChair. As presented in the Affected Environment section, BSR maintains approximately 390 acres of hike-to terrain within the current operational boundary. The Proposed Action would increase hike-to terrain at BSR by 36 percent. The hike from the upper Peak 6 lift's top terminal to the Peak 6 ridgeline is anticipated to take approximately 20 minutes. Furthermore, based on current use data from Imperial Express whereby approximately 20 percent of the lift's riders hike to the summit of Peak 8, approximately 15 percent of the upper Peak 6 lift's riders may hike to the Summit. The percentage is reduced due to a slightly longer anticipated hike time and greater vertical elevation gain.

Backcountry Terrain

Under Alternative 2, the existing backcountry experience within the Peak 6 portion of BSR's current SUP area would be eliminated. Factors that would contribute to the elimination of the backcountry experience within the proposed Peak 6 pod include: installation two lifts; development of approximately 550 acres of

developed terrain (including terrain on the north aspect of Peak 7 that would become lift served from the Imperial Express); the introduction of lift-served skiers on a daily basis, grooming, avalanche control, and the presence of BSR ski patrol. Backcountry terrain would be reduced by 820 acres to 1,811 acres. Access to backcountry terrain on Peaks 9 and 10 would remain unchanged.

Removing the Peak 6 portion of BSR's SUP area from Summit County's supply of backcountry terrain would directly impact a portion of skiers who value this area for the experience it affords, its proximity to the town of Breckenridge, and its relatively easy access (compared to more remote backcountry options in the area). As discussed previously in Table 3B-5, BSR ski patrol has recorded annual use of Peak 6 over the past four winter seasons—noting between 127 and 300 annual users. Therefore, eliminating Peak 6 as a backcountry area would displace those users (which as discussed in the Affected Environment is a growing use pattern)—presumably to either Peak 5, or another relatively local backcountry destination.

While a certain segment of the local skier population would be displaced by construction of the proposed Peak 6 project, on an annual basis tens of thousands of skiers would benefit from its development as lift-served terrain. As previously noted, the entire BSR SUP area—Peak 6 included—is identified in the 2002 Forest Plan as within Management Area 8.25 – Ski Areas (Existing and Potential). On the WRNF, Management Area 8.25 includes existing resorts that have already been permitted and developed, as well as additional suitable terrain into which development is planned for the future, which characterizes Peak 6. Therefore, it is important to note that, while the Proposed Action is not without controversy over acknowledged impacts to existing backcountry users, this proposal is consistent with the WRNF Forest Plan direction regarding management of these public lands.

Under the Proposed Action, BSR's ski area operational boundary would be shifted north within the existing SUP area—from its current location on Peak 7, to the north side of Peak 6 (refer to Figure 3 and Figure 6). Backcountry access would change commensurately, based on the development of Peak 6 for lift-served skiing. A Forest Service backcountry access point would be established along the new ski area operational boundary.[91]

By moving the ski area operational boundary north, access to backcountry terrain within the Peak 5 portion of the SUP area would become much easier under the Proposed Action, which could increase the use of Peak 5 by backcountry skiers. However, those wishing to access Peak 5 from outside of BSR's ski area operational boundary (e.g., from the Peaks Trail) may find it more cumbersome, as both the existing Breckenridge Nordic Center and proposed developed, below treeline trails on Peak 6 would represent obstacles to a more-or-less direct ascent. This would likely require backcountry users to reassess their

[91] The location of a relocated access point is beyond the scope of this analysis. However, for impacts to various resources in this FEIS, it is assumed the terrain north of the proposed operational boundary will be accessible via a relocated access point.

approach strategy for accessing Peak 5. Hiking along the Peaks Trail further north may become a more logical access route to Peak 5 under the Proposed Action.

The Proposed Action may increase the potential for skiers that choose to duck a rope along the proposed operational boundary of Peak 6 or Peak 7 to impact the Breckenridge Nordic Center's Siberian Loop. Roped boundaries and signage PDC have been included to minimize the amount of skiers that impact the Siberian Loop; however, the potential remains. Several of these occurrence are anticipated to continue as they are a result of residents of the Peak 7 neighborhood skiing home and using the Nordic Center trail. Backcountry users of Peak 5 might also use the Siberian Loop to both access the backcountry terrain from the northern end of the Siberian Loop and egress from the backcountry terrain.

Skier Circulation

Existing usage patterns at BSR are expected to change as a result of the Proposed Action. This would primarily be manifested as a shift in portal use as the terrain on Peak 6 is utilized by guests. The Proposed Action would affect lift-line waits as demonstrated in Table 3B-16 in some existing lift pods as well as circulation throughout the SUP area.

To analyze these effects, a circulation model was completed specifically for this recreation analysis. The data is contained in the project file, and the results are summarized here. The analysis completed for Alternative 2 relies on two fundamental assumptions.

First, under Alternative 2, the only portions of the existing resort that would be anticipated to experience a noticeable difference in the recreational experience would be primarily those lifts and trails which offer an experience similar to the Proposed Action (i.e., Intermediate and Advanced terrain that is accessible from detachable lifts). These pods are (as presented above in Table 3B-16): Mercury, Beaver Run, Colorado, Rocky Mountain, and Imperial Express. However, it is expected that Expert ability level guests will use the proposed Peak 6 lifts and Expert terrain (both lift-served and hike-to). It is therefore assumed that, under Alternative 2, the same skiers who currently use the Comparison Pods would also use the Proposed Action terrain.

Second, while total annual visitation is expected to increase under Alternative 2, peak days (defined as days in excess of 18,500+ guests [roughly 125 percent of CCC]) would not increase as a result of the Proposed Action. Annual visitation is anticipated to increase because, throughout the season, more skiers are expected on average and low visitation days, but visitation on peak days would not substantially increase as a result of Alternative 2 (refer to Chapter 1 for a discussion of the rationale).

Portal Use/Egress

It is logical to assume that there would be an overall shift of portal use, resulting in increased use of the Peak 7 portal under the Proposed Action. This anticipated shift in use would largely be the result of the Proposed Action and the resulting increase in use of the northern portion of the resort. The shift in portal

use would be reflected across the entire mountain—Peak 8 would become the center of the resort, with Peaks 9 and 10 to the south and Peaks 7 and 6 to the north. Since most guests utilizing the Peak 6 pod would be expected to use the Peak 7 portal to egress from the proposed terrain on Peak 6 at the end of the day, BSR would likely improve the Peak 7 portal (located on private lands) in conjunction with Alternative 2. Improvements to the Peak 7 portal could include improving access to the platform for downloading the gondola, adding signage for guests looking to egress from Peaks 6 and 7, and altering gondola cabin loading strategies at the Peak 8 terminal so that a percentage of gondola cabins are sent empty across to Peak 7. As a result of these factors, it is assumed that the percentage of skiers using Peak 7 as an egress portal would increase. It has been calculated that future portal egress would be 20 percent at Peak 7, 40 percent at Peak 8, and 40 percent at Peak 9 (Table 3B-18). This increase in use of Peak 7 and corresponding decrease in use of Peaks 8 and 9 as egress portals would likely result in a noticeable decrease in afternoon congestion in the Peaks 8 and 9 portals.

Table 3B-18:
Access/Egress Role By Portal Based on Design Day – Alternative 2

Portal	Access		Egress	
	Guests (%)	Guests	Estimated % of Guests	Guests
Peak 7	20	3,200	20	3,200
Peak 8	40	6,400	40	6,400
Peak 9	40	6,400	40	6,400
Total	***100***	***16,000***	***100***	***16,000***

Source: Breckenridge Ski Resort, 2007

Essentially all skiers using the proposed Peak 6 lifts and trails would use *Monte Cristo* (the northern-most trails on Peak 7) to return to the Peak 7 portal (or ride the Independence SuperChair to access the Peak 8 portal) at the end of the day, trail densities on *Monte Cristo* would be expected to increase throughout the day, and particularly during the afternoon egress period (refer to Table 3B-19).

As discussed in the Affected Environment section, egress trail densities at BSR have been identified as an issue of concern as they can be quite high during the afternoon egress period. As presented in Table 3B-19, the projected egress densities would decrease as a result of the Proposed Action.

Table 3B-19:
Design Day Egress Skier Densities – Proposed Action

Primary Egress Trails	Minimum Width (ft.)	Skier Speed (ft./min.)	Portal Guests (%)	Egress Density (guests/acre)	Reference Density (guests/acre)	Difference from Reference (+/-)	Difference from Reference (%)
Peak 9							
Silverthorne	192	800	45	21	18	+3	115
Lower Sundown	118	800	30	22	10	+12	224
Peak 8							
Four O'Clock	122	800	20	14	14	0	103
Springmeier	155	800	30	17	14	+3	122
Swinger	89	800	15	15	14	+1	106
Crescendo	125	800	30	21	14	+7	151
Claimjumper	97	800	10	9	14	-5	65
Peak 7							
Pioneer	148	800	60	18	14	+4	127
Monte Cristo	74	800	30	18	14	+4	127

Compared to the No Action Alternative (which would be similar to the existing egress densities), all primary egress trails on Peak 9 and 8 would decrease approximately 15 percent. *Claimjumper* and *Pioneer* would experience substantial increases due to both the shift in portal use to Peak 7 as well as the increase in use due to the Proposed Action as guest egress from the Peak 6 area at the end of the day. Still the anticipated egress density is within the range of the target trail density for *Pioneer* and *Monte Cristo.* On days with skier visits less than 16,000, commensurate decreases in egress densities are anticipated and would improve the guest experience.

On peak days, under Alternative 2, there would not be a noticeable decrease to egress trail densities throughout the existing portion of the resort as a result of the Proposed Action. Since demand for these lifts would be expected to remain high on peak days, every seat on every chair is assumed to be filled (except for unavoidable decreases due to loading inefficiencies), and there would be lift-lines. The effect of this is that trail densities would remain similar to existing levels—lift-lines would be shorter, but there would still be the same number of skiers per hour unloading from the top of the each lift and descending the trails.

Guest Circulation throughout the Operational Boundary

The Proposed Action would have effects on the overall skier circulation from Peak 7 to Peak 10. The anticipated effects are presented in Table 3B-20, with a resultant reduction in skier circulation time from Peak 7 to Peak 10 of five minutes. The time for a guest to transition from Peak 10 to Peak 7 would be unchanged. The result would be reduced lift-line wait times as presented in Table 3B-20.

Table 3B-20:
Skier Circulation Between Peaks 7 and 10 on Design Day – Proposed Action

Starting Point	Destination	Approximate Duration (min)
Peak 7 Base Area	**Peak 10 – Bottom of Falcon**	
Independence SuperChair Lift-Line Wait Time		10:00
Bottom of Independence SuperChair	Top of Independence SuperChair	7:40
Top of Independence	Bottom of Colorado SuperChair	9:30
Colorado SuperChair Lift-Line Wait Time		10:00
Bottom of Colorado SuperChair	Top of Colorado	7:00
Top of Colorado SuperChair	Bottom of Beaver Run	12:40
Beaver Run SuperChair Lift-Line Wait Time		7:00
Bottom of Beaver Run SuperChair	Top of Beaver Run SuperChair	9:00
Top of Beaver Run SuperChair	Bottom of Falcon SuperChair	6:10
Total Time Commitment from Peak 7 to Peak 10		***79:00***
Peak 10 – Bottom of Falcon	**Peak 7 Base Area**	
Bottom of Falcon SuperChair	Peak 8 SuperConnect Bottom Terminal	5:30
Peak 8 SuperConnect Lift-Line Wait Time		5:00
Bottom of Peak 8 SuperConnect	Top of Peak 8 SuperConnect	9:00
Top of Peak 8 SuperConnect	Bottom of Independence SuperChair	7:30
Total Time Commitment from Peak 10 to Peak 7		***27:00***

Trail Densities

With implementation of the Proposed Action, on days with visitation levels of 16,000 or (the Design Day capacity) lower, it is likely that trail densities would decrease throughout the Comparison Pods. As discussed previously, since the Peak 6 area would primarily represent a diverse experience for Intermediate and Advanced-Intermediate level skiers, it is reasonable to assume that some of the skiers who would have otherwise been using the Mercury, Beaver Run, Colorado, Rocky Mountain, and Imperial Express would choose to use the Proposed Action terrain instead. Key to the decreased skier densities under this scenario is the assumption that there would be some percentage of empty chairs going up those lifts in the Comparison Pods, resulting in fewer people off-loading lifts throughout the day and commensurately lower numbers of skiers on the trails. The effect of these reductions would be an overall less-crowded feel to those portions of the existing resort. Projected densities on the certain trails within the current operational boundary are presented in Table 3B-21. The trails in Table 3B-21 are sample trails for this analysis, but other Intermediate and Advanced-Intermediate trails within the Comparison Pods would experience commensurate decreases in trail densities. This would have an overall positive benefit to the guest experience.

Table 3B-21:
Design Day Trail Density – Proposed Action

Sample Trails	Minimum Trail Width	Skier Speed	Trail Density	Reference Density	Difference from Reference	Difference from Reference
	(ft.)	(ft./min.)	(guests/acre)	(guests/acre)	(+/-)	(%)
Peak 9						
Silverthorne	192	800	22	18	+4	120
Lower Sundown	118	800	23	10	+13	235
Peak 8						
Four O'Clock	122	800	12	14	-2	82
Springmeier	155	800	14	14	0	97
Swinger	89	800	12	14	-2	85
Crescendo	125	800	17	14	+3	121
Claimjumper	97	800	7	14	-7	52
Peak 7						
Pioneer	148	800	9	14	-5	64
Monte Cristo	74	800	3	14	-11	21

When compared to the No Action Alternative (No Action is assumed to be similar to the existing condition on a Design Day), average trail densities on a Design Day would decrease by approximately 11 percent on Peak 9, and 6 percent on Peak 8. Densities would not measurably change on Peak 7. For days with visitation levels below the Design Day, trail densities are anticipated to have a commensurate level of reduction on Peaks 8 and 9, and would not be measurably affected on Peak 7.

Although this analysis does not quantify anticipated trail densities on every trail at BSR, resort-wide densities would decrease as increased acreage would the current level of guest visitation to disperse to a greater extent, especially on similar ability level terrain as is proposed on Peak 6. This would create the feeling of overall less crowding for the BSR guest.

Peak days would continue to have higher than reference trail densities on existing trails. Furthermore, existing chairlifts would continue to operate at-capacity and output a similar amount of skiers onto existing trails. Due to the circumstance where the pace of the entire Resort is slowing, the Peak 6 lifts and associated terrain would improve this condition to a certain degree and create an overall less congested experience across BSR lift and terrain network.

Snow Safety

As discussed in the Affected Environment, BSR is characterized as a "Class A" Avalanche Hazard Ski Area, which means it has an everyday need for avalanche control and evaluation. BSR has a variety of

terrain that ranges from an absence of hazard, to highly hazardous areas capable of producing large destructive avalanches—terrain that would become lift-served under the Proposed Action is no exception.

Alternative 2 would include approximately 550 acres of lift-served and hike-to terrain that would be incorporated into BSR's ski area operational boundary. Due to aspect, slope and exposure, it is well known that terrain on Peaks 6½ and 6 is susceptible to avalanche activity. Approximately 68 acres of this terrain would be below treeline, 339 acres would be lift-served (by the Peak 6 lifts and Imperial Express) and approximately 143 acres of Expert terrain would be available by hiking beyond the top terminal of the upper Peak 6 lift and the north-facing summit of Peak 7 (accessed from upper Peak 6 lift or the Imperial Express).

With the inclusion of the Proposed Action terrain into the ski area operational boundary, BSR's Snow Safety Plan would be amended, as appropriate, to specifically address the unique needs of avalanche control on developed, open-bowl, and hike-to terrain on Peak 6.

A preliminary avalanche risk assessment was conducted by Hal Hartman with SPH Works. Preliminary estimates of avalanche stopping positions were based on the following methods: 1) terrain analysis from maps and air photos, 2) field studies of terrain, vegetation and surficial materials, 3) weather and snow records, and 4) application of topographic-statistical models. The assessment (located in the project file) determined that the proposed top terminal of the lift and its ropeway are located beyond the reach of avalanches with return periods of 3 to 30 years.[92] Moreover, the ropeway segment spanning the elevation band from 11,600 feet to 12,120 feet is affected by avalanches with return periods of 3 to 30 years (with no control work being performed on a daily basis). Therefore, the top station, the top station unloading area and lift towers situated in the aforementioned elevation band are located in a Red Zone (highly vulnerable to avalanches).[93] Otherwise, all other ropeway segments are beyond the reach of avalanches. Locating lift towers in an avalanche path between 11,600 feet to 12,120 feet is not an uncommon practice based on industry standards, and should not pose construction or operation problems. Furthermore, adhering to the Snow Safety Plan and performing daily stability control work will significantly reduce the projected avalanche return period. The avalanche return period assumes no control work is performed.

Search and Rescue

As is currently the case, BSR Ski Patrol would not patrol, control or maintain any of the terrain that is beyond its ski area operational boundary. In terms of providing response to backcountry users who become injured, lost, stranded or go missing, this would continue to be the responsibility of Summit County Search and Rescue (with assistance provided by BSR Ski Patrol, as needed). However,

[92] Return period is the frequency of occurrence.
[93] McClung et al., 2006

quantifying the potential for increased demand placed on Summit County Search and Rescue is not possible.

Access to the West Side of the Tenmile Range

As has been previously discussed, in Summit County, legal access to the backcountry from a ski area's operational boundary is only through designated backcountry access points; i.e., ducking a rope to exit or enter the ski area operational boundary is illegal. Violating boundary closures can lead to disciplinary action by law enforcement officials.

Under Alternative 2, the roped boundary (and informational signage) that currently demarcates the ski area operational boundary along the Tenmile ridge between Peaks 8 and 7 would be extended along the expanded ski area operational boundary to the northern portion of Peak 6. As noted, informational signage along BSR's ski area operational boundary identifies a backcountry access point (refer to Photo 3B-4). There is currently legal access to the west side of the Tenmile Range from the western ski area operational boundary, and BSR Ski Patrol would continue to enforce that policy along with the WRNF and local law enforcement, as appropriate and feasible. Regardless, installation of the Peak 6 pod and expansion of BSR's ski area operational boundary to the Peak 6 summit carries with it increased potential for skiers *illegally* accessing the west side of Tenmile Range from the SUP area. However, it is not possible to quantify illegal entry into backcountry terrain west of the SUP area, nor impacts to Summit County Search and Rescue.

On-Mountain Guest Services

The Proposed Action would be located on the northern-most extent of BSR's ski area operational boundary, well removed from the nearest guest service facilities, which are located at the base area of Peaks 7 and 8, or the Vista Haus at the top of the Colorado SuperChair on Peak 8. The proposed restroom facility at the junction of the proposed chairlifts (approximately 1,200 square feet) would be critical for guests who choose to ski in this area. The facility would provide the appropriate level of amenities for the size of the lift and trail network in the Proposed Action with a 150-seat capacity.

The ski patrol/warming hut proposed at the top of the upper Peak 6 lift would be similar in function and operation to the Peak 7 ski patrol/warming hut at the top of the Independence SuperChair. The building would provide an outpost for ski patrol functions which would be necessary due to the Peak 6 pod being somewhat removed, distance-wise, from other lifts and trails. The warming hut would also allow guests to avoid the elements during certain weather conditions and/or provide a location for guests to rest

Refer to the Cumulative Effects analysis for a discussion of the previously-approved Peak 7 Restaurant.

Alternative 3

Annual Visitation

As presented above, annual visitation at BSR is anticipated to maintain average annual growth of 1.25 percent. As presented in Table 3B-13, Year 10 annual skier visits could be approximately 1,810,000 (an increase of approximately 210,000 over the current annual average of 1.6 million skier visits). As discussed in this recreation section, annual visitation has less of an impact on the recreation resource and the guest experience than daily visitation. An increase in annual visitation would mean that the frequency of higher skier visit days would increase annually (e.g., current 10,000 skier visit days during the mid-week could become 11,500 skier days). But with Alternative 3 (similar to the No Action and Alternative 2 in rationale), Peak Day skier visits (18,500+) are not anticipated to increase in daily skier visits, but the frequency of the 18,500+ skier day could increase across the course of the season.

Daily Visitation

Single day visitation is not anticipated to increase and over-burden the recreation resource. The purpose and need is to better accommodate the current daily skier visits occurring at BSR and make the proposed CCC more in-line with that visitation level (16,000—a quantity of guests that already visit BSR approximately 25 percent of the year). The CCC with implementation of Alternative 3 would increase to approximately 16,500 skiers. As described in the Scope of the Analysis at the beginning of this section, CCC is based on a comparison of uphill vertical lift supply to downhill vertical skiing demand. Therefore, with the upgrade of the existing lift infrastructure and a one new chairlift, the CCC of BSR would increase by approximately 1,500 guests over the No Action Alternative.

Lift Network

Alternative 3 would include three lift upgrades (Colorado SuperChair, A-Lift and C-Lift) and one new lift installation to service the gladed terrain north of Peak 7. The remainder of the lift network at BSR would resemble existing conditions. The upgrades to the lift network would increase the uphill capacity of the three aforementioned lifts by approximately 4,000 people per hour. This increase would be primarily a reflection of the upgrade of A-Lift from a fixed grip double chair to a high-speed four-person chair with a mid-load and unload station. The new lift in Alternative 3 would be a lower capacity lift due to the amount of terrain it would serve (97 acres) and would have a design capacity of 1,200 people per hour. Other lift projects, previously-approved for implementation, are addressed in Cumulative Effects below.

Lift-Line Wait Times

As discussed in the Affected Environment section, the round trip interval has a direct affect on the quality of the recreation experience, and is heavily influenced by lift-line wait times. Under Alternative 3, lift-lines are anticipated to decrease for the Mercury and Beaver Run SuperChairs as a result of replacing A-Chair and C-Chair with detachable lifts and distributing skiers between the four adjacent lifts more evenly. Lift-lines on the Colorado SuperChair would likely reduce due to the proposed increase to the

hourly capacity of that lift (2,800 to 3,000 people per hour design capacity). The affected lifts are highlighted in Table 3B-22.

Table 3B-22:
Round Trip Interval and Runs per Day – Alternative 3

Lift/Wait Time	Round Trip Interval (min.)	Runs per Day from Lift
QuickSilver Super6		
Alternative 1: Design Day Lift-line Wait Time (10 min)	32	8
Alternative 3: Design Day Lift-line Wait Time (10 min)	32	8
Peak Day Lift-line Wait Time (20 min) – *unchanged*	42	6
Mercury SuperChair (Comparison Pod)		
Alternative 1: Design Day Lift-line Wait Time (7 min)	30	10
Alternative 3: Design Day Lift-line Wait Time (6 min)	29	10
Peak Day Lift-line Wait Time (12 min) – *unchanged*	35	9
A-Chair (Comparison Pod)		
Alternative 1: Design Day Lift-line Wait Time (5 min)	31	8
Alternative 3: Design Day Lift-line Wait Time (2 min @ each load station)	13	19
Peak Day Lift-line Wait Time (10 min) – *unchanged*	36	7
C-Chair (Comparison Pod)		
Alternative 1: Design Day Lift-line Wait Time (10 min)	34	10
Alternative 3: Design Day Lift-line Wait Time (7 min)	34	10
Peak Day Lift-line Wait Time (12 min) – *unchanged*	36	9
Beaver Run SuperChair (Comparison Pod)		
Alternative 1: Design Day Lift-line Wait Time (10 min)	38	8
Alternative 3: Design Day Lift-line Wait Time (8 min)	25	13
Peak Day Lift-line Wait Time (12 min) – *unchanged*	40	7
Colorado SuperChair (Comparison Pod)		
Alternative 1: Design Day Lift-line Wait Time (12 min)	32	9
Alternative 3: Design Day Lift-line Wait Time (6 min)	26	12
Peak Day Lift-line Wait Time (15 min) – *unchanged*	35	9
Rocky Mountain SuperChair		
Alternative 1: Design Day Lift-line Wait Time (5 min)	23	13
Alternative 3: Design Day Lift-line Wait Time (3.5 min)	22	17
Peak Day Lift-line Wait Time (13 min)	31	10
Independence SuperChair		
Alternative 1: Design Day Lift-line Wait Time (10 min)	33	9
Alternative 3: Design Day Lift-line Wait Time (10 min)	33	9
Peak Day Lift-line Wait Time (22 min) – *unchanged*	45	7

Table 3B-22:
Round Trip Interval and Runs per Day – Alternative 3

Lift/Wait Time	Round Trip Interval (min.)	Runs per Day from Lift
6-Chair		
Alternative 1: Design Day Lift-line Wait Time (10 min)	24	15
Alternative 3: Design Day Lift-line Wait Time (10 min)	24	15
Peak Day Lift-line Wait Time (15 min) – *unchanged*	29	12
Imperial Express SuperChair		
Alternative 1: Design Day Lift-line Wait Time (7 min)	18	20
Alternative 3: Design Day Lift-line Wait Time (7 min)	15	24
Peak Day Lift-line Wait Time (15 min) – *unchanged*	26	14
T-Bar		
Alternative 1: Design Day Lift-line Wait Time (7 min)	21	17
Alternative 3: Design Day Lift-line Wait Time (7 min)	21	17
Peak Day Lift-line Wait Time (15 min) – *unchanged*	29	12

Note: Planned Lift-line Wait Time is based on data contained in the BSR MDP (BSR, 2007). Alternative 3 Design Day lift-line wait time calculations are based an assumed decrease of lift-lines between 20% for proximate lifts and up to 50% for lift upgrades. Peak Day Lift-line Wait Times are based on actual wait times recorded throughout the ski season (USDA Forest Service, 2010 and SE Group, 2010) and would not change as a result of the Alternative 3.

As discussed in both the Affected Environment, and Alternative 2, lift-line wait times have a direct effect on the amount of runs and vertical feet a guest can accumulate in one day. Overall, the upgrade of three lifts would have the effect of reducing lift-line wait times. Compared to the No Action Alternative, lift-line wait times on Beaver Run would reduce by approximately 20 percent, the Colorado SuperChair by roughly 50 percent, A-Lift by 60 percent, C-Chair 30 percent and Mercury by 15 percent. For comparison, Alternative 1 would average nine runs per day for the lifts highlighted in Table 3B-16. However, with implementation of Alternative 3 the average runs per day would total 13. This would amount to an additional 10,400 vertical feet that a typical guest could ski on the affected lifts, compared to the No Action Alternative.

On days below 16,000 skier visits, the Comparison Pods would have a commensurate decrease in lift-line wait times and a commensurate increase in runs per day. This would be a benefit to the guest experience on approximately 75 percent of the ski season. On peak days, lift-line wait times would not decrease as the level of visitation (18,500+) would continue to require the existing lifts to operate at-capacity.

Terrain

Lift-Served Terrain

Lift-served terrain under Alternative 3 falls into two categories: within, and outside of, the developed current ski area operational boundary.

Within the developed ski area operational boundary, Alternative 3 trails have been planned on Peaks 8, 9 and 10 that would provide 33 acres of additional Low-Intermediate (6 acres), Intermediate (14 acres) and Advanced-Intermediate (13 acres) terrain. The ski area operational boundary would increase to 3,428 acres, an increase of 303 acres. Outside of the current developed ski area operational boundary, the new terrain north of the current operational boundary would provide approximately 97 acres of gladed lift-served Intermediate (55 acres) and Low-Intermediate (42 acres) terrain.

In total, and as indicated in Table 3B-23, Alternative 3 would provide an additional 280 acres of new terrain: 48 acres of Low-Intermediate terrain, 68 acres of Intermediate terrain, 13 acres of Advanced-Intermediate terrain, and 150 acres of Expert terrain. All of the Expert terrain would be lift-served by the Imperial Express and would be the result of the relocated operational boundary (refer to Figure 7).

Table 3B-23:
Lift-Served Terrain Distribution by Ability Level – Alternative 3

Skier Ability Level		Existing Trail Acreage (acres)	Existing BSR Skier Distribution[a] (%)	Alternative 3 Trail Area (acres)	Alternative 3 BSR Skier Distribution (%)	Central Rockies Skier Market (%)
●	Beginner	2.8	1	2.8	1	5
●	Novice	106.6	15	106.6	14	15
■	Low-Intermediate	403.4	38	451.8	39	25
■	Intermediate	402.0	29	470.2	30	35
◆	Advanced-Intermediate Traditional Bowl Skiing	 175.7 173.4	9	 188.5 173.4	9	15
◆	Expert Traditional Bowl Skiing	 217.9 342.7	7	 217.9 493.0	7	5
	Total	**1,824.5**	**100**	**2,104.2**	**100**	**100**

Under Alternative 3, new trail development within and outside of BSR's existing ski area operational boundary would result in approximately 81 acres of additional Intermediate and Advanced-Intermediate terrain. As noted previously, when taken together, the Intermediate and Advanced-Intermediate ability levels represent 50 percent of BSR's market, but currently at BSR slightly less than 40 percent (approximately 751 acres) of the resort serves guests of these ability levels. Alternative 3 would increase the percentage of distribution capacity for Intermediate terrain by 1 percent over the No Action Alternative, and BSR would maintain a deficit of Intermediate terrain, when compared to the skier market. Advanced-Intermediate terrain would increase (13 acres), but BSR would still maintain a deficit of Advanced-Intermediate terrain, when compared to the skier market.

Mountain Pine Beetle

Of the acreage presented in Alternative 1, approximately 19.4 acres would be developed under Alternative 3.

Hike-To Terrain

With Alternative 3, approximately 46 acres of hike-to terrain would be located on the north-facing summit of Peak 7 and on Peak 6½. It is anticipated that this terrain would be primarily accessed by traversing north from the top terminal of the Imperial Express; however, it would be possible to hike from the top of the Alternative 3 Lift. Hike-to terrain densities would likely decrease marginally in other hike-to areas of BSR as a result of Alternative 3. Note that densities on these types of terrain are primarily a function of snow conditions, so accurate predictions of densities on any given day are not possible, but it is likely that average overall densities would decrease.

Backcountry Terrain

Under Alternative 3, backcountry terrain within the northern portion of BSR's SUP area (on Peaks 6½ and 6) would be reduced from 2,631 to 2,328 (a reduction of 303 acres). Backcountry terrain on Peaks 9 and 10 would remain unchanged.

Within the BSR SUP area, backcountry skiers primarily use the Peak 6 Bowl, and a portion of the cornice to the south—Peak 6½ is used less frequently. Because the Peak 6 Bowl, and some of the cornice to the south, would remain outside of the developed Alternative 3 boundary, the backcountry experience within the Peak 6 portion of BSR's SUP area would be retained. However, under Alternative 3, Peak 6 backcountry skiers would be in much closer proximity to BSR's ski area operational boundary than under the No Action Alternative and this could impact the user's solitude.

As previously noted, the entire BSR SUP area—Peak 6 included—is identified in the 2002 Forest Plan as within Management Area 8.25 – Ski Areas (Existing and Potential). On the WRNF, Management Area 8.25 includes existing resorts that have already been permitted and developed, as well as additional suitable terrain into which development is planned for the future, which characterizes Peak 6. Therefore, this proposal is consistent with the WRNF's Forest Plan direction regarding management of these public lands.

Under Alternative 3, BSR's ski area operational boundary would be shifted within the SUP area—from its current location on Peak 7, to the north side of Peak 6½ (refer to Figure 7). Backcountry access would change commensurately, and a Forest Service backcountry access point would be established along the new ski area operational boundary.

By moving the ski area operational boundary north and establishing a new Forest Service access point, access to backcountry terrain on the Peak 6 and 5 portion of the SUP area would become much easier

than under Alternative 1. This has the potential to increase the use of both Peaks 6 and 5 by backcountry skiers.

Skier Circulation

Portal Use/Egress

With development of the gladed terrain in Alternative 3, a continued shift towards the Peak 7 portal is anticipated compared to the No Action Alternative. The increase in use of Peaks 7 and 8 would likely result in an increase in afternoon congestion, compared to the No Action Alternative. The decrease in use of Peak 9 would result in a slight decrease in egress densities, compared to the No Action Alternative.

Table 3B-24:
Access/Egress Role By Portal Based on Design Day – Alternative 3

Portal	Access		Egress	
	Estimated % of Guests	Guests	Estimated % of Guests	Guests
Peak 7	15	2,400	15	2,400
Peak 8	42	6,720	42	6,720
Peak 9	43	6,880	43	6,880
Total	***100***	***16,000***	***100***	***16,000***

Essentially all skiers using the Peak 6½ lift and gladed terrain lift would need to use *Monte Cristo* (the northern-most trails on Peak 7) to return to the Peak 7 portal (or ride Independence SuperChair to access the Peak 8 portal) at the end of the day, trail densities on *Monte Cristo* would be higher during the afternoon egress period (refer to Table 3B-25).

As discussed in the Affected Environment, egress trail densities at BSR have been identified as an issue of concern as they can be quite high during the afternoon egress period. As presented in Table 3B-25, the projected egress densities on Peak 9 would decrease as a result of Alternative 3, compared to the No Action Alternative. However, as the Peak 7 portal use would grow, the Peak 8 portal use would remain the same as the No Action Alternative; therefore, egress densities would not change, compared to the No Action Alternative. On days less than 16,000 skier visits, commensurate changes in egress densities would be expected.

Table 3B-25:
Design Day Egress Skier Densities – Alternative 3

Primary Egress Trails	Minimum Width	Skier Speed	Portal Guests	Egress Density	Reference Density	Difference from Reference	Difference from Reference
	(ft.)	(ft./min.)	(%)	(guests/acre)	(guests/acre)	(+/-)	(%)
Peak 9							
Silverthorne	192	800	45	22	18	+4	123
Lower Sundown	118	800	30	24	10	+14	241
Peak 8							
Four O'Clock	122	800	20	15	14	+1	108
Springmeier	155	800	30	18	14	+4	128
Swinger	89	800	15	16	14	+2	111
Crescendo	125	800	30	22	14	+8	158
Claimjumper	97	800	10	10	14	-4	68
Peak 7							
Pioneer	148	800	60	13	14	-1	96
Monte Cristo	74	800	30	13	14	-1	96

Guest Circulation throughout the Operational Boundary

As presented in Table 3B-26, Alternative 3 would reduce the circulation time for a guest to move from Peak 7 to Peak 10 by approximately 20 minutes. This reduction would be the result of several projects including the upgrade of the Colorado SuperChair (reduced lift-line wait time), the grading project on *Sawmill* and *Lower Crosscut* trail (reduced time on trail), and the upgrade of C-Chair. If a guest chooses to descend to Beaver Run (reduced lift-line wait time), a reduction of over ten minutes would still occur. This has a beneficial effect on the guest experience, as the guest would have more time engaged in skiing during the day. In addition, the existing condition includes a flat stretch on *Lower Sawmill* where the majority of snowboards are presently required to walk. Alternative 3 would provide a consistent slope where guests could hold their speed to, or past, the base of C-Chair.

Table 3B-26:
Skier Circulation Between Peaks 7 and 10 on Design Day – Alternative 3

Starting Point	Destination	Approximate Duration (min)
Peak 7 Base Area	**Peak 10 – Bottom of Falcon**	
Independence SuperChair Lift-Line Wait Time		10:00
Bottom of Independence SuperChair	Top of Independence SuperChair	7:40
Top of Independence	Bottom of Colorado SuperChair	9:30
Colorado SuperChair Lift-Line Wait Time		6:00
Bottom of Colorado SuperChair	Top of Colorado	7:00
Top of Colorado SuperChair	Bottom of C-Chair	8:00
Option 1 (same route as Affected Environment)		
Bottom of C-Chair	Bottom of Beaver Run SuperChair	2:30
Beaver Run SuperChair Lift-Line Wait Time		8:00
Bottom of Beaver Run SuperChair	Top of Beaver Run SuperChair	9:00
Top of Beaver Run SuperChair	Bottom of Falcon SuperChair	6:10
Option 1 Total Time Commitment From Peak 7 to Peak 10		***73:50***
Option 2 (Use Upgraded C-Chair)		
C-Chair Lift-Line Wait Time		7:00
Bottom of Upgraded C-Chair	Top of Upgraded C-Chair	5:45
Top of Upgraded C-Chair	Bottom of Falcon SuperChair	5:20
Option 2 Total Time Commitment from Peak 7 to Peak 10		***64:55***
Peak 10	**Peak 7 Base Area**	
Bottom of Falcon SuperChair	Peak 8 SuperConnect Bottom Terminal	5:30
Peak 8 SuperConnect Lift-Line Wait Time		5:00
Bottom of Peak 8 SuperConnect	Top of Peak 8 SuperConnect	9:00
Top of Peak 8 SuperConnect	Bottom of Independence SuperChair	7:30
Total Time Commitment from Peak 10 to Peak 7		***27:00***

Trail Densities

When compared to the No Action Alternative (No Action is assumed to be similar to the existing condition on a Design Day), trail densities would increase, on average, approximately 2 percent on Peak 9 (mainly due to increased lift capacity), decrease by 6 percent on Peak 8, and remain similar to the No Action Alternative on Peak 7.

Table 3B-27:
Design Day Trail Density – Alternative 3

Primary Egress Trails	Minimum Trail Width	Skier Speed	Egress Density	Reference Density	Difference from Reference	Difference from Reference
	(ft.)	(ft./min.)	(guests/acre)	(guests/acre)	(+/-)	(%)
Peak 9						
Silverthorne	192	800	25	18	+7	138
Lower Sundown	118	800	27	10	+17	268
Peak 8						
Four O'Clock	122	800	12	14	-2	82
Springmeier	155	800	14	14	0	97
Swinger	89	800	12	14	-2	85
Crescendo	125	800	17	14	+3	121
Claimjumper	97	800	7	14	-7	52
Peak 7						
Pioneer	148	800	9	14	-5	64
Monte Cristo	74	800	3	14	-11	21

Under Alternative 3, average trail densities would be expected to increase above desired densities for A-Chair, Mercury, and Beaver Run. These densities would rise because the approximately 4 acres of additional Intermediate ability level trails would not be commensurate with the increase in lift capacity and decrease in lift ride time.

Peak 8 would have a slight decrease in densities on the trails described in Table 3B-27 along with the addition of approximately 20 acres of Low-Intermediate, Intermediate and Advanced-Intermediate terrain. However, what the density model cannot predict are the new trail intersections that would be created on Peak 8. Trails 2 through 5 would create additional intersections on *Northstar*, *Dukes* and *Little Johnny* trails that could create safety concerns and trail congestion in those isolated areas. The model estimates trail densities on a Design Day of 16,000 skier visits. On days with a visitation level below the Design Day, a proportionate level of change is anticipated for Peaks 7, 8 and 9. Therefore, over the course of the ski season, Peak 9 would have higher trail densities when compared to the No Action Alternative, while Peak 8 would see a benefit to the guest experience with respect to trail densities. Peak 7 would still remain below the reference trail densities, where trail density is not currently an issue due to the proper capacity balance between trails and the Independence SuperChair. Peak days would not be affected by Alternative 3, and high trail densities would still occur across BSR.

Snow Safety

The 36 acres of new Low-Intermediate, Intermediate, and Advanced-Intermediate terrain proposed on Peaks 8, 9 and 10 would not necessitate supplementing BSR's Snow Safety Plan. These areas are already

within BSR's ski area operational boundary, (in some cases) are already used by guests, and are not of sufficient slope angle where avalanche activity is of concern.

Approximately 95 acres of new lift-served Intermediate and Low-Intermediate gladed terrain is proposed on the north side of Peak 7—on Peak 6½. An additional 180 acres of lift-served (via Imperial Express) Expert terrain on Peak 6½ is also included in Alternative 3. Although the proposed Peak 6½ lift in Alternative 3 has been planned such that it avoids areas of known avalanche concerns, the new lift-served terrain above this lift would require augmenting BSR's Snow Safety Plan.

The Peak 6½ lift top terminal, located below Peak 6½ and its ropeway are situated beyond the reach of avalanches with return periods of 30 to 100 years.

Search and Rescue

Search and Rescue activities under Alternative 3 would be the same as described for Alternative 2.

Access to the West Side of the Tenmile Range

Issues related to accessing the west side of the Tenmile Range under Alternative 3 would be the same as for Alternative 2.

On-Mountain Guest Services

No additional on-mountain guest services are included in Alternative 3. Existing facilities on Peaks 8, 9 and 10 would continue to experience crowding on the Design Day and above. Crowding at guest services is entirely dependent on daily skier visits, time of the day and weather conditions. Therefore, even on days below 16,000 skier visits, the guest service facilities are at-capacity during the lunch period. With an increase in up-hill capacity on Peaks 8 and 9, on-mountain facilities could experience increases in utilization compared to the No Action Alternative.

CUMULATIVE EFFECTS

Scope of Analysis

For a detailed description of past, present, and reasonably foreseeable future projects within the cumulative effects analysis area, the reader is referred to Appendix A in this document.

Temporal Bounds

The temporal bounds for this cumulative effects analysis for recreational resources extends from BSR's inception as a ski area in 1961, through the foreseeable future in which BSR can be expected to operate (BSR's current 40-year SUP expires December 31, 2029; however, this analysis assumes the SUP would be reissued).

Spatial Bounds

The spatial bounds for this cumulative effects analysis primarily focuses on NFS lands within, and adjacent to, BSR's SUP area. However, the cumulative effects analysis area extends to include the SUP areas of all four of Summit County's ski areas (BSR, Copper Mountain Resort, Keystone Resort and Arapahoe Basin), all of which are administered according to the 2002 Forest Plan's Management Area 8.25 (Ski Areas – Existing and Potential).

It is important to note that BSR's Forest Service administered SUP boundary has shifted over the years due to several factors, including the 1984 WRNF Forest Plan, 2002 Forest Plan Revision and agreements with the Breckenridge Nordic Center. However, the NFS lands within BSR's current SUP boundary are, and have been since the 1984 Forest Plan, allocated by the WRNF for "existing and potential winter sports sites." The WRNF's 1984 Forest Plan previously identified all of the NFS lands on the east side of the Tenmile Range between the current southern boundary of the SUP area on Peak 10 to approximately Peak 3 as Management Area 1B – Existing and Potential Winter Sports Sites.

When the 2002 Forest Plan was approved, Management Area 1B was replaced with Management Area 8.25: Ski Areas – Existing and Potential. However, NFS lands from North Barton (Peak 5) to approximately Peak 3, which were previously in Management Area 1B, were omitted from the 8.25 Management Area. In fact, the 30,015 acres of NFS lands in Summit County that were allocated for skiing in the 1984 WRNF Forest Plan under Management Area 1B were reduced by 17 percent—to 24,928 acres—in the current 2002 Forest Plan.

Past, Present, and Reasonably Foreseeable Future Actions

Past, present, and reasonably foreseeable actions that affect recreation resources within the analysis area are related to development of public and private lands dating back to the 1960s. These past, present, and reasonably foreseeable actions include:

- Breckenridge Ski Resort Master Development Plan projects
- Development of Peak 7 Terrain
- BreckConnect Gondola
- Imperial Express and 6-Chair EA
- Peaks 7 and 9 Facilities EA
- Peak 9 Lifts and Facilities Improvements EA
- Breckenridge Ski Resort Vegetation Management Plan
- Summit County Ski Area Projects
- Miscellaneous Projects that affect Recreation

- In-holding Property
- Weber Gulch Hut
- White River National Forest Travel Management Plan

Alternative 1

Summit County Annual Visitation

Annual visitation at the four Summit County ski areas between the 1999/2000 and 2009/10 seasons is provided in Table 3B-28. The four Summit County ski areas are compared against annual visitation for Colorado, which receives considerably more skier visitation than any state. As indicated, the four Summit County resorts contribute to—on average—one third of Colorado's annual skier visits.

Table 3B-28:
Total Annual Skier Visitation at BSR, Copper Mountain Resort, Keystone Resort and Arapahoe Basin

Season	Colorado	Summit County	BSR	Copper Mountain Resort	Keystone Resort	Arapahoe Basin
2009/10	11,862,478	3,780,969	1,608,031	834,089	982,000	356,849
2008/09	11,855,498	3,791,849	1,528,000	873,039	981,000	409,810
2007/08	12,540,603	4,125,483	1,630,108	934,870	1,129,608	430,897
2006/07	12,566,299	4,228,237	1,650,321	1,046,959	1,170,710	360,247
2005/06	12,533,108	4,171,169	1,619,043	1,132,021	1,106,634	326,428
2004/05	11,816,193	3,866,523	1,470,961	1,046,242	1,041,395	328,892
2003/04	11,250,761	3,557,043	1,402,055	931,143	944,433	275,428
2002/03	11,605,777	3,840,424	1,424,770	1,058,016	1,038,942	317,401
2001/02	11,128,131	3,695,077	1,468,518	1,005,913	1,069,111	151,678
2000/01	11,666,672	3,871,611	1,422,783	992,888	1,230,100	240,406
1999/00	10,892,263	3,660,812	1,444,365	803,312	1,192,528	220,945

As indicated in Table 3B-28, BSR's annual visitation increased by 9 percent between the 2004/05 and 2005/06 seasons. While this was coincident with the installation of the Imperial Express SuperChair on Peak 8 in 2005, Copper Mountain Resort and Keystone Resort experienced annual visitation increases of 8 and 6 percent (respectively) during the same time period without any capital improvements. BSR's annual visitation has remained above 1.5 million ever since the 2005/06 season. Arapahoe Basin's annual visitation spiked in the 2007/08 season (a 19 percent increase from the 2006/07 season), coincident with the development of Montezuma Bowl, and has remained near 400,000 since that time.

Under Alternative 1, BSR would not pursue any capital improvement projects (with the exception of the previously approved projects detailed below) and, as discussed under Direct and Indirect Environmental Consequences, its average annual visitation increases would be expected to decrease to around

0.75 percent. Over a ten-year analytical timeframe, annual visitation at BSR would be expected to increase incrementally by 125,000 under Alternative 1. Moreover, as other Summit County resorts pursue capital improvement projects, some of BSR market may erode as skiers opt to go elsewhere.

- Other Summit County resorts—notably Copper Mountain Resort and Keystone Resort—have reasonably-foreseeable future projects that could potentially be brought on-line. At Copper Mountain Resort, these include approved lift, terrain and snowmaking projects (including the installation of an upgraded Highpoint Lift to be constructed in summer 2011). Keystone Resort has a newly accepted MDP that would need to undergo site-specific NEPA analysis prior to individual lift, trail and infrastructural projects being installed. Arapahoe Basin has developed all projects included in its 2006 EIS and Record of Decision, with the exception of the upper parking lot project.
- Reasonably foreseeable future projects at Copper Mountain Resort and Keystone Resort have potential to induce additional annual visitation to Summit County. However, due to the speculative nature of projects at other Summit County resorts, under Alternative 1, cumulative annual skier visitation in Summit County is anticipated to trend steadily in the future—hovering around the 4 million mark. This depends on numerous external forces that are impossible to predict, including weather and the economy.

Breckenridge Ski Resort Master Development Plan and Past Projects

Key projects that have received Forest Service approval include the 6-Chair upgrade and the Peak 7 Restaurant. The details of each of these projects are presented in Appendix A. The Forest Service did not "require" either of these projects to be constructed after they were approved. However, this analysis assumes these projects are reasonably foreseeable future developments.

It is reasonable to anticipate that the upgrade to 6-Chair would decrease lift-line wait times on that lift, Imperial Express and T-Bar. Imperial Express and T-Bar provide similar terrain. A result of this upgrade would be an increase in skier utilization of the 6-Chair terrain and the terrain be "tracked-out" sooner on a powder day. In addition, the 6-Chair upgrade would increase the CCC by 110 to a total CCC of 15,030. The other previously-approved lift upgrade projects (e.g., A-Lift) are included in Alternative 3.

The Peak 7 Restaurant would provide on-mountain guest services in a location that is not currently provided. Therefore, by constructing the facility, some utilization of other on-mountain facilities (Vista Haus, Peak 9 Restaurant and Ten Mile Station would be reduced. This would improve the guest experience of these facilities as the current demand for guest seating and guest service space would be off-set with the Peak 7 Restaurant.

Summit County Hike-To Terrain

Table 3B-29 displays cumulative impacts to hike-to terrain at Summit County resorts (BSR, Copper Mountain Resort, Keystone Resort and Arapahoe Basin) under Alternative 1 – No Action. The rationale for using 2002 as the basis for this hike-to terrain cumulative effects analysis is that, upon its adoption, the 2002 Forest Plan modified SUP boundaries for all Summit County resorts.[94] This serves as a reasonable baseline for which to compare the extent of past, present and future hike-to terrain within ski area SUP boundaries. Again, as described in the Affected Environment section of this analysis, hike-to terrain is within a ski area's operational boundary, but is not lift-served.

Table 3B-29:
Cumulative Impacts to Hike-To Terrain (acres) at Summit County Ski Areas: Alternative 1

Ski Area	SUP Acreage	Hike-To Terrain: 2002	Hike-To Terrain: Present	Hike-To Terrain: Future
BSR	5,756	414	390	390
Copper Mountain Resort	7,486	479	479	225
Arapahoe Basin	1,872	177	253	253
Keystone Resort	8,536	331	1,441	158
Total	**23,650**	**1,400**	**2,563**	**1,036**
Total Net Change from 2002	***N/A***	**--**	***+1,163***	***-364***

As indicated in Table 3B-29, total hike-to terrain at the four Summit County ski areas increased by approximately 1,163 acres between 2002 and present, for a total of 2,563 acres. Cumulatively, hike-to terrain is anticipated to decrease in the future under Alternative 1, due to other reasonably foreseeable future projects at Copper Mountain Resort and Keystone Resort, as discussed below.

Breckenridge Ski Resort

At BSR, the changes to hike-to terrain between 2002 and present is attributable to two actions:

- Installation of the Imperial Express SuperChair in 2005, which converted hike-to terrain on Peaks 7 and 8 to lift-served terrain (a decrease of hike-to terrain), and
- Incorporation of hike-to terrain in *Snow White* (which was formerly backcountry terrain within BSR's SUP area) into the resort's operational boundary in 2006 (an increase in hike-to terrain).
- Thus, the removal of hike-to terrain on Peaks 7 and 8, combined with the incorporation of *Snow White* into BSR's operational boundary, created a net decrease of 24 acres in hike-to terrain at BSR.

[94] The Alternative 2 and 3 cumulative effects analyses use 2002 as the baseline, as well.

Copper Mountain Resort

At Copper Mountain Resort, no projects have been implemented since 2002 that have affected hike-to terrain within the SUP area. However, Copper Mountain Resort has WRNF approval to construct a lift on Tucker Mountain, which, upon installation, would convert approximately 254 acres of existing hike-to terrain to lift-served.

Arapahoe Basin

At Arapahoe Basin, the difference in hike-to terrain between 2002 and present is attributable to the installation of the Zuma Lift in 2007.[95] This opened approximately 76 acres of "hike-back" terrain below the bottom terminal.

Keystone Resort

At Keystone Resort, approximately 1,110 additional acres of snowcat and hike-to terrain in Little Bowl/Erickson Bowl, and on Independence Mountain, were incorporated into its operational boundary in 2003 and 2006, respectively. This increased Keystone's hike-to terrain to a total of 1,441 acres. The WRNF has since accepted a MDP for Keystone that includes provisions for developing lift-served terrain that is currently hike-to in the Outback, Bergman Bowl, Erickson Bowl and Independence Bowl, as well as new snowcat/hike-to terrain on Independence Mountain. Conversion of hike-to terrain to lift-served, combined with new snowcat/hike-to terrain on Independence Mountain, would create a net loss of hike-to terrain from approximately 1,441 acres to 158 acres. Note that none of the projects contained in Keystone Resort's accepted MDP have undergone site-specific NEPA analysis or approval at this time.

Summit County Backcountry Terrain within SUP Areas

As with the previous analysis of cumulative impacts to hike-to terrain, the following backcountry terrain cumulative impacts analysis uses 2002 as the baseline year.

Table 3B-30:
Cumulative Impacts to Backcountry Terrain (acres) with SUP Areas at Summit County Ski Areas: Alternative 1

Ski Area	SUP	Backcountry Terrain: 2002	Backcountry Terrain: Present	Backcountry Terrain: Future
BSR	5,756	2,604	2,631	2,631
Copper Mountain Resort	7,486	3,911	3,911	3,898
Arapahoe Basin	1,872	1,216	786	311
Keystone Resort	8,536	4,938	3,811	2,785
Total	**23,650**	**12,669**	**11,139**	**9,422**
Total Net Change from 2002	***N/A***	**--**	***-1,530***	***-2,642***

[95] This, however, reduced backcountry terrain at Arapahoe Basin, as discussed in the next section.

Table 3B-30 indicates that between 2002 and present, approximately 1,530 acres of backcountry terrain within the four Summit County ski areas were converted to other forms of terrain (lift-served or hike-to). Under Alternative 1, in the reasonably foreseeable future, roughly 1,515 additional acres of backcountry terrain may potentially be converted to other types of terrain at Copper Mountain Resort, Arapahoe Basin and Keystone Resort. This would lead to a net reduction in backcountry terrain of 2,642 acres from 2002. Each resort is discussed separately, below.

Breckenridge Ski Resort

At BSR, the incorporation of Snow White into its operational boundary in 2006 converted approximately 176 acres of backcountry terrain that was within the Breckenridge SUP area to hike-to terrain, which became accessible from the Imperial Express SuperChair. In addition, the SUP area was modified in 2006 that increased backcountry terrain.[96]

Under Alternative 1, use of the backcountry within BSR's SUP boundary is anticipated to increase in the future, with potential for significant increases. This is due to two primary factors: 1) the locations of Forest Service access points along BSR's operational boundary; and 2) the popularity of, and accessibility to, backcountry equipment for consumers (for purchase or rent). The backcountry access points on the north and south sides of BSR's operational boundary typically experience high levels of use. This is important, given that upper Peak 7 access point was opened in February 2011. Increased use of the backcountry in the future could, on isolated days, affect the experience for some users that are accustomed to a certain level of solitude in the backcountry that is immediately north and south of the BSR operational boundary.

Copper Mountain Resort

Copper Mountain Resort did not complete any projects between 2002 and present that affected its backcountry terrain. It does, however, have approval to install the Tucker Lift, which would lift-serve approximately 13 acres of backcountry terrain. These 13 acres would be converted to lift-served and are currently accessed by some guests via snowcat.

Arapahoe Basin

Approved in a Record of Decision in 2006, Arapahoe Basin installed the Zuma Lift in Montezuma Bowl in 2007. This converted approximately 430 acres of backcountry terrain that was within its SUP area to lift-served terrain. Arapahoe Basin has submitted preliminary draft plans to the WRNF that include a project to develop the Beavers for lift-served skiing. This would include approximately 475 acres within their current SUP boundary. At this time, the Forest Service has not officially "accepted" the Master Plan update.

[96] Refer to Appendix C for more information on the SUP boundary adjustment.

Keystone Resort

At Keystone Resort, backcountry terrain within its SUP area decreased between 2002 and present, attributable to WRNF approval for guided snowcat skiing and riding on Bergman Bowl/Erickson Bowl and on Independence Mountain. Keystone Resort's Master Development Plan includes additional guided snowcat skiing and riding on the north side of Independence Mountain, as well as lift service within Bergman and Independence Bowls, that would further remove backcountry terrain from the SUP area. These reasonably foreseeable future projects (which require NEPA analysis and approval before they can be implemented) would result in a net decrease of approximately 2,153 acres of backcountry terrain at Keystone Resort compared to the 2002 acreage of 4,938.

Miscellaneous Projects that Affect Recreation

Due to the on-going mountain pine beetle epidemic, several WRNF forest health projects have been approved. Due to the interface between recreation (primarily summer season) and forest health projects/ tree removal activities (refer to Chapter 3J – Forest Health), hiking and mountain biking activities could be affected in Summit County.

The Weber Gulch Hut proposal, which the Forest Service is currently analyzing, would increase use of a portion of backcountry terrain on the north side of Baldy Mountain. This increase in use could impact current backcountry users' experience.

The in-holding parcel that is surrounded by NFS lands and the BSR SUP area could be developed in the future as a residential property. Should this occur, access to the property during the winter and summer could affect recreation use on the Siberian Loop of the Nordic Center. Additional details on the project are contained in Appendix A; however, a specific access plan for this project has not been formalized.

The WRNF Travel Management Plan will affect dispersed recreation across the Forest as trails and roads may be decommissioned. However, the decommissioning of certain roads for motorized use may provide a better non-motorized experience for certain guests.

Alternative 2

Summit County Annual Visitation

Under Alternative 2, BSR's annual visitation would be expected to remain consistent with a past average annual growth of up to 2 percent for the next ten years. A 2 percent increase would contribute an additional 350,000+/- annual skier visits to Summit County. This, combined with reasonably foreseeable future projects at the other three Summit County ski areas would likely push Summit County's annual skier visits to nearly 4.5 million over the next decade.

Breckenridge Ski Resort Master Development Plan and Past Projects

Cumulatively, BSR would provide greater lift capacity for Advanced-Intermediate and Expert ability level guests when combining the Peak 6 lifts with an upgraded 6-Chair. The upgrade to 6-Chair, combined with Alternative 2, would increase the overall CCC at BSR to 16,280. Other previously approved lift upgrades are being re-analyzed under Alternative 3. Expert ability level guests would use the Peak 6 lifts to access terrain in the Peak 6 area. This condition combined with an upgraded 6-Chair and the existing lift network that services Expert terrain would result in an overall reduction on lift-line wait times and terrain utilization compared to the No Action Alternative.

The guest services facilities proposed on Peak 6, combined with existing and reasonably foreseeable projects would provide the appropriate level of guest service space and would better meet guest expectations. The Peak 6 restroom facility would be located within the Peak 6 terrain and is anticipated to only be used by guests riding the Peak 6 lifts.

Summit County Hike-To Terrain

Table 3B-31 displays cumulative impacts to hike-to terrain at Summit County resorts (BSR, Copper Mountain Resort, Arapahoe Basin and Keystone Resort) under Alternative 2 – the Proposed Action.

Table 3B-31:
Cumulative Impacts to Hike-To Terrain (acres) at Summit County Ski Areas: Alternative 2

	SUP Acreage	Hike-To Terrain: 2002	Hike-To Terrain: Present	Hike-To Terrain: Future
BSR	5,756	414	390	535
Copper Mountain Resort	7,486	479	479	225
Arapahoe Basin	1,872	177	253	253
Keystone Resort	8,536	331	1,441	158
Total	**23,650**	**1,400**	**2,563**	**1,171**
Total Net Change from 2002	***N/A***	**--**	***+1,163***	***-229***

As indicated in Table 3B-31, total hike-to terrain at the four Summit County ski areas increased by approximately 1,163 acres between 2002 and present, for a total of 2,563 acres. Cumulatively, hike-to terrain is anticipated to decrease in the future under Alternative 2, but less than under Alternative 1. This is attributable to other reasonably foreseeable future projects at Copper Mountain Resort and Keystone Resort that will potentially decrease hike-to terrain within their SUP areas, as well as approximately 143 acres of proposed new hike-to terrain at BSR on Peak 6.

All other projects at Copper Mountain Resort, Arapahoe Basin and Keystone Resort are as discussed under Alternative 1.

Summit County Backcountry Terrain

Table 3B-32 indicates that between 2002 and present, approximately 1,733 acres of backcountry terrain within the four Summit County ski areas were converted to other forms of terrain. Under Alternative 2, in the reasonably foreseeable future, approximately 2,330 additional acres of backcountry terrain may potentially be converted to other types of terrain within the BSR, Copper Mountain Resort and Keystone Resort SUP areas.

Table 3B-32:
Cumulative Impacts to Backcountry Terrain (acres) within SUP Areas at Summit County Ski Areas: Alternative 2

	SUP	Backcountry Terrain: 2002	Backcountry Terrain: Present	Backcountry Terrain: Future
BSR	5,756	2,604	2,631	1,811
Copper Mountain Resort	7,486	3,911	3,911	3,898
Arapahoe Basin	1,872	1,216	786	311
Keystone Resort	8,536	4,938	3,811	2,785
Total	**23,650**	**12,669**	**11,139**	**8,805**
Total Net Change from 2002	***N/A***	**--**	***-1,530***	***-2,334***

Reasonably foreseeable future impacts to backcountry terrain at Copper Mountain Resort and Keystone Resort were discussed under Alternative 1. At BSR, the 820 acres of backcountry terrain that would be removed between “Present” and “Future” is attributable to the development of the Peak 6 portion of the SUP area for lift-served terrain (the loss of backcountry is greater than skiable acreages presented in the Proposed Action, due to the Proposed Action not including all tree islands (refer to Figure 3 and Figure 5). This acreage represents the difference between Alternatives 1 and 2 for the cumulative effects analysis to backcountry terrain.

Miscellaneous Projects that Affect Recreation

The Proposed Action would have an impact to the hiking/biking experience on the construction access road. This impact would be temporary in nature and would include a range of impacts from a hiker/biker encountering a single construction vehicle to a hiker/biker encountering segments of road that are being re-contoured. From a cumulative effects standpoint, all activities (BSR or forest health projects related) would be short-term in nature and would not create a long-term cumulative impact to the recreation experience. Additional miscellaneous projects are addressed under Alternative 1, and Alternative 2 would not have a cumulative impact with these projects due to a difference in impact type.

Alternative 3

Summit County Annual Visitation

Even though Alternative 3 includes projects that would help address the Purpose and Need, some erosion in BSR's market share would be anticipated. This would have potential to decrease annual visitation growth at BSR from approximately 1.5 percent to approximately 1.25 percent. Development of the Alternative 3 gladed terrain, combined with upgrades of the Colorado SuperChair, A-Chair and C-Chair, would reduce lift-lines at certain lifts and provide a new terrain offering; all contributing to annual visitation growth beyond the No Action Alternative.

An annual average growth rate of 1.25 percent at BSR would contribute an additional 210,000+/- annual skier visits to Summit County over the next ten years. This, combined with reasonably foreseeable future projects at the other three Summit County ski areas would likely increase Summit County annual skier visits to approximately 4.25 million over the next decade.

Breckenridge Ski Resort Master Development Plan and Past Projects

The upgrade to 6-Chair and construction of the Peak 7 Restaurant would have a positive cumulative effect on lift-line wait times and the guest experience as presented in the No Action Alternative analysis. The upgrade of 6-Chair would increase the overall BSR CCC to 16,520.

Summit County Hike-To Terrain

Table 3B-33 displays cumulative impacts to hike-to terrain at Summit County resorts (BSR, Copper Mountain Resort, Keystone Resort and Arapahoe Basin) under Alternative 3.

Table 3B-33:
Cumulative Impacts to Hike-To Terrain (acres) at Summit County Ski Areas: Alternative 3

	SUP Acreage	Hike-To Terrain: 2002	Hike-To Terrain: Present	Hike-To Terrain: Future
BSR	5,756	414	390	437
Copper Mountain Resort	7,486	479	479	225
Arapahoe Basin	1,872	177	253	253
Keystone Resort	8,536	331	1,441	158
Total	**23,650**	**1,400**	**2,563**	**1,073**
Total Net Change from 2002	***N/A***	**--**	***+1,163***	***-327***

As indicated in Table 3B-33, total hike-to terrain at the four Summit County ski areas increased by approximately 1,163 acres between 2002 and present, for a total of 2,563 acres. Cumulatively, hike-to terrain is anticipated to decrease in the future under Alternative 3, but less than under Alternative 1. This is attributable to other reasonably foreseeable future projects at Copper Mountain Resort and Keystone

Resort that will potentially decrease hike-to terrain within their SUP areas, as well as approximately 45 acres of proposed additional hike-to terrain at BSR on Peak 6½.

All other projects at Copper Mountain Resort, Arapahoe Basin and Keystone Resort are as discussed under Alternative 1.

Summit County Backcountry Terrain

Table 3B-34 indicates that between 2002 and present, approximately 1,733 acres of backcountry terrain within the four Summit County ski areas were converted to other forms of terrain. Under Alternative 3, in the reasonably foreseeable future, roughly 1,817 additional acres of backcountry terrain may potentially be converted to other types of terrain within the BSR, Copper Mountain Resort and Keystone Resort SUP areas.

Table 3B-34:
Cumulative Impacts to Backcountry Terrain (acres) within SUP Areas at Summit County Ski Areas: Alternative 3

	SUP	Backcountry Terrain: 2002	Backcountry Terrain: Present	Backcountry Terrain: Future
BSR	5,756	2,604	2,631	2,328
Copper Mountain Resort	7,486	3,911	3,911	3,898
Arapahoe Basin	1,872	1,216	786	311
Keystone Resort	8,536	4,938	3,811	2,785
Total	**23,650**	**12,669**	**11,139**	**9,322**
Total Net Change from 2002	***N/A***	**--**	***-1,530***	***-1,817***

Reasonably foreseeable future impacts to backcountry terrain at Copper Mountain Resort and Keystone Resort were discussed under Alternative 1. At BSR, the 303 acres of backcountry terrain that would be removed between “Present” and “Future” is attributable to the development of the Peak 6½ portion of the SUP area for lift-served terrain. This acreage represents the difference between Alternatives 1 and 3 for the cumulative effects analysis to backcountry terrain.

Miscellaneous Projects that Affect Recreation

Cumulative effects to the recreation experience related to forest health projects would be negligible as the construction of projects for Alternative 3 would be contained primarily within the current operational boundary.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Development of additional lift-served terrain in the previously undisturbed Peak 6 and 6½ portion of BSR's SUP area would represent irretrievable effects to backcountry recreation resources within the SUP area. However, the vegetation and ground disturbance required to provide lift-served skiing for either the Proposed Action or Alternative 3 could be reclaimed and revegetated, thus restoring its backcountry characteristics during the winter season. Therefore, this commitment of the recreation resource is not considered irreversible in nature.

C. TRAFFIC, PARKING AND SKI AREA ACCESS

SCOPE OF THE ANALYSIS

The scope of this analysis includes segments of State Highway 9 (Highway 9), Ski Hill Road (Lincoln Ave), and Main Street within the Town of Breckenridge and its surrounding area. The road segments studied for the traffic, parking and ski area access resources include:

- Highway 9 between the Boreas Pass Road intersection (mile marker 86.2), and the Tiger Road intersection (mile marker 90.3).
- Ski Hill Road/Lincoln Avenue from Main Street to the existing Peak7/8 base and the proposed Peak 6 construction access; and
- Main Street between South Park Avenue and North Park Avenue intersections.

AFFECTED ENVIRONMENT

During the scoping process, traffic congestion and parking demand were topics raised by the public as ongoing issues in and around the Town of Breckenridge. In 2008 a Task Force was created, that included members of BSR, the Town of Breckenridge, Summit County, and the Breckenridge business community to consider issues such as traffic and parking raised during scoping that were impractical to consider in an isolated discussion regarding the Peak 6 proposal (for details regarding Task Force meetings refer to the Peak 6 Task Force section in Chapter 1). The Task Force noted in their report findings that Highway 9 near the Town reaches a point where police must assist traffic flow 20 days per year, and if no improvements (roadway or alternative transit) were completed, at build-out of the Town, police would likely be necessary for traffic management 45 days per year. In considering this possibility, the Task Force identified minimizing additional congested days as a priority, and a comprehensive solution would require collaboration between the Town, County, the parking district and BSR.

Ski Area Access

Highway 9

BSR is accessed via Highway 9, the principal north-south corridor connecting Breckenridge to Interstate 70 about 10 miles north (near Frisco) and connecting to US 285 in Fairplay (Park County) approximately 23 miles south over Hoosier Pass. Colorado Department of Transportation (CDOT) classifies Highway 9 generally as a Regional Arterial for access management purposes. Lower (less restrictive access) Rural and Non-rural highway categories are assigned to segments passing through built up communities along the route (Fairplay, Breckenridge, Frisco). Through the Town of Frisco, Highway 9 is a four-lane road with a raised median and several signalized intersections. Through a series of improvements starting in 2004, key segments of the former two- and three-lane highway between the Towns of Breckenridge and Frisco have been widened to four lanes, with right and left turn auxiliary

lanes at key intersections. More than 80 percent of BSR day skiers arrive via Highway 9 from the north, i.e., Front Range visitors accessing Summit County from Interstate 70. Approximately 20 percent of day skiers enter Breckenridge on Highway 9 from the south, including visitors from Colorado Springs and other population centers, south of Denver. Summer destination guests exhibit similar arrival patterns.

Bus Service

A consolidated Town and BSR "Free Ride" bus service provides connections from residential neighborhoods and the day skier parking lots to the Peak 7, 8 and 9 ski portals and the Breckenridge Station. The Breckenridge Station intermodal center is central to the Town and ski resort access. The four in-town Free Ride circulator routes converge at Breckenridge Station and beginning in January 2007, the BreckConnect Gondola transports skiers between Town and Peaks 7 and 8 base areas. With 111,390 riders in 2006, Breckenridge Station is the highest boarding location, accounting for almost 21 percent of originations for the entire transit system. It is also the terminus for the regional Summit Stage Frisco and Boreas Pass bus routes. The Beaver Run stop near the Peak 9 portal, with 39,920 riders in 2006, was the third highest boarding stop in the system. The Peak 8 base, with 12,552 annual riders, was the seventh highest boarding location. Several lodgings provide courtesy van service for their skiing guests.

BSR reviews its transportation program annually and modifies the program in order to improve service between the Town and the Resort.

Traffic

As stated above in Scope of the Analysis, Highway 9 is the sole route for skier traffic entering Breckenridge from the north and south. For the purpose of this analysis, Highway 9 traffic data for the year 2009 will represent the existing environmental baseline.

The following definitions are used in this analysis:

- "AADT" means the annual average two-way daily traffic volume. AADT represents the total traffic on a section of roadway for the year, divided by 365. It includes both weekday and weekend traffic volumes. Raw data is processed and converted to AADT volumes. AADT can be adjusted to compensate for monthly and daily fluctuations in traffic; the basic intent being to provide traffic volumes which best approximate the use of a given highway section for a typical day of year.
- "VPD" means vehicles per day, which is the total two-way daily traffic volume on a section of roadway.

- "Trip" means a single or one-direction vehicle movement with either the origin or the destination inside a study area. A vehicle leaving the highway and entering a property is one trip. Later, when the vehicle leaves the property it is a second trip.
- "DHV" means design hourly volume which is the total traffic in both directions during the 30th highest hourly volume of the year.

Average Annual Daily Traffic (AADT)

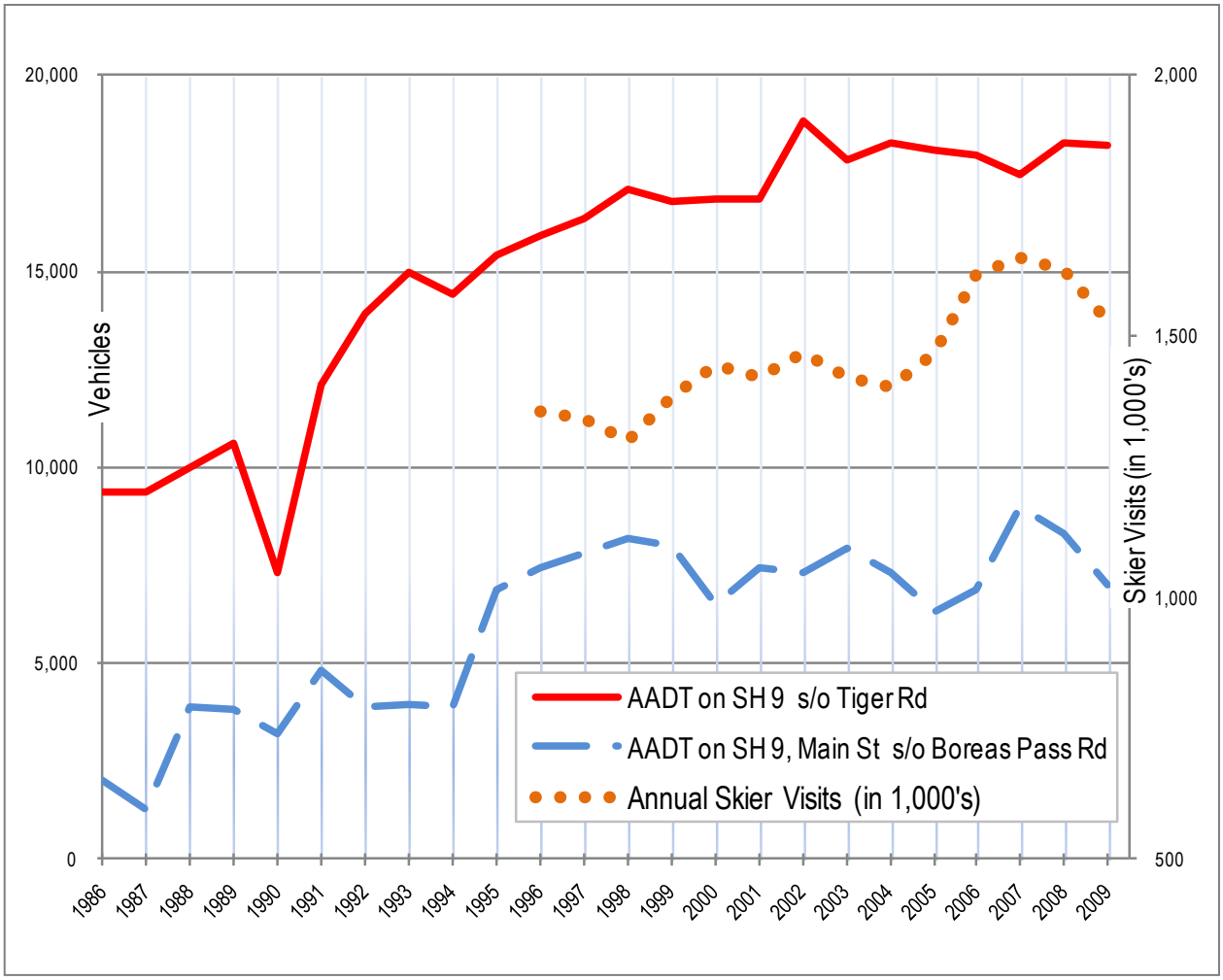
Highway 9 at Tiger Road

Highway 9, as it approaches the Town of Breckenridge from the north, has a permanent Automatic Traffic Recorder (ATR) located just south of Tiger Road (approximately 1 mile north of the Highway 9 Roundabout at Park Avenue). This ATR records directional traffic volumes by hour of day, for the entire year.[97] Traffic in other locations along Highway 9 in Breckenridge is counted annually.[98] Historical data dating back to 1986 show trends in AADT over the last 25 years. Chart 3C-1 indicates that traffic volumes climbed steadily from 1990 to 2002, at which point AADT has leveled off over the last seven years. Traffic volumes near the south end of Breckenridge south of Boreas Pass Road, represent about 65 percent of the traffic volume on Highway 9 at Tiger Road.

Chart 3C-1 also displays the annual number of BSR skier visits from 1996 through 2009. This data shows a general trend in growth in skier visits, and an increase in annual skier visits over 1986 levels. However, although skier visits increased from 2004 to 2007, AADT volumes have leveled off. The decline in skier visits since 2007 can most likely be attributed to the global economic downturn.

[97] CDOT, 2010
[98] Ibid.

Chart 3C-1:
Annual Average Daily Traffic on State Hwy 9 and
Annual Breckenridge Skier Visits 1986 to 2009



Main Street

Beginning in 2005, additional traffic count locations were added along Highway 9 as it follows the North Park and South Park Avenue alignments).

Table 3C-1 provides AADT data along Highway 9 for the last five years at several points within the study area. As depicted in the above chart some 2009 AADT volumes are slightly reduced from 2008 AADT levels, which is believed to be related to the economic recession. However, volume on Park Avenue at the Highway 9 intersection was higher in 2009 than in 2008 (reaching a peak volume of 9,300 AADT) indicating an increase in vehicles using the Highway 9 bypass around Main Street through town.

Table 3C-1:
Existing AADT on Highway 9 within the Study Area

Count Location on Highway 9	2005	2006	2007	2008	2009
s/o Tiger Rd	18,100	18,000	17,500	18,300	18,200
on N Park Ave, W/o Main St	6,800	9,100	9,000	8,600	9,300
on N Park Ave, n/o Watson Ave	8,600	11,500	11,100	10,800	10,500
on N Park Ave, s/o Ski Hill Rd	7,700	10,300	9,200	8,900	8,800
on S Park Ave, w/o Main St	7,200	9,600	8,700	8,400	8,300
on Main St, s/o S Park Ave	9,900	12,800	12,300	11,900	11,800
n/o Boreas Pass Rd	10,400	10,400	11,900	10,800	10,400
s/o Boreas Pass Rd	6,300	6,900	9,000	8,300	7,000

Source: CDOT Website

Ski Hill Road

The BreckConnect Gondola and limited public parking supply at the Peak 8 Base have reduced day skier traffic use of Ski Hill Road from previous levels. No traffic counts were conducted on Ski Hill Road because no long-term increase in traffic is projected; construction use would be lower than historic levels.

Peak Daily/Hourly Traffic Volumes on Highway 9

Vehicle travel in this area is significantly affected by the time of year, with higher daily and hourly volumes occurring in the winter time. The most recent traffic volume data on Highway 9 south of Tiger Road (October 1, 2009 to September 30, 2010) shows the 14 highest volume days were all winter season ski days. The 15th, 24th, and 25th highest volume days were summer days in July and August.

Table 3C-2 depicts the 25 highest days of total daily traffic volume recorded on Highway 9 at the Tiger Road automatic count station. The north and southbound directional totals show that peak Fridays have greater daily volume southbound into Town while Sundays show a greater northbound volume, when day and many destination visitors are leaving Town. Using the peak travel day volume as an indexed base, the tenth highest day volume (a winter day) is about 88 percent of the peak, while a high summer day exhibits 85 percent of the peak traffic volume.

Table 3C-2:
25 Highest Traffic Volume Days
October 2009–September 2010 on Highway 9 s/o Tiger Road

Rank	Date	Day	Daily NB	Daily SB	Daily TOTAL	Index %
1	1/30/2010	Sat	14,231	13,473	27,704	100.0
2	12/29/2009	Tue	13,235	13,334	26,569	95.9
3	12/31/2009	Thu	12,603	13,362	25,965	93.7
4	12/30/2009	Wed	13,008	12,776	25,784	93.1
5	12/28/2009	Mon	12,684	12,362	25,046	90.4
6	1/16/2010	Sat	12,099	12,901	25,000	90.2
7	1/29/2010	Fri	11,500	13,109	24,609	88.8
8	12/19/2009	Sat	11,811	12,738	24,549	88.6
9	3/18/2010	Thu	12,342	12,123	24,465	88.3
10	1/15/2010	Fri	11,203	13,211	24,414	88.1
11	2/6/2010	Sat	12,034	12,342	24,376	88.0
12	2/5/2010	Fri	11,318	12,969	24,287	87.7
13	12/21/2009	Mon	12,201	12,082	24,283	87.7
14	2/27/2010	Sat	12,095	12,163	24,258	87.6
15	8/6/2010	Fri	11,594	12,619	24,213	87.4
16	1/8/2010	Fri	11,737	12,423	24,160	87.2
17	3/12/2010	Fri	11,359	12,770	24,129	87.1
18	1/31/2010	Sun	12,570	11,541	24,111	87.0
19	3/17/2010	Wed	12,025	12,018	24,043	86.8
20	12/22/2009	Tue	12,189	11,835	24,024	86.7
21	3/6/2010	Sat	11,860	12,147	24,007	86.7
22	3/16/2010	Tue	12,009	11,861	23,870	86.2
23	3/13/2010	Sat	11,471	12,338	23,809	85.9
24	7/23/2010	Fri	11,222	12,557	23,779	85.8
25	7/30/2010	Fri	11,583	12,124	23,707	85.6

Source: CDOT website; Traffic Data.

Peak hour traffic flow is used in determining operational level of service of the roadway; however, highways are designed to accommodate the 30th highest hourly volume approximately 20 years from build-out; not the peak hour traffic flow.[99] The DHV on Highway 9 south of Tiger road is 2,184 vehicles per hour.[100] The three peak periods during a winter day are recognized as: **AM** (8:00 a.m. to 10:00 a.m.), **Midday** (10:00 a.m. to 2:00 p.m.) and **PM** (3:00 p.m. to 6:00 p.m.). Table 3C-3 summarizes the peak hour volumes experienced on Highway 9 on the Peak Day, Saturday, January 30, 2010 (Snow Sculpture

[99] TDOT, 2010
[100] CDOT, 2010

Competition). On this day, the AM peak hour was 9 a.m. to 10 a.m., midday peak hourly volumes occurred from 2 p.m.to 3 p.m. and the late afternoon peak was 3 p.m. to 4 p.m. These hourly volumes account for 7 percent, 8 percent, and 9 percent, respectively, of the daily total volume of 27,704 vehicles.

Table 3C-3:
Peak Traffic Volume Experience
Saturday, January 30, 2010 on Highway 9 s/o Tiger Road

Hour of Day	Peak Hour Traffic Volume			% of Daily Total
	NB	SB	Total	
AM Peak Hour	813	1,138	1,951	7
Midday Peak Hour	1,299	940	2,239	8
PM Peak Hour	1,447	953	2,400	9

Source: CDOT website, Traffic Counts.

Urban area morning and afternoon peak hour volumes are typically 9 to 11 percent of the daily total. The Breckenridge winter peak periods indicate that busy day traffic congestion would most likely be experienced over a mid to late afternoon two- to three-hour period on busy days. The total peak hour traffic volume on January 30, 2010—the busiest day of the year—exceeded the DHV during peak traffic hours.

Parking

A parking agreement between BSR and the Town states that BSR is committed to providing a minimum of 2,500 parking spaces for winter recreational visitors.[101] The Task Force findings indicate maintenance of this agreement and continued cooperation between BSR, the Town and the County would help manage parking demand.

Parking for BSR and Town visitors is currently provided by ski area parking lots, town lots, and on-street parking. Generally, the in-town parking lots are intended for day skier usage and destination guests with lodging outside of Town. On-Street parking is intended for those patronizing Main Street business establishments. Other additional private lots in Town, not included in these counts, are intended for local business employees and patrons. Presumably, skiers staying at in-town lodging that is convenient to one of the four free circulator routes will use parking provided by the respective lodging.

BSR/Town of Breckenridge Parking Management Plan

Most of the 2,500 required spaces, approximately 1,540, are currently provided in the combined total of the North and South Gondola lots, the Gold Rush, and Beaver Run lots. The Town of Breckenridge

[101] Town of Breckenridge, 2008a

currently provides an additional 1,000 parking spaces for day skiers and visitors in smaller lots throughout Town.

An additional 600+ spaces are available in the expandable Satellite Lot, to accommodate demand on high season days and offer a free parking alternative to the close-in lots. As shown in Chart 3C-2, on peak winter Saturdays the close-in lots are typically used at or near capacity. The Satellite Lot provides overflow parking on days when full parking conditions are anticipated in the Town core. Skiers approaching from the north on Highway 9 are directed by signing and attendants to use these free spaces to avoid full parking lots ahead.

Town lots provide parking in 16 defined locations throughout Town, and may charge fees depending on the season. On-street parking serves businesses and resort visitors along Main, Ridge and French Streets and Lincoln and Adams Avenues, referred to here as zones. Table 3C-4 summarizes the available day skier parking supply.

Table 3C-4:
Parking Supply by Provider

Parking Providers	# of Lots/Zones	Total Supply
Ski Area Parking Lots	4	1,540
Ski Area Satellite Parking Lot[a]	1	600
City Parking Lots	16	1,003
On-Street Spaces[b]	7	567
Total Supply available to Skiers & Visitors		**3,710**

[a] capacity expanded on peak days
[b] zones counted
Source: Breckenridge Parking Sheet, 2009–2010

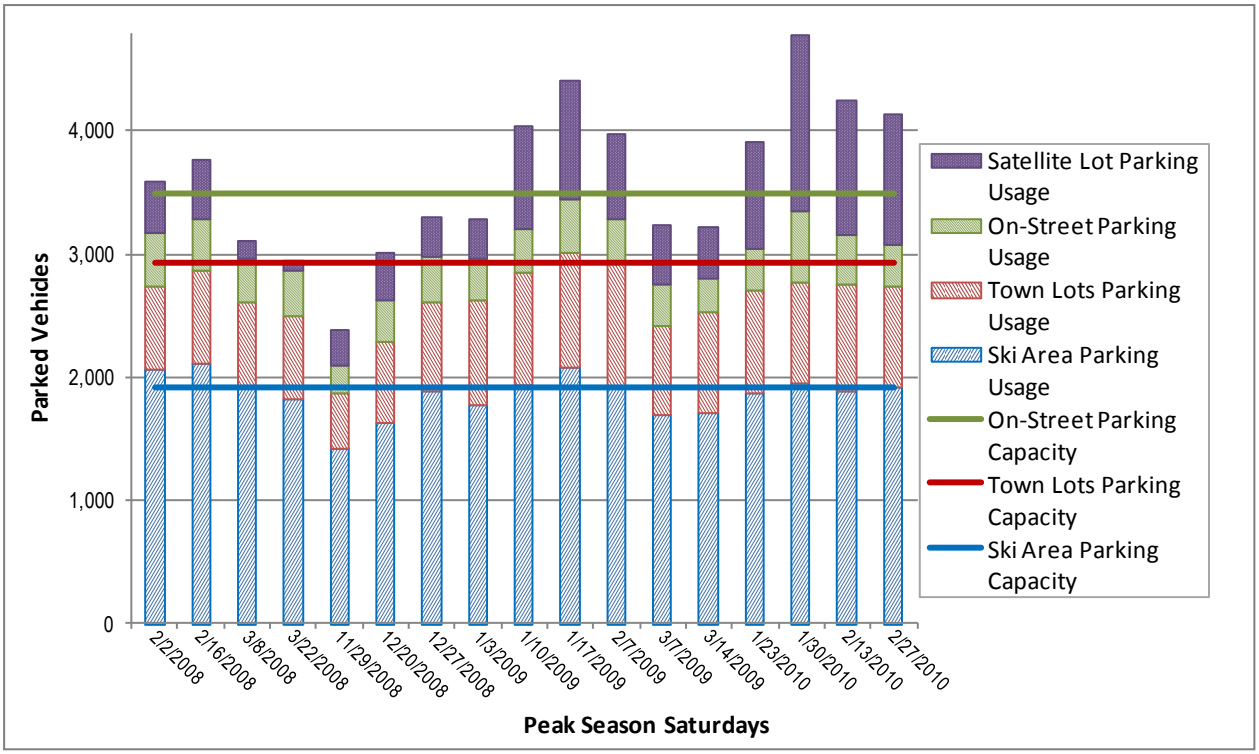
Parking utilization was sampled on 50 ski days, over three ski seasons, from January 2008 and March 2010. This data shows that Saturday parking demand is consistently higher than other days of the week, with Saturdays in January and February showing the highest demand. The Peak 9 Beaver Run Lot was not included in the parking count studies, but is assumed to be at 100 percent utilization during peak Saturdays and is included in this analysis of parking supply and demand.

Utilization data for the other ski area parking lots was collected via manual counts at approximately the same time every day, near 11 a.m. The ski area parking lots have a confirmed parking capacity; however, the Satellite Lot is summarized separately, as capacity for this unpaved lot is flexible, depending on demand. Access to the Satellite Lot is provided by BSR shuttle bus service and the Town of Breckenridge Free Ride Gray Route.

Town lots and on-street parking are summarized separately, with defined capacities noted. As shown in Chart 3C-2, of the 17 Saturdays of peak parking demand over three ski seasons, there are 3 days when Ski

Area Lot parking demand exceeds supply, but no days when the combined Ski Area and Town parking lots demand exceeds supply. As part of a Town/BSR joint Parking Management Plan, on high demand days, the Satellite parking lot provides the overflow space needed to meet demand accommodating over 1,000 vehicles on three Saturdays.

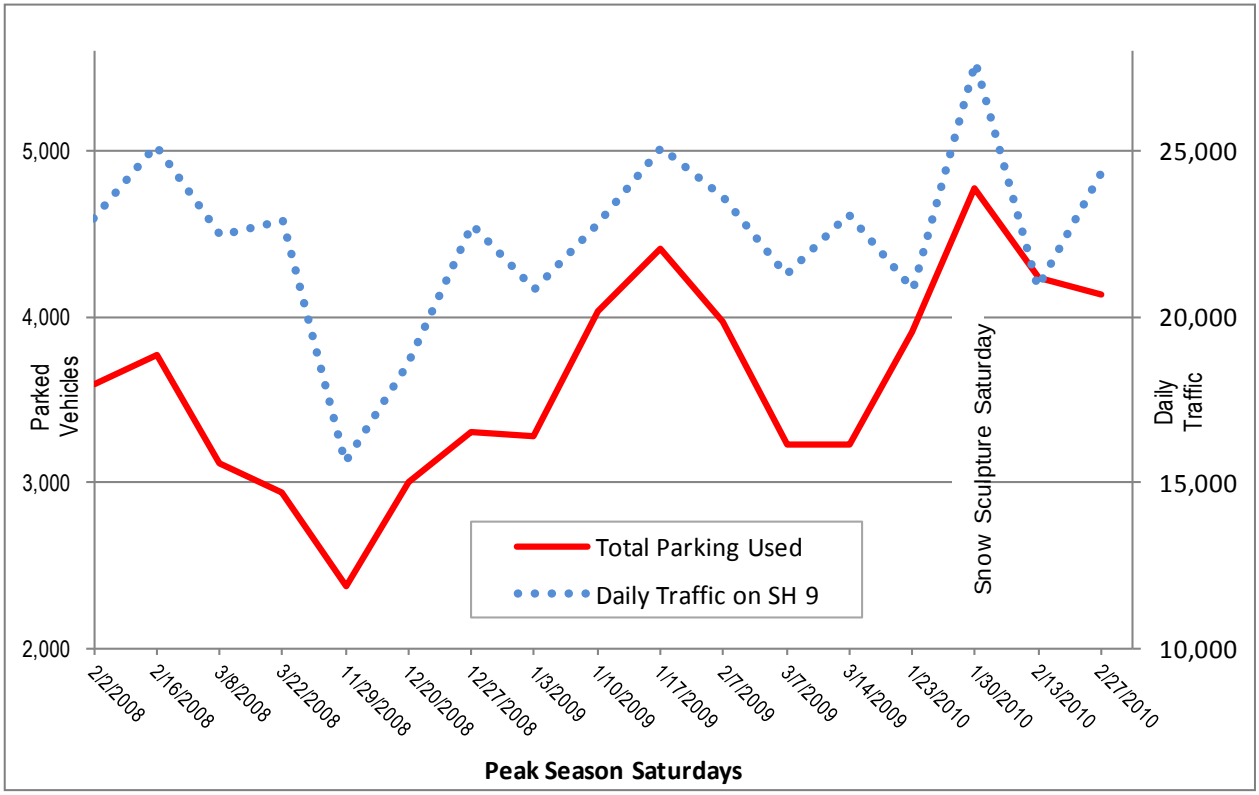
Chart 3C-2:
Parking Accumulation Compared to Parking Capacity for Various Peak Saturdays during Ski Seasons 2008–2010



As shown in Chart 3C-2, usage of the Town lots is fairly uniform during all of these peak ski season Saturdays, at approximately 85 percent utilization. Popular events such as the Snow Sculpture competition draw many non-skiing visitors to the area, increasing parking lot usage, as is illustrated on January 30, 2010. Peak parking accumulation was recorded with ski area parking lots full, on-street parking absorbing non-skier visits, and over 1,400 vehicles parking in the Satellite Lot. Even on this peak demand day, the Town lots had available supply.

Chart 3C-3 indicates that there is a correlation between the total traffic volume on Highway 9 north of Town and total parking utilization.

Chart 3C-3:
Parking Accumulation Compared to Daily Traffic for Various Peak Saturdays during Ski Seasons 2008–2010



Note: Peak traffic volume and parking demand spike on the Saturday of the annual Breckenridge Snow Sculpture event in January 2010.

When parking demand is high, BSR provides additional signing and service at the Satellite Lot to encourage visitors to park outside of Town and use the shuttle service to connect to Town and ski activities. This program reduces both the vehicle travel and parking demand in the Town center, thereby reducing congestion. As shown, the Satellite Lot served over 1,400 parkers that day, by utilizing the flexible capacity of that lot. The success of this program is evident in the slight under-capacity usage of the Town lots (83 percent) that day.

Table 3C-5:
Peak Parking Accumulation Experience
Saturday, January 30, 2010
Vehicles Parked Midday

Location	Capacity	Vehicles Parked	Utilization
Ski Area Lots	1,540	1,558	101
Ski Area Satellite Lot	600	1,428	238
City Lots	1,003	835	83
On-Street Parking	567	577	102
Total	**3,710**	**4,398**	**119**

Note: Satellite Lot has flexible capacity to meet demand.
Source: Breckenridge Parking Sheet, 2009–2010

Day Skier Parking Capacity

Currently BSR provides approximately 1,540 parking spaces specifically intended for day skier parking. The Town provides an additional 1,003 spaces designated as skier parking. Assuming full utilization of those lots, and average vehicle occupancy (AVO) of 2.7 skiers per parked vehicle, this equates to about 8,486 daily skiers. A 16,000 skier day with a 60/40 Destination to Day skier ratio would have 9,600 Destination skier and 6,400 Day skiers; therefore, this visitation is assumed to be accommodated with the existing parking supply. Furthermore, assuming the 2.7 AVO and 60/40 ratio are achieved, BSR and the Town could accommodate a 21,215 skier day with the existing parking supply.

Table 3C-6:
Existing Day-Skier Parking Capacities

Parking Providers	Parking Spaces	AVO Multiplier	Skiers
Ski Area Parking Lots	1,540	2.7	4,158
Ski Area Satellite Parking Lot[a]	600	2.7	1,620
Town Parking Lots	1,003	2.7	2,708
Total	**3,143**		**8,486**

[a] capacity expanded on peak days
Source: Breckenridge Parking Sheet, 2009–2010

DIRECT AND INDIRECT ENVIRONMENTAL CONSEQUENCES

Table 3C-7:
Summary of Traffic, Parking and Ski Area Access Effects by Issue and Indicator

Alternative 1	Alternative 2	Alternative 3
Issue: Proposed projects may generate measurable increases in daily/seasonal visitation, thereby affecting traffic movement and volumes within the Town of Breckenridge, on Highway 9 between Frisco and Breckenridge, and on construction/maintenance access roads proximate to the ski area. Parking capacities may also be affected by proposed projects.		
Indicator: Historic and projected traffic counts for roadway networks to access BSR		
The 2009 traffic counts at Highway 9 and Tiger Road recorded 18,200 VPD which is expected to increase to 30,000 VPD by 2030. The 2009 traffic counts at Highway 9 and Boreas Pass Road recorded 10,400 VPD which is expected to increase to 16,700 VPD by 2030.	Same as under the No Action.	Same as under the No Action.
Indicator: Comparison of anticipated winter traffic volumes with existing winter traffic volumes and the design capacities of roadway networks accessing BSR		
2009 traffic counts at Highway 9 and Tiger Road show ski area traffic as 5.8% of annual average traffic at Tiger Road and 2.5% of annual average traffic at Boreas Pass Road. At a projected skier per day growth rate of 0.75%, skier traffic under the No Action Alternative is anticipated to decrease by 2030 to 4.1% of annual average traffic at Tiger Road and 1.8% of annual average traffic at Boreas Pass Road. In 2010 the DHV was exceeded during peak hours on peak visitation days. As residential growth continues at 2% annually and growth in visitation occurs at 0.75% annually, it is anticipated that the number of peak days each season would increase, resulting in more days when peak traffic hours would exceed the DHV on Highway 9.	Under the Proposed Action assuming a projected skier per day growth rate of 2.0%, skier traffic is anticipated to decrease by 2030 to 5.2% of annual average traffic at Tiger Road and 2.3% of annual average traffic at Boreas Pass Road from existing conditions. As residential growth continues at 2% annually and growth in visitation occurs at 2.0% annually, it is anticipated that the number of peak days each season would increase, resulting in more days when peak traffic hours would exceed the DHV on Highway 9.	At a projected skier per day growth rate of 1.25%, skier traffic under the No Action Alternative is anticipated to decrease by 2030 to 4.5% of annual average traffic at Tiger Road and 2.0% of annual average traffic at Boreas Pass Road from existing conditions. As residential growth continues at 2% annually and growth in visitation occurs at 1.25% annually, it is anticipated that the number of peak days each season would increase, resulting in more days when peak traffic hours would exceed the DHV on Highway 9.

Table 3C-7:
Summary of Traffic, Parking and Ski Area Access Effects by Issue and Indicator

Alternative 1	Alternative 2	Alternative 3
Indicator: Quantification/documentation of anticipated impacts to proposed construction/maintenance access roads and effects to Peak 7 neighborhood residents		
Since 2007, the BreckConnect Gondola and limited parking at the Peak 8 base area have minimized visitors accessing the ski area using Ski Hill Road.	As discussed in the No Action Alternative, BSR visitors using Ski Hill Road have been minimized. However, under the Proposed Action temporary construction vehicle trips would occur over two summer construction seasons. This level of traffic activity would be negligible. A PDC is included for the Proposed Action to require BSR construction to use Ski Hill Road and County Road 3, avoiding the majority of the Peak 7 neighborhood roads.	As discussed in the No Action Alternative, BSR visitors using Ski Hill Road have been minimized. However, under the Proposed Action, temporary construction vehicle trips would occur over seven summer construction seasons. This level of traffic activity would be negligible.
Indicator: Quantification of existing and proposed parking capacity for day and destination skiers within BSR parking lots		
Under the No Action Alternative 4,090 parking spaces are provided in ski area and Town lots and on-street parking.	Consistent with the Town's Integrated Transportation Plan, Alternative 2 does not include provisions for expanded skier parking.[a] An agreement between the Town and BSR provides for managing use of existing skier parking supply through pricing, issuing permits, coordinated transit service and pedestrian access improvements.	Consistent with the Town's Integrated Transportation Plan, Alternative 3 does not include provisions for expanded skier parking.[a] An agreement between the Town and BSR provides for managing use of existing skier parking supply through pricing, issuing permits, coordinated transit service and pedestrian access improvements.
Indicator: Quantification of indirect effects to parking capacities within the Town of Breckenridge for day and destination skiers within town, related to guests visiting BSR		
Peak day visitation would be consistent with Table 3C-4, which currently shows adequate parking spaces to accommodate Peak Day capacities	Adequate parking spaces for Peak Day capacities would be maintained because no increase in the number of visitors on peak days is projected; parking would accommodate Peak Day capacities in the future.	Adequate parking spaces for Peak Day capacities would be maintained because no increase in the number of visitors on peak days is projected; parking would accommodate Peak Day capacities in the future.

[a] Source: Town of Breckenridge, 2008

Consistent with the Town's Integrated Transportation Plan, Alternatives 1, 2 and 3 do not include provisions for expanded skier parking. An agreement between the Town and BSR provides for managing use of existing skier parking supply through pricing, issuing permits, coordinated transit service and pedestrian access improvements. Continuing growth of day skiers will be accommodated with the available supply. High season conditions will continue to be accommodated at the Satellite Lot off Airport Road north of Town per the Town/BSR the Parking Management Plan. Additional destination guests will have use of the Town's Free Ride transit system or in some cases, courtesy van service provided by their respective lodging. Day skiers parking at the North and South Gondola lots will have improved pedestrian access to the Town core along the expanding Blue River trail system. This will encourage a "park-once" practice for day visitors and help preserve on-street parking for other guests', visitors' and residents' short-duration needs.

Potential traffic and parking impacts associated with expected visitation changes associated with each Peak 6 development alternative are summarized in this section.

Alternative 1 – No Action

Ski Area Access

Under the No Action Alternative there would be no changes to the existing road network that serves skier traffic. Highway 9 north and south of the Town of Breckenridge would continue to be the principal access route for day skiers travelling by personal vehicles or transit buses. The BreckConnect Gondola and adjacent parking have reduced day skier traffic use of Ski Hill Road.

Traffic

Highway 9

As shown in Table 3C-8, AADT volume on Highway 9 in the study area is projected to grow steadily over the next 20 years reaching almost 30, 000 VPD when measured north of downtown near Tiger Road.[102] Based on those figures, average VPD in 2030 would be almost 12,000 vehicles more than the 18,200 VPD recorded in 2009. At the south end of downtown, just north of the Boreas Pass Road junction, Highway 9 (Main Street) VPD volumes currently averaging 10,400 VPD, are projected to rise to averages of 16,700 VPD by 2030.

Based on data that shows 80 percent of day skiers pass through the Tiger Road intersection and 20 percent pass through the Boreas Pass Road/Main Street intersection, day skier vehicles in 2009 represented 5.8 percent of the annual average traffic at Tiger Road and 2.5 percent of the average daily volume at Boreas Pass Road.[103]

[102] CDOT, 2010
[103] Ibid.

With an average annual visitation growth rate of 0.75 percent projected for Alternative 1, 1,221 day skier VPD in 2030 would represent 4.1 percent of Highway 9 AADT in 2030.[104] At the South Main Street location, 305 daily skier vehicles are 1.8 percent of the Highway 9 AADT volume in 2030. Therefore, under the No Action Alternative, skier visits are projected to grow at a slower rate than background growth resulting in skier vehicle trips representing a smaller portion of the overall traffic.

A 2008 analysis of traffic condition at community build-out prepared for the Town, factored in 800 additional VPD on Highway 9 VPD during the high season at build-out.[105] The report concluded that with the capacity improvements to Park Avenue and Highway 9 north of Park Avenue and the continuing multi-modal enhancements to the transport system, the number of days each season that are considered "congested" (currently 20 days), would remain about the same at build-out.

Table 3C-8:
Highway 9 Annualized BSR Skier Vehicles per Day

Year	Annual Average Volume	Alternative 1		Alternative 2		Alternative 3	
		South of Tiger Rd	North of Boreas Pass Rd	South of Tiger Rd	North of Boreas Pass Rd	South of Tiger Rd	North of Boreas Pass Rd
2009 Existing	Total Daily Vehicles	18,200	10,400	18,200	10,400	18,200	10,400
	BSR Day Skier Vehicles	1,059	265	1,059	265	1,059	265
	BSR Day Skier Portion	5.8	2.5	5.8	2.5	5.8	2.5
2012	Total Daily Vehicles	19,865	11,305	19,865	11,305	19,865	11,305
	BSR Day Skier Vehicles	1,067	267	1,081	270	1,073	268
	BSR Day Skier Portion	5.4	2.4	5.4	2.4	5.4	2.4
2020	Total Daily Vehicles	24,306	13,718	24,306	13,718	24,306	13,718
	BSR Day Skier Vehicles	1,133	283	1,266	317	1,185	296
	BSR Day Skier Portion	4.7	2.1	5.2	2.3	4.9	2.2
2030	Total Daily Vehicles	29,857	16,734	29,857	16,734	29,857	16,734
	BSR Day Skier Vehicles	1,221	305	1,543	386	1,341	335
	BSR Day Skier Portion	4.1	1.8	5.2	2.3	4.5	2.0

Source: CDOT website AADT Future Calculator; TDA Colorado using annual skier day growth estimate; SE Group

In 2010 the DHV was exceeded during peak hours on peak visitation days. As residential growth continues at 2 percent annually and growth in visitation occurs at 0.75 percent annually, it is anticipated that the number of peak days each season would increase, resulting in more days when peak traffic hours would exceed the DHV on Highway 9.

[104] Assumes 60/40 split in destination/day skiers, 140-day season, 2.7 skier average vehicle occupancy, 1.6 million BSR base year annual visits.
[105] Felsburg Holt & Ullevig, 2008

Parking

As addressed above, Alternatives 1, 2 and 3 do not include provisions for expanded skier parking. An agreement between the Town and BSR provides for managing use of existing skier parking supply through pricing, issuing permits, coordinated transit service and pedestrian access improvements. The Task Force findings indicate maintenance of this agreement and continued cooperation between BSR, the Town and the County would help manage parking demand.

BSR visitation is projected to grow to approximately 1.7 million annual skier visits ten years post implementation (refer to Table 3B-11 in Chapter 3B – Recreation, Mountain Operations and Guest Services). In addition, the peak days are not anticipated to increase in guests per day; rather, the mid-week skier visits are anticipated to increase. Therefore, parking demand is not anticipated to increase under the No Action, and the current parking capacity would continue to meet demand. Furthermore, daily visitation on peak days is not anticipated to increase under the No Action; and the current supply would continue to meet demand, even on a Peak Day.

Alternative 2 – Proposed Action

Ski Area Access

Under the Proposed Action there would be no changes to the existing public road network that serves skier traffic. Highway 9 north and south of the Town of Breckenridge will continue to be the principal access routes for day skiers travelling by personal vehicles or transit buses. The BreckConnect Gondola and adjacent parking have reduced day skier traffic use of Ski Hill Road from previous levels.

As discussed in the Construction Practices section in Chapter 2 and as shown on Figure 3, construction access roads would be constructed (on Peak 7) and reconstructed (timber roads) to provide adequate construction equipment access to proposed Peak 6 trails and the site at the junction of the two lifts. These constructed and reconstructed roads would not serve as public access to ski area and the proposed Peak 6 area. Construction access and impacts are described below. As shown on Figure 8, construction vehicles would access the project area via Ski Hill Road.

Traffic

Highway 9

With an average annual visitation growth rate of 2.0 percent projected for the Proposed Action, 1,543 day skier VPD in 2030 would represent 5.2 percent of Highway 9 AADT in 2030.[106] At the South Main Street location, 386 daily skier vehicles are 2.3 percent of the Highway 9 AADT volume in 2030. As residential

[106] Assumes 60/40 split in destination/day skiers, 140-day season, 2.7 skier average vehicle occupancy, 1.6 million BSR base year annual visits.

and visitation growth increases, it is anticipated that the number of peak days each season would increase, resulting in more days when peak traffic hours would exceed the DHV on Highway 9.

As indicated by the Task Force, traffic congestion would continue to be managed by ongoing Highway 9 capacity improvements, parking management practices and multi-modal transport to maintain current levels of daily congestion as the Town reaches build-out and day skier daily traffic grows.

Ski Hill Road

As identified in Table 3C-7, short-term, construction related Ski Hill Road vehicle trips would be generated by the Proposed Action. In addition, after Ski Hill Road, the majority of the vehicle trips would follow the Forest Service road to the junction of the proposed lifts.[107] Below are anticipated vehicle trips per week to construct various project elements (e.g., the development of the proposed lifts would require approximately 64 vehicle trips per week on Ski Hill Road). This level of construction traffic activity would be negligible between Town and the Peak 7/8 Base relative to prevailing volume on this collector road.

- Lift development would require approximately 60 vehicle trips per week for approximately four months. The number of vehicle trips remains the same as those disclosed in the DEIS. Although there would be two lifts constructed rather than one, the infrastructure required is similar and therefore is not anticipated to require additional vehicle trips.[108]
- Trail clearing would require approximately 60 vehicle trips per week for approximately five months.
- The restroom facility would require approximately 40 vehicle trips per week for two weeks (the restroom facility would be built during the same season as the lifts).

Parking

As addressed above, Alternatives 1, 2 and 3 do not include provisions for increased skier parking capacity. An agreement between the Town and BSR provides for managing use of existing skier parking supply through pricing, issuing permits, coordinated transit service and pedestrian access improvements. The Task Force finding indicates maintenance of this agreement and continued cooperation between BSR, the Town and the County would help manage parking demand.

Annual visitation is anticipated to grow at approximately 2 percent annually. Ten years post implementation, visitation could be approximately 1.95 million annual skier visits. However, as stated in the No Action Alternative analysis, and similarly under the Proposed Action, peak days are not

[107] A portion of lift construction vehicle trips would occur on the BSR mountain road network within the SUP area to construct the bottom terminal.
[108] Vehicle trips for the lift would include installation of power lines.

anticipated to increase in guests per day. Therefore, adequate parking capacity would be maintained into the future.

Alternative 3

Ski Area Access

Under Alternative 3 there would be no changes to the existing public road network that serves skier traffic. Highway 9 north and south of the Town of Breckenridge will continue to be the principal access routes for day skiers travelling by personal vehicles or transit buses. The BreckConnect Gondola and limited public parking supply at the Peak 8 Base have reduced day skier traffic use of Ski Hill Road from previous levels.

Traffic

Highway 9

With an average skier day growth rate of 1.25 percent per year projected for this alternative, 1,324 day skier vehicles per day in 2030 would represent 4.5 percent of Highway 9 AADT in 2030.[109] At the South Main Street location, 335 daily skier vehicles are 2.0 percent of the Highway 9 AADT volume in 2030. With this growth in visitation it is anticipated that the number of peak days each season would increase, resulting in more days when peak traffic hours would exceed the DHV on Highway 9.

As indicated by the Task Force, traffic congestion would continue to be managed by ongoing Highway 9 capacity improvements, parking management practices and multi-modal transport to maintain current levels of daily congestion as the Town reaches build-out and day skier daily traffic grows within the range of any of the Peak 6 development alternatives.

Ski Hill Road

Short-term traffic impacts due to construction access are anticipated to occur for varying periods over seven years. Vehicle trips can be estimated as follows:

- Lift development would require approximately 60 vehicle trips per week for approximately four months (over four construction seasons)[110]
- Trail clearing and glading would require approximately 60 vehicle trips per week for approximately three months (over seven construction seasons)[111]

[109] Assumes 60/40 split in destination/day skiers, 140-day season, 2.7 skier average vehicle occupancy, 1.6 million BSR base year annual visits.
[110] Vehicle trips for lift development would include installation of the power line.
[111] Trail clearing includes grading on Trail 2.

- The installation of snowmaking infrastructure would require approximately ten vehicle trips per week for three months (over seven construction seasons)
- Grading on *Sawmill* trail for the skier circulation project would require approximately 20 vehicle trips per week for three months (over one construction season)

Parking

As addressed above, none of the alternatives include provisions for expanded skier parking; however, currently there is enough parking to accommodate Peak Day visitation, and because no increase in number of visitors on peak days is anticipated, no impact to available parking would result from Alternative 3. Annual visitation is anticipated to grow at approximately 1.25 percent annually. Ten years post implementation, visitation could be approximately 1,811,633 annual skier visits. An agreement between the Town and BSR provides for managing use of existing skier parking supply through pricing, issuing permits, coordinated transit service and pedestrian access improvements.

CUMULATIVE EFFECTS

Scope of the Analysis

The effects analyzed in the cumulative effects section apply to all alternatives, including the No Action Alternative. For a detailed description of past, present, and reasonable foreseeable future projects, the reader is referred to Appendix A in this document. The following projects are expected to cumulatively have short- and long-term effects on traffic, parking and ski area access.

Temporal Bounds

The temporal bounds for this cumulative effects analysis for traffic, ski area access and parking extend from 1986 (first year of CDOT automated traffic counter installation near Tiger Road) through Town build-out and to 2030 per CDOT traffic analysis guidelines.

Spatial Bounds

The spatial bounds for this cumulative effects analysis are limited to Interstate 70, Highway 9 and Ski Hill Road.

Past, Present, and Reasonably Foreseeable Projects

- BSR Projects
- Implementation of the BreckConnect Gondola
- Ongoing Highway 9 improvements
- Interstate 70 Programmatic EIS

Since development of the ski area in 1961, BSR has become one of the most popular ski areas in the nation, with 1.6 million visits per year since 2006.[112] Resort visitation has affected traffic on Highway 9 and congestion within the Town of Breckenridge. In order to accommodate these levels of visitation within the Town infrastructure, road and parking improvements are ongoing, and the current level of service and parking accommodations are adequate.

In fall 2004 construction on Park Avenue in Breckenridge began to provide an alternative route from the north end of Town to the south end, improving circulation throughout the community and reducing congestion on Main Street particularly during peak arrival (AM) and departure (PM) hours. Construction was completed in 2006, and included a roundabout at the north intersection of Highway 9 (Main Street) and Park Avenue. The alternative route increased safety and mobility of drivers, transit, pedestrians and bicyclists within BSR. None of the project alternatives would increase Peak Day visitation; therefore, the existing level of service would persist.

When the BreckConnect Gondola was built in 2007, it consolidated parking and provided non-vehicular access directly from the resort to the Town. The gondola also reduced traffic on Ski Hill Road because the public no longer accesses the mountain from the base of Peak 8. Consolidating parking in the two gondola lots has encouraged people to park once to access the mountain and Town, therefore reducing congestion (traffic and parking) on Main Street. None of the project alternatives include parking or traffic projects; however, the BreckConnect Gondola improved access to the Town and BSR particularly on peak days. With implementation of any of the alternatives, visitation on a Peak Day would remain similar to existing levels.

While this analysis indicates that increased skier visitation under Alternatives 1, 2 and 3 would be insignificant to traffic volumes, traffic on Interstate 70 (Colorado's major east-west corridor) is becoming a major issue. CDOT and the FHA began analyzing alternatives for the Interstate 70 Mountain Corridor in January 2000 in order to address the underlying need to reduce congestion and to improve mobility and accessibility on Interstate 70 between Glenwood Springs and C-470. A Final PEIS is anticipated in the winter 2011; a Record of Decision is anticipated in spring 2011; and Tier 2 processes occurring after the Record of Decision.

The PEIS identifies that the need to relieve this congestion is especially acute for extended weekend travelers seeking access between the Denver metropolitan area and US 40 (to Grand County), as well as through the Eisenhower Tunnel to the Western Slope. Ultimately, the selected alternative that will be identified in the upcoming Record of Decision is expected to result in greater accessibility to mountain communities along the Interstate 70 corridor, benefiting Summit County economies, as well as local ski areas. Improved mobility would likely increase residential and visitor traffic, which is extremely variable

[112] Breckenridge Ski Resort, 2010b

depending on the extent of improvements. The alternatives analysis considers both population and visitation growth through 2030; therefore, in combination with any of the approved projects the cumulative effect of Interstate 70 improvements would need to be managed through ongoing Highway 9 improvements, parking management and improved multi-modal transportation options to alleviate congestion on roads and parking in Summit County.

With annual growth in skier visitation as well as Town residential and commercial build-out the number of congested traffic days within Town would increase above the current level of 20 days per winter season. However, the Town of Breckenridge's 2008 Comprehensive Plan includes measures to improve capacity on Highway 9, manage parking, and improve multi-modal transportation which would help alleviate congestion due to growth in population and visitation.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

No irreversible and/or irretrievable commitments of resources in relation to traffic, parking or ski area access have been identified in association with any of the alternatives analyzed in this document.

D. SCENERY

SCOPE OF THE ANALYSIS

The scope of this scenery analysis includes BSR's entire 5,756-acre Forest Service-administered SUP area, extending from Peak 5 to Peak 10. The development of facilities, infrastructure, and developed trails at BSR has occurred over the past four decades in which BSR has been managed as a developed winter recreation site on the WRNF.

Analysis of the scenic environment requires an evaluation of the project area and its ability to absorb the effects of historic and ongoing modification to the landscape (both natural and human-caused). Thus, slope, natural vegetation types and patterns, topography, and viewing distance are important factors in this analysis. The potential impacts to the scenic environment within the study area were considered in relation to the overall existing development/recreational theme of BSR and the Town of Breckenridge.

As indicated in Chapter 1, four critical viewpoints were identified by the ID Team as appropriate for assessing the scenic quality of the project area under existing and proposed conditions. These viewpoints include:

- Highway 9/Coyne Valley Road looking west/southwest
- French Gulch Road/Wellington Road intersection looking west
- Boreas Pass Road looking west
- Highway 9 looking west/northwest

Critical viewpoints are included in figures 9 through 21.

MANAGEMENT OF THE SCENIC ENVIRONMENT ON NATIONAL FOREST SYSTEM LANDS

The Scenery Management System (SMS) was adopted in 1995 as the primary scenery management direction by the Forest Service. In brief, the SMS is a systematic approach for assessing scenic resources in a project area and then using the assessment findings to help make management decisions on the project.

Scenic Integrity Objectives and Landscape Character

An action can cause changes to scenic resources that can be objectively measured. By assessing the existing scenic character of an area in terms of pattern elements (form, line, color and texture) and pattern character (dominance, scale diversity and continuity), it is possible to identify the extent to which the scenic character would exhibit scenic contrast with the landscape, or its converse, scenery compatibility.

The 2002 Forest Plan establishes acceptable limits of change for Scenic Resources.[113] The acceptable limits of change of a particular area (e.g., Management Area, as defined in the 2002 Forest Plan) are the documented Scenic Integrity Objectives (SIO), which serve as management goals for scenic resources. SIOs provide a measure of visible disruption of landscape character, ranging from "*Very High"* to "*Unacceptably Low*." In order of least-to-most altered, SIOs are:

- **Very High** (unaltered)
- **High** (appears unaltered)
- **Moderate** (slightly altered)
- **Low** (moderately altered)
- **Very Low** (heavily altered)
- **Unacceptably Low** (extremely altered)

For reference, *Very High* SIOs are typically found in designated wilderness areas and special interest areas. While there is no standard for SIOs in relation to ski area special use permit areas on National Forest System lands, in most cases, they fall somewhere between *Very Low* and *Moderate*. This is in recognition of the developed nature of ski areas, which tend to operate in scenic environments (i.e., assigning an artificially high SIO at a developed ski area would be unachievable, just as assigning an artificially low SIO would not incentivize the ski area to strive to minimize visual impacts).

As indicated in the 2002 Forest Plan, the majority of BSR's SUP area is designated as *Very Low*, with the high-alpine areas of Peak 6 and Peak 10 designated as *Low*.[114]

The *Very Low* SIO is defined as:[115]

> *The valued landscape character appears heavily altered. Deviations may strongly dominate the valued landscape character. They may borrow from valued attributes such as size, shape, edge effect, pattern of natural openings, changes in vegetation types, or architectural styles within or outside the landscape being viewed. However, deviations must be shaped by and blend with the natural terrain so that elements such as unnatural edges, roads, landings and structures do not dominate the composition.*

[113] USDA Forest Service, 2002a
[114] SIO designations within the BSR SUP are depicted graphically in the Project File.
[115] USDA Forest Service, 1995

The *Low* SIO is defined as:[116]

> *The valued landscape character appears moderately altered. Deviations begin to dominate the valued landscape character being viewed, but they borrow valued attributes such as size, shape, edge effect, and pattern of natural openings, changes in vegetation types, or architectural styles outside the landscape being viewed. They should not only appear as valued character outside the landscape being viewed, but they should be compatible or complementary to the character within.*

However, the 2002 Forest Plan states that all NFS lands shall be managed to attain the highest possible scenic quality commensurate with other appropriate public uses, costs, and benefits.[117]

Scenery Management System Distance Zones

Viewing distance is important in determining how change is perceived across a landscape. Distance zones are divisions of a particular landscape being viewed, and are used to describe the part of a characteristic landscape that is being inventoried or evaluated.

- Immediate Foreground: This zone begins at the viewer and extends to about 300 feet. Individual leaves, flowers, twigs, bark texture, and other details dominate this view.
- Foreground: This zone is usually limited to areas within 300 feet to 0.5 mile (not to exceed 0.5 mile) of the observer, but it must be determined on a case-by-case basis, as should any distance zoning. Generally, detail of landforms is more pronounced when viewed from within the foreground zone.
- Middleground: Alterations in the middleground (0.5 to 4 miles from the observer) are less distinctive. Texture is normally characterized by the masses of trees in stands or uniform tree cover.
- Background: This zone extends from middleground (minimum of 4 miles between the observer and the area being viewed) to infinity. Shape may remain evident beyond 10 miles, especially if it is inconsistent with other landscape forms. Beyond 10 miles, alteration in landscape character becomes obscure.

While BSR's SUP area is visible in the foreground, middleground, and background zones (depending on the viewpoint), the four identified critical viewpoints utilized in this analysis are within the *middleground* distance zone. In addition to the critical viewpoints used for visual simulations, site perspectives are

[116] Ibid.
[117] USDA Forest Service, 2002a

included to enable the reviewer to better understand the appearance of projects in the immediate foreground and foreground.

Forest Plan Standards and Guidelines

In addition to the SMS, the 2002 Forest Plan contains forest-wide standards and guidelines which apply to resources across the WRNF.[118] While the 2002 Forest Plan contains no forest-wide standards for scenery management, it offers the following guidelines that are applicable to this project:[119]

- Management activities should be designed and implemented to achieve, at minimum, the level of scenic integrity shown on the Scenic Integrity Objective Map.
- Plan, design and locate vegetation manipulation on a scale that retains the color and texture of the landscape character, borrowing directional emphasis of form and line from natural features.
- Choose facility and structure design, scale, color of materials, location and orientation to meet the scenic integrity objective on the Scenic Integrity Objective Map.
- Facilities, structures and towers with exteriors consisting of galvanized metal or other reflective surfaces will be treated or painted dark non-reflective colors that blend with the forest background to meet an average neutral value of 4.5 or less as measured on the Munsell neutral scale.

Management Area 8.25 standards and guidelines applicable to this project and the scenery resource include:

- Standard: Permanent outdoor advertising is not a needed public service and is not allowed.
- Guideline: Facilities are designed with an architectural theme intended to blend facilities with the natural environment.
- Guideline: Vegetation is retained to screen facilities from key viewpoints.
- Guideline: Roads are designed to minimize visual and resource impacts. They are constructed and maintained with good alignments and grades that minimize erosion.

[118] A *standard* is a course of action which must be followed; adherence is mandatory. A *guideline* is a preferred course of action designed to achieve a goal, respond to variable site conditions, or respond to an overall condition.
[119] USDA Forest Service, 2002a

Furthermore, the following information on the desired condition for scenic values is contained in Management Area 8.25:[120]

> *Protection of scenic values is emphasized through application of basic landscape aesthetics and design principles, integrated with forest management and development objectives. Reasonable efforts are made to limit the visibility of structures, ski lifts, roads, utilities, buildings, signs, and other man-made facilities by locating them behind landform features or by screening them behind existing vegetation. Facilities are architecturally designed to blend and harmonize with the national forest setting as seen from key viewpoints. Facilities that no longer serve a useful purpose are removed.*

The 2002 Forest Plan further states that it is a regional goal to "provide for scenic quality and a range of recreational opportunities that respond to the needs of the forest customers and local communities."[121]

The Built Environment Image Guide

The Built Environment Image Guide (BEIG) was prepared by the Forest Service for the "thoughtful design and management" of the built environment contained within the National Forests.[122] The Forest Service defines the built environment as "the administrative and recreation buildings, landscape structures, site furnishings, structures on roads and trails, and signs installed or operated by the Forest Service, its cooperators, and permitees.[123] The BEIG divides the United States into eight provinces which combine common elements from the ecological and cultural contexts over large geographical areas; Breckenridge and adjacent NFS lands are within the Rocky Mountain Province. Site development, sustainability, and architectural character should conform to BEIG guidelines described for this Province. An example of an existing on-mountain guest services facility at BSR that is consistent with BEIG guidelines is the Ten Mile Station (Photo 3D-1).

[120] Ibid.
[121] Ibid.
[122] USDA Forest Service, 2001
[123] Ibid.

Photo 3D-1:
Ten Mile Station

AFFECTED ENVIRONMENT

BSR's existing lift and trail network, all related infrastructure, maintenance and guest operation buildings are currently consistent with the 2002 Forest Plan SIO designations (*Very Low* and *Low*) for the SUP area, as well as forest-wide guidelines for scenery management.

Scenic Characteristics of the SUP Area

BSR is located on the eastern face of the Tenmile Range, which is in the Gore/Mosquito Range subsection of the national ecological hierarchy for the WRNF. High elevation alpine peaks characterize the Gore/Mosquito subsection. The jagged peaks of the Gore range contrast with the rounded alpine summits of the Tenmile range to the south. Landform features include scoured bowl-like cirque headwalls and floors, U-shaped valleys, couloirs, talus and scree slopes, and rounded mountain slopes. This subsection is composed of north-south laying high relief granitic mountains.[124]

The Gore-Mosquito Ranges are dominated by alpine, sub-alpine, and montane life zones. The alpine zone is a bare, rocky region covered with snow for the greater part of the year, approximately 11,000 feet to over 14,000 feet. The sub-alpine zone is described as the upper spruce/fir zone up to timberline, where the trees begin to be dwarfed. The montane life zone is characterized by extensive forest stands of lodgepole pine, aspen and the lower part of the Engelmann spruce belt. This zone also has mixed aspen and Engelmann spruce or grassy parks and aspens intermingled. Photo 3D-2 was taken from Peak 7 (within the SUP area) looking north towards Peak 6 and the rest of the Tenmile Range to Peak 1. The Gore Range is in the background.

[124] USDA Forest Service, 2002b Appendix P p. 6

Photo 3D-2:
Tenmile and Gore Range

The BSR SUP area is characterized by continuous stands of mature, even-aged lodgepole pine, spruce and mixed conifer, as well as above-treeline terrain comprised of alpine herbaceous vegetation, small woody vegetation and rock outcrops. Similar vegetative conditions are found on adjacent NFS and non-federal land. Much of Summit County, and all of the Tenmile Range, was burned or was clear-cut between 1880 and 1900. Fire and insect activities have played a role in the makeup of the current vegetative mosaic, and therefore the scenic qualities of SUP area and beyond. Currently, Summit County is experiencing mortality in lodgepole pine forested areas due to mountain pine beetle. Field and aerial surveys indicate that lodgepole pine mortality has spread throughout the County, changing the large-scale landscape appearance from the evergreen color of live trees to a red or brown color as lodgepole pines succumb to beetle kill. Up to 90 percent of mature lodgepole pine stands may to die on federal and non-federal lands by 2015.

With a lift-served elevation of 12,836 feet, and additional hike-to terrain above that, BSR offers some of the highest lift-served and hike-to terrain in North America. BSR's SUP area includes the eastern-facing aspects of Peaks 5 through 10 along the Tenmile Range, which is oriented north-south. Only Peaks 7 through 10 are currently developed with BSR's terrain network and associated infrastructure. Only Peak 8 contains built infrastructure above treeline (Imperial Express SuperChair, T-Bar top terminal and T-Bar ski patrol building).[125] The remainder of the BSR SUP area above-treeline is undeveloped. The existing trail configuration contains a large number of linear trail cuts and some modern trail design (e.g., Peak 7)

[125] Note: Peak 8 facilities are located in the *Very Low* SIO.

utilizing less rigid lines. For this reason, the existing terrain network is a major component of the foreground, middleground and background views of Peaks 7 through 10. However, BSR's above-treeline terrain (e.g., open bowls and ridgelines on Peaks 7 and 8) contribute to its aesthetic attributes as much as its traditional trails. BSR's traditional (below treeline) trails are the major contributing factor to the *Very Low* SIO classification ("appears heavily altered") for the developed portions of the SUP area. However, more recent trail design within Peak 7, which includes larger inter-trail tree islands and variable trail edges meet the *Low* SIO designation (refer to Figure 13). The above treeline portions of the SUP area with built infrastructure (Peak 8) currently only meets the *Very Low* SIO due to the difficulty in blending the facility to meet the form, line, color and texture of the surrounding environment.

The following discussion of the development of BSR's SUP area, in relation to its defining aesthetic characteristics, is provided more-or-less chronologically, by Peak.

Peak 10

Peak 10 opened in 1985 with installation of the Falcon SuperChair. Peak 10 is defined by distinct, below-treeline trails which are oriented on its north, south, and east-facing aspects. Existing structural facilities on NFS lands on Peak 10 include: the Ten Mile Station (restaurant) and the Peak 10 Hut (Falcon's Aerie). The Ten Mile Station (refer to Photo 3D-1) is BSR's newest on-mountain restaurant and is considered the architectural theme which the resort plans to replicate into the future. Ten Mile Station is not visible outside of the ski area. Falcon's Aerie is a wooden structure located immediately northwest of the Falcon SuperChair top terminal. This structure is well screened and can only been seen in the immediate foreground when unloading the chairlift. The road network on Peak 10 is limited to the top and bottom of the terrain pod. The access road on the bottom extends from the Ten Mile Station up *Flapjack* and partially up *Cimarron.* This road is only visible near the Ten Mile Station, but the remainder is not visible outside the ski area. The access road to the top terminal extends from *Upper Lehman* on Peak 9 up the north facing slopes west of *Spitfire.* Due to the density and height of the spruce/fir forest in this area, the road to the top terminal of the Falcon SuperChair is not visible from the middleground and background viewpoints and minimally visible in the foreground (e.g., from south facing-trails on upper Peak 9). Occasionally, a banner is hung on the deck of the Ten Mile Station visible to skiers on trails immediately adjacent to the restaurant.

Similar to Peaks 8 and 9, Peak 10's developed below-treeline trails—totaling approximately 150 acres—are visible in the foreground, middleground and background distance zones; however, the Falcon SuperChair is only readily identifiable in the foreground from most viewpoints (i.e., within 0.5 mile).

The SIO for Peak 10 is *Very Low*, which is currently being met. Undeveloped, above-treeline portions, as well as below-treeline areas outside of the ski area operational boundary of Peak 10 include a SIO of *Low*, which is also currently being met.

Peak 9

Peak 9 opened in 1971 with 2 double chairlifts and 12 trails. Development of Peak 9 continued into the 1980s, including in the world's first high-speed quad chairlift (Quicksilver) in 1981, and E-Chair in 1982. Today, Peak 9 is heavily altered by the amount of trail development—approximately 435 acres—and includes six chairlifts (not all visible from one viewpoint: E-Chair (which serves north-oriented trails on Peak 9); the Beaver Run SuperChair (providing out-of-base conveyance); C-Chair and the Mercury SuperChair (which serve trails on the eastern and southern aspects); A-Chair, and the QuickSilver Super6. Hike-to, above-treeline terrain on Peak 9 is limited to the Windows, Broadway, and Twin Chutes.

Similar to Peak 8, Peak 9's trails are visible in the foreground, middleground and background distance zones; however, lifts are only readily identifiable in the foreground to middleground (i.e., within 1 mile). Peak 9 includes a dense trail network with minimally sized tree islands on the east facing slopes. The mountain access road on Peak 9 is also County Road 751. In the midst of the developed trail network, the road is not visible from outside the ski area, with the exception of a 1,400-foot segment where the road crosses *Cashier*, *Bonanza* and *Columbia* on the lower section of Peak 9. Primarily, the visible section of the road extends above treeline within and beyond the BSR SUP area to the summit of Peak 10 near Fourth of July Bowl.

Existing structural facilities on NFS lands on Peak 9 include: Peak 9 Restaurant, Peak 9 Patrol Hut, the snowmaking compressor building, and the old QuickSilver top terminal building. The Peak 9 Restaurant and Peak 9 Patrol Hut are visually screened from the middleground and background views. The two-story old QuickSilver top terminal is 1970s architecture with unique edge lines. This structure is visible from several viewpoints within town and south of town. The Peak 9 Restaurant, Peak 9 Patrol Hut, and old QuickSilver top terminal (now used for storage) are all-wood exteriors that blend with the surrounding landscape. The snowmaking compressor building is located along the Mercury SuperChair lift-line and is constructed with metal siding. This building is well screened and primarily visible while riding the chairlift. Occasionally, a banner is hung on the deck of the Peak 9 Restaurant visible to skiers on trails immediately adjacent to the restaurant.

The SIO for Peak 9 is *Very Low*, which is currently being met. Undeveloped, above-treeline portions of Peak 9 include a SIO of *Low*, which is also currently being met.

Peak 8

In December 1961, BSR opened to the public with a double chairlift and a T-Bar on what is currently considered lower Peak 8. By the mid-1970s, additional terrain on Peak 8 had been developed, including an above-treeline surface lift up Peak 8, which served Horseshoe Bowl. Five decades later, Peak 8 is defined by both above- and below-treeline lift-served and hike-to terrain. Below-treeline terrain on its south-facing aspect is served by the Peak 8 SuperConnect, while Chair 5, Rocky Mountain SuperChair and Colorado SuperChair serve Peak 8's eastern aspect. Above-treeline terrain is served by 6-Chair, the

T-Bar, and the highest chairlift in North America—the Imperial Express SuperChair (12,998 feet), which was installed in 2005. The Imperial Express chairlift has been determined to be consistent with the SIO designation of *Very Low*.[126]

Peak 8's below-treeline trails which total approximately 490 acres, are easily identifiable in the foreground, middleground and background distance zones; however, lifts that serve below-treeline terrain are only readily identifiable in the foreground and middleground (i.e., within 1 mile). All of the trails on Peak 8 were constructed prior to the 2002 Forest Plan and previous 1984 Forest Plan that included scenery management. Still, the majority of trails on Peak 8 meet the SIO, with the exception of *Mach 1*, which is a south facing trail with linear edges. This trail is only visible from elevated southern viewpoints. The Peak 7/8 Summer Access Road minimizes scenery impacts due to its location and existing visual screening. The access road from the Vista Haus (Peak 8 on-mountain restaurant at the top of the Colorado SuperChair) to the 6-Chair top and Imperial Express SuperChair bottom terminal is visible from several viewpoints due to its steep, exposed route south of Cucumber and Horseshoe bowls. Structural facilities on Peak 8 (on NFS lands) include: the Vista Haus (restaurant), T-Bar Hut (ski patrol), Peak 8 Summit (ski patrol), and 6 Hut (warming hut). With the exception of the Peak 8 Summit ski patrol facility that was constructed in 2005, the remaining facilities on Peak 8 are over 20 years old. These older facilities lack a consistent architectural theme, but do blend with the landscape beyond the foreground. The T-Bar Hut, located above treeline and Horseshoe Bowl includes a natural stone exterior to blend well with the backdrop, but this facility does "sky-line" from northern viewpoints. Vegetation surrounding Vista Haus and 6 Hut has been retained to the greatest extent practicable (given the need for efficient skier access) to provide a visual screen. The Peak 8 Summit facility was designed with the scenic resource in mind, and was constructed into the hill-slope to blend and screen the facility. No permanent outdoor advertising exists on NFS lands on Peak 8. Occasionally, a banner is hung on the exterior of the Vista Haus facing the Colorado SuperChair, advertising a breakfast special. All other signage on Peak 8 is for trail and lift signage, which all include a consistent design theme and coloration.

In the foreground (0 to 0.5 mile) and, from some viewpoints in the middleground (0.5 to 4 miles), the T-Bar, 6-Chair, and the Imperial Express are visible. The visibility of these lifts is enhanced when snow is on the ground, which contrasts the coloration of the lifts. Lift structures have all been colored to blend with the forest and landscape background to meet the SIO. On-mountain structures have historically been located to avoid "sky-lining" on exposed ridges and peaks; however, at some vantage points (primarily when viewed from the north—e.g., Highway 9 coming into Breckenridge) the T-Bar and Imperial Express SuperChair are visible along the Peak 8 ridgeline.

The SIO for Peak 8 is *Very Low*, which is currently being met.

[126] USDA Forest Service, 2004

Peak 7

Although the upper portions of Peak 7 were opened for hiking and tree skiing in 1993, the lower portions were not lift-served until the Independence SuperChair was installed in 2002, along with 175 acres of intermediate ability level trails. Above-treeline terrain on Peak 7 is accessed by traversing north from the Imperial Express, on Peak 8.

Similar to Peaks 8 through 10, Peak 7's trails are visible in the foreground, middleground and background distance zones. Being a more modern trail design (circa 2002), the size of inter-trail tree islands is much greater to the observer when compared to trails on Peak 8 through 10. This type of trail design allows the Peak 7 area to meet the *Low* SIO definition. Also, the trail edges on Peak 7 were scalloped and feathered to a greater degree, providing more natural visual variations. The Independence SuperChair is only readily identifiable in the foreground (i.e., within 0.5 mile). In the early morning hours, the sunlight does reflect from the lift towers and line making the lift more apparent for approximately 30 minutes each day. Refer to the visual simulations prepared for this analysis to better understand the visible contrast in overstory vegetation clearing densities. The Peak 7 Warming Hut and Ski Patrol building has a wood exterior, is only visible from the immediate foreground, and is one of two structures on NFS lands on Peak 7. The other structure is an above-ground water storage tank on lower Peak 7 that is not visible from within or outside the ski area because of its location being heavily screened. The Peak 7/8 Summer Access Road is well screened throughout Peak 7 and not visible from outside the ski area.

The SIO for Peak 7 is *Very Low*, which is currently being met.

Peaks 5 and 6

As undeveloped portions of BSR's SUP area, Peaks 6 and 5 exist in their natural states, which is broadly defined by above-treeline bowls and ridgelines, and forested below (approximately) 11,500 feet. The existing visual condition proximate to Peaks 5 and 6 includes timber patch cuts from the 1980s that are partially within the BSR SUP area, but primarily located within the Breckenridge Nordic Center's SUP area (refer to the visual simulations). These patch cuts are regenerating, but remain perceptible to the visual observer.

The SIO for Peaks 5 and 6 is *Low* ("human activities must remain visually subordinated to the attributes of the existing landscape character") and *Very Low*, which is currently being met.

Views from Slopes and Lodges within the Ski Area

Winter foreground and middleground views for skiers on the mountain or at a mountain facility are of a predominantly natural forest with large snow covered openings. Some foreground views include lift terminals, towers and lift shacks, maintenance structures, sanitation, food service, and patrol facilities. These structures are relatively common across the ski area terrain. On-mountain architectural character is diverse and lacks total consistency due to some older buildings. Background landscape views are of

scenic natural and developed landscapes overlooking the Town of Breckenridge and the Upper Blue River Valley, the Keystone Resort, Continental Divide, and west to Copper Mountain and the Gore Range if a guest is atop Peak 8 and the Tenmile Range.

Summer foreground views within the ski area include a mixed conifer forest, road and trail corridors and associated cutbanks and fill slopes. In addition, views of all the facilities seen during winter are viewed during summer. Bare ground reveals areas of eroded and disturbed soils and unsurfaced roadways that contribute to a *Very Low* SIO, with some facilities meeting a *Low* SIO.

DIRECT AND INDIRECT ENVIRONMENTAL CONSEQUENCES

The Proposed Action upper lift top terminal and ski patrol/warming hut would not meet the Forest Plan guideline of Low SIO. The remainder of projects for the alternatives analyzed comply with forest-wide guidelines (no forest-wide standards exist) and Management Area 8.25 standards and guidelines in the 2002 Forest Plan.[127]

Table 3D-1:
Summary of Scenery Effects by Issue and Indicator

Alternative 1	Alternative 2	Alternative 3
Issue: Development of proposed projects, including associated infrastructure, would be visible from Highway 9 and the Town of Breckenridge.		
Indicator: Compliance with Forest Plan standards and guidelines for scenery management within the SUP area and from established critical viewpoints by meeting Scenic Integrity Objectives		
Existing facilities and ski area clearings are consistent with the current SIO of *Low* and *Very Low*.	Proposed trail and lift clearings and infrastructure projects **would not meet the Forest Plan guideline of Low SIO**. Trail design includes PDCs to minimize scenic impacts. The proposed upper Peak 6 lift top terminal and almost 6,700 feet of new snow fence would be visible from many viewpoints; coloration and non-reflective materials would assist in reducing the scenery impact to the greatest extent practicable but would only meet a Very Low SIO which does not meet the Forest Plan.	The majority of proposed projects are within the developed lift and trail network of the ski area boundary. Therefore, these incremental additions to the trail and lift network are not anticipated to be visually perceptible. The Peak 6½ lift and trail glading project and snow fencing would be located in an area designated with the *Low* SIO. Trail glading would minimize the visual distinction and would replicate areas on the Tenmile Range that are have been thinned in the past 200 years by fire. The Peak 6½ lift top terminal is located at treeline at the toe of steep slopes. This would help disguise the top terminal to meet the *Low* SIO.

[127] USDA Forest Service, 2002a

Table 3D-1:
Summary of Scenery Effects by Issue and Indicator

Alternative 1	Alternative 2	Alternative 3
Indicator: Infrastructure should imitate landscape character with natural appearing materials and colors to minimize impacts to the scenery resource		
Lack of a unifying architectural design theme is evident and in some cases, materials, colors, and architectural styles are of a low aesthetic quality. Lift towers and terminals are of non-reflective materials and colors. Colors of buildings are painted to blend with the surrounding landscape.	New facilities would comply with the BEIG. The top terminal and warming hut/ski patrol building would be colored (in summer colors) to blend with the surrounding landscape. Architectural designs for all proposed buildings would be submitted to the Forest landscape architect for final review and approval to ensure effectiveness of the design.	Identical design principles would be applied to Alternative 3 project components.
Indicator: Discussion of four identified critical viewpoints.		
The four visual simulations from identified critical viewpoints display the developed character of the BSR existing operational and development boundary within their SUP.	The four visual simulations from the identified viewpoints display the Proposed Action in context with the remaining developed character of the existing operational and development boundary. The Proposed Action would incrementally add to the overall developed character and would add a new lift, two additional structures, and 6,695 feet of new snow fence total in four locations (each of which would be visible) above-treeline. Design criteria and the larger tree islands on Peak 6 would lessen the aesthetic impacts of the Proposed Action compared to historic trail design.	The four visual simulations from the identified viewpoints display Alternative 3 in context with the remaining developed character of the existing operational boundary. Peak 6½ would be an incremental scenery impact beyond the existing operational and development boundary, but the gladed terrain would blend better with the surrounding landscape compared to traditional trail development. All other vegetation removal and lift upgrades/realignments would occur within the current operational boundary, resulting in less perceptible effects.

Alternative 1 – No Action

Under the No Action Alternative, no changes or modifications would be approved that would affect the scenic quality of the SUP area.

Several previously-approved projects at BSR remain unimplemented. These projects and their related effects are addressed in the cumulative effects analysis below in this section. Regardless of which alternative is selected, the loss of lodgepole pine within the SUP area due to the mountain pine beetle epidemic will continue to impact the scenic quality (Forest Health is analyzed in greater detail in Chapter 3J – Forest Health).

Compliance with Forest Plan Standards and Guidelines for Scenery Management

As discussed under Existing Conditions, BSR's traditional, below treeline trails are the major contributing factor to the Very Low SIO ("appears heavily altered") classification for the developed portions of the SUP area. Above treeline portions of the SUP area that include built infrastructure currently meet the Very Low SIO.

Under the No Action Alternative, developed and undeveloped portions (within the existing ski area operational boundary) of BSR's SUP area would continue to meet the SIO of *Very Low*.

Critical Viewpoints

Critical viewpoints used for this scenery analysis can be found in the overview map (Figure 9), with each viewpoint addressed in figures 10 through 21. Under the No Action Alternative, there would be no change from the existing condition. These critical viewpoints are intended to serve as the baseline for which to compare the effects of implementation of Alternatives 2 and 3, which are displayed in the visual simulations in figures 10, 13, 16 and 19.

Alternative 2 – Proposed Action

The Proposed Action project components are located in the *Low* and *Very Low* SIO designation guidelines, per the 2002 Forest Plan.[128] Figure 9 depicts the boundaries for the SIO designations within the SUP area. Proposed Action project components located in the *Low* SIO include:

- 4,558 feet of the chairlift and 0.26 acre of ground disturbance for the top terminal,
- 0.48 acre of ground disturbance for the warming hut/ski patrol building,
- 49.9 acres of overstory vegetation removal for ski trails,
- 6,695 feet of above-treeline snow fencing, and
- 6,088 feet of the buried power line extending to the top terminal.

Proposed Action project components located in the *Very Low* SIO include:

- 3,941 feet of the chairlift and 0.77 acre of ground disturbance for the junction of the two lifts and bottom terminal of the lower lift,
- 0.72 acre of ground disturbance for the Peak 6 restroom facility,
- 19.7 acres of overstory vegetation removal for ski trails,
- 1,200 feet of new road construction,

[128] Ibid.

- 8,100 feet of road rehabilitation, and
- 6,261 feet of the buried power line extending from Peak 7 to the bottom terminal and junction of the two lifts

Compliance with Forest Plan Standards and Guidelines for Scenery Management

Analysis of Lift

The lower Peak 6 lift would be installed as a four-person chairlift. The lift would have a slope length of approximately 2,600 feet extending from the Peak 7 trail network to an existing patch cut to the northwest. The upper Peak 6 lift would be installed as a detachable six-person chairlift. The lift would have a slope length of approximately 6,000 feet and a vertical rise of approximately 1,550 feet. The upper lift would extend from the top terminal of the lower Peak 6 lift up the spine of Peak 6 to an elevation of 12,293 feet. The top terminal would be located in the same location as was originally disclosed in the DEIS—approximately 257 feet below the summit of Peak 6, which has an elevation of 12,550 feet. The proposed top terminal of the upper lift would be constructed on a relatively flat area, reducing the amount of ground disturbance required to install the terminal. The lift terminals would be approximately 28 feet wide, 60 feet long and 20 to 24 feet tall. The proposed lift terminals and towers would be colored to maximize blending with the surrounding summer landscape. Photo 3D-3 provides an example of a high-speed, detachable lift terminal.

Photo 3D-3:
Lift Terminal Example

Construction of the lift would require a corridor of variable width (average 60 feet) to be created through the forest canopy. To provide a variable width, additional tree removal would occur, although, balancing the aesthetic impact with wildlife habitat is an important consideration. Design criteria for the lift-line would minimize the negative scenic effect of a straight corridor by creating larger openings in key locations, to better visually blend into the surrounding landscape as viewed in winter. Installation of the

lift towers would require excavation for foundations. Above-treeline, a spider excavator (a light weight, highly maneuverable excavator ideal for high-alpine environments) or similar type of "light-on-the-land" machine would be used to excavate foundations. Material excavated for foundations above-treeline would be stockpiled and removed to minimize visual scars on the landscape. Because of the above-treeline location of the top terminal of the upper lift, the structure would meet the SIO of *Very Low* **but would not be consistent with the SIO of *Low*, and would not meet the Forest Plan guideline.** The bottom terminal of the upper lift and top and bottom terminals of the lower lift would be consistent with the SIO of *Very Low*.

The lift infrastructure **does not meet** the desired future condition for Management Area 8.25 to make reasonable efforts to limit the visibility of structures by locating them behind landform features or by screening them behind existing vegetation. The top terminal of the upper lift cannot be screened from viewpoints due to its location above-treeline and **does not meet the SIO of Low and does not meet the Forest Plan guideline**.

Analysis of Ski Patrol/Warming Hut

The Warming Hut/Ski Patrol building would be approximately 500 square feet with a footprint of approximately 25 feet by 20 feet. This structure would incorporate suitable massing and scale to relate to the surrounding landscape. The exterior of the building would include boulder/native stone materials to match the backdrop of the Tenmile Range alpine environment. The roof form would be consistent with examples portrayed in the BEIG for the alpine environment.[129] Final design of the facility would be reviewed and approved by the Forest Landscape Architect to minimize impacts to the scenery resource. However, the above-treeline structure could not be effectively screened from viewpoints; therefore, the structure **would not be consistent with the SIO of *Low* and does not meet the Forest Plan guideline.** It would only meet a SIO of *Very Low*.

Upon site review prior to project implementation, the ski patrol/warming hut building would comply with the BEIG guidelines and ADA and ABA regulations.

Analysis of the Peak 6 Restroom Facility

The proposed restroom facility located at the junction of the upper and lower Peak 6 lifts would be approximately 1,200 square feet with a footprint of approximately 40 by 30 feet. The structure would have a similar architectural design as the Peak 7 Warming Hut but would be bigger (refer to Photo 3D-4). The building would be built of natural materials to blend with the surrounding landscape (refer to figures 22 and 23). The design of this facility includes a natural vegetative screen on the north side of the structure. Final design of the facility would be reviewed and approved by the Forest Landscape Architect to ensure consistency with Forest Plan guidelines.

[129] USDA Forest Service, 2001 p. 169

Upon site review prior to project implementation, the restroom facility building would comply with BEIG guidelines and ADA and ABA regulations.

Photo 3D-4:
Restroom Facility Example

Analysis of Trail Development

The Proposed Action includes approximately 80 acres of overstory vegetation removal. All trails included in the Proposed Action would be considered a "clear-cut" with no regeneration efforts. The following design criterion was added to the FEIS which could minimize the scenic impact of clear-cut trails: Minimize overstory vegetation removal during construction of ski trails, which could result in glading ski trails. Vegetation removal should not occur beyond analyzed trail widths. The majority of trails would not be graded, so revegetation/soil stabilization efforts would be expected to have a high success rate. Cleared areas would be revegetated with a native grass mix. Trail edges would be feathered or scalloped to provide a variable line, thereby minimizing linear cuts in overstory vegetation. Trails have been designed with consideration for the aesthetic resource. Larger inter-trail tree islands would be maintained to minimize the impact of cleared trails.

The majority of skiable terrain (285 acres) for the Proposed Action would be above-treeline, capitalizing on natural terrain features and topography. The use of above-treeline terrain minimizes the amount of tree removal (and therefore scenery impacts) necessary to meet the purpose and need for additional intermediate and advanced intermediate terrain. To help maintain snow coverage above-treeline, snow fencing would be installed in several locations, including: the north side of Peak 7 (1,600 feet), and along the north (1,450 feet) and south (1,600 feet) side of the lift, and along the northern edge of the operational boundary (1,550 feet). Proposed fences would be similar to other fences currently at the ski area and may be visible from certain angles from the middleground viewpoint. The approximately 6- to 8-foot tall snow fencing would be constructed of wooden 2 inch by 6 inch boards secured horizontally to wooden or steel

supports (refer to Photo 3D-5). Ski area snow fencing tends to blend with the surrounding landscape during the summer, and is (by design) partially covered in snow during the winter.

Photo 3D-5:
Snow Fence Example

Analysis of Road Construction

The development of the Proposed Action would necessitate reconstruction of existing roads and construction of new segments of road, totaling approximately 9,300 feet. All roads would be dirt/gravel surfaced. All roads to the junction of the two Peak 6 lifts and the lift-line corridor would be below approximately 10,800 feet in elevation and would utilize existing roads and abandoned roads to the greatest extent possible to minimize aesthetic impacts. One approximately 800-foot segment of new road would be constructed to gain access to the proposed lift corridor for the upper lift (beyond the current operational and development boundary). Another road spur is proposed (approximately 1,200 feet) to access the Peak 6 lower lift bottom terminal location. This road spur would be located within the existing operational boundary. The roads have been proposed in locations that avoid the need to cross stream channels and wetlands with construction equipment to develop the ski trails and lift. The road proposed to the bottom terminal of the lower lift (also serving as a ski trail in the winter) would utilize existing benches in the topography to the greatest extent practicable to minimize ground disturbance and cut/fill slopes.

No road access is proposed to the top terminal of the upper Peak 6 lift. The top terminal would be constructed with helicopters and maintained with over-the-snow access in the spring/fall, as necessary.

Analysis of Utilities

All utility lines would be buried, reducing the long-term scenery impact. The proposed power line to the top terminal of the upper lift would create a short-term (two to three years) scenic impact due to ground disturbance above-treeline. The following design criterion was added to the FEIS to minimize the scenic impact from power line installation: Ground disturbance above treeline associated with the installation of the power line will adhere to strict disturbance area and revegetation conditions. These conditions will promote prompt and more successful restoration of the corridor. Prior to implementation, these conditions will be reviewed and approved by the Forest botanist, soil scientist and landscape architect. This line would be installed with machinery that would minimize ground disturbance by restoring the ground surface immediately after installation. The power line to the lower lift terminals and the upper lift's bottom terminal would originate from the Peak 7 terrain (refer to Figure 3). The line would be buried in existing and proposed roads to the bottom terminal of the lower lift. The line to the junction of the two lifts would be buried in a similar manner as discussed above, minimizing scenery impacts.

Critical Viewpoints

A series of four summer photographs were simulated to provide comparative analysis of "before" and "after" photo representations. Refer to figures 11, 14, 17 and 20 for a depiction of the Proposed Action's effects to the scenery resources and photo simulations during the summer months.

Highway 9 – North

Highway 9 provides a direct view in the middleground and background of the majority of BSR's ski terrain including proposed trails on Peak 6. From the Highway 9/Coyne Valley Road intersection looking southwest, the proposed lifts and trails on Peak 6 would be approximately 3 to 4 miles from the observer in the middleground view (Figure 11).[130] More specifically, the three northern-most (northeast-facing) trails on Peak 6 would be visible. Also visible would be a portion of the clearing at the junction of the two lifts, where current clearing from the 1980s-era timber sale is already evident. The proposed top terminal of the upper lift, ski patrol/warming hut, towers, and approximately 6,700 feet of snow fencing—all of which would be above treeline—would be visible to the discerning observer. As depicted on Figure 11, as structures move further into the middleground distance, objects and structures tend to blend with the landscape to a greater degree. Vegetation breaks on the slopes include highly visible existing and proposed ski trails on the lower portion of the mountain. Although the proposed trails represent new, unnatural breaks in vegetation, implementation of design criteria would minimize the sharp line contrasts between cut runs and adjacent forest. If vegetation removal is minimized to the extent of glading some areas (as the new design criterion suggests) that would further minimize contrasts between cut runs and adjacent forest. Design criteria to blend the trail edges as well as the coloration and reflectivity of the top terminal and ski patrol/warming hut allow BSR to meet the Forest Service SIO designation *Very Low*.

[130] Proposed upper lift top terminal would be 3.8 miles, junction of lifts would be 2.9 miles, and the lower lift bottom terminal would be 2.8 miles from the Highway 9 viewpoint.

The facilities above-treeline would not be consistent with the Forest Plan guideline to meet the SIO designation of *Low*.

Within the context of BSR's developed SUP boundary, other prominent scenic features are identifiable from this viewpoint, which help to absorb the scenery impacts of the Peak 6 pod. These include: developed trails on Peak 7 and 8 (Peaks 9 and 10 are not included in this photograph, but are visible from this location) and the Imperial Express top terminal on Peak 8.

Wellington Neighborhood

The French Gulch Road/Wellington Road intersection, adjacent to the Wellington Neighborhood, provides a direct view in the middleground and background of the majority of BSR's ski terrain including proposed trails on Peak 6. From this intersection looking west, the proposed Peak 6 lifts and trails would be approximately 2.5 to 4.5 miles from the observer in the middleground and background views (Figure 14).[131] This is a common viewpoint for locals that live in the Wellington Neighborhood and Vista Point. From this critical viewpoint, more of the Proposed Action components are visible than from any other critical viewpoint studied. All but the northern-most trail on Peak 6 would be visible from this viewpoint. The majority of both the upper and lower lift-lines would be visible; however, the top terminal of the lower lift and the bottom terminal of the upper lift would not be visible due to the topography adjacent to South Barton Creek. A notable existing structure that is slightly discernable from this viewpoint is the top terminal of the Imperial Express SuperChair on Peak 8. The Peak 6 upper lift's top terminal and ski patrol/warming hut structures are anticipated to have a similar incremental scenic effect within the context of the developed SUP boundary from this viewpoint. The Peak 7 and Peak 8 trails would continue to dominate the middleground viewshed from this viewpoint.

Though many of the proposed projects are visible from the French Gulch Road/Wellington Road intersection, PDC requirements contained in Table 2-4, including the new PDC discussed above, would minimize impacts to the scenery resource, but would only achieve a *Very Low* SIO, which **does not meet the Forest Plan guideline of *Low* SIO.**

Boreas Pass Road Overlook

Boreas Pass Road, looking west, provides a direct view in the middleground and background of the majority of BSR's SUP area, including the existing lift/trail network and the proposed Peak 6 pod. From the Boreas Pass Road overlook, the proposed lifts and trails would be approximately 2.5 to 4 miles from the observer in the middleground and background (Figure 17).[132] The Town of Breckenridge, extending from the base of Boreas Pass to Peaks 7 and 8, dominates the foreground views. Existing trails on Peak 8

[131] Proposed upper lift top terminal would be 4.3 miles, junction of lifts would be 3.2 miles, and the lower lift bottom terminal would be 2.6 miles from the French Gulch Road/Wellington Road intersection viewpoint.
[132] Proposed upper lift top terminal would be 4.1 miles, junction of lifts would be 3.0 miles, and the lower lift bottom terminal would be 2.5 miles from the Boreas Pass Road viewpoint.

(e.g., *Claimjumper* and *Dukes*, and *Northstar*) dominate the middleground view. Because this is a somewhat elevated viewpoint, all of Peak 6 and associated infrastructure would be visible, including: both proposed Peak 6 lifts, lift corridors and all terminals, ski patrol/warming hut, Peak 6 restroom facility, 6,700 feet of snow fencing, four east/southeast facing trails on Peak 6, and the return trail to the bottom terminal of the lower lift. The lower segments of the proposed trails are less discernable and the trail clearing on the upper segments of the trails are proposed with variable edges. The top terminal and ski patrol/warming hut facility add to the developed character of the viewshed, especially above treeline. PDCs for facility coloration and non-reflective materials will reduce the aesthetic impacts of these structures.

Though many of the proposed projects are visible from the Boreas Pass Overlook, PDC requirements contained in Table 2-4, including the new PDC discussed above, would minimize impacts to the scenery resource, achieve a *Very Low* SIO, which **does not meet the Forest Plan guideline of *Low* SIO**.

Highway 9 – South

Highway 9 south of downtown Breckenridge provides a direct view in the middleground and background of the majority of BSR's ski terrain (looking west/northwest) including proposed trails on Peak 6. From this Highway 9 viewpoint, the proposed lifts and trails would be approximately 2 to 4 miles from the observer in the middleground (Figure 20).[133] From this location, the junction of the two lifts, Peak 6 restroom facility, and bottom terminal of the lower lift would be concealed due to topography. The top terminal of the upper lift and ski patrol/warming hut structures would "skyline" on the east/west spine of Peak 6 and snow fencing may be visible, but at this distance the structures would be poorly defined, but would be noticeable. The proposed east/southeast facing trails would be visible from this viewpoint, but the variable edges of trails and the inter-trail tree island sizes would provide vegetative breaks in the landscape. If vegetation removal is minimized to the extent of glading some areas (as the new design criterion suggests) that would further minimize contrasts between cut runs and adjacent forest.

From this viewpoint, the projects within the *Very Low* SIO designation would be consistent. All development within the *Low* SIO designation would not be consistent due to the "skylining" effect of the structures above-treeline, and **would not meet the Forest Plan guideline of *Low* SIO.**

Site Perspectives

Site perspectives have been prepared to display to the reader what proposed infrastructure would look from the viewpoint of the guest within the Peak 6 project area. These perspectives allow the reader to better understand the built environment.

[133] Proposed upper lift top terminal would be 3.8 miles, junction of lifts would be 2.8 miles, and the lower lift bottom terminal would be 2.2 miles from the viewpoint on Highway 9, south of downtown Breckenridge.

Figure 22 – Peak 6 Upper and Lower Lift Junction Model simulates what the guest would observe from immediately below the Peak 6 restroom facility. This includes the top terminal of the lower lift, the bottom terminal of the upper lift, Peak 6 restroom facility, a portion of a proposed trail, and the upper lift-line extending towards the top terminal of the upper lift as it crosses South Barton Creek. Guests would descend towards the viewer to return to Peak 7 and the proposed lift bottom terminal of the lower lift.

Figure 23 – Peak 6 Upper and Lower Lift Junction Model simulates what the guest would observe when skiing to the junction of the two lifts within Peak 6. This includes the top terminal of the lower lift, bottom terminal of the upper lift and Peak 6 restroom facility in the foreground and the timber sale clear cuts in the middleground. The junction of the two lifts and Peak 6 restroom facility is located in the existing timber sale clear cut. Guests would descend to the right side of this perspective to return to Peak 7 and the proposed bottom terminal of the lower lift.

Figure 24 – Top Terminal Model simulates what a guest riding the upper lift would observe when approaching the top terminal. In the immediate foreground is the lift terminal, lift control building and ski patrol/warming hut building. The backdrop is the Peak 6 and Tenmile Range ridgeline.

Figure 25 – Top Terminal Model simulates what a guest standing above the top terminal of the upper lift, approximately at grade with the ski patrol/warming hut, would observe. In the immediate foreground is the built environment with the ski patrol/warming hut, top terminal and lift control building. In the middleground is the developed ski area (Peaks 7, 8, 9, and 10). In the background is the Town of Breckenridge in the valley floor and Bald Mountain (Mount Baldy) extending above treeline.

Alternative 3

Alternative 3 project components are located in the *Low* and *Very Low* SIO designation guidelines, per the 2002 Forest Plan.[134] Figure 9 depicts the boundaries for the SIO designations within the SUP area.

Alternative 3 project components located in the *Low* SIO include:

- approximately 2,338 feet of the new chairlift and 0.5 acre of ground disturbance for the top terminal,
- 87.7 acres of area that would receive 50 percent overstory vegetation removal for gladed terrain,
- 1,615 feet of above-treeline snow fencing, and
- 2,386 feet of the buried power line extending to the top terminal.

[134] USDA Forest Service, 2002a

Alternative 3 project components located in the *Very Low* SIO include:

- 1,416 feet of the new chairlift and 1.5 acres of ground disturbance for the new terminal,
- 16,517 feet of the upgraded chairlifts (Colorado SuperChair, C-Chair and A-Chair) and 0.8 acre of ground disturbance for the upgraded terminals,
- 6.8 acres of ground disturbance for proposed snowmaking,
- 32.9 acres of overstory vegetation removal for ski trails,
- 2,444 feet of the buried power line extending from the T-Bar bottom terminal to the bottom terminal of the Peak 6½ lift, and
- 1,356 feet of buried power line extending to upgraded chairlifts.

Compliance with Forest Plan Standards and Guidelines for Scenery Management

Analysis of Lifts

Three lifts would be upgraded within the existing ski area operational boundary: Colorado SuperChair, C-Chair and A-Chair. C-Chair and A-Chair would have a new alignment, but because it would be in the highly developed Peak 9 areas, the effects would not be discernable to the casual observer. The realigned segment of A-Chair would primarily utilize existing ski trails, minimizing the need for overstory vegetation removal. A-Chair would necessitate minimal tree removal through three existing tree islands, but the scenic effects would be indistinguishable from beyond the ski area operational boundary. C-Chair would be realigned to the north as described in Chapter 2, necessitating approximately 4.9 acres of tree removal.

The Peak 6½ lift would be approximately 3,800 feet in length, extending from the tree island between *Monte Cristo* and *Angels Rest* trails to approximately treeline below Peak 6½. The top terminal would be at an elevation of approximately 11,600 feet. The top and bottom lift terminals would be approximately 28 feet wide, 60 feet long and 20 feet tall. The terminals and towers will be colored to maximize blending with the surrounding summer landscape.

Construction of the Peak 6½ lift would require a corridor of variable width (average 60 feet) to be created through the forest canopy. To provide a variable width, additional tree removal would occur, although, balancing the aesthetic impact with wildlife habitat must occur. Design criteria for the lift-line would minimize the negative scenic effect of a straight corridor by creating larger openings in key locations, to better visually blend into the surrounding landscape as viewed in winter. The existing forest this lift would be constructed through is already thinned due to a historic fire, so the lift-line would not be as distinct as if it were through an older, denser forest. Installation of the lift towers will require excavation for foundations.

Analysis of Trail Development

Alternative 3 includes approximately 90.7 acres of overstory vegetation removal. All 13 trails within the existing ski area operational boundary would be considered a "clear-cut" with no overstory regeneration efforts. These trails would be considered a permanent impact to the scenery resource, but due to the location within the existing operational boundary, effects would be imperceptible to the casual observer. The Peak 6½ trail pod would be thinned at approximately 50 percent to provide a groomable glade experience. Thinning 50 percent in the Peak 6½ area would create an impact to the scenery resource, but the impact would resemble other areas near treeline (e.g., the 6-Chair area). All trails within the existing ski area operational boundary would not be graded, with the exception of Trail 2. Revegetation success on non-graded trails is anticipated to have a higher success rate; therefore, scenery impacts would be reduced. Trail edges would be feathered or scalloped to provide a variable line with a thinned appearance, thereby minimizing linear cuts in overstory vegetation. The goal would be to mimic existing treeline transition areas north and south of the project area.

The Peak 8 to Peak 9 grading project would require substantial ground disturbing activities and approximately 30-foot cut/fill slopes. The disturbance would only be visible in the immediate foreground. All disturbed slopes would be promptly revegetated. Retaining walls may be used to reduce disturbance, and their appearance would be designed and colored to blend with the surrounding landform features (e.g., native rock retaining walls). To cross Sawmill Creek a bridge is proposed (described in Chapter 2). The bridge would consist of natural materials and colored to blend with the surrounding environment. The final bridge and retaining wall design and grading plan would be submitted to the Forest Landscape Architect for review and approval prior to construction.

To maintain snow coverage above-treeline snow fencing would be installed on the north side of Peak 7 (1,600 feet) to provide hike-to access for guests traversing from Imperial SuperChair, across Peak 7, to Peak 6½. Fences would be similar to other fences currently on the mountain and would be imperceptible from the middleground viewpoint. The approximately 6- to 8-foot tall snow fencing would be constructed of wooden 2 inch by 6 inch boards that blend with the surrounding landscape.

Analysis of Utilities

All utility lines would be buried, reducing the long-term scenery impact. Alternative 3 would include the installation of 14,500 feet of snowmaking lines on existing and proposed trails. Installing snowmaking infrastructure on the Alternative 3 trails would temporarily degrade scenic integrity of the areas under construction. The disturbance corridor for snowmaking lines would be limited to approximately 40 feet in width. Disturbance areas would be promptly revegetated in accordance with PDCs stated in Table 2-4. The power line to the top terminal of the Peak 6½ lift would follow the lift alignment and be installed with machinery that would minimize ground disturbance by restoring the ground surface immediately after installation. The ground disturbance corridor would be promptly revegetated in accordance with PDCs stated in Table 2-4. The power line to the lift's bottom terminal would originate at the bottom

terminal of the T-Bar and would be buried in the Peak 7/8 Access Road and cross Angels Rest immediately prior to connecting to the proposed bottom terminal. The line to the bottom terminal would be buried in a similar manner as discussed above, minimizing scenery impacts.

Discussion of Critical Viewpoints

For the following discussion of critical viewpoints related to Alternative 3, the reader is referred to Figure 4, which identifies proposed trails, by number.

Note: the visual simulations completed for Alternative 3 focus on the proposed Peak 6½ lift and gladed terrain. Existing and proposed lifts, trails and infrastructure on Peaks 6 through 8 are included on the simulations and are specifically discussed in the following text. Because proposed lifts and trails on Peaks 9 and 10 are within the existing lift and trail network, they would not contribute to a noticeable change in the built environment; these projects were not visually simulated, but are specifically discussed in the following text.

Highway 9 – North

Highway 9 provides a direct view in the middleground and background of the majority of BSR's ski terrain including proposed glading for Peak 6½. From the Highway 9/Coyne Valley Road intersection looking southwest, the proposed Peak 6½ lift and trails (the only project outside the existing ski area operational boundary and current development) would be approximately 3 to 3.4 miles from the observer in the middleground (Figure 12). The only other noticeable proposed trail would be Trail 11 on the north side of Peak 10 at 4.5 miles in the background. More specifically, observers would be able to primarily view the proposed northeast facing gladed terrain beneath Peak 6½. The Peak 6½ lift and gladed terrain would blend well with the landscape from this viewpoint, with the thinning primarily in the *Low* SIO (only the north facing terrain in the viewshed) being relatively indistinguishable and the lift-line only the top 500 feet and bottom 500 feet visible.

Design criteria presented in Table 2-4 to blend the trail edges as well as the coloration of the top and bottom terminals allow BSR to remain in compliance with the Forest Service SIO designation of *Low* and *Very Low*.

Other prominent existing development would be visible from this viewpoint including: developed trails on north and northeast facing slopes of Peak 7, 8, 9 and 10; and the Imperial Express top terminal on Peak 8.

Wellington Neighborhood

As depicted in Figure 15, the proposed Peak 6½ gladed terrain would take advantage of natural clearing to provide a less visible development when compared to existing fully cleared trails throughout the SUP

area.[135] The Peak 6½ project would be 3 to 3.5 miles from the viewpoint in the middleground.[136] The lift-line corridor alignment would not directly face the observer from this viewpoint and would blend well into the overstory vegetation to meet the *Low* SIO. Other proposed trails visible to the observer from this viewpoint, although they would be indistinguishable as they are within the highly developed context of Peak 8, include: proposed trails 2, 3, 4, and 5 (all located in the *Very Low* SIO).

The existing Colorado SuperChair blends with the landscape, so it is anticipated the upgraded chairlift (which is proposed in an identical alignment with the same top and bottom terminals) would similarly blend with the landscape and would be indiscernible.

Although Peak 9 is visible from this viewpoint, proposed trails and lift upgrades on it would be imperceptible, as they would blend into the exiting developed lift and trail network. The C-Chair upgrade would involve minimal overstory vegetation removal in a tree island visible from this viewpoint, although the width of clearing (approximately 60 feet) would be difficult to distinguish. All other projects on Peak 9 are south facing and would blend with the landscape or be topographically concealed from this viewpoint.

Trail 11 on the north side of Peak 10 would be indistinguishable from this viewpoint.

Design criteria presented in Table 2-4 to blend the trail edges as well as the coloration of the top and bottom terminals allow BSR to remain in compliance with the Forest Service SIO designation of *Low* and *Very Low*.

Boreas Pass Road Overlook

As depicted in Figure 18, looking west, the proposed Peak 6½ groomable glade terrain would take advantage of natural clearing to provide a less visually impactful development when compared to existing fully cleared trails throughout the SUP area.[137] The Peak 6½ project would be 3 to 3.5 miles from the viewpoint in the middleground.[138] The lift-line corridor alignment would face the observer from this viewpoint and a linear corridor would be visible. The lift corridor would be feathered to blend well into the surrounding gladed overstory vegetation to meet the *Low* SIO. Other proposed trails visible to the observer from this viewpoint, although they would be indistinguishable as they are within the highly developed context of Peak 8, include: trails 2 through 7 (all located in the *Very Low* SIO).

[135] Figure 15 focuses on Alternative 3 project components on Peak 6½ and Peak 8, as these only these projects would perceptible to the viewer upon detailed study.
[136] Proposed upper lift top terminal would be 3.7 miles and the lower lift bottom terminal would be 3.1 miles from the French Gulch Road/Wellington Road intersection viewpoint.
[137] Figure 18 focuses on Alternative 3 project components on Peak 6½ and Peak 8, as these only these projects would perceptible to the viewer upon detailed study.
[138] Proposed upper lift top terminal would be 3.5 miles and the lower lift bottom terminal would be 2.9 miles from the Boreas Pass Road viewpoint.

The existing Colorado SuperChair blends with the landscape, so it is anticipated that the upgraded chairlift (which would be in the exact same alignment with the same top and bottom terminal locations) would similarly blend with the landscape and would be indiscernible.

Although Peak 9 is visible from this viewpoint, proposed trails and lift upgrades on it would be imperceptible, as they would blend into the exiting developed lift and trail network. The C-Chair upgrade would involve minimal overstory vegetation removal in a tree island visible from this viewpoint, although the width of clearing (approximately 60 feet) would be difficult to distinguish as it is slightly north facing. The A-Chair upgrade and realignment at the mid-station would be visible from the Boreas Pass viewpoint, but would be imperceptible within the context of the highly developed Peak 9 landscape. Trails 9 and 10 would be south facing, but their entry points would be noticeable only if the viewer knows the trail exists. Overall, the projects on Peak 9 would add to the already developed character of the landscape and would remain consistent with the *Very Low* SIO designation.

On Peak 10, Trail 11 would blend with the landscape and would not be perceptible from this viewpoint. Similar to trails 9 and 10 on Peak 9, trails 12, 13 and 14 would be south facing, but their entry points would be noticeable only if the viewer knows the trail exists. The projects on Peak 10 would add to the already developed character of the landscape and would remain consistent with the Very Low SIO designation.

Highway 9 – South

As depicted in Figure 21, the proposed Peak 6½ gladed terrain would take advantage of natural clearing to provide a less visually impactful development when compared to existing fully cleared trails. The Peak 6½ project would be 2.5 to 3 miles from the viewpoint in the middleground.[139] Due to topography, only the top half of the Peak 6½ project area is visible. The lift-line corridor alignment would face the observer from this viewpoint and a slightly more linear corridor would be visible. The lift corridor would be feathered to blend well into the surrounding gladed overstory vegetation to meet the *Low* SIO. Other proposed trails visible to the observer from this viewpoint, although would be indistinguishable as these three trails are within the highly developed context of Peak 8, include: trails 2 through 7 (all located in the *Very Low* SIO). The remaining trails would be concealed by roadside vegetation, but would generally be visible to the observer.

CUMULATIVE EFFECTS

Scope of Analysis

For a detailed description of past, present, and reasonable foreseeable future projects within Summit County and certain projects across the WRNF, the reader is referred to Appendix A in this document.

[139] Proposed upper lift top terminal would be 3.2 miles and the lower lift bottom terminal would be 2.6 miles from the viewpoint on Highway 9, south of downtown Breckenridge.

Temporal Bounds

The temporal bounds for this cumulative effects analysis for the aesthetic resource extend from BSR's inception as a resort in 1961, through the foreseeable future in which BSR can be expected to operate.

Spatial Bounds

The spatial bounds for this cumulative effects analysis for the aesthetic resource are limited to the public and private lands on the eastern face of the Tenmile Range, within the immediate vicinity of the Town of Breckenridge.

Past, Present, and Reasonably Foreseeable Future Actions

Past, present, and reasonably foreseeable actions that have cumulatively affected, and that will likely cumulatively affect, scenery resources within the project area are related to development of public and private lands dating back to the 1960s. The mountain pine beetle epidemic and related vegetation management activities are also critical components of the visual character of the project area. These past, present, and reasonably foreseeable actions include:

- Breckenridge Ski Resort – Master Development Plan projects
- Breckenridge Ski Resort – BreckConnect Gondola
- Breckenridge Ski Resort – Peak 8 Summit Lift and 6 Chair Replacement EA
- Breckenridge Ski Resort – Peaks 7 and 9 Facilities EA
- Breckenridge Ski Resort – Vegetation Management Plan
- Development of One Ski Hill Place (Peak 8 base area)
- Development of Crystal Peak Lodge (Peak 7 base area)
- Continued Town of Breckenridge and Upper Blue Residential Build-out
- In-holding Property
- Weber-Gulch Hut
- Breckenridge Forest Health and Fuels EA
- Mountain Pine Beetle Effects (Upper Blue Watershed)
- Red Tail Ranch WUI
- 1988 Gold Hill Clear Cuts

Breckenridge Ski Resort Projects Analysis

The ski area and base area have incrementally developed since 1961 as skiing has gained popularity and the residential and tourism population has grown. Historic development on NFS lands at BSR has involved clearing of trails, grading, and construction of lifts, roads, and buildings. Changes in vegetative patterns and developed facilities are visible from NFS lands within the permit area, and numerous areas locations—including, but not limited to, the four critical viewpoints utilized in this analysis.

From an aesthetic perspective, the BSR MDP includes shortening the existing Rocky Mountain SuperChair (moving the bottom terminal up-slope) and installing an additional chairlift to improve access to Peak 7 terrain from the base of Peak 8. From an appearance standpoint, the lifts would resemble current lift technology. The relocation of the bottom terminal on the existing Rocky Mountain SuperChair would minimally change the aesthetic environment; moreover, the relocated bottom terminal could be visible from additional viewpoints due to its location at a higher elevation. The additional lift would further contribute to the built environment on Peak 8; however, this project would meet the *Very Low* SIO designation. In the recent past, a change to the built environment occurred in 2002 with the construction of the Peak 7 terrain, with 165 acres of clearing and the installation of the Independence SuperChair. The Peak 7 project extended the built environment at BSR to the north by an additional 3,000 feet. Additionally, a 2003 Decision Notice approved the development of the Peak 7 Restaurant below the Peak 7/8 Summer Road and between *Claimjumper* and *Pioneer* trails. Once constructed, this approved facility will be visible from the critical viewpoints and will incrementally contribute to the developed character of the SUP area. This facility will be constructed to be consistent with the Forest Service's BEIG. It will also be consistent with the *Very Low* SIO designation for the BSR SUP area, as identified in the 2002 Forest Plan.

The Imperial Express SuperChair was constructed in 2005 with a top terminal elevation on Peak 8 at 12,840 feet. This lift was the first major above-tree line development at BSR (other structures near treeline include the T-Bar and the T-Bar Patrol Station on Peak 8). This lift "skylines" from viewpoints north of Breckenridge on Highway 9 and from the Breckenridge Golf Club. The coloration and design of the top terminal allows it to blend with the surrounding landscape to the greatest extent practicable. Cumulatively, the Imperial Express SuperChair, combined with the Proposed Action, would result in two major lifts (not including the T-Bar) and two buildings (including the T-Bar Patrol Station) above treeline at BSR. These top terminals and mountain operations buildings each incrementally contribute to the heavily altered scenic character of the BSR SUP boundary and would be consistent with the *Very Low* SIO designation in this location.

The opening of the BreckConnect Gondola in January 2007 contributed to the developed character of the Breckenridge community, as it extends across private and Town lands between the Gondola parking lots in Town to the base of Peak 8. The segment of the gondola that transformed the aesthetic character of the area the most is the crossing of Cucumber Creek in a large undeveloped wetland meadow on private

lands. The remainder of the gondola fits with the previously developed nature of the area (commercial and residential).

The Forest Service's BEIG provides architectural guidelines for structures on NFS lands. BSR will continue to incorporate these guidelines into future on-mountain buildings to match the architectural theme of the community to the greatest extent practicable.

Residential and Commercial Projects Analysis

Base area development has occurred in the last four years on private lands at the base of Peak 7 and 8 (Grand Lodge on Peak 7, Crystal Peak Lodge and One Ski Hill Place). Each of these developments contributes to the developed landscape that is visible from several viewpoints on the east side of the Town of Breckenridge, including the Wellington Neighborhood and the Boreas Pass overlook (middleground viewpoints).

According to the Town of Breckenridge 2009 Overview Report, the Town of Breckenridge is approximately 79 percent built out.[140] Residential, commercial and institutional development on private lands continues to contribute to the developed character of the Town of Breckenridge; however, community character was identified in the 2002 Town of Breckenridge Vision Plan as the most important consideration to make in future development decisions, and Town of Breckenridge Town Code includes strict aesthetic requirements for development within the Town (refer to Chapter 3A – Quality of Life for a further discussion on preserving the historic character of the Town).[141]

In-holding Property

The private in-holding located within BSR's SUP boundary on Peak 7, north of the existing developed trail network (refer to figures 2 through 4), could be developed in the future consistent with Summit County zoning and regulations. Any future development may be visible from NFS and private lands in the area and could add to the developed nature of the lands within BSR's SUP boundary.

Weber Gulch Hut

The proposed Weber Gulch Hut would be located on the north aspect of Baldy Mountain. The hut is proposed to be one or two stories and between 1,400 and 2,000 square feet in size. The analysis conducted by the Forest Service would analyze impacts to the scenic environment, if the hut is determined to be visible from critical viewpoints, it may impact the scenic resource on lands surrounding the Town of Breckenridge.

[140] Town of Breckenridge, 2009
[141] Town of Breckenridge, 2002 and 2009a

Vegetation Projects Analysis

Timber removal associated with the BSR Vegetation Management Plan, Breckenridge Forest Health and Fuels, Red Tail Ranch WUI, 1980s Gold Hill Clear Cuts, and the Mountain Pine Beetle Effects (Upper Blue Watershed) are or will be visible from identified critical viewpoints. These projects will amount to thousands of acres of tree removal in the Breckenridge area, the majority of which will combat tree mortality due to the mountain pine beetle. These projects will create a scenery impact for approximately 30 years before overstory regeneration matures. The 1980s Gold Hill Clear Cuts are currently visible and regenerating (refer to Visual Simulations).

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Additional developed terrain and infrastructure in previously undisturbed portions of the SUP area would represent irretrievable effects to scenery resources, particularly in high elevation areas; however, this commitment of the scenery resource is not considered irreversible because facilities and lifts could be removed and, in time, the area could be reclaimed and revegetated, restoring its natural appearance.

E. CULTURAL RESOURCES

SCOPE OF THE ANALYSIS

This cultural resource assessment is mandated by the National Historic Preservation Act of 1966 (NHPA). Section 106 of the NHPA requires that federal agencies take into account the effects of a federal undertaking on any cultural resource that is included in or eligible for inclusion in the National Register of Historic Places (NRHP). Cultural resources may refer to sites, areas, buildings, structures, districts, and objects which possess scientific, historic, and/or social values of a cultural group or groups as specified by 36 CFR 296.3.

This assessment is based on archaeological sources that indicate the historic and prehistoric utilization of lands, such as hunting, gathering, grazing, timber harvesting, and natural resource transport, within and adjacent to Breckenridge's SUP boundary (refer to Figure 2), known as the area of potential effect (APE). NRHP eligibility is evaluated in terms of the integrity of the resource; its association with significant persons, events, or patterns in history or prehistory; its engineering, artistic, or architectural values; or its information potentially relative to important research questions in history or prehistory.[142] The significance of NRHP eligibility of cultural resources is determined by the Forest Archaeologist in consultation with the State Historic Preservation Officer (SHPO).

AFFECTED ENVIRONMENT

Prehistorically, the project area falls within the Northern Colorado River Basin Context which is divided into four eras: the Paleoindian Era, the Archaic Era, the Formative Era, and the Protohistoric Era. The history of the Breckenridge area begins during 1859 and 1860 with the discovery of gold in the Blue River Valley. An estimated 8,000 miners flocked to the area and Breckenridge became the first town established on Colorado's western slope. By 1869 declining profits left approximately 20 to 30 homes in the area. A series of fires hindered growth until gold Iode deposits were discovered in 1878 and the Denver, South Park and Pacific Railroad came to Breckenridge in 1882. By the early 20th century, hydraulic mining and dredging had become hugely profitable in the area, lasting through World War II. On December 18, 1961, the Breckenridge Ski Resort opened for the first time.

Files of the Colorado Office of Archeology and Historic Preservation (OAHP) database and WRNF were consulted prior to the initiation of fieldwork. Data indicated that 11 survey projects were conducted in or near the current APE. These projects include investigations for land exchanges (ST.FS.R55, ST.FS.R25), the Upper Blue Stewardship Project (ST.FS.R26, ST.FS.R27), a core hole project for the Environmental Science Association (ST.FS.NR8), the South Barton Timber Sale (ST.FS.R5), Breckenridge Bike Path

[142] 36 CFR Section 60.4

(ST.FS.NR51), and investigations for projects at BSR (ST.FS.NR75, ST.FS.R42, ST.FS.R51, ST.FS.R52).

Forty-seven cultural resources (12 isolated finds and 35 sites) have been recorded in or near the current project area as a result of these projects. Three of the sites are prehistoric open lithic scatters, one is a historic trail and bridge, one is a historic loading chute, three are sawmill camps, five are water control features, six are mines or mining-related camps, seven are historic trash scatters or dumps, and nine are sites with historic log structures. Of these 35 sites, 26 have been recommended not eligible for inclusion on the NRHP, 7 have been evaluated as "needs data," and 2 have been recommended eligible for the NRHP. All of the isolated finds are recommended to be not eligible for the NRHP. Both of the eligible sites, 5STl61 and 5STl64, are outside of the current APE. Sites 5STl79 (needs data), 5STl80 (not eligible), and 5ST206 (not eligible) and isolated finds 5ST201, 5ST203, 5ST208, and 5ST209 (all not eligible) are mapped within 200 feet of the project APE and would be avoided by the development based on their mapped locations. Of the previously recorded cultural resources, only two isolated artifacts (5ST205, 5ST207) and one isolated feature (5ST837) are within the current APE.[143]

Cultural Resource Sites and Isolated Finds Inventory

The APE encompasses approximately 1,131.6 acres, 478.4 of which were intensively surveyed through 20 to 50 meter transects, 3.1 of which were visually inspected from a distance for structures and mining-related features, and 327.7 of which were inspected with binoculars due to steep slopes (in excess of 30 degrees), scree/boulder fields, or wetlands. The remaining 322.4 acres have been covered by previous inventory for other projects. Field analysis encompassed all proposed developments, including an approximate 100 meter buffer around the outermost trails and facilities. Two newly discovered historic sites were recorded, one newly recorded isolated find, two previously recorded isolated artifacts, and one previously recorded isolated feature were found within the APE.

One newly discovered site consists of a small cabin (5ST1241) and very sparse scatter of associated artifacts of food cans, stove parts, and jar glass. Mineral patent information suggests that it was a habitation site; at least seasonally beginning in the early 1920s and is likely associated with mining activity in the area. This site does not fit criteria regarding historical use by important people or during important events, or unique characteristics. Further, the historic integrity of the site has been lost due to significant use and alterations made by recreationists. Site 5ST1241 was determined officially not eligible for the NRHP by the Colorado SHPO on August 31, 2010.[144]

The second site newly discovered site (5ST1305) consists of the remains of two log structures and associated artifacts. The site consists of the remains of two vernacular log structures and associated

[143] Metcalf, 2010
[144] Colorado State Historic Preservation Officer, 2010

artifacts. Structure 1 consists of four courses of logs on the north and east sides. The south side is partially collapsed and the west side is completely collapsed and decomposing. The opening that appears to have been the doorway is on the south side. The structure was constructed from large, sawcut, V-notched logs. Smaller logs have been planed and split on two sides to form a wedge shape and used as chinking. Structure 2 is constructed using the same materials and methods as Structure I though one comer is reinforced with a piece of milled lumber. Five courses of logs remain on the west and south walls of this structure, although the south wall is partially collapsed. Site 5ST1305 was determined officially not eligible for the NRHP by the Colorado SHPO on August 31, 2010.[145] Two isolated artifacts, 5ST205 and 5ST207, and one isolated feature, 5ST837, were previously recorded in the project area and determined not eligible for the NRHP at that time. One isolated find, 5ST1306, was newly recorded during the current inventory. It is a prospect pit, approximately 1.5 meters in diameter and 1 meter deep with a small gravel back dirt pile, located on a steep north-facing slope. Although the region is known to have been heavily mined and prospect pits are prolific, no other pits, mines, or artifacts were found in the immediate vicinity. Isolated find 5ST1306 was determined officially not eligible for the NRHP by the Colorado SHPO on August 31, 2010.[146]

DIRECT AND INDIRECT ENVIRONMENTAL CONSEQUENCES

Table 3E-1 summarizes potential effects on cultural resources under each alternative by issue and indicator.

Table 3E-1:
Summary of Cultural Resource Effects by Issue and Indicator

Alternative 1	Alternative 2	Alternative 3
Issue: Implementation of proposed projects and associated ground disturbance may affect previously unidentified cultural and heritage resources within the SUP area.		
Indicator: Survey and document presence or absence of identified cultural resources		
Two newly discovered historic sites were recorded, one newly recorded isolated find, two previously recorded isolated artifacts, and one previously recorded isolated feature were found within the APE.	All inventory reports were submitted to the SHPO in completion of the NHPA Section 106 process. SHPO concurrence regarding this project was received on August 31, 2010.	Same as Alternative 2.
Indicator: Documentation of impacts to potentially-eligible National Register of Historic Places (NRHP) sites		
Implementation of Alternative 1 would have “no effect” on any known NRHP listed or eligible historic properties.	Implementation of the Proposed Action was determined to have “no effect” on any known NRHP listed or eligible historic properties. Written concurrence was received from the SHPO on August 31, 2010.	Implementation of the Proposed Action was determined to have “no effect” on any known NRHP listed or eligible historic properties. Written concurrence was received from the SHPO on August 31, 2010.

[145] Ibid.
[146] Ibid.

Alternative 1

Under the No Action Alternative, new development projects would not occur. The resort would continue to operate under its current configuration and capacity. Because no ground disturbance is proposed under the No Action Alternative, there is no potential to affect the historic sites within the area of potential effect as a result of the No Action Alternative.

Alternatives 2 and 3

The two newly discovered historic sites and one newly discovered isolated find within the APE were recorded and found to be not eligible for inclusion on the NRHP. In addition, the two previously recorded isolated artifacts, and one previously recorded isolated feature found within the APE were determined to not be eligible for inclusion on the NRHP. Therefore, neither of the action alternatives would have adverse effects to historic properties determined by the Forest Service and SHPO. Topographically, the ruggedness of the area provides only limited level areas suitable for prehistoric or historic sites. Because of this, expectations for the discovery of cultural materials are low. As stated in the project design criteria (Table 2-4), if previously-unknown cultural resources or artifacts are discovered during implementation of any approved projects, all ground disturbing activities will cease, and SHPO consultation will commence.

CUMULATIVE EFFECTS

Scope of the Analysis

The effects analyzed in the cumulative effects section apply to all alternatives, including the No Action Alternative. For a detailed description of past, present, and reasonable foreseeable future projects, the reader is referred to Appendix A in this document.

Temporal Bounds

The temporal bounds for this cumulative effects analysis for cultural resources extend from BSR's inception as a destination resort in 1961 through the foreseeable future in which BSR can be expected to operate.

Spatial Bounds

The spatial bounds for this cumulative effects analysis are limited to public and private lands in the vicinity of the BSR SUP area.

Past, Present, and Reasonably Foreseeable Future Projects

From a cumulative perspective, since implementation of projects contained in the action alternatives were determined to have "no effect" on any known NRHP listed or eligible historic properties, by definition, no cumulative impacts to cultural resources are identified specifically related to the BSR projects.

All projects listed in Appendix A would require the completion of requisite cultural surveys and to satisfy State and Federal requirements. However, additional potential impacts to cultural resources may be related to livestock grazing, siting of water troughs, mining, and other recreation projects. As stated above, this project has been determined to have no adverse affect either independently or cumulatively to cultural resources.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

No irreversible and/or irretrievable commitments of cultural resources have been identified in association with any of the alternatives analyzed in this document.

F. SOCIAL AND ECONOMIC RESOURCES

SCOPE OF THE ANALYSIS

The development elements contained in BSR's proposal have the potential to affect not only the physical aspects of the project area's environment but also the social and economic (socioeconomic) environment. Development of the proposed facilities could potentially alter certain socioeconomic characteristics of Summit County, and more specifically the Town of Breckenridge, including demand for Town/County housing (in compliance with Executive Order 12898). This analysis targets the specific issues within this broad framework as identified during scoping. In addition, some of the scoping comments received raised broader community issues and are impractical to consider in an isolated discussion regarding the Peak 6 proposal. Therefore, to aid in consideration of these issues, a Task Force was developed in August 2008, which included members from BSR, the Town of Breckenridge, Summit County, and the Breckenridge business community (for details regarding Task Force meetings refer to the Peak 6 Task Force section in Chapter 1). The Task Force identified social issues that BSR, the Town and County, and business community share with respect to growth, and identified a process for dealing with these issues in a more comprehensive manner. Details regarding Task Force issues and results are contained within the Project File and summarized below.

A correlation exists between the operation of BSR and the Summit County economy. This correlation encompasses seasonal tourism, employment and income levels, and tax revenues. The strength of this correlation is assessed and disclosed herein.

Economic Impact Theory – A significant body of prior research regarding ski operations makes it clear that by drawing non-local visitation to an area, ski facilities can generate economic activity in the form of employment and dollar flows. Further, these benefits accrue to both the ski area and to local businesses that benefit from spending by visitors. Perhaps just as importantly, the direct dollars spent at ski areas and local businesses have a secondary (multiplier) impact, creating additional dollar flows/jobs within the local and regional economy.

Economic Impacts – Employment and dollar flows are typically defined at three levels:

- Direct – Employment created as a direct impact of a business. On and off-site construction jobs, resort-based jobs and non-resort jobs generated by visitor expenditures are included in this category. The majority of these jobs will be created within a small geographic area—typically in the immediate area of the resort.

- Indirect – Employment created by industry-to-industry spending. For instance, increased food and beverage spending at BSR will result in the purchase of more supplies from food vendors. This revenue will allow the food vendors to create more employment. These are indirect jobs. These jobs would be created both locally and throughout the geographic area in which the resort regularly conducts business.
- Induced – Employment created by increased household spending. The additional jobs and income created by direct spending would allow consumers to increase their spending on goods and services. This spending will allow a number of businesses to create more jobs. These are induced jobs. Induced jobs will be generated over a relatively broad geographic area.

The direct and secondary impacts of the Alternatives were projected using a computer-based model—IMPLAN3.[147] IMPLAN3 is a broadly accepted model used by the Forest Service for making projections regarding employment and economic impacts and is often used by the Forest Service in the preparation of Environmental Impact Statements as part of the NEPA process.

In this analysis, existing and prospective new jobs are defined in terms of "Full-Time-Equivalents" (FTEs)—one FTE provides sufficient work to keep one person employed full-time for one year. In seasonal industries—such as ski areas—one FTE may represent several employment positions.

AFFECTED ENVIRONMENT

Population

Table 3F-1 presents the total year-round resident population for Summit County from 1970 through 2010.

[147] IMPLAN3 software guides users though the task of creating an impact study that tracks the effects of a modeled event (such as each Alternative) against 440 unique sectors in the United States. The result is a detailed summary of economic impacts including: changes in jobs, household incomes, tax impacts, and gross regional product that can be used to show the effect of firms moving into an area, special events, introduction of new technologies, recreation and tourism, military base closures, changes in government spending and many more events. Additional information regarding IMPLAN3 software and data used for the economic analysis is contained in the Social and Economics technical report in the Project File.

Table 3F-1:
Summit County Permanent Resident Population Estimates (1970–2010)

Area	1970	1980	1990	2000[a]	2002	2004	2008[b]	2010[c]
Incorporated Areas								
Breckenridge	548	818	1,285	2,408	3,123	3,299	3,668	3,790
Blue River	8	230	440	685	711	744	769	769
Dillon	182	337	553	802	806	820	838	867
Frisco	471	1,221	1,601	2,443	2,630	2,700	2,852	2,871
Montezuma			60	42	43	46	53	54
Silverthorne	400	989	1,768	3,196	3,637	3,810	4,203	4,355
Subtotal	*1,609*	*3,595*	*5,707*	*9,576*	*10,950*	*11,419*	*12,383*	*12,705*
Unincorporated Areas								
Lower Blue Basin			2,533	4,592	5,037	5,105	5,352	5,399
Snake River Basin			1,765	4,187	4,949	4,976	5,209	5,234
Ten Mile Basin			532	837	1,081	1,156	1,170	1,212
Upper Blue Basin			2,344	4,356	4,873	4,816	5,029	5,075
Subtotal	*1,056*	*5,253*	*7,174*	*13,972*	*15,940*	*16,053*	*16,760*	*16,921*
Total Summit County	**2,665**	**8,848**	**12,881**	**23,548**	**26,890**	**27,472**	**29,143**	**29,626**

[a] The 1970–2000 population numbers are based on U.S. Census data.
[b] The 2002–2008 populations reflect estimates prepared by the State Demographer. The State Demographer estimates the permanent resident population in arrears as of July 1 of each year (i.e., the 2008 population was confirmed by the State Demographer in 2009; the 2009 population will be confirmed by the State Demographer in 2010).
[c] The 2010 population estimate was prepared by the Summit County Planning Department. The methodology uses the State Demographer's July 2008 estimates as a base or starting point, and then estimates population growth from July 2008 to January 2010 using: certificate of occupancy (CO) permits issued by the County and towns, and vacancy rates and population per household estimates determined by the State Demographer. The 2010 population estimate incorporates all COs issued through December 31, 2009.
Source: Summit County Planning Department Website, 2010

From 1970 to 2006, Summit County was one of the fastest growing counties in Colorado (from 2001 to 2002 growth was 10 percent), likely due to changes in traditional employment opportunities (tele-commuting) and increase in popularity of healthy/recreation lifestyle.[148] However, according to population projections, these historic growth rates are not expected to continue over the next two decades. Summit County's population growth from 2000 to 2010 was 25.8 percent or an average of 2.6 percent per year. Population projections anticipate growth in Summit County to average 2.14 percent per year. This growth represents an 86.6 percent increase, or an additional 20,395 residents over a 25-year period.[149]

Population projections are approximations that are affected by factors such as changes in assumptions (numbers of persons per household), transient residents, the number of second homes, and second home owners converting into permanent residents. Table 3F-2 displays population projections and percent change for 2015, 2020, and 2025 for Summit County.

[148] Summit County, 2010
[149] Ibid.

Table 3F-2:
Summit County Projected Permanent Population Projections (2000–2025)

Time Frame/Years	Percent Change	New Residents Added	Projected Ending Population
2000–2010	25.8	6,078	29,626
2010–2015	12.5	3,755	33,706
2015–2020	15.1	5,082	38,788
2020–2025	13.3	5,155	43,943

Source: U.S. Census Bureau and State Demographer

The Economy

BSR is a major generator of visitor activity in Summit County, attracting local, regional, national and international visitors. BSR visitors tend to fall into one of two broad categories:

- Day Visitors – Visitors who travel to and from BSR for a day of activity. No overnight lodging is involved.
- Destination Visitors – Visitors whose trip to BSR includes one or more nights spent away from their place of residence.

BSR visitors—by virtue of their expenditures on goods and services—support employment and dollar flows both inside and outside BSR, on a direct and secondary basis.[150]

While resort-based employment is focused in Summit County, secondary impacts can extend well beyond the local region. In accordance with the "levels of impact" defined in the Scope of the Analysis, the following types of employment are generated:

- Direct – Employment at BSR and employment at area businesses that benefit from expenditures by BSR visitors. This would include: BSR, restaurants, retail shops, hotels, etc. These jobs are primarily local.
- Indirect – Employment at businesses that benefit from increased activity at BSR and businesses supported by BSR visitor expenditures. This would include food vendors, service/cleaning businesses, etc. These jobs are generated regionally.
- Induced – Employment created by increased household spending. The jobs and income created by BSR allows consumers to increase spending on goods and services within the economy. In turn, allowing a number of businesses to create more jobs. For example, a lift operator goes to a restaurant more now that he has a job and the restaurant hires a new employee; this is an *induced* job. Induced jobs are generated over a relatively broad geographic area.

[150] The *direct* dollars spent at ski areas and local businesses have a *secondary* (multiplier) impact, creating more dollar flows/jobs in the local and regional economy.

Because BSR visitors' expenditures drive employment and dollar impacts, variations in visitation are significant to the area economy. Resort visitation for three recent seasons—along with averages for the three-year period—are summarized in Table 3F-3, below. Figures are shown for: skier visits (destination and day skiers), overnight non-skiers, and day non-skiers.[151] Among skiers alone, the current distribution is: 60 percent destination skiers and 40 percent day skiers.

It is important to consider non-skier visitors as a significant economic component of resort visitation—particularly among destination groups. Destination groups commonly include persons who do not ski, but who take advantage of other BSR or Town of Breckenridge offerings. For instance, a family group might include a parent or very young child who does not ski. In some instances, North American mountain resorts have reported that non-skiers account for as much as 50 percent of winter visitors. However, in this instance, it has been assumed that 20 percent of BSR's winter destination visitors are non-skiers. Thus, for every four destination skiers, one additional non-skier is included in visitation totals; for example, a family of five would likely have one non-skier. Among day skiers, the segment accounted for by non-skiers is significantly smaller. In this instance, it has been assumed that approximately 5 percent of persons in day skier parties are non-skiers. Thus, while the distribution of *skiers* is 60 percent destination visitors/40 percent day visitors, resort visitor *totals* are closer to 64 percent destination visitors/36 percent day visitors.

Table 3F-3:
Recent & Average Breckenridge Ski Resort Visitation

	2008/09	2009/10	2010/11	Three Year Average
Skier Visits	1,528,000	1,608,031	1,631,000	1,589,010
Destination/Overnight	916,800	964,818	978,600	953,406
Day Visitor	611,200	643,213	652,400	635,604
Overnight Non-Skiers	229,200	241,205	244,650	238,352
Day Non-Skiers	30,560	32,161	32,620	31,780
Total: Destination Visitor	*1,146,000*	*1,206,023*	*1,223,250*	*1,191,758*
Total: Day Visitor	*641,760*	*675,374*	*685,020*	*667,385*
Total Visitation	**1,787,760**	**1,881,397**	**1,908,270**	**1,859,142**

Over the past three years, for which data is available, Breckenridge averaged over 1.8 million visitors—approximately 64 percent of which were destination (overnight) visitors. This is a critical distinction, as destination visitors' per diem expenditures are higher than day visitors' per diem expenditures. Destination skiers incur costs for lodging, food, travel, etc., resulting in significantly higher expenditures than day visitors.

[151] Assumes 60/40 breakdown between destination and day skiers. Assumes one non-skier for every four destination skiers. Assumes one non-skier for every 20 day skiers. No data available for summer visitation. Note that visitation figures are for winter only.

Table 3F-4 summarizes the current level of total employment positions at BSR. Employment positions are the number of persons employed by BSR. In many instances, these positions are both seasonal and part-time. As such, an employment position can be less than a full-time, year-round job.

Table 3F-4:
BSR Employment *Positions*

MOUNTAIN OPERATIONS		
	Summer	**Winter**
Year-Round Full-Time	110	
Year-Round Part-Time	1	
Seasonal Full-Time	139	1,024
Seasonal Part-Time	99	585
Total Mountain Operations Employment Positions		*1,958*
LODGING OPERATIONS		
		Average Level
Year-Round Full-Time	--	173
Year-Round Part-Time	--	0
Seasonal Full-Time	--	38
Seasonal Part-Time	--	48
Total Lodging Operations Employment Positions		*259*
Total Employment Positions/Resort		**2,217**

Over a 12-month period, BSR currently generates over 2,200 employment positions in its Mountain and Lodging Operations. Again, many of these positions are less than full-time employment. Table 3F-5 summarizes the conversion of BSR-based employment positions to FTEs.[152]

Table 3F-5:
Breckenridge Resort: Conversion of Employment Positions to FTEs

	Year-Round Full-Time	**Year-Round Part-Time**	**Seasonal Full-Time**	**Seasonal Part-Time**	**Totals**
Mountain Operations	110	1	1,163	684	**1,958**
Lodging Operations	173	0	38	48	**260**
Total Employment Positions	**283**	**1**	**1,201**	**732**	**2,217**
FTE Conversion Factors	1.00	0.33	0.33	0.17	
= FTEs	283.0	0.3	396.3	124.4	**804**

The 2,218 employment resort-based employment positions converts to 804 FTEs.

[152] Conversions as follows: Full-Time Year-Round = 1.0 (Works full-time for 12 Months; Part-Time Year-Round = 0.33 (Works part-time for 12 months); Full-Time Seasonal = 0.33 (Works full-time for four months); Part-Time Seasonal = 0.17 (Works part-time for four months).

BSR's ongoing operations have a significant impact on Summit County's economy. Direct employment is created both at BSR (refer to Table 3F-5) and locally, as visitors make expenditures both at BSR and at other area businesses, such as hotels, restaurants, retail stores, etc. Secondary employment is dispersed over a broader geographic area, including suppliers, service contractors, etc, who work with BSR and other local businesses. Ongoing operation of BSR (expressed in terms of visitor expenditures) effectively generates employment in three ways:

1. Resort-based employment: Direct impact of visitor expenditures within the ski resort (Table 3F-5).
2. Employment outside the resort: Direct impact of visitor expenditures at area businesses—hotels, restaurant, retail stores, etc.
3. Employment in the region: Secondary (multiplier) impact of increased economic activity generated by visitor/resort expenditures—resort suppliers, service contractors, etc.

Estimation of these impacts is directly related to skier visits and overall visitation—as expenditures by visitors generate dollar flows and support employment. As noted above, BSR currently attracts 1.8+ million overall visitors on an annual basis. Over the years, a number of studies and data sources have been utilized to estimate average, detailed per diem expenditures, by category of visitor (day-skiers, overnight skiers, etc).[153] These studies are based on direct research, which includes visitor surveys that gather data on actual visitor expenditures.

Table 3F-6 shows estimated, daily expenditures by Colorado skiers, broken down by:[154]

- Type of Visitor – Destination or Day
- Expenditures Inside and Outside the resort
- Expenditures by Category – Lodging, Food & Beverage, etc.

[153] Sources include: Colorado Ski Country, Colorado State University, Utah Bureau of Economic & Business Research, Vermont Tourism Data Center, Alberta Economic Development
The greatest weight was applied to estimates of Colorado skier activity. Per capita expenditure figures have been factored up to account for Consumer Price Index (CPI) increases since the dates of publication.
[154] Lodging figures have been adjusted to account for assumed expenditures inside and outside BSR.

Table 3F-6:
Daily, Per Capita Expenditures – Colorado Skiers

	Destination (Overnight Visitors)			Day Visitors		
	In Resort	Outside Resort	Total	In Resort	Outside Resort	Total
Retail	$11.48	$65.03	$76.51	$2.99	$16.95	$19.94
Hotel & Lodging	$6.16	$70.87	$77.03	$0	$0	$0
Lifts & Ski School	$51.39	$0	$51.39	$33.47	$0	$33.47
Food & Beverage	$9.29	$37.16	$46.45	$2.42	$9.69	$12.11
Other Services	$0	$21.86	$21.86	$0	$5.70	$5.70
Totals	**$78.32**	**$194.92**	**$273.24**	**$38.88**	**$32.33**	**$71.22**

The daily, per capita expenditure estimates were then multiplied by current BSR visitation (by type of visitor) to develop current estimates of total visitor expenditures—by industry category—both inside and outside the resort. The results of these calculations are shown in the Table 3F-7.

Table 3F-7:
Estimated Annual Expenditures by BSR Visitors: Current Level ($Millions)

	Destination Visitors	Day Visitors	All Visitors
Inside Resort	$94.15	$26.18	$120.33
Outside Resort	$234.31	$21.77	$256.08
Totals	$328.46	$47.94	**$376.40**

Current level direct expenditures by BSR visitors are estimated in excess of $375 million annually. These expenditures were input to the IMPLAN3 (described below) model in order to estimate the net impact of BSR on local/regional dollar flows and employment. The IMPLAN3 model converts the direct expenditure figures (above) into employment and dollars generated on both direct and secondary (Indirect and Induced) bases. A summary of these findings is shown in the Table 3F-8.

Table 3F-8:
Total Current FTE Employment and Dollar Flow Impact
(Breckenridge Ski Resort)

	Total Impact (Inside and Outside Resort)
EMPLOYMENT (FTES)	
Direct Impact	2,681
Secondary Impact	1,584
Total	**4,265**
DOLLAR OUTPUT ($ MILLIONS)	
Direct Impact	$254.6
Secondary Impact	$234.1
Total	**$488.7**

The model indicates that BSR's current annual level of total economic impact is: 4,265 FTE jobs and $488.7 million in dollar output.

BSR's current economic "impact" on the regional and statewide economy can be referenced as follows:

- The average number of persons employed (by all employers) in Summit County (2009) was 15,482.[155] Based on the data and findings summarized above, it is estimated that the average number of persons employed at the resort over the course of the recent year was 1,390 (Employment Positions – Not FTEs). Thus, BSR's direct employment impact (only includes jobs within the resort) accounts for approximately 9 percent of the county's overall employment.[156] Moreover, BSR visitor expenditures directly support employment at businesses outside the resort as well as employment on a secondary basis. While the majority of these direct expenditures occur within Summit County, a segment of the secondary expenditures occur outside the county. Overall, it is estimated that the average number of Summit County-based employment positions supported by BSR visitor expenditures is 3,250. On this basis, BSR's total (Direct and Secondary) economic impact accounts for approximately 16 percent of Summit County's employment.[157]
- On a statewide (Colorado) basis, Breckenridge accounts for approximately 0.4 percent of total employment.[158]
- It is estimated that Breckenridge generates $94.4 million in personal income in Summit County on an annual basis (Direct and Secondary Impact).[159] This accounts for 8.2 percent of total personal income in Summit County.[160]

In summary, BSR is currently a major economic factor in Summit County—both in terms of employment and income.

Housing

The Town of Breckenridge prepared a capacity analysis in 2008, which contained a detailed build-out analysis. Table 3F-9 presents the total number of existing dwelling units (2007), as well as the remaining

[155] Colorado Department of Labor and Employment, 2009. This figure measures the average number of persons employed in the county over the course of the year—and is not the same as FTEs.
[156] 1,390 (BSR Average BSR Employment Positions) ÷ 15,482 (Summit County Average Employment Positions) = 0.0897 ~ 9%
[157] 3,250 (Total Average BSR Employment Positions in Summit County – Direct & Secondary) ÷ 15,482 (Summit County Average Employment Positions) = 0.2099 ~ 21%
[158] Colorado Employment – 2,492,540; Colorado Department of Labor and Employment, 2010
[159] Doug Kennedy Advisors, 2010
[160] Summit County total personal income (2007) $1,146,315,000

absolute and realistic residential single family equivalents (SFE). As stated in the Town of Breckenridge Capacity Analysis:[161]

Table 3F-9:
Town of Breckenridge Residential Build-Out, 2007

	Existing Units	Remaining Residential SFEs (Absolute)	Remaining Residential SFEs (Realistic)
Total Residential Units	6,394 (77% Built Out)	2,090	1,861 (23% Remaining)
Single Family	1,116		691
Multi-Family	3,090		1,170
Duplex	281	*	*
Townhome	390	*	*
Condo Hotel	547	*	*
Fractional Ownership	467	*	*
Lodge Room	503	*	*

* For Remaining Residential SFEs, it is uncertain which type of multi-family use (e.g., condo hotel, lodge, etc.) will be developed on individual properties. Thus, Remaining SFEs for different multi-family uses are not indicated and instead are grouped together under the "multi-family" heading.
Source: Town of Breckenridge, 2008a

The terms "Absolute" and "Realistic" are used to describe build-out in the above table. "Absolute" refers to all density that is recognized on a property through Land Use Guidelines, master plans, or other entitlements. Absolute density can include "phantom" density—density that is assigned to a property but cannot actually be built because of physical limitations on the site. In contrast, "realistic" density refers to the density that can reasonably fit on a property based on zoning and other entitlements.

The bulk of remaining residential SFEs are located in the Peak 7 & 8 Master Plan area (450.5 SFEs), the Highlands at Breckenridge (291 SFEs) and Wellington Neighborhood (148 SFEs). The remainder of available SFEs is spread out throughout town.

Table 3F-10 shows existing built residential units for the Towns of Breckenridge, Blue River, and Summit County.

[161] Town of Breckenridge, 2008a

Table 3F-10:
Existing Residential Units in the Upper Blue Basin, 2007[a]

Jurisdiction	Units Built to Date
Town of Breckenridge	6,394
Town of Blue River	660
Summit County	3,398
Total	**10,452**

[a] Town of Breckenridge and Summit County numbers are draft, undergoing final review.
Town of Blue River number is from 2002.
Source: Town of Breckenridge, 2008a

BSR Workforce Housing

According to current Town of Breckenridge estimates, 45 percent of employees who work in the Town of Breckenridge live in town; 60 percent live within the Upper Blue (including the Town of Breckenridge). Currently, there is a scarcity of deed-restricted units in the Town of Breckenridge. In the future as additional employment opportunities arise in the Town, the deficit of affordable housing may result in a larger portion of employees commuting into Town from other areas of the county (or other counties) where cheaper housing is available.

BSR currently provides approximately 500 employee housing beds, which had an occupancy rate of 74 percent in the 2008/09 winter season. A portion of the beds are reserved for Town of Breckenridge employees and BSR lodging operations employees. BSR currently provides workforce housing at Breckenridge Terrace on Airport Road and maintains housing "credits" because of vacant units.[162] The Task Force identified the potential for vacant units to be rented by area employees to increase occupancy and improve the housing supply.

Social Services

The Task Force analyzed social services within Summit County during their discussions. A portion of BSR employees are likely at or below 60 to 80 percent of the area median income (AMI), and as a result could be in a position to require social services. The effect from any action alternative to the operation of services such as the Community Care Clinic and the Family and Intercultural Resource Center (FIRC) is not anticipated to be measurably recognized, however the Task Force recognized the need for BSR's contributions to continue pace with growth of the resort. BSR would continue to contribute to social services through the Summit Foundation. Social services are addressed in the Summary of Key Findings and Guiding Principles document prepared by the Task Force.[163] This document is located in the Project File.

[162] Task Force, 2009
[163] Ibid.

Environmental Justice

In 1994 President Clinton issued Executive Order (EO) 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" to ensure such populations are not subject to disproportionately high levels of environmental risk.[164] EO 12898 provides that "each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." EO 12898 makes it clear that its provisions apply fully to programs involving Native Americans.

Racial diversity has remained limited in Summit County; 83.7 percent of the County's population is white and 14.2 percent is Hispanic or Latino.[165] Other groups, each contributing approximately 1 percent or less of the population in Summit County, are: Black, American Indian and Eskimo, Asian, Hawaiian and Pacific Islander, Other, and people of two or more races.

DIRECT AND INDIRECT ENVIRONMENTAL CONSEQUENCES

Major conclusions and determinations of this Social and Economic Resources analysis are summarized in Table 3F-11.

Table 3F-11:
Summary of Social and Economic Resource Effects by Issue and Indicator

Alternative 1	Alternative 2	Alternative 3
Issue: Implementation of the proposed projects could potentially alter certain socioeconomic characteristics of Summit County, including demand for Town/County housing (in compliance with Executive Order 12898), by increasing total annual visitation.		
Indicator: Potential effects to socioeconomic indicators in Summit County, including: population, housing and affordable housing, employment, and expenditures		
Population: Under the No Action Alternative Summit County's population is projected to increase by 2.14% per year to 43,943 permanent residents by 2025. Resort visitation is expected to increase at 0.75% annually under the No Action Alternative.	Population: Alternative 2 would result in 30 new employees (FTE 9.3 employees) a percentage of which are assumed to relocate into the Country (primarily seasonally). Despite these new employees, Summit County's population growth would remain the same as is projected for the No Action Alternative at 2.14% per year through 2025. Alternative 2 is expected to result in increases in resort visitation at a rate up to 2.0% annually.	Population: Alternative 3 would result in eight new employees (FTE 2.5 employees) a percentage of which are assumed to relocate into the Country (primarily seasonally). Despite these new employees, Summit County's population growth would remain the same as is projected for the No Action Alternative at 2.14% per year through 2025. Alternative 3 is expected to result in increases in resort visitation at a rate of 1.25% annually.

[164] 59 Federal Register 7629, 1994; *Disproportionately* is a generic term used to define the adverse effects of environmental actions that burden minority and/or low income populations at a higher rate than the general public.
[165] Colorado Division of Local Government, 2010

Table 3F-11:
Summary of Social and Economic Resource Effects by Issue and Indicator

Alternative 1	Alternative 2	Alternative 3
Housing: BSR currently provides the full amount of employee housing that is currently required, and BSR has committed to maintaining adequate housing for BSR employees into the future. Currently, there is a scarcity of community workforce housing, which is projected to continue in the future. Approximately 1,861 (or 23% of total) single family equivalents remain to be built within the Town of Breckenridge.	Housing: BSR currently provides the full amount of employee housing required. The existing scarcity of workforce housing, is projected to continue in the future.	Housing: BSR currently provides the full amount of employee housing required. The existing scarcity of workforce housing, is projected to continue in the future.
Employment: BSR directly offers 2,217 year-round and seasonal full-time and part-time *positions* or the equivalent of 804 FTEs. It is estimated that employment within BSR directly accounts for approximately 9% of Summit County's employment. When BSR visitors' total expenditures are included, it is estimated that BSR accounts for approximately 16% of Summit County's total employment. At the end of the ten-year projection period, the No Action Alternative is projected to generate 295 additional FTEs on an ongoing basis.	Employment: Alternative 2 construction activity is projected to generate a cumulative total of 105 FTEs, over a two-year period. Alternative 2 will result in the creation of 30 new job positions within BSR. At the end of the ten-year projection period, Alternative 2 is projected to generate 813 FTEs on an ongoing basis, regionally.	Employment: Alternative 3 construction activity is projected to generate a cumulative total of 328 FTEs over a seven-year period. Alternative 3 will result in the creation of eight new job positions within BSR. At the end of the ten-year projection period, Alternative 3 is projected to generate 498 FTEs on an ongoing basis.
Revenue: BSR generates $94.4 million in personal income in Summit County. BSR (Winter) visitors currently generate over $375 million in annual expenditures, generating a total over of over 4,260 FTEs throughout Colorado (Direct and Secondary Impact).	Revenue: Alternative 2 construction activity is projected to generate over $7.5 million in economic activity, over a two-year period. At the end of the ten-year projection period, Alternative 2 is projected to generate 813 FTEs and $97.4 million in annual dollar activity—on an ongoing basis.	Revenue: Alternative 3 construction activity is projected to generate over $60 million in economic activity, over a seven-year period. At the end of the ten-year projection period, Alternative 3 is projected to generate $58.8 million in annual dollar activity—on an ongoing basis.

This section evaluates potential direct and indirect Social and Economic Resource impacts associated with the different alternatives.

An economic impact analysis was completed to assess both the current and projected economic impact of BSR in terms of the employment the resort creates and dollar flows it generates within the regional economy. The analysis considered both the direct and secondary economic impacts of the resort. The

analysis of current impact focused on levels of activity within the past three years, while the projected analysis focused on the potential impacts of three alternatives now under consideration for the resort.

This analysis measured both the direct and secondary impacts of BSR's economic activity. It is well established that direct spending in any industry—in this instance, visitor spending at BSR—has a multiplier effect, resulting in the creation of additional employment and dollar flows. The alternatives will create economic impacts in two ways:

- Construction – Construction of the improvements planned as part of Alternatives 2 and 3 will create short-term economic impacts through employment and dollar flows.[166]
- Ongoing Operations – Increased visitation at BSR will create long-term economic impacts.

Forward looking economic impacts have been projected over a ten-year timeframe—with Year 1 being equivalent to the first year of project activity for either Alternative 2 or 3. Impacts have been presented on year-by-year and cumulative basis. The forward looking analyses were conducted in two ways:

- BSR's projections regarding increases in resort-based employment as a result of implementation of the alternatives; and
- The IMPLAN3 Model was used in this analysis to project potential employment/dollar flow impacts outside BSR on both a direct and secondary basis.

Alternative 1 – No Action

Population

Population growth projections expect Summit County's resident population to grow by 2.14 percent per year between 2000 and 2025 to 43,943 in year-round residents by 2025. In 2009 the resident population of Summit County was 27,239 people. Over the 16-year period from 2009 to 2025 an additional 16,704 residents will likely be added, representing a 38 percent increase over current population levels. Alternative 1 is not anticipated to measurably affect (positively or negatively) this overall population trend.

The Economy

Alternative 1 does not include any projects that would address the Purpose and Need. An erosion of market share would be anticipated, decreasing annual skier-visit growth to +0.75 percent, as addressed below.[167] Visitation growth projections are presented in Table 3B-13 in Chapter 3B – Recreation, Mountain Operations and Guest Services. Similar resorts in the Colorado ski resort market that have not

[166] The No Action Alternative does not include and construction activity.
[167] Refer to Chapter 3B – Recreation, Mountain Operations and Guest Services for additional information regarding projections for annual skier growth.

met evolving guest expectations over the previous ten years have experienced similar average declines in annual growth.[168] Colorado's population is generally projected to grow at a 2 percent annual rate in the future. This figure (2 percent) has been found to correlate well with annual change in statewide skier visits. As such, a ski resort that remains "on par" competitively by upgrading facilities, services, etc., can be expected to experience a 2 percent annual increase in skier visits. An annual increase of less than 2 percent would be indicative of a ski facility that has become less competitive and is losing market share.

Year-by-year visitation projections are shown in Table 3F-12 – Projected Net Increases in Annual Visitation (over current levels), and are depicted by Day and Destination (Overnight) visitors.

Table 3F-12:
Projected Net Increases in Annual BSR Visitation – Alternative 1

Year	1	2	3	4	5	6	7	8	9	10
NO ACTION – 0.75% ANNUAL										
Destination[a]	9,020	18,100	27,250	36,470	45,760	55,120	64,550	74,050	83,620	93,260
Day[a]	5,050	10,140	15,260	20,420	25,630	30,870	36,150	41,470	46,830	52,230
Totals	14,060	28,230	42,510	56,890	71,390	85,990	100,700	115,520	130,450	145,490

[a] Destination and Day numbers include non-skier visitors, as well as skier visits.

Over the ten-year analytical timeframe, net annual overall visitation would increase incrementally by 145,000 over the ten-year projection period.

The daily per capita expenditure estimates summarized above (under "Current Economic Impact") were applied to net annual projected increases in visitation (by visitor type) to develop annual estimates of net increases in visitor expenditures—by industry category—both inside and outside of BSR. The resultant total expenditures were then input to the IMPLAN3 Model in order to estimate the net economic impact on regional dollar flows and employment. Table 3F-13 shows the annual direct and secondary FTE jobs and dollars of the No Action Alternative.

[168] SE Group, 2010d

Table 3F-13:
FTE Jobs and Dollar Flow Impacts – Alternative 1

		Year										Cumulative
		1	2	3	4	5	6	7	8	9	10	
FTEs	Direct: In Resort	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
	Direct: Outside Resort	22.2	41.5	59.7	77.2	94.3	111.1	127.7	144.2	160.6	174.6	1,013
	Secondary	14.0	26.2	37.6	48.7	59.5	70.1	80.5	90.9	101.3	110.2	639
Total FTEs		37.2	69.7	100.3	129.9	158.8	187.2	215.3	243.1	270.8	294.8	1,707
Dollars ($Millions)	Direct	$2.3	$4.3	$6.2	$8.0	$9.8	$11.5	$13.3	$15.0	$16.7	$18.1	$105.2
	Secondary	$2.1	$3.9	$5.6	$7.3	$8.9	$10.5	$12.0	$13.6	$15.1	$16.4	$95.3
Totals Dollar Impact		$4.4	$8.2	$11.8	$15.3	$18.7	$22.0	$25.3	$28.5	$31.8	$34.5	$200.5

Over the ten-year projection timeframe, the No Action Alternative would create no new jobs at BSR related to construction activity or additional operations. It is assumed additional jobs would be created due to increases in annual visitation over time but would primarily occur outside BSR. However, incremental increases in visitation would result in a total of over 290 new, long-term FTEs being created. In addition, economic activity would increase by $34.5 million on an annual basis.

Table 3F-14:
Economic Impact During Projection Period – Alternative 1

	Year										Cumulative
	1	2	3	4	5	6	7	8	9	10	
OPERATIONS/INCREASED VISITATION											
Jobs (FTEs)	37	70	100	130	159	187	215	243	271	295	1,707
Dollar Flows ($Millions)	$4.4	$8.2	$11.8	$15.3	$18.7	$22.0	$25.3	$28.5	$31.8	$34.5	$200.5
BSR CONSTRUCTION											
Jobs (FTEs)	--	--	--	--	--	--	--	--	--	--	--
Dollar Flows ($Millions)	--	--	--	--	--	--	--	--	--	--	--
COMBINED											
Jobs (FTEs)	37	70	100	130	159	187	215	243	271	295	1,707
Dollar Flows ($Millions)	$4.4	$8.2	$11.8	$15.3	$18.7	$22.0	$25.3	$28.5	$31.8	$34.5	$200.5

Cumulatively, direct/indirect and secondary economic impacts, under the No Action Alternative would generate 1,707 FTEs and just over $200 million in dollar flows over the ten-year projection period.

Housing

Although 1,861 SFE houses remain to be built within the Town of Breckenridge, currently there is a shortage of affordable workforce housing which is projected to continue into the future. BSR currently provides the full amount of employee housing required. No new workforce housing would be supplied as a result of the No Action Alternative.

Social Services

Social services would not be directly or indirectly affected by the No Action Alternative.

Environmental Justice

No low income or minority populations were identified as potentially being disproportionately affected in terms of Environmental Justice issues. Therefore, no Environmental Justice issues related to the No Action Alternative were identified to be analyzed.

Alternative 2 – Proposed Action

Population

Although Alternative 2 would result in 30 new employees (9.3 FTEs) a percentage of which would be expected to relocate into Summit Country (primarily seasonally) specifically for the job, Summit County's population growth would remain the same as is projected for the No Action Alternative at 2.14 percent per year through 2025.

The Economy

BSR's annual visitation would be expected to remain consistent with past average annual growth at up to 2 percent for the next ten years. This figure (2 percent) has been found to correlate well with annual change in statewide skier visits. As such, a ski resort that remains "on par" competitively by upgrading facilities, services, etc., can be expected to experience a 2 percent annual increase in skier visits in the Colorado market.[169] Furthermore, this average growth is similar to that projected for statewide population growth, the most accurate correlation to BSR visitation growth. Also, the 2002 Forest Plan projected ski area visitation growth at 2.5 percent annually; as such, 2.0 percent average annual growth is a downward adjustment from that projected Forest-wide in 2002.[170]

While Alternative 2 would have short-term construction impacts for two years, it is the ongoing operation of BSR that would have a long-term impact on the Summit County and regional economies. Specifically, ski area improvements can typically be expected to generate increases in visitation that, in turn, result in increases in visitor expenditures both inside and outside the ski area. Ongoing operation of BSR (expressed in terms of visitor expenditures) will generate employment and dollar flows in three ways:

[169] Refer to Chapter 3B – Recreation, Mountain Operations and Guest Services for additional information regarding projections for annual skier growth.
[170] USDA Forest Service, 2002b p. 3-471

1. BSR-based employment: Direct impact of visitor expenditures within the ski area. At completion, it is anticipated that Alternative 2 would support 30 new employment positions (all in Mountain Operations), 9.3 of those would be new, permanent FTEs. This net new resort-based employment would continue on into the future—beyond the ten-year projection period.
2. Employment outside the ski area: Direct impact of visitor expenditures at area businesses—hotels, restaurants, retail stores, etc.
3. Employment in the region: Secondary (multiplier) impact of increased economic activity generated by visitor/ski area expenditures.

As noted, estimation of impacts is directly related to visitation—as expenditures by visitors will generate dollar flows and support new jobs. Projections prepared for this analysis do not anticipate major increases in visitation as a result of Alternative 2. Table 3F-15 includes both Destination and day non-skier visitors, as well as skier visits.

Table 3F-15:
Projected Net Increases in Annual BSR Visitation – Alternative 2 Comparison

Year	1	2	3	4	5	6	7	8	9	10
NO ACTION – 0.75% ANNUAL										
Destination	9,020	18,100	27,250	36,470	45,760	55,120	64,550	74,050	83,620	93,260
Day	5,050	10,140	15,260	20,420	25,630	30,870	36,150	41,470	46,830	52,230
Totals	14,060	28,230	42,510	56,890	71,390	85,990	100,700	115,520	130,450	145,490
ALTERNATIVE 2 – 2.00% ANNUAL										
Destination	24,040	48,570	73,580	99,090	125,120	151,660	178,740	206,350	234,520	263,250
Day	13,460	27,200	41,200	55,490	70,070	84,930	100,090	115,560	131,330	147,420
Totals	37,510	75,760	114,780	154,580	195,180	236,590	278,830	321,910	365,850	410,680

The construction activity required to accomplish Alternative 2 would generate employment and dollar flows in the local/regional economy. However, these impacts would be short-term—only affecting the economy over the two years in which construction activity occurs.

The planned project construction schedule for Alternative 2 is summarized in Table 3F-16. The table shows: 1) the construction project—new lift, trail work, etc.; 2) the year in which the construction is expected to occur; and 3) the projected construction budget.[171]

[171] SE Group, 2010a

Table 3F-16:
Project Construction Schedule and Budget – Alternative 2

	Project Year						Totals
	1	2	3	4	5	6–10	
New Lifts	$8,000,000	--	--	--	--	--	$8,000,000
Ski Patrol Hut	$400,000	--	--	--	--	--	$400,000
Trail Work	$1,600,000	--	--	--	--	--	$1,600,000
Restroom Facility	--	$200,000	--	--	--	--	$200,000
Totals	**$10,000,00**	**$200,000**	**$0**	**$0**	**$0**	**$0**	**$10,200,000**

The construction values were input to the IMPLAN3 Model to provide estimates of direct and secondary employment and dollar flows to be generated by the construction component of the Alternatives. The results of the analyses are shown in Table 3F-17. This table shows direct and secondary jobs (in FTEs) and dollar flows produced by construction activity—throughout the construction period, for Alternative 2. Annual and cumulative totals are shown.

Table 3F-17:
FTE Employment and Dollar Flow Impacts Short Term – Alternative 2

	Construction Year										Cumulative Totals
	1	2	3	4	5	6	7	8	9	10	
JOBS (IN FTES)											
Direct Impact	54.2	1.4	--	--	--	--	--	--	--	--	55.6
Secondary Impact	49.5	1.0	--	--	--	--	--	--	--	--	50.5
Total Impact	103.7	2.4	--	--	--	--	--	--	--	--	106.1
DOLLAR FLOWS ($MILLIONS)											
Direct Impact	$10.00	$0.19	--	--	--	--	--	--	--	--	$10.19
Secondary Impact	$7.19	$0.14	--	--	--	--	--	--	--	--	$7.33
Total Impact	$17.19	$0.33	--	--	--	--	--	--	--	--	$17.52

Alternative 2 construction activity would generate 105 FTEs and over $17.52 million in total dollar flows. These impacts would occur over a two-year period (Years 1–2).

Table 3F-18:
FTE Jobs and Dollar Flow Impacts – Alternative 2

		Year										Cumulative
		1	2	3	4	5	6	7	8	9	10	
FTEs	Direct: In Resort	0.0	9.1	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3	84
	Direct: Outside Resort	59.3	112.0	162.2	211.1	259.4	307.3	355.1	402.9	450.8	492.9	2,813
	Secondary	37.4	70.6	102.3	133.2	163.6	193.8	224.0	254.1	284.3	310.8	1,774
Total FTEs		96.7	191.7	273.8	353.6	432.3	510.5	588.4	666.3	744.4	**813.0**	4,671
Dollars ($Millions)	Direct	$6.2	$11.6	$16.8	$21.9	$26.9	$31.9	$36.8	$41.8	$46.8	$51.0	$291.7
	Secondary	$5.6	$10.5	$15.2	$19.8	$24.4	$28.9	$33.3	$37.8	$42.3	$46.3	$264.2
Totals Dollar Impact		$11.7	$22.1	$32.0	$41.7	$51.3	$60.7	$70.2	$79.6	$89.1	**$97.4**	$555.9

At the completion of the ten-year projection, Alternative 2 would generate 9.3 FTEs (30 total Employment Positions) at BSR (Table 3F-18). Incremental increases in visitation would result in a total of 813 new, long-term FTEs regionally. In addition, economic activity would increase by $97.4 million.

Table 3F-19:
Summary of Economic Impacts During Projection Period – Alternative 2

	Year										Cumulative
	1	2	3	4	5	6	7	8	9	10	
OPERATIONS/INCREASED VISITATION											
Jobs (FTEs)	97	192	274	354	432	510	588	666	744	813	4,671
Dollar Flows ($Millions)	$11.7	$22.1	$32.0	$41.7	$51.3	$60.7	$70.2	$79.6	$89.1	$97.4	$555.9
BSR CONSTRUCTION											
Jobs (FTEs)	104	2	--	--	--	--	--	--	--	--	106
Dollar Flows ($Millions)	$17.2	$0.3	--	--	--	--	--	--	--	--	$17.5
COMBINED											
Jobs (FTEs)	201	194	274	354	432	510	588	666	744	813	4,778
Dollar Flows ($Millions)	$28.9	$22.5	$32.0	$41.7	$51.3	$60.7	$70.2	$79.6	$89.1	$97.4	$573.4

Cumulatively, as presented in Table 3F-19, Alternative 2 would generate 4,778 FTEs and just over $573 million in dollar flows over the ten-year projection period.

Housing

During the two summer construction seasons associated with implementation of the Proposed Action, construction workers who do not have local housing would have access to BSR employee housing, which is generally reduced in occupancy to approximately 50 percent during the summer season.[172]

[172] Task Force, 2009

No new workforce housing is proposed (or required) to be supplied as a result of the Proposed Action. As identified in the Task Force findings, current vacancies in BSR employee housing could accommodate the 30 additional (primarily seasonal) employment positions at BSR resulting from the Proposed Action. Beyond BSR's responsibilities in providing workforce housing, the Town of Breckenridge's deficit of workforce housing would continue into the future and may be exacerbated by a general increase in workforce demands as the population grows into the future. Should additional vacancies in BSR employee housing be identified by BSR, the Task Force identified the potential for vacant units to be rented by area employees to increase occupancy and improve the housing supply.

Ultimately, by the end of the ten-year projection period, increases in visitation at a rate of 2.00 percent per year would result in a total of 813 new, long-term FTEs regionally (this includes the 9.3 FTE employed at BSR). Summit County projects 13,955 more dwelling units could be built, a portion of which is anticipated to be affordable housing, likely relieving some of the workforce housing deficiency.

There is also a scarcity of rental units (beyond BSR workforce housing benefits) for seasonal employees at or below the 60 to 80 percent AMI levels, and these are the most likely to be impacted by the jobs created through Alternative 2.[173]

Social Services

The Task Force recognized the limited increases in BSR FTEs, however, even limited increases could affect social services due to increased demand. The effect to the operation of services such as the Community Care Clinic and the Family and Intercultural Resource Center (FIRC) is not anticipated to be measurable. BSR is committed to annual contributions to support these important local resources, and these contributions are anticipated keep pace with the increased demand placed upon them by BSR employees.[174]

Environmental Justice

The level of environmental risk to humans is too low to measure since no low income or minority populations were identified as potentially being disproportionately affected in terms of Environmental

[173] AMI is determined by the US Department of Housing and Urban Development (HUD), is adjusted on an annual basis, and varies based on household size and area. In determining AMI HUD typically uses a 7.5% interest rate over 30 years. The different AMIs imply the amount spent on rent or mortgage (excluding utilities) will not exceed 30% of the combined gross income of all household members. The County and Summit Combined Housing Authority use the various AMIs as calculated by HUD to determine the maximum purchase price individuals or households can afford.
For example, in the County in 2004, 100% AMI for a four-person family household was $76,100. In 2008 100% AMI for a four-person household was $81,300. These AMIs represent the middle point (50th percentile) of all four-person household incomes in the entire county (i.e., half the four-person households make more and half the four-person households make less). According to RRC Associates, Inc., in 2005 32% of the County's households earned less than 80% of the AMI, 51% earned less than 100% AMI, and 65% earned less than 120% AMI.
[174] Task Force, 2009

Justice issues. Therefore, no Environmental Justice issues related to the Proposed Action were identified to be analyzed.

Alternative 3

Population

Although Alternative 3 would result in eight new employees (2.5 FTEs) a percentage of which would be expected to relocate into Summit Country (primarily seasonally) specifically for the job, Summit County's population growth would remain the same as is projected for the No Action Alternative at 2.14 percent per year through 2025.

Alternative 3 includes projects that would meet components of the Purpose and Need, but would not address trail congestion. Therefore, some erosion in market share would be anticipated, decreasing annual visitation growth to +1.25 percent.[175] The upgrade of the Colorado SuperChair, A-Chair and C-Chair and the development of the gladed terrain and lift would reduce lift-lines at certain lifts and provide a new terrain offering; all contributing to continued annual visitation growth.

The Economy

Alternative 3 would have short-term construction impacts for seven years. However, it is the ongoing operation of BSR that would have a long-term impact on the Summit County and regional economies. Ongoing operation of BSR (expressed in terms of visitor expenditures) will generate employment and dollar flows in three ways:

1. Alternative 3 would support eight new employment positions. Based on the current BSR ratio of Employment Positions to FTEs, this would result in 2.5 new, permanent FTEs. This net new resort-based employment would continue on into the future—beyond the ten-year projection period.
2. Employment outside the ski area – Direct impact of visitor expenditures at area businesses—hotels, restaurants, retail stores, etc;
3. Employment in the region – Secondary (multiplier) impact of increased economic activity generated by visitor/ski area expenditures.

[175] Refer to Chapter 3B – Recreation, Mountain Operations and Guest Services for additional information regarding projections for annual skier growth.

Table 3F-20:
Projected Net Increases in Annual BSR Visitation – Alternative 3 Comparison

Year	1	2	3	4	5	6	7	8	9	10
NO ACTION – 0.75% ANNUAL										
Destination	9,020	18,100	27,250	36,470	45,760	55,120	64,550	74,050	83,620	93,260
Day	5,050	10,140	15,260	20,420	25,630	30,870	36,150	41,470	46,830	52,230
Totals	14,060	28,230	42,510	56,890	71,390	85,990	100,700	115,520	130,450	145,490
ALTERNATIVE 3 – 1.25% ANNUAL										
Destination	15,030	30,240	45,640	61,240	77,030	93,020	109,210	125,600	142,200	159,000
Day	8,410	16,930	25,560	34,300	43,140	52,090	61,160	70,340	79,630	89,040
Totals	23,440	47,180	71,210	95,540	120,170	145,120	170,370	195,940	221,830	248,050

Alternative 3 would generate employment and dollar flows in the local/regional economy. Construction employment would be short-term—only affecting the economy in the years in which construction activity occurs. The planned project construction schedule for Alternative 3 is summarized in the Table 3F-21 and shows: 1) the construction project—new lift, trail work, etc.; 2) the year in which the construction is expected to occur; and 3) the projected construction budget.[176]

Table 3F-21:
Project Construction Schedule and Budget – Alternative 3

	Project Year								Totals
	1	2	3	4	5	6	7	8–10	
New Lift	$5,880,000	--	--	--	--	--	--	--	$5,880,000
Trail Pod	$1,120,000	--	--	--	--	--	--	--	$1,120,000
Replace Lift	--	--	$7,000,000	--	$7,000,000	--	$9,000,000	--	$23,000,000
Trail Clear/ Construction	--	$166,667	$166,667	$166,667	$166,667	$166,667	$166,667	--	$1,000,000
Snowmaking	--	$833,333	$833,333	$833,333	$833,333	$833,333	$833,333	--	$5,000,000
Grading	--	--	--	$2,000,000	--	--	--	--	$2,000,000
Totals	$7,000,000	$1,000,000	$8,000,000	$3,000,000	$8,000,000	$1,000,000	$10,000,000	$0	$38,000,000

Alternative 3 has a total construction budget of $38 million.

[176] SE Group, 2010a

Table 3F-22:
FTE Employment and Dollar Flow Impacts Short Term – Alternative 3

	Construction Year										Cumulative
	1	2	3	4	5	6	7	8	9	10	
JOBS (IN FTES)											
Direct Impact	31.4	5	32.1	16.2	30.4	4.4	35.7	--	--	--	155.2
Secondary Impact	34.9	5.3	36.5	16.4	34.6	4.7	40.7	--	--	--	173.1
Total Impact	66.3	10.3	68.6	32.6	65	9.1	76.4	--	--	--	328.3
DOLLAR FLOWS ($MILLIONS)											
Direct Impact	$6.81	$0.94	$7.38	$2.61	$6.99	$0.83	$8.29	--	--	--	$33.85
Secondary Impact	$5.46	$0.81	$5.76	$2.43	$5.45	$0.71	$6.44	--	--	--	$27.07
Total Impact	$12.26	$1.75	$13.14	$5.05	$12.45	$1.54	$14.73	--	--	--	$60.92

The cumulative impact of Alternative 3 construction activity will be to generate approximately 325 FTEs and $60 million in total dollar flows. These impacts would occur over a seven-year period (Years 1–7).

Table 3F-23:
FTE Jobs and Dollar Flow Impacts – Alternative 3

		Year										Cumulative
		1	2	3	4	5	6	7	8	9	10	
FTEs	Direct: In Resort	0.3	0.6	0.9	1.2	1.6	1.9	2.2	2.5	2.5	2.5	16
	Direct: Outside Resort	37.1	69.7	100.6	130.4	159.6	188.4	216.9	245.1	273.3	297.7	1,719
	Secondary	23.4	44.0	63.4	82.3	100.7	118.8	136.8	154.6	172.3	187.7	1,084
Total FTEs		61.8	116.3	167.9	217.9	266.8	315.1	362.8	410.2	457.1	**497.9**	2,874
Dollars ($Millions)	Direct	$3.8	$7.2	$10.4	$13.5	$16.5	$19.5	$22.5	$25.4	$28.3	$30.8	$178.1
	Secondary	$3.5	$6.5	$9.4	$12.2	$15.0	$17.7	$20.3	$23.0	$25.6	$28.0	$161.3
Totals Dollar Impact		$7.3	$13.8	$19.9	$25.7	$31.5	$37.2	$42.8	$48.4	$53.9	**$58.8**	$339.3

At the completion of the ten-year projection, Alternative 3 would generate a relatively small number of new FTEs within the resort, increase resort employment positions by eight. However, incremental increases in visitation would result in a total of almost 500 new, long-term FTEs. In addition, economic (dollar) activity would increase by $58.8 million on an annual basis.

Overall, the impacts of increased BSR visitation could be substantial, although the bulk of this impact will take place outside the resort. The multiplier impact of operations activity (the amount by which direct impacts are reinvested in the regional economy) is 1.87—for every dollar spent directly by BSR visitors, an additional $0.87 (over and above the initial dollar) is circulated through the regional economy.[177]

[177] Average of employment and dollar multipliers

The tables below summarize the total private sector impact of the BSR Alternatives projects, in terms of FTEs and dollar flows. Combined construction and operations impacts are summarized over the ten-year projection timeframe in the tables below.

Table 3F-24:
Summary of Economic Impacts During Projection Period – Alternative 3

	Year										Cumulative
	1	2	3	4	5	6	7	8	9	10	
OPERATIONS/INCREASED VISITATION											
Jobs (FTEs)	62	116	168	218	267	315	363	410	457	498	2,874
Dollar Flows ($Millions)	$7.3	$13.8	$19.9	$25.7	$31.5	$37.2	$42.8	$48.4	$53.9	$58.8	$339.3
BSR CONSTRUCTION											
Jobs (FTEs)	66	10	69	33	65	9	76	--	--	--	328
Dollar Flows ($Millions)	$12.3	$1.8	$13.1	$5.0	$12.4	$1.5	$14.7	--	--	--	$60.9
COMBINED											
Jobs (FTEs)	128	127	237	251	332	324	439	410	457	498	3,202
Dollar Flows ($Millions)	$19.6	$15.5	$33.0	$30.8	$44.0	$38.7	$57.5	$48.4	$53.9	$58.8	$400.3

Cumulatively, Alternative 3 would generate 3,202 FTEs and just over $400 million in dollar flows over the ten-year projection period.

Housing

During the seven summer construction seasons associated with implementation of Alternative 3, construction workers who do not have local housing would have access to BSR employee housing, which is generally reduced in occupancy to approximately 50 percent during the summer season.[178]

No new workforce housing is proposed (or required) to be supplied as a result of Alternative 3. As identified in the Task Force findings, the eight additional (primarily seasonal) employment positions at BSR resulting from Alternative 3 could be accommodated in BSR's workforce housing at Breckenridge Terrace or other properties. BSR is committed to providing the appropriate level of workforce housing.[179] Beyond BSR's responsibilities in providing workforce housing, the Town of Breckenridge's deficit of workforce housing would continue into the future and may be exacerbated by general increased workforce demands as population grows into the future. Should additional vacancies in BSR employee housing be identified by BSR, the Task Force identified the potential for vacant units to be rented by area employees to increase occupancy and improve the housing supply.

Ultimately, by the end of the ten-year projection period, increases in visitation at a rate of 1.25 percent per year would result in a total of 500 new, long-term FTEs regionally (this includes the 2.5 FTE employed at

[178] Task Force, 2009
[179] Ibid.

BSR). Summit County projects 13,955 more dwelling units could be built, a portion of which is anticipated to be affordable housing, likely relieving some of the workforce housing deficiency.

There is also a scarcity of rental units (beyond BSR workforce housing benefits) for seasonal employees at or below the 60 to 80 percent AMI levels, and these would be negligibly impacted by the jobs created for Alternative 3.

Social Services

Social services would not be measurable affected by increased demand from Alternative 3. BSR is committed to annual contributions to support these important local resources, and these contributions are anticipated to keep pace with the increased demand placed upon them by BSR employees.[180]

Environmental Justice

The level of environmental risk to humans is too low to measure since no low income or minority populations were identified as potentially being disproportionately affected in terms of Environmental Justice issues. Therefore, no Environmental Justice issues related to Alternative 3 were identified to be analyzed.

CUMULATIVE EFFECTS

Forest Service decisions within BSR's SUP area, as well as the approval of private land development by the Town of Breckenridge, have contributed to growth trends and the social and economic environment within the Town of Breckenridge and Summit County. BSR, along with the three other ski areas within Summit County, have driven both employment and dollar flows that accrue to both the ski areas and other area businesses.

Scope of the Analysis

The effects analyzed in the cumulative effects section apply to all alternatives, including the No Action Alternative. For a detailed description of past, present, and reasonable foreseeable future projects, the reader is referred to Appendix A in this document. The following projects are expected to cumulatively have short- and long-term effects on Social and Economic Resources.

Temporal Bounds

The temporal bounds for this cumulative effects analysis for Social and Economic Resources extend from BSR's inception as a destination resort in 1961 through the foreseeable future in which BSR can be expected to operate.

[180] Ibid.

Spatial Bounds

It is expected that the social and economic impacts from operations at BSR would be primarily felt locally, and in the Summit County area. However, the project's secondary impacts would extend through a broader region that includes the Front Range.

Past, Present, and Reasonably Foreseeable Future Projects

As noted above, the estimation of social and economic impacts is directly related to visitation—as expenditures by visitors generate dollar flows and support new jobs. BSR's projections do not anticipate major increases in visitation as a result of Alternative 1, Alternative 2 or Alternative 3. Rather, BSR expects gradual increases in visitation related to regional growth over time. Other projects with potential to impact social and economic resources are:

- Resort and Residential/Commercial Development Projects
- Interstate 70 Corridor Projects

Population

Summit County has experienced some of the fastest population growth in Colorado over the last decade. Although those rates are not expected to persist, an average growth rate of 2.1 percent, approximately 0.5 percent slower than the average between 2000 and 2010, is likely. Projections shown in Table 3F-1 (refer to the Affected Environment section above) consider continued resort, residential and commercial growth, as well as travel improvements in Interstate 70 corridor, and therefore should be considered accurate predictions of the future population of Summit County. Population growth is independent of BSR and therefore is projected to be 2.1 percent under any of the project Alternatives 1, 2 or 3.

The Economy

The residential and commercial tax base, as well as visitor and local spending, is expected to increase based on population growth, by approximately 2 percent per year (refer to the Economy section of the Affected Environment). BSR visitation is expected to be affected by implementation of the No Action Alternative (0.75 percent), Alternative 2 (2.0 percent) or Alterative 3 (1.25 percent). Under the No Action Alternative and Alternative 3, the economy would grow at a slower rate than population growth because it is anticipated that BSR could lose a portion of its market share to other local or regional resorts. With implementation of Alternative 2, Breckenridge's economy would be expected to grow at a similar rate to population growth, as it has in the past. Both Alternative 2 and 3 would provide some temporary increase in spending and employment during construction of either action alternative. With economic growth, employment opportunities would also be anticipated as an increase to accommodate visitor and residential needs.

The Interstate 70 corridor has been the primary east/west access route to BSR since the resort opened in 1961 (although, the opening of the Eisenhower Tunnel in the 1970s dramatically changed how guests accessed Summit County from what was originally Highway 6). Guests commuting from the Front Range, flying to Denver International Airport or flying to the Eagle County Airport primarily use Interstate 70 to get to Summit County. Due to the long-term and undecided nature of future Interstate 70 improvement projects, impacts to the economy in Summit County from Interstate 70 improvements are uncertain. Depending on the form transportation improvements take, commerce in the area may expand and there may be an increase in Summit County residents commuting to Denver for work. Regardless of the project alternatives, transportation improvements along the Interstate 70 corridor are anticipated to increase commerce in Summit County.

Housing

With continued growth, the remaining 1,861 single family equivalent housing units shown in Table 3F-9 would continue to be built as necessary. As described above, visitation growth would be greatest under Alternative 2, than Alternative 3 and the least growth would occur with implementation of the No Action Alternative. Under any of the Alternatives, BSR would continue to provide the full amount of workforce housing that they are responsible for, based on the number of employees and BSR operations. Other commercial entities would also be required to contribute toward housing credits. Together, employers and the County would continue to work towards supplying a sufficient amount of workforce housing.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

No irreversible and/or irretrievable commitment of social or economic resources has been identified in association with any of the alternatives analyzed in this document.

G. NOISE

SCOPE OF THE ANALYSIS

Avalanche control work (using explosives) would be necessary to ensure safe use of the proposed project areas. To address scoping comments received from the residents in the Peak 7 neighborhood, acoustic monitoring was conducted on Slalom Drive within the Peak 7 neighborhood to assess potential noise effects in residential neighborhoods closest to the project areas. This section briefly discusses noise characteristics pertaining to existing and proposed conditions within the Town of Breckenridge and Peak 7 neighborhood.

AFFECTED ENVIRONMENT

Noise Standards

Summit County Development Code 3512.04 regulates commercial, industrial and construction noise. There is no regulation dealing specifically with avalanche control work; however, Section C of the code states,[181]

> ***A. Noise Levels:*** *Noise produced by a commercial or industrial operation shall not exceed the levels established in C.R.S. § 25-12-101 et seq. as maximum permissible noise levels for commercial and light industrial zones, respectively.*
>
> ***B. Construction Noise:*** *Noise from construction operations is prohibited on Sundays, and from 7:00 p.m. to 6:59 a.m. on weekdays and Saturdays except as provided in a County approved temporary or conditional use permit or in a County approved PUD designation, or when construction work is required to make emergency repairs. Construction noise shall not exceed the maximum permissible noise levels for industrial zones as specified in C.R.S. § 25-12-101.*
>
> ***C. Snowmaking:*** *Noise from snowmaking equipment is exempt from regulation.*

C.R.S. § 25-12-103 includes establishes maximum permissible noise levels.

> *(1) Every activity to which this article is applicable shall be conducted in a manner so that any noise produced is not objectionable due to intermittence, beat frequency, or shrillness. Sound levels of noise radiating from a property line at a distance of twenty-five feet or more there from in excess of the db(A) established for the following time periods and zones shall constitute prima facie evidence that such noise is a public nuisance.*

[181] Summit County, 2010b

Table 3G-1:
Maximum Permissible Noise Levels

Zone	7:00 a.m. to 7:00 p.m.	7:00 p.m. to 7:00 a.m.
Residential	55 db(A)	50 db(A)
Commercial	60 db(A)	55 db(A)
Light industrial	70 db(A)	65 db(A)
Industrial	80 db(A)	75 db(A)

(10) This article is not applicable to the use of property for the purpose of manufacturing, maintaining, or grooming machine-made snow. This subsection (10) shall not be construed to preempt or limit the authority of any political subdivision having jurisdiction to regulate noise abatement.

C.R.S. § 25-12-104 establishes that, "Notwithstanding any other provision of this section, a county shall not maintain an action pursuant to this section if the alleged nuisance involves…avalanche control activities."

Methodology

Field testing was conducted in the Peak 7 neighborhood in order to characterize ambient noise levels under existing conditions. The test site is located approximately 2 miles, straight line distance, from Peak 6. The test was performed on March 10, 2009, starting at approximately 8:15 a.m. and ending at roughly 12:15 p.m. The test avalanche control work within Peaks 6 and 7 was conducted by Breckenridge ski patrol following a nighttime storm that deposited 10 to 13 inches of new snow within the SUP area. This is typical of conditions during which the ski patrol would need to perform snow safety work on Peak 6. The control work consisted of the detonation of five explosive charges on Peak 6 on top and below the cornice. The explosives, typical of explosives used for inbounds control work, ranged in size from 2.0 to 2.7 pounds.

Ambient monitoring continued for approximately one-half hour, in advance of the monitoring test that occurred during test avalanche control work. The monitoring location was located on Slalom Drive towards the western edge of the Peak 7 neighborhood. Air temperature during the monitoring was approximately 45 degrees Fahrenheit. Wind speeds averaged approximately 10 to 15 mph, gusting at times to 20 to 30 mph, with partly cloudy skies. Ambient sound levels were monitored utilizing a Quest Technologies 2900 Type II recording sound meter, averaging at a one-minute interval.

Findings

Ambient noise levels in the Peak 7 neighborhood, as observed during the test time period, were influenced by several factors:

- Vehicular traffic (including heavy equipment for snow removal)
- Gusts of wind
- Birds
- Home construction (hammering, radio noise, electrical sawing)
- Airplanes flying over
- People talking

Average ambient noise levels during the baseline test were measured to be approximately 45 dBA.[182] This measured average level was influenced by several observed louder noises such as those listed above. The peak noise level during the ambient test was observed to be approximately 56 dBA, associated with vehicles performing snow removal on Slalom Drive. During quiet periods, ambient levels ranged from 34 to 40 dBA.

For comparison purposes, typical noise levels (in dBA) associated with a variety of common sources are outlined in Table 3G-2.

Table 3G-2:
Noise Levels for Common Sources

Source/Type	Noise Level (dBA)
Quiet Rural Area	25–30
Quiet Residential Area	40
Conversation, busy office	50–60
Highway Traffic	70
Heavy Traffic	85
Snowmobile at 25 feet	100

Based on a comparison of measured ambient noise levels in the Peak 7 neighborhood to those of common sources, existing conditions are generally similar to a quiet residential area.

[182] dBA is a measurement of sound level expressed in decibels, filtered or weighted at various frequencies to approximate the response of the human ear. A decibel (dB) is a unit for measuring the intensity of sound. The human hearing range is from 0 dB (the theoretical threshold of audibility) to 130 dB (the average pain threshold). dBA means sound levels in decibels measured on the "A" scale of a standard sound level meter having characteristics defined by the American national standards institute, publication ANSI S1.4-1971.

DIRECT AND INDIRECT ENVIRONMENTAL CONSEQUENCES

Table 3G-3 summarizes potential effects from noise related impacts under each alternative by issue and indicator.

Table 3G-3:
Summary of Noise Effects by Issue and Indicator

Alternative 1	Alternative 2	Alternative 3
Issue: Snow management and avalanche safety through the use of explosives on Peak 6 has the potential to generate additional noise audible in the Peak 7 neighborhood and Town of Breckenridge.		
Indicator: Comparison of existing and proposed audible conditions (in decibels) related to snow management and safety		
Within the Peak 7 neighborhood, average ambient noise levels during the baseline test were measured to be approximately 45 dBA, with an existing peak of 74 dBA.	The peak observed sound level due to avalanche control explosive work on Peak 6, as measured in the Peak 7 neighborhood on Slalom Drive, was 67 dBA.	Same as Alternative 2.

Alternative 1 – No Action

The No Action Alternative would not result in any additional acoustic impacts within, or in the vicinity of the Town of Breckenridge and the Peak 7 neighborhood. Noise levels would not be expected to increase in relationship to existing trends. Existing avalanche control work and snowmaking efforts would continue into the future.

Alternatives 2 and 3

The effects from Alternatives 2 and 3 would be nearly identical due to the anticipated avalanche control work that would be necessary for each project area. Increased avalanche control work would be necessary for Alternative 2 and the Peak 6 terrain, and increased avalanche control work would be necessary for the terrain above the Peak 6½ lift. Noise generated by increased snowmaking proposed under Alternative 3 would be identical to existing conditions.

As noted, the test avalanche control work within the Peak 6 project area was conducted following a nighttime storm that deposited 10 to 13 inches of new snow at BSR. The peak observed sound level due to avalanche control explosive work on Peak 6, as measured in the Peak 7 neighborhood on Slalom Drive, was 67 dBA. This represents an instantaneous peak effect, and is not representative of an impact to average observed noise conditions within the Peak 7 neighborhood. In fact, the loudest noise encountered during the test observations was 74 dBA, caused by control work on Peak 7 at BSR. The average observed ambient noise level during the hour-long avalanche control test was 42 dBA, which is statistically the same as ambient conditions (when control work does not occur) recorded by the Type II noise meter.

A construction schedule will be developed to minimize construction noise impacts to residents of the Peak 7 neighborhood by maintaining construction during daylight hours, minimizing unnecessary idling of vehicles and identifying appropriate hours and routes for vehicles to access the construction site. By using these BMPs, and due to the location of construction and the duration of the project, noise impacts from construction would be managed and potentially reduced.

Overall, Alternatives 2 and 3 would have minimal noise impacts within the Peak 7 neighborhood and Town of Breckenridge. The amount of explosives used, and therefore instantaneous peak noise, would generally increase with the development of Alternatives 2 and 3. On a typical day, the terrain on Peak 6 may generate five instantaneous peak noises. However, the frequency of instantaneous peak noise is variable from day to day.

CUMULATIVE EFFECTS

Scope of the Analysis

The effects analyzed in the cumulative effects section apply to all alternatives, including the No Action Alternative. For a detailed description of past, present, and reasonable foreseeable future projects, the reader is referred to Appendix A in this document.

Temporal Bounds

The temporal bounds for this cumulative effects analysis for cultural resources extend from BSR's inception as a destination resort in 1961 through the foreseeable future in which BSR can be expected to operate.

Spatial Bounds

The spatial bounds for this cumulative effects analysis are limited to public and private lands in the vicinity of the BSR SUP area.

Past, Present, and Reasonably Foreseeable Future Projects

Past, present, and reasonably foreseeable future projects with potential to cumulatively contribute to noise impacts to the Peak 7 neighborhood include the following projects (refer to Appendix A for a description of these projects):

- Breckenridge Forest Health and Fuels
- Red Tail Ranch Wildland Urban Interface Project
- Breckenridge Ski Resort MDP[183]

[183] BSR MDP projects would require a site-specific review via the NEPA process prior to potential project decision and implementation.

Cumulatively, the various projects that have occurred or are anticipated to take place at BSR and near the Town of Breckenridge and Peak 7 neighborhood have the potential to influence noise levels since they are closest to the project area. It is important to recognize that when sound levels are summed together it is the stronger noise source that dominates the influence. Therefore it is the existing snowmaking between mid-October and late December that is of the most important in a cumulative context.

Other past, present and reasonably foreseeable future projects that would result in cumulative acoustic impacts would include forest health projects and the short-term construction related impacts these projects would generate adjacent to the Peak 7 neighborhood. Noise abatement strategies and requirements would be expected to reduce the acoustic impacts of those projects (e.g., hours of operation); however, cumulative impacts would accrue to background noise levels in proximal areas. Furthermore, the additive impacts from forest health projects would likely occur during non-winter periods and would not overlap with BSR snowmaking and/or avalanche control work operations.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Between November and April, instantaneous noise level increases associated with avalanche control work on Peak 6 would be considerable and noticeable to residents of the Peak 7 neighborhood and the Town of Breckenridge. However, it is unlikely that noise specifically from the proposed activity would be a noticeably different from existing conditions, or result in activity interference for indoor residents. Because this activity would cease in April when BSR closes for the season, this is not considered an irreversible impact.

H. VEGETATION

SCOPE OF THE ANALYSIS

This analysis of plant resources summarizes the more detailed Biological Assessment (BA) and Biological Evaluation (BE) contained in the Project File.[184] Those technical documents and this analysis disclose the existing conditions and anticipated effects due to the alternatives presented in this FEIS. For a description of the pre-field and field botanical review methodology, refer to the Project File.

AFFECTED ENVIRONMENT

Threatened and Endangered Species

There are currently no Endangered plant species listed for Forest Service Region 2 in the WRNF. No critical habitats are currently designated at BSR study area for any of the listed plant species. Three plant species are listed as Threatened for Region 2 in the WRNF: Penland alpine fen mustard *(Eutrema penlandii*), Colorado hookless cactus (*Sclerocactus glaucus*), and the Ute Ladies' Tresses Orchid (*Spiranthes diluvialis*). One species is proposed Threatened: De Beque phacelia (*Phacelia scopulina*). Potential habitat for the Penland alpine fen mustard *(Eutrema penlandii*) exists at BSR at higher elevations.

No occupied or potential habitat occurs at BSR for the Colorado hookless cactus (*Sclerocactus glaucus*), Ute Ladies' Tresses Orchid (*Spiranthes diluvialis*), and the De Beque phacelia (*Phacelia scopulina*) as these three species grow at lower elevations, and they are not documented from Summit County. Therefore, the Colorado Hookless Cactus and Ute Ladies' Tresses Orchid are dropped from further consideration. De Beque phacelia (*Phacelia scopulina*) was proposed as threatened in the fall of 2010 and will likely become listed as a threatened plant species in the future.

Penland Alpine Fen Mustard

The threatened plant, Penland alpine fen mustard (*Eutrema penlandii*), is known from Summit County on Hoosier Ridge, approximately 7 miles south of the project area.[185] There are no records of this plant at BSR, and the main populations of the plant occur in the Hoosier Ridge area that extends south to Mount Sherman in the Mosquito Range. This rare mustard is generally found above 11,500 feet in rocky crevices where there is moisture during the growing season, rooted in mosses on stream banks, and in wetlands that remain wet year-round primarily from snowmelt. Habitat for the alpine fen mustard includes wetland areas and mossy wet rocks below snowbanks and persistent snowfields. It is mostly found in high calcium and high pH soils, derived from calcareous substrates, which is the composition of the Leadville Limestone geological formation that outcrops in the Hoosier Ridge area. The plant is in flower from mid-July through mid-August, and in fruit after this time period.

[184] Steinmann, 2011
[185] Spackman et al., 1997

No occupied habitat was located or observed for Penland alpine fen mustard. Therefore, this analysis does not analyze this species in further detail (refer to the Project File for additional information).

Region 2 Sensitive Species

Forest Service Region 2 (R2) has designated "sensitive species" representing species declining in number or occurrence or whose habitat is declining, either of which could lead to federal listing if action is not taken to reverse the trend, and species whose habitat or population is stable but limited.[186] The updated Region 2 sensitive plant species list contains 32 plant species that were determined to be present or potentially present on the WRNF after an analysis of all sensitive species on the overall updated R2 list.[187] The authors have reviewed the R2 and WRNF sensitive species lists and are familiar with the local habitats and plant distributions within and adjacent to the BSR project areas.[188]

Required habitats for these species and the 27 listed Region 2 sensitive plant species which could potentially occur at BSR or warrant further discussion are summarized in Table 3H-1. The remaining five listed Region 2 sensitive plant species presented in Table 3H-1 do not occur in the habitats present in the project area, do not have elevation and/or distributional ranges that overlap the project area, have not been documented in the general geographic area of the project. These five species are dropped from further consideration (refer to the Project File for additional information).

Table 3H-1:
R2 Sensitive Plant Species that may occur on the WRNF at BSR

Common name, *Scientific name*	Rational for Potential Project Effects (Habitat Affinity)
PLANTS	
Sea pink, *Armeria maritima* ssp. *sibirica*	Potential habitat (wet sandy alpine slopes 11,900'–13,000')
Park milkvetch, *Astragalus leptaleus*	No habitat (wet meadows/aspen; Gun. Basin, Middle Park)
Trianglelobe moonwort, *Botrychium ascendens*	Potential habitat (montane willow wetlands up to alpine habitats)
Slender moonwort, *Botrychium lineare*	Potential habitat (montane through subalpine and alpine habitats)
Peculiar moonwort, *Botrychium* paradoxum	Potential habitat (montane through subalpine and alpine habitats)
Smooth rockcress, *Braya glabella*	Potential habitat (sparse. calcareous alpine gravels >12,000')
Lesser panicled sedge, *Carex diandra*	Potential habitat (subalpine wetlands, wet meadows, w. carrs)
Livid sedge, *Carex livida*	Potential habitat (fens)
Yellow lady's slipper, *Cypripedium parviflorum*	Potential habitat (variety of forests, incl. S-F & LP, 5,700'–12,400')
Clawless draba, *Draba exunguiculata*	Potential habitat (granitic alpine fellfields 12,000'–14,000')
Gray's Peak whitlow-grass, *Draba grayana*	Potential habitat (gravelly alpine slopes 11,500'–14,000')
Weber's Draba, *Draba weberi*	Potential habitat (moist alpine habitats 11,500'–14,000')
Roundleaf sundew, *Drosera rotundifolia*	Potential habitat (continuously moist or saturated fens)
Giant helleborne (*Epipactis gigantea*)	No habitat (seeps on sandstone, springs, hot springs 4,800'–8,000')

[186] USDA Forest Service, 2009
[187] USDA Forest Service, 2011; Proctor, 2011
[188] USDA Forest Service, 2011

Table 3H-1:
R2 Sensitive Plant Species that may occur on the WRNF at BSR

Common name, *Scientific name*	Rational for Potential Project Effects (Habitat Affinity)
Dropleaf buckwheat, *Eriogonum exilifolium*	No habitat (sparsely vegetated, rolling, sedimentary hills <8,500')
Altai cotton-grass, *Eriophorum altaicum* var. *neogaeum*	Potential habitat (peat wetlands 9,500'–14,000')
Chamisso's cotton-grass, *Eriophorum chamissonis*	Potential habitat (high elevation peaty wetlands)
Slender cotton-grass, *Eriophorum gracile*	Potential habitat (peaty wetlands & saturated soils, 6,900'–8,000')
Hall fescue, *Festuca hallii*	Potential habitat (alpine tundra and subalpine grasslands, 11,000'–12,000')
Simple Bog Sedge, *Kobresia simpliciusula*	Potential habitat (wet meadows, fens, wetlands to 12,000')
Colorado tansy-aster, *Machaeranthera coloradoensis*	Potential habitat (sparsely vegetated sandy soils 8,500'–12,500')
Kotzebue's grass-of-Parnassus, *Parnassia kotzebuei*	Potential habitat (edges of standing water bodies 10,000'–12,400')
Harrington penstemon, *Penstemon harringtonii*	No habitat (open sagebrush, pinyon-juniper habitats)
Porter's feathergrass, *Ptilagrostis porteri*	Potential habitat (peaty soils in willow-tuft. hairgrass >10,000')
Ice cold buttercup, *Ranunculus karelinii*	Potential habitat (ridge/Mtn. top rock, scree, 12,000'–14,100')
Dwarf raspberry, *Rubus arcticus* ssp. *acaulis*	Potential habitat (moist montane and sub-alpine habitats, 7,000'–9,720')
Sageleaf willow, *Salix candida*	Potential habitat (nutrient-rich fens and thickets, 8,800'–10,600')
Autumn willow, *Salix serissima*	Potential habitat (calcareous fens, 7,800'–9,300')
Narrowleaf peatmoss, *Sphagnum angustifolium*	Potential habitat (fens)
Baltic sphagnum, *Sphagnum balticum*	Potential habitat (fens)
Sun-loving meadowrue, *Thalictrum heliophilum*	No habitat (steep oil shale slopes 6,300'–8,800')
Lesser bladderwort, *Utricularia minor*	Potential habitat (fens and other calm, shallow, aquatic habitats)

Note: Other R2 plant species are not listed because they have not been found on the WRNF, they have no affinities to project area habitats, the project area is outside of the species' range or elevational distribution. Potential pre-field survey occurrence on the project area and habitat affinity is summarized for each species. Species in bold are potentially present and/or are discussed in the text. Plants are listed alphabetically by scientific name.
Source: USDA Forest Service, 2009. Personal Communication with J. Proctor, USDA Forest Service, Jan. 28, 2010 and May 07, 2011; Western Ecosystems, Inc., 2011.

No occupied habitat was located or observed for any Region 2 sensitive plant species after comprehensive field reconnaissance was conducted at BSR in 2010 and in previous years. The field survey efforts were completed in detail, focusing on areas of potential habitat for the listed species, and none of the listed plant species were found. Surveys were adequate to determine that 23 of the 27 listed R2 sensitive plant species carried into the field reconnaissance portion of the analysis are absent from the area of influence of the action alternatives. *Botrychium ascendens*, *Botrychium lineare*, *Botrychium paradoxum* and *Draba weberi* are presented below and are carried forward into the effects analysis.[189]

[189] Rationale for carrying these into the effects analysis is included in the Project File.

Trianglelobe Moonwort

Trianglelobe moonwort (*Botrychium ascendens*) habitat includes wetlands, wetland edges, montane willow communities with high moss, gravel and cobble ground cover. The preferred substrate for the plant is calcareous, volcanic or granitic alluvium. Moonworts are habitat generalists associated with a variety of ecological conditions, including open, previously disturbed, and early successional habitats. Moonworts (*Botrychium* spp.) are small, inconspicuous, and often ephemeral species, which may not appear above the ground every year. *Botrychium* populations are often found in disturbed areas such as ski trails, and along roadsides.[190] Trianglelobe moonwort produces spores from July to August and is most visible during the months of July and August.

Botrychium aggregations are often found in genus groups, such that aggregations of relatively common moonworts represent potential habitat for Trianglelobe moonwort and other rare moonworts. Due to the small size of this species, and because *Botrychium* plants may not be visible above ground every year, it is possible that representatives of this species could occur at BSR. Threats to moonworts include surface disturbing activities that may physically change soils or moisture. Ski trail development through closed-canopy forests in Colorado has benefited moonworts by creating potential habitat out of previously unsuitable habitat, as ski runs are known to provide habitat for moonwort species. Moonworts appear to tolerate snow compaction.

Slender Moonwort

Slender moonwort (*Botrychium lineare*) occurs in the southern, central and northern Colorado mountains in subalpine and alpine environments, from 8,000 to 12,500 feet above sea level. Habitat for the species includes grassy meadows, streamside forests, aspen groves, old mine sites, dams, roadsides, and clearings. The preferred substrate for the plant is calcareous, volcanic or granitic alluvium.

Paradox Moonwort

Paradox moonwort (*Botrychium paradoxum*), first described in 1981, has been found in only a few, widely scattered sites in the western United States and southwestern Canada.[191] In the United States, it has been documented in Idaho, Montana, Oregon, Utah, Washington, Wyoming, and Colorado. Elevation range of the plant is approximately 9,000 to 12,500 feet above sea level. Paradox moonworts are found in montane to subalpine grassy meadows and open areas. Potential habitat for the paradox moonwort includes ski trails, old landings, skid trails, roadsides, under conifer saplings, meadows, and other clearings. Ski trail development through closed-canopy forests in Colorado has benefited moonworts by creating potential habitat. Paradox moonworts grow after the snow melts, and plants are visible in July and August.

[190] Spribille and Kolb, 2001
[191] Farrar, 2006

Weber's Draba

Weber's Draba (*Draba weberi*) is small Colorado endemic that grows in rock crevices and at moist areas at the edges of streams between approximately 11,500 and 14,000 feet above sea level.[192] It is found blooming in moist and protected microhabitats, such as a depressed surface area, adjacent to small boulders, and/or protected by larger plants. It blooms with yellow petals in June to July. It is known from only two populations, one in Summit County, and one recently found population at approximately 11,150 feet in Park County on the Pike National Forest.[193] The best potential habitat at BSR for this species occurs in sheltered wet areas near and above treeline, such as within the higher elevation cirques. Potential habitat for this species occurs in the alpine and subalpine portions of the Peak 6 area. Field survey work was completed with the expectation that suitable habitat for Weber's Draba does occur at BSR, and the species was looked for during field survey work. The field survey work was completed intensively at all proposed areas of direct impact (from grading, clearing or glading) that qualified as potential habitat for Weber's Draba.

DIRECT AND INDIRECT ENVIRONMENTAL CONSEQUENCES

Table 3H-2:
Summary of Vegetation Effects by Issue and Indicator

Alternative 1	Alternative 2	Alternative 3
Issue: Plant communities (including Threatened, Endangered, and Sensitive [TES] species and regionally important plants) may be altered as a result of the proposed projects.		
Indicator: Identification of any threatened, endangered or Region 2 sensitive (TES) plant species present in the study area		
Currently, there are no Endangered plant species listed for Forest Service Region 2 in the WRNF. Potential habitat for the Threatened Penland alpine fen mustard (*Eutrema penlandii*) exists at BSR at higher elevations; however, no occupied habitat was located or observed. The updated Region 2 sensitive plant species list contains 32 plant species that were determined to be present or potentially present on the WRNF. No occupied habitat was located or observed for any Region 2 sensitive plant species.	Identical to Alternative 1.	Identical to Alternative 1.

[192] Spackman et al., 1997
[193] Proctor, 2011

Table 3H-2:
Summary of Vegetation Effects by Issue and Indicator

Alternative 1	Alternative 2	Alternative 3
Indicator: Quantification (acreage) of proposed ground disturbance and overstory vegetation removal effects by species		
No alteration of habitat occupied by any Threatened, Endangered or R2 sensitive plant species would occur under the No Action Alternative. Overstory vegetation removal is discussed in Chapter 3J – Forest Health.	No alteration of habitat occupied by any Threatened, Endangered or R2 sensitive plant species would occur under the Proposed Action. A total of 339 acres of new ski terrain would be made available to users, with approximately 25 acres of this new terrain being potential habitat for *Draba weberi*. Overstory vegetation removal is discussed in Chapter 3J – Forest Health.	No alteration of habitat occupied by any Threatened, Endangered or R2 sensitive plant species would occur under Alternative 3. Approximately 2 acres of habitat containing common *Botrychium* species was identified within the study area at 19 separate sites. Alternative 3 would result in direct impacts to 15 of the 19 *Botrychium* aggregation sites, or direct impacts adjacent the sites. Construction activities from Alternative 3 would directly impact approximately 8 acres of existing potential *Botrychium* habitat at BSR, mainly from new ski lift construction, ski lift relocation, snowmaking, snow fencing, grading, utility installation, and other infrastructure. Alternative 3 would include the clearing of approximately 45 acres of forest, which would result in the creation of 45 acres of new potential *Botrychium* habitat. Overstory vegetation removal is discussed in Chapter 3J – Forest Health.
Indicator: Disclosure of impacts to TES plant species and overstory vegetation		
No alteration of habitat occupied by any Threatened, Endangered or R2 sensitive plant species would occur under the No Action Alternative.	No alteration of habitat occupied by any Threatened, Endangered or R2 sensitive plant species would occur under the Proposed Action.	No alteration of habitat occupied by any Threatened, Endangered or R2 sensitive plant species would occur under Alternative 3.
Indicator: Identification and use of design criteria and BMPs to avoid contamination of the project area by noxious weeds		
The Annual Summer Construction Plan for BSR includes a discussion of invasive weed management.	The Annual Summer Construction Plan for BSR includes a discussion of invasive weed management.	The Annual Summer Construction Plan for BSR includes a discussion of invasive weed management.

Alternative 1

Under the No Action Alternative there would be no construction and no new facilities. Therefore, Alternative 1 would not result in any direct or indirect effects to *Botrychium ascendens, B. linare, B. paradoxum* or *Draba weberi*.

Alternative 2 – Proposed Action

To minimize impacts to vegetation resulting from construction of proposed projects under Alternative 2, two PDCs were added to the FEIS:

- Minimize overstory vegetation removal during construction of ski trails, which could result in glading ski trails. Vegetation removal should not occur beyond analyzed trail widths.
- Ground disturbance above treeline associated with the installation of the powerline will adhere to strict disturbance area and revegetation conditions. These conditions will promote prompt more successful restoration of the corridor. Prior to implementation, these conditions will be reviewed and approved by the Forest botanist, soil scientist and landscape architect.

No occurrences of Region 2 sensitive plant species were found during surveys that were primarily focused in areas that would be directly impacted under Alternative 2. Therefore, it is unlikely that there would be any direct effects to R2 sensitive species under Alternative 2. However, because occurrences of *Botrychium ascendens, Botrychium lineare, Botrychium paradoxum* and *Draba weberi* could have been overlooked, there is a possibility of direct and/or indirect effects to these species. It is anticipated that these impacts would be localized and not of sufficient intensity or scale to cause a significant effect to these species. For additional information regarding Alternative 2 direct and/or indirect to these species, refer to the Project File.

Noxious weed invasions often occur where machinery is used and habitats are disturbed. *Botrychium* species frequently grow at previously disturbed sites such as roadside, power line alignments, ski lift alignments and ski runs. If a noxious weed invasion occurred within occupied habitat for any of the listed *Botrychium* species, individuals or whole populations could be affected as a result of the plant community change and resulting competition. The Annual Summer Construction Plan for BSR includes a discussion of invasive weed management.

Under Alternative 2, a total of 339 acres of new ski terrain would be made available to users, with approximately 25 acres of this new terrain being potential habitat for *Draba weberi* (all riparian zones and wetlands above 11,000 feet within the Proposed Action area). As stated above, it is unlikely that there would be any direct effects this species under Alternative 2.

A determination of “May adversely impact individuals, but not likely to result in a loss of viability on the Planning area, nor cause a trend towards federal listing or a loss of species viability rangewide” was made for the following four listed sensitive plant species, *Botrychium ascendens, Botrychium lineare, Botrychium paradoxum* and *Draba weberi*, due to the possibility that these species could occur in the Proposed Action study area.

Alternative 3

No occurrences of Region 2 sensitive plant species were found during surveys that were primarily focused in areas that would be directly impacted under Alternative 3. Therefore, it is unlikely that there would be any direct effects to R2 sensitive species under Alternative 3. However, because occurrences of *Botrychium ascendens, Botrychium lineare, Botrychium paradoxum* and *Draba weberi* could have been overlooked, there is a possibility of direct and/or indirect effects to these species. It is anticipated that these impacts would be localized and not of sufficient intensity or scale to cause a significant effect to these species. Approximately 2 acres of habitat containing common *Botrychium* species was identified within the study area at 19 separate sites. Alternative 3 would result in direct impacts to 15 of the 19 *Botrychium* aggregation sites, or direct impacts adjacent the sites. Through PDC construction impacts to known moonwort aggregations that may contain sensitive plant species would be minimized on a site by site basis by avoiding work within known moonwort aggregations at BSR.

Construction activities from Alternative 3 would directly impact approximately 8 acres of existing potential *Botrychium* habitat at BSR, mainly from new ski lift construction, ski lift relocation, snowmaking, snow fencing, grading, utility installation, and other infrastructure. Alternative 3 would include the clearing of approximately 45 acres of forest, which would result in the creation of 45 acres of new potential *Botrychium* habitat.

Noxious weed invasions often occur where machinery is used and habitats are disturbed. *Botrychium* species frequently grow at previously disturbed sites such as roadsides, power line alignments, ski lift alignments and ski runs. If a noxious weed invasion occurred within occupied habitat for any of the listed *Botrychium* species, individuals or whole populations could be affected as a result of the plant community change and resulting competition. The Annual Summer Construction Plan for BSR includes a discussion of invasive weed management.

Under Alternative 3, a total of 280 acres of new ski terrain would be made available to users, with approximately 20 acres of this new terrain being possible potential habitat for *Draba weberi*, and potential habitat for the species consisting of all riparian zones and wetlands above 11,000 feet within the Alternative 3 project area. As stated above, it is unlikely that there would be any direct effects this species under Alternative 3.

A determination of “May adversely impact individuals, but not likely to result in a loss of viability on the Planning area, nor cause a trend towards federal listing or a loss of species viability rangewide” was made for the following four listed sensitive plant species, *Botrychium ascendens, Botrychium lineare, Botrychium paradoxum* and *Draba weberi*, due to the possibility that these species could occur in the Alternative 3 study area.

CUMULATIVE EFFECTS

Scope of Analysis

The effects analyzed in the section apply to all alternatives, including the No Action Alternative. Cumulative effects to sensitive plant species occur over time and across populations. Because no Threatened or Endangered species are analyzed in this document, Endangered Species Act cumulative effects are not evaluated. For a detailed description of past, present and reasonable foreseeable future projects, the reader is referred to Appendix A in this document.

Temporal Bounds

The temporal bounds for this cumulative effects analysis for the aesthetic resource extend from BSR's inception as a resort in 1961, through the foreseeable future in which BSR can be expected to operate.

Spatial Bounds

The spatial bounds for this cumulative effects analysis are limited to public and private lands in the vicinity of the BSR SUP area.

Past, Present, and Reasonably Foreseeable Future Actions

Past, present, and reasonably foreseeable actions that have cumulatively affected, and that will likely cumulatively affect, botanical resources within the project area are related to development of public and private lands dating back to the 1960s. The mountain pine beetle epidemic and related vegetation management activities are also critical components of the visual character of the project area. These past, present, and reasonably foreseeable actions include:

- Breckenridge Ski Resort – Master Development Plan projects
- Miscellaneous Recreation Activities/Projects
- Continued Town of Breckenridge and Upper Blue Residential Build-out
- Breckenridge Forest Health and Fuels EA
- Mountain Pine Beetle Effects (Upper Blue Watershed)
- Historic Mining Activities
- In-holding Property
- Weber Gulch Hut

Alternative 1

The No Action alternative would not result in any identified new cumulative effects to *Botrychium ascendens, Botrychium lineare, Botrychium paradoxum* and *Draba weberi* at BSR.

Alternatives 2 and 3

Because *Botrychium ascendens, Botrychium lineare, Botrychium paradoxum* and *Draba weberi* could potentially occur with the study area, there is a possibility of cumulative effects to these plant species from Alternatives 2 and 3. The rarity of *Botrychium ascendens, Botrychium lineare, Botrychium paradoxum* and *Draba weberi* make them vulnerable to extirpation due to random events. It is unknown how local populations of these species might interact throughout their range. Since there is very little known about interactions among disjunct populations it is difficult to predict how effects to a single population might influence the status of other populations. Therefore, cumulative effects have been analyzed for the plants listed above within the limits of BSR.

A variety of past and ongoing actions in the BSR analysis area have resulted in the current conditions. Assuming presence of the above listed plant species; past actions including ski area development, forest clearing and thinning, motorized and non-motorized recreational use, trail building, lift construction, maintenance, insect and disease outbreaks, fire suppression, mining, road construction, urban development (sub-dividing and development of private land), and noxious weed infestation are likely to have had the greatest past negative impacts on R2 sensitive plant species and their habitats. Past actions such as timber clearing and thinning that cleared forest canopy while minimizing ground disturbance or soil sterilization and avoided the introduction of noxious weeds would likely have been beneficial actions for the *Botrychium* species listed above.

Current activities at BSR and within the vicinity of the BSR SUP area have altered sensitive plant habitats. Such activities have the potential to cumulatively affect sensitive plant species. These activities include: forest clearing and thinning, snow compaction associated with alpine skiing, motorized and non-motorized recreational uses, road/trail construction and maintenance, insect and disease outbreaks, fire suppression, fire (prescribed and wildfire), mining, development, and noxious weed infestation.

The cumulative effects of alternatives 2 and 3 are not anticipated to contribute to any change in status or viability for *Botrychium ascendens, Botrychium lineare, Botrychium paradoxum* and *Draba weberi*. The ongoing, proposed and reasonably foreseeable actions would continue to provide forest clearings that allow the R2 sensitive species *Botrychium ascendens, Botrychium lineare* and *Botrychium paradoxum*, to become established in new locations. Cumulative effects related to alternatives 2 and 3 at BSR are not expected contribute to an increase in any current or predicted downward trend in population numbers or density or to current or predicted downward trends in habitat capability that would reduce the existing distribution of any of the R2 sensitive plant species carried forward into this analysis.

Non-native plant invasion is often the result of the ground disturbing activities listed above. These non-native species displace native plants, mostly through direct competition. In some cases highly competitive non-native species have been used in revegetation efforts, and these species are potent competitors for

light, nutrients, and water. The alternatives being considered may add to the cumulative effects of non-native plant invasion at BSR due to habitat disturbances and improved access.

Through project design construction impacts to known moonwort aggregations that may contain sensitive plant species would be minimized on a site by site basis by avoiding work within known moonwort aggregations at BSR.

Additional information regarding cumulative effects to botanical species is presented in the Project File.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Ground disturbance related to trail and lift development would represent an irretrievable effect to botanical resources within the SUP area. However, this is not considered an irreversible commitment because vegetation is a renewable resource. Should ground disturbance occur to the point where potential habitat is removed entirely, an irreversible commitment of this resource could occur. However, as stated in the analysis, Threatened and Endangered and R2 sensitive species were not identified in the areas of disturbance.

I. WILDLIFE

SCOPE OF THE ANALYSIS

The ecological analyses are considered at up to three scales: project component areas, the BSR SUP area, and the 2,286,400-acre WRNF. Each of these areas is described below.

This section is tiered to the 2002 Forest Plan and incorporates by reference other recent BSR NEPA documents contained in the Project File.[194] Recent BSR NEPA documents were supplemented with information on species status, distribution, and ecology derived from Colorado Natural Heritage Program (CNHP) data base maps and reports, Colorado Division of Wildlife (CDOW) (now Colorado Parks and Wildlife [CPW]) Wildlife Resource Information System and Natural Diversity Information (NDIS) System mapping, Forest Service data, knowledge from the Forest Service wildlife biologists, applicable scientific studies and reports, field surveys, and information contained in the BE for the revised WRNF Forest Plan.[195] Field surveys were conducted specifically for this project between March 9, 2004 and August 20, 2010.

As different animal species occupy different ranges and habitats, the study area varies for Threatened, Endangered, and MIS, as discussed throughout this analysis.

ADDITIONAL ANALYSIS AREAS

For the purposes of this document, ecological analyses are considered at several scales biologically appropriate for individual species. In addition to disturbance areas, the project area, and the Planning Area, other animal-related analysis areas are described as follows.

Swan River Lynx Analysis Unit

The Canada Lynx Conservation Assessment and Strategy indicated that project planning should evaluate the effects to lynx habitat within designated Lynx Analysis Units (LAU) exceeding 25,000 acres in the southern Rocky Mountain Geographic Area.[196] LAUs are intended to provide the smallest scale at which the effects of management actions on lynx habitat are quantitatively evaluated. LAUs do not represent actual lynx home ranges, but their scale should approximate the size of an area used by an individual lynx. The BSR project area is located within the Swan River Lynx Analysis Unit, LAU 27, encompassing 79,008.6 acres. Swan River LAU boundaries extend from the crest of the Tenmile Range on the west, the Continental Divide on the south and east, the Blue River drainage to the Gold Hill and Ophir Mountain area on the north, and to the Swan River/Snake River hydrologic divide north.

[194] USDA Forest Service, 2002a,b,c,d,e as amended
[195] USDA Forest Service, 2002f
[196] Ruediger et al., 2000

Lynx Linkages

Five lynx linkages mapped within the Southern Rockies Geographic Area are bisected by high speed highways that seasonally contain traffic associated with BSR.[197] Four of these linkages (Herman Gulch, Loveland Pass, Officer's Gulch, and Vail Pass) occur along the Interstate 70 corridor and one (Kenosha Pass) occurs along Highway 285 to the southeast. Each of these linkage areas, generally associated with large contiguous blocks of federal lands, is described further, below. The goal of linkage areas is to ensure population viability through population connectivity.[198] Linkage areas are areas of movement opportunities between habitat blocks that may be separated by intervening areas of "non-habitat" such as basins, valleys, agricultural lands, or where lynx habitat naturally narrows between blocks.[199] They exist on the landscape and can be maintained, degraded, or severed by management activities and human infrastructure, such as high-use highways, subdivisions, or other developments.[200] The Forest Service does not consider lynx linkages to be "corridors" (which imply only travel routes), but broad areas of habitat where animals can find food, shelter, and security that also provide connectivity between larger habitat blocks.[201] However, characteristics of some of the linkages considered herein, as delineated (e.g., Herman Gulch), are largely limited to highway crossing locations.[202] Such linkages zones would be expected to support greater use by transient or nomadic individuals.[203] Linkages are also important for maintaining genetic diversity throughout the Southern Rockies population.[204]

Colorado Parks and Wildlife Core Areas

As part of the CPW augmentation plan, all 218 lynx releases to date have been in the San Juan Mountains of southwestern Colorado, in what the CPW has defined as the San Juan Core Area (SJCA) and the Lynx Release Core Area.[205] The SJCA (and the Taylor Park Core Area [TPCA], defined below) are not "recovery units" as defined under the ESA.[206] The SJCA (11,232 square miles; 7,188,480 acres) is a qualitative lynx analysis area that extends from the Colorado/New Mexico border north to Gunnison, west to Taylor Mesa, and east to Poncha Pass. The BSR is approximately 78 miles outside (north-northeast) of the northern boundary of the SJCA. The SJCA abuts the southwestern tip of the Sawatch Range, while BSR is located on the east side of the Tenmile Range, the next major range to the east of the Sawatch Range. The SJCA is considered to be some of the best lynx habitat in the state because of large, contiguous, subalpine and montane habitat blocks supporting relatively high snowshoe hare densities

[197] USDA Forest Service, 2008b
[198] Ibid.
[199] USDA Forest Service, 2008b; Ruediger et al., 2000 (Oct. 2001 rev. definition)
[200] Ibid.
[201] USDA Forest Service, 2008b
[202] Ibid.
[203] Thompson, 1999
[204] USFWS, 2006
[205] Shenk, 2007
[206] USFWS and NMFS, 1998

(based on track indices and pellet plots), permeated by few highways, and supporting a relatively low human population density.[207]

In the last few years, lynx have established another area of concentrated activity in the Collegiate Peaks/Taylor Park area on the southwestern side of the Sawatch Range.[208] The TPCA (aka Lynx Established Core Area) is closer to BSR than the SJCA. Because lynx high use areas associated with the TPCA extend along the east slope of the Sawatch Range, the northern boundary of the TPCA could be interpreted as extending north to the Tennessee Pass area.[209]

The CPW's lynx augmentation is an attempt to reestablish a viable state-wide population. However, to reestablish and maintain a viable population, lynx will have to disperse to other areas of the state. The above two areas of concentrated lynx activity are considered herein because they represent current dispersal points to other areas of the state.

Southern Rockies Ecosystem

The Southern Rockies Geographic Area (aka Southern Rockies Ecosystem [SRE]; approximately 60,000 square miles; 384,000,000 acres), including the mountainous regions of Colorado, south-central Wyoming, and north-central New Mexico, is the lynx action area for the project because it would contain all potential impacts from the Federal Action, including direct and indirect effects.[210]

FOREST PLAN DIRECTION

Forest Plan Standards and Guidelines specific to each of the following wildlife and aquatic species are located in the appropriate wildlife technical reports, the Biological Assessment (BA) or the Biological Evaluation (BE) contained in the Project File. In addition, a Forest Plan Consistency Analysis (FPCA) for each of the standards and guidelines prescribed in the Forest Plan was conducted for Alternatives 1 through 3 and is contained in Appendix B.

Standard ALL S1 technically does not apply to the existing condition or No Action Alternative, as it applies to "new or expanded permanent developments." However, through this scientific assessment, habitat connectivity is not maintained under current conditions, and this Standard is currently unable to be met in the future, with or without further development at BSR.[211]

[207] Byrne, 1998; Bartmann and Byrne, 2001; Shenk, 2004
[208] Shenk, 2007
[209] Ibid.
[210] Ruediger et al., 2000; USFWS and NMFS, 1998
[211] USDA Forest Service, 2008b

Standard ALL S1 states (not including footnotes):

> *New or expanded permanent developments and vegetation management projects must maintain habitat connectivity in an LAU and/or linkage area.*

Based on detailed analysis and thorough consideration, the Forest Service has included a non-significant Forest Plan Amendment as a component of the alternatives. The Forest Plan amendment would eliminate the applicability of Standard ALL S1 to this FEIS.

AFFECTED ENVIRONMENT

BSR is located on the east side of the Tenmile Range in Summit County, Colorado. The ski area is located in the upper Blue River watershed above Green Mountain and Dillon Reservoirs, in the upper Colorado River basin, on the western slope of the Rocky Mountains. Three first-order ephemeral to perennial streams (depending on elevation) are located north of the operational boundary on Peak 6: Cucumber Creek, South Barton Gulch and Middle Barton Gulch, and three first-order perennial streams run through the developed ski area Carter Gulch, Lehman Gulch and Sawmill Creek (refer to Figure 28 – Water Resources).

Elevations at BSR range from approximately 9,600 feet in the Peak 9 base area and the gondola base to 13,633 feet at the Peak 10 summit. The project area consists of existing ski runs, chair lifts, access roads, ski facilities, islands of trees between the runs, and undeveloped alpine and subalpine terrain. The ski area receives heavy year-round recreational use (skiing and snowboarding in the winter; hiking, biking and horse riding in the summer).

The BSR study area contains 7,543 acres, of which 5,755.9 acres are on NFS lands managed by the Forest Service. Vegetation communities within the BSR project area are provided in Table 3I-1, based on stand surveys associated with BSR's Vegetation Management Plan.[212] The majority of BSR forests are second-growth lodgepole pine (*Pinus contorta*) and Engelmann spruce (*Picea engelmannii*) and subalpine fir (*Abies bifolia*, spruce-fir) stands that were historically logged in the 1870s, then again in the 1940s by the Rounds/Porter Lumber Company of Kansas.

[212] SE Group et al., 2011

Table 3I-1:
Vegetation Communities within the BSR SUP Area – Existing Condition

Vegetation Community	Acres (%)
Alpine (NFL, non-forested)	2,601.1 (45.2)
Ski Trails	1,193.0 (20.7)
Spruce-fir	807.3 (14.0)
Lodgepole Pine (≥ 90% LP)	534.7 (9.3)
Mixed Conifer (spruce-fir with < 50% LP)	447.0 (7.8)
Mixed Lodgepole (50 to 90% LP with spruce-fir)	149.5 (2.6)
Willows	23.2 (0.4)
Total	**5,755.9 (100)**

Note: Numbers do not reflect the acreage of vegetation types on private lands outside of the SUP area that are part of BSR.
Source: Breckenridge Ski Resort (2010) and SE Group.

Threatened and Endangered Species

Federally listed and proposed species that were initially considered in the BA included those identified by the US Fish and Wildlife Service (USFWS) (Feb. 3, 2011 update) as potentially present on the WRNF, potentially present on the DRD, and/or potentially affected by management decisions associated with Alternatives 1 through 3 (Table 3I-2). Uncompahgre fritillary butterfly *(Boloria acrocnema*), humpback chub (*G. cypha*), bonytail (*Gila elegans*), Colorado pikeminnow (*Ptychocheilus lucius*), razorback sucker (*Xyrauchen texanus*), greenback cutthroat trout (*Oncorhynchus clarkii stomias*), and Canada lynx (*Lynx canadensis*) were identified. Of these species, only lynx would have potential to be affected by the proposed projects and are carried forward in detailed analysis (refer to Table 3I-2 for reasons why there is not potential affect to other Threatened and Endangered species). Other listed and proposed species known to occur elsewhere on the WRNF and/or in Colorado were considered, but dropped from detailed analysis because they were not identified by the USFWS or Forest Service as potentially present on the DRD, their habitats do not occur in the action area, they have no affinities to project area habitats, the project area is outside of the species' range, and Alternatives 2 and 3 would have "no effect" on the species or on designated critical habitat. Additional information on the above listed species and candidate species is located in BA in the Project File.[213]

[213] Thompson and Steinmann, 2011

Table 3I-2:
Federally Listed and Proposed Species Applicable to BSR – Existing Condition

Common and *Scientific Name*	Status	Rationale for Occurrence[a] (Habitat)
Uncompahgre fritillary butterfly, *Boloria acrocnema*	E	No habitat (alpine snow willow stands >12,000'on peaks ≥ 12,600')
Humpback chub, *Gila cypha*	E	No additional Colorado River water depletions beyond authorized limits (far downstream in Colorado River)
Bonytail chub, *G. elegans*	E	No additional Colorado River water depletions beyond authorized limits (far downstream in Colorado River)
Colorado pikeminnow, *Ptychocheilus lucius*	E	No additional Colorado River water depletions beyond authorized limits (far downstream in Colorado River)
Razorback sucker, *Xyrauchen texanus*	E	No additional Colorado River water depletions beyond authorized limits (far downstream in Colorado River)
Greenback cutthroat trout, *Oncorhynchus clarkii stomias*	T	Not part of historic range (isolated mountain stream headwaters)
Canada lynx, *Lynx canadensis*	T	Present in AA, potential forage/travel habitat (montane and subalpine forests)

[a] In Action Area (AA).
Note: Other listed and proposed species are not listed in this table because they have no affinities to action area habitats, the project area is outside of the species' range, and the Proposed Action would have no effect on the species. Federal status, listed after species, is as follows: E = Endangered, T = Threatened, P = Proposed. Potential pre-field survey occurrence on the project area and habitat affinity is summarized for each species. The Forest Service has completed formal Section 7 consultation with the U.S. Fish and Wildlife Service (USFWS) for water deletions and past lynx impacts, for further consultation history refer to the wildlife BA contained in the Project File.
Source: Roberts, 2011 and Western Ecosystems, Inc.

Canada Lynx

In an attempt to reestablish a viable population, the CPW released 218 lynx in the San Juan Mountains.[214] All releases have been in the San Juan Core Area (SJCA) in southwestern Colorado.[215] As of May 25, 2009, the CPW was tracking 42 of the 103 reintroduced lynx still possibly alive in the Southern Rockies Ecosystem.[216] Additional animals are present on the landscape, but it is difficult to determine the extent of the lynx population in Colorado due to reproduction, failed collars, and/or movement outside of the research area.[217] CPW biologists estimate the number of lynx in Colorado is holding steady at about 150, with most in the southern mountains.[218] Reproduction has been documented in 2003 to 2006, and 2009 scattered throughout the Southern Rockies Ecosystem.[219] Between 2003 and 2010, a total of at least 141 kittens were born, including a Colorado born female that produced kittens in 2006 and two dens in Summit County.[220] Some lynx released in the SJCA have moved north of Interstate 70 in Colorado and

[214] CDOW, 2006
[215] Ibid.
[216] CDOW, 2009b
[217] Shenk, 2006
[218] Broderdorp, 2007; CDOW, 2006
[219] Shenk, 2006; Andree, no date
[220] CDOW, 2006 and 2010

into Utah, Wyoming, New Mexico, Montana, Idaho, Arizona, Nevada, Kansas, and South Dakota.[221] Of all lynx released, 43 individuals had been relocated on the WRNF.

Landscape Connectivity and Lynx Movements

Wildlife movement occurs through corridors that support habitat values, particularly where they represent linear patches, however, their principal value is that they connect substantive habitat blocks.[222] In a broader, landscape-level context, some wildlife corridors with extensive, continuous habitat connectivity may go beyond the function of allowing daily and seasonal movements between home range segments. Such corridors in a fragmented habitat matrix may provide key connectivity between subpopulations in large habitat patches, functioning as landscape linkages and dispersal corridors. The importance of such linkages to the landscape ecology of rare forest carnivores include (1) facilitating daily and seasonal intra- and inter-home range movements, (2) facilitating mating and genetic interchange, (3) allowing dispersal from population centers and colonization of otherwise suitable, vacant habitat, and (4) allowing populations to respond to natural and human-caused environmental changes and catastrophes.[223]

The best information available suggests that lynx were nearly extirpated from the Colorado Rockies.[224] The CPW concluded that if native lynx remained in Colorado, their numbers were so small that they did not represent a viable population.[225] The CPW's lynx augmentation in the San Juan Mountains was an attempt to reestablish a viable population. On September 17, 2010, the CPW announced that the lynx reintroduction project had successfully accomplished its goal of establishing a breeding population in the Southern Rockies.[226] However, to maintain a viable population, lynx will have to continue to disperse to other areas of the state.

Because of the patchy, discontinuous distribution of lynx habitat in the Southern Rockies Ecosystem, maintaining landscape-level habitat connectivity may be paramount to maintaining a viable population. Landscape linkages must be available to allow lynx movements between adjacent mountain ranges. Colorado lynx habitats are not only constrained by broad alpine zones and non-forested valleys, but also by towns, reservoirs, highways, and other human developments that fragment and isolate montane and subalpine lynx habitats. This does not mean that lynx will not cross broad alpine zones, broad open valley bottoms, highways, or other landscape features, because they do. However, movements through such open habitats are not preferred because it predisposes animals to increased risk factors (e.g., predation, poaching, highway mortality) in habitats that do not support their primary suite of prey species.[227] Any

[221] Shenk, 2006
[222] Rosenberg et al., 1997; Beier and Loe, 1992
[223] Noss, 1983; Harris and Gallagher, 1989; Bennett, 1990; Bleich et al., 1990; Henein and Merriam, 1990; Beier and Loe, 1992; Taylor et al., 1993; Wiens, 1997
[224] Ruediger, 1994; Seidel et al., 1998
[225] Seidel et al., 1998
[226] CDOW, 2010
[227] Ruediger et al., 2000

continuously forested corridor between mountain ranges supporting lynx habitat that is relatively free of human development has the potential to be an important landscape linkage. Large tracts of continuous forest are the most effective for lynx travel and dispersal.[228]

Characteristics of lynx movements that are relevant to the present analysis include movement type, movement frequency, landscape familiarity, movement efficiency, dispersal distances, and daily travel distances. Lynx movements may be of four types: those associated with an established home range, those of transient or nomadic lynx that do not maintain home ranges, those of dispersing individuals, and those associated with extensive exploratory movements. The frequency that lynx may use a landscape linkage would theoretically decline from an area occasionally used as part of a resident's home range, to infrequent use within a nomadic range, to one-time use by dispersing and exploring individuals.

Long distance lynx movements (i.e., > 62.5 miles), once reported as anomalies, are now considered characteristic of the species, involving nearly one-half of some populations during periods of low prey availability.[229] The most extreme example of a dispersing movement is that of lynx BC03M02, who was captured in a neck snare near Nordegg, Alberta on January 28, 2010, approximately 1,800 kilometers north of its home range in the Silverton, Colorado area.[230] Other radio-collared lynx in Colorado have displayed similar long distance movements, which have been related to dispersal and mating.[231]

Non-dispersing daily travel distances (DTD), the distance that resident animals move in a 24-hour period, are also relevant to the present analysis with respect to the ability of a lynx to cross through fragmented habitats between adjacent diurnal security areas. DTDs are equivalent to the following terms reported in the literature: night's hunt distance, distance between consecutive daytime beds, daily cruising distances,

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[228] Tanimoto, 1998

[229] Nellis and Wetmore, 1969; Mech, 1977; Brittell et al., 1989; Slough and Mowat, 1996

[230] This male was captured for the reintroduction effort near Kamloops, BC in 2003 and released in Colorado April 16, 2003 near Creede. The CDOW obtained regular locations on this lynx after his release and he remained in the state at least until April 20, 2007. He was a territorial male who fathered two litters of kittens with a female in the Silverton area, one in 2005 and one in 2006. The CDOW never heard his signal after April 20, 2007. The straight line distance from Silverton to Nordegg is approximately 1,800 km. He weighed 26 lbs and was in excellent body condition when he was captured in Alberta (Shenk 2010). The extensive, non-forested, low-quality foraging habitat that this lynx crossed between Colorado and Alberta was clearly non-habitat, yet an adequate level of connectivity existed, at least for this lynx.

[231] Two of the more concerted lynx movements that have been reported include the female killed on Interstate 70 at Vail Pass on July 19, that had moved about 130 miles in the seven weeks since her most recent release. Another lynx moved from the Crystal River valley south of Carbondale (July 23) to Vallecito Reservoir (Aug. 12), a movement of 130 miles in 19 days over what the CDOW described as "some very formidable real estate" (G. Byrne, CDOW, pers. comm.). One of the lynx traveled to Nebraska before it was shot, another moved from south of Rifle to Guanella Pass (south of Georgetown), possibly crossing through Copper Mountain Resort (CMR), another moved to Rocky Mountain National Park, and another moved through Keystone and A Basin Ski Areas to the East Slope. A Yukon male (from the 1999 release) that had been using both sides of Fremont Pass over the 1999/2000 winter, and whose trail had been located in Tucker Creek (south of CMR) during winter tracking surveys, returned to the San Juans for the 2000 breeding season, traveling approximately 110 miles in approximately 25 days (Shenk 2000; Byrne and Shenk 2000)

straight-line daily travel distance, and minimum daily travel distances.[232] All distances reported are straight-line distances between two successive points and, therefore, underestimate the actual meandering course that an animal travels in a heterogeneous landscape. DTDs reported during dispersal are generally within the same range as those reported for resident animals. Therefore, these two groups of DTDs were not separated. As a summation of DTD studies, Ruediger et al. (2000) indicated that project planning should consider mean DTDs of up to 3 to 6 miles for resident females.[233] Recent data from radio-collared Colorado lynx suggests that lynx within home ranges may be relatively sedentary during winter, concentrating activity within a higher quality portion of their home range (September into April).[234]

Landscape Connectivity in Southern Summit County

Because of the patchy, discontinuous distribution of lynx habitat in Colorado, maintaining landscape-level habitat connectivity may be paramount to maintaining a viable population. Colorado lynx habitats are not only constrained by broad alpine zones and non-forested valleys, but also by towns, reservoirs, highways, and other human developments that fragment and isolate montane and subalpine lynx habitats. Any continuously forested corridor between mountain ranges supporting lynx habitat that is relatively free of human development has the potential to be an important landscape linkage.

Southern Summit County, which includes the project area, is relatively well connected with forested habitats in adjacent mountain ranges to the south, one of the two sources of lynx (the other being the west) that might enter the county.[235] The WRNF Forest Plan and Southern Rockies Lynx Management Direction identified Forested Landscape Linkages to be managed as key landscape linkages for lynx and other carnivores. The east slope of the Tenmile Range, which contains the BSR project area, is not part of any designated, lynx landscape linkage or a Forested Landscape Linkage. However, the east slope of the Tenmile Range is continuously forested, with the exception of the fragmentation associated with the ski area and recent clearcuts to the north of the ski area. As a result, forest carnivores following forest cover have found their way to the ski area. With respect to landscape-level habitat connectivity across the ski area and through this portion of the Tenmile Range/LAU, impaired connectivity is largely an issue only during the ski season, not so much by the developed ski terrain as by the obstacles/restrictions presented by skier presence and activity during operating hours. Habitat connectivity through the lodgepole and mixed conifer zones along the eastern slope of the Tenmile Range has been, and continues to be, further impaired by the effects of the MPB epidemic, which is reducing foraging values and diurnal security habitat.

[232] Nellis and Keith, 1968; Brand et al., 1976; Parker et al., 1983; Ward and Krebs, 1985; Slough and Mowat, 1996
[233] Saunders, 1963; Nellis and Keith, 1968; Brand et al., 1976; Parker et al., 1983; Slough and Mowat, 1996; Poole, 1997
[234] Shenk, 2008
[235] Thompson, 2003b

The closest, most viable lynx landscape linkage to BSR is Georgia Pass, to the southeast, then Hoosier Pass, to the south, both of which likely conduct movements over the Continental Divide. The other closest designated lynx landscape linkages include Officer's Gulch, on the northern end of the Tenmile Range, and Loveland Pass, to the east. The closest, highly functional Forested Landscape Linkage extends over Georgia Pass, through the upper forks of the Swan River, through the Snake River drainage between Keystone and Arapahoe Basin ski areas and across Interstate 70 east or west of the tunnel. This linkage theoretically facilitates lynx movements from South Park into Grand County and other large habitat blocks beyond in the northern extent of the SRE. No other portions of LAU 27 or contiguous areas are presently considered to be in key linkage areas or in a Forested Landscape Linkage according to current designations.

In 2012, the Forest Service initiated a review lynx habitat conditions in southern Summit County. The southern Summit County Lynx Habitat Assessment aims to aid land management planning efforts in southern Summit County, Colorado by providing a large-scale view of current and projected Canada lynx habitat needs, and providing a focus area for conservation and habitat management projects that can improve habitat effectiveness. The main focus was to determine the depth of current and proposed activities within the Southern half of Summit County. The primary goal of this planning effort was to establish a defined area within Summit County that the Forest Service and partners could implement effective habitat improvement for Canada lynx. The Summit County Lynx Habitat Assessment is available online at the WRNF website: http://www.fs.usda.gov/whiteriver.

Lynx Habitat Potential along the East Slope of the Tenmile Range

The forest along the east slope of the Tenmile Range is virtually all second-growth, composed of higher quality, upper elevation spruce-fir and lower quality, lower elevation, lodgepole pine. Lodgepole stands are broader and compose a larger portion of the overall forest at the lower elevation, northern end of the Tenmile Range. A MPB epidemic has been advancing through the east slope of the Tenmile Range, affecting the lodgepole pine component of forest stands. Beetles will reduce lynx foraging habitat, diurnal security habitat effectiveness, habitat connectivity, and impair the ability of lynx to maintain a home range over the moderate term (approximately 25 to 40 years).

Results of snowshoe hare pellet surveys, horizontal conifer cover surveys, and prey base indices collected through the central and northern portions of the east slope of the Tenmile Range indicate that relative habitat quality is currently poor for central Colorado because of historic mining effects and the progression of the MPB epidemic. For a description of snowshoe hare habitat and abundance; snowshoe hare pellet and horizontal conifer cover surveys; snowshoe hare habitat modeling at BSR; and winter tracking surveys in the east-central Tenmile Range, refer to the BA located in the Project File.

Mountain Pine Beetle Effects on Lynx Habitat

The forest along the east slope of the Tenmile Range is virtually all second-growth, composed of higher quality, upper elevation spruce-fir stands (primary lynx habitat) and lower quality, lower elevation,

lodgepole pine stands (secondary lynx habitat). Lodgepole stands are broader and compose a larger portion of the overall forest at the lower elevation, middle and northern portions of the range. A MPB epidemic has been advancing along east slope of the Tenmile Range, affecting lodgepole pine forests. Based on a SWReGAP analysis of the east slope of the Tenmile Range, MPBs will affect 9,234 acres of these forest stands, to some extent, composing 53 percent of the lower and mid-elevation elevation lynx habitat. Within forests dominated by lodgepole pine, MPB-induced lodgepole pine mortality will alter lynx prey species abundance and lynx habitat use. Reduced foraging habitat, diurnal security habitat effectiveness, and habitat connectivity in the lodgepole zone could further impair the ability of lynx to maintain a home range within the LAU and connected LAUs over the moderate term (approximately 25 to 40 years), including the life of the Proposed Action, until adequate forest cover redevelops. Untreated (where dead trees fall and jackstraw) lodgepole stands will have offsetting regeneration effects. Unless the jackstrawed layer is removed (resulting in ≥ 20 percent regeneration mortality), regeneration can be sparse and patchy. Conversely the jackstrawed trees reduce deer and elk access resulting in better seedling/sapling survival and growth. With moderate levels of natural lodgepole germination, lodgepole stands can develop hare winter foraging values from approximately 10 to 40 years after treatment. Young, dense lodgepole stands can support some of the highest hare densities of any forest type/structural stage. Thus, in the moderate-term, conditions will improve to provide high quality foraging values along with DSH values that facilitate habitat connectivity. After 40 to 60 years, the live lodgepole canopy tends to lift beyond the year-round range of snowshoe hare foraging and the relative foraging values of the stand decreases for hares and increases for red squirrels. MPB effects in mixed conifer (spruce-fir dominated with a subdominant lodgepole pine component) stands could cause minor to moderate long-term increases in the primary lynx prey base, while year-round habitat connectivity through affected areas would not be meaningfully affected. Most of the Peak 6 project area consists of spruce-fir habitat that will not be affected by MPB.

Lynx Use of the East Slope of the Tenmile Range

The BSR project area is located in the middle of the east slope of the Tenmile Range, within a relatively narrow (east-west) band of forest extending between the alpine and the valley bottom/development along the length of the range. This forest band is medially fragmented by the relatively wide (north-south) terrain associated with BSR and constrained on the east by the Town and base area development. Forest carnivores following this band of forest cover have found their way to the ski area.

Lynx have been relatively uncommon along the east slope of the Tenmile Range, which may be used as a movement corridor, although there is poor habitat connectivity out of/into the northern end of the range. Several relocations and sightings have been made in the central portion of the range supporting such use. In fall 2004 several relocations of radio-collared lynx were made on or in the vicinity of BSR. It is uncertain how accurate the relocations were (i.e., considering triangulation error). Although data unanalyzed or unreleased by the CPW may indicate otherwise, these relocations provided circumstantial evidence that a lynx may have moved through BSR. During a 2008 boreal owl survey, Forest Service

biologists encountered a lynx trail in the Peak 6 pod.[236] Several lynx sightings (south of the ski area [near Francie's Cabin] and on the ski area [on *Ore Bucket*, during the day, during the ski season]) and a Highway 9 road kill northeast of the ski area within a relatively short period of time (2007/08) suggest that portions of the Swan River LAU, including the east slope of the Tenmile Range, could also be used as seasonal portions of a home range. Indeed, recent evidence from a collared animal indicates that lynx have been using southern portions of the Tenmile Range for at least seasonal portions of a home range.[237]

It is likely that the east slope of the Tenmile Range has been or could be used by lynx as a movement corridor and any such landscape level movement would almost certainly extend through the ski area. However, there is some level of impaired habitat connectivity for lynx across the ski area, which impairs habitat through this portion of the LAU. Developed BSR terrain may impair the ability of some lynx to move across the ski area during the day (during the 7.5 hours per day that skiers and patrol present widespread human presence/activity on the ski area) during the winter ski season (mid-November to mid-April, 5.25 months), adversely affecting habitat effectiveness and connectivity through the middle portion of the Tenmile Range. Such lynx movements would likely occur during the 16.5 nocturnal and crepuscular hours of each day when lynx are most active. However, lynx can be active at any time of the day and lynx have been observed on active BSR ski terrain during operating hours. Note that this analysis recognizes a distinction between habitat connectivity and the ability of lynx to move through portions of the landscape.[238] This distinction is discussed in greater detail in the impact analysis, below.

Effects of Recreational Activities on Lynx

The effects of recreational activities on lynx populations have not been well studied.[239] Prediction of recreational effects is based largely on known lynx ecology, preliminary habitat use data from Colorado's reintroduction effort, ecological concepts, the cautious application of anecdotal accounts (e.g., Roe et al. 2000), and professional judgment. Recognizing the lack of data on lynx and recreational activities, Ruggiero et al. concluded "limited anecdotal observations do not support the hypotheses that snowmobiling, ski touring, or hiking [i.e., dispersed recreation] result in significant behavioral disturbances to lynx." However, this statement is unqualified with respect to the intensity of these activities.

With respect to developed recreation effects on lynx (relevant to the action alternatives), Ruediger et al. indicated "to date, most investigations of lynx have not shown human presence to influence how lynx use the landscape. Intuitively we assume that some threshold exists where human disturbance becomes so intense that it precludes use of an area by lynx." "High intensity recreational use, such as that occurring at ski areas, may provide a level of disturbance that effectively precludes lynx use (at least temporarily) of

[236] Roberts, 2008
[237] Roberts, 2011
[238] USDA Forest Service, 2009a
[239] Ruggiero et al., 1999

otherwise suitable habitat."[240] They go on to state that "lynx may be able to adapt to the presence of regular and concentrated recreational use, so long as critical habitat needs are being met." Such use by some lynx has been demonstrated at some ski areas, including some in Colorado (e.g., Thompson and Halfpenny 1989, Thompson 2006). The natural activity patterns of lynx (largely nocturnal) versus recreational activities (largely diurnal) provide an opportunity to maintain both uses in the same landscape. A key to providing temporal segregation of use is ensuring that effective diurnal security habitats are present and adequately distributed.[241] While lynx and ski areas may not be incompatible, the developed ski terrain itself is a small part of their normally used areas. Larger surrounding tracts of undeveloped, effective forest facilitate lynx use of ski areas.[242]

Project Area Lynx Habitat

Project Area Vegetation Communities

BSR contains 7,543 acres, of which 5,755.9 acres are within the SUP area on NFS lands managed by the Forest Service. Lynx habitat within the BSR SUP area is presented on Figure 26.[243] Vegetation communities within the BSR project area are provided in Table 3I-1, based on ground-truthed surveys associated with BSR's Vegetation Management Plan.[244] The majority of BSR forests are second-growth lodgepole pine and spruce-fir stands that were historically logged in the 1870s, then again in the 1940s by the Rounds/Porter Lumber Company of Kansas. Progression of the ebbing MPB epidemic could continue to alter forest stands containing lodgepole pine at BSR and in the surrounding landscape.

Project Area Lynx Habitat Classification

Lynx habitat classification data for the 5,755.9-acre BSR SUP area (not field verified outside of Alternative 2 and 3 proposed disturbance areas) was split out of the LAU data obtained from the Forest Service for a finer-scale impact assessment (Table 3I-3). These LAU data reflect the results of the Forest-wide lynx habitat remapping effort to reflect the effects of the MPB epidemic. The remapping effort considered lodgepole stands to be currently unsuitable where the vegetation cover type is lodgepole only, lodgepole and aspen only, or lodgepole and other coniferous species, where the sum of those other coniferous species is less than 40 percent of the stand. In general, the lynx habitat classifications are accurate in the Peak 5 and 6 areas, but inaccurate (over estimating WFH and underestimating "other" habitat) in the lodgepole zone across the lower one-half of the developed ski area. The majority (63.1 percent) of the SUP area is "non-habitat," composed of the alpine and ski trails. Winter foraging habitat (overestimated) composes 15.8 percent of the SUP area. All lynx habitat (WFH + denning +

[240] Ibid.
[241] Ibid.
[242] Thompson and Halfpenny, 1989
[243] All project disturbance areas were field verified to lynx habitat type categories. Where the field verification identified a lynx habitat type in the disturbance area that differed with the Forest Service lynx habitat mapping category, the entire lynx habitat type polygon was changed to be consistent with the field validation.
[244] BSR, 2010f

"other," + currently unsuitable) composes 36.6 percent of the SUP area. Higher quality ("primary") lynx habitat (WFH + denning) comprises a relatively small (15.8 percent) portion of the SUP area.

Project Area Lynx Diurnal Security Habitat

Lynx diurnal security habitat (DSH) includes those areas that provide cover values that are also relatively isolated from, and unaffected by, human developments and activities. These are areas where largely nocturnal and crepuscular lynx can rest during the day without being regularly displaced or harassed by humans or exposed to other risk factors.[245] Denning habitat is often used as a surrogate for security habitat, but security habitat is more widespread because it generally includes a greater variety of forest structural stages and aspects, and can include smaller habitat patch sizes and less isolation from risk factors. The structural cover component of security habitat is not as important as that associated with denning. It is likely that most forested habitats that provide adequate cover and diurnal seclusion from human activities, predators, and competitors support potential security habitat. Relatively non-forested habitats can also provide effective diurnal security areas, depending on the level of human activity and a host of other factors.[246]

Table 3I-3:
Lynx Habitat Types within the BSR SUP Area – Existing Condition

Lynx Habitat Type	Acres (%)[a]
Winter Foraging	900.7 (15.8)
Denning	0.2 (<0.01)
Other	245.3 (4.3)
Currently Unsuitable	941.0 (16.5)
Total Lynx Habitat[b]	2,087.2 (36.6)
Non-habitat	3,594.8[c] (63.1)
Private	17.2 (0.3)
Total	**5,699.1[c] (100)**

[a] These data have not been field verified.
[b] On NFS land, = ∑ WFH + denning + other + currently unsuitable.
[c] Does not include 56.8 acres of alpine habitat (non-habitat) along crest of the Tenmile Range that is not part of the Swan River LAU.
Source: USDA Forest Service (May 11, 2011 update provided by E. Roberts, USFS), SE Group, and Western Ecosystems, Inc.

The LCAS defined DSH more narrowly as secure winter daytime bedding sites in highly disturbed or heavily used areas (such as downhill ski areas and snowmobile play areas).[247] It is assumed that the distribution of viable diurnal security habitat is more important in fragmented landscapes experiencing intense or widespread human activities, whether recreational or not. So long as effective security blocks

[245] Ruediger et al., 2000; Shenk, 2005
[246] Thompson and Halfpenny, 1989
[247] Ruediger et al., 2000, 2-Glossary

are present and adequately distributed, and other critical habitat needs are met, lynx may be able to adapt to the presence of regular and concentrated human use during winter and other seasons.[248] Diurnal security habitat allows lynx the ability to retreat from adjacent human disturbances during daytime hours, and emerge at dusk to hunt and travel when most human activity ceases. "Security habitats will generally be sites that naturally discourage winter [or other displacing] human activity because of extensive forest floor structure, or stand conditions that otherwise make human access difficult…Security habitats are likely to be most effective if they are sufficiently large to provide visual and acoustic insulation from winter [and other seasonal] human activity and to easily allow movement away from infrequent human intrusion."[249] While, habitat block size, buffering distances, and other variables have not been well-studied or quantified relative to potentially disruptive human activities, the Lynx Biology Team indicated that a 50-meter buffer was required to protect DSH from such human disturbances.[250] In the general landscape, effective DSH is most needed to facilitate extended lynx movements beginning in April and ending in September, when lynx are no longer relatively sedentary on winter range subsets and are dispersing to and from mates, respectively.[251]

Within the larger Tenmile Range landscape, BSR is located between two large blocks of effective DSH. On the north, the entire 340-acre Peak 6 project area that is below treeline occurs within the extreme, southwest corner of a ±8,300-acre, largely forested, habitat block extending between Frisco on the north, developed portions of BSR on the south, the open Blue River valley bottom on the east, and treeline on the west. Recreational activity within this block is largely confined to the Breckenridge Nordic trail system on the southeast, the Ophir Mountain area on the northeast, and the Peaks Trail bisecting the lower lodgepole pine zone on the east. Some backcountry skiing occurs through the Peak 6 pod, below treeline mostly south of the highest reach of South Barton Gulch, but largely outside of the higher quality lynx habitat that is effective as DSH. On the south (and west of Highway 9), there is a ±3,100-acre block of higher elevation forest composed largely of spruce-fir stands that narrows, but extends up and over Hoosier Pass. The lower tips of alpine ridges and two subdivisions (Quandry Village and McDill Placer) extend into this block, but winter recreational activity is largely limited to Francie's Cabin, the access route from the BSR Peak 9 portal, and the largely alpine hike-to areas above the cabin. There are a number of other recreational trails along the length of the east slope of the Tenmile Range and on Hoosier Pass that are used by recreationists (some with dogs). However, the potential effects of such winter trail use are largely confined to the 100-meter wide trail corridors/buffers, leaving large effective blocks of DSH outside of these corridors.

[248] Ibid.
[249] Ibid.
[250] Roberts, 2009
[251] Shenk, 2008

Adverse effects of the MPB epidemic that may affect 53 percent of the lower elevation lynx habitat along the east slope of the Tenmile Range, to some extent, will include impaired DSH effectiveness and habitat connectivity in the lodgepole zone that could impair the ability of lynx to maintain a home range within the LAU and connected LAUs over the moderate term (approximately 25 to 40 years), until adequate forest cover redevelops. Most of the Peak 6 project area consists of spruce-fir habitat that will not be affected by MPB.

Diurnal security habitat is a focal issue of the Peak 6 project proposal because it likely affects habitat connectivity across the ski area. The closer that effective security habitat is to developed ski terrain, the closer to that terrain that a lynx could bed during the day, then cross the ski area from dusk through dawn to the next DSH block on the opposite side of developed ski terrain before the ski area reopens. Distances across developed ski terrain that are within a lynx's DTD could allow lynx to completely avoid human interaction. Diurnal security habitat across BSR is most limited during the day (7.5 hours when skiers are present, including "sweep") during the winter ski season (mid-November to the third week of April, 5.25 months), because of tree skiing, and most available during the rest of the year, when many intertrail islands across the ski area are effective as DSH because of the absence of human activity.

To date, there is no evidence that any habitat block or intertrail island within developed BSR ski terrain have been used by lynx as DSH. One lynx was observed in active BSR ski terrain during the day.[252] Lynx have been sighted in active ski terrain during operating hours at other Colorado ski areas (e.g., Durango Mountain Resort (DMR), and Telluride Ski Area).[253] Lynx daybeds have been located adjacent to active, developed ski terrain at Vail and DMR, and daybeds within active, developed ski terrain were strongly suspected within the developed interior of DMR in intertrail islands of similar size to those present within BSR.[254]

Habitat blocks in the vicinity of BSR that are currently effective as ski season DSH (i.e., when year-round DSH is most limited) are described below. Circumscribed blocks adjacent to ski season human activity areas were refined to show effective DSH blocks buffered with a 50-meter zone recommended by the Lynx Biology Team. Each of these blocks is described below based on winter and summer field validation.

[252] During the 2007/08 winter, a lynx was observed on "Ore Bucket" (Phinney 2008), naturally gladed terrain due north of the top of the Independence Lift in the Peak 7 pod, near treeline in the spruce-fir zone, near the edge of developed BSR terrain.
[253] Tompkins and Grother, 2006
[254] Thompson and Halfpenny, 1991; Thompson, 2006

The Peak 5 and 6 DSH Block

Most of the Peak 5 and 6 habitat block below treeline (830 acres, buffered above the Siberian Nordic Trail) is an intact, continuous, second-growth, spruce-fir dominated (approximately 50 percent spruce-fir mix, 20 percent spruce, and 30 percent mixed lodgepole pine [50 to 90 percent lodgepole with spruce-fir]), forest block (not including clearcuts and historic burns), that is little-used by humans. Most of the Peak 5 and 6 block also supports a multi-layered understory with medium to high density LHCF and relatively high (i.e., for the Tenmile Range) snowshoe hare track abundance (2.51 fresh [<24 hours old] trails/km, 38.7 km, n=9 days). From a lynx habitat perspective, the Peak 6 block contains relatively high quality, low quality, and "non-habitat." Virtually the entire Peak 5 and 6 block is effective as DSH, including the lower clearcuts.[255] The Peak 5 and 6 habitat block is also contiguous with undeveloped, closed-canopy, spruce-fir and mixed conifer forest that is effective as DSH that extends north almost to Frisco.

Areas within the Peak 6 pod (mostly south of, and including, the main drainage of South Barton Gulch) have occasional, localized, reduced DSH effectiveness because of backcountry skier use. During nine winter tracking surveys through the Peak 6 pod (December 16, 2005 through April 7, 2010), backcountry skier trails ranged from 0 to 28 trails per week. For the past four ski seasons, BSR Ski Patrol has monitored the daily use of Peak 6 backcountry terrain by counting individual skiers and tracks, as well as by monitoring use of the Peak 7 access point at the top of the Independence SuperChair. Peak 6 backcountry terrain (accessed via a backcountry access point) is currently suitable for skiing from approximately January 1 through the close of the season (typically the third week in April) providing roughly 110 days of use. Access from other than a backcountry access point (e.g., Peaks Trail or Siberian Loop) occurs beyond the BSR season depending on snowfall. Annual and average daily skier use of current Peak 6 backcountry terrain is shown in Chapter 3B – Recreation, Mountain Operations and Guest Services. Skier use has generally increased over the last four seasons. Based on BSR Ski Patrol observations, during the 2009/2010 season, Peak 6 backcountry use averaged approximately 19 skiers per week and some of that use extended down through the 830 acres of forest below the alpine terrain.

The appeal of the Peak 6 backcountry is the alpine terrain, not the 830 acres below treeline. Peak 6 backcountry terrain users typically ski the bowl south of Peak 6, although use of the bowl north of Peak 6 has increased over the past two seasons. Those skiing the south bowl either return to BSR through the access point at treeline (with little incursion into effective DSH), return to BSR lower by ducking the rope in *Ore Bucket* (also with little incursion into effective DSH), or exit via the South Barton drainage per se (a relatively open, consistent line down the incised drainage) to the Siberian Loop in the Nordic Center. Those skiing the north bowl exit via the incised North Fork South Barton drainage back to the Siberian Loop or down to the Peaks Trail. Both of these egress routes down through the large block of DSH follow

[255] Thompson and Halfpenny, 1991

the two incised drainage bottoms resulting in localized, buffered, minimal intrusions into the high quality core of this DSH block.

Additional information regarding the Peak 5 and 6 DSH habitat block can be found in the BA.

The Carter Lake DSH Block

The 45-acre (buffered) Carter Lake habitat block, located south of developed BSR terrain and east of Carter Lake on the south side of Carter Gulch, is 4B spruce-fir forest with Stage 5 characteristics and a moderately dense LHCF understory that meets WFH and denning criteria.[256] This patch is relatively flat, unsuited to Alpine skiers and is on the opposite (uphill, south) side of Carter Gulch. During five surveys (April 13, 2005 to April 13, 2006) through this area, no evidence of winter recreation use was ever detected and, as such, this block is currently effective winter DSH habitat. The Carter Lake habitat block also supports above average snowshoe hare abundance relative to mean values for the Tenmile range. Winter tracking surveys through this block detected a mean snowshoe hare abundance of 5.4 tracks per kilometer (along 3.32 kilometers of transects).

The Burro Trail/Francie's Cabin DSH Block

The Burro Trail/Francie's Cabin habitat block (830 acres, buffered) is the next large, currently effective, winter DSH block south of the influence of BSR and access and winter recreational use areas associated with Francie's Cabin. The block is actually much larger, extending to the east on the opposite side of the Burro Trail (the primary access route to the cabin) and to the south (on the opposite side of the Burro Trail) 3.8 miles to the Quandry Village and McDill Placer subdivisions. Upper elevations of this block are composed of 4B spruce-fir forest with a moderate LHCF understory meeting WFH and, locally, denning criteria.[257] On the opposite side of a central rock glacier supporting a savannah of associated conifers to Stage 4 tree), the spruce-fir transitions through mixed conifer to lodgepole, and understory LHCF transitions to relatively low density. During five surveys (April 13, 2005 to April 13, 2006) through this area, no evidence of winter recreation use was ever detected and, as such, this block is currently effective winter DSH habitat. Winter tracking surveys through this block detected a mean snowshoe hare abundance of 3.9 tracks per kilometer (along 16.1 kilometers of transects). This mean value is above the means of 1.51 and 2.51 tracks per kilometer within developed BSR terrain and in the Peak 6 pod, respectively.

Lynx Habitat Connectivity across BSR

As a worst case scenario, habitat connectivity across BSR is addressed from the perspective of transient lynx, presumably less familiar with landscape features and exhibiting a broader selection of habitat types for movements than resident lynx. Potential movement patterns of transient lynx (dispersing and male

[256] USDA Forest Service, 2002h
[257] Ibid.

mating season) would also cover those of resident lynx (i.e., within annual home ranges and foraging movements within the winter home range subset).

The ability of lynx to cross BSR is an issue on a south-north and north-south basis, as animals move between the two large, largely intact habitat blocks at each end of the Tenmile Range. The likelihood of animals coming over the crest of the Tenmile Range on a regular basis is unlikely and atypical, and those crossing through the Town are discountable. Habitat connectivity across BSR is impaired and most limited during the winter ski season (mid-November to the third week of April, 5.25 months), when lifts operate from 9 a.m. to 4 p.m. and widespread human disturbance from skiing occurs until approximately 4:30 p.m. (7.5 hours per day). This provides a 16.5-hour interval each day for lynx to cross the ski area relatively undisturbed by human presence during the crepuscular and nocturnal hours when lynx are most likely to be active. Additional, localized, and low levels of human activity occur shortly before lift opening/closing (lift warm-up/ski patrol sweep) and at night (grooming). Additional nocturnal human activity associated with snowmaking generally extends from late October to early January. During the winter ski season, these human activities would theoretically impair the ability of a lynx to cross through active ski terrain and human activity areas. The ability of lynx to cross BSR during the rest of the year is less of a concern because many intertrail islands are effective as DSH because of the absence of human activity.

Although lynx are primarily active during nocturnal and crepuscular activity periods that are largely exclusive with diurnal skiing, they may be active at any time of day. As a worst case scenario, what would happen to a lynx "caught" on the ski area in active ski terrain while attempting to cross the ski area or disturbed by skiers in its daybed in an intertrail island? Possibilities include (1) the lynx continuing across the ski area while avoiding skiers until it was out of active ski terrain, (2) the lynx stopping in an intertrail island or moving to another intertrail island, where it would likely be disturbed over the course of the 7.5-hour ski day, before continuing its crossing, or (3) the lynx retreats back through the ski area where it may be stressed by skiers. The lynx observed in active ski terrain during operating hours at Durango Mountain Resort and Telluride Ski Area remained in the vicinity of those ski areas after those encounters. While those two ski areas are in different contexts than BSR, these accounts provide insight into how some lynx respond to active ski terrain. Other, similar anecdotal accounts have been documented at Canadian ski areas.[258] However, as a worst case scenario, (1) all such encounters would result in harassment, (2) encounters with humans that delayed the ski area crossing would result in further impaired connectivity (i.e., between effective patches of DSH and higher quality foraging habitat on each end of the ski area), and (3) a lack of connectivity for those lynx that might abort the crossing attempt. In the event that the thwarted lynx does not attempt, or does not successfully make, another crossing, that result could reduce potential lynx habitat use of the large habitat blocks north and south of the ski area and impair the ability of lynx to use those portions of the LAU as part of its winter home range. The

[258] Roe et al., 2000

significance of that eventuality should be tempered by the likelihood of a lynx not being able to cross the ski area at all and the likelihood of a winter crossing, when lynx are generally sedentary within higher quality winter range subsets where the prey base is more abundant.

The best available data indicates that "the distribution of habitats across the LAU should consider daily movement distances of resident females (typically up to 3 to 6 miles)."[259] Without considering whether any existing intertrail islands within the developed ski area provide currently effective DSH during the ski season, existing travel distances across the ski area are 2.9 miles through the spruce-fir zone (where lynx movements associated with higher quality habitat may be more likely to occur) and 2.36 miles through the lodgepole pine zone. The former route extends from atop a ridge south of Carter Gulch near the northern edge of the Burro Trail/Francie's DSH block and the latter route extends from a lower northern edge of the Burro Trail/Francie's DSH block to a lower portion of the Peak 6 DSH block. The exact starting and stopping points and resulting distances are unimportant, but they do provide representative distances across the ski area. Discounting DSH use within the existing ski area, these distances should be considered minimums. Most lynx use of the east Tenmile Range to date has been by transients, unfamiliar with the terrain ahead of them. Such animals should not know where they are going or when and where to stop for the day immediately short of active ski terrain to minimize their travel distance across the ski area. Nevertheless, environmental baseline distances across active ski terrain are below (but, in the spruce-fir zone, approaching,) the maximum range identified by Ruediger et al. that presumably allows for habitat connectivity.

The only intertrail island within the developed ski area that could provide currently effective lynx DSH during the ski season is the 34-acre (buffered) portion of the Windows block that is north of Sawmill Creek. That block of 4B spruce-fir forest with a dense LHCF understory occurs on a relatively shallow gradient, sloping to the east and southeast. Because of the shallow slope and dense understory, it is difficult to ski through this patch on skis. As a result, few people enter this patch and no one who does so, returns. During two surveys (January 25, 2002 and April 8, 2010) through this patch, 14 fresh snowshoe hare tracks were recorded along 2.39 kilometers of transects for a mean abundance of 5.86 tracks per kilometer. Although there are sample size limitations associated with this track count, the index is one of the highest recorded along the east slope of the Tenmile Range and well above mean values of 1.51 and 2.51 tracks per kilometer within developed BSR terrain and in the Peak 6 pod, respectively. Thus, this patch is also structurally suitable and effective as WFH. The north Windows block is ideally located midway across the ski area, theoretically allowing a lynx to travel approximately 1.1 miles from a midpoint in the Carter Lake block, daybed in the north Windows patch, then, after the lifts close, travel approximately 2.2 miles to the southern edge of the Peak 5 and 6 DSH block. However, it seems unrealistic for a lynx to find that one (i.e., north Windows) patch (and that patch only) in the large matrix of conventional trails and intertrail islands that do not provide DSH, know enough to bed in that patch for

[259] Ruediger et al., 2000 p. 7-4 (carried forward into the SRLMD [USDA Forest Service 2008b])

the day, and complete its crossing of the ski area the following night. Therefore, environmental baseline ski season habitat connectivity across BSR should consider single, one night movements across the entire ski area.

With respect to the ability of lynx to cross BSR, it is likely that virtually all lynx could cross the ski area during the 6.75 months outside of the ski season and that most lynx should be able to cross during the ski season if they exhibit their typical nocturnal and crepuscular activity patterns. This conclusion is based on (1) that lynx have been observed on active BSR ski terrain (*Ore Bucket*, on the north side of Peak 7) during the day during the ski season, (2) that there is anecdotal evidence that lynx have crossed BSR, (e.g., the lynx that was killed on Highway 6 near Tiger Road), (3) that lynx have been documented crossing through other Colorado ski areas (Beaver Creek, Vail, Vail Pass, Copper, Keystone, A-Basin, Wolf Creek, Purgatory, Telluride, and Canadian ski areas), (4) that lynx are largely sedentary on their winter range subsets (i.e., they would not likely attempt to cross the ski area during winter, but they are physically capable of doing so if they so chose), (5) that existing distances across developed ski terrain are below, but approaching, the maximum 3- to 6-mile range recommended for project planning, and (6) that if a lynx wanted to, it could move far further than 6 miles overnight.[260] Nevertheless, if a lynx attempted to cross developed and active ski terrain during the day during the winter ski season, that movement attempt may be impaired or thwarted.

As considered by SRLMD, habitat connectivity along the east slope of the Tenmile Range and through this portion of the LAU is currently impaired by habitat fragmentation associated with developed BSR terrain whose width is approaching the maximum 3- to 6-mile range recommended for project planning.[261] Habitat connectivity across the ski area and along the east slope of the Tenmile Range will become further impaired with the loss of forest cover associated with the progression of the MPB epidemic.

Lynx Analysis Unit 27

The Canada Lynx Conservation Assessment and Strategy indicated that project planning should evaluate the effects to lynx habitat within designated Lynx Analysis Units (LAU) exceeding 25,000 acres in the southern Rocky Mountain Geographic Area. LAUs are intended to provide the smallest scale at which the effects of management actions on lynx habitat are quantitatively evaluated. LAUs do not represent actual lynx home ranges, but their scale should approximate the size of an area used by an individual lynx.

The BSR project area is located entirely within the Swan River Lynx Analysis Unit, LAU 27 (with the exception of 166.8 acres along the crest of the Tenmile Range that extends into the Tenmile LAU). The updated environmental baseline statistics for LAU 27 that reflect the results of the MPB epidemic

[260] Thompson, unpublished data; Roe et al., 2000; Ruediger et al., 2000; USDA Forest Service, 2008b
[261] Ruediger et al., 2000; USDA Forest Service, 2008b

(Table 3I-4). LAU 27 totals 79,008.6 acres, of which 61,683.7 acres (78.1 percent) are Forest Service and 17,324.9 acres (21.9 percent) are non-Forest Service. Lynx habitats on private lands on the WRNF are not mapped and classified. "Denning" habitat in the LAU totals 3,837.3 acres, 10.5 percent of the total habitat (36,410 acres). Lynx habitat on NFS lands composes 46.1 percent of the total LAU; 37.8 percent of the LAU is "currently unsuitable." "Currently unsuitable" habitat, "non-habitat," and private habitat in the LAU totals 56,364.9 acres, 71.3 percent of the LAU. Snow compacting activity areas (e.g., roads, Nordic trails, huts, snowmobile, and snowcat operations) in LAU 27 have been mapped and are part of the Project File. The Town and BSR are located within the middle of LAU 27, reducing the habitat effectiveness within the LAU.

Table 3I-4:
Lynx Habitat in the Swan River Lynx Analysis Unit – Existing Condition

Habitat Description	Acres of Habitat in LAU	% of all Lynx habitat in LAU
Winter Foraging	10,758.2	29.5
Denning	3,837.3	10.5
Other	8,048.1	22.1
Currently Unsuitable	13,766.3	37.8
Total Lynx Habitat[a]	36,410.0	100
Non-habitat	25,273.7	-
Forest Service Acres in LAU	61,683.7	78.1
Private Acres in LAU	17,324.9	21.9
Total Acres in LAU	79,008.6	100

[a] On NFS land, = ∑ WFH + denning + other + currently unsuitable.
Source: USDA Forest Service (2002h, update provided by E. Roberts, USFS, May 11, 2011), SE Group, and Western Ecosystems, Inc.

Lynx Home Range Efficacy

Because of the current condition of the Swan River LAU, the effective habitat blocks within the LAU per se may be too fragmented, isolated, and small by themselves to support a lynx home range year-round. Specific LAU characteristics supporting this conclusion include: (1) non-habitat, currently unsuitable habitat, and private lands compose 71.3 percent (i.e., a large amount) of the LAU; (2) an excess of unsuitable lynx habitat (37.8 percent vs. the 30 percent Forest Plan threshold; (3) commercial, residential, and ski area developments are located at the center and along the entire, medial, north-south axis of the LAU; (4) alpine zones (non-lynx habitat composing restrictions, if not barriers) occurring along three sides of the LAU; (5) low quality lodgepole pine habitat dominating most forested portions of the LAU that has been further degraded by the MPB epidemic and expected to affect 53 percent of the mid- and lower-elevation lynx habitat along the east slope of the Tenmile Range; (6) higher quality spruce-fir habitat that is generally limited to narrow bands around the periphery of the LAU; (7) remaining habitat blocks that are fragmented, isolated, and too small by themselves to support a lynx home range; and (8) existing travel distances for lynx crossing BSR during the ski season are near the lower end of the

maximum 3- to 6-mile range for movements through the spruce-fir zone. Habitat conditions will improve as post-epidemic forests succeed to stands supporting more abundant lynx prey populations. However, the habitat present across the developed ski area will likely remain largely non-functional to lynx as anything other than travel and opportunistic, low-value foraging habitat. This effectively breaks the LAU and contiguous habitat into three functional habitat blocks, the approximately 8,300 acres north of the existing ski area, approximately 3,100 acres south of the ski area and west of Highway 9, and approximately 6,300 acres north of the Continental Divide and east of Highway 9. The northern habitat block is poorly connected to larger, quality habitat blocks in adjacent LAUs, such that it is possible, but uncertain, if this block could support more than a seasonal portion of a lynx home range after the habitat recovers from the MPB epidemic. To date, there is no evidence that this northern habitat block has been used by a resident lynx, although lynx have dispersed through this block. The southern two habitat blocks, separated by two-lane Highway 9 and discontinuous, flanking residential developments, are well connected to other large, contiguous, quality habitat blocks in adjacent LAUs. Indeed, these two southern blocks have been used by dispersing lynx and have supported at least seasonal (winter) portions of a lynx home range.[262] The collective habitat associated with the two southern blocks and contiguous blocks is likely large enough and adequately connected to support a lynx home range. Lastly, it is also possible that, post-MPB recovery, a lynx home range could encompass the northern and two southern Swan River habitat blocks, with the northern and southern blocks separated into seasonal home range blocks by active (in winter) BSR terrain. Based on the seasonal occupancy of the higher quality habitat block(s) at the southern end of the LAU and the distribution and extent of similar, connected, higher quality habitat extending into the Snake River LAU, it appears that there is sufficient habitat within those portions of both LAUs to support a lynx home range. Based on that biological rationale, it is arguable that the occupied and likely occupied portions of both LAUs "conserves lynx."

Traffic on Regional Highways Serving BSR

This section addresses the conflicts between lynx and highways and environmental baseline traffic volumes on the primary highways serving BSR.

Conflicts between Lynx and Highways

High-speed, high-volume highways can result in lynx road-kills, fragment and restrict lynx habitat use, impair home range effectiveness, and inhibit local and dispersing movements that may lead to reduced habitat connectivity and the decline of some wildlife populations and species over time due to genetic isolation.[263] Highway mortality levels can increase appreciably with relatively small increases in traffic volumes and speeds.[264] Fourteen of the 218 lynx released to date in Colorado have been killed attempting

[262] Roberts, 2011
[263] Forman and Alexander, 1998; Apps, 1998; USFWS, 2000a; Alexander, 1998; Alexander et al., 2004 and 2005; Clevenger et al., 2002; Forman et al., 2003
[264] Ruediger et al., 2000

to cross highways), including one on Highway 9 near Tiger Road, north of Breckenridge.[265] As a summary of highway traffic volume and carnivore road-kill probabilities, annual average two-way daily traffic (AADT) volumes within or above the 2,000 to 5,000 vehicles per day (VPD) range have been documented to impair lynx movements.[266]

Existing Highway Traffic Effects

Traffic analyses in this document assess environmental baseline traffic, projected traffic increases under Alternatives 1 through 3, and Peak 6-related traffic effects on lynx highway mortality and habitat permeability. Pertinent environmental baseline traffic volumes presented in this section are based on Year 2009 traffic volumes from the Colorado Department of Transportation (CDOT) website and represent the most current available data. Throughout the analysis, the reader should keep in mind the relative range of baseline traffic volumes compared to the relative range of traffic levels known to affect lynx movements.

Environmental Baseline Traffic Sources and Volumes

Traffic sources and patterns used in this analysis consider the points of origin of the vast majority of guests and employees associated with BSR and the vast majority of resort-related traffic that crosses through the designated lynx linkage areas.[267] These traffic patterns are assumed to be similar between the environmental baseline (Year 2009) and full build out of the Peak 6 project, so the data are presented here in the environmental baseline section.

The vast majority of BSR-related environmental baseline traffic is associated with guests, as opposed to employees. Guests may be categorized as destination (60 percent) or day (40 percent) skiers. Of all destination skiers, 80 percent travel south on Highway 9 from Frisco and 20 percent travel north over Hoosier Pass.[268] Of all destination skiers traveling through Frisco, 90 percent come from the east on Interstate 70 and 10 percent come from the west on Interstate 70 over Vail Pass. Interstate 70 is one of the primary ground transportation corridors across the United States and the major east-west transportation corridor through Colorado. Of all destination skiers coming from the east on Interstate 70, 56 percent come all the way from Denver International Airport (DIA) and 44 percent come from elsewhere along from Front Range. Between Silver Plume and Vail (the highway section containing all four lynx linkages), Interstate 70 has four to six lanes (generally four lanes except on the west side of the tunnel and other local areas) with posted speeds of 55 to 65 miles per hour (mph). Where eastbound and westbound lanes are not separated with a vegetated median, long highway sections are separated with a Jersey barrier. Jersey barriers are also locally present along some highway shoulders. Of all destination skiers coming north over Hoosier Pass, 50 percent come over Trout Creek Pass on U.S. 285, 40 percent come

[265] CDOW, 2009b; Berwyn, 2008
[266] Stevens et al., 1996; Clevenger et al., 2002; Alexander et al., 2004 and 2005
[267] TDA Colorado, 2010
[268] It is assumed that no guests traveling west on Interstate 70 will take U.S. Highway 6 over Loveland Pass to get to BSR because it is slower and longer than continuing through the Eisenhower Tunnel to the east Frisco exit.

over Ute Pass on U.S. 24 from Colorado Springs, and 10 percent come over Kenosha Pass on U.S. 285 from Denver. In the areas of interest, Highways 285 and 9 are two to three lanes (generally two lanes) with posted speeds of 55 mph. Destination guests do not drive through lynx linkages on regional highways every day, only when they are traveling to and from BSR. While the average duration of destination skier visits is five days (including travel), as a worst case scenario the mean duration was reduced to 2.5 days, resulting in a factor of 0.4 destination skier trips per day through count locations in lynx linkages on regional.

Of all day skiers coming through Frisco, 95 percent come from the east on Interstate 70, 4 percent come from the west on Highway 91 and Interstate 70 (from and through Leadville), and 1 percent come from the west on Interstate 70 over Vail Pass. Of all day skiers coming north over Hoosier Pass, 40 percent come over Kenosha Pass on U.S. 285 from Denver, 40 percent come over Ute Pass on U.S. 24 from Colorado Springs, and 20 percent come from the Fairplay/Alma area.

Regarding employees, BSR currently generates over 2,200 employment positions, equivalent to full-time employment (FTE) for 800 persons.[269] Of these employees, 60 percent live in Breckenridge/Upper Blue (south of Breckenridge, but north of Hoosier Pass), 30 percent live in Summit County, accessed via Highway 9 from Frisco and beyond, and 10 percent live in Park County and drive north over Hoosier Pass to work.

Existing Highway Traffic Effects

Table 3I-5 shows environmental baseline AADT volumes along regional highways serving BSR, existing BSR vehicle contributions, and the percentage of BSR contributions to overall AADT. Total traffic volumes along all sections of Interstate 70 of interest to this analysis, including designated lynx linkages, are currently well above the 2,000 to 5,000 VPD range that have been documented to impair lynx movements and where traffic volumes (>4,000 VPD) are more serious threats to mortality and habitat fragmentation.[270] Traffic volumes along key monitoring points along Highways 285 and 9 are within the range documented to impair lynx movements, increase road-kill probabilities, and fragment habitats.

[269] Doug Kennedy Advisors, 2010
[270] Stevens et al., 1996; Clevenger et al., 2002; Alexander et al., 2004 and 2005; Ruediger et al., 2000

Table 3I-5:
Traffic Volumes on Regional Highways (Year 2009) – Existing Condition

Highway, Monitoring Point	CDOT Reference Point	Traffic Volume	BSR Vehicle Contributions	BSR Percent of AADT
Pena Blvd./Interstate 70, DIA	283.74	65,400	215	0.3
Interstate 70, Herman Gulch LLA[a]	216.185	25,500	1,393	5.5
Interstate 70, Loveland Pass LLA[a]	205.423	29,300	1,393	4.8
Interstate 70, Officer's Gulch LLA[a]	195.258	26,800	96	0.4
Interstate 70, Vail Pass LLA[a]	179.866	17,700	53	0.3
Highway 9, Hoosier Pass	71.307	4,000	372[b]	9.3[b]
Highway 285, Kenosha Pass LLA[a]	220.612	4,400	117	2.7

[a] LLA = Lynx Linkage Area.
[b] Does not include employees.
Source: CDOT website.

Existing BSR traffic makes relatively small contributions to overall AADT through the designated lynx linkages, ranging from 0.3 to 5.5 percent, and a modest proportion of traffic over Hoosier Pass. By itself, existing BSR traffic does not reach levels documented to impair lynx movements and fragment habitats. However, existing BSR traffic currently contributes to overall traffic volume through lynx linkages that adversely affects lynx.

Region 2 Sensitive Wildlife Species

Forest Service Region 2 (R2) has designated "sensitive species," representing species declining in number or occurrence or whose habitat is declining, either of which could lead to federal listing if action is not taken to reverse the trend, and species whose habitat or population is stable but limited.[271] From the updated R2 list, a subset of sensitive animals, including 1 insect, 5 fish, 2 amphibians, 18 birds, and 8 mammals, was determined to be present or potentially present on the WRNF after an analysis of all sensitive species on the overall updated R2 list.[272] These species are considered below in phylogenetically ordered taxa (insects, fish, amphibians, birds, and mammals) and discussed individually where appropriate. Alternatives 1 through 3 would have no impact on any other R2 sensitive species not on the WRNF list. Only species that have potential habitat within the study area are carried forward in this analysis. For additional information on these species, refer to the BE in the Project File.

[271] USDA Forest Service, 2009
[272] Ibid. Table 4-1

Table 3I-6:
R2 Sensitive Species Applicable to BSR – Existing Condition

Common name, *Scientific name*	Rationale for Potential Project Effects (Habitat Affinity)
INSECTS	
Great Basin silverspot, *Speyeria nokomis nokomis*	No habitat (Wetlands supporting violet populations)
FISH	
Roundtail chub, *Gila robusta robusta*	No suitable habitat present (Far downstream in Colorado River)
Mountain sucker, *Catostomus platyrhynchus*	No suitable habitat present (Not known from Blue River)
Bluehead sucker, *Catostomus discobolus*	No suitable habitat present (Not known from Blue River)
Flannelmouth sucker, *Catostomus latipinnis*	No suitable habitat present (Larger west slope Colorado Rivers)
Colorado River cutthroat trout, *Oncorhynchus clarkii pleuriticus*	Historic and potential habitat (Isolated, headwater streams and lakes)
AMPHIBIANS	
Boreal western toad, *Bufo boreas boreas*	Potential habitat (Montane/subalpine ponds with willow wetlands)
Northern leopard frog, *Rana pipiens*	Potential habitat (Permanent wetlands)
BIRDS	
Northern goshawk, *Accipiter gentilis*	Potential habitat (Closed montane forests > 7,500')
Northern harrier, *Circus cyaneus*	Potential habitat (Grasslands, agricultural lands, marshes & alpine)
Ferruginous hawk, *Buteo regalis*	No habitat (Plains, grasslands)
American peregrine falcon, *Falco peregrinus anatum*	Potential habitat (Cliffs, habitats concentrating/exposing vulnerable prey)
Bald eagle, *Haliaeetos leucocephalus*	No habitat (Open water bodies, big game winter range)
White-tailed ptarmigan, *Lagopus leucurus*	Present (Alpine habitat and upper elevation willow stands)
Greater sage grouse, *Centrocercus urophasianus*	No habitat (Sagebrush)
Columbian sharp-tailed grouse, *Tympanuchus phasianellus columbianus*	No habitat (Sagebrush and mountain shrub)
Flammulated owl, *Otus flammeolus*	No habitat (Old-growth ponderosa pine and aspen)
Boreal owl, Aegolius funereus	Potential habitat (Mature spruce-fir & mixed conifer)
Black swift, *Cypseloides niger*	No habitat (Waterfalls, cliffs)
Lewis' woodpecker, *Melanerpes lewis*	No habitat (Ponderosa pine and cottonwoods)
American three-toed woodpecker, *Picoides dorsalis*	Present (Mature-decadent conifer forests)
Olive-sided flycatcher, *Contopus cooperi*	Present (Open, upper elev. conifer forests)
Loggerhead shrike, *Lanius ludovicianus*	No habitat (Plains, low valleys, shrublands)
Purple martin, *Progne subis*	No habitat (Old-growth aspen)
Brewer's sparrow, *Spizella breweri*	No habitat (Sagebrush and other structurally similar shrublands)
Sage sparrow, *Amphispiza belli*	No habitat (Low elevation big sagebrush and sage/greasewood)
MAMMALS	
Pygmy shrew, *Microsorex hoyi montanus*	Potential habitat (Variety of subalpine habitats)
Fringed myotis, *Myotis thysanodes*	No habitat (Forests/woodlands to 7,500 ft.; unknown on WRNF
Spotted bat, *Euderma maculatum*	No habitat (Cliffs, arid terrain)
Townsend's big-eared bat, *Corynorhinus townsendii townsendii*	No habitat (Structures, tree cavities <9,500 ft.)
American marten, *Martes americana*	Present (Conifer forests)

Table 3I-6:
R2 Sensitive Species Applicable to BSR – Existing Condition

Common name, *Scientific name*	Rationale for Potential Project Effects (Habitat Affinity)
North American wolverine, *Gulo gulo luscus*	Potential travel habitat (Mountains)
River otter, *Lontra canadensis*	No habitat (Year-round open water and streamflows of ≥ 10 cfs
Rocky Mountain bighorn sheep, *Ovis canadensis canadensis*	Potential habitat (High visibility habitat near escape terrain)

Note: Other R2 species are not listed because they have not been found on the WRNF, they have no affinities to project area habitats, the project area is outside of the species' range or elevational distribution. Potential pre-field survey occurrence on the project area, potential for project effects, and habitat affinity is summarized for each species. Species in **bold** are potentially present and/or are discussed in the text. Wildlife are listed phylogenetically. Source: Forest Service (2007a,b) and Western Ecosystems, Inc.

Fish

Colorado River Cutthroat Trout

Colorado River cutthroat trout (CRCT, *Oncorhynchus clarkii pleuriticus*) are adapted to clear, cold, well-oxygenated streams and lakes, which are devoid of introduced trout. In general, habitat requirements of this subspecies are similar to those of other cutthroat trout. The decline of genetically pure, native Colorado River cutthroat populations was caused by massive introductions of non-native trout.[273] Brook and brown trout introductions have caused competitive displacement. In streams, CRCT are quite susceptible to angling pressure and are at a disadvantage when competing with other species of trout that are more difficult to catch. However, non-native trout have displaced even unexploited populations of these cutthroats. In other areas, habitat destruction, toxic mine wastes, water diversions, logging, road building, and overgrazing have adversely affected this subspecies. Whirling disease, a parasitic infection of trout and salmon caused by a microscopic amoeba has not been identified in any wild populations of CRCT.[274] Genetic purity of this subspecies is graded A (most pure) through F (least pure), designating various degrees of hybridization. Pure grades are found only in a few, small, isolated headwater streams in northwest Colorado. Additional general background information and habitat characterizations can be found in the Project File.

The CRCT analysis area for this project extends downward from those stream reaches that could be affected by Alternatives 2 and 3 to and including the Blue River above Dillon Reservoir. The stream reaches draining the project area represent at least historic and potential CRCT habitat. There are no stream reaches known to be occupied by CRCT in or downstream of the project area that would be influenced by the Proposed Action or that represent potential reintroduction sites.[275] Aquatics Associates sampled fish populations in four streams across the Peak 6 project area on September 15 and 16, 2009, to document the existing communities.[276] Sample sites ranged from Cucumber Creek, on the south, to

[273] Langlois, 1978
[274] CDOW, 2000
[275] CDOW WRIS Maps, Sep. 1997, NDIS data July 2, 2008
[276] Aquatics Associates, 2010

Middle Barton Gulch, on the north. Additional information regarding this sampling is contained in the Project File. Fish monitoring was also conducted on North Barton Gulch in 2004, the drainage north of the Peak 6 project area.[277] Brook trout (*Salvelinus fontinalis*) was the only species detected during these surveys. Nevertheless, for this analysis it will be assumed that the habitat is suitable and that CRCT may be present in one or all of the project area streams, even though they have never been detected.

Amphibians/Reptiles

Two species of sensitive amphibians, boreal western toad (*Anaxyrus* [*formerly Bufo*] *boreas boreas*) and northern leopard frog (*Lithobates* [*formerly Rana*] *pipiens*), and no species of sensitive reptile occur on the WRNF (Table 3I-6).[278] Both amphibians are discussed below.

Boreal Western Toad

The boreal western toad inhabits marshes, wet meadows, and the margins of streams, beaver ponds, lakes, and glacial kettle ponds between 7,000 and 11,860 feet in Colorado.[279] They may be active both day and night, hiding beneath rocks, logs, or in rodent burrows when inactive. These toads emerge from winter chambers during May and begin moving back to the hibernaculum in late August and early September. By October, most toads have entered hibernation. Breeding begins in late spring as the winter snow pack recedes. Strings of eggs are usually deposited in shallow pools or along pond margins in late May to early June. Tadpoles metamorphose their first or second summer depending on elevation and water temperature. Post-breeding dispersal of adult toads may extend considerable distances into upland habitats from breeding sites. While males appear to have home ranges within an approximate 300-meter radius of breeding sites, females generally disperse farther (up to 2.5 miles) and into drier habitats than males. Although this toad was once widespread in Colorado's mountains, and while suitable habitat is still widespread, this species has declined in recent years, with chytrid fungus *(Batrachochytrium dendrobatidis, "Bd")* thought to be the primary agent.[280]

Eight populations of boreal toads are known to occur on the DRD.[281] There is an extant boreal toad breeding site in Cucumber Gulch below the Peak 8 and Peak 7 base areas. See Project File for a detailed history of this population, surveys of it, boreal toad habitat characterization of private Cucumber Gulch and NFS lands above it, barriers surrounding the Cucumber Gulch breeding complex, and potential dispersal and hibernacula use of the surrounding area.[282] The Boreal Toad Recovery Team (BTRT) annually monitors known boreal toad populations statewide. In summary, the last evidence of reproduction observed in Cucumber Gulch was a single egg mass in 1999, no toads were observed from

[277] Hirsch et al., 2004
[278] USDA Forest Service, 2009
[279] Hammerson, 1999
[280] Longcore et al., 1999; Pilliod et al., 2009
[281] Grove, 2010
[282] Thompson, 1998b

2000 to 2004, one male and one female adult toad were observed in 2005, and no toads were observed in 2007 or the population was not monitored in 2007.[283] The Cucumber Gulch toad population has been declining and may be extirpated.[284] Boreal toad transplants are being considered to supplement the Cucumber Gulch population.[285]

The boreal toad analysis area for this project extends outward from the Cucumber Gulch breeding complex approximately 2.5 miles, the maximum, documented, post-breeding, female dispersal from a breeding site.[286] There are no other known, extant breeding sites close enough to the project disturbance areas such that female toads dispersing from those sites could be affected by the Proposed Action.

No boreal toads (or other amphibians) were detected on or around the Peak 6 project area during two years of replicated surveys conducted specifically to detect them. No viable breeding habitat is present in the Peak 6 project area. The few, small subalpine depressions that temporarily support standing water from snowmelt usually support open water (not considering overnight ice sheets) by late May to early June, but were dried up by early to mid-July. While all surveys occurred during drought years, likely resulting in less water volume and persistence, these small depressions could not support enough initial volume to retain water the several more months that would be required for potential tadpole metamorphosis. These temporary depressions are far smaller and less persistent than the kettle ponds present in the Peak 7 project area.[287] While boreal toads are known to breed in streams, those streams present in the Peak 6 project area have high gradients, without relatively calm pools or eddies, and support cold water temperatures through the summer. The one exception was a non-forested, graminoid wetland with a shallow gradient and slow water movement located approximately 1,400 feet above the closest disturbance associated with the Peak 6 access trail. Nevertheless, this site at treeline (11,400 feet) does not represent potential breeding habitat because it is at the extreme upper elevation that boreal toads are known to breed, it does not melt out before mid-June, it is fed by runoff from the large, persistent, Peak 6 basin snowfields (hence cold water temperatures), and it does not support adequate standing water into early fall. Several alpine ponds, located between 11,600 and 11,800 feet are otherwise suitable as potential breeding habitat, except for their extreme elevation, relatively late opening dates (mid-June), and their locations immediately below snowfields resulting in water temperatures ≤ 41°F in mid-summer (July 18, 2006). Boreal toads are known to disperse through forested terrestrial habitats and use such habitats after the breeding season. The Peak 6 project area is within the annual dispersal distance from the extant Cucumber Gulch breeding site. The closest proposed Peak 6 disturbance area is approximately 4,900 feet from the closest pond in the Cucumber Gulch breeding complex, with an intervening beaver pond

[283] BTRT, 2006 and 2008
[284] Hirsch, 2008 p. 10
[285] BTRT, 2008
[286] Loeffler, 1998
[287] Thompson, 1998b

complex (approximately 4,000 feet below the closest proposed Peak 6 disturbance area) above County Road 3 and the Peak 8 and Peak 7 base areas.

Northern Leopard Frog

The northern leopard frog analysis area for this project is the upper Blue River basin above Dillon Reservoir. Northern leopard frogs are widespread across North America, inhabiting the banks and shallow portions of marshes, ponds, lakes, reservoirs, beaver ponds, streams and other bodies of permanent water, especially those having rooted aquatic vegetation.[288] After hibernation, leopard frogs become active in April or May. Breeding occurs in the shallow, non-flowing portions of permanent water bodies and seasonally flooded areas adjacent to permanent pools. Breeding pools typically support fairly clear water with vegetation and algal mats. Eggs are attached to submerged vegetation. Metamorphosis occurs during the first summer, with tadpoles transforming in August or September, depending on elevation. The diet consists of insects, spiders, grubs, and larvae. Their Colorado distribution extends throughout most riparian habitats to above 11,000 feet. They avoid overgrazed habitats.

There are no recent records of this frog's presence in the vicinity of Breckenridge. Leopard frogs have only been collected on the Rifle and Blanco Districts of the WRNF.[289]

Birds

Eighteen species of sensitive birds are known or expected to occur on the WRNF. Eleven of those species are associated with habitats that are not found in the project area (Table 3I-6). Those habitats include plains, and semi-arid shrublands, cliffs, open water (in winter) and big game winter ranges, lowland conifer and riparian complexes, sagebrush and mountain shrub habitats, late-successional aspen forest, and waterfalls. The remaining seven species are addressed individually, below.

Northern Goshawk

Goshawks (*Accipiter gentilis*) are a forest-interior species generally associated with mature aspen and conifer forests between 7,500 and 11,300 feet on the WRNF.[290] Goshawks nest in mature to old-growth aspen and mixed aspen and coniferous forests with a depauperate understory on gently sloping north or east aspects near the bottom of stream courses.[291] Goshawks exhibit high breeding-territory fidelity and nests may be reused in subsequent years.

The Forest Service monitors known goshawk nest sites on the DRD; data indicate that goshawks are uncommon in Summit County, however one to two individuals can be observed daily in appropriate seasons and habitats. The goshawk analysis area for this project is the upper Blue River basin above

[288] Stebbins, 1966; Hammerson, 1999
[289] Healy, 2007
[290] Doerr, 2004
[291] Shuster, 1980; Andrews and Righter, 1992

Dillon Reservoir, which would include the furthest extent of any nest territories that might overlap proposed project disturbance areas.

It is unlikely that goshawks nest within the Peak 6 project area because of high elevation forest stand characteristics and superior nesting and foraging habitat at lower elevations in the surrounding area. Most of the Peak 6 project area is composed of spruce-fir forest and it is uncommon for goshawks to nest in that habitat in Colorado.[292] No evidence of goshawks was detected within the Peak 6 project area during the calling surveys or during other wildlife fieldwork associated with the project.

Northern Harrier

Northern harriers (*Circus cyaneus*) are relatively rare breeders that nest in a variety of habitats, including native and non-native grasslands, agricultural lands, emergent wetlands, and tall desert shrublands, with the only requirement being abundant cover, such as that provided by tall reeds, cattails, and grasses.[293] Their primary breeding areas in Colorado include extensive wetlands on the eastern plains and the San Luis Valley, and they have not been documented in Summit County.[294]

The northern harrier analysis area for this project is southern Summit County, which would include the local transitory range of any migrants that might move through the Alternative 2 and 3 disturbance areas.

American Peregrine Falcon

American Peregrine Falcons (*Falco peregrinus anatum*) are rare on the WRNF; however, some breeding or non-nesting migrants have been recorded. With reduced pesticide use and reintroduction efforts, the number of peregrines nesting in Colorado and summering on the Forest has been increasing. Nesting sites are located on precipitous cliffs ranging in height from 40 to 2,100 feet, averaging 200 to 400 feet tall and have access to extensive hunting habitat.

The peregrine falcon analysis area for this project extends approximately 30 miles from Dillon Dam (the maximum hunting distance away from the nest site) which would overlap the proposed Alternative 2 and 3 disturbance areas. An active peregrine falcon eyrie is present in the Tenmile Range such that the Peak 6 project area could be considered to be within a hunting territory.[295] Birds from this eyrie are thought to prey on pigeons and other birds around Dillon Reservoir. The Peak 6 project area is located within 10 miles, but beyond 1 mile of the active peregrine eyrie. There are no habitats within the Peak 6 project area that concentrate prey or expose the moderate prey base to peregrine attack any more so than other habitats common in the surrounding area.

[292] Rhea et al., 2006
[293] Andrews and Righter, 1992; Kingery et al., 1998
[294] Id.
[295] Kroening, 2002

White-tailed Ptarmigan

White-tailed ptarmigan (*Lagopus leucurus*) are residents of the alpine, although they (especially females) may vertically migrate to winter in subalpine basin and water courses containing willow stands.[296] They inhabit all alpine regions of Colorado except the Wet Mountains and Spanish Peaks.[297] Males generally winter above treeline in areas of exposed grasslands and short willow thickets, while females often winter below treeline in taller, denser willow thickets. Impacts to this species have largely come from winter habitat losses, attributable to high-altitude reservoir development, livestock grazing, an expanded elk population, road construction along stream courses, ski area development, and snowmobiling.

The white-tailed ptarmigan analysis area for this project extends outward from the proposed Alternative 2 and 3 disturbance areas to the furthest female winter ranges in the surrounding area. The upper Blue River basin above Dillon Reservoir as well as Tenmile and West Tenmile Creeks would likely include all potential habitat. Ptarmigan are present and were detected during summer and winter field surveys in and around alpine portions of the Peak 6 project area. As in other developed and undeveloped portions of the BSR SUP area, alpine areas are used as summer habitat, breeding range, and as winter range (primarily by a lower number of males). Most proposed, skiable, alpine terrain within Peak 6 project area (i.e., accessed via existing backcountry gates and hike-to skiing) is now being used at low levels to some extent. Impacts from existing hike-to skiing have little adverse effect on winter ptarmigan forging and roosting.

Boreal Owl

Boreal owls (*Aegolius funereus*) are uncommon residents of Colorado's mountains, mainly above 9,000 feet.[298] They inhabit mature and late-successional spruce-fir and spruce-fir/lodgepole pine forests interspersed with small meadows, streams, and wetlands. They prefer stands with a relatively high density of large diameter 12-inch dbh trees with an open understory and multilayered canopy.[299] The forest structure provides nest cavities and the more mesic communities generally support higher small rodent populations.

The boreal owl analysis area for this project extends outward from the BSR SUP area to the furthest extent of any boreal owl home range that could overlap the Proposed Action disturbance areas. Because boreal owl home ranges can be in the range of 3,447 to 3,894 acres (e.g., for two males) the boreal owl analysis area could extend 3 to 4 miles beyond the proposed project disturbance areas.[300] One boreal owl was detected in 2008, but its location was outside proposed disturbance areas to the extent that no PDC would be required to minimize impacts to nesting owls.[301] No owls were detected during the 2010 survey.

[296] Braun et al., 1976; Andrews and Righter, 1992; Kingery, 1998
[297] Kingery, 1998
[298] Andrews and Richter, 1992; Kingery, 1998
[299] USDA Forest Service, 1991; Grother et al., 1994
[300] Palmer, 1984
[301] Roberts, 2008

While evidence of nesting boreal owls was not detected in or near Peak 6 project area, most of the large diameter mature (12-inch dbh), closed canopy, spruce-fir and mixed conifer stands in the Peak 6 project area are structurally suitable as boreal owl nesting habitat. This is also true for some intertrail islands associated with Alternative 3, although there are habitat fragmentation issues that may impair or preclude home range viability within the developed ski area. Most other spruce-fir and mixed conifer stands within the project area could also provide foraging values for one or more pairs of owls.

American Three-toed Woodpecker

Three-toed woodpeckers (*Picoides tridactylus*) are uncommon residents of higher mountains.[302] This species is most common in years and areas where trees have high insect populations (such as MPB) due to disease or fire.[303] The three-toed woodpeckers are primarily cavity nester associated with spruce-fir forests, but they may also occur in ponderosa pine, Douglas-fir, and lodgepole pine forests supporting high insect populations.

Three-toed woodpeckers were not detected in the Peak 6 project area during 2005–2008 surveys, but several individuals were detected in 2009 and 2010. This woodpecker was also detected in the Peak 6 area during 1991 breeding bird surveys.[304] Based on habitat distribution and structural conditions present, most conifer stands in the Peak 6 project area represents potential nesting and foraging habitat. Although they were not detected in proposed project areas during 2009 and 2010 field surveys, habitats present in some of those areas are suitable and this species will be assumed to be present.

Olive-sided Flycatcher

Olive-sided flycatchers (*Contopus cooperi*) are uncommon summer residents of higher Colorado mountains and migrants through lower elevations.[305] Olive-sided flycatchers use suitably mature and senescent spruce-fir forests on developed portions of other ski areas.[306] In Colorado, they breed from 7,000 to 11,000 feet, primarily in dense, mature spruce-fir and Douglas-fir forests, especially on steep slopes or near cliffs, and less often in other coniferous forests, montane and foothill riparian forests, and aspen forests.[307] Requisite habitat components for this species are snags and conifers and they are often associated with forest openings and forest edge habitat.[308] The olive-sided flycatcher analysis area for this project extends outward to the furthest extent of any home range that could overlap the proposed project disturbance areas.

[302] Andrews and Righter, 1992
[303] Koplin, 1969; Crockett and Hansley, 1978
[304] Thompson, unpublished data
[305] Andrews and Righter, 1992
[306] Thompson, 1994a, 2005c, 1994–2008 unpublished data
[307] Andrews and Righter, 1992
[308] Kingery, 1998

During field surveys, olive-sided flycatchers were detected in mixed conifer stands bordering clearcuts in lower to mid-elevations of the Peak 6 project area stands and in fragmented spruce-fir and lodgepole stands near treeline in the southwestern part of the project area. Approximately 50 percent of BSR's spruce-fir and mixed conifer stands represent potential nesting and foraging habitat.

Mammals

Eight species of sensitive mammals occur or are expected to occur on the WRNF (Table 3I-6), and five species have affinities to habitats present within the project area, may be present, and are addressed below. Additional life history and occurrence information for these species is contained in the wildlife species BE in the Project File.

Pygmy Shrew

Pygmy shrews (*Microsorex hoyi montanus*) are a species associated with the northern boreal forests of Canada and the northern United States. Pygmy shrews are thought to occur primarily in spruce-fir and lodgepole pine forests, where they are most abundant in mature and old-growth structural stages.[309] In 2009, nine individuals were documented in a variety of habitat types at five different locations at elevations ranging from 9,600 to 11,180 feet.[310] Two capture locations were in Summit County: Peru Creek and Elliot Ridge.

No suitable trapping surveys have been conducted within the project area to detect this rare species; however, in 2009 pygmy shrews were documented in Summit County.[311] Based on the species' broad habitat affinities, forested and mesic habitats associated with study area fall within the broad habitat continuum known to be occupied by this species.

American Marten

Martens (*Martes americana*) are boreal weasels closely associated with dense, late-successional, spruce-fir forests in Colorado, with seasonal distributions from the alpine and down into lodgepole pine forests and coniferous riparian corridors.[312] Martens are well distributed across the WRNF in suitable habitats in mid- to upper elevation zones. Although they are most commonly observed in spruce-fir forests, they are occasionally seen in lower-elevation, mixed-conifer forests. Marten are present in Peak 6 project area, most common in spruce-fir and upper elevation mixed conifer stands, but also occasionally extending into lodgepole pine zone, where spruce-fir and mixed conifer habitats extend down along Cucumber Creek. There is some seasonal variation in habitat use. During the non-snow months, martens will occasionally use more open habitats if cover is available.[313] This use is probably in response to a seasonal shift in

[309] RMRIS Stages 4 and 5; Towry, 1984
[310] Siemers, 2009
[311] Siemers, 2009; Hugie et al., 1996; Thompson, 1996a,b, 1997, unpubl. data; Wilson and Ask, 1999; Wilson and Hadley, 2000a,b; Hadley and Wilson, 2002; USDA Forest Service, 2002f
[312] Armstrong, 1972; Towry, 1984; Fitzgerald et al., 1994; Buskirk and Ruggiero, 1994; Banci, 1994
[313] Buskirk and Ruggerio, 1994

availability of prey (primarily voles, squirrels, and other small mammals, but will opportunistically eat insects, birds, fruits, and nuts).[314] Snowshoe hares probably represent the largest usual prey of martens.[315]

The American marten analysis area for this project extends outward from the BSR SUP area to the furthest extent of any marten home range that could overlap the Proposed Action disturbance areas. Therefore, the marten analysis area could extend approximately 1 mile beyond the proposed Alternative 2 and 3 disturbance areas. Based on tracking surveys marten are present at BSR and other local ski areas, roughly in proportion to prey abundance. Snowshoe hare, red squirrel, and rodent indices were both higher in the Peak 6 terrain compared to the broader, more fragmented and developed landscape.

North American Wolverine

Wolverine (*Gulo gulo luscus*) range in Colorado extends the length of the Rocky Mountains and the West Slope.[316] A historic record of wolverine in Summit County included the Peak 6 area within the wolverine's historic range.[317] Currently, although there is circumstantial evidence that wolverine are present in Colorado, viable populations have not been identified.[318] No evidence of wolverine was detected during winter tracking surveys from 1996 to 2011.

The wolverine analysis area for this project extends outward from the BSR SUP area to the furthest extent of any wolverine home range that could overlap the proposed Alternative 2 and 3 disturbance areas. The Tenmile Range, including BSR, remains functional as a wildlife movement corridor that might encourage more frequent wolverine movements through the local area.

Because wolverine home ranges can be hundreds of square miles, the wolverine analysis area for this project could include Summit County and isolated portions of contiguous counties connected by mountain ranges.[319]

River Otter

Otters (*Lontra canadensis*) were extirpated in Colorado by beaver trapping and water pollution incidental to early mining efforts, but have been reintroduced to some major river systems (Colorado, Gunnison, Piedra, and Dolores).[320] Additional major river systems have been at least temporarily colonized by dispersal. Otters require year-round open water (including suitable ice-free areas in winter) and minimum stream flows of around 10 cfs to support a sufficient year-round supply of fish, amphibians, and crustaceans.[321] Habitats must have high water quality and contain an abundant supply of fish, amphibians,

[314] Fitzgerald et al., 1994; Buskirk and Ruggiero, 1994
[315] Clark et al., 1987
[316] Bissell, 1978
[317] Cary, 1911; Armstrong, 1972; Halfpenny, 1981
[318] Halfpenny, 1981; Nead et al., 1985
[319] Krott, 1960; Halfpenny, 1981; Nead et al., 1985; Hornocker and Hash, 1981; Copeland, 1996
[320] Bissell, 1978b; Fitzgerald et al., 1994
[321] Id.

and crustaceans. Home ranges have been reported from approximately 1 to 49 miles long.[322] Wintering areas are those large river and lake systems that provide suitable year-round habitat and represent core population areas. As aquatic systems open with the spring thaw, large areas of seasonally suitable habitat become available and may be used for dispersal and as temporary habitat.

Individual otters are occasionally present in the Blue River system during summer, when transients are thought to move upstream from the Colorado River. They have been documented as high up the Blue River as Dillon Reservoir and in South Barton and Cucumber Gulches (though not on NFS land), traveling up these creeks from the Blue River.[323] No evidence of otters has been located on the Peak 6 project area and habitats within are unsuitable because of their first-order characteristics. However, Peak 6 project area streams (Cucumber Creek and South Barton Gulch) drain into beaver pond complexes on private lands off the Forest that represent potential summer otter habitat.[324] The closest proposed Peak 6 disturbance area is approximately 4,900 feet from the closest pond in the Cucumber Gulch where otters have been detected. Otters have not been documented in an intervening beaver pond complex that occurs along Cucumber Creek on private and NFS lands above County Road 3.

The river otter analysis area for this project extends outward from the BSR SUP area to the furthest extent seasonal ranges that could potential disturbance areas associated with the Proposed Action, the highest of which include Cucumber Gulch and the beaver pond complex on the mainstem of Cucumber Creek above County Road 3. Therefore, the otter analysis area could extend down the Blue River to the Colorado River in Grand County and along other associated tributaries.

Rocky Mountain Bighorn Sheep

Rocky Mountain bighorn sheep (*Ovis canadensis canadensis*) inhabit high-visibility habitat dominated by grasses, low shrubs, and rock cover, areas near open escape terrain, and topographic relief. The bulk of the diet is graminoids, browse, and some forbs.[325] Bighorn sheep have never been detected in the Tenmile Range in the vicinity of BSR during any ski area-related wildlife survey.[326] However, bighorn sheep occur in the contiguous Mosquito Range to the south, in the Gore Range to the north, and the intervening Tenmile Range has been used by sheep as a dispersal corridor between those two ranges.[327] The bighorn sheep analysis area for this project is the Tenmile Range, which should include any sheep that may use the Alternative 2 and 3 disturbance areas.

[322] Melquist and Hornocker, 1979 and 1983
[323] Chappell, 1991; Thompson, 1998b
[324] Thompson, 1998b
[325] Moser, 1962; Smith, 1954; Todd, 1972
[326] Thompson, unpubl data 1991–2010
[327] NDIS data; Thompson, unpubl data 1991–2008

Management Indicator Species

From the current list of Forest-wide MIS, elk (*Cervus elaphus*), American pipit (*Anthus rubescens*), aquatic macroinvertebrates, and all trout were identified as BSR Peak 6 project MIS, based on Forest Plan selection criteria and the presence or potential occurrence of these organisms and their habitats on NFS lands within or adjacent to the Peak 6 project area.[328] These project MIS are discussed below. Other MIS were not selected as project MIS because they do not occur on NFS lands in the project area and they and their associated habitats on NFS lands would not be affected by the Proposed Action. MIS not selected as project MIS include cave bats (no caves present or affected), Brewer's sparrow (no sagebrush present or affected), and Virginia's warbler (no mountain shrubland habitat present or affected). Table 3I-7 summarizes the analysis and rationale of the MIS evaluation for the Proposed Action.

[328] USDA Forest Service, 2002b,c, 2005a, 2006a

Table 3I-7:
Management Indicator Species – Existing Condition

MIS Species[a]	Monitoring Question Identified in 2002 Forest Plan Revision	Habitat Occupied by Species? Are species and habitat present in the analysis area?	Will Proposed Action affect (direct, indirect, or cumulative) the species, its habitat, or its management question?	Will Proposed Action affect Forest-wide Population or Habitat Trends?	Is species addressed in other project documents?
Elk	Does Forest motorized and non-motorized travel and recreation management result in effective use of habitat by large ungulates?"	Wide range of forest and non-forest habitats; Species Presence: Yes Habitat Presence: Yes	Species – Alternative 1: No; Alternatives 2 and 3: Yes Habitat – Alternative 1: No; Alternatives 2 and 3: Yes Is monitoring question applicable to project? – Alternative 1: No; Alternatives 2 and 3: Yes, effective use of habitat by large ungulates would be affected.	Population trends: No Habitat trends: No	No
Cave Bats	Are caves being managed so that bat species will continue to use the caves, and maintain populations in the areas adjacent to the caves?"	Caves, abandoned mines; Species Presence: No Habitat Presence: No	Species – No Habitat – No Is monitoring question Applicable to Project? – No, project will not affect any cave resources.	Population trends: No Habitat trends: No	Yes, fringed myotis, spotted bat, and Townsend's big-eared bat are considered in the BE.
American Pipit	"Is the alpine grassland habitat being managed to provide habitat for those species dependent or strongly associated with alpine grassland habitat?"	Alpine Grassland; Species Presence: Yes Habitat Presence: Yes	Species – Alternative 1: No; Alternatives 2 and 3: Yes Habitat – Alternative 1: No; Alternatives 2 and 3: Yes Is monitoring question applicable to project? Alternative 1: No; Alternatives 2 and 3: Yes, project would affect alpine grassland.	Population trends: No Habitat trends: No	No

Table 3I-7:
Management Indicator Species – Existing Condition

MIS Species[a]	Monitoring Question Identified in 2002 Forest Plan Revision	Habitat Occupied by Species? Are species and habitat present in the analysis area?	Will Proposed Action affect (direct, indirect, or cumulative) the species, its habitat, or its management question?	Will Proposed Action affect Forest-wide Population or Habitat Trends?	Is species addressed in other project documents?
Brewer's Sparrow	"Is sagebrush habitat being managed adequately to provide the quality and quantity of habitat for species dependent or strongly associated with sagebrush?"	Sagebrush; Species Presence: No Habitat Presence: No	Species: No Habitat: No Is monitoring question applicable to project? – No, the project would not affect sagebrush habitats.	Population trends: No Habitat trends: No	Yes, this species is considered in the BE.
Virginia's Warbler	"Does forest management maintain populations of species dependent on dense shrub habitat dispersed throughout the shrub cover types?"	Dense Shrub Habitats; Species Presence: No Habitat Presence: No	Species: No Habitat: No Is monitoring question applicable to project? – No, the project would not affect shrub habitat types.	Population trends: No Habitat trends: No	No
Aquatic Macro-invertebrates	"Does forest management maintain or improve water quality (including chemical aspects as well as sediment) such that aquatic faunal communities are similar between managed and reference sites?"	Perennial streams, intermittent streams, lakes and reservoirs; Species Presence: Yes Habitat Presence: Yes	Species – Alternative 1: No; Alternatives 2 and 3: Yes Habitat – Alternative 1: No; Alternatives 2 and 3: Yes Is monitoring question applicable to project? – Alternative 1: No; Alternatives 2 and 3: Yes, project would affect aquatic macroinvertebrates and would not maintain or improve water quality.	Population trends: No Habitat trends: No	No

Table 3I-7:
Management Indicator Species – Existing Condition

MIS Species[a]	Monitoring Question Identified in 2002 Forest Plan Revision	Habitat Occupied by Species? Are species and habitat present in the analysis area?	Will Proposed Action affect (direct, indirect, or cumulative) the species, its habitat, or its management question?	Will Proposed Action affect Forest-wide Population or Habitat Trends?	Is species addressed in other project documents?
All Trout (brook, brown, rainbow, CR cutthroat)	1. "Does forest management maintain or improve the physical habitat quality for salmonids in mountain streams?" 2. "Do winter water depletions associated with Forest special uses impact spawning success of fall spawning fish?"	Perennial streams and lakes; Species Presence: Yes Habitat Presence: Yes	Species – Alternative 1: No; Alternatives 2 and 3: Yes Habitat – Alternative 1: No; Alternatives 2 and 3: Yes Is monitoring question #1 applicable to project? – Alternative 1: No; Alternatives 2 and 3: Yes, project would not maintain or improve habitat quality for salmonids in mountain streams. Is monitoring question #2 applicable to project? – Alternative 1: No; Alternatives 2 and 3: Yes, there would be winter water depletions from snowmaking storage reservoirs that could affect spawning success of fall spawning fish.	Population trends: No Habitat trends: No	Colorado River cutthroat trout are considered in the BE. None of the other species are considered elsewhere.

[a] Species in **bold** are project MIS.

American Elk

Elk habitat on the WRNF includes all of the dominant vegetation types, and most of the other types found in the Southern Rocky Mountains. The WRNF provides most of the summer range for the herds in the general area. Certain areas in the extreme lower elevations of the Forest are used as winter or transitional range, but the vast majority of the winter range occurs off the Forest. Winter range is considered the most limiting seasonal range for most elk populations on the Forest.[329]

Elk were selected as a MIS to answer the question "Does Forest motorized and non-motorized travel and recreation management result in effective use of habitat by ungulates?"[330] Forest-wide, the elk population is increasing, but the population is decreasing in some areas as a result of intentional management (e.g., DAU E-13).[331] The State of Colorado has responsibility for the management of wildlife populations. The CDOW has specific elk management goals and objectives that have been developed in cooperation with landowners, the public and federal land management agencies. The CDOW estimates population numbers of elk and sets management objectives for elk in units referred to as Data Analysis Units (DAUs). Approximately 3,853 square miles of these DAUs are located within the WRNF boundary.

The project area is in DAU E-13, which comprises all of Summit County and the southern part of Grand County. DAU E-13 contains 1,369.2 square miles, with 35 percent (479.1 square miles) of this DAU within the WRNF. The BSR study area (7,088 acres) represents a small portion (0.81 percent) of the home ranges of herds within DAU E-13. The DAU E-13 herd increased from approximately 700 animals in the early 1950s to over 10,000 at its peak in 1990.[332] The management objective for this herd is 3,000, however current population is nearly double that. There are no current MIS concerns about the overall population number or overall population trend for this herd.[333]

Elk are seasonally present in the Peak 6 project area from spring through fall. During years with early snowmelt (e.g., 2007), a low number of cows may calve well below treeline in and adjacent to the Peak 6 project area (i.e., including the lower-elevation Nordic SUP area) while other portions of the herd drift through the area following receding snowlines to higher elevations. Cow and calf movements through the Peak 6 project area before July 1 meet the definition of "calving." Although elk are occasionally present in the Peak 6 area through summer, until they are forced by increasing snow depths to lower elevation winter ranges, the most important value of the area is as calf-rearing habitat. Up to moderate numbers of cows, calves, and yearlings occasionally forage at night in the broad, willow-dominated alpine wetlands below the saddle between Peaks 6 and 7. Elk winter range occurs below the Peak 6 project area,

[329] CDOW, 2002
[330] USDA Forest Service, 2002c
[331] Ibid.
[332] Giezentanner, 2008
[333] Ibid.

overlapping a portion of the Nordic trail system and including the Peak 7 subdivisions.[334] Elk winter range is defined as the area typically occupied by elk from December 15 to May 15. The Cucumber Gulch area is the southern, distal end of the elk winter range polygon that extends down the Blue River Valley and around Dillon Reservoir. This polygon gets as high as approximately 10,400 feet in the Cucumber Creek and South and Middle Barton Gulch area, but does not extend into proposed Alternative 2 and 3 development areas.

American Pipit

Alpine grasslands are the primary habitat for American pipits on the WRNF. These areas are sensitive to disturbances that alter vegetation cover, since the soils can be unstable and have low fertility, and the vegetation is slow growing.[335] Approximately 131,980 acres (206 square miles) of alpine habitat on the WRNF supports grassland communities that may be suitable habitat for American pipits.

American pipits are summer residents in alpine portions of the Peak 6 project area. They are most common along the crest of the Tenmile Range and its persistent leeward snowfields, but also range downward to more xeric alpine grasslands where they nest. The alpine portion of Peak 6 is foraging and potential nesting habitat of one or more pipit pairs. American pipits have also been detected during summer in ski terrain elsewhere on BSR, and at Copper Mountain, Keystone, Ski Cooper, Vail, Monarch, and Wolf Creek ski areas, and are probably also present on other Colorado ski areas extending sufficiently into the alpine.[336] Skiing and ski area management of alpine areas does not generally result in ground disturbance or measurable effects of alpine vegetation communities and is mutually exclusive with summer pipit habitat use.

American pipit (*Anthus rubescens*) was selected as a MIS to answer the question, "Is the alpine grassland habitat being managed to provide habitat for those species dependent or strongly associated with alpine grassland habitat?"[337] Population trend for this species is supposed to indicate trend for the quality and quantity of habitat for other alpine grassland species. Alpine grasslands are the primary habitat for American pipits on the WRNF. The primary risk factors affecting alpine grassland communities on the WRNF have been identified as recreation and livestock management. This species was not chosen as a MIS because of any viability concerns, there is not a viability concern for this species on the WRNF.[338]

[334] NDIS mapping accessed Dec. 14, 2010
[335] USDA Forest Service, 2002b
[336] Thompson, 2005a, 2003c, unpubl. data; 1994a, 1998b
[337] USDA Forest Service, 2002b p. 3-132, 2005d, 2006b
[338] USDA Forest Service, 2002b

Aquatic Macroinvertebrates

Aquatic macroinvertebrates are those invertebrates that spend at least part of their life cycle in water.[339] These include worms, mollusks, mites, and insects. Aquatic macroinvertebrate communities are influenced by the timing of flows and water quality in the streams in which they live. Geology, elevation, temperature, gradient, and substrate distribution are other factors that commonly influence macroinvertebrate communities. As habitats are degraded, either by chemical pollutants, increased sediment, or unfavorable changes in flow regime (especially severe reductions), the response of the macroinvertebrate community is typically a reduction in the number of species which occur there and especially the number of sensitive species.

Macroinvertebrate communities occur in all water bodies on the WRNF, including ponds, lakes, reservoirs, wetlands, rivers, perennial streams, and intermittent streams. The WRNF has 3,400 miles of perennial streams, 4,200 miles of intermittent streams, and 13,900 acres of lakes and reservoirs (Forest Service 2002d). Even degraded systems usually contain aquatic macroinvertebrates, however such communities differ considerably from those in pristine systems. None of the Forest-wide macroinvertebrate monitoring sites are within the BSR project area, but sampled sites are present in North Barton Gulch (north and hydrologically uninfluenced by BSR), Crystal Creek (south and hydrologically uninfluenced by BSR) and Two Elk Creek (within the influence of Vail Ski Area) that function, in part, as 8.25 Management Area treatment and control sites. Preliminary results derived from the above monitoring sites suggest that where watersheds are heavily managed for recreation (e.g., access roads, clearing for ski runs, etc.), macroinvertebrate communities deviate from reference streams.

Macroinvertebrate densities ranged from 598 to 5,775 organisms/square mile at the nine sites. Density was lowest at site *cucum* on South Cucumber Creek. Total numbers of taxa collected ranged from 25 to 34 with taxa richness also lowest at site *cucum*. Densities and taxa richness varied among the nine sites and were within the typical ranges reported for other similar headwater Colorado montane streams. The lower density and number of taxa reported for site *cucum* was mainly due to the low stream flow (~0.25 to 0.3 cfs), the scarcity of riffles and smaller substrates (cobble and gravel) preferred by many aquatic insects for colonization, the greater degree of embeddedness, and the steeper gradient.

Aquatic macroinvertebrates were selected as a MIS of water quality, specifically to answer the question: "Does Forest management maintain or improve water quality (including chemical aspects as well as sediment) such that aquatic faunal communities are similar between managed and reference sites?"[340] On the WRNF, aquatic macroinvertebrates were selected to address trend and condition of flowing waters only. Therefore, macroinvertebrates in still water habitats will not be discussed further in this document. Because of their wide distribution and their sensitivity to disturbance and pollutants, aquatic

[339] USDA Forest Service, 2004a
[340] USDA Forest Service, 2002d p. 3-173, 2005d, 2006b

macroinvertebrates are widely used to monitor the health of streams and rivers. This group was not chosen as a MIS because of any viability concerns, there is not a viability concern for this species on the WRNF, viability is not expected to become a concern through implementation of this project or continued implementation of the Forest Plan, and viability of this MIS will not be addressed further in this document.[341] The aquatic macroinvertebrate analysis areas for this project include the WRNF and those streams (including the Blue River above Dillon Reservoir) draining the project area that could be affected by sediments and increased flows from proposed project disturbance areas.

Brook Trout, Brown Trout, Rainbow Trout, and Colorado River Cutthroat Trout

Trout occur in most of the perennial water bodies on the WRNF, including streams, rivers, lakes, and reservoirs. The WRNF has 3,400 miles of perennial streams, 4,200 miles of intermittent streams, and 13,900 acres of lakes and reservoirs.[342] Trout may be excluded from some areas due to chemical contamination below mines or by natural or human-caused barriers. At high elevations, trout may be absent due to water temperature. On the Forest, trend and condition are considered in streams and rivers only. Therefore, trout in still water habitats will not be discussed further in this document. The timing of flows, water quality, and availability of various habitat features such as deep pools, cover, and spawning gravels influence trout abundance. Geology, elevation, temperature, gradient, and substrate distribution are other factors that commonly influence trout abundance. As habitats are degraded, either by chemical pollutants, increased sediment, or unfavorable changes in flow (especially severe reductions), trout typically respond with lower abundance and uneven year class distribution. Because trout were selected as a MIS during the 2002 the Forest Plan revision, the Forest does not yet have trout population numbers and trends for reference and affected stream reaches Forest-wide. However, the Forest Plan EIS estimated no change in total trout habitat quantity, stable Forest-wide populations of trout as a whole, and improving habitat quality due to improved streamside protection measures.[343]

All trout, including brook (*Salvelinus fontinalis*), brown (*Salmo trutta*), rainbow (*Oncorhynchus gairdneri*), Colorado River cutthroat trout, and their hybrids (hereinafter MIS trout, or trout), were selected as a MIS to address issues related to salmonid habitat management and winter water depletions/spawning success.[344] All trout were selected to answer two management questions: (1) "Does Forest management maintain or improve the physical habitat quality for salmonids in mountain streams?" and (2) Do winter water depletions associated with Forest special uses impact spawning success of fall spawning fish?" Decreased habitat quality can result from changes in channel morphology and increased

[341] USDA Forest Service, 2002d
[342] Ibid.
[343] Ibid.
[344] Ibid. p. 3-186, 2005a, 2006a

sedimentation.[345] This group was not chosen as a MIS because of any viability concerns, there is not a viability concern for this MIS group on the WRNF (with the exception of CRCT).[346]

For this project, fish sampling was performed at four sites including Middle Barton Gulch, Cucumber Creek, South Barton Gulch, and the North Fork of South Barton Gulch (NFS Barton Gulch). No fish were collected at two of the sites, Cucumber Creek and South Barton Gulch. Brook trout were the only fish species collected at sites on Middle Barton Gulch and NFS Barton Gulch. The project area occurs well above the highest known overwintering habitats. The closest proposed Peak 6 disturbance area is approximately 4,900 feet above the closest pond in the Cucumber Gulch breeding complex, with an intervening beaver pond complex (approximately 4,000 feet below the closest proposed Peak 6 disturbance area) above County Road 3 and the Peak 8 and Peak 7 base areas. Both of these pond complexes provide year-round trout habitat, with the latter complex (at 9,880 feet) likely providing the closest year-round habitat below this portion of the Peak 6 project area. The closest beaver pond complex likely providing year-round habitat on South Barton Gulch is at 9,720 feet, approximately 7,100 feet below the Peak 6 project area. The closest beaver pond complex likely providing year-round habitat on North Fork South Barton Gulch is at 9,880 feet, approximately 8,000 feet below the closest disturbance area in the Peak 6 project area.

CDOW Endangered, Threatened and Species of Special Concern

The current lists of Colorado endangered and threatened species and species of state special concern was considered for species that may occur on and around the project area. Those lists included 2 mollusks, 23 fish, 7 amphibians, 10 reptiles, 19 birds, and 13 mammals. With the exception of the Colorado roundtail chub, none of those listed state species occur or have potential habitat that would be influenced by the Proposed Action, or the species have been previously addressed above as part of other species lists.

The Colorado roundtail chub, a state species of special concern (not a statutory category) as well as a R2 sensitive species (Table 3I-6), inhabits the mainstem and larger Colorado River tributaries along with the four endangered big river fish. At the present time, the only documented population of roundtail chubs on NFS lands in R2 is on the San Juan National Forest.[347]

[345] USDA Forest Service, 2002d
[346] Ibid.
[347] Rees et al., 2005

Migratory Birds

In 2008 the Forest Service Chief signed a MOU with the USFWS to promote the conservation of migratory birds. This MOU was pursuant to Executive Order 131866, Responsibilities of Federal Agencies to Protect Migratory Birds.[348] The Executive Order directs agencies to take certain actions to further comply with the migratory bird conventions, the Migratory Bird Treaty Act (MBTA), the Bald and Golden Eagle Protection Act (BGPEA) and other pertinent statutes. The purpose of the MOU is to strengthen migratory bird conservation by identifying strategies that promote conservation and avoid or minimize negative impacts on migratory birds.

The MOU outlined that the Forest Service shall evaluate the effects of agency actions on migratory birds within the NEPA process, with a focus on species of management concern along with their priority habitats and key risk factors. An evaluation of the effects of the proposed projects to bird species and habitats of management concern is included in the various sections herein. The project has been designed to the extent practical to minimize incidental take through the implementation of PDC.

Table 3I-8:
USFWS Birds of Conservation Concern[a] – Existing Condition

Species	General Habitat	Occurrence in BSR Analysis Area
Northern Harrier	Grasslands	Possible rare fall migrant[b]
Swainson's Hawk	Grasslands	No
Ferruginous Hawk	Prairie	No
Golden Eagle	Cliffs/grasslands	Yes, project area part of large hunting range; no local nests
Peregrine Falcon	Cliffs	Yes, project area may be part of large hunting range; eyrie non-local
Prairie Falcon	Cliffs	No
Gunnison sage-grouse	Sagebrush	No
Snowy Plover	Shorelines	No
Mountain Plover	Prairie	No
Solitary Sandpiper	Shorelines	No
Marbled Godwit	Wetlands	No
Wilson's Phalarope	Waterbodies/Shorelines	No
Yellow-billed Cuckoo	Deciduous Riparian	No
Flammulated Owl	Ponderosa pine/snags	No
Burrowing Owl	Plains/grasslands	No
Short-eared Owl	Parks/grasslands	No
Black Swift	Waterfalls/wet cliffs	No
Lewis's Woodpecker	Riparian Cottonwood	No
Williamson's Sapsucker	Montane forests/snags	No
Gray Vireo	Oak woodlands/scrub	No

[348] 66 Fed. Reg. 3853, 2001

Table 3I-8:
USFWS Birds of Conservation Concern[a] – Existing Condition

Species	General Habitat	Occurrence in BSR Analysis Area
Pinyon Jay	Pinyon/Juniper	No
Bendire's Thrasher	Rare spp of arid areas	No
Crissal Thrasher	No records in CO	No
Sprague's pipit	No records in CO	No
Virginia's warbler	Riparian scrub	No
Black-throated gray warbler	Oak scrub/riparian	No
Grace's warbler	Ponderosa pine	No
Sage sparrow	Sagebrush	No
Chestnut-collared longspur	Plains	No

[a] Species in **Bold** are documented or potential occurrence on BSR project area during at least some part of the year, including migratory stopovers, based on habitats present and species' habitat affinities and distributions.
[b] Evaluated under Region 2 Sensitive Species

More detailed information on the habitat requirements, status, distribution, abundance, and key habitat components of most species is on file at the Forest Service Supervisor's Office in Glenwood Springs, Colorado, and the USFWS's Western Colorado Field Office in Grand Junction, Colorado, and will not be reviewed here.

DIRECT AND INDIRECT ENVIRONMENTAL CONSEQUENCES

Table 3I-9 summarizes potential effects on wildlife resources under each alternative by issue and indicator.

Table 3I-9:
Summary of Wildlife Effects by Issue and Indicator

Alternative 1	Alternative 2	Alternative 3
Issue: Development of proposed projects, including associated infrastructure, would necessitate vegetation removal and would increase human presence. Increased use of the area, loss of habitat, and habitat fragmentation could disrupt terrestrial wildlife, including TES species and Management Indicator Species (MIS) that may utilize habitat within BSR's SUP area.		
Indicator: Quantification (acres) and qualification of existing wildlife habitat and proposed alteration, fragmentation, or removal of wildlife habitat, by species. Include specifically lynx diurnal security habitat, winter forage habitat, and denning habitat		
No impacts would occur under Alternative 1. Existing conditions include: **Threatened and Endangered Species**: <u>Uncompahgre fritillary butterfly, humpback chub, bonytail Colorado pikeminnow, razorback sucker, greenback cutthroat trout</u>: No habitat or no additional depletions <u>Canada lynx</u>: Diurnal Security Habitat – 830 acres within and outside SUP area	**Threatened and Endangered Species**: Alternative 2 impacts to lynx habitat types would total 86.4 acres. Diurnal Security Habitat – values maintained Winter Foraging Habitat – 56.7 acres Denning Habitat – 0.0 acre **Region 2 Sensitive Species:** Determinations presented in Table 3I-13.	**Threatened and Endangered Species**: Alternative 3 impacts to lynx habitat types would total 168.0 acres. Diurnal Security Habitat – values maintained Winter Foraging Habitat – 37.1 acres Denning Habitat – 0.0 acre **Region 2 Sensitive Species:** Determinations presented in Table 3I-13.

Table 3I-9:
Summary of Wildlife Effects by Issue and Indicator

Alternative 1	Alternative 2	Alternative 3
Winter Foraging Habitat – 900.7 acres Denning Habitat – 0.2 acre **Region 2 Sensitive Species:** Refer to Table 3I-6 for species with and without potential habitat **Management Indicator Species:** Refer to Table 3I-7 for species with and without potential habitat	**Management Indicator Species:** American Elk: 86.3 acres of habitat conversion American Pipit: 0.9 acre of disturbance Aquatic Macroinvertebrates: maintained with PDC Trout: 86.3 acres of stabilizing vegetation removed	**Management Indicator Species:** American Elk: 153.2 acres of habitat conversion American Pipit: 0.9 acre of disturbance Aquatic Macroinvertebrates: maintained with PDC Trout: 153.2 acres of stabilizing vegetation removed
Indicator: Description of effects to lynx and elk from Highway 9 traffic.		
No impacts associated with Alternative 1.	19 additional vehicle trips on Hoosier Pass over the No Action. No lynx linkages on Highway 9 north of BSR. Elk would not be measurably affected by additional vehicle trips.	Eight additional vehicle trips on Hoosier Pass over the No Action. No lynx linkages on Highway 9 north of BSR. Elk would not be measurably affected by additional vehicle trips.
Indicator: Disclosure of effects to TES and MIS wildlife species		
No impacts associated with Alternative 1.	**Threatened and Endangered Species**: Uncompahgre fritillary butterfly, humpback chub, bonytail Colorado pikeminnow, razorback sucker, greenback cutthroat trout: No Effect Canada lynx: Likely to Adversely Affect **Management Indicator Species:** Alternative 2 would meet Forest Plan direction.	**Threatened and Endangered Species**: Uncompahgre fritillary butterfly, humpback chub, bonytail Colorado pikeminnow, razorback sucker, greenback cutthroat trout: No Effect Canada lynx: Likely to Adversely Affect **Management Indicator Species:** Alternative 2 would meet Forest Plan direction.
Indicator: Identification of effects within LAU boundaries in relation to the SUP area		
No impacts associated with Alternative 1.	LAU boundary effects are presented in Table 3I-11.	LAU boundary effects are presented in Table 3I-15.
Indicator: Quantification and qualification of compensatory mitigation for impacts to lynx habitat		
No impacts associated with Alternative 1.	Two lynx conservation goals have been developed by the Forest Service: 1) BSR and the Forest Service will explore options to improve habitat connectivity within southern Summit County and actively cooperate with stakeholders. 2) BSR and the Forest Service will off-set habitat loss through forest restoration/enhancement activities within southern Summit County.	Two lynx conservation goals have been developed by the Forest Service: 1) BSR and the Forest Service will explore options to improve habitat connectivity within southern Summit County and actively cooperate with stakeholders. 2) BSR and the Forest Service will off-set habitat loss through forest restoration/enhancement activities within southern Summit County.

Alternative 1

The No Action Alternative reflects a continuation of existing operations and management practices at BSR without changes, additions or upgrades on NFS lands due to selection of this alternative. The ongoing MPB epidemic in mid- and lower-elevation lodgepole pine and mixed conifer habitats along the

east slope of the Tenmile Range, including the Peak 6 area and other portions of the BSR SUP area, will likely reduce short- and moderate-term forest habitat.

Ski area- and non-ski area-related traffic and its effects along highway corridors bisecting lynx linkages will increase slightly by the year 2015, largely because of a larger regional population and increasing resort visitation. Those future traffic effects represent a continuation of the environmental baseline and are considered here so that additional BSR-related traffic attributable to Alternatives 2 and 3 can be accurately quantified.

Under Alternative 1, resort visitation would grow by approximately 0.75 percent per year, resulting in 48,543 more skier visits in Year 2015 than at present (1,600,000 skier visits/year in 2009). Destination (60 percent) and day (40 percent) skier average vehicle occupancy (AVO) rates would be 4.0 and 2.7 skiers per vehicle, respectively, and the distributions of BSR skier traffic along regional highways would be the same as described in the environmental baseline. There would be no BSR-related traffic contributions from additional employees under Alternative 1. Under Alternative 1, skier growth would add relatively little traffic to regional highways, ranging from 2 to 42 AADT, and representing 0.008 to 0.143 percent of the total 2015 traffic volume going through designated lynx linkages. Resort-related traffic over Hoosier Pass would total 11 AADT, 0.237 percent of total vehicle volume. With the incremental, traffic contributions that would occur under Alternative 1, total AADT BSR traffic would not reach levels documented to impair lynx movements and fragment habitats, although it would contribute incrementally to overall traffic volume through lynx linkages that are known to adversely affect lynx. Traffic volumes that can affect lynx vary over the course of a year. Skier traffic contributions from BSR that go through lynx linkages are limited to the 140-day ski season (approximately mid-November to mid-April). To equate BSR data with CDOT AADT counts, BSR contributions were averaged over the entire year.

Alternative 2

Threatened and Endangered Species

Alternative 2 would have "**no effect**" to uncompahgre fritillary butterfly, *Boloria acrocnema,* humpback chub, *Gila cypha,* bonytail chub, *G. elegans,* Colorado pikeminnow, *Ptychocheilus lucius,* razorback sucker, *Xyrauchen texanus,* and greenback cutthroat trout, *Oncorhynchus clarkii stomias.* Alternative 2 would "**likely adversely affect**" Canada lynx, as analyzed and disclosed below.

Canada Lynx

Effects Summary

Project Design Criteria have been incorporated into Alternative 2 to avoid and minimize impacts to lynx. Collective direct, secondary, and ongoing and reasonably certain cumulative effects on lynx have been considered in the above analysis. The Proposed Action would be consistent with historic ski area operations, but would result in an extension of the current development area boundary within the existing

SUP area. Alternative 2 impacts to lynx habitat types would total 86.4 acres, 1.1 percent of the entire BSR SUP area. Alternative 2 would impact 80.9 acres of lynx habitat (including 56.7 acres of WFH) on NFS lands, representing 0.22 percent of the 36,329.1 acres of lynx habitat in LAU 27. Impacts to lynx habitat would almost entirely result from the development of conventional ski trails and the permanent conversion of lynx habitat into "non-habitat." These habitat effects would exceed the definitions of insignificant and discountable.[349] There would also be a loss of ski season DSH resulting from increased skier presence in and adjacent to developed ski terrain. Alternative 2 would further impair diurnal, winter ski season, habitat connectivity across the ski area and through the BSR portion of the LAU, although most lynx should still be able to cross the ski area when they are most likely to attempt such movements year-round. The incremental loss of effective WFH, DSH, and habitat connectivity would also impair home range efficacy within the LAU, although lynx should be able to continue to use larger habitat blocks within the LAU as seasonal portions of a home range that are connected to functional habitats in contiguous LAUs. The additional Alternative 2 traffic would make insignificant and discountable incremental contributions to the adverse effects (increased highway mortality, traffic-impaired habitat connectivity and permeability, reduced home range efficacy, and impaired recovery of the Southern Rockies lynx population) associated with overall traffic volume through lynx linkages used to access BSR. Other indirect effects would be insignificant and discountable. With respect to Alternative 2 consistency with applicable SRLMD, the ALL S1 Standard includes a non-significant Forest Plan Amendment process. Alternative 2 would be consistent with all applicable SRLMD guidelines. Alternative 2 would be consistent with Section 7(d) of the ESA.[350] Some reasonably certain effects and additional risk factors will extend onto adjacent NFS lands, further impairing incrementally habitat effectiveness and habitat connectivity and the ability of the Swan and Snake River LAUs to support a lynx home range.

BSR SUP Area Lynx Habitat Types

Alternative 2 impacts to lynx habitat types would total 86.4 acres, 1.5 percent of the BSR SUP area Table 3I-10. Alternative 2 would impact 80.9 acres of lynx habitat and 5.5 acres of "non-habitat" on NFS lands. Impacts to lynx habitat would almost entirely result from the development of conventional ski trails and the conversion of habitat into "non-habitat." Alternative 2 impacts would be additive to the permanent habitat conversion that has occurred to date for ski area development, which has resulted in 1,193 acres of ski trails composing 20.7 percent of the existing SUP area. Potential MPB effects would be the same as under Alternative 1.

[349] USFWS and NMFS, 1998
[350] 50 CFR §402.01; USFWS and NMFS, 1998

Table 3I-10:
Lynx Habitat Impacts by Type – Alternative 2

Lynx Habitat Type	Acres (%) Currently Present[a]	Acres (%) of Lynx Habitat Type Impacted[b]
Winter Foraging	900.7 (15.8)	56.7 (6.3)
Denning	0.2 (<0.01)	0.0 (0)
Other	245.3 (4.3)	13.0 (5.3)
Currently Unsuitable	941.0 (16.5)	11.2 (1.2)
Total Lynx Habitat[c]	2,087.2 (36.6)	80.9 (3.9)
Non-habitat	3,594.8[d] (63.1)	5.5 (0.2)
Private	17.2 (0.3)	0.0 (0)
Total	**5,699.1[d] (100)**	**86.4 (1.5)**

[a] These data have not all been field verified.
[b] These data have been field verified.
[c] On NFS land, = ∑ WFH + denning + other + currently unsuitable.
[d] Does not include 56.8 acres of alpine habitat (non-habitat) along the crest of the Tenmile Range that is not part of the Swan River LAU.
Source: USDA Forest Service (2002a, update provided by E. Roberts, USFS, May 11, 2011), SE Group, and Western Ecosystems, Inc.

Lynx Analysis Unit 27

The Forest Service provided updated environmental baseline statistics for LAU 27 that included results of the MPB epidemic.[351] Classification changes were only made where unambiguous corrections were warranted and only to entire project component polygons. Where an impact polygon consisted of, or overlapped, two lynx habitat types (e.g., "other" and WFH), the entire polygon was assigned the higher value habitat type (e.g., WFH). While some impact areas structurally met denning criteria, they were classified as WFH because of land use conflicts (skiing up to approximately one month preceding denning) and spatial, maternal, home range considerations of the impact area and the surrounding landscape.

Under Alternative 2, 80.9 acres of lynx habitat and 5.5 acres of "non-habitat" would be affected on NFS lands, with breakdowns shown in Table 3I-10. There would be no impacts on private land. Table 3I-11 shows Alternative 2 changes to lynx habitat and resulting statistics in the Swan River LAU. Virtually all affected lynx habitat would be permanently converted to "non-habitat." Temporary impacts that could result in the redevelopment of lynx habitat (e.g., the closure of the temporary access road after construction of the Peak 6 lifts and voluntary forest succession to "other" habitat) are not considered in these numbers because they are immaterial and sufficient habitat recovery would not occur within the life of the Forest Plan. Quantitative lynx habitat management thresholds that were recommended by Ruediger et al. and were part of the Forest Plan have been superseded by qualitative SRLMD standards and

[351] USDA Forest Service, 2002h (updated via E. Roberts, USFS, May 11, 2011)

guidelines to help preserve lynx habitat viability within the LAU.[352] Statistical changes to LAU 27 lynx habitat resulting from Alternative 2 would not be inconsistent with SRLMD applicable to ski areas. According to the updated LAU statistics, there is an excess of unsuitable lynx habitat (37.8 percent vs. the 30 percent Forest Plan threshold) in the LAU, Alternative 2 would immaterially (and speciously) "improve" this short- to medium-term condition by converting 11.2 acres of currently unsuitable habitat into "non-habitat."[353] Lynx habitat conversion resulting from Alternative 2 would be additive to the effects of the MPB epidemic converting "other" habitat into currently unsuitable habitat and WFH into "other" and currently unsuitable habitat.

Table 3I-11:
Changes to Lynx Habitat in the Swan River Lynx Analysis Unit – Alternative 2

Habitat Description	Acres Affected by Project[a]	Resulting Acres[b]	Net Change (%) in LAU Habitat[c]	Updated Habitat in LAU[b] (acres)	Updated % of Lynx Habitat in LAU
Winter Foraging	56.7	-56.7	-0.53	10,701.5	29.46
Denning	0	0	0	3,837.3	10.56
Other	13.0	-13.0	-0.16	8,035.1	22.12
Currently Unsuitable	11.2	-11.2	-0.08	13,755.1	37.86
Total Lynx Habitat[d]	80.9	-80.9	-0.22	36,329.1	100
Non-habitat	5.5	+80.9	0.32	25,354.6	-

[a] Lost on NFS land. No impacts on private land.
[b] Net with implementation of the Proposed Action. Does not include immaterial temporary impacts.
[c] From environmental baseline LAU acres
[d] On NFS land, = ∑ WFH + denning + other + currently unsuitable.
Source: USDA Forest Service (2002h, update provided by E. Roberts, USFS, May 11, 2011), SE Group, and Western Ecosystems, Inc.

Winter Snowshoe Hare Habitat

Snowshoe hares persist at Breckenridge and at other ski areas in larger intertrail islands of low to high quality habitat that are open to skiing and in smaller islands of higher quality habitat, where multiple islands can be combined as part of seasonal ranges. The presumed lower abundance of hares in (1) developed ski terrain vs. (2) undeveloped, but skied terrain vs. (3) undeveloped and unskied terrain has not been quantified at BSR. However, Alldredge and Alldredge conducted such an analysis that provides quantitative insight into this issue, though their study area received greater ski terrain development than what would occur under the Peak 6 proposal.[354] The 1998–2001 ski area development in Pete's Bowl (Vail Ski Area) resulted in an average of approximately 50 to 70 percent tree removal on gladed trails (compared to the approximately 18 percent tree removal within the 340-acre Peak 6 project area below

[352] USDA Forest Service, 2008b, 2009
[353] Under Standard VEG S1, which does not apply to ski runs (USDA Forest Service, 2009)
[354] 2006

treeline that would be cleared for conventional trails). Alldredge and Alldredge found that hare abundance in Pete's Bowl declined by approximately 50 percent following ski area development. They attributed possible pre- and post-treatment differences in hare abundance to forest loss (to ski trails), increased human disturbance (skiers), increased coyote predation, and possible cyclic hare population changes. At Peak 6, it is likely that there would be less than a 50 percent reduction in hare abundance and probably more than an 18 percent decline.

Lynx Diurnal Security Habitat

Peak 5 and 6 DSH Block

Under Alternative 2, the effectiveness of Peak 6 DSH would be maintained with signed, bumblebee rope closures. The use of bumblebee rope to close ski terrain was 54 to 97 percent effective on Peak 8 intertrail islands with a history of skiing.[355] It is likely that the closure of the large Peak 6 intertrail islands would be largely effective because (1) the terrain does not have a history of use, (2) the Peak 6 forest has a dense, multi-layered understory making it difficult to ski through, and (3) it is not particularly attractive skiing. While it is empirically and anecdotally unknown how many skiers can ski through an intertrail island containing a bedded lynx without degrading the DSH value (the theoretical answers are [1] "none" when a lynx is present, if the skier approaches within approximately 50 meters of the lynx, and [2] "it doesn't matter how many skiers," as long as a lynx is not present, which would be most of the time, because lynx are rare and are expected to remain rare along the east slope of the Tenmile Range, especially on and adjacent to the ski area during winter), the Forest Service established a three skiers per week threshold to protect DSH values.[356] Based on that threshold, Peak 6 intertrail islands closed with only bumblebee rope would not provide or maintain effective lynx DSH.[357] Therefore, it is likely that unauthorized skiing of the closed Peak intertrail islands would exceed levels that would allow effective use of those buffered islands as effective DSH during the ski season. While the island closures may not be 100 percent effective, implementing the closures would help maintain DSH effectiveness as well as WFH effectiveness, which would be monitored over time. The reduced DSH effectiveness in the large Peak 6 intertrail islands could further impair lynx habitat connectivity across the ski area during the ski season.

It is also likely that the closure of the large forest block below the lowest Peak 6 collector trail would be largely effective for the first three reasons listed above for the closed intertrail islands, and because (4), compared to the Peak 8 intertrail islands, it would be difficult and time consuming (at least 45 minutes on skis, longer for snowboards) for skiers that might duck the rope to return to the ski area once they reach the upper Siberian Nordic loop. Based on lift ticket prices, these are rationale considerations. While such unauthorized skiing below the developed Peak 6 terrain would (1) increase over current levels, (2) would likely be more widespread than at present, and (3) could impair DSH effectiveness if the skier came

[355] Thompson, 2009, 2010
[356] Roberts, 2009 and 2011
[357] Thompson, 2010

within 50m of a bedded lynx, if and when lynx might be present during the 5.25 month ski season, it is likely that this large forest block would remain largely effective as DSH. However, any incremental impairment of DSH effectiveness in this forest block could further impair lynx habitat connectivity across the ski area during the ski season.

Under Alternative 2, it is uncertain if backcountry skiing in the 178 acres of Peak 5 forest north of Middle Barton Gulch (i.e., outside of proposed Peak 6 terrain) would increase over current levels and if DSH values in that habitat block would be further impaired. The Peak 5 alpine terrain (i.e., the attraction prompting the backcountry use, not the forest below), is smaller and more difficult (steeper, rockier, and more avalanche-prone) than most of the current Peak 6 backcountry terrain, restricting use to a subset of Expert ability level skiers. Therefore, there would likely be less backcountry use through the northern access point than through the current Peak 6 access point. With less backcountry use, there should be less skiing through the forest below. Over one-half of the Peak 5 forest block is north-facing and would likely receive no unauthorized skier use because of the difficulty skiers would have returning to the Nordic loops and the ski area. The southeast-facing portion of this forest block and its understory are more open than the Peak 6 forest (possibly encouraging greater skier use), but it is even further away from the existing ski area than the Peak 6 forest. While it is unknown what the level skier use through the forest might be, it would likely be less than that of current Peak 6 levels because of the practicality of backcountry skiers returning to the ski area, but more than the three skiers per week threshold needed to maintain DSH values.[358] However, it is likely that any such use would collect in the creek's bottom, localizing and buffering potential disturbances along the drainage bottom along the southern periphery of this overall block. Therefore, it is likely that the majority of DSH values in the Peak 5 forest would not be degraded by backcountry skiing under Alternative 2.

West Slope Tenmile Range DSH

A potential issue that was considered as part of this project was the extent to which a lift extending nearly to the top of Peak 6 might increase unauthorized skiing down the west slope of the Tenmile Range to Highway 91 through a wide band of undeveloped spruce-fir and lodgepole pine forest that sees little human use year-round, other than along the Colorado and Wheeler Trail corridors. This continuous band of forest is likely important for landscape-level lynx movements (north-south over Fremont Pass and east-west, through CMR, as diurnal security habitat (also important for movements through CMR), and as a large block of year-round foraging habitat. Peak 6, located directly above the top of the proposed upper Peak 6 lift, is located directly above the "Y" path of the "SKY Chutes" (three avalanche chutes shaped like the letters S, K, and Y). The concern is that unauthorized skiing either through the trees or down the "SKY Chutes" could impair these habitat values. This type of use would be unauthorized (i.e., illegal under the Colorado Skier Safety Act) because a skier would need to duck a rope at the top of Peak 6 to access this terrain. Authorized use of the west side of the Tenmile Range could occur if a skier exits the

[358] Roberts, 2011

proposed operational boundary through a designated backcountry access point (discussed below). Based on considerations below, the likelihood of such potential, skier use of the "SKY Chutes" measurably affecting lynx habitat use was considered to be extremely unlikely.

First, there will be no additional backcountry access points added to the ski area along the crest of the Tenmile Range to access areas to the west or any approved change in backcountry access that would facilitate unauthorized access to the west side of the Tenmile Range as a result of implementing Alternative 2. Skiers intending to use the west side of the Tenmile Range now legally access the area via backcountry gates on Peaks 7 and 9 (i.e., not Peak 6).

Second, the west side of the Tenmile Range is now rarely skied because it is difficult to access, hazardous (avalanche potential), attractive and safe only under limited conditions, and there are a large number of areas offering much better skiing in the local backcountry. Once on top of the Tenmile Range via authorized hiking from the upper Peak 6 lift, unauthorized skiers would have to duck the signed closure rope and hike up to 0.26 mile down across windblown alpine to access treeline and continuous snow. Skiing through the trees is just not that good. That is why the consensus of opinion (i.e., via interviews with backcountry skiers at BSR, interviews of seven BSR Ski Patrollers, and discussions with project personnel) was that virtually no one now skies from the ski area down through the trees on the west side of the Tenmile Range (and no one would do it twice). Approximately 8 to 12 people ski the SKY Chutes each year, generally late in the season when adequate snow is present, avalanche conditions are reasonable, and fresh snow improves conditions. Skiing the chutes is the kind of experience that a few locals might do once in their lives, largely because there is much better skiing elsewhere.

Third, while there would be the potential for adventurous skiers who access the top of the Tenmile Range via the upper Peak 6 lift to duck the existing rope/signs and illegally ski the west side of the Tenmile Range, it is extremely unlikely that this would occur and result in a skier displacing a bedded lynx that just happened to be in the area below Peak 6 or adjacent to one of the SKY Chutes.

Lastly, winter egress from the ski area through a signed closure/ski area boundary (i.e., by other than through a designated backcountry gate) is prohibited under the Colorado Skier Safety Act (SB 203) and, therefore, represents an illegal activity. As such, the potential effects resulting from this illegal activity are inappropriate to consider as part of the Section 7 analysis.[359]

Lynx Habitat Connectivity

Under Alternative 2, lynx travel distances across the ski area (i.e., between the closest potential daybeds) would increase (+0.45 to +1.16 miles, depending on the specific route) to 3.35 to 4.06 miles through the spruce-fir zone and remain unchanged at 2.36 miles through the lodgepole zone. The 4.06-mile distance

[359] Broderdorp, 2002

reflects a potential daybed site on the north side of Middle Barton Gulch for a movement that extended the longest possible distance through the proposed Peak 6 terrain. That daybed location (i.e., in the Peak 5 area and within the SUP boundary), would be beyond the influence of the Peak 6 pod and unauthorized tree skiing (i.e., skiers ducking signed rope closures along the lower Peak 6 collector trail) below the pod that could degrade or eliminate effective, ski season DSH, an important issue at ski areas with respect to habitat connectivity across developed ski terrain. Large, Peak 6 intertrail islands containing otherwise effective DSH that would be closed to skiing with signed, bumblebee ropes may continue to provide effective DSH values, which could reduce movement distances across the ski area. For a lynx that crosses the ski area through the spruce-fir zone and exploits the project's design by using a daybed below the developed Peak 6 terrain, the travel distance across the ski area would increase approximately 0.45 mile over the environmental baseline to 3.35 miles. New ski area structures (e.g., lift terminals and towers, buildings, etc.) would represent inanimate objects that a lynx encountering them would simply walk around. New trails would be crossed theoretically by lynx as they are now. The further incremental impairment of habitat connectivity across the ski area and through this portion of the Tenmile Range/LAU as a result of Alternative 2 would be almost entirely an issue only during the ski season, not only as a result of the further habitat fragmentation and loss of forest cover that facilitates lynx movements, but also by the diurnal disturbances presented by skiers. As described above, it is likely that unauthorized skiing below the developed Peak 6 terrain would increase over current levels, would likely be more widespread, and could impair DSH effectiveness if and when lynx might be present during the 5.25 month ski season. Also as described above, it is likely that the majority of DSH values in the Peak 5 forest would not be degraded by illegal skiing. Therefore, Alternative 2 would (1) increase lynx travel distances across the developed ski area, (2) extend the length of movements into the maximum 3- to 6-mile range recommended in the LCAS and SRLMD to maintain habitat connectivity, (3) further impair habitat connectivity, and (4) possibly reduce the effectiveness of the large habitat block north of the ski area that could be used as part of a winter home range.

The ability of lynx to cross BSR is only relevant during the day (7.5 hours) during the 5.25 month winter ski season. During the rest of the year connectivity is less of a concern because many intertrail islands are effective as DSH because of the absence of human activity. Furthermore, lynx are less likely to attempt extended movements across the ski area between September and April when they are more sedentary within winter subsets of their overall home range.[360] Therefore, under Alternative 2, the majority of lynx should still be able to cross the ski area when they are most likely to attempt such movements.

Lastly, the potential effects to a lynx "caught" on the ski area in active ski terrain while attempting to cross the ski area or disturbed in its daybed in an intertrail island would likely range from indifference to mild harassment (the lynx walking away from people that closely approached it), with the lynx responding by (1) continuing across the ski area while avoiding skiers until it was out of active ski terrain,

[360] Shenk, 2008

(2) stopping in an intertrail island or moving to another intertrail island, where it would likely be disturbed over the course of the seven-hour ski day, before continuing its crossing, or (3) retreating back through the ski area where it could be stressed by skiers.

Lynx Home Range Efficacy

Alternative 2 would convert 80.9 acres of lynx habitat in the Peak 6 area into non-habitat. This represents 23.8 percent of the 340 acres of the Peak 6 pod that is below treeline. While snowshoe hares could adjust their home ranges to connect the large, remaining, high quality intertrail islands, there would likely be some reduction in the local hare population, particularly when more minor, but additional adverse effects of authorized and unauthorized tree skiing within the Peak 6 pod are considered. Snow compaction effects from unauthorized tree skiing extending outside of the Peak 6 pod would have additional, but minimal effects on snowshoe hare abundance. Therefore, there would likely be some reduction in snowshoe hare abundance within the 340 forested acres of the Peak 6 pod. This represents approximately 4 percent of the forested habitat block extending north of the developed ski area. While this is a relatively small percentage of the north habitat block, it would affect a patch of relatively high quality foraging habitat, because of its composition of spruce-fir habitat with a dense regenerating understory, and a patch that would not be affected by the MPB epidemic. The locally reduced snowshoe hare prey base, habitat fragmentation, and human activity in the Peak 6 pod during winter would further impair lynx home range effectiveness in this relatively isolated portion of a seasonal home range subset. Nevertheless, based on the size and seasonal occupancy of the higher quality habitat block(s) at the southern end of the LAU and the distribution and extent of similar, connected, higher quality habitat extending into the Snake River LAU, sufficient habitat would remain within those portions of both LAUs to support a lynx home range. Hare abundance and behavior relative to tree skiing in the Peak 6 area would be monitored over time.

Construction Activity Effects

The two years of construction activities associated with Alternative 2 should not result in lynx injury or mortality, but it could displace a lynx that might be moving through activity areas and access corridors. Although lynx may be active at any time of day, their primary nocturnal and crepuscular activity period is largely exclusive with the diurnal construction period. Construction noise would alert any lynx that might be moving through the area, giving it ample opportunity to avoid the construction activities. The likelihood of a healthy lynx being killed by construction traffic off regional highways and roads (addressed below) is discountable because of only partly overlapping activity periods, the low number of lynx present in the landscape, and the slow speeds of vehicles (<20mph) on forest roads. A lynx encountering construction traffic might wait in forest cover to cross the road until the vehicle passed, increase its gait across the road before the vehicle arrived, or stand and watch the vehicle that would likely stop to observe the lynx, like what happened on Keystone Ski Area on October 3, 2000 (Thompson 2003d). Another less likely option would be for the lynx to retrace its route. In any event, it is unlikely that any such encounter would occur, and if it occurred, it would not meaningfully affect lynx habitat use

or survival probabilities. The potential effects to lynx of the above construction-related activities would meet USFWS and NMFS definitions of "insignificant" and "discountable."

Traffic Contributions and Indirect Effects

Table 3I-12 shows Year 2015 AADT volumes along regional highways serving BSR, BSR vehicle contributions that would occur under Alternative 2, and the percentage of BSR's Alternative 2 contributions to overall AADT. Under Alternative 2, resort visitation would grow by 2.0 percent per year, resulting in 131,891 more skier visits in Year 2015 than at present (1,600,000 skier visits/year in 2009) and 83,348 more skier visits than would occur under Alternative 1. Destination and day skier proportions, AVO rates, and traffic distributions along regional highways would be the same as described under Alternative 1. Traffic contributions from additional employees under Alternative 2 are not included in Table 3I-12 because BSR employees (both short-term construction related and direct employment) would not cross through designated lynx linkages to travel to and from work (Hoosier Pass is not a designated lynx linkage) and/or they would make immaterial contributions to total traffic volumes (i.e., under Alternative 2, four additional seasonal employees would likely live on the south side of Hoosier Pass where daily commutes would likely involve some level of carpooling that might not add any AADT).

Table 3I-12:
Traffic Volumes on Regional Highways (Year 2015) – Alternative 2

Highway, Monitoring Point	Traffic Volume	BSR Vehicle Contributions	BSR Contributions Above Alternative 1[a]	Alternative 2 Contributions as a % of AADT[a]
Pena Blvd./Interstate 70, DIA	81,292	232	11	0.014
Interstate 70, Herman Gulch LLA[b]	29,478	1,507	73	0.246
Interstate 70, Loveland Pass LLA[b]	33,695	1,507	73	0.215
Interstate 70, Officer's Gulch LLA[b]	30,900	104	5	0.016
Interstate 70, Vail Pass LLA[b]	20,302	58	3	0.014
Highway 9, Hoosier Pass	4,756	403[c]	19[c]	0.408[c]
Highway 285, Kenosha Pass LLA[b]	4,902	126	6	0.124

[a] From a lynx perspective, AADT contributions attributable to BSR only include destination and day skier guest visitation. Employees of BSR (both short-term construction related and direct employment) do not cross a designated lynx linkage to travel to and from work (Hoosier Pass is not a designated lynx linkage). It is assumed that an indiscernible number of trips would be generated by short-term construction workers driving to Denver from Breckenridge once a week, but would be housed in Breckenridge or Summit County for the duration of the project.
[b] LLA = Lynx Linkage Area.
[c] Does not include employees.
Source: AADT projections from CDOT website Future Calculator. CDOT traffic projections are historically based, straight time projections that consider the local land use trend at the time of the projection (Ventura 2004).

Under Alternative 2, skier growth would add relatively little traffic to regional highways, ranging from 3 to 73 AADT (depending upon the specific highway section), and representing 0.014 to 0.246 percent of the total 2015 traffic volume going through designated lynx linkages. Resort-related traffic over Hoosier Pass would total 19 AADT, 0.408 percent of total vehicle volume, not including traffic associated with

the four additional seasonal employees that would commute over Hoosier Pass. Compared to the environmental baseline (Year 2009), BSR traffic contributions under Alternative 2 would actually decline as a percentage of total traffic volume because of the resort's small additional contributions relative to larger traffic volume increases from other sources.

Total traffic volumes along all sections of Interstate 70 of interest to this analysis, including designated lynx linkages, are currently well above the range documented to impair lynx movements and pose more serious threats to highway mortality and habitat fragmentation.[361] Traffic volumes along key monitoring points along Highways 285 and 9 are also currently within the range documented to impair lynx movements, increase road-kill probabilities, and fragment habitats. The additional Alternative 2 traffic would make insignificant and discountable incremental contributions to the adverse effects (increased highway mortality, traffic-impaired habitat connectivity and permeability, reduced home range efficacy, and impaired recovery of the Southern Rockies lynx population) associated with overall traffic volume through lynx linkages used to access BSR.

Secondary Development

Alternative 2 is not expected to generate any secondary development from additional residents or employees. Temporary employees and contractors that would implement the project components would be mostly local, in-county commuters, or overnight at existing hotels. Alternative 2 would generate additional seasonal full- and part-time employees. There would be an increased need for seasonal (ski season) parking lot attendants. These additional employees are expected to exploit existing vacancies in the local housing market (as opposed to building new homes or contributing meaningful demand for additional subdivision development). Traffic effects resulting from these employees are addressed above.

Dispersed Recreation Effects

A potential issue that was considered as part of this project (also considered as part of the Chairs 6 and 8 upgrade proposal [Thompson 2005a]) was the extent to which a lift extending nearly to the top of Peak 6 might increase unauthorized skiing down the west slope of the Tenmile Range to Highway 91 through a wide band of undeveloped spruce-fir and lodgepole pine forest that sees little human use year-round, other than along the Colorado and Wheeler Trail corridors. This continuous band of forest is likely important for landscape-level lynx movements (north-south over Fremont Pass and east-west, through Copper Mountain Resort, as DSH (also important for movements through CMR), and as a large block of year-round foraging habitat.[362] Unauthorized skiing either through the trees directly below Peak 6 or down the "SKY Chutes" could impair these habitat values. Based on considerations described in detail above under Alternative 2 Effects on Lynx Diurnal Security Habitat, West Slope Tenmile Range DSH,

[361] Stevens et al., 1996; Clevenger et al., 2002; Alexander et al., 2004, 2005; Ruediger et al., 2000
[362] Thompson, 2003c

the likelihood of such potential, unauthorized skier use measurably affecting lynx habitat use was considered to be discountable (extremely unlikely).

Potential dispersed recreation effects associated with additional BSR employees encountering lynx on the Forest would also be discountable.

Region 2 Sensitive Species

Determinations to R2 sensitive species are presented in Table 3I-13, and impacts are disclosed under individual species headings for those species with potential to occur.

Table 3I-13:
Effects to R2 Sensitive Species – Alternatives 1 through 3

Common name, *Scientific name*	Determination		
	Alternative 1	Alternative 2	Alternative 3
INSECTS			
Great Basin silverspot, *Speyeria nokomis nokomis*	NI	NI	NI
FISH			
Roundtail chub, *Gila robusta*	NI	NI	NI
Mountain sucker, *Catostomus platyrhynchus*	NI	NI	NI
Bluehead sucker, *Catostomus discobolus*	NI	NI	NI
Flannelmouth sucker, *Catostomus latipinnis*	NI	NI	NI
Colorado River cutthroat trout, *Oncorhynchus clarkii pleuriticus*	NI	MAII	MAII
AMPHIBIANS			
Boreal western toad, *Bufo boreas boreas*	NI	MAII	MAII
Northern leopard frog, *Rana pipiens*	NI	NI	NI
BIRDS			
Northern goshawk, *Accipiter gentilis*	NI	MAII	MAII
Northern harrier, *Circus cyaneus*	NI	MAII	MAII
Ferruginous hawk, *Buteo regalis*	NI	NI	NI
American peregrine falcon, *Falco peregrinus anatum*	NI	MAII	MAII
Bald eagle, *Haliaeetos leucocephalus*	NI	NI	NI
White-tailed ptarmigan, *Lagopus leucurus*	NI	MAII	MAII
Greater sage grouse, *Centrocercus urophasianus*	NI	NI	NI
Columbian sharp-tailed grouse, *Tympanuchus phasianellus columbianus*	NI	NI	NI
Flammulated owl, *Otus flammeolus*	NI	NI	NI
Boreal owl, *Aegolius funereus*	NI	MAII	MAII
Black swift, *Cypseloides niger*	NI	NI	NI
Lewis' woodpecker, *Melanerpes lewis*	NI	NI	NI
American three-toed woodpecker, *Picoides tridactylus*	NI	MAII	MAII
Olive-sided flycatcher, *Contopus cooperi*	NI	MAII	MAII
Loggerhead shrike, *Lanius ludovicianus*	NI	NI	NI

Table 3I-13:
Effects to R2 Sensitive Species – Alternatives 1 through 3

Common name, *Scientific name*	Determination		
	Alternative 1	Alternative 2	Alternative 3
Purple martin, *Progne subis*	NI	NI	NI
Brewer's sparrow, *Spizella breweri*	NI	NI	NI
Sage sparrow, *Amphispiza belli*	NI	NI	NI
MAMMALS			
Pygmy shrew, *Microsorex hoyi montanus*	NI	MAII	MAII
Fringed myotis, *Myotis thysanodes*	NI	NI	NI
Spotted bat, *Euderma maculatum*	NI	NI	NI
Townsend's big-eared bat, *Corynorhinus townsendii townsendii*	NI	NI	NI
American marten, *Martes americana*	NI	MAII	MAII
North American wolverine, *Gulo gulo luscus*	NI	MAII	MAII
River otter, *Lontra canadensis*	NI	MAII	MAII
Rocky Mountain bighorn sheep, *Ovis canadensis canadensis*	NI	MAII	MAII

Other R2 sensitive animals are not listed because they have not been found on the WRNF, they have no affinities to habitats on the project area, the project area is outside of the species' range or elevational distribution, and the Proposed Action. Proposed Action would have no impact on those species. Species in **bold** are potentially present and/or are discussed individually in the text. Wildlife are listed phylogenetically.
NI = No impact; BI = Beneficial impact; MAII = may adversely impact individuals, but is not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing.
Determinations in this table only consider NFS lands that may be directly, indirectly, or cumulatively affected by the alternatives, which R2 species determinations are based on.

Fish

Colorado River Cutthroat Trout

Alternative 2 would cause short-term, localized ground disturbing activities (tree removal, grading of some trails, snowmaking water line installation, building installation, some new road construction, etc.) and increased runoff (short- to long-term) with potential erosion and sedimentation that could extend to local creeks and cause changes to the hydrology and aquatic habitat of project area streams. Water quality-related PDC would be implemented to avoid and minimize adverse effects to aquatic habitat and biota within and below the project area. Under Alternative 2, impacts to stabilizing vegetation communities would total 86.3 acres in three watersheds, including the headwaters of two watersheds (South Barton Creek and the unnamed tributary to the north of South Barton Creek) that have not been disturbed by human activities since historic, selective winter logging (circa 1940s) and more recent (circa mid-1990s) clearcuts.

Indirect effects would be limited largely to short-term water quality impacts (associated with maintenance vehicles on mountain roads serving the Alternative 2 project components under wet conditions where sediments could wash off roads into local streams) to potential, but unoccupied CRCT habitat.

Regarding CRCT, because of hydrologic effects to potential, but currently unoccupied and unsuitable CRCT habitat, as a worst case scenario, direct and indirect effects associated with Alternative 2 "**may adversely impact individuals, but is not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing.**"

Amphibians/Reptiles

Boreal Western Toad

Alternative 2 would have no affect on any known boreal toad breeding habitat or surrounding terrestrial habitats that could be expected to be used post-breeding or for hibernacula. With the implementation of PDC, no sediment originating in construction areas is likely to extend to the private Cucumber Gulch breeding complex or to the closer, intervening beaver pond complex above County Road 3 that occurs on private and NFS lands. It is possible, though unlikely, that extreme female home range or dispersing toad movements could extend from the Cucumber Gulch breeding complex into the Alternative 2 project area. As such, loss of forest cover associated with ski trail development could individually or collectively adversely affect habitat connectivity. It is also possible, though unlikely, that toads dispersing towards or into the Peak 6 development area could be killed by construction (a direct effect) and maintenance vehicles (an indirect effect) and by construction activity (a direct effect). Therefore, Alternative 2 "**may adversely impact individuals, but is not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing**."

Northern Leopard Frog

Alternative 2 project components would not affect any known northern leopard frog breeding habitat or surrounding terrestrial habitats that could be expected to be used post-breeding or for hibernacula. Therefore implementation of this alternative would have "**no impact**" on the leopard frog.

Birds

Northern Goshawk

Alternative 2 would affect goshawks by removing or thinning forest cover that supports potential prey species (e.g., snowshoe hare and/or red squirrel). Based on goshawk habitat associations, Alternative 2 would affect 83.3 acres of potential goshawk habitat.[363] Tree removal would fragment a relatively large, intact block of high quality foraging habitat vs. smaller, intertrail islands supporting a lower prey density within currently developed ski terrain. No goshawk nests or nesting habitat associated with a known nesting block would be affected. No indirect effects associated with this project would impact goshawks.

[363] Rhea et al., 2006

Alternative 2 "**may impact individuals, but are not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing**."

Northern Harrier

Alternative 2 could affect the availability and effectiveness of potential foraging habitat via a net gain of non-forested habitats (via forest clearing for ski trails). By itself, this effect would result in a "beneficial impact" determination. However, because a small area of currently effective, potential foraging habitat would also be lost to ski lift terminal and access road development, the insignificant and discountable direct and indirect effects, "**may adversely impact individual harriers, but is not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing**."

American Peregrine Falcon

The loss of forest cover associated with subalpine ski trail development should have no discernable adverse effect because the associated prey base below the canopy is unavailable to peregrines. Indeed, ski trail development below treeline may insignificantly benefit peregrines by increasing the quality of potential foraging habitat by creating additional openings that prey species would have to fly across (thereby increasing the vulnerability of forest and "edge" birds to peregrine predation) and by improving potential prey recovery habitat, for birds knocked down by peregrines above the former canopy. However, small areas of currently effective, potential foraging habitat would be lost to ski lift terminal and access road development. Overall, the proposed projects should improve insignificantly the availability of the local peregrine prey base. Alternative 2 "**may impact individuals, but are not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing**."

White-tailed Ptarmigan

Ptarmigan use of the Peak 6 project area and adjacent habitats for summer and breeding uses would be largely unaffected by Alternative 2. The top-terminal of the upper Peak 6 lift and above treeline lift towers would remove approximately 1 acre of habitat and initial construction activities would displace birds from the lift corridor. Development of the Peak 6 terrain would likely result in more frequent displacement of wintering ptarmigan along the Tenmile Range's main ridgeline, in exposed willow and graminoid stands within alpine Peak 6 terrain, and within snow deposit areas in Peak 6 basin (i.e., below Peaks 6 and 6½). There would be no physical loss of alpine willow stands in the Peak 6 basin from increased skier use (virtually all are now buried under snow before skiing begins) or extended ski area management (i.e., avalanche control). However, the winter effectiveness of alpine forging and roosting areas skied would be reduced appreciably in the Peak 6 area due to skiing activity and snow compaction. With respect to the Alternative 3 lift, willows are adjacent to the top terminal location. Grooming would occur and may clip the tops of the woody vegetation. This would reduce the functional value of the willow with respect to wildlife habitat to a certain extent. A PDC has been incorporated into Table 2-4 to address avoidance of willows by grooming machines to the greatest extent practicable.

Some ptarmigan would remain during winter, as they do in Peaks 7, 8 and 9 alpine ski terrain. It is possible that ptarmigan wintering in exposed willow and graminoid stands along the Tenmile Range's main ridgeline could experience locally increased and decreased displacement as patterns of hike-to skiers change with increased access to the main ridgeline facilitated by the upper Peak 6 lift. These areas are presently used by low numbers of skiers to some extent (primarily for access and egress, rather than skiing). Implementation of PDC should have no effect on ptarmigan. Limited to increases in dispersed recreation extending into ptarmigan habitat and would be an indirect effect of development on Peak 6, but would have no impacts on this species. Alternative 2 "**may adversely impact individuals, but is not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing**."

Boreal Owl

Alternative 2 would affect boreal owls by removing or thinning linear forest strips, representing year-round foraging habitat and, to a lesser extent, potential, but presently unoccupied nesting habitat, scattered throughout one or more owl home ranges. Potential boreal owl foraging habitat affected would total up to 83.3. Loss of forest-interior prey may be partially offset during the snow free season by substantial increases in deer mice on newly created ski trails. Potential nesting habitat affected, largely associated with mature, closed canopy spruce-fir stands, would total up to 80.7. The Proposed Action would fragment a relatively large, intact block of high quality foraging habitat. Skiing activity should have no adverse effects on owls. The abundance of some prey species (small mammals and birds) may decline in an area larger than the area of tree removal as a result of tree removal, snow compaction, forest fragmentation effects, and tree skiing. If nest trees associated with active territories occur within impact areas during the construction season, direct mortality of eggs and/or nestlings should be avoided by conducting tree removal outside the May 21 to July 15 nesting period when eggs/young are present.[364] Implementation of other PDC should have no effect on the boreal owl. Given this species' primarily nocturnal habitat use, cavity nesting habit, the relatively small amount of subalpine terrain that would be developed on Peak 6 (i.e., compared to the intact terrain that would remain), and tolerance to human disturbance, it is likely that the forested Peak 6 ski terrain could continue to support boreal owls, including possible future nesting. Indirect effects would be limited to increases in dispersed recreation extending into boreal owl habitat and would have no impact on this species. Alternative 2 "**may impact individuals, but are not likely to result in a loss of viability on the planning area, nor cause a trend toward federal listing**."

American Three-toed Woodpecker

Alternative 2 would affect three-toed woodpeckers by removing or thinning linear forest strips, representing year-round foraging habitat and, to a lesser extent, occupied nesting habitat, scattered throughout the home ranges of at least several pairs of birds. Forest cover that would be affected, representing potential three-toed woodpecker habitat, would total up to 83.3. If nest trees associated with

[364] Kingery et al., 1998

active territories occur within impact areas during the construction season, direct mortality of current year recruitment should be avoided by conducting tree removal outside the March 14 to July 15 nesting period when eggs/young are present.[365] Implementation of other PDC should have no effect on three-toed woodpeckers. While Alternative 2 would reduce the amount of foraging and nesting habitat within the Peak 6 project area, the project area and forested portions of the overall ski area would continue to support three-toed woodpeckers. Habitat effectiveness may decline in an area larger than the area of tree removal as a result of forest fragmentation effects. Indirect effects would be limited to increases in dispersed recreation extending into three-toed woodpecker habitat and would have no impacts on this species. Alternative 2 "**may impact individuals, but are not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing**."

Olive-sided Flycatcher

Alternative 2 would affect olive-sided flycatchers by removing linear forest strips, portions of which represent summer nesting and foraging habitat, scattered throughout the home ranges of at least several pairs of birds. Forest cover that would be affected, representing potential olive-sided flycatcher foraging and nesting habitat, would total up to 83.3. Tree removal could be partly beneficial from a long-term, foraging habitat, perspective as forest openings could support a higher prey base. Conversely, existing, non-forested, foraging habitat (e.g., grasslands, meadows, and ski trails) adjacent to forest stands supporting the flying insect prey base of this species could also be adversely affected (over short- to moderate-terms) by ski trail, road, and other impacts. If nest trees associated with active territories occur within impact areas during the construction season, direct mortality of current year recruitment should be avoided by conducting tree removal outside the June 1 and July 15 nesting period when eggs/young are present.[366] Implementation of other PDC should have no effect on olive-sided flycatchers. While Alternative 2 would reduce the amount of foraging and nesting habitat within the existing SUP area, the ski area would continue to support these flycatchers (as influenced by the MPB epidemic, see above). Habitat effectiveness may decline in an area larger than the area of tree removal as a result of forest fragmentation effects, snag removal, and subsequent ski trail forage effectiveness. Indirect effects are limited to increases in dispersed recreation extending into olive-sided flycatcher habitat and would have no impacts on this species. Alternative 2 "**may impact individuals, but are not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing**."

Mammals

Pygmy Shrew

Alternative 2 could impact individual pygmy shrews through direct, construction-related mortality and/or loss of potential habitat. Loss of forest-interior prey may be partially offset during the snow-free season by substantial increases in deer mice (potential prey) on newly created ski trails. The project impact areas,

[365] Ibid.
[366] Ibid.

including areas affected by PDC, represent an insignificant proportion of the total potential range and habitat available to this species on the Forest. The probability that this species would be present in those potentially suitable habitats proposed for subalpine trails and lift corridor development when it is so rare on the WRNF is unlikely. Indirect effects associated with increases in dispersed recreation extending into potential pygmy shrew habitat would have no impact on this species. Nevertheless, because potential habitat would be removed and altered, Alternative 2 "**may adversely impact individuals, but is not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing**."

American Marten

Alternative 2 would affect martens by removing linear forest strips, which represent foraging habitat and possible denning habitat, likely extending into portions of several individuals' home ranges. Affected forest cover, representing at least potential marten habitat, would total up to 83.3 acres. The Proposed Action would fragment a relatively large, intact block of high quality foraging habitat. No known marten dens are present within disturbance areas; however marten dens are virtually impossible to locate without the use of radio-collared animals. Young-of-the year would be vulnerable to den tree removal that occurred between approximately March 1 and June 15.[367] About 50 percent of most proposed tree removal under Alternative 2 would not occur within the interiors of larger, closed canopy, mature forest patches where martens might den in the Peak 6 area. Because denning selection, if not denning per se, generally begins before the ski season has ended, marten may not select den sites within areas currently used for tree skiing, although such diurnal skiing when martens are asleep in arboreal and subnivian dens probably has little influence. Habitat conversion/treatment disturbances to active dens would be avoided with the implementation of PDC into Alternative 2. Implementation of other PDC should have no impact on martens.

Marten habitat effectiveness may decline in an area larger than the area of tree removal as a result of fragmentation effects and tree skiing. The effects of tree skiing intertrail islands on the local forest prey base are unclear, but are unlikely to be beneficial. Loss of forest-interior prey would be partially offset during the snow-free season by substantial increases in deer mice on newly created ski trails. Within the existing SUP area, marten habitat would be further fragmented by additional ski trails, restricting (but not blocking) marten movements, and habitat effectiveness similar to that now experienced by martens on the existing ski area.

Indirect effects associated increases in dispersed recreation extending into marten habitat, would have no impact on this species. Individual marten that may be affected by the Peak 6 project do not likely have home ranges that would extend through the Nordic area to the vicinity of the Peak 7 subdivisions, where new, project-related employees might live whose stray pets might present an increased mortality risk, or food source, to martens. Similarly, the individuals that may be affected by the Peak 6 project do not have

[367] Fitzgerald et al., 1994

home ranges that would extend to the Highway 9 corridor where any increased traffic volumes might increase road-kill probabilities. Alternative 2 "**may impact individuals, but are not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing**."

North American Wolverine

Alternative 2 would result in insignificant and discountable, adverse direct effects to potential wolverine foraging habitats as a result of construction and management activities, habitat modifications, and habitat fragmentation. Indirect effects associated increases in dispersed recreation extending into potential, but unoccupied wolverine habitat, would have no impact on this species. Indirect effects would be insignificant and discountable because of the small contributions from additional skiers and employees driving on regional highways relative to background traffic volumes and because enough human activity exists in and around the Tenmile Range to minimize wolverine habitat effectiveness. The relatively large BSR project area is insignificant at the scale of a single wolverine home range. Alternative 2 "**may impact individuals, but are not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing**."

River Otter

Alternative 2 project components would have no impact on otter habitat. With the implementation of standard BMPs incorporated into these alternatives as PDC, no sediment originating in temporary Peak 6 construction areas are likely to extend off-Forest or to the private Cucumber Gulch breeding complex or to the closer, intervening beaver pond complex above County Road 3 that occurs on private and NFS lands. Such sedimentation could adversely affect trout recruitment and temporarily affect the forage availability of any transient otters that might be present. Indirect effects associated with increases in dispersed recreation extending into potential, but unoccupied otter habitat, would have no impact on this species. Alternative 2 "**may impact individuals, but are not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing**."

Rocky Mountain Bighorn Sheep

The only project components that could affect sheep would be the loss of approximately 1 acre of alpine (potential foraging) habitat associated with the upper lift terminal and lift towers, and patrol building. While these structures are not located in terrain known to be used by sheep, they are located in potential foraging habitat. There would be no facilities installed that would block dispersing sheep movements, the only suspected bighorn habitat use in the vicinity of the project area. Winter recreation that would extend along the crest of the Tenmile Range, between approximately Peaks 6 and 8, would be mutually exclusive with dispersing sheep. Indirect effects associated with increases in dispersed recreation extending into sheep habitat, would have no impact on this species. Alternative 2 "**may impact individuals, but are not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing**."

Management Indicator Species

American Elk

Habitat conversion to conventional ski trails would affect a large, relatively isolated, habitat block that is little-used by humans during spring through fall when elk are present, using the area as transitional range, elk calving (during years with early snowmelt), calf-rearing, and summer range. Habitat effectiveness of these seasonal ranges would also be reduced by habitat fragmentation and low levels of human activities (summer maintenance and dispersed recreation) in a larger area surrounding the 86.3 acres of permanent habitat conversion and temporary disturbance (3.0 acres). Construction activity displacement effects would persist for years and while full recovery cannot be assumed, it is possible that elk use could largely return to former levels after about seven years, as long as human use remains near current environmental baseline levels.[368] Otherwise, most current elk use would be lost during and after intervals of human activity. Elk may benefit from increased forage availability on new conventional ski trails, as long as they are not displaced by human activity, although summer forage availability is not a limiting factor. Assuming full habitat occupancy at present, temporarily or permanently displaced elk would compete with their cohorts in the DAU for the reduced effectiveness of spring through summer habitats on Peak 6. Alternative 2 development and facilities would not affect elk winter range availability and use.

Dispersed recreation effects on elk resulting from the additional employees would be additive, but insignificant. Continued closure of the Siberian Loop Road to the public and restoration of the temporary Peak 6 lifts construction access road would minimize additional, potential, indirect effects on elk. Additional employees and skiers would also make additional, but discountable, incremental contributions to elk highway mortality and the fragmenting effects of highways.

Regarding the management question for this species, recreation management associated with Alternative 2 would negatively affect the local habitat effectiveness of this species, however, would not measurably contribute to any negative trend in the DAU or Forest-wide population or habitat trend of this MIS that would affect achieving Forest Plan MIS objectives. This alternative would be consistent with all applicable WRNF standards and guidelines, the management objective, and with Forest direction related to elk.[369] The Forest-wide implementation of more conservative standards and guidelines associated with the revised Forest Plan, other habitat protection measures, and ongoing monitoring and management, is expected to maintain or improve overall Forest-wide habitat quality for elk.[370] The CDOW will continue managing the elk population. The Forest Service will continue implementing the elk monitoring protocol, in cooperation with the CDOW, to monitor population and habitat trends across the WRNF.

[368] Morrison et al., 1995
[369] USDA Forest Service, 2002a,b
[370] Ibid.

American Pipit

Ground disturbance associated with the upper Peak 6 lift terminal, alpine lift towers and patrol building would result in a net loss of American pipit nesting and/or foraging habitat. The total alpine disturbance area of 0.9 acre is slightly smaller than this species' mean territory size. It is unknown if any pipits would be nesting in or immediately adjacent to proposed disturbance areas during the lift construction season. Based on displaying male density observed during field surveys, pipit density in the vicinity of alpine disturbance areas is far lower than what would be associated with full occupancy at one pair per 1.4 acres. Therefore, it is most likely that adults with established territories overlapping disturbance areas would be displaced from foraging habitat to adjacent, unoccupied habitat. However, the construction season would overlap the nesting period. If construction started prior to nesting, adults would be displaced from foraging habitat and a potential nesting area, but there would be no loss of construction year recruitment as a result of destruction of a nest with eggs/young or nest (with eggs/young) abandonment. If construction began after eggs were laid and a nest was located in an impact area, there would be a loss of recruitment if birds did not renest and fledge the same number of young they would have otherwise (unlikely, as second clutches are generally smaller). Regardless, Alternative 2 would result in a small net loss of habitat used by American pipits and other species associated with alpine grasslands. Potential direct effects would have no discernable effect on this species' Forest-wide population and habitat trends. Regarding the question of whether alpine grassland habitat is being managed to provide habitat for those species dependent or strongly associated with alpine grassland habitat, proposed management of BSR would continue to provide habitat for those species dependent on, or strongly associated with, alpine grasslands.

Alternative 2 is not expected to generate any secondary development or dispersed recreation effects from additional residents, employees, or guests that would affect this species or its alpine grassland habitat.

Aquatic Macroinvertebrates

Refer to the Chapter 3K – Water Resources for impacts to aquatic macroinvertebrates and site-specific, drainage management measures proposed under Alternative 2 to address drainage management and maintain stream health and water quality consistent with the Forest Plan.

Brook Trout, Brown Trout, Rainbow Trout, and Colorado River Cutthroat Trout

Alternative 2 would cause short-term, localized ground disturbing activities (tree removal, grading of some trails, building installation, some new road construction, etc.) and increased runoff (short- to long-term) with potential erosion and sedimentation that could extend to local creeks and cause changes to the hydrology and aquatic habitat of project area streams. Under Alternative 2, impacts to stabilizing vegetation communities would total 86.3 acres, including 83.3 acres of forest clearing, in three watersheds, including the headwaters of two watersheds (South Barton Creek and the unnamed tributary to the north of South Barton Creek) that have not been disturbed by human activities since historic,

selective, winter logging (circa 1940s), more recent (circa mid-1990s) clearcuts, and other minor (Nordic and bike trail) human disturbances.

While the implementation of PDC would avoid and minimize potential erosion and sedimentation, increased runoff from areas cleared of forest has the potential to further increase stream volumes and water velocities, destabilize channels, allow runoff to enter the WIZ and local creeks, degrade water quality, and alter physical habitat quality for salmonids at the project level (although it is unlikely that these effects would extend downstream to occupied trout habitat), beyond what has already occurred in and below developed ski terrain. With respect to the management questions for this MIS under Alternative 2, forest management would not improve physical habitat quality for salmonids, but it would likely maintain habitat quality in those occupied reaches of South Barton Gulch and Cucumber Gulch Creeks on NFS lands. Under Alternative 2, there would be no additional winter water depletions that would impact the spawning success of fall spawning fish.

BSR would continue to provide potential, but largely unoccupied summer trout habitat across the existing ski area, albeit in somewhat degraded conditions, and they would not measurably contribute to any negative trend in the Forest-wide population or habitat trend of this MIS that would affect achieving Forest Plan MIS objectives. PDCs would further reduce potential project effects.

Indirect effects would be limited largely to short-term water quality impacts (associated with maintenance vehicles on mountain roads under wet conditions where sediments could wash off roads into local streams) to salmonid habitat. This alternative is not expected to generate any secondary development or dispersed recreation effects from additional residents, employees, or guests that would affect this MIS group or their habitat in the analysis area. Dispersed recreation would not result in any impacts to aquatic macroinvertebrates or their habitat.

CDOW Endangered, Threatened and Species of Special Concern

Alternative 2 would have no potential impact on Colorado Roundtail Chub because there would be no water depletions associated with this alternative.

Alternative 3

Threatened and Endangered Species

Alternative 3 would have "**no effect**" to uncompahgre fritillary butterfly, *Boloria acrocnema*, humpback chub, *Gila cypha*, bonytail chub, *G. elegans*, Colorado pikeminnow, *Ptychocheilus lucius*, razorback sucker, *Xyrauchen texanus*, and greenback cutthroat trout, *Oncorhynchus clarkii stomias.* Alternative 3 would "**likely adversely affect**" Canada lynx, as analyzed and disclosed below.

Canada Lynx

Effects Summary

Project Design Criteria have been incorporated into Alternative 3 to avoid and minimize impacts to lynx. Alternative 3 would be consistent with historic ski area operations, but would result in an extension of the current development area boundary within the existing SUP area. Alternative 3 impacts to lynx habitat types would total 168.0 acres, 2.2 percent of the entire BSR SUP area. Alternative 3 would impact 129.6 acres of lynx habitat (including 37.1 acres of WFH) on NFS lands, representing 0.38 percent of the 34,351.0 acres of lynx habitat in LAU 27. Impacts to lynx habitat would almost entirely result from the development of conventional ski trails and glades and the permanent conversion of lynx habitat into "non-habitat" and "other" habitat. These adverse habitat effects would be almost entirely related to the habitat modifications in the Peak 6½ pod. There would also be a loss of ski season DSH resulting from increased skier presence in and adjacent to the proposed Peak 6½ ski terrain. Alternative 3 would further impair diurnal, winter ski season, habitat connectivity across the ski area and through the BSR portion of the LAU, although most lynx should still be able to cross the ski area when they are most likely to attempt such movements year-round. The incremental loss of effective WFH, DSH, and habitat connectivity would also impair home range efficacy within the LAU, although lynx should be able to continue to use larger habitat blocks within the LAU as seasonal portions of a home range that are connected to functional habitats in contiguous LAUs. The additional Alternative 3 traffic would make insignificant and discountable incremental contributions to the adverse effects (increased highway mortality, traffic-impaired habitat connectivity and permeability, reduced home range efficacy, and impaired recovery of the Southern Rockies lynx population) associated with overall traffic volume through lynx linkages used to access BSR. Other indirect effects would be insignificant and discountable. With respect to Alternative 3 consistency with applicable SRLMD, the ALL S1 Standard includes a non-significant Forest Plan Amendment process. Alternative 3 would be consistent with all applicable SRLMD guidelines. Alternative 3 would be consistent with Section 7(d) of the ESA.[371] Some reasonably certain effects and additional risk factors will extend onto adjacent NFS lands, further impairing incrementally habitat effectiveness and habitat connectivity and the ability of the Swan and Snake River LAUs to support a lynx home range.

For more detailed information, refer to the following impacts discussion and the BA located in the Project File.

BSR SUP Area Lynx Habitat Types

Alternative 3 impacts to lynx habitat types would total 168 acres, 2.9 percent of the BSR SUP area Table 3I-14. Alternative 3 would impact 129.6 acres of lynx habitat and 31.1 acres of "non-habitat" on NFS lands, totaling 160.7 acres. Impacts on private lands, all to "non-habitat," would total 7.3 acres. The 30.4 acres of forest clearing would result almost entirely in the development of conventional ski trails.

[371] 50 CFR §402.01, USFWS and NMFS, 1998

The 61.8 acres of "other" habitat that would be gladed (via 10 to 30 percent tree removal) would remain effective as "other" habitat. The 27.7 acres of WFH habitat that would be gladed were assumed to be converted into "other" habitat, even though resulting canopy coverage would not necessarily be reduced below the 40 percent threshold separating "other" from WFH. Non-structural impacts to the 31.1 acres of current ski trails and alpine would be reclaimed in kind. Alternative 3 impacts would be additive to the habitat conversion that has occurred to date for ski area development. Lynx habitat conversion resulting from Alternative 3 would be additive to habitat changes resulting from the MPB epidemic.

Table 3I-14:
Lynx Habitat Impacts by Type – Alternative 3

Lynx Habitat Type	Acres (%) Currently Present[a]	Acres (%) of Lynx Habitat Type Impacted[b]
Winter Foraging	900.7 (15.8)	37.1 (4.1)
Denning	0.2 (<0.01)	0.0 (0)
Other	245.3 (4.3)	92.5 (37.7)
Currently Unsuitable	941.0 (16.5)	0.0 (0)
Total Lynx Habitat[c]	2,087.2 (36.6)	129.6 (6.2)
Non-habitat	3,594.8[c] (63.1)	31.1 (0.9)
Private	17.2 (0.3)	7.3 (42.4)
Total	**5,699.1[d] (100)**	**168.0 (2.9)**

[a] These data have not all been field verified.
[b] These data have been field verified.
[c] On NFS land, = ∑ WFH + denning + other + currently unsuitable.
[d] Does not include 56.8 acres of alpine habitat (non-habitat) along the crest of the Tenmile Range that is not part of the Swan River LAU.
Source: USDA Forest Service (2002h, update provided by E. Roberts, USFS, May 11, 2011), SE Group, and Western Ecosystems, Inc.

LAU 27 Habitat Parameters

Under Alternative 3, 129.6 acres of lynx habitat and 31.1 acres of ""non-habitat"" would be affected on NFS lands, with breakdowns shown in Table 3I-15. All lynx habitat affected by clearing and/or grading were assumed to be converted into "non-habitat." The 61.8 acres of "other" habitat that would be gladed (via 10 to 30 percent tree removal) would remain effective as "other" habitat. The 27.7 acres of WFH habitat that would be gladed were assumed to be converted into "other" habitat, even though resulting canopy coverage would not necessarily be reduced below the 40 percent threshold separating "other" from WFH. Additionally, there would be 7.3 acres of impacts (all to "non-habitat") on private land. Statistical changes to LAU 27 lynx habitat resulting from Alternative 3 would not be inconsistent with SRLMD. Lynx habitat conversion resulting from Alternative 3 would be additive to those resulting from the MPB epidemic.

Table 3I-15:
Changes to Lynx Habitat in the Swan River Lynx Analysis Unit – Alternative 3

Habitat Description	Acres Affected by Project[a]	Resulting Acres[b]	Change (%) in Habitat[c]	Updated Habitat in LAU[b] (acres)	Updated % of Lynx Habitat in LAU
Winter Foraging	37.1	-37.1	-0.34	10,721.1	29.48
Denning	0	0	0	3,837.3	10.55
Other	92.5	-89.4	-1.11	7,958.7	21.88
Currently Unsuitable	0.0	0	0	13,766.3	37.85
Total Lynx Habitat[d]	129.6	-40.1	-0.11	36,369.9	100
Non-habitat	31.1	+40.1	0.16	25,313.8	-
Private	7.3 [e]	0 [e]	-0.34	10,721.1	29.48

[a] Lost on NFS land. No impacts on private land.
[b] Net with implementation of the Proposed Action. Does not include immaterial temporary impacts.
[c] From environmental baseline LAU acres.
[d] On NFS land, = ∑ WFH + denning + other + currently unsuitable.
[e] All private impacts would affect "non-habitat" resulting in no lynx habitat type conversion and no change to the environmental baseline.
Source: USDA Forest Service (2002a, update provided E. Roberts, USFS, May 11, 2011), SE Group, and Western Ecosystems, Inc.

Winter Snowshoe Hare Habitat

Snowshoe hares occur in "other" lynx habitat during winter on and around BSR, however they are more abundant in the higher quality WFH. Alternative 3 would affect 37.1 acres of WFH. Most Alternative 3 WFH impacts would be associated with glading in the Peak 6½ pod, where it would be converted to "other" habitat. Alternative 3 would affect 92.5 acres of "other" lynx habitat. Virtually all of the "other" habitat that would be converted into "non-habitat" for conventional ski trails would occur within the existing, fragmented, developed interior of the ski area. Not only are most of the 63 intertrail islands that would be affected within developed ski area relatively small with respect to a snowshoe hare home range, they are also non-functional as hare habitat by themselves, mostly non-functional as part of a hare's home range that might be pieced together with surrounding intertrail islands, and the red squirrel component of this potential lynx foraging habitat is becoming lost as the MPB epidemic progresses across the ski area. Alternative 3 would have potential to degrade backcountry terrain as a result of authorized and non-authorized skier disturbance and snow compaction effects.

Lynx Diurnal Security Habitat

Alternative 3 would result in the additive loss of DSH that may now be associated with the Peak 6½ pod because of skier presence and habitat fragmentation/conversion, but would result in a relatively minor loss of DSH. The only potentially effective DSH that might be lost to proposed terrain under Alternative 3 would be that associated the forest stringers and forest edge (i.e., the south edge of the Peak 5-6 habitat block) in and around the Peak 6½ pod. No DSH would affected by proposed Alternative 3 project components within the existing ski area because none of the affected intertrail islands are currently

effective as DSH. It is uncertain how effective the existing Peak 6½ pod DSH is during the middle (January 1) to end of the ski season, when most of this area provides the main egress for backcountry Peak 6 skiers, especially since the additional Peak 7 backcountry access point was implemented in February 2011. It is likely that most of the forested Peak 5-6 block would remain effective as DSH following the extension of the backcountry gate for the same reasons described for Alternative 2. It is also likely that while the closure of the large forest block below the lowest Peak 6 collector trail would be largely effective, a larger percentage of skiers would violate the closure compared to the similar signed rope closure under Alternative 2 (because of the more open forested terrain and the ease that skiers could quickly return to developed Peak 7 terrain). The result would be that a sufficient number of skiers violating the closure would reduce the effectiveness of the approximately 60 to 70 acres of potential DSH below the Peak 6½ pod.

Lynx Habitat Connectivity

Under Alternative 3, the further, incremental loss of DSH effectiveness and forest cover that could increase diurnal, ski season lynx movement distances across developed ski terrain would incrementally impair already impaired habitat connectivity across the ski area and through this local portion of the LAU. Under Alternative 3, ski season lynx travel distances across the ski area would increase (+0.01 to +0.51 mile, depending on the specific route) from 2.9 miles to 2.91 to 3.41 miles through the spruce-fir zone and remain unchanged at 2.36 miles through the lodgepole zone. The increased travel distance across the ski area resulting from skier presence and habitat fragmentation/conversion could extend minimum daily movements through the spruce-fir zone slightly into the maximum 3- to 6-mile range recommended by Ruediger et al. and the SRLMD to maintain habitat connectivity. These increased distances include the likely effects of skiers violating the signed rope closure that could reduce DSH effectiveness below the Peak 6½ pod. Backcountry skier use of the Peak 5 and 6 forest blocks should continue to maintain high quality, effective DSH, as described above under Alternative 2.

Lynx Home Range Efficacy

Under Alternative 3, the loss of effective WFH, DSH, and habitat connectivity across developed ski terrain would further incrementally reduce the ability of the Tenmile Range in the vicinity of the ski area to support a lynx home range. With the exception of the 9.4 acres of WFH that would be converted to “non-habitat” on the north side of Peak 10, the 62.7 acres of habitat effects within existing, developed terrain would have little adverse effect on the local prey base. The 129.6 acres of lynx habitat conversion/modifications would permanently reduce the lynx prey base and further incrementally reduce the ability of the Tenmile Range in the vicinity of the ski area to support a lynx home range. Alternative 3 effects to LAU statistics and snowshoe hares are described above in this section. Nevertheless, based on the size and seasonal occupancy of the higher quality habitat block(s) at the southern end of the LAU and the distribution and extent of similar, connected, higher quality habitat extending into the Snake River LAU, sufficient habitat would remain within those portions of both LAUs to support a lynx home range.

Alternative 3's incremental impairment of home range efficacy would be almost entirely related to the habitat modifications and winter human presence in the Peak 6½ pod.

Construction Activity Effects

Under Alternative 3, the potential effects to lynx of construction-related activities would be the same as those described above under Alternative 2 and would also meet USFWS and NMFS definitions of "insignificant" and "discountable."

Traffic Contributions and Indirect Effects

Table 3I-16 shows Year 2015 AADT volumes along regional highways serving BSR, BSR vehicle contributions that would occur under Alternative 3, and the percentage of Alternative 3's contributions to overall AADT. Under Alternative 3, resort visitation would grow by 1.25 percent per year, resulting in 81,513 more skier visits in Year 2015 than at present (1,600,000 skier visits/year in 2009) and 32.970 more skier visits than would occur under Alternative 1. Destination and day skier proportions, AVO rates, and traffic distributions along regional highways would be the same as described under Alternative 1. Traffic contributions from additional employees under Alternative 3 are not included in Table 3I-16 because BSR employees (both short-term construction related and direct employment) would not cross through designated lynx linkages to travel to and from work (Hoosier Pass is not a designated lynx linkage) and/or they would make immaterial contributions to total traffic volumes (i.e., under Alternative 3, one additional seasonal employee would likely live on the south side of Hoosier Pass where daily commutes would likely involve carpooling that would not add any AADT).

Table 3I-16:
Traffic Volumes on Regional Highways (Year 2015) – Alternative 3

Highway, Monitoring Point	Traffic Volume	BSR Vehicle Contributions	BSR Contributions Above Alternative 1[a]	Alternative 2 Contributions as a % of AADT[a]
Pena Blvd./Interstate 70, DIA	81,292	225	4	0.005
Interstate 70, Herman Gulch LLA[b]	29,478	1,464	29	0.097
Interstate 70, Loveland Pass LLA[b]	33,695	1,464	29	0.085
Interstate 70, Officer's Gulch LLA[b]	30,900	101	2	0.006
Interstate 70, Vail Pass LLA[b]	20,302	55	1	0.005
Highway 9, Hoosier Pass	4,756	391[c]	8[c]	0.161[c]
Highway 285, Kenosha Pass LLA[b]	4,902	123	2	0.049

[a] From a lynx perspective, AADT contributions attributable to BSR only include destination and day skier guest visitation. Employees of BSR (both short-term construction related and direct employment) do not cross a designated lynx linkage to travel to and from work (Hoosier Pass is not a designated lynx linkage). It is assumed that an indiscernible number of trips would be generated by short-term construction workers driving to Denver from Breckenridge once a week, but would be housed in Breckenridge or Summit County for the duration of the project.
[b] LLA = Lynx Linkage Area.
[c] Does not include employees.
Source: AADT projections from CDOT website Future Calculator. CDOT traffic projections are historically based, straight time projections that consider the local land use trend at the time of the projection (Ventura 2004)

Under Alternative 3, skier growth would add relatively little traffic to regional highways, ranging from 1 to 29 AADT, and representing 0.005 to 0.097 percent of the total 2015 traffic volume going through designated lynx linkages. Resort-related traffic over Hoosier Pass would total 8 AADT, 0.161 percent of total vehicle volume, not including traffic associated with the one additional seasonal employee that would commute over Hoosier Pass. Compared to the environmental baseline (Year 2009), BSR traffic contributions under Alternative 3 would actually decline as a percentage of total traffic volume because of the resort's small additional contributions relative to larger traffic volume increases from other sources.

Total traffic volumes along all sections of Interstate 70 of interest to this analysis, including designated lynx linkages, are currently well above the range documented to impair lynx movements and pose more serious threats to highway mortality and habitat fragmentation.[372] Traffic volumes along key monitoring points along Highways 285 and 9 are also currently within the range documented to impair lynx movements, increase road-kill probabilities, and fragment habitats. The additional Alternative 3 traffic would make insignificant and discountable incremental contributions to the adverse effects associated with overall traffic volume through lynx linkages used to access BSR.

Secondary Development

Alternative 3 is not expected to generate any secondary development from additional residents or employees for the same reasons described above under Alternative 2.

Dispersed Recreation Effects

Under Alternative 3, the potential for an increase in unauthorized skiing down the west slope of the Tenmile Range that could adversely influence lynx habitat use is considered to be discountable for the same reasons described under Alternative 2, and because of the greater vertical distances that skiers on Peak 6 would have to hike to achieve the crest of the Tenmile Range.

Potential dispersed recreation effects associated with additional (Alternative 3) BSR employees encountering lynx on the Forest would also be discountable.

Region 2 Sensitive Species

Determinations to R2 sensitive species are presented in Table 3I-13, and impacts are disclosed under individual species headings for those species with potential to occur.

Fish

Colorado River Cutthroat Trout

In addition to MPB affects, described under Alternative 3 would cause short-term, localized ground disturbing activities (tree removal, grading of some trails, snowmaking water line installation, building

[372] Stevens et al., 1996; Clevenger et al., 2002; Alexander et al., 2004, 2005; Ruediger et al., 2000

installation, some new road construction, etc.) and increased runoff (short- to long-term) with potential erosion and sedimentation that could extend to local creeks and cause changes to the hydrology and aquatic habitat of project area streams. Water quality-related PDC would be implemented to avoid and minimize adverse effects to aquatic habitat within and below the project area Under Alternative 3, impacts to stabilizing vegetation communities would total 153.2 acres in five watersheds, almost entirely in watersheds that have been previously affected by Alpine ski area development. Under Alternative 3, indirect effects would be limited largely to short-term water quality impacts (associated with maintenance vehicles on mountain roads serving the project components under wet conditions where sediments could wash off roads into local streams) to potential, but unoccupied CRCT habitat.

Regarding CRCT, because of hydrologic effects to potential, but currently unoccupied and unsuitable CRCT habitat, as a worst case scenario, direct and indirect effects associated with Alternative 3 "**may adversely impact individuals, but is not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing.**"

Amphibians/Reptiles

Boreal Western Toad

Alternative 3 would have no affect on any known boreal toad breeding habitat or surrounding terrestrial habitats that could be expected to be used post-breeding or for hibernacula. With the implementation of PDC, no sediment originating in construction areas is likely to extend to the private Cucumber Gulch breeding complex or to the closer, intervening beaver pond complex above County Road 3 that occurs on private and NFS lands. It is possible, though unlikely, that extreme female home range or dispersing toad movements could extend from the Cucumber Gulch breeding complex into the Alternative 3 project areas. As such, loss of forest cover associated with ski trail development could individually or collectively adversely affect habitat connectivity. It is also possible, though unlikely, that toads dispersing towards or into the Peak 6½ development area could be killed by construction (a direct effect) and maintenance vehicles (an indirect effect) and by construction activity (a direct effect). Therefore, Alternative 3 "**may adversely impact individuals, but is not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing**."

Northern Leopard Frog

None of the Alternative 3 project components would affect any known northern leopard frog breeding habitat or surrounding terrestrial habitats that could be expected to be used post-breeding or for hibernacula. Therefore implementation of this alternative would have "**no impact**" on the leopard frog.

Birds

Northern Goshawk

Alternative 3 would affect goshawks by removing or thinning forest cover that supports potential prey species (e.g., snowshoe hare and/or red squirrel). Based on goshawk habitat associations, Alternative 3

would affect 119.1 acres of potential goshawk habitat.[373] Tree thinning for glading would have less effect on foraging habitat (i.e., the majority of foraging values may be retained and hunting facilitated by a more open canopy) than total tree removal for conventional ski trail development. No goshawk nests or nesting habitat associated with a known nesting block would be affected. No indirect effects goshawks are anticipated.

Regarding goshawks, direct and indirect effects of Alternative 3 "**may impact individuals, but are not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing**."

Northern Harrier

Alternative 3 could affect the availability and effectiveness of potential foraging habitat via a net gain of non-forested habitats (via forest clearing for ski trails). By itself, this effect would result in a "beneficial impact" determination. However, because a small area of currently effective, potential foraging habitat would also be lost to ski lift terminal and access road development, the insignificant and discountable direct and indirect effects, "**may adversely impact individual harriers, but is not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing**."

American Peregrine Falcon

The loss of forest cover associated with subalpine ski trail development should have no discernable adverse effect because the associated prey base below the canopy is unavailable to peregrines. Indeed, ski trail development below treeline may insignificantly benefit peregrines by increasing the quality of potential foraging habitat by creating additional openings that prey species would have to fly across (thereby increasing the vulnerability of forest and "edge" birds to peregrine predation) and by improving potential prey recovery habitat, for birds knocked down by peregrines above the former canopy. However, small areas of currently effective, potential foraging habitat would be lost to ski lift terminal and access road development. Overall, the proposed projects should improve insignificantly the availability of the local peregrine prey base.

Regarding peregrine falcons, direct and indirect effects of the projects "**may impact individuals, but are not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing**."

White-tailed Ptarmigan

Ptarmigan use of the Peak 6½ project area and adjacent habitats for summer and breeding uses would be largely unaffected by Alternative 3. The Peak 6½ top terminal of the lift and lift towers above treeline would remove approximately 1 acre of habitat and initial construction activities would displace birds from the lift corridor. Development of Peak 6½ terrain would also result in more frequent displacement of wintering ptarmigan along the Tenmile Range's main ridgeline, in exposed willow and graminoid stands

[373] Rhea et al., 2006

within alpine Peak 6½ terrain, and within snow deposit areas in the basin below Peak 6½. Additionally, there would be a minor loss of alpine willows and krummholz under the proposed lift-line. There would be no physical loss of alpine willow stands in the Peak 6½ basin from increased skier use or extended ski area management (i.e., avalanche control). However, the winter effectiveness of alpine forging and roosting areas skied under Alternatives 3 would be reduced due to skiing activity and snow compaction.

Some ptarmigan would remain during winter, as they do in Peaks 7, 8 and 9 alpine ski terrain. Some changes in dispersed recreation would occur with development of the Peak 6½ terrain, however this would have no impacts on this species.

Regarding white-tailed ptarmigan, direct and indirect effects of Alternative 3 "**may adversely impact individuals, but is not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing**."

Boreal Owl

Alternative 3 would affect boreal owls by removing or thinning linear forest strips, representing year-round foraging habitat and, to a lesser extent, potential, but presently unoccupied nesting habitat, scattered throughout one or more owl home ranges. Potential boreal owl foraging habitat affected would total up to 119.1 acres. Loss of forest-interior prey may be partially offset during the snow free season by substantial increases in deer mice on newly created ski trails. Potential nesting habitat affected, largely associated with mature, closed canopy spruce-fir stands would total up to 79.9 acres. Alternative 3 would affect small, intertrail islands supporting low prey densities within currently developed ski terrain. Skiing activity should have no adverse effects on owls. Tree thinning (i.e., for glading) should have less effect on foraging habitat (i.e., the majority of foraging values may be retained) if snow compaction does not become great enough that it limits subnivian small mammal (primary boreal owl prey) access to the surface. The abundance of some prey species (small mammals and birds) may decline in an area larger than the area of tree removal as a result of tree removal/thinning, snow compaction, forest fragmentation effects, and tree skiing. If nest trees associated with active territories occur within impact areas during the construction season, direct mortality of eggs and/or nestlings should be avoided by conducting tree removal outside the May 21 to July 15 nesting period when eggs/young are present. Implementation of other PDC should have no effect on the boreal owl. Given this species' primarily nocturnal habitat use, cavity nesting habit, the relatively small amount of subalpine terrain that would be developed on Peak 6½ (i.e., compared to the intact terrain that would remain), and tolerance to human disturbance, it is likely that the forested Peak 6½ ski terrain could continue to support boreal owls, including possible future nesting. Indirect effects associated with dispersed recreation extending into boreal owl habitat would have no impact on this species.

Regarding boreal owls, direct and indirect effects of Alternative 3 "**may impact individuals, but are not likely to result in a loss of viability on the planning area, nor cause a trend toward federal listing**."

American Three-toed Woodpecker

Alternative 3 would affect three-toed woodpeckers by removing or thinning linear forest strips, representing year-round foraging habitat and, to a lesser extent, occupied nesting habitat, scattered throughout the home ranges of at least several pairs of birds. Forest cover that would be affected, representing potential three-toed woodpecker habitat, would total up to 119.1 acres. If nest trees associated with active territories occur within impact areas during the construction season, direct mortality of current year recruitment should be avoided by conducting tree removal outside the March 14 to July 15 nesting period when eggs/young are present. Implementation of other PDC should have no effect on three-toed woodpeckers. While Alternative 3 would reduce the amount of foraging and nesting habitat within the Peak 6½ project area, the project area and forested portions of the overall ski area would continue to support three-toed woodpeckers. Habitat effectiveness may decline in an area larger than the area of tree removal as a result of forest fragmentation effects. Indirect effects be limited to increases in dispersed recreation extending into three-toed woodpecker habitat and would have no impacts on this species.

Regarding three-toed woodpeckers, direct and indirect effects of Alternative 3 "**may impact individuals, but are not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing**."

Olive-sided Flycatcher

Alternative 3 would affect olive-sided flycatchers by removing linear forest strips, portions of which represent summer nesting and foraging habitat, scattered throughout the home ranges of at least several pairs of birds. Forest cover that would be affected, representing potential olive-sided flycatcher foraging and nesting habitat, would total up to 119.1 acres. Tree removal could be partly beneficial from a long-term, foraging habitat, perspective as forest openings could support a higher prey base. Conversely, existing, non-forested, foraging habitat (e.g., grasslands, meadows, and ski trails) adjacent to forest stands supporting the flying insect prey base of this species could also be adversely affected (over short- to moderate-terms) by ski trail, road, and other impacts. If nest trees associated with active territories occur within impact areas during the construction season, direct mortality of current year recruitment should be avoided by conducting tree removal outside the June 1 and July 15 nesting period when eggs/young are present.[374] Implementation of other PDC should have no effect on olive-sided flycatchers. While tree removal would reduce the amount of foraging and nesting habitat within the existing SUP area, the ski area would continue to support these flycatchers (as influenced by the MPB epidemic). Habitat effectiveness may decline in an area larger than the area of tree removal as a result of forest fragmentation effects, snag removal, and subsequent ski trail forage effectiveness. Indirect effects associated with increases in dispersed recreation extending into olive-sided flycatcher habitat would have no impacts on this species.

[374] Kingery et al., 1998

Regarding olive-sided flycatchers, direct and indirect effects of Alternative 3 "**may impact individuals, but are not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing**."

Mammals

Pygmy Shrew

Alternative 3 could impact individual pygmy shrews through direct, construction-related mortality and/or loss of potential habitat. Loss of forest-interior prey may be partially offset during the snow-free season by substantial increases in deer mice (potential prey) on newly created ski trails. The project impact areas, including areas affected by PDC, represent an insignificant proportion of the total potential range and habitat available to this species on the Forest. The probability that this species would be present in those potentially suitable habitats proposed for subalpine trails and lift corridor development when it is so rare on the WRNF is unlikely. Indirect effects associated with increases in dispersed recreation extending into potential pygmy shrew habitat would have no impact on this species. Nevertheless, because potential habitat would be removed and altered, Alternative 3 "**may adversely impact individuals, but is not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing**."

American Marten

Alternative 3 would affect martens by removing linear forest strips, which represent foraging habitat and possible denning habitat, likely extending into portions of several individuals' home ranges. Affected forest cover, representing at least potential marten habitat, would total up to 119.1 acres. Intertrail islands support a lower prey density than larger forest stands in the Peak 6½ area. No known marten dens are present within disturbance areas; however marten dens are virtually impossible to locate without the use of radio-collared animals. Young-of-the year would be vulnerable to den tree removal that occurred between approximately March 1 and June 15.[375] Tree removal within the interiors of larger, closed canopy, mature forest patches within the Peak 6½ area would affect martens denning habitat. Because denning selection, if not denning, generally begins before the ski season has ended, marten may not select den sites within areas currently used for tree skiing, although such diurnal skiing when martens are asleep in arboreal and subnivian dens probably has little influence. Habitat conversion/treatment disturbances to active dens would be avoided with the implementation of mitigation measures that have been incorporated as PDC into Alternative 3. Implementation of other PDC should have no impact on martens.

Marten habitat effectiveness may decline in an area larger than the area of tree removal as a result of fragmentation effects and tree skiing. The effects of tree skiing intertrail islands on the local forest prey base are unclear, but are unlikely to be beneficial. Tree thinning (for glading) would have less impact on foraging habitat (i.e., the majority of foraging values may be retained) than total tree removal for conventional ski trail development. Loss of forest-interior prey would be partially offset during the snow-

[375] Fitzgerald et al., 1994

free season by substantial increases in deer mice on newly created ski trails. Within the existing SUP area, marten habitat would be further fragmented by additional ski trails, restricting (but not blocking) marten movements, and habitat effectiveness similar to that now experienced by martens on the existing ski area.

Indirect effects associated with increases in dispersed recreation extending into marten habitat, would have no impact on this species. Individual marten that may be affected by the Peak 6 project do not likely have home ranges that would extend through the Nordic area to the vicinity of the Peak 7 subdivisions, where new, project-related employees might live whose stray pets might present an increased mortality risk, or food source, to martens. Similarly, the individuals that may be affected by the Peak 6 project do not have home ranges that would extend to the Highway 9 corridor where any increased traffic volumes might increase road-kill probabilities.

Regarding American marten, direct and indirect effects of Alternative 3 "**may impact individuals, but are not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing**."

North American Wolverine

Alternative 3 would result in insignificant and discountable, adverse direct effects to potential wolverine foraging habitats as a result of construction and management activities, habitat modifications, and habitat fragmentation. Indirect effects associated increases in dispersed recreation extending into potential, but unoccupied wolverine habitat, would have no impact on this species. Indirect effects would be insignificant and discountable because of the small contributions from additional skiers and employees driving on regional highways relative to background traffic volumes and because enough human activity exists in and around the Tenmile Range to minimize wolverine habitat effectiveness. The relatively large BSR project area is insignificant at the scale of a single wolverine home range. Regarding wolverines, direct and indirect effects of Alternative 3 "**may impact individuals, but are not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing**."

River Otter

Alternative 3 project components would have no impact on otter habitat. With the implementation of standard BMPs incorporated into these alternatives as PDC, no sediments originating in temporary Peak 6½ construction areas are likely to extend to the private Cucumber Gulch breeding complex or to the closer, intervening beaver pond complex. Such sedimentation could adversely affect trout recruitment and temporarily affect the forage availability of any transient otters that might be present. Indirect effects associated with increases in dispersed recreation extending into potential, but unoccupied otter habitat, would have no impact on this species.

As a worst case scenario regarding otters, direct, indirect, and cumulative effects of Alternative 3 "**may impact individuals, but are not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing**."

Rocky Mountain Bighorn Sheep

The only project components that could affect sheep would be the loss of approximately 1 acre of alpine (potential foraging) habitat associated with the upper lift terminal and lift towers. While these structures are not located in terrain known to be used by sheep, they are located in potential foraging habitat. There would be no facilities installed that would block dispersing sheep movements, the only suspected bighorn habitat use in the vicinity of the project area. Winter recreation that would extend along the crest of the Tenmile Range, between approximately Peaks 6½ and 8, would be mutually exclusive with dispersing sheep. Indirect effects associated with increases in dispersed recreation extending into sheep habitat, would have no impact on this species.

As a worst case scenario regarding bighorn sheep, direct and indirect effects of Alternative 3 "**may impact individuals, but are not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing**."

Management Indicator Species

American Elk

Implementation of this alternative would result in 153.2 acres of habitat conversion and disturbance, these impacts would be located largely within the developed interior of the ski area that has been so fragmented that it is only briefly used by elk as they migrate through the ski area. As such, Alternative 3 effects would largely avoid most of the transitional range, elk calving (during years with early snowmelt), calf-rearing, and summer range impacts. Depending upon the time of year (spring–summer) when initial construction activity started, that activity could displace elk from all of those seasonal ranges associated with the Peak 6½ pod. Delays until July 1 during the construction year only would allow what low levels of calving that might occur in and beyond the disturbance area to take place as normal. Permanent construction and maintenance delays (i.e., a seasonal closure from May 1 to July 1, should allow most transitional range and elk calving use (during years with early snowmelt) to continue after local elk recover and habituate to the initial construction activity displacement and summer maintenance regimes. Construction and summer maintenance activity displacement effects associated with transitional range and elk calving use would persist for years. While full recovery could not be assumed, it is possible that elk use of these two seasonal largely return to former levels after about seven years, as long as human use remains near current environmental baseline levels (i.e., with the seasonal closure).[376] Calf-rearing and summer use of the Peak 6 basin area would be affected, resulting in reduced use from that now occurring, even with the potential seasonal closure.

While habitat effectiveness would be reduced adjacent to Peak 6½ pod development areas, it would be limited and buffered by terrain and forest cover to the south side of the upper South Barton Gulch

[376] Morrison et al., 1995

headwaters, maintaining the effectiveness preserving of undeveloped Peak 6 and Peak 5 forest stands further north within the SUP area. Elk would realize little benefit from the increased forage availability on new conventional ski trails within existing developed ski terrain because they have largely moved through those areas in spring before much vegetative growth has developed and they move through relatively quickly during fall. Assuming full habitat occupancy at present, elk temporarily or permanently displaced from existing seasonal ranges associated with Alternative 3 would introduce competition with their cohorts in the DAU because less habitat would be available. Alternative 3 development and facilities would not affect elk winter range availability and use.

Dispersed recreation effects on elk resulting from the additional employees would be additive, but insignificant. Continued closure of the Siberian Loop Road to the public would minimize additional, potential, indirect effects on elk. Additional employees and skiers would also make additional, but discountable, incremental contributions to elk highway mortality and the fragmenting effects of highways.

Regarding the management question for this species, recreation management associated with Alternative 3 would negatively affect the local habitat effectiveness of this species; however, it would not measurably contribute to any negative trend in the DAU or Forest-wide population or habitat trend of this MIS that would affect achieving Forest Plan MIS objectives. This alternative would be consistent with all applicable WRNF standards and guidelines, the management objective, and with Forest direction related to elk. The Forest-wide implementation of more conservative standards and guidelines associated with the revised Forest Plan, other habitat protection measures, and ongoing monitoring and management, is expected to maintain or improve overall Forest-wide habitat quality for elk.[377] The CDOW will continue managing the elk population. The Forest Service will continue implementing the elk monitoring protocol, in cooperation with the CDOW, to monitor population and habitat trends across the WRNF.

American Pipit

Ground disturbance associated with the upper Peak 6½ lift terminal and alpine lift towers would result in a net loss of American pipit nesting and/or foraging habitat. The total alpine disturbance area of 0.9 acre is slightly smaller than this species' mean territory size. It is unknown if any pipits would be nesting in or immediately adjacent to proposed disturbance areas during the lift construction season. Based on displaying male density observed during field surveys, pipit density in the vicinity of alpine disturbance areas is far lower than what would be associated with full occupancy at one pair per 1.4 acres. Therefore, it is most likely that adults with established territories overlapping disturbance areas would be displaced from foraging habitat to adjacent, unoccupied habitat. However, the construction season would overlap the nesting period. If construction started prior to nesting, adults would be displaced from foraging habitat and a potential nesting area, but there would be no loss of construction year recruitment as a result of destruction of a nest with eggs/young or nest (with eggs/young) abandonment. If construction began after

[377] USDA Forest Service, 2002d

eggs were laid and a nest was located in an impact area, there would be a loss of recruitment if birds did not renest and fledge the same number of young they would have otherwise (unlikely, as second clutches are generally smaller). Regardless, Alternative 3 would result in a small net loss of habitat used by American pipits and other species associated with alpine grasslands. Potential direct effects would have no discernable effect on this species' Forest-wide population and habitat trends. Regarding the question of whether alpine grassland habitat is being managed to provide habitat for those species dependent or strongly associated with alpine grassland habitat, proposed management of BSR would continue to provide habitat for those species dependent on, or strongly associated with, alpine grasslands.

Alternative 3 is not expected to generate any secondary development or dispersed recreation effects from additional residents, employees, or guests that would affect this species or its alpine grassland habitat.

Aquatic Macroinvertebrates

Refer to the Chapter 3K – Water Resources for impacts to aquatic macroinvertebrates and site-specific, drainage management measures proposed under Alternative 3 to address drainage management and maintain stream health and water quality consistent with the Forest Plan.

Brook Trout, Brown Trout, Rainbow Trout, and Colorado River Cutthroat Trout

While the implementation of PDC would avoid and minimize potential erosion and sedimentation, increased runoff from areas cleared of forest and additional snowmaking has the potential to further increase stream volumes and water velocities, destabilize channels, allow runoff to enter the WIZ and local creeks, degrade water quality, and alter physical habitat quality for salmonids at the project level (although it is unlikely that these effects would extend downstream to occupied trout habitat), beyond what has already occurred in and below developed ski terrain. With respect to the management questions for this MIS under Alternative 3, forest management would not improve physical habitat quality for salmonids, but it would likely maintain habitat quality in those occupied reaches of South Barton Gulch and Cucumber Gulch Creeks on NFS lands. There would be no additional winter water depletions that would impact the spawning success of fall spawning fish. BSR would continue to provide potential, but largely unoccupied summer trout habitat across the existing ski area, albeit in somewhat degraded conditions, and they would not measurably contribute to any negative trend in the Forest-wide population or habitat trend of this MIS that would affect achieving Forest Plan MIS objectives. PDC would further reduce potential project effects.

Alternative 3 would cause short-term, localized ground disturbing activities (tree removal, grading of some trails, snowmaking water line installation, building installation, some new road construction, etc.) and increased runoff (short- to long-term) with potential erosion and sedimentation that could extend to local creeks and cause changes to the hydrology and aquatic habitat of project area streams. Under Alternative 3, impacts to stabilizing vegetation communities would total 153.2 acres, including 119.1 acres of forest clearing, in five watersheds, ranging from Carter Gulch on the south, to South Barton Gulch on the north, that have been previously affected by Alpine ski area development.

Under Alternative 3, snowmaking also has the potential to affect salmonid habitat and fall spawning success in the off-site streams and reservoirs associated with BSR's water withdrawals and augmentation releases necessary to mitigate injury to senior downstream water rights.

Indirect effects would be limited largely to short-term water quality impacts (associated with maintenance vehicles on mountain roads under wet conditions where sediments could wash off roads into local streams) to salmonid habitat. This alternative is expected to generate any secondary development or dispersed recreation effects from additional residents, employees, or guests that would affect this MIS group or their habitat in the analysis area. Dispersed recreation would not result in any impacts to aquatic macroinvertebrates or their habitat.

Alternative 3 would be consistent with all applicable WRNF standards and guidelines, the management objective, and with Forest direction related to salmonid habitat management and winter water depletions/spawning success. The reader is also referred to Chapter 3K – Water Resources for more comprehensive data.

CDOW Endangered, Threatened and Species of Special Concern

Alternative 3 would result in additional water depletions associated with snowmaking, however, the additional depletions would not exceed limits that have already been consulted on for the big river fish that have been offset by compensatory conservation measures that would also benefit Colorado roundtail chubs. Therefore, Alternative 3 would also have no impact on this species.

CUMULATIVE EFFECTS

Scope of the Analysis

For a detailed description of past, present, and reasonably foreseeable future projects within the cumulative effects analysis area, the reader is referred to Appendix A in this document.

Temporal Bounds

The temporal bounds for this cumulative effects analysis extends from prior to BSR's development as a ski area in 1961, through the foreseeable future in which BSR can be expected to operate (BSR's current 40-year SUP expires December 31, 2029; however, this analysis assumes the SUP would be reissued).

Spatial Bounds

The spatial bounds of this wildlife cumulative effects analysis varies by species and is discussed above in the Effected Environment.

Past, Present, and Reasonably Foreseeable Future Projects

Past, present, and reasonably foreseeable actions that have cumulatively affected or that are likely to affect wildlife resources on WRNF:

- Breckenridge Ski Resort Projects
- Resort and Residential/Commercial Development Projects
- Summit County Ski Area Projects
- Forest Health and Fuels Projects
- Forest Programmatic Projects
- Transportation Projects
- Historic Development Activities

Threatened and Endangered Species

Most of the cumulative effects warranting consideration for lynx under NEPA are those ongoing activities and approved projects in the environmental baseline. Alternative 2 and 3 include lynx conservation measures (refer to Chapter 2) to address the loss of habitat and the impact to habitat connectivity within southern Summit County. These measures would occur within and beyond the BSR SUP boundary and would make the most effective use of resources to improve habitat conditions. These conservation measures are incorporated into the findings of this cumulative effects analysis.

Other current and future federal actions may also affect lynx warrant consideration. Descriptions of those projects are listed below and further detailed in the Project File.

BSR MDP Projects

With respect to lynx, the remaining reasonably foreseeable MDP components would result in relatively minor, additional habitat conversions of secondary and primary habitats within the fragmented interior of the ski area. No currently effective DSH would be affected and it is unlikely that habitat connectivity across the ski area would be further impaired.

Keystone Resort Master Development Plan

With respect to lynx, Keystone Resort does not occur in the same LAU (Swan River) as BSR, but in the contiguous Snake River LAU. Because of mountain physiography and the distribution of human developments, there is poor and circuitous habitat connectivity between these two LAUs. While it is possible that a lynx could maintain a home range encompassing the large, higher quality, core habitat blocks in each LAU, those seasonal range components would be miles apart from each other.

Implementation of all of Keystone Resort's MDP components would result in the conversion of moderate acreages of primary and secondary habitats into "non-habitat" associated with conventional ski trails, additional habitat fragmentation, further reduction of habitat effectiveness, and a slightly impaired ability of lynx to cross through developed and non-developed ski terrain during the winter ski season. These effects would be tempered because all MDP component areas are currently skied by snowcat and hike-to

skiers, although these relatively large areas of primary lynx habitat that would receive increased access via new lifts are outside of the current development boundary. These adverse, localized effects in and contiguous with Keystone Resort should not preclude lynx from maintaining a home range that might extend into the Swan River LAU or blocking or deflecting landscape-level habitat connectivity such that a lynx moving through Keystone would be unable or less likely to access the Swan River LAU.

Breckenridge Forest Health and Fuels Project

With respect to lynx, implementation of one of the action alternatives would better insure forest regeneration in the wildland-urban interface where lynx may occasionally be present.[378] This should provide a moderate- to long-term, potential benefit to lynx as forest succession creates higher quality habitat for the prey base than what is now present (and what was recently present). The project per se would have few potential effects (e.g., lynx displaced from active treatment areas, insignificant increases in project-related road-kill probabilities, etc.) on lynx or its habitat. The project involves salvaging standing dead and dying MPB-infested lodgepole trees that have been and will be killed by MPBs. Such trees have little present and subsequent value to the lynx prey base. Thus, the habitat conversion that has and will occur (and the resulting changes in LAU statistics) is a result of the beetles, not the removal of the dead trees. The broader effects of the MPB epidemic in the Tenmile Range and Swan River LAU have been considered as part of the environmental baseline. The effects of this forest health project could benefit lynx in these analysis areas in the moderate- to long-terms.

Ophir Mountain Forest Health and Fuels Reduction Project

With respect to lynx, the project would have the same potential benefits and effects in the northern end of the Swan River LAU and a portion of the Snake River LAU that is contiguous with the Swan River LAU as that described above for the Breckenridge Forest Health and Fuels Project.

North Summit Wildland Urban Interface Fuels Reduction Project

With respect to lynx, the project would have the same potential benefits and effects as that described above for the Breckenridge Forest Health and Fuels Project. The North Summit project area is in the LAU to the north of the Swan River LAU and there is impair habitat connectivity between the two LAUs as a result of natural landscape features, human development, and Interstate 70. It is uncertain if the potential benefits and effects of this project would be realized by any lynx using the Swan River LAU.

WRNF Travel Management Plan

With respect to lynx, any of the alternatives considered in the TMP would result in reduced mileage of summer roads and trails over the existing situation because of rehabilitation of user-created roads and trails.[379] This should result in a slight beneficial effect to lynx due to a reduction in the areas affected by motorized, mechanized, and foot/horse travel. The roads and trails being considered for removal do not

[378] Ibid.
[379] USDA Forest Service, 2008a

carry the heavy traffic loads that have been identified as significant to lynx. Since general summer recreation use of forest roads is not identified as a risk factor for lynx, this reduction in potential harassment is not expected to result in a measurable effect on lynx or lynx habitat conditions across the forest. In winter, all alternatives considered would maintain the same amount of motorized prohibited areas, while Alternative G would reduce the amount of open motorized areas and increase the amount of the restricted motorized use areas.[380] The decisions made under the TMP would not increase the "authorized, managed, and promoted" routes or play areas identified under the Forest snow compaction map. These forest-wide effects would extend to some extent to the Swan River LAU.

Interstate 70 PEIS

With respect to lynx, it is likely that the selected action will meet its goal of accommodating greater traffic volumes at higher speeds. Where such upgraded highway sections bisect lynx habitat, the effect will be greater lynx highway mortality probabilities, impaired local and landscape-level habitat connectivity across the highway, and reduced habitat effectiveness adjacent to the highway. These adverse effects will be partly offset with the implementation of conservation measures, including, but not limited to highway crossing structures.

Region 2 Sensitive Species

Colorado River Cutthroat Trout

Past actions (most likely historic) in the vicinity of the project area, including introductions of non-native trout, fishing pressure, habitat modifications (possibly including ski area development), toxic mine wastes, water diversions, logging, road building, and overgrazing have adversely affected CRCT habitat and probably resulted in the local extirpation of this native trout from local creeks.

The ongoing MPB epidemic in mid- and lower-elevation lodgepole pine and mixed conifer habitats along the east slope of the Tenmile Range, including the Peak 6 area and other portions of the BSR SUP area, will likely reduce short- and moderate-term forest cover. This could result in increased runoff and increased sedimentation of local creeks that provide potential, but unoccupied CRCT habitat. Such negative MPB effects would be a continuation of the ongoing MPB epidemic.

Past, present and reasonably foreseeable future actions, including, but not limited to ongoing residential development, summer construction projects on the ski area, and dispersed recreation at elevations overlapping potential cutthroat trout habitat, have likely been limited to minor additional impacts (runoff and other water quality impacts) to potential, but unoccupied CRCT habitat.

[380] Ibid.

Boreal Toad

Past actions in the vicinity of the project area, including mining, logging and road building, other habitat modifications (including ski area and secondary base area developments), water diversions, recreational trails and use, and the continuing chytrid fungus and MPB trends have adversely affected boreal toad habitat and have probably adversely affected local historic toad populations, including the Cucumber Gulch population that borders on the brink of extirpation. Present actions (ongoing residential, base area, and secondary ski area developments, summer construction projects on the ski area, traffic on local roads, and dispersed recreation at elevations overlapping potential boreal toad habitat, have likely contributed minor, additional impacts to potential, but unoccupied boreal toad habitat. Impacts and potential impacts include forest clearing and fragmentation that could affect terrestrial toad movements, hibernacula, and the quality of aquatic breeding sites, traffic resulting in toad mortality during pre- and post-breeding toad movements, and dispersed recreation resulting in mortality risks and the inadvertent spread of chytrid fungus between breeding sites. The exception to this may be the continued use of that portion of the ski area in the Cucumber Gulch drainage, secondary base area developments, and recreational trails and use within the Cucumber Gulch Overlay Protection District that may be affecting the extant toad population.

Reasonably foreseeable actions include the implementation of future components of the BSR MDP, continued Town of Breckenridge and Upper Blue residential build-out, the Ophir Mountain and Breckenridge Forest Health and Fuels Reduction Projects, and Highway 9 widening. With the exception of the former action, these actions would affect lower elevation, mostly private lands containing no known historic or extant toad populations. While some of those project areas extending to within several miles of the Cucumber Gulch breeding complex theoretically represent potential, post- and pre-breeding, upland toad habitats, those areas are likely unoccupied. Those actions affecting streams could affect potential, but unoccupied boreal toad breeding habitat via habitat conversion, ground disturbance, erosion, sedimentation, increased runoff (short- to long-term), and other negative water quality impacts. Loss of forest cover could adversely affect toad dispersal and hibernacula sites. These reasonably foreseeable actions would all include PDC that would avoid and minimize negative effects to water quality and boreal toad habitat that would likely result in minimal additional impacts to potential, but unoccupied boreal toad habitat.

These past, present and reasonably foreseeable future actions, that have extended within the ± 2.5-mile dispersal distance of the Cucumber Gulch population and this occupied and potential toad habitat, could have additive, adverse effects to terrestrial toad movements, hibernacula, and the quality of aquatic breeding sites, traffic resulting in toad mortality during pre- and post-breeding toad movements, and dispersed recreation resulting in mortality risks and the inadvertent spread of chytrid fungus between breeding sites.

Northern Goshawk

Past and present actions, largely associated with historic mining and logging and more recent ski area and secondary residential development in the Peak 6 goshawk project area, have adversely affected goshawk foraging and possible nesting habitat through habitat conversion, fragmentation, loss, and incomplete successional recovery. However, goshawks persist along the east slope of the Tenmile Range. The ongoing MPB epidemic will likely reduce short- and moderate-term foraging and nesting opportunities along mid- and lower-elevation lodgepole pine and mixed conifer habitats along the east slope of the Tenmile Range, including the Peak 6 area and other portions of the BSR SUP area.

Impact zones associated with reasonably foreseeable projects considered in this analysis (implementation of future components of the BSR MDP, continued Town of Breckenridge and Upper Blue residential build-out, and the Ophir Mountain and Breckenridge Forest Health and Fuels Reduction Projects) would contribute additional effects to foraging and potential nesting habitat along the east slope of the Tenmile Range. Despite past, present and foreseeable future projects, goshawks would persist in this analysis area.

Northern Harrier

Past and present actions (largely associated with historic mining and logging and more recent ski area development in the Peak 6 project area) that created grasslands out of closed canopy forest, have potentially benefitted harriers by creating potential foraging habitat that might be used by rare fall migrants. Reasonably foreseeable actions that could affect harriers that could also be affected by Alternatives 2 and 3 would be implementation of future components of the BSR MDP, and the Ophir Mountain and Breckenridge Forest Health and Fuels Reduction Projects. These actions could also provide potentially beneficial, but in all likelihood unrealized increases in potential foraging habitat.

American Peregrine Falcon

Past, present and future actions (largely associated with historic mining and logging and more recent ski area development in the Peak 6 project area) that created grasslands out of closed canopy forest, have potentially benefitted peregrines by creating additional openings that prey species would have to fly across (thereby increasing the vulnerability of forest and “edge” birds to peregrine predation) and increasing the quality of potential foraging habitat (by improving potential prey recovery habitat, for birds knocked down by peregrines above the former canopy). This potential, relatively insignificant benefit may have been realized before (circa pre-1960) peregrine populations were affected by persistent pesticides and may be realized in recent years (post mid-1990s) with the re-occupancy of the local eyrie.

White-tailed Ptarmigan

Past actions in the Peak 6 project area had little effect on their alpine habitat, although impacts largely associated with historic mining and logging may have adversely affected subalpine wetlands that may have been used by wintering females. Hunting associated with those historic activities may also have locally reduced ptarmigan numbers. Present and future actions, including ski area management and use, have likely to contribute minor, additional impacts to wintering male (on the ski area) and potential

female (around Goose Pasture Tarn) ptarmigan habitat effectiveness, although wintering males are expected to persist in and beyond active ski terrain.

Boreal Owl

Past and present actions, largely associated with historic mining and logging and more recent ski area and secondary residential development, have adversely affected suitable foraging and nesting habitat through habitat conversion, fragmentation, loss, and incomplete successional recovery. However, boreal owls persist along the east slope of the Tenmile Range and may occur in large enough blocks of developed ski terrain. The ongoing MPB epidemic will likely reduce short- and moderate-term foraging and nesting opportunities along mid- and lower-elevation lodgepole pine and mixed conifer habitats along the east slope of the Tenmile Range, including the Peak 6 area and other portions of the BSR SUP area.

Impact zones associated with reasonably foreseeable projects considered in this analysis (implementation of future components of the BSR MDP, continued Town of Breckenridge and Upper Blue residential build-out, and the Ophir Mountain and Breckenridge Forest Health and Fuels Reduction Projects) would contribute additional effects primarily to boreal owl foraging habitat, but also to upper elevation potential nesting habitat along the east slope of the Tenmile Range. However, boreal owls would persist in this analysis area. Other reasonably foreseeable projects considered in this analysis would contribute no additional cumulative effects to this species because impact zones associated with those other projects would not extend to potential habitat for this species that could be directly and indirectly affected by Alternatives 1 through 3 on NFS lands.

American Three-toed Woodpecker

Past and present actions, largely associated with historic mining and logging and more recent ski area and secondary residential development in the Peak 6 three-toed woodpecker project area, have adversely affected suitable foraging and nesting habitat through habitat conversion, fragmentation, loss, and incomplete successional recovery. However, three-toed woodpeckers persist along the east slope of the Tenmile Range and occur in suitable developed ski terrain.

The current MPB epidemic will influence three-toed woodpecker habitat availability and abundance within the Peak 6 project area, in other portions of the BSR SUP area, and along the east slope of the Tenmile Range. Effects within the Peak 6 project area should be relatively modest because most of the project area’s forest is dominated by spruce-fir stands. Woodpecker populations may increase to maximum densities closely tracking the epidemic, then decline to ebbs, particularly in lodgepole stands, as the flush of secondary and tertiary wood-boring beetles decline appreciably in a landscape with a small proportion of the former foraging habitat present. Thereafter, foraging and nesting opportunities in the same MPB impact area may remain at relatively low levels until forest structure succeeds back to mature stages

Olive-sided Flycatcher

Past and present actions, largely associated with historic mining and logging and more recent ski area and secondary residential development, have adversely affected suitable olive-sided flycatcher foraging and nesting habitat through habitat conversion, fragmentation, and loss. However, olive-sided flycatchers persist along the east slope of the Tenmile Range, including in developed ski terrain.

Impact zones associated with reasonably foreseeable projects considered in this analysis (implementation of future components of the BSR MDP, continued Town of Breckenridge and Upper Blue residential build-out, and the Ophir Mountain and Breckenridge Forest Health and Fuels Reduction Projects) would contribute additional effects to olive-sided flycatcher foraging and nesting habitat along the east slope of the Tenmile Range. However, olive-sided flycatchers would persist in this analysis area. Other reasonably foreseeable projects considered in this analysis would contribute no additional cumulative effects to this species because impact zones associated with those other projects would not extend to potential habitat for this species that could be directly and indirectly affected by Alternatives 1 through 3 on NFS lands.

Pygmy Shrew

Past and present actions that resulted in habitat conversion, fragmentation, loss, and incomplete successional recovery that were largely associated with historic mining and logging and more recent ski area and secondary residential development may have adversely affected potential habitat of this species. Large areas of potential habitat persist along the east slope of the Tenmile Range, including developed and undeveloped ski terrain within the BSR SUP area.

American Marten

Past and present actions, largely associated with historic mining and logging (including trapping) and more recent ski area and secondary residential development, have adversely affected marten habitat through habitat conversion, fragmentation, loss, and incomplete successional recovery. However, martens persist along the east slope of the Tenmile Range and occur in larger, suitable blocks of developed ski terrain.

North American Wolverine

Past and present actions in the Peak 6 project area permanently degraded potential, but unoccupied, wolverine travel and opportunistic foraging habitat along the east slope of the Tenmile Range. Large areas of both of these habitats remain along the length and subalpine forests along both sides of the ranges, although they are somewhat isolated by surrounding highways and human developments.

River Otter

Past and present actions, including historic effects and contemporary resort development and its support infrastructure, have generally had adverse affects on summer otter and travel habitat associated with upper Blue River stream systems. However, transient otters are occasionally present in this analysis area, including drainages below the Peak 6 project area.

Impact zones associated with reasonably foreseeable projects considered in this analysis (implementation of future components of the BSR MDP, continued Town of Breckenridge and Upper Blue residential build-out, the Ophir Mountain and Breckenridge Forest Health and Fuels Reduction Projects, and continued Highway 9 widening) would contribute minor additional effects to summer otter habitat use along the east slope of the Tenmile Range. All of these projects would include PDC to avoid and minimize potential impacts to potential otter habitat. Other reasonably foreseeable projects considered in this analysis would contribute no additional cumulative effects to this species because impact zones associated with those other projects would not extend to potential habitat for this species that could be directly and indirectly affected by Alternatives 1 through 3 on NFS lands.

Rocky Mountain Bighorn Sheep

With the possible exception of Interstate 70 upgrading that may occur in Tenmile Canyon that could further impair sheep habitat connectivity between the Tenmile and Gore Ranges, other reasonably foreseeable projects considered in this analysis would contribute no additional cumulative effects to this species because impact zones associated with those projects would not extend to potential habitat for this species directly and indirectly affected by Alternatives 1 through 3 on NFS land.

Management Indicator Species

American Elk

Past actions, largely associated with historic mining, logging, and reservoir developments and more recent ski resort and supporting infrastructure developments (in particular secondary residential and commercial developments and traffic increases), have affected seasonal elk habitats in the upper Blue River valley. Actions earlier than the 1950s, when elk first began recolonizing the valley, affected unoccupied habitat, but the resulting habitat losses, modifications, and distributions of human developments and activities in the valley, established a baseline for how elk utilize the landscape today in response to present actions.

Reasonably foreseeable projects considered in this analysis (implementation of future components of the BSR MDP, continued Town of Breckenridge and Upper Blue residential build-out, the Ophir Mountain and Breckenridge Forest Health and Fuels Reduction Projects, continued Highway 9 widening, and possible Interstate 70 upgrading between the east and west Frisco exists) would make additional, increments effects to year-round habitat use, habitat connectivity, and highway mortality. The forest health projects could benefit elk by increasing winter and transitional range forage availability. Such benefits would be realized in those areas that are more buffered and isolated from human activities. The remaining reasonably foreseeable projects would contribute minor, local negative effects on elk habitat effectiveness, but no discernible effect on habitat effectiveness within the DAU. Other reasonably foreseeable projects considered in this analysis would contribute no additional cumulative effects to elk because impact zones associated with those projects would not extend to potential habitat for this species that could be directly and indirectly affected by Alternatives 1 through 3 on NFS lands.

A number of issues and continuing trends have the potential to affect elk slightly from the current environmental baseline (Year 2009) to full build out (Year 2015) of Alternatives 2 and 3. The effects associated with these issues represent a continuation of the environmental baseline and are considered here so that additional BSR-related effects under Alternatives 1 through 3 can be accurately quantified.

Human Population Growth

Human population growth and land development will continue to be two of the largest influences on elk management. Both of these factors could further limit winter range availability and effectiveness, a major limiting factor for elk populations, as well as the effectiveness of other seasonal ranges.

Winter Severity

Winter severity and its effects on winter range forage availability is another major factor that can affect overwinter elk survival, subsequent recruitment, and the size of elk herds.

Climate Change

Climate change is reducing the snow pack in western North American mountains and is shifting the distribution of boreal forest northward and up mountain slopes.[381] As a result, climate change has the potential to affect the long-term viability of those species in the contiguous United States heavily dependent and/or restricted to those narrow bands of upper elevation forests.[382] Based on three climate change scenarios, boreal habitat in the lower 48 United States could decrease by 47 to 69 percent by 2100 A.D. using Canada lynx (*Lynx canadensis*) as a proxy.[383] However, the Proposed Action would be completed in 2015, likely before any measureable climate change effects predicted by Gonzales et al. could be discerned from background variation that would be realized on upper elevation Rocky Mountain forested habitats.

CDOW Management

The State of Colorado has the responsibility for the management of wildlife populations. The CDOW has specific elk management goals and objectives that have been developed in cooperation with landowners, the public and federal land management agencies. These plans help guide the state's direction in the management of elk, increasing and decreasing harvest quotas in attempts to balance herd numbers with habitat availability.

Increased Dispersed Recreation

Dispersed recreation can adversely affect elk habitat use.[384] Conflicts on winter range and calving areas are generally thought to be more significant. Existing levels and distributions of dispersed recreational

[381] Knowles et al., 2006; IPCC, 2007; Sturm et al., 2001; Danby and Hik, 2007
[382] Gonzales et al., 2007
[383] Ibid.
[384] Schultz and Bailey, 1978; MacArthur et al., 1982; Freddy et al., 1986; Knight and Cole, 1995; Phillips and Alldredge, 2000

activities is currently influencing elk habitat use in DAU E-13. Based on the recent trend, dispersed recreational activities will continue to increase annually, imposing additional pressure on elk habitat effectiveness.

American Pipit

Past and present actions in the Peak 6 project area, including BSR development, have had little impact on alpine grasslands and American pipits. With the possible exception of future BSR MDP components that would extend into the alpine, other reasonably foreseeable projects considered in this analysis would contribute no additional cumulative effects to pipits and other species associated with alpine grasslands because impact zones associated with those projects would not extend into potential habitat for this species that would be directly and indirectly affected by Alternatives 1 through 3 on NFS lands.

Aquatic Macroinvertebrates

Past and present actions that have affected aquatic macroinvertebrates and their habitat in the vicinity of the project area include historic mining, historic and contemporary logging, other habitat modifications (including alpine and Nordic ski area development), secondary resort development, and the effects of recreational activities. These actions have modified stream channels to some extent and resulted in short-term to long-term perturbations to water quality and aquatic faunal communities compared with control streams.

Reasonably foreseeable actions considered herein that could affect aquatic macroinvertebrates that could also be affected by Alternatives 2 and 3 would be implementation of future components of the BSR MDP, continued Town of Breckenridge and Upper Blue residential build-out, the Ophir Mountain and Breckenridge Forest Health and Fuels Reduction Projects, and Highway 9 widening. Effects to aquatic macroinvertebrates could result from habitat conversion, ground disturbance, erosion, sedimentation, increased runoff (short- to long-term), increases and decreases of woody debris in streams, and other negative water quality impacts. These future actions would all include PDC that would avoid and minimize negative effects to water quality that would likely result in minimal additional impacts to aquatic macroinvertebrate communities. The impact zones of other reasonably foreseeable projects considered in this analysis would contribute no additional cumulative effects to project area streams because impact zones associated with those projects would not extend to the flowing waters that could be directly and indirectly affected by Alternatives 1 through 3 on NFS lands. Stream conditions on the WRNF as a whole are generally in good (i.e., somewhat near reference) condition and Forest-wide aquatic macroinvertebrates are expected to move toward reference (i.e., better) conditions as more conservative habitat protection measures are implemented and as habitat improves.

Brook Trout, Brown Trout, Rainbow Trout, and Colorado River Cutthroat Trout

Past actions have had mostly negative effects to native trout and their habitat and beneficial and negative effects to the non-native trout considered in this MIS group. Past and present actions that have affected trout and their habitat in the vicinity of the project area include historic mining, historic and contemporary

logging, other habitat modifications (including Alpine and Nordic ski area development), secondary resort development, water diversions and impoundments, road building, the effects of recreational activities, and CDOW management (i.e., restocking). These actions have introduced non-native trout to streams presumably occupied by CRCT, created additional trout habitat (impoundments), and degraded existing habitat, presumably also affecting fall spawning. Introductions of non-native brook, brown, and rainbow trout into Colorado in the late 1800s clearly benefitted these species, while these same introductions and other factors adversely affected CRCT.

Reasonably foreseeable actions considered herein that could affect trout that could also be affected by Alternatives 2 and 3 would include the implementation of future BSR MDP components, continued Town of Breckenridge and Upper Blue residential build-out, the Ophir Mountain and Breckenridge Forest Health and Fuels Reduction Projects, and Highway 9 widening. With the exception of the former action, these actions would affect the lower, mostly private reaches of the streams draining the project area and the reaches containing fish. These actions would all include PDC that would avoid and minimize negative effects to water quality and trout habitat that would likely result in minimal additional impacts to this MIS group. The additional incremental effects of these actions could have localized, temporary (generally), minor, degrading affects on trout, however they would not meaningfully contribute any negative effects to Forest-wide water quality or quantity that would affect local or Forest-wide trout populations or habitat trend. The impact zones of other reasonably foreseeable projects considered in this analysis would contribute no additional cumulative effects to project area streams because impact zones associated with those projects would not extend to the streams that could be directly and indirectly affected by Alternatives 1 through 3 on NFS lands.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The amount of habitat modifications, as well as disturbances during the ski season, related to the lift installations and replacement would irretrievably affect some individual members of various wildlife species, but are not considered irreversible.

J. FOREST HEALTH

SCOPE OF THE ANALYSIS

The project area consists of BSR's 5,756-acre SUP area, designated as Management Area 8.25 (Ski Areas – Existing and Potential), which is intensively managed for downhill skiing opportunities and opportunities for non-motorized recreation. The scope of this analysis includes forested vegetation along the east slope of the Tenmile Range. The components of the action alternatives would meet the Forest Plan definition of vegetation management—"any activities undertaken to modify the existing condition of the vegetation."[385] Although, the vegetation management that is a component of the action alternatives is not specifically proposed for forest health. This analysis incorporates and analyzes data collected as part of a recent BSR Vegetation Management Plan (VMP) as it relates to the alternatives.[386] Plan components from the VMP are not proposed in this EIS. This Forest Health analysis was prepared in part to respond to scoping comments requesting information on the effects of mountain pine beetle within the SUP area, and how the epidemic interacts with winter recreation.

FOREST SERVICE DIRECTION

Activities permitted and conducted on NFS lands must comply with the long-term management directions included in the Forest Plan. The Forest Plan includes 33 separate Management Areas for different portions of the Forest based on ecological conditions, historic development, and desired future conditions. Management Area 8.25 includes the following vegetation management standard:

> *"Vegetation management practices will be used to maintain and improve ski area objectives." (3-83)*

The desired future conditions within Management Area 8.25 include the following vegetation management direction:

> *"Management areas are characterized by a vegetational mosaic that includes natural and man-made grassy openings intermixed with forested or partially forested areas and rocky outcroppings. Forested areas are managed as sustainable cover with a variety of species and age classes in patterns typical of the natural landscape character of the area. Vegetation is managed to avoid catastrophic changes that could result from windthrow, insects, disease, or fire. Disturbed areas are revegetated to protect scenery and minimize erosion." (3-80)*

[385] USDA Forest Service, 2002
[386] SE Group et al., 2011

AFFECTED ENVIRONMENT

Summit County is experiencing heavy mortality of mature lodgepole pine due to an epidemic population of mountain pine beetle (*Dendroctonus ponderosae*). Mountain pine beetle (MPB) activity became evident in Summit County in 2003 with small pockets of trees showing signs of MPB mortality (e.g., red needles). Drought, mild winters and single-age stand conditions have supported increasing MPB populations within the project area, as well as across much of north central Colorado.

Tenmile Range

Generally, the lower elevations of the Tenmile Range are dominated by lodgepole pine (*Pinus contorta*), with small patches of aspen and scattered mountain meadows. Within lodgepole pine forests from Frisco to Red Tail Ranch, mortality rates due to mountain pine beetle are approaching an average of 80 percent of the basal area in stands with average diameter at breast height (dbh) greater than 7 inches. Current projections for that area are that 90 percent of the mature lodgepole pine is expected to die on federal and non-federal lands within the next three to five years. Within stands affected by the action alternatives, lodgepole pine mortality due to MPB ranges from 0 to 80 percent.[387] In stands where MPB was recorded, 30 and 80 percent of the stand is affected by MPB. These stands were assigned a level of susceptibility to MPB mortality ranging from low risk (6.0) to moderate risk (12.0). Smaller diameter stands (under 7 dbh) have lower MPB mortality and lower risk susceptibility.[388] Based on the decreasing amount of new MPB activity recorded in Summit County in 2009 and 2010, it is likely that MPB activity peaked and further activity in the area will be reduced.[389]

In areas with high MPB mortality, dead lodgepole pine trees are expected to deteriorate and fall to the ground creating heavy fuels accumulations that could support large-scale wildfire characterized by high severity/high intensity fire behavior. The higher elevations are sub-alpine to alpine environments consisting of Engelmann spruce (*Picea engelmannii*) and sub-alpine fir (*Abies lasiocarpa*) which transition into non-forested alpine tundra. Lodgepole pine occurs throughout the elevation range in the area but is generally present as a minor component in spruce-fir dominated stands above 10,800 feet elevation.

Peak 6 and the Developed Terrain Network

A forest inventory of all the stands in BSR's SUP area was conducted in 2002 and 2009. The 2009 survey included an inventory of recent mountain pine beetle mortality and tree regeneration already present

[387] In stands with lodgepole pine averaging 7 inches dbh or greater.
[388] The overall risk rating score is determined by three risk factors: 1) elevation, 2) average age, and 3) average dbh. Stands are assigned risk factor values of 1, 2, or 3, depending upon the stand conditions for each risk factor. The three risk factor scores are then multiplied together to arrive at a final "risk susceptibility" score (ranging from 1 to 27). If the product of the three scores equals: 1 to 9 the overall risk is considered Low; 12 to 18 the overall risk is considered Moderate; and 19 to 27 the overall risk is considered high. Amman et al., 1977
[389] Green, 2011

within all the stands. An assessment of ski-related damage to the regeneration was also made. The inventory was conducted using the USFS Common Stand Exam protocols, is archived in the USFS R2 FSVeg database, and is further detailed in the BSR VMP.

Existing Vegetation Communities within the SUP Area

The BSR project area contains 5,756 acres of NFS lands managed by the Forest Service. Four dominant vegetation communities were identified within the ski resort including grasslands (Alpine and ski trails), barren lands, spruce-fir forest, and lodgepole pine forests. Each of these dominant types have small inclusions of wetlands, willows, water, mountain shrub, and aspen habitats that may be either too small to map or not the dominant species. In addition, disturbed/developed areas exist where grading, utility installation and/or building has occurred for the development of ski resort facilities, including base area buildings, on-mountain facilities, lifts, trails, roads, and runs. Disturbed areas without structures have been reseeded primarily to grasses and exhibit relatively sparse to adequate vegetation cover.

Current conditions on NFS lands support the following vegetation types: mountain grassland (44 percent), ski trails (21 percent), pure lodgepole pine (*Pinus contorta*) forest (9 percent), mixed lodgepole pine (*Pinus contorta*) forest (3 percent), mixed-conifer forest (8 percent), spruce-fir (*Picea engelmannii-Abies bifolia*) forest (14 percent), aspen (*Populus tremuloides*) forest (<1 percent), high elevation riparian (<1 percent), wet meadow (<1 percent), and lakes (<1 percent). Lodgepole pine and spruce-fir forest communities that occur within the BSR SUP area are briefly discussed below. Each of these forested communities have small inclusions of wetlands, willows, water, mountain shrub, and aspen habitats that may be either too small to map or not the dominant species. In addition, disturbed/developed areas exist where grading, utility installation and/or building has occurred for the development of ski resort facilities, including base area buildings, on-mountain facilities, lifts, trails, roads, and runs. A more detailed description of these forest communities is contained in the BSR VMP.[390]

Lodgepole Pine Forest Community

The lodgepole pine dominant forest community is the second most extensive vegetation type in the ski resort, and the primary forest type. It is located primarily at elevations below 11,400 feet (3,475 meters). In concept, without disturbance, these lodgepole pine stands would eventually convert to sub-alpine fir-Engelmann spruce stands, provided that seed sources for these species are nearby. However, this process has been accelerated due to the severity of the MPB outbreak in Summit County. During the 2009 forest inventory, MPB activity and lodgepole pine mortality was evident throughout the ski area. Where MPB was active within stands affected by the action alternatives, mortality ranged from 30 to 80 percent of the stand. Many of the sites dominated by mature lodgepole pine appear to have few spruce-fir seed sources, thus, these sites may be climax lodgepole pine. The susceptibility of these stands succumbing to MPB mortality ranges from low risk to moderate risk.

[390] SE Group et al., 2011

The lodgepole pine of BSR reached its current condition from various disturbance agents near the end of the 20th century. These agents included insects, disease, fire (natural and human-induced), and logging. Dense, closed canopy lodgepole pine stands within the permit boundary have limited shrub and grass/forb components as a result of the high tree-stem densities of the stands. The majority of the dense, mature lodgepole pine on the mountain at this time has little vegetative ground cover.

The lodgepole pine sites across the BSR landscape had been delineated as 23 separate stands in 1979. Cutting of ski trails and lift-lines over the past 50 years have increased the number of pine stands to 51 or more, as well as decreased the overall average stand size. Where stands have detailed data, mean diameter ranges between 4.0 inches and 8.2 inches with an average of 6.0 inches. This relatively small average diameter (under 7 inches dbh) reflects typical high-density lodgepole pine and the large amount of "doghair" stands on the mountain. Although the pine stands are small diameter, the pine stands are advanced in age. The lodgepole pine stands average between 80 years and 170 years in age. Typically, 3-inch diameter trees are found to be the same age as a 12-inch diameter tree nearby; however, despite the similar age, these smaller diameter trees (less than 7-inch dbh) have lower risk of being affected by MPB.

Mixed-Conifer Forest Community

Mixed-conifer stands are made up of spruce, fir and lodgepole pine, with greater than 50 percent of the composition being spruce and/or fir. This is the fifth largest community type within the SUP area, with Peak 7 having the majority of mixed-conifer stands; however, it is common across the SUP area up to 11,800 feet (3,597 meters). Seven mixed-conifer stands have been delineated within the SUP area. Where stands have detailed data, mixed-conifer trees range from 4.2 inches dbh to 8.8 inches dbh, with an average dbh within the SUP area of 6.7 inches.

Spruce-Fir Forest Community

The spruce-fir forest community is the third most extensive vegetation type in the ski resort. It is located primarily at elevations below 11,600 feet (3,536 meters), but small pockets of windswept, stunted trees (krummholz) extend to around 11,800 feet (3,597 meters) in the upper central portion of the ski resort. Subtle differences in slope and aspect result in varying spruce-fir habitat types (tree sizes and ground cover) and can be observed across the BSR depending upon the respective soil development and elevation.

Spruce-fir within stands average approximately 90 years in age (e.g., BR0503 0010) although some stands may be much older in the Peak 6 area where individual trees over 300 years of age were observed (legacy trees). Within the developed ski area and stands occurring on Peak 6, tree ages vary considerably due to the shade-tolerant, uneven-aged ecology of the spruce-fir forest type. Thus, the stand average age is actually lower than the ages of many individual trees. Literature has documented that spruce and fir seedlings can take 10 to 70 years before growing beyond 4.5 feet in height.[391] There are known individual

[391] Veblen et al., 1994

trees approximately 500 years old within the BSR SUP area. Tree age data is important to understand in order to estimate forest vigor and to predict persistence in the longer-term. Documented life expectancy in spruce-fir forest types without epidemic spruce beetle outbreaks or catastrophic fire have realized spruce individuals ranging from 300 to over 500 years in age.[392]

A narrow band along upper timberline on Peak 6 (within BR0503) has been identified as having a concentration of legacy (advanced age) trees. Trees in this area were surveyed in 2009 (locations of legacy trees are identified in the Project File), identifying certain trees as having some or all of the following characteristics trees of advanced age:

- Very large diameter (24 to 40 inches)
- Generally taller than the surrounding canopy layer
- Rounded crown tops
- Non-conical crown shape
- Sparse foliage/crown

Based on core samples taken from trees in the nearby population, these trees are estimated to be between 300 and 500 years old. Individual and clumps of legacy trees were identified within a 50-acre band of trees before tree line (between 11,520 and 11,590 feet) on spruce-fir stands on Peak 6. Legacy trees are primarily Engelmann spruce, although there are several large diameter sub-alpine fir in the Peak 6 area as well (which are not as long-lived as the spruce).

For clarity, old growth is typically defined as a forest characterized by the presence of large old trees, numerous snags and woody debris, and a multilayered canopy that is usually in a late successional stage ecologically.[393] Although the forests in Peak 6 have some of these characteristics they cannot be characterized as old growth due to the absence of one or more of these characteristics. Specifically, some areas were lacking suitable amounts of down woody debris, while in other areas a lack of snags was observed. Therefore, although there are large, old legacy trees in the Peak 6 area, it would not meet the definition of old growth.

Existing Forest Regeneration

Few forest sites within the BSR permit exhibit early-seral ecological stages. The largest regenerating lodgepole pine site is BR0507 0085, a lower elevation stand in the Peak 6 area, inventoried to have approximately 3,100 trees per acre as regeneration. Several Engelmann spruce and sub-alpine fir sites occur as relatively young trees in the vicinities of Peak 7 and the Burn trail on the north side of Peak 10. It is important to note that during the forest inventory it was observed that many stands within the BSR SUP

[392] Veblen, 1986; Peet, 1988
[393] Helms, 1998

area exhibited some relative natural regeneration occurring by each species composition and that in many of the lodgepole pine stands it was not uncommon to observe greater than 150 seedling trees per acre. In all species, many of the smaller, fragmented tree islands have very little natural regeneration.

FSVeg data reflects that aspen is a minor understory component of forested sites and was typically observed occurring as regeneration (i.e., < 1-inch dbh) on moist sites. Aspen occurs within four sites inventoried during the preparation of the BSR VMP; though it is limited throughout the SUP area. FSVeg data reflects that most aspen was mixed with lodgepole pine. Field review results that aspen also occurs as fragmented stands within ski trails and drainages, and within a few spruce-fir sites.

Current natural regeneration occurs in Engelmann spruce and/or sub-alpine fir stands to varying degrees dependent upon dominant seed sources, disturbance, and water holding capacity of the soil. Higher elevations and poor sites may never experience Engelmann spruce being succeeded by sub-alpine fir.

Approximately 30 percent of lodgepole pine stands have some spruce and or sub-alpine fir succeeding the pine. This spruce-fir component occurs as mature trees, saplings, and seedlings. The majority of lodgepole pine stands on the mountain (approximately 60 percent) has less than 10 percent occurrence of spruce or sub-alpine fir. Few early seral sites of lodgepole pine occur to any measurable size, beyond where lift corridors or ski trails have been abandoned for skiing.

The VMP recommended five regeneration options to ensure that as the current MPB outbreak kills trees greater than 7 inches in diameter, revegetation would be present to replace the stand. The regeneration options were based on soil productivity and the level of existing natural regeneration in each stand (e.g., vigorous, non-existent). Typically, in stands with vigorous existing regeneration, it was recommended that the existing natural regeneration processes be allowed to continue. Alternately, in stands where no natural revegetation was observed, a combination of transplantation and track scarification was prescribed.

Of the 74 stands sampled within the ski area boundary, existing natural regeneration was considered vigorous enough in 44 stands totaling approximately 1,769.7 acres that the revegetation prescription was to utilize either natural regeneration or minor levels of transplantation/track scarification to ensure the stand would be replaced.[394] It is important to note that in many cases where artificial regeneration was prescribed the stands were observed to have as many as 1,200 existing seedlings present in the understory. In those cases, the recommendation was made to increase species diversity. Of the thirty forest stands remaining where predominantly artificial means of revegetation was the prescription, five were located in Engelmann spruce or mixed-conifer stands and only nine stands of the 30 stands exhibited no regeneration at all. Additionally, the stands exhibiting no regeneration were located in the smaller, fragmented tree islands within the existing developed ski area.

[394] SE Group et al., 2011

Insects, Diseases and Damage

Mountain Pine Beetle

MPB is an insect native to the Rocky Mountain area that typically infests ponderosa pine (*Pinus ponderosa*), lodgepole and limber pines (*Pinus flexilis*). Populations of MPB in Colorado have been steadily increasing since the late 1990s and currently are at epidemic levels. Since the mid-1990s, MPB has infested over 1,500,000 acres of lodgepole pine with an average dbh of 7 inches or greater forest statewide. MPB has affected the White River National Forest, including the area permitted for BSR.

The October 2009 inventory identified 33 of the 74 forest stands in the BSR SUP area containing lodgepole pine averaging >5-inch dbh. All of 33 stands exhibited active MPB infestations and mortality to some degree, totaling approximately 220 acres. In stands where the action alternatives would occur and MPB was recorded, 30 and 80 percent of the stand is affected by MPB with the level of susceptibility to MPB mortality ranging from low risk (6.0) to moderate risk (12.0).[395]

The combination of an abundance of susceptible forest stands (such as those with high tree densities, and large trees), mild temperatures throughout the spring and fall seasons, and an increasing MPB population set the stage for the development of the current epidemic. However, based on the decreasing amount of new MPB activity recorded in Summit County in 2009 and 2010, it is likely that MPB activity peaked and MPB will continue to occur endemically until drought or stand conditions change. Colorado's current MPB epidemic is the largest recorded in state history.

MPBs assist in creating multi-aged forest stands by removing large-diameter trees, reducing stand densities, and providing growing space for canopy (e.g., Engelmann spruce) and below the canopy species. Future stand development will vary across the landscape and will be affected by current stand composition and further disturbance. Future dominance of species will vary from site to site depending on factors such as site quality, established regeneration, moisture, elevation, and cardinal direction of stands.

Other Insects, Diseases and Damage

Spruce beetle (*Dendroctonus rufipennis*) is another insect native to the Rocky Mountains. Several areas within Colorado are experiencing epidemic outbreaks of spruce beetle, killing spruce trees larger than 4 inches in diameter. Spruce beetle has not been identified within the BSR SUP area at this time. Other pathogens noted in the permit area include armellaria root rot (*Armellaria mellea*) in sub-alpine fir, and broom rust (*Chrysomyxa arctostaphyli*) and snow mold (*Herpotrichia nigra*) on spruce. None of these pathogens are considered to have major significance.

Porcupine damage on the stems and branches of lodgepole pine and sub-alpine fir was noted during the 2009 inventory, with some stands having severe damage. This was the most prevalent animal related damage within the BSR SUP area.

[395] Ibid.

Mechanical damage to the tops of regenerating trees of all species was noted in stands receiving skier use. Damage was particularly prevalent in "gladed" runs.

Dwarf mistletoe (*Arceuthobium americanum*) is a parasitic plant that is the most widespread and damaging disease agent in lodgepole pine throughout it range. Heavy mistletoe infections adversely impact tree and stand vigor by reducing rates of height and diameter growth and seed and cone production. The October 2009 inventory detected very little area infected by dwarf mistletoe and indicate that all of the lodgepole pine dominated areas have low to moderate levels of infection by dwarf mistletoe with Hawksworth ratings of 1–4.

Wildfire Danger

As discussed above, the MPB epidemic has resulted in large numbers of dead and dying lodgepole pine in all areas of the ski resort. Experience in similar MPB outbreaks in other areas has shown that the dead trees will begin to fall within five to seven years and 90 percent will be down within twenty years. Falling trees are hazardous to skiers and summer recreationists and can create heavy fuel loads across the landscape.

Wildfire is the greatest natural threat to the physical infrastructure of BSR. In 1880 wildfires surrounding the Town of Breckenridge and the Blue River devastated forests.[396] Past wildfires in the SUP area are evident from charred logs in the stands and large homogenous lodgepole pine stands. These observations in combination with regional climate, topography and fuels characteristics generally indicate an infrequent/high intensity fire regime for this area. What this means is naturally ignited (e.g., lightning) wildfires occur infrequently in this area at time intervals of 150 to 200 years, but the fires that do occur are high intensity fires with an average intensity greater than 1,200 BTU/foot/second.

Structures and improvements are not at risk from wildfires due to the presence of defensible space and less flammable vegetation in proximity to improvements. However, the threat of catastrophic wildfire is intensifying due to the increasing amount of dead and dying lodgepole pine in the BSR SUP area.

Non-Native Species and Noxious Weeds

No non-native invasive species of forest pathogens or insects were noted during the field surveys. Noxious weeds fortunately occur only at limited locations within BSR and mainly at lower elevations or the base area. False Chamomile (*Anthemis cotula*) was found to be prolific at each base area (mostly private lands), Toadflax (*Linaria Vulgaris*) was found at several locations, and Canada thistle (*Cirsium arvense*) was found infrequently dispersed across the lower elevations.[397]

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[396] Breckenridge Ski Resort, 2010e

[397] Noxious weed management options for common mullein, Canada thistle and musk thistle can be found at http://www.coopext.colostate.edu/adams/weed/.

DIRECT AND INDIRECT ENVIRONMENTAL CONSEQUENCES

Table 3J-1:
Summary of Forest Health Resource Effects by Issue and Indicator

Alternative 1	Alternative 2	Alternative 3
Issue: Due to the mountain pine beetle (MPB) outbreak that is currently affecting Colorado forests, the majority of lodgepole pine within the SUP area is either dead or may be dead within several years. Proposed projects could take advantage of tree stands that will be affected by MPB or could remove tree species other than lodgepole pine.		
Indicator: Quantification (acreage) of lands affected by MPB (pure/mixed lodgepole pine)		
1,131 acres of the lodgepole pine, mixed-conifer, and mixed-lodgepole pine forest types would be affected by MPB under Alternative 1. The level of susceptibility to MPB mortality is low to moderate. The effect would vary commensurate with the amount of lodgepole pine composing the stands.	Under Alternative 2, approximately 11.5 acres of clearing/grading would occur in mixed-conifer and lodgepole pine stands susceptible to the MPB outbreak. One stand where clearing would occur exhibits lodgepole pine mortality due to MPB, the level of susceptibility to MPB of this stand is moderate.	Under Alternative 3, approximately 42.5 acres of clearing and glading would occur in the lodgepole pine, mixed-conifer, and mixed lodgepole pine forest types stands susceptible to the MPB outbreak. 5.3 acres of the vegetation impacts would be glading, which would be beneficial at the site scale reducing MPB activity. The level of susceptibility to MPB mortality is low to moderate.
Indicator: Quantification (acreage) and disclosure of regeneration potential		
Under Alternative 1, approximately 1,780 acres of forest stands within the ski area would continue to experience good natural regeneration. Implementation of the BSR VMP would improve regeneration potential in the remaining forested areas of the ski area.	Under Alternative 2, 79.8 acres of vegetation clearing would occur in forest stands which are currently experiencing good natural regeneration. Implementation of the BSR VMP would improve regeneration potential in the remaining forested areas of the ski area.	Under Alternative 3, approximately 103.3 acres of tree removal would occur to create ski trails in forest stands that are currently exhibiting relatively high levels of natural regeneration. 88.6 acres of the vegetation impact under Alternative 3 would be glading for new trails, which would not immediately be affected. Implementation of the BSR VMP would improve regeneration potential in the remaining forested areas of the ski area.
Indicator: Quantification (acreage) of impacts from proposed projects by stand type and regeneration		
Under Alternative 1 no new projects would be implemented, and no new impacts to forest stands would be expected.	Under Alternative 2 impacts by stand type and regeneration are displayed in Table 3J-3. Under Alternative 2, 79.8 acres of vegetation clearing would occur in forest stands which are currently experiencing good natural regeneration.	Under Alternative 3 impacts by stand type and regeneration are displayed in Table 3J-3. Under Alternative 3 approximately 103.3 acres of vegetation clearing would occur in forest stands that are currently exhibiting relatively high levels of natural regeneration.
Indicator: Quantification (acreage/amount) and disclosure of impacts to legacy trees within the Peak 6 area		
Under Alternative 1, no new projects would be implemented and no new impacts to legacy trees would be expected. Currently, legacy trees are located within a 50-acre band of spruce-fir on NFS lands in the Peak 6 area.	Under Alternative 2, legacy trees would continue to be located in the Peak 6 area. Under Alternative 2, legacy trees within the project area would be identified and preserved to the greatest extent practicable.	Under Alternative 3, legacy trees would continue to be located in the Peak 6 area (within and beyond the proposed operational boundary). Under Alternative 3, legacy trees within the glading project area would be identified and preserved to the extent practicable.

Alternative 1 – No Action

Under Alternative 1, BSR would not construct any new facilities, trails or chairlifts. Based on the decreasing amount of new MPB activity recorded in Summit County in 2009 and 2010, it is likely that MPB activity peaked and further activity in the area will be reduced, approaching endemic levels.[398] The level of susceptibility to MPB mortality, measured in stands affected by the action alternatives ranged from low risk (6.0) to moderate risk (12.0). Some MPB mortality would continue to occur increasing the potential for catastrophic wildfire. Implementation of Alternative 1 would allow the project area to continue on its current trend. During the stand exams performed in 2009, MPB activity was observed within 33 of the 74 forest stands totaling approximately 310 acres. Additionally, lodgepole pine occurs throughout the SUP area either in mixed stands with Engelmann spruce or sub-alpine fir or in pure stands occurring lower in elevation. Although activity was not observed in all of these stands, it is expected that larger diameter lodgepole pine (greater than 7 inches dbh) in all forest communities would be affected by the outbreak. In essence, MPB related lodgepole pine mortality would occur at some level (generally between 30 and 80 percent of lodgepole pine based on project specific stand surveys) on approximately 1,131 acres or 19.6 percent of the ski area.

Under Alternative 1, trees killed by MPB would begin to deteriorate and eventually fall to the ground. This change in the fuel profile would increase the fuel hazard rating due to a combination of natural fuel build-up from pine beetle activity and subsequent regeneration with the opening of the canopy. As the fuel profiles change over time, so would the fuel hazard. In this project area the result would be an increased continuity between the ground fuels and the next generation of aerial fuels. Under Alternative 1, approximately 789 acres or 69.8 percent of the forest affected by the MPB epidemic would experience relatively good natural regeneration. Although all stands containing lodgepole pine are anticipated to be affected by the MPB epidemic, the degree each stand would be affected is directly related to the species composition (e.g., presence of other tree species).

Under Alternative 1, approximately 1,769.7 acres of forest stands within the ski area would continue to experience good natural regeneration. Vegetation management within the existing ski area under Alternative 1 would be accomplished through implementation of the VMP, which is a requirement of the SUP. Management projects detailed in the VMP are designed to address BSR operational needs that are inextricably related to forest health within the SUP area, as well as the WRNF in achieving the objectives of its 2002 Forest Plan (refer to Appendix A). The techniques used would provide for the adaptive management of vegetation at BSR, as the mountain pine beetle outbreak moves across the landscape and conditions change rapidly. Specifically, implementation of the regeneration prescriptions (e.g., transplantation) contained in the VMP would increase regeneration potential in the remaining 342 acres of forest that would be affected by MPB and where natural regeneration is poor. Additionally, implementation of the VMP would reduce risks from wildfires and other hazards while promoting forest

[398] Green, 2011

health. Individual projects under the VMP would require site specific environmental review and approval under NEPA.

Under the No Action Alternative, impacts to regeneration from current ski operations would continue to occur from incidental contact between skiers and grooming equipment, however these impacts are not expected to be measurable. MPB mortality in existing tree islands and gladed skiing terrain would continue to occur effecting the recreational experience of ski area guests as dead trees fall and new tree regeneration and shrubs start to grow up through the dead-fall (refer to Chapter 3B – Recreation, Mountain Operations and Guest Services).

Alternative 2 – Proposed Action

Under Alternative 2, there would be approximately 82.3 acres of direct impacts to vegetation communities resulting from tree removal for the construction of the proposed Peak 6 terrain development, associated trails, roads and utilities. This includes tree removal in the mixed-conifer, mixed lodgepole pine and spruce-fir forest types. The following PDC could reduce the amount of overall clearing: Minimize overstory vegetation removal during construction of ski trails, which could result in glading ski trails. Vegetation removal should not occur beyond analyzed trail widths.

Where MPB is present, lodgepole pine mortality is approaching 40 percent, and the risk of stand succumbing to MPB is Moderate (18.0).[399] Under Alternative 2, approximately 450 acres of new terrain is proposed, approximately 385 acres of this terrain would be located above treeline (285 acres lift-served, 100 acres hike-to). The majority of the tree removal would be for the construction of the chairlift and ski trails. Table 3J-2 summarizes disturbance acreages associated with each of the two action alternatives.

Table 3J-2:
Clearing/Grading Impacts by Alternative

Vegetation Type	Alternative 2 (acre)	Alternative 3 (acre)
Grassland	1.0	22.1
Lodgepole Pine	0.0	27.9
Mixed-conifer	10.2	3.1
Mixed Lodgepole	1.3	6.2
Mixed Lodgepole (glading)	n/a	5.3
Willow	0.0	1.0
Spruce-Fir	70.1	16.0
Spruce-Fir (glading)	n/a	73.1
Total	**82.3**	**153.6**

Note: Totals may vary due to rounding.

[399] For clarification, the MPB epidemic is not considered a direct or indirect effect of the action alternatives.

Under Alternative 2, the mature, diseased and infested forests in the BSR permit area, especially lodgepole pine, will continue to incur some level of mortality as described under Alternative 1. Implementation of Alternative 2 would result in clearing and/or grading in approximately 11.5 acres of mixed lodgepole and mixed-conifer stands. As discussed above, these stands are most likely to be affected by MPB. Mortality rates would vary by stand as a function of annual winter temperature, individual weather events, and stand structure. Stands with large diameter (greater than 7 inches dbh) lodgepole pine would be affected first by MPB. Dense live and dead trees would likely stay standing for several years, provided the stand remains intact and trees are not toppled by wind events. Although not part of this decision, implementation of the BSR VMP would provide guidance to reduce fuel loads and improve revegetation in areas impacted by the MPB epidemic. Regeneration would be affected under Alternative 2 as 79.8 acres of vegetation clearing would occur in forest stands which are currently experiencing "good" natural regeneration. "Good" regeneration is a "stocked" stand containing >150 seedlings per acre, and "poor" regeneration is a stand containing <150 seedlings per acre.[400] Table 3J-3 summarizes the effects on regeneration potential for the action alternatives.

Table 3J-3:
Summary of Revegetation Potential by Forest Type and Project Impacts (acres)[a]

Forest Type	Alternative 2 Good Regeneration	Alternative 2 Poor Regeneration	Alternative 3 Good Regeneration	Alternative 3 Poor Regeneration
Lodgepole Pine	0.0	0.0	10.1	14.4
Mixed-conifer	10.3	0.0	5.3	0.0
Mixed Lodgepole	0.1	0.8	11.2	0.0
Spruce-Fir	69.4	0.0	76.6	0.1
Total	**79.8**	**0.8**	**103.3**	**14.5**

[a] Totals will differ from Table 3J-2 due to the analysis focusing on forested areas (e.g., excluding grassland)
Note: Totals may vary due to rounding

Development of the Peak 6 terrain would require clearing of approximately 69.4 acres in the spruce-fir community. As disclosed in the Affected Environment section, approximately 200 legacy trees were identified between 11,520 and 11,590 feet (tree line) in elevation in the Peak 6 area. Under Alternative 2, trees meeting the definition of a legacy tree would be identified and preserved to the greatest extent practicable through implementation of PDC.[401] While clearing in this forest type would reduce the overall forested acreage within the BSR SUP area, the proposed lifts and trails would not negatively affect overall forest health or reduce the potential for natural regeneration in areas not proposed for development of ski area infrastructure.

[400] SE Group et al., 2011
[401] Locations of legacy trees are contained in the Project File.

Alternative 3

Under Alternative 3, there would be approximately 153.6 acres of direct impacts to vegetation communities resulting from tree removal to construct lift corridors, trails and install utilities (refer to Table 3J-2). Approximately 73.1 acres of these impacts would be due to thinning for tree skiing in the spruce-fir forest type, requiring the removal of approximately 50 percent of the existing trees. A portion (between 30 and 80 percent) of lodgepole pine >7 inches dbh is expected to be lost to the MPB epidemic, as described in Alternative 1 and 2. In stands where MPB was recorded and the action alternatives would occur, 30 and 80 percent of the stand is affected by MPB with the level of susceptibility to MPB mortality ranging from low risk (6.0) to moderate risk (12.0). Implementation of Alternative 3 would result in 42.5 acres of clearing and glading in the lodgepole pine, mixed-conifer, and mixed lodgepole pine forest types. Approximately 5.3 acres of the vegetation impacts would be glading in lodgepole pine stands. Glading in this forest type would be beneficial in maintaining forest health by increasing the amount of sunlight reaching the understory. Specifically, thinning lodgepole stands has been shown to be effective in reducing MPB activity by increasing temperatures in the understory and increasing the space between affected trees. Although glading may be beneficial for this forest type, implementation of this project is not expected to measurably decrease the amount of MPB activity across the SUP area.

Implementation of Alternative 3 would result in approximately 103.3 acres of tree removal to create ski trails (trails 1, 4, 5, 6, 8, 9, 10, 11, 13 and 14) in forest stands that are currently exhibiting relatively good levels of natural regeneration. Approximately 14.5 acres of vegetation impacts are proposed in areas of poor levels of natural regeneration (refer to Table 3J-3). Specifically, trails 2, 3, 7 and 14 are proposed in areas where revegetation following the MPB outbreak would require transplantation to ensure the forest would be replaced following insect mortality (refer to Figure 4 – Alternative 3).

Approximately 73.1 acres of the vegetation impact under Alternative 3 would be glading for new trails (Trail 1 on Figure 4). Glading would not immediately effect regeneration and the forest understory since no grading is proposed in this area. Once new regeneration reaches an above the snow height, the trees would be subjected to the same incidental skier damage seen throughout the gladed stands and trail edges in the developed ski area.

Poor regeneration is primarily due to existing soil conditions and levels of natural revegetation in these stands containing lodgepole pine. An example of this is found in Stand BR0504 71 where trails 12 and 13 are proposed. Existing revegetation in this stand is approximately 50 seedlings per acre. This is well below the 150 seedlings per acre that would reflect a “stocked” stand. Construction of ski trails in this stand would remove this stand from the BSR VMP revegetation efforts and restrict BSR’s ability to improve forest health in the area most affected by the MPB outbreak.

Under Alternative 3, trees meeting the definition of a legacy tree within the glading project area would be identified and preserved to the greatest extent practicable through implementation of PDC.[402] It is anticipated that, through implementation of PDC, any trees encountered during construction meeting the definition of a legacy tree would be retained.

CUMULATIVE EFFECTS

The Breckenridge area was heavily logged for mining timbers and railroad materials in the late 1800s and early part of the last century. Trees were used for lumber and burned to clear land for livestock or to expose minerals. The result in landscape is now primarily dense, even-aged lodgepole pine dominated forests between 90 to 130 years of age. This has lead to a relative monoculture, susceptible to insects, disease and fire due to the size and age of the forests. The following forest health treatments are expected to cumulatively have short- and long-term effects on forest health.

Scope of the Analysis

The effects analyzed in the cumulative effects section apply to all alternatives, including the No Action Alternative. For a detailed description of past, present, and reasonable foreseeable future projects, the reader is referred to Appendix A in this document.

Temporal Bounds

The temporal bounds for this cumulative effects analysis for forest health extend from BSR's inception as a destination resort in 1961 through the foreseeable future in which BSR can be expected to operate.

Spatial Bounds

The spatial bounds for this cumulative effects analysis are limited to public and private lands in the vicinity of the BSR SUP area.

Past, Present, and Reasonably Foreseeable Future Projects

- Breckenridge Ski Resort – Vegetation Management Plan
- Forest-wide Hazardous Tree Removal and Fuels Reduction Project EA
- On-going Mountain Pine Beetle Effects (Upper Blue Watershed)
- Breckenridge Forest Health and Fuels EA
- North Summit Wildland Urban Interface Fuels Reduction Project
- Red Tail Ranch WUI

[402] Locations of legacy trees are contained in the Project File.

- 1988 Gold Hill Clear Cuts
- Ophir Mountain Forest Health and Fuels Reduction Project EA

Due to the widespread MPB infestation, which is resulting in the loss of mature lodgepole pine trees on the WRNF, the Forest Service proposed to remove or fell hazardous trees in compliance with the Healthy Forest Restoration Act of 2003 (HFRA). The MPB infestation has resulted in a high rate of mortality of pine trees in the WRNF. In association with the growing numbers of dead pine trees is also the growing future risk of falling trees.

In September 2009 the WRNF Supervisor signed a Decision Notice approving removal of hazard trees located within 110 percent of the height of the tallest tree from the edge of roads, trails, trailheads, administrative sites, recreation sites, and heritage resource sites on the Forest. Implementation is expected to occur on a site-by-site basis over the next ten years in order to fully address the current and expected high incidence of hazardous trees on the Forest.

The analysis area for the project includes portions of WRNF lands in Eagle, Garfield, Pitkin, and Summit counties in central Colorado. The analysis area consists of a total acreage of 1.2 million acres which are managed as part of the WRNF. Approximately 160,000 acres of lodgepole pine dominant stands have been delineated. According to estimates that were developed through aerial surveys that were performed by the USFS in 2008 and years prior, approximately 256,424 acres of the lodgepole pine inclusive stands have been infested by MPB. In addition to this Forest-wide effort, site specific projects have been approved within Summit County to address forest health and fuels. These projects total approximately 9,100 acres and are focused primarily on infrastructure (e.g., Wildland Urban Interface [WUI] areas, transmission lines).

All of the past, present and reasonably foreseeable projects discussed above will benefit forest health in the Breckenridge area as the MPB epidemic progresses. Discussed above, a majority of the mature lodgepole pine on private and public lands are expected to eventually be killed by MPB activity. BSR's Vegetation Management Plan was developed to address MPB activity within the SUP area. Management projects detailed in the VMP were designed to address BSR operational needs that are inextricably related to forest health within the SUP area.

Cumulatively, the projects above will manage and alter vegetation types and patterns. The action alternatives will incrementally add to the current trend of landscape alteration within BSR but are not anticipated to detrimentally affect forest health within the permit area.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Vegetation removal related to the action alternatives would represent an irretrievable effect to vegetation resources within the SUP area. However, this is not considered an irreversible commitment because vegetation is a renewable resource.

K. WATER RESOURCES

SCOPE OF THE ANALYSIS

The scope of the analysis of water resources focuses on riparian and wetlands resources within the Carter Gulch, Jones Gulch, Lehman Gulch, Sawmill Gulch, Cucumber Gulch, Cucumber Creek, and South Barton Gulch watersheds on NFS and adjacent lands at Breckenridge Ski Resort (BSR). The surface area comprised by these watersheds totals approximately 8,055 acres.

FOREST PLAN DIRECTION

Pursuant to the Forest Plan, as amended, stream health management measures and design criteria are provided in the Region 2 Watershed Conservation Practices Handbook (WCPH) to ensure applicable Federal and State laws are met on NFS lands in Region 2.[403] The WCPH contains several Management Measures of relevance regarding stream health and water resources effects:

Applicable WCPH Management Measures (MM)

The WCPH includes Management Measures that are environmental goals to protect soil, aquatic and riparian systems.[404]

- MM-1. Manage land treatments to conserve site moisture and to protect long-term stream health from damage by increased runoff.
- MM-2. Manage land treatments to maintain enough organic ground cover in each activity area to prevent harmful increased runoff.
- MM-3. In the water influence zone (WIZ) next to perennial and intermittent streams, lakes, and wetlands, allow only those actions that maintain or improve long-term stream health and riparian ecosystem condition.
- MM-4. Design and construct all stream crossings and other instream structures to provide for passage of flow and sediment, withstand expected flood flows, and allow free movement of resident aquatic life.
- MM-5. Conduct actions so that stream pattern, geometry, and habitats maintain or improve long-term stream health.
- MM-6. Maintain long-term ground cover, soil structure, water budgets, and flow patterns of wetlands to sustain their ecological function.

[403] USDA Forest Service, 2002a; USDA Forest Service, 2006
[404] Ibid.

- MM-8. Manage water use facilities to prevent gully erosion of slopes and to prevent sediment and bank damage to streams.
- MM-16. Apply runoff controls to disconnect new pollutant sources from surface and groundwater.

Management Area 8.25 – Forest Plan Standard

The Forest Plan Water and Aquatic Resource Standard included in Management Area 8.25 is listed below:

- Standard 3. Snow management, including snowmaking and snow farming, will be conducted in a manner that prevents slope failures and gully erosion, as well as bank erosion and sediment damage in receiving channels.

Relevant WCPH Definitions

FSH 2509.25 (The Watershed Conservation Practices Handbook) provides definitions for some terms that are important to conveying information in this report:

Concentrated-Use Site: Areas designed and managed for high density of people or livestock, such as developed recreation sites and livestock watering areas.

Ephemeral Stream: A stream that flows only in direct response to precipitation in the immediate locality (watershed or catchment basin), and whose channel is at all times above the zone of saturation.

Intermittent Stream: A stream or reach of stream channel that flows, in its natural conditions, only during certain times of the year or in several years. It is characterized by interspersed, permanent surface water areas containing aquatic flora and fauna adapted to the relatively harsh environmental conditions found in these types of environments.

Gully: An erosion channel greater than 1 foot deep.

Permanent Stream: A stream or reach of a channel that flows continuously or nearly so throughout the year and whose upper surface is generally lower than the top of the zone of saturation in the areas adjacent to the stream.[405]

Rill: An erosion channel less than 1 foot deep.

Swale: A landform feature lower in elevation than adjacent hillslopes, usually present in headwater areas of limited areal extent, generally without display of a defined watercourse or channel that may or may not flow water in response to snowmelt or rainfall. Swales exhibit little evidence of surface runoff and may be underlain by porous soils and bedrock that readily accepts infiltrating water.

[405] USDA Forest Service, 2006

AFFECTED ENVIRONMENT

Project Area Description

BSR is located in the Central Rocky Mountains of Colorado, approximately 80 miles west of Denver, CO. The resort is situated at elevations ranging from 9,650 and 12,200 feet, receiving most of its annual precipitation as snow during the winter months. Average annual precipitation ranges from 20 inches at the lower elevations to 29 inches at the higher elevations. Monthly mean temperatures during the winter months are between 15 and 23 degrees Fahrenheit; average temperatures for the summer months range between 46 and 53 degrees Fahrenheit.

The watersheds within BSR's SUP area are all tributaries to the Blue River, which flows north from its headwaters atop Hoosier Pass into Dillon Reservoir, proceeding through Summit County into Green Mountain Reservoir, before its confluence with the Colorado River near Kremmling, CO. The primary watersheds in the area of interest are summarized in Table 3K-1 and depicted on Figure 28.

Among BSR's watersheds, Cucumber Gulch and Jones Gulch are the most heavily influenced by ski area activities relative to their drainage area. As outlined in Table 3K-1, the South Barton Gulch and Upper Cucumber Creek watersheds would experience development activities under the action alternatives.

Table 3K-1:
Breckenridge Ski Resort Watersheds

Watershed	Area (acres)	Alternative 2 Actions	Alternative 3 Actions
Carter Gulch	892	None	Ski trail development
Upper Lehman Gulch	577	None	Ski trail development, A-Chair realignment
Lower Lehman Gulch	117	None	A-Chair realignment
Jones Gulch	469	None	A-Chair realignment, Peak 9 Ski School Building, C-Chair improvement, ski trail improvement
Sawmill Gulch	1,749	None	C-Chair improvement, ski trail improvement
Cucumber Gulch	1,000	None	Ski trail development and improvement
Cucumber Creek	1,133	Lower Peak 6 lift bottom terminal, access road, ski trail development, utilities trenching	Peak 6½ lift bottom terminal, access road, ski trail development, utilities trenching
South Barton Gulch	2,118	Upper Peak 6 lift, Lower Peak 6 lift top terminal and ski trail construction, utilities trenching, top terminal warming hut, restroom, access road	Peak 6½ lift top terminal, ski trail development

Water Rights

The Blue River Basin is an over-appropriated stream containing numerous water rights for irrigation, domestic, municipal and power generation purposes. Two major water facilities, the Bureau of Reclamation's (BOR) Green Mountain Reservoir and Denver Water's Dillon Reservoir/Roberts Tunnel Collection System, together can place a water right call on the Blue River at any time during a dry year.

In order to help protect from potential senior water right calls originating from within the Blue River Basin, BSR has obtained numerous direct flow and storage water rights and has decreed two plans for augmentation with the State water court. In addition, BSR has executed long-term lease agreements with the Town of Breckenridge for the use of storage in Goose Pasture Tarn Reservoir. Under the terms of the decrees and lease agreement, the Resort can rely on storage releases from any one of five reservoirs in order to offset stream depletions due to domestic and snowmaking water uses. The amount of reservoir release and source of storage vary from year to year depending upon the location of the calling rights. Generally, BSR utilizes storage in the Goose Pasture Tarn, Clinton Gulch, Williams Fork, Upper Blue Reservoir and Green Mountain Reservoir.

Snowmaking

Diversions

BSR's use of reservoir storage to augment snowmaking diversions has been decreed in Cases 81CW3 (consolidated) and 92CW294. Snowmaking diversions originate from the Breckenridge Ski Resort Pumping Plant and Pipeline located on the Blue River at Maggie Pond. The pipeline is decreed for a total of 14.0 cubic feet per second (cfs). Through its various water right decrees and storage lease agreements, BSR has developed 807 acre feet (AF) of reliable yield for the snowmaking system.

Of the 807 AF of snowmaking water supply, 307 AF is considered to be direct flow diversions from the Blue River, and can be diverted only during those periods that the streamflow in the Blue River, near its confluence with the Swan River, remains above the established minimum flow. When flows approach minimum levels, BSR can call for release of up to 500 AF of reservoir storage located within the Blue River Basin above Maggie Pond to offset its diversions. Four-hundred AF of storage is available from the Goose Pasture Tarn through long-term lease agreements with the Town of Breckenridge. An additional 100 AF of storage is available from the Upper Blue Reservoir through a water right exchange with the City of Colorado Springs. The release of water from upstream storage during low flow periods replaces snowmaking diversions on a 1-for-1 basis, thereby mitigating the potential impact of snowmaking diversions on the Blue River. Table 3K-2 provides a summary of the quantity and source of legal water supply available to BSR for snowmaking purposes.

Table 3K-2:
Snowmaking Water Supply Legal Sources of Supply

Physical Source	Legal Source	Amount
DIRECT FLOW SOURCES		
Direct Flow Diversion From the Blue River at Maggie Pond	Clinton Gulch Reservoir (61.5 AF) Fraser River Agreement Snowmaking exchange using Williams Fork Reservoir Decreed Case No. 92CW294	307.0
STORAGE SOURCES		
Goose Pasture Tarn Release. Water Released From Leased Water	Town of Breckenridge's Clayton Hill Ranch decrees. Previously Transferred to Goose Pasture Tarn. Decreed Case No. 51CW3	175.0
Goose Pasture Tarn Release. Water Released from Leased Storage	Lusher Ditch Decreed Case No. 92CW292	100.0
Goose Pasture Tarn Release. Water Released from Leased Storage	Clinton Gulch Reservoir Decreed Case No. 92CW292	125.0
Upper Blue Reservoir	Exchange with City of Colorado Springs	100.0
Total		**807.0**

Source: Resource Engineering, Inc., 2010

Consumptive Use

The consumptive use associated with snowmaking in Summit County is considered 20 percent of diversion. The balance, 80 percent, returns to the stream system each spring as snowmelt runoff. The 20 percent consumptive use factor was established based upon multiple runs of the computational procedures included in the Water Resources Evaluation of Non-Point Silvicultural Sources (WRENSS Model) and in the Water Management Research Project.[406] The study process was completed in consultation with the Colorado Department of Natural Resources and was approved by the State Engineer's Office by letter dated March 15, 1993. Thus, of the 807.0 AF of snowmaking diversions allowed under existing water court decrees and exchanges, approximately 161.4 AF of water will be consumed.

Water Yield

Runoff hydrographs for watersheds in the area of interest were developed following the methodologies included in WRENSS Model and in the Colorado Ski Country USA (CSCUSA) Report.[407] The water balance of the WRENNS Model is coupled with a snowmaking hydrology computation process developed through the CSCUSA study. Together, these calculations produce estimates of water yield hydrographs typical of sub-alpine mountain watersheds. It is important to note that the computations do not include routing of runoff water through the watershed to the stream system. In other words, the water

[406] Troendle and Leaf, 1980; Leaf, 1986
[407] Ibid.

yield hydrographs do not represent streamflow per se, but rather basin-wide water yield to the receiving waters.

The runoff hydrographs were modeled under baseline, existing, and proposed conditions using average precipitation and temperature data for each watershed. The purpose of this modeling effort is to estimate the effects of proposed ski area development and activities on the watersheds' yield and peak flow. The baseline hydrographs modeled conditions prior to any human impacts, such as logging or ski trail development, took place in these watersheds. Under existing conditions, water yields for these watersheds, except South Barton Gulch, are affected by the existing ski trail system and the input of additional water in the form of snowmaking. Additional impacts in these watersheds, including South Barton Gulch, involve housing developments and past logging activities. Table 3K-3 summarizes the forested and cleared areas corresponding to the existing conditions. Table 3K-4 displays the existing snowmaking coverage and associated water usage by watershed.

Table 3K-3:
BSR's Watersheds – Existing Conditions

Watershed	Surface Area (acres)					
	Total	Above Treeline	Forested	Thinned	Cleared	
					Acres	Notes
Carter Gulch	890	262	541	0	87	Ski trails
Upper Lehman Gulch	577	199	211	0	167	Ski trails
Lower Lehman Gulch[a]	1,584	461	811	0	312	294 ac = ski trails 18 ac = roads and housing
Jones Gulch	468	0	169	0	299	223 ac = ski trails 76 ac = roads and housing
Sawmill Gulch	1,748	1,011	447	0	290	173 ac = ski trails 117 ac = roads and housing
Cucumber Gulch	1,001	145	438	0	418	329 ac = ski trails 89 ac = roads and housing
Cucumber Creek	1,133	354	630	35	114	99 ac = ski trails 15 ac = roads and housing
South Barton Gulch	2,119	406	1,407	149	157	Roads and housing

[a] Includes acreage of tributary watersheds Carter Gulch and Upper Lehman Gulch.

Table 3K-4:
Snowmaking Coverage on BSR's Watersheds – Existing Conditions

Watershed	Ski Trail (acres)	Snowmaking Coverage (acres)	Snowmaking Water Used (acre feet)
Carter Gulch	86.9	44.2	32.7
Upper Lehman Gulch	167.1	73.3	76.0[b]
Lower Lehman Gulch[a]	294.2	141.3	126.3
Jones Gulch	223.2	171.1	148.4[b]
Sawmill Gulch	173.2	46.4	34.3
Cucumber Gulch	329.2	196.7	211.0[b]
Cucumber Creek	98.9	40.6	30.0
South Barton Gulch	0.0	0.0	0.0
Total	**1,372.6**	**713.7**	**550.0**

[a] Includes acreage of tributary watersheds Carter Gulch and Upper Lehman Gulch.
[b] Amount includes snowmaking for terrain park features.

Water yields and peak flows calculated using the WRENNS Model for each watershed are summarized in Table 3K-5, for both baseline and current conditions. Hydrograph plots that depict the character of these water yields in time were also developed using the WRENNS Model. These hydrographs reveal flow characteristics reflective of the current ski trail system and snowmaking applications. In general, snowmelt hydrographs influenced by vegetative clearing and snowmaking have higher intensity peak flows of shorter duration as compared to pre-development conditions. This is a result of the higher volume and rate of snowmelt due to increased solar radiation in cleared areas and also due to the snowmaking water input (additional to natural precipitation) to the affected watersheds.

Table 3K-5:
WRENNS Model Output for Baseline – Existing Conditions

Watershed	Baseline Conditions		Existing Conditions	
	Water Yield (acre feet)	Peak Flow (cfs)	Water Yield (acre feet)	Peak Flow (cfs)
Carter Gulch	723.4	5.5	781.1	6.7
Upper Lehman Gulch	798.8	6.9	921.5	10.4
Lower Lehman Gulch	1,349.0[a]	10.9[a]	1,564.9[a]	16.9[a]
Jones Gulch	355.6	2.9	579.3	6.7
Sawmill Gulch	2,497.1	23.7	2,633.2	30.7
Cucumber Gulch	1,121.9	9.4	1,446.7	16.4
Cucumber Creek	1,314.2	11.5	1,381.1	14.4
South Barton Gulch	1,769.0	14.56	1,768.1	15.0

[a] Yield and peak flow calculated for Lower Lehman Gulch include effects of tributary watersheds Upper Lehman Gulch and Carter Gulch.

Stream Health

Stream Health Definitions

As described above, the Forest Plan adopted the WCPH for direction on projects that affect water resources. The WCPH mandates several Management Measures of relevance regarding stream health and water resources effects. To facilitate the evaluation of stream health compliance in the context of the WCPH Management Measures, the WCPH outlines several key definitions relevant to the quantification of stream health.

> Stream Health: The condition of a stream versus reference conditions for the stream type and geology, using metrics such as channel geometry, large woody debris, substrate, bank stability, flow regime, water chemistry, and/or aquatic biota.
>
> Stream Health Class: A category of stream health. Three classes are recognized in the Rocky Mountain Region: Robust, At-Risk, and Diminished. These classes are recommended to be used for assessing long-term stream health and impacts from management activities.

Throughout this document, analysis of stream health is conducted according to the definitions of stream classes as outlined in Table 3K-6. In order to characterize the existing status of stream health, the WRNF engaged in intensive field stream sampling surveys during the 2002–2004 field seasons, utilizing the Forest Service Region 1/Region 4 survey methodology for measuring and quantifying specific stream health metrics. The WRNF collected data for 21 project streams at six ski areas, and 21 reference streams across the Forest. Surveyed stream health metrics included: fine sediment, large woody debris, residual pool depth, undercut banks, and unstable banks.

Reference stream reaches are located in basins with little to no development. Reference streams represent natural conditions that are the most attainable for a given channel type, climate, geology, aspect and slope. Reference stream reaches were surveyed to provide an analytical control against which to compare the conditions found in response reaches. Concurrently, response stream reaches were surveyed in areas (usually within lower elevations of affected watersheds) that were judged to reflect the effects caused by management and project activities.

Table 3K-6:
Stream Health Classes for Attainment of Forest Plan Standards (WCPH)

Stream Health Class	% of Reference	Habitat Condition
Robust	> 74 or < 126[a]	Stream exhibits high geomorphic, hydrologic and/or biotic integrity relative to its natural potentials condition. Physical, chemical and/or biologic conditions suggests that State assigned water quality (beneficial, designated or classified) uses are supported.
At-Risk	59 to 73 or 127 to 141[a]	Stream exhibits moderate geomorphic, hydrologic and/or biotic integrity relative to its natural potential condition (as represented by a suitable reference condition). Physical, chemical and/or biologic conditions suggest that State assigned water quality (beneficial, designated or classified) uses are at risk and may be threatened.
Diminished	< 58 or > 141[a]	Stream exhibits low geomorphic, hydrologic and/or biotic integrity relative to its natural potential conditions (as represented by a suitable reference condition). Physical, chemical and/or biologic conditions suggest that State assigned water quality (beneficial, designated or classified) uses may not be supported.

[a] For metrics that increase with decreasing stream health, such as fine sediment and unstable stream banks.

Management Effects to Stream Health

Metric:

Unstable Banks: A streambank showing evidence of the following: breakdown (clumps of bank are broken away and banks are exposed); slumping (banks have slipped down); tension cracking or fracture (a crack visible on the bank); or vertical and eroding (bank is mostly uncovered, less than 50 percent covered by perennial vegetation, roots, rocks of cobble size or larger, logs of 0.1 meter in diameter or larger, and the bank angle is steeper than 80 degrees from the horizontal). Undercut banks are considered stable unless tension fractures show on the ground surface at the back of the undercut.[408]

Causal Mechanism(s):

Channel Network Extension: Roadside drainages frequently connect directly to the stream channel and result in a net increase in the length of the existing channel network within the watershed. This increases the efficiency of flow routing within the watershed, increasing peak flows and subsequent erosion and sediment transport. The WCPH outlines the following Design Criterion under MM-1: "In each 3rd-order and larger watershed, limit connected disturbed areas so that the total stream network is not expanded by more than 10 percent. Progress toward zero connected disturbed area as much as feasible." Roads are usually a primary source of channelized connection between disturbed soils and the stream channel. Because roadside drainage ditches provide an efficient mechanism for capturing runoff and frequently drain to a stream system, a direct link between the road-generated sediment source and the stream system is easily created. A second potential source of connected disturbance could be sparsely vegetated ski trails with drainage water bars that connect directly to the stream system.

[408] USDA Forest Service, 2006

Connected Graded Terrain: In terms of the effect of proposed management activities upon bank stability conditions in affected stream reaches, ultimately the area of disturbance and/or snowmaking that is directly connected to the stream system is the variable of management concern. The WCPH defines connected disturbed area (CDA) as follows: "High-runoff areas like roads and other disturbed sites that discharge surface runoff into a stream or lake." Field observations during the spring runoff period verified that instances where high surface flows emanating from graded ski trails and roads are then routed directly to the stream meet the WCPH definition of a connected disturbed area.

The WCPH clearly documents the relationship between CDA and effects to peak flows in the associated stream system. Likewise, the effect of channel network extension and the increased efficiency of hydraulic routing has been well documented by several investigations, including references in the Zero Code of the WCPH.[409]

Metric:

Channel Sedimentation (Percent Fines and Residual Pool Depth): The effect of land disturbances such as roads, roadside ditches, ski trail water bars, and utilities corridors within forested watersheds tend to cause an increase in exposed and compacted surface soils and therefore increase erosion and sediment transport. An increase of sediment load input to the stream network of a watershed is often indicated by higher percentages of fine-grained particles on the channel bed. Fine sediment deposition can diminish habitat by aggradation, or filling in, of pool systems. Pools are important components of habitat for many fish species and other aquatic organisms. Filling by fines affects pool habitat by reducing volume, particularly during low flow conditions, and obliterating substrate cover.

Causal Mechanism(s):

Connected Disturbed Area (CDA): High-runoff areas, like roads and other disturbed sites, having a continuous surface flow path into a stream or lake. Hydrologic connection exists where overland flow, sediment, or pollutants have a direct route to the channel network. CDAs include roads, ditches, compacted soils, bare soils, and areas of high burn severity that are connected to the channel system. Ground disturbing activities located within the water influence zone (WIZ) would be considered connected unless site-specific actions are taken to disconnect them from the streams. CDA provides a measure of the extent to which a stream reach is influenced by direct, channelized connections between disturbed soils and the stream network itself.

Metric:

Wood Frequency: Sustainable woody debris recruitment is recognized as an important riparian function in mountain channels. Standing dead trees provide habitat for nesting species in the riparian zone and contribute detritus and insects to streams. Once in streams, coarse woody debris helps maintaining

[409] Burroughs and King, 1989; Troendle and Olsen, 1994

channel structure by storing sediment and encouraging pool scour. Large woody debris (LWD) reduces stream energy by interrupting the continuous slope of channel beds and creating turbulence. In streams supporting fisheries, LWD also helps provide stable fish habitat by retaining spawning gravel and by serving as rearing cover.

Causal Mechanism(s):

Vegetation Removal in WIZ: Recruitment of LWD is dependent upon maintenance of riparian vegetation structure and function. Removal of vegetation within the WIZ has been demonstrated to have a negative impact upon maintenance of adequate wood frequency. In addition, culverts located along the stream channels often present an obstacle to LWD transport within the stream system. Because these culverts must be periodically cleared of obstructions caused by woody debris, the constitute sites of net woody debris loss from the stream system.

Existing Stream Health

The WRNF has completed a Stream Channel Condition Survey (Channel Survey) for portions of the streams within BSR's SUP boundary. Information collected during the Channel Survey includes different metrics such as bank stability and percentage of fine sediment found within the streambed. Comparison of these metrics against those found at reference channels allowed the WRNF to classify surveyed stream reaches into one of three health classes: robust, at-risk, and diminished (refer to Table 3K-6). Stream health classes are used for assessing long-term stream health and impacts from management activities. In addition, Management Measure MM-3 included in the WCPH states that "only those actions that maintain or improve long-term stream health and riparian ecosystem condition" shall be allowed.

As mentioned in the Management Effects to Stream Health Section of this document, disturbance of the WIZ has a direct impact in stream health metrics, such as channel sedimentation and wood frequency. The WCPH states the importance of the WIZ in the protection of interacting aquatic, riparian, and upland functions.[410] Furthermore, Management Measure MM-3 includes design criteria requiring that new concentrated-use sites be located outside the WIZ if practicable. Table 3K-7 summarizes the existing impacts to the WIZ within BSR's SUP boundary.

[410] Reid and Ziemer, 1994

Table 3K-7:
Impacts to the WIZ within BSR's Watersheds – Existing Conditions

Watershed	Baseline Forested WIZ (acres)	Existing Forested WIZ (acres)	Impacted WIZ (%)
Carter Gulch	131	123	6
Upper Lehman Gulch	53	27	49
Lower Lehman Gulch	17	9	47
Jones Gulch	62	25	60
Sawmill Gulch	103	73	29
Cucumber Gulch	123	58	53
Cucumber Creek	123	108	12
South Barton Gulch	213	195	8

The WRNF Channel Survey included reaches from eight streams located within BSR's SUP boundary: (i) Cucumber Creek; (ii) South Fork of Cucumber Creek; (iii) Jones Gulch; (iv) Lehman Gulch; (v) Sawmill Gulch; (vi) North Fork of South Barton Gulch; (vii) South Barton Gulch; and (viii) Middle Fork of Barton Gulch.

The results of the WRNF Stream Health Survey data and analysis at BSR are summarized in Table 3K-8. Most of the stream reaches included in Table 3K-8 were classified as "Robust" with measured values well within the limits established in Table 3K-6. That is, the channel conditions can be slightly degraded and still remain within the "Robust" classification. However, Lehman Gulch, Jones Gulch, and South Fork of Cucumber Creek were determined to have a degraded stream health in at least one of the four surveyed metrics. These reaches are further discussed below.

Table 3K-8:
Stream Health within BSR's SUP Boundary – Existing Conditions

Stream Reach	Fine Sediment			Bank Stability			Large Woody Debris			Residual Pool Depth		
	Value (%)	% of Reference	Stream Health Condition	Unstable Bank (%)	% of Reference	Stream Health Condition	Pieces per 100m	% of Reference	Stream Health Condition	Depth (m)	% of Reference	Stream Health Condition
Lehman Gulch	16	70	Robust	6	56	Robust	3.1	13	Diminished	0.19	111	Robust
Jones Gulch	24	104	Robust	12	105	Robust	10.5	155	Robust	0.11	63	At-Risk
Sawmill Gulch	15	65	Robust	14	124	Robust	28	414	Robust	0.26	150	Robust
Main Stem of Cucumber Creek	23	100	Robust	10	88	Robust	51	210	Robust	0.19	111	Robust
South Fork of Cucumber Creek	78	339	Diminished	0	0	Robust	52	214	Robust	0.13	74	At-Risk
Main Stem of South Barton Gulch	19	83	Robust	11	95	Robust	36	533	Robust	0.18	104	Robust
North Fork of South Barton Gulch	24	104	Robust	7	65	Robust	64	947	Robust	0.19	105	Robust

Source: White River National Forest, 2010

Lehman Gulch

Although this reach exhibits "Robust" health for residual pool depth, survey results indicate a 15 percent increase on this metric will lower the classification to "At Risk." Also, the reach was classified as "Diminished" for amount of large woody debris, measuring at only 13 percent of the reference value. Since these two metrics are mutually dependent, Lehman Gulch presents an opportunity for enhancement of stream health by relatively simple measures (e.g., introducing woody debris or other channel stabilization materials at specific locations to help stabilize the channel and improve residual pool depths).

Jones Gulch

This reach contains a healthy amount of large woody debris. However, residual pool depth was classified as "At-Risk," measuring 63 percent of the reference value. As it is the case for Lehman Gulch, there is an opportunity to improve Jones Gulch health.

Sawmill Gulch

This stream has been classified as "Robust" in all four metrics. However, bank stability at this reach was measured at 124 percent of the reference value, just 2 percent above the limit for the "At-Risk" class (refer to Table 3K-6). Thus, any disturbance within the Sawmill Gulch watershed with potential to increase bank instability, such as new snowmaking operations, will have to contain mitigation measures to ensure that streamflows will not be affected by an action. For example, a proposal for additional snowmaking operations in trails within Sawmill Gulch watershed would need to include specific mitigation measures for collecting the additional snowmelt runoff and discharging it at an adequate location where it would not impact Forest Service resources.

Cucumber Creek

A large amount of fine sediments was found during the survey of the South Fork of Cucumber Creek. This amount represents more than 300 percent of the reference value and thus the stream reach was classified as "Diminished" for this metric. In addition, residual pool depth in this reach was surveyed as being at 74 percent of the reference value and classified as "At-Risk." The survey was performed shortly after the development of new ski trails in this watershed and the WRNF suspects results were temporarily affected by construction activities. This reach may be re-surveyed in the future.

Existing Connected Disturbed Area

To help further define existing conditions related to stream health, BSR completed a comprehensive survey of the on-mountain drainage infrastructure (e.g., water bars, road-side ditches, etc.) during the summer of 2008 as part of the development of its Mountain Drainage Plan.[411] Data collected through this survey include GPS-location, slope, flow direction, and general condition of road-side ditches, water bars, sediment ponds, culverts, and indications of surface runoff. This information provides knowledge of the

[411] Resource Engineering, Inc., 2009; Resource Engineering, Inc., 2009a

extent to which the identified stream health metrics could be influenced by future actions. In particular, the Mountain Drainage Plan provides insight as to the extent to which the disturbed road surfaces route flows directly to the stream system (i.e., are connected to the stream) within each watershed. A comprehensive watershed investigation using Mountain Drainage Plan survey data, recent and historic aerial photography, and GIS spatial analysis tools was performed for the watersheds within the area of BSR's SUP boundary. Results from this investigation that are relevant to the CDA analysis are displayed in Table 3K-9.

Design Criteria for MM-1 states that "In each watershed containing a 3rd-order and larger stream, limit connected disturbed areas so the total stream network is not expanded by more than 10 percent." Direct connection of disturbances to the stream channel, such as roads via roadside ditches, results in a net increase in the length of the existing channel network within the watershed. Connected disturbed areas capture surface runoff and concentrate flows within the watershed, increasing both volume and peak streamflows. This, in turn, creates a direct link between the sediment generated in disturbed areas and the stream system. As discussed before, CDA have a direct, negative impact in stream health metrics such as unstable banks and channel sedimentation.

An exhaustive analysis of BSR's on-mountain drainage network was performed to define the status of the mountain's connected disturbed and connected graded areas. As shown in Table 3K-9, all of the watersheds, with the exception of Carter Gulch, exhibit an existing level of channel network extension that exceeds the 10 percent threshold identified the Design Criteria included in MM-1. The most impacted watershed is Jones Gulch with 62.3 percent increase in its channel network length. Cucumber Gulch and Sawmill Gulch also exhibit significant increases in channel lengths, with 29.7 percent and 24.5 percent, respectively. These measured changes in the watersheds channel system provide supportive evidence of enhanced flow routing, increasing peak flows and stream energy during runoff.

Table 3K-9:
CDA within BSR's Watersheds – Existing Conditions

Watershed	Natural Stream Channel Length[a] (ft)	Road Drainage Connected Length (ft)	Connected Disturbed Area (acres)	Percent Increase of Channel Length (%)
Carter Gulch	35,971	540	5.9	1.5
Upper Lehman	20,116	6,685	25.4	33.2
Lower Lehman	60,537[b]	11,430[b]	45.2[b]	18.9[b]
Jones Gulch	13,637	8,490	43.7	62.3
Sawmill Gulch	40,087	9,805	38.1	24.5
Cucumber Gulch	35,557	10,585	49.9	29.8
Cucumber Creek	28,945	6,145	18.3	21.2
South Barton Gulch	47,938	10,370	13.4	21.6

[a] Derived from GIS and field-collected data analysis
[b] Includes Carter Gulch and Upper Lehman Gulch

Existing Connected Graded Area

Connected graded areas were determined using the GPS surveys collected as part of the Mountain Drainage Plan development coupled with analysis of 2009 NAIP imagery, GIS tools, and following Forest Service recommendations and guidelines.[412] Table 3K-10 outlines graded areas connected to the stream channel network.

As is the case with CDA, the Jones Gulch and Lehman Gulch watersheds display a high percentage of connectedness—22.2 percent and 20.6 percent, respectively. In addition, it is interesting to note that, although the Cucumber Gulch watershed has the second largest percentage of graded areas relative to the watershed size (33.6 percent), it ranks fifth in the percent of connected graded terrain. This is mainly due to BSR's efficient mitigation measures and drainage management within the Cucumber Gulch watershed. On the other hand, the graded terrain within Sawmill Gulch watershed represents only 5.9 percent of its drainage area. However, 36.5 percent of this graded terrain is connected to the stream channel network.

[412] NAIP: National Agriculture Imagery Program (U.S. Department of Agriculture). Aerial imagery acquired during the agricultural growing seasons at a 1-meter ground sample distance.

Table 3K-10:
Connected Graded Areas within BSR's Watersheds – Existing Conditions

Watershed	Graded Area (acres)	% of Watershed that is Graded (%)	Connected Graded Area (acres)	% of Graded Terrain that is Connected (%)
Carter Gulch	48.7	5.5	5.9	12.1
Upper Lehman	120.4	20.9	20.2	16.8
Lower Lehman	194.3	12.3	40.0	20.6
Jones Gulch	196.4	41.9	43.7	22.2
Sawmill Gulch	103.2	5.9	37.6	36.5
Cucumber Gulch	335.8	33.6	49.9	14.9
Cucumber Creek	92.8[a]	8.2	9.3	10.0
South Barton Gulch	143.2[b]	6.8	13.4	9.4

[a] Of this total, 13.8 acres correspond to non-ski area roads.
[b] Current graded areas within the South Barton Gulch watershed correspond to non-ski area roads and private homes.

Water Quality Data

The Colorado Department of Public Health and Environment – Water Quality Control Commission publishes the Colorado Section 303(d) List of Impaired Waters and Monitoring and Evaluation List. This report is publicly available on-line at: http://www.cdphe.state.co.us/regulations/wqccregs/93_2012(03).pdf. The Clean Water Act Section 303(d) impairment includes manganese with a segment location of the mainstem of the Blue River from the confluence with French Gulch to a point 0.5 mile below Summit County Road 3.[413] In addition, Colorado's Monitoring and Evaluation List "identifies water bodies where there is reason to suspect water quality problems, but there is also uncertainty regarding one or more factors, such as the representative nature of the data. Water bodies that are impaired, but it is unclear whether the cause of impairment is attributable to pollutants as opposed to pollution, are also placed on the Monitoring and Evaluation List."[414] Cadmium and zinc are identified on the Monitoring and Evaluation List for a portion of a tributary to Blue River (Gold Run Gulch below Jessie Mine). Cadmium and zinc have been historically monitored near the project area on Cucumber Creek and South Barton. This data is available in the Project File.

Aquatic Macroinvertebrates

Aquatic macroinvertebrates are those invertebrates that spend at least part of their life cycle in water.[415] These include worms, mollusks, mites, and insects. Insects are by far the most common. Most insect species spend just the immature phase (larval or nymph phase) in water. Aquatic macroinvertebrate communities are influenced by the timing of flows and water quality in the streams in which they live. Geology, elevation, temperature, gradient, and substrate distribution are other factors that commonly

[413] Colorado Department of Public Health and Environment, 2012
[414] Ibid.
[415] USDA Forest Service, 2004a

influence macroinvertebrate communities. As habitats are degraded, either by chemical pollutants, increased sediment, or unfavorable changes in flow regime (especially severe reductions), the response of the macroinvertebrate community is typically a reduction in the number of species which occur there and especially the number of sensitive species. Although sensitive species occur in most insect orders, three orders are comprised primarily of species that are more sensitive to disturbance. These are Ephemeroptera (mayflies), Plecoptera (stoneflies), and Tricoptera (caddisflies). In this document, "EPT taxa richness" refers to the number of taxa in these three sensitive families, while "taxa richness" refers to the number of taxa of all aquatic macroinvertebrates. Additionally, a specific WRNF metric was developed identifying local taxa sensitive to sediment.

Aquatics Associates sampled aquatic macroinvertebrates at nine sites across BSR on September 15 and 16, 2009 to document the existing communities.[416] Sample sites ranged from Lehman Gulch, on the south, to Meadow Creek, to the north (near Frisco, CO). Sample sites and the types of samples collected at each site were identified by the Forest Service. Sampling and analysis methods were consistent with USFS protocols to allow for data comparability with previous years. Aquatic survey locations, sample dates, types of samples collected, UTM coordinates, and stream type are presented in Table 3K-11.

Table 3K-11:
Aquatic Survey Locations, Date, and Types of Samples Collected for the BSR Peak 6 Project, September 2009

Stream	USFS Site Code	Sample Date	Sample Type [a]	Location 83 UTM E	Location 83 UTM N	Reference	Stream Type
Middle Barton	bartmf	9/15/09	M, F	407877	4374546	YES	A
NF South Barton	bartnf	9/16/09	M	406569	4373152		A
South Barton	bartsf	9/16/09	M	406989	4372674		A
South Cucumber Creek	cucum	9/15/09	M	408075	4371534		Aa+
Cucumber Creek	cucum2	9/16/09	M	407373	4371868		A
Meadow Creek	mead2	9/16/09	M	403517	4383461	YES	Aa+
Cucumber Creek	cucum_f	9/16/09	F	408268	4372021		A
South Barton	bartsf_f	9/16/09	F	407894	4372852		A
NF South Barton	bartnf_f	9/16/09	F	408109	4373676		A
Sawmill Creek	sawMIS	9/16/09	M	407143	4369095		A
Sawmill Creek	sawml	9/16/09	M	408797	4369806		A

[a] Fish and macroinvertebrate samples are denoted by F and M, respectively.

[416] Aquatic Associates, 2010

Macroinvertebrate populations were quantitatively sampled at the nine study sites using a Surber sampler with mesh size of 500 microns (*u*m). At each site, eight Surber samples were randomly collected from riffle areas and composited into one sample for analysis. A summary of key community metrics that were selected to describe the macroinvertebrate community is provided in Table 3K-12. The selected metrics included total density, species diversity, total taxa, EPT taxa (richness), EPT percent abundance, where EPT refers to Ephemeroptera (mayflies), Plecoptera (stoneflies), and Trichoptera (caddisflies), percent Chironomidae, and the Hilsenhoff Biotic Index (HBI). Complete summaries of macroinvertebrate data are presented in Appendices B and C of the Aquatics Associates report in the Project File, which are consistent with the routine data analyses performed for the Forest Service. Macroinvertebrate data comparisons (summary of community metrics, relative abundance, and density for the orders collected) are provided for the two stream types A and Aa+ in Appendix B.[417] Summary data comparisons are also provided in the Project File that compares the 2009 data with previous sampling years for each site.[418] Data for each site are also provided, which includes a list of species, individual densities in numbers per square meter (organisms/m^2), percent relative abundance, total density, total number of taxa, and other relevant community metrics as well as the percent abundance and densities for the major taxonomic groups collected.

Table 3K-12:
Summary of Key Community Metrics for Macroinvertebrate Samples Collected at BSR Peak 6 Project Study Sites, September 2009

Stream Type/Stream	Site ID	Density (n/m2)	Species Diversity	Total Taxa	EPT Taxa	% EPT	% Chiron	HBI
TYPE A								
Middle Barton Gulch *	bartmf	2,193	4.45	33	19	58.6	22.2	2.86
NF South Barton Gulch	bartnf	5,775	3.34	28	16	73.7	3.6	3.31
South Barton Gulch	bartsf	1,783	3.58	27	17	56.7	14.4	3.92
Cucumber Creek	cucum2	1,256	3.67	32	20	68.2	14.4	3.01
Sawmill Creek	sawMIS	3,962	3.43	28	14	55.8	9.5	3.63
Sawmill Creek	sawml	2,189	3.38	29	15	46.3	16.2	4.72
TYPE AA+								
Meadow Creek [a]	mead2	5,559	3.65	34	21	86.1	2.6	1.95
South Cucumber Creek	cucum	598	3.78	25	11	58.6	22.8	2.31
Lehman Gulch	lehma	2,867	3.62	29	14	53.6	24.4	2.25

[a] Reference sites are Middle Barton for stream type A and Meadow Creek for stream type Aa+.

[417] Ibid.
[418] Ibid.

Macroinvertebrate densities ranged from 598 to 5,775 organisms/m^2 at the nine sites. Density was lowest at site *cucum* on South Cucumber Creek (refer to Table 3K-12). Total numbers of taxa collected ranged from 25 to 34 with taxa richness also lowest at site *cucum*. Densities and taxa richness varied among the nine sites and were within the typical ranges reported for other similar headwater Colorado montane streams. The lower density and number of taxa reported for site *cucum* was mainly due to the low stream flow (~0.25–0.3 cfs), the scarcity of riffles and smaller substrates (cobble and gravel) preferred by many aquatic insects for colonization, the greater degree of embeddedness, and the steeper gradient.

The nine macroinvertebrate communities were typical of Colorado montane streams and comprised mainly of aquatic insects.[419] Species composition was relatively similar at all sites in that the community was generally dominated by stoneflies, followed by mayflies and caddisflies, with the dipterans, mainly midges, also relatively abundant.[420] The non-insects, Turbellaria (flatworms) and Oligochaeta (aquatic worms) were also relatively abundant at all sites. Oligochaetes were particularly abundant at site *sawml* on Sawmill Creek where they were the dominant group (34.5 percent).

The Forest Service's North Barton Gulch (the drainage north of the Peak 6 project area) aquatic macroinvertebrate monitoring station (located approximately 1.5 miles northeast and 800 vertical feet below a comparable point in the Peak 6 project area) is one of several spatial control stations across the Forest established to compare with streams affected by ski area development. This station, most recently sampled in 2004, supported 16 EPT taxa and eight sediment sensitive macroinvertebrate taxa during 2004 sampling.[421] These values indicated moderate quality habitat conditions and biotic integrity. EPT values of 21 or greater are indicative of a non-impaired montane stream.[422]

DIRECT AND INDIRECT ENVIRONMENTAL CONSEQUENCES

Table 3K-13:
Summary of Water Resources Effects by Issue and Indicator

Alternative 1	Alternative 2	Alternative 3
Issue: Implementation of terrain modifications associated with proposed projects (vegetation removal, grading, utility installation/burial, road reconstruction, and facilities construction) has the potential to affect stream and riparian health.		
Indicator: Anticipated temporary and permanent changes in water yield (acre feet) and peak flows (cfs), and subsequent watershed effects		
No changes in water yield and peak flow would occur under Alternative 1. Water yield and peak flows would continue to resemble quantities presented in Table 3K-5.	Alternative 2 would affect the Cucumber Creek and South Barton Gulch watersheds. <u>Cucumber Creek:</u> *Water Yield*: 4.0 AF increase (0.3% relative to existing condition) *Peak Flows*: 0.2 cfs increase	Alternative 3 would cause the following increases in water yields and peak flows: <u>Lehman Gulch:</u> *Water Yield*: 14.2 AF increase (0.9% relative to existing condition) *Peak Flows*: 0.3 cfs increase

[419] Ward et al., 2002
[420] Aquatics Associates, 2010
[421] Hirsch et al., 2004
[422] McGuire, 1999

Table 3K-13:
Summary of Water Resources Effects by Issue and Indicator

Alternative 1	Alternative 2	Alternative 3
	(1.3% relative to existing conditions) South Barton Gulch: *Water Yield*: 26.1 AF increase (1.5% relative to existing condition) *Peak Flows*: 0.6 cfs increase (3.7% relative to existing conditions)	(1.6% relative to existing conditions) Jones Gulch: *Water Yield*: 2.4 AF increase (0.4% relative to existing condition) *Peak Flows:* 0.0 cfs increase (0% relative to existing conditions) Sawmill Gulch: *Water Yield*: 7.4 AF increase (0.3% relative to existing condition) *Peak Flows*: 0.1 cfs increase (0.4% relative to existing conditions) Cucumber Gulch: *Water Yield*: 13.9 AF increase (1.0% relative to existing condition) *Peak Flows:* 0.3 cfs increase (1.6% relative to existing conditions) Cucumber Creek: *Water Yield*: 1.2 AF increase (0.1% relative to existing condition) *Peak Flows*: 0.1 cfs increase (0.4% relative to existing conditions) South Barton Gulch: *Water Yield*: 0.6 AF increase (0% relative to existing condition) *Peak Flows:* 0.0 cfs increase (0.1% relative to existing conditions)
Indicator: Discussion of existing stream health conditions and water influence zone (WIZ) impacts, within the context of the following stream health metrics: bank stability, fine sediment, residual pool depth, wood frequency, and macroinvertebrates. Evaluation of compliance with Watershed Conservation Practices Handbook and Forest Plan requirements		
No additional impacts to the WIZ would occur under Alternative 1. However, watersheds will continue to adjust to existing impacts, such as increased sediment loads originating in current CDAs. Additional resource damage is likely to occur as a consequence of these existing impacts. In addition, since Alternative 1 would have no direct or indirect effects, no affects to macroinvertebrates would occur.	Impacts to the WIZ account for 1.7 acres (1.6 percent of the currently forested WIZ) within the Cucumber Creek watershed. Forest clearing in South Barton Gulch's WIZ equals 4.2 acres, which represents 2.2 percent of the WIZ in this watershed. Construction and implementation of Alternative 2 would be consistent with the WCPH and would not adversely impact the health of Cucumber Creek and South Barton Gulch. With the implementation of proposed drainage management PDC for the two project area watersheds, the Proposed Action would meet Forest Plan direction for macroinvertebrate communities.	Lehman Gulch stream health was determined to be "diminished" for LWD. Alternative 3 proposes to remove an additional 1 acre of vegetation within the WIZ in this watershed, which would increase the cumulative removal of WIZ vegetation to 42 acres (or 21percent of baseline conditions). Recruitment of coarse woody debris would be mitigated by felling trees into intertrail islands within the WIZ to improve LWD density. Jones Gulch was classified as At-Risk for the residual pool depth health metric. Alternative 3 proposes to clear 0.12 acre of WIZ trees. Although this is a relatively small area, it would bring the cumulative tree removal within the WIZ to more than 67 acres, or 60 percent of

Table 3K-13:
Summary of Water Resources Effects by Issue and Indicator

Alternative 1	Alternative 2	Alternative 3
		baseline conditions. Extensive mitigation measures would be needed to offset the impacts to the Jones Gulch watershed and comply with the WCPH management direction that requires to progress toward a robust stream health. Implementation of Alternative 3 within the Jones Gulch watershed would be consistent with management measures included in the WCPH. A stream health survey was not conducted for Cucumber Gulch. However, this watershed has been heavily impacted by ski area development. Additional and new activities proposed under Alternative 3 for Cucumber Gulch would be fully off-set and therefore comply with the WCPH. With the implementation of proposed drainage management PDC. Alternative 3 would meet Forest Plan direction for macroinvertebrate communities.
Indicator: Qualitative and quantitative discussion of existing surface drainage conditions within the context of Forest Plan Standard (3) for Management Area 8.25:(3) Snow management, including snowmaking and snow-farming, will be conducted in a manner that prevents slope failures and gully erosion, as well as bank erosion and sediment damage in receiving channels		
BSR's Mountain Drainage Plan determined that 20% of the existing drainage features within BSR are in poor condition and require improvement. For example, the summer 2008 field inspection determined that 24% of the water bars within the Carter Gulch watershed were in poor condition. These water bars are key components of the ski trail drainage system, which includes flows originating from man-made snowmelt.	Alternative 2 does not include additional snowmaking coverage. Snow-farming that may occur within the Proposed Action terrain to ensure adequate snow coverage on proposed trails would be managed with the installation of water bars and drainage management features discussed in Table 2-4. Therefore, Alternative 2 would be consistent with Management Area 8.25 Standard and 3.	Additional snowmaking coverage proposed under Alternative 3 would not result in significant increases in peak flows and basin yields (refer to Tables 3K-17 and 3K-18). It is not expected that the proposed snowmaking coverage would cause additional drainage concerns with strict application of PDCs.
Indicator: Quantification and discussion of existing drainage concerns and treatment areas, including areas of rilling and gullying		
The existing CDA totals approximately 208 acres. Most of the existing drainage concerns are located within the Jones Gulch (~23 acres) and	See Alternative 1 description.	See Alternative 1 description.

Table 3K-13:
Summary of Water Resources Effects by Issue and Indicator

Alternative 1	Alternative 2	Alternative 3
Sawmill Gulch (~12 acres) watersheds. The Fall 2009 Report of BSR's Mountain Drainage Plan identified five sites within these watersheds that exhibit severe erosion and or sedimentation problems.		
Indicator: Development and analysis of drainage management measures to maintain or improve stream health		
No drainage management measures would be implemented with Alternative 1.	Alternative 2 proposes to disconnect 7.9 acres of existing CDA within the Cucumber Creek watershed. This would off-set Alternative 2 impacts and "maintain" stream health in the Cucumber Creek watershed. Alternative 2 would grade 13.4 acres of terrain within the South Barton Gulch watershed as part of the proposed ski trails construction. This grading would not occur within 200 feet of the stream channel. In addition, water bars and sediment control PCDs would be constructed on the proposed ski trails to ensure surface runoff drains away from the WIZ. Implementation of PDCs would "maintain" stream health in South Barton Gulch watershed.	Proposed drainage management measures under Alternative 3 include restoration of severely eroded drainage channels and a minimum disconnection of 36.1 acres of existing CDA. Implementation of drainage management measures proposed under Alternative 3 would "maintain" stream health in the project area watersheds.
Indicator: Quantity (acres) of impacts to WIZ		
0.0 acre	6.7 acres	15.6 acres
Indicator: Changes in connected disturbed area (CDA) (acres)		
No changes in CDA would occur under Alternative 1.	6.7 acres of proposed additional CDA. 7.9 acres of proposed mitigation of existing CDA.	Approximately 10 acres of proposed additional CDA. A minimum of 36.1 acres of existing CDA would be disconnected.
Indicator: Changes in channel network extension (length of connected channel)		
No changes in channel network extension are anticipated to occur under Alternative 1.	No changes in channel network extension are anticipated to occur under Alternative 2.	No changes in channel network extension are anticipated to occur under Alternative 3.
Indicator: Quantification (acres) of ground disturbing activities located on highly erodible soils as it pertains to stream health		
No ground disturbing activities would occur under Alternative 1.	Ground disturbing activities (grading) would total approximately 29.3 acres. All of which would be located on soils with a low to moderate erodibility rating. With PDCs established during construction, effects to stream health would be minimized.	Ground disturbing activities (grading) would total approximately 41 acres. All of which would be located on soils with a low to moderate erodibility rating. With PDCs established during construction, effects to stream health would be minimized.

Alternative 1 – No Action

Under the No Action Alternative, BSR would continue current summer and winter seasonal operations. Creation of additional skiing terrain would not occur with selection of this alternative. The effects of previously approved, but as yet unimplemented projects are disclosed in Cumulative Effects and are not considered a consequence of the selection of Alternative 1. This alternative would have no direct or indirect effects on the watershed and aquatic resources. Existing concerns regarding the condition of the watersheds and health of the streams are expected to continue. In fact, resource damage such as down-cutting and lateral erosion to drainage channels may worsen as the causal mechanism of said damage would continue to exist.

A field investigation conducted as part of BSR's Mountain Drainage Plan identified several sites with extensive and progressing resource damage. Three of these sites were determined to require immediate mitigation of erosion and sedimentation problems. Two of these sites are located within the Jones Gulch watershed where the existing CDA have effectively increased the channel network length by more than 60 percent (refer to Table 3K-9). For example, 2 to 3 feet deep down-cutting and gully erosion were observed in the *Cashier* trail, near the Peak 8 SuperConnect bottom terminal. The reader is referred to the BSR's Mountain Drainage Plan fall 2009 Report in the Project File for a detailed description of current impacts to the stream channels and hill slopes.

As shown in Table 3K-9, three out of five streams surveyed by the WRNF within BSR's SUP boundary currently exhibit a less than "Robust" health condition in at least one stream health metric. Lehman Gulch shows a "Diminished" condition for LWD; this stream health metric is negatively affected by removal of vegetation in the WIZ. No additional impacts to the WIZ will occur if Alternative 1 is selected, thus deterioration of this metric is not expected.

Jones Gulch was classified as "At-Risk" for residual pool depth and the survey of the South Fork of Cucumber Creek (tributary to Cucumber Creek) determined that its health condition is currently "Diminished" for fine sediments and "At-Risk" for residual pool depth. As previously discussed, the extension of CDA is the causal mechanism for these metrics. Selection of Alternative 1 will not cause changes in CDA; however, currently impacted watersheds, such as Jones Gulch, will continue to adjust to the input of sediment loads originating in the existing CDAs.

In addition, Sawmill Gulch unstable banks represent 124 percent of the corresponding reference stream which is only 2 percent below the 126 percent limit for the "At-Risk" class. In other words, a relatively minor increase in the length of Sawmill Gulch unstable banks would lower the classification of this metric from "Robust" to "At-Risk." As mentioned before, bank instability is primarily caused by increases in the channel network length and the extension of connected graded areas. In summary, additional resource damage to currently impacted watersheds is likely to occur under Alternative 1.

Alternative 2 – Proposed Action

Under Alternative 2, BSR proposes to install a new chairlift and add 550 acres of new terrain within the South Barton Gulch and Cucumber Creek watersheds. These improvements involve clearing 79.4 acres of existing forested areas; of this total, 69.3 acres correspond to the South Barton Gulch watershed while the remaining 10.1 acres are located in the Cucumber Creek watershed. The proposed clearing represents 4.9 percent and 1.6 percent of the existing forested areas, respectively. No new snowmaking coverage is included in the Proposed Action. The Cucumber Creek and South Barton Gulch basins are the only watersheds within BSR's SUP boundary that would be affected by activities proposed under Alternative 2. Table 3K-14 summarizes Alternative 2 proposed clearing for the affected watersheds.

Table 3K-14:
Forest Clearing – Alternative 2

Watershed	Existing Forested Area (acres)	Proposed Clear-Cut (acres)	Percent Proposed Clear-Cut (%)
Cucumber Creek	630	10.1	1.6
South Barton Gulch	1,407	69.3	4.9
Total	**2,037**	**79.4**	**3.9**

Water Yield

Hydrologic computations performed using the WRENSS Model show that the 10 acres of proposed forest clearing within the Cucumber Creek watershed would increase the basin's average annual yield by 4 AF to 1,385.1 AF.[423] This represents less than 0.5 percent increase relative to the existing watershed yield. The calculated peak flow for the Cucumber Creek watershed would increase from 14.4 cfs to 14.6 cfs, or approximately 1.3 percent relative to current conditions.

The South Barton Gulch watershed would increase its average annual yield to 1,794.2 AF due to the proposed 69.3 acres of forest clearing. This is an increase of 26 AF, or approximately 1.5 percent relative to current annual yield. South Barton Gulch peak flows would increase by approximately 3.5 percent from the current 15.0 cfs to 15.5 cfs.

The calculated increases in water yield and peak flow for the Cucumber Creek and South Barton Gulch watersheds are solely due to the 79.4 acres of forest clearing. No new snowmaking coverage is proposed under Alternative 2. Tables 3K-15 and 3K-16 display a comparison in peak flow and yield under baseline, existing, and proposed conditions.

[423] Troendle and Leaf, 1980

Table 3K-15:
Increase in Annual Yield – Alternative 2

Watershed	Water Yield (AF)			Increase Relative to Existing Yield (%)	Cumulative Increase Relative to Baseline Yield (%)
	Baseline	Existing	Alternative 2		
Cucumber Creek	1,314.2	1,381.1	1,385.1	0.3	5.4
South Barton Gulch	1,706.6	1,768.1	1,794.2	1.5	5.1

Table 3K-16:
Increase in Peak Flows – Alternative 2

Watershed	Peak Flows (cfs)			Increase Relative to Existing Peak Flow (%)	Cumulative Increase Relative to Baseline Peak Flow (%)
	Baseline	Existing	Alternative 2		
Cucumber Creek	11.5	14.4	14.6	1.3	26.8
South Barton Gulch	14.0	15.0	15.5	3.5	10.8

Stream Health

Alternative 2 would involve clearing existing forested areas within the Cucumber Creek and South Barton Gulch watersheds. The Proposed Action was evaluated against the WRNF measured stream health conditions for Cucumber Creek and South Barton Gulch. As shown in Table 3K-8, three of the four reaches surveyed within these two watersheds are classified as Robust for all four metrics. The three Robust reaches correspond to the main stem of Cucumber Creek, the main stem of South Barton Gulch, and the North Fork of South Barton Gulch, while the South Fork of Cucumber Creek was classified as less than Robust for two of the four metrics.

In order to evaluate the potential, additional CDA resulting from the Proposed Action, a 200-foot buffer was delineated along the affected streams. As stated before, the WCPH considers ground disturbing activities within the WIZ (100-foot buffer) as connected to the stream, unless site-specific actions are implemented to disconnect these areas from the stream. The buffer along the stream is increased to 200 feet when disturbed areas are also graded.[424]

Cucumber Creek

Two stream reaches were surveyed by WRNF personnel within the Cucumber Creek watershed: one reach in the main stem of Cucumber Creek and an additional reach in the South Fork of this creek. The main stem of Cucumber Creek exhibits a “Robust” health condition in all four metrics. The stream reach surveyed on the South Fork of Cucumber Creek exhibited a “Robust” classification for bank stability and large woody debris; however, the stream health condition for this reach was classified as Diminished for

[424] Anderson, 2010

fine sediment and as At-Risk for Residual Pool Depth.[425] Therefore, new activities in the Cucumber Creek watershed would require appropriate project design criteria in order to "maintain or improve" stream health in accordance with WCPH Management Measures (MM) 1, 3, 5, and 8 along with Forest Plan Management Area 8.25 Standard 3.

The Proposed Action involves 1.7 acres of clearing within Cucumber Creek's WIZ. This represents 1.6 percent of the approximate total of 107.8 acres of forested areas within Cucumber Creek's WIZ. Existing LWD frequency on the Cucumber Creek and on the South Fork of Cucumber Creek was measured at 51 and 52 pieces/100 meters (#/100 m) of stream, respectively. These measurements correspond to 210 percent and 214 percent relative to the reference reach (Table 3K-8) and therefore these two streams classify as Robust for the LWD metric. It is unlikely that the proposed reduction of 1.6 percent of riparian vegetation would result in coarse wood frequency dropping below the minimum Robust level of 18 #/100 m of stream (i.e., 74 percent of the reference stream).

Unstable banks on the main stem of Cucumber Creek and on the South Fork of Cucumber Creek were measured at 10 meters per 100 meters (m/100 m) and 0 m/100 m respectively. Under the Proposed Action, the Cucumber Creek watershed yield would increase by 0.3 percent while peak flow increase would be approximately 1.3 percent (refer to Tables 3K-15 and 3K-16). It is not expected that these changes in yield and peak flows would increase bank instability beyond the 14 m/100 m threshold for Robust classification (126 percent of the reference value of 11 m/100 m unstable banks). However, prevention and drainage management measures would be designed and implemented to protect stream banks stability. For example, Design Criteria included in MM-3 states to "Keep heavy equipment out of streams, except to cross at designated points, build crossings, or do restoration work, or if protected by at least 1 foot of packed snow…" Skier access to the junction of proposed lifts and back to the bottom terminal in Peak 7 requires crossing the South Fork of Cucumber Creek and Cucumber Creek channels. These crossings would be constructed seasonally from snow and would be compliant with Design Criteria included in MM 1, 3, 5, and 8 along with Forest Plan Management Area 8.25 Standard 3. The ski trail designs proposed under Alternative 2 are consistent with the Design Criteria included in the WCPH.

Ground disturbing activities proposed under Alternative 2 could result in 1.8 acres of additional CDA within the Cucumber Creek watershed. These ground disturbing activities include 1.7 acres of forest removal within Cucumber Creek's WIZ and an additional 0.1 acre of forest clearing and terrain grading within 200 feet of the stream channel.

As indicated by Design Criteria included in MM-1, drainage management measures would be designed and implemented to "maintain or reduce watershed-scale Connected Disturbed Area." Table 3K-9 shows that the existing CDA within Cucumber Creek's watershed totals 18.3 acres. Analysis of field data

[425] These Non-Robust classifications may be due to the fact that this reach was surveyed shortly after construction activities took place in close proximity of the channel upstream of the survey.

collected during development of BSR's Mountain Drainage Plan indicates that approximately 8.0 acres could be effectively disconnected from the stream channel. This represents 43 percent of the 18.3 acres of total Cucumber Creek existing CDA.

Proposed Drainage Management Measures within the Cucumber Creek Watershed:

- Disconnect 1.85 acres of existing disturbed area by redirecting two ski trail water bars away from the creek's WIZ (in other words, changing the direction to where the water bars currently drain). These water bars drain sections of the Angels Rest and Wirepatch trails. This measure would off-set the proposed impacts and be consistent with WCPH Design Criteria.
- Disconnect an additional 3.2 acres of ski trail by directing drainage that originates from the upper Monte Cristo trail away from WIZ.
- Disconnect approximately 2.8 acres of existing roads by discharging road-side ditch flows in well forested areas, away from WIZ. This road is located at the upper section of the Pioneer, Wirepatch, Lincoln Meadows, and Angels Rest trails.

Additionally, water bars must be designed and constructed to discharge surface runoff originating within the proposed ski trails away from the WIZ and into well vegetated areas, effectively disconnecting disturbed areas from the stream channel. When appropriate, the downstream end of water bars will include BMPs that encourage sediment separation and dispersion of flow, such as straw bales and fiber logs. Water bars and associated BMPs must be constructed immediately after construction of the ski trail, and inspected during the first snowmelt period following construction.[426]

South Barton Gulch

The South Barton Gulch currently has a CDA of approximately 13 acres (refer to Table 3K-9). This disturbance corresponds to non-ski area roads and private homes. The analysis of CDA within South Barton Gulch also shows that the channel network length has been increased by approximately 22 percent due to connected non-ski area roads. As shown in Table 3K-14, development under the Proposed Action would clear approximately 66.6 acres of forests, of which 6.5 acres correspond to areas already impacted by past logging activities. The proposed removal of vegetation within the WIZ associated with construction of ski trails and a lift corridor would total 4.2 acres, which represent 2 percent of the currently vegetated WIZ.

Alternative 2 includes construction of a trail that would take skiers from the proposed terrain back to the junction of the Peak 6 lifts. This proposed trail would cross over the Main Stem of South Barton Gulch and therefore appropriate measures must be taken to minimize impacts to the stream channel. For instance, even though construction of this trail involves grading approximately 13.4 acres, grading will not occur within 200 feet of the stream channel. In addition, mitigation measures would be carefully

[426] USDA Forest Service, 2001a

designed and implemented in order to effectively disconnect the proposed graded areas from the channel network. Road-side ditches and water bars would be designed to discharge flow into well vegetated areas located more than 200 feet from the stream channel. In addition, BMPs to reduce flow velocities and separate sediment will be designed, installed, and maintained at the locations of runoff discharge into the forest. These measures would ensure CDA within the South Barton Gulch watershed would not increase with implementation of the Proposed Action.

Increases in watershed yield and peak streamflow calculated for the South Barton Gulch watershed under the Proposed Action are approximately 1.4 percent and 3.5 percent respectively (refer to Tables 3K-15 and 3K-16). Forest clearing within the South Barton Gulch WIZ totals 4.2 acres; this represents 2.2 percent of the 195.3 acres of forested areas within this WIZ. As Table 3K-8 shows, the two surveyed reaches of South Barton Gulch exhibit Robust classification for all four metrics. Furthermore, the surveyed values for the four stream health metrics are well beyond the thresholds for the Robust classification. For example, the Main Stem of South Barton Gulch measured 11 m/100 m of unstable banks and the threshold for the Robust classification for this stream is 14m/100 m. This means that unstable banks in the Main Stem of South Barton Gulch would have to increase by more than 27 percent to be classified as At-Risk. Fine sediments were surveyed on this stream at 19 percent and the Robust/At-Risk threshold for this stream and this metric is 29 percent. In other words, the amount of fine sediments in the streambed would have to increase by more than 52 percent to be classified as At-Risk. Construction and implementation of the Proposed Action, following the applicable Design Criteria included in the WCPH, would be consistent with the WCPH and would not adversely impact the health of South Barton Gulch.

Proposed Drainage Management Measure within the South Barton Gulch Watershed:

- Water bars must be designed and constructed to discharge surface runoff originating within the proposed ski trails away from the WIZ and into well vegetated areas, effectively disconnecting disturbed areas from the stream channel.
- When appropriate, the downstream end of water bars will include BMPs that encourage sediment separation and dispersion of flow, such as straw bales and fiber logs.
- Water bars and associated BMPs must be constructed immediately after construction of the ski trail; inspect water bars during the first snowmelt period following construction.[427]

Water Quality Data

Zinc and cadmium are currently being monitored by the Colorado Department of Public Health and Environment along the Blue River. With PDC to minimize sedimentation in streams proximate to project areas, the Proposed Action is not anticipated to contribute increased levels of zinc and cadmium to the

[427] Ibid.

Blue River. The Forest Service will continue annual monitoring in Cucumber Creek and South Barton near disturbance areas to ensure increased levels of zinc and cadmium do not occur.

Aquatic Macroinvertebrates

Alternative 2 would result in approximately 77 acres of forest clearing (refer to Table 3K-14), with all but 10 acres within the South Barton Gulch watershed that is largely intact from recent and historic logging and other human disturbances. A minor amount of forest clearing would extend into Cucumber Creek, to the south, where forests north of the creek are largely intact from recent and historic logging. The proposed amount of clearing in the Peak 6 area would affect a smaller percentage of forest than in existing developed BSR ski terrain. Additional MPB effects on water quality would be insignificant and undetectable because most of the Peak 6 project area is spruce-fir dominated. *Armillaria* mortality is localized and would not result in detectable water quality effects. No additional snowmaking is proposed under Alternative 2. With the implementation of proposed PDC presented above for the two project area watersheds, the Proposed Action would meet Forest Plan direction for macroinvertebrate communities.

Alternative 3

Under Alternative 3, BSR would open 326 acres of new terrain, upgrade three chairlifts, install a new chairlift, and expand the snowmaking infrastructure to cover 40.4 acres of existing and proposed ski trails. These improvements involve clearing 46.4 acres and thinning 114.2 acres of existing forested areas, and diverting approximately 30 AF of additional Blue River water. Tables 3K-17 and 3K-18 summarize the clearing and thinning acreage and changes due to snowmaking improvements proposed under Alternative 3.

Table 3K-17:
Forest Clearing and Thinning – Alternative 3

Watershed	Baseline Forest (acres)	Existing Forested Area (acres)	Proposed Clear-Cut (acres)	Proposed Thinning (acres)
Carter Gulch	628	541	3.9	0.0
Upper Lehman	378	211	10.0	0.0
Lower Lehman	117	59	0.0	0.0
Jones Gulch	453	169	5.4	0.0
Sawmill Gulch	734	446	6.7	0.0
Cucumber Gulch	854	437	13.6	0.0
Cucumber Creek	779	630	4.8	55.4
South Barton Gulch	1,715	1407	1.9	33.0
Total			**46.3**	**88.4**

Table 3K-18:
Snowmaking Coverage and Associated Water Demands – Alternative 3

Watershed	Snowmaking Coverage (acres)		Snowmaking Water (AF)	
	Existing	Proposed	Existing	Proposed
Carter Gulch	44.2	6.4	32.7	4.7
Upper Lehman	73.3	9.2	76.1	6.8
Lower Lehman	141.1	15.6	126.4	11.5
Jones Gulch	171.1	0.6	148.4	0.5
Sawmill Gulch	46.5	8.7	34.4	6.5
Cucumber Gulch	196.7	15.6	211.0	11.5
Cucumber Creek	40.6	0.0	30.1	0.0
South Barton Gulch	0.0	0.0	0.0	0.0
Total	**596.2**	**40.5**	**550.3**	**30.0**

Water Yield

Output of the WRENSS Model indicates that the 130 acres of forest disturbance (clearing and thinning) combined with the 30 AF of additional snowmaking water input would increase both water yields and peak flows in all affected watersheds.[428] As shown in Tables 3K-17 and 3K-18, Jones Gulch exhibits the largest changes in yield and peak flow values relative to its baseline conditions. This is consistent with the fact that Jones Gulch is the watershed that has been most heavily impacted by ski trail development. Tables 3K-17 and 3K-18 also show that yields and peak flows in the Lehman Gulch and Cucumber Gulch watersheds would experience significant increases, as compared to baseline conditions, under Alternative 3. Increases in yield and peak streamflow values proposed under Alternative 3 are largest for Lehman Gulch and Cucumber Gulch when compared against existing conditions.

[428] Troendle and Leaf, 1980

Table 3K-19:
Increase in Annual Yield – Alternative 3

Watershed	Water Yield (AF)			Increase Relative to Existing Yield (%)	Cumulative Increase Relative to Baseline Yield (%)
	Baseline	Existing/ No Action	Alternative 3		
Carter Gulch	723.4	781.1	786.1	0.6	8.7
Upper Lehman	798.8	921.5	930.6	1.0	16.5
Lower Lehman	1,349.0[a]	1,564.9[a]	1,579.1[a]	0.9	17.1
Jones Gulch	355.6	579.3	579.3	0.4	63.5
Sawmill Gulch	2,497.1	2,633.2	2,640.6	0.3	5.8
Cucumber Gulch	1,121.9	1,446.7	1,460.6	1.0	30.2
Cucumber Creek	1,314.2	1,381.1	1,382.3	0.1	5.2
South Barton Gulch	1,706.6	1,768.1	1,768.7	0.0	3.6

[a] Yield and peak flow calculated for Lower Lehman Gulch include effects of tributary watersheds Upper Lehman Gulch and Carter Gulch.

Table 3K-20:
Increase in Peak Flows – Alternative 3

Watershed	Peak Flow (cfs)			Increase Relative to Existing Peak Flow (%)	Cumulative Increase Relative to Baseline Peak Flow (%)
	Baseline	Existing/ No Action	Alternative 3		
Carter Gulch	5.5	6.7	6.8	1.2	23.4
Upper Lehman	6.9	10.4	10.6	1.8	54.7
Lower Lehman	10.9[a]	16.9[a]	17.1[a]	1.6	57.3
Jones Gulch	2.9	6.7	6.7	0.7	135.9
Sawmill Gulch	23.7	30.7	30.8	0.4	29.9
Cucumber Gulch	9.4	16.4	16.7	1.5	77.0
Cucumber Creek	11.5	14.4	14.5	0.4	25.8
South Barton Gulch	14.0	15.0	15.0	0.1	7.1

[a] Yield and peak flow calculated for Lower Lehman Gulch include effects of tributary watersheds Upper Lehman Gulch and Carter Gulch.

Stream Health

Lehman Gulch

The Upper Lehman Gulch is a 2nd-order stream that extends from its headwaters at approximately 12,000 feet to its confluence with Carter Gulch. The 3rd-order stream that flows from this confluence down to the Blue River is often called Lower Lehman Gulch. In order to be consistent with the WCPH, which often references management measures and design criteria to 3rd-order or larger watersheds, the stream health analysis contained in this section was performed to the area draining to Lower Lehman Gulch (i.e., the analysis includes Carter Gulch and Upper Lehman Gulch).

Alternative 3 proposes to clear 13.9 acres of forest within the Lehman Gulch watershed (Table 3K-17). This represents 1.7 percent of the existing forest in this basin. Stream health data for this watershed was collected on a reach located on the Upper Lehman Gulch. As shown in Table 3K-8, this reach was classified as Robust for fine sediment, bank stability, and residual pool depth. However, the large woody debris metric was classified as Diminished. This is not surprising since approximately 44 percent of the original forest on the Upper Lehman Gulch sub-basin has been cleared, removing a large potential source for large woody debris.

CDA within the Lehman Gulch watershed totals 45.2 acres, with approximately 89 percent of this area corresponding to graded terrain. Additionally, 2.2 miles of Lehman Gulch roads are connected to the stream channel network, representing approximately a 19 percent increase of the baseline channel length (refer to Table 3K-9).

Of the 13.9 acres of forest clearing proposed under Alternative 3, 1.0 acre would be within the WIZ. MM-3 states that only those actions that "maintain or improve long-term stream health" would be allowed in the WIZ of perennial and intermittent streams, such as Lehman Gulch. Further, Design Criteria included in MM-3 specifies that degraded streams (i.e., At-Risk or Diminished stream health classes) would progress toward Robust stream health and that new concentrated-use sites would be located outside the WIZ. The 1.0 acre of proposed disturbance within the WIZ corresponds to the lower sections of four ski trails (a total of six new ski trails are proposed for this watershed) and would bring the cumulative removal of WIZ vegetation to 21 percent. Implementation of this alternative would mitigate the clearing of WIZ forest by felling trees into the intertrail islands that exist within the WIZ to improve LWD density. In addition, branches that are cut would be scattered on trails or piled along the edge of ski runs. Implementation of these mitigation measures would be consistent with the management direction provided in the WCPH.

Jones Gulch

The Jones Gulch watershed has been heavily impacted by ski area development. As shown in Table 3K-3, this is the only watershed within BSR's SUP boundary where the existing cleared area (299 acres) is larger than the remaining forested area (169 acres). Moreover, even though Jones Gulch has the smallest drainage area (414 acres) of the six major BSR's watersheds, it ranks second in the use of snowmaking water. Jones Gulch currently exhibits the largest increases in yield and peak flow relative to baseline conditions (refer to Table 3K-5). In addition, Jones Gulch receives runoff from 31 acres of trails located on adjacent watersheds. This "trans-basin" water is imported into Jones Gulch via water bars and road-side ditches. These existing impacts to the Jones Gulch watershed have been documented in BSR's Mountain Drainage Plan.

Only 0.6 acre of new snowmaking coverage is proposed under Alternative 3 (refer to Table 3K-18) representing an increase of less than 0.5 percent in snowmaking water imported into this watershed. The

calculated increases in yield and peak flow are 0.4 percent and 0.7 percent, respectively. It is not expected that the proposed additional snowmaking activities, and associated increases in watershed yield and peak streamflow would diminish Jones Gulch stream health. However, because the residual pool depth metric is currently classified as At-Risk, the applicable WCPH direction is to "progress toward robust stream health." In other words, proposed activities in this watershed need to include design criteria to improve stream health.

Development of Alternative 3 activities involves clearing 5.4 acres of currently forested areas within the Jones Gulch watershed. Approximately 2 percent of this disturbance (0.12 acre) would be located within the WIZ. The impacted WIZ corresponds to two 1st-order streams that are tributary to Jones Gulch. The proposed clearing would bring the cumulative removal of forests within the WIZ to 59.5 percent relative to baseline conditions. Although LWD density within the WIZ could be mitigated by, for example, leaving felled trees in the intertrail sections of the WIZ and scattering branches on the WIZ trails, there are additional functions the riparian vegetation provides that are beneficial for the health of the stream ecosystem. For example, vegetation within the WIZ provides shade and shelter for wildlife, protects the water quality of the stream by filtering sediment and pollutants, stabilizes the streambanks and prevents soil erosion, and shields streams form solar radiation. Extensive mitigation measures would be needed to offset the impacts to the Jones Gulch watershed and comply with the WCPH management direction that requires to progress toward a robust stream health.

Proposed Drainage Management Measures within the Jones Gulch Watershed:

Disconnect 14.3 acres currently connected to the stream. This mitigation opportunity was identified during development of BSR's Mountain Drainage Plan. A summary description is provided below; the reader is referred to this document for more details.

- Restore hill slope and disconnect 14.3 acres of the Columbia and American ski runs: Drainage channel runs through the middle of the ski slope on Columbia (slope ≈ 40 ft/100 ft) causing severe erosion and down-cutting. Pipe lower and middle sections of this drainage channel and connect to the existing pipe under American.
- Enlarge and improve existing detention pond at the downstream end of pipeline.

Construction and implementation of Alternative 3 within the Jones Gulch watershed, as described above, would be consistent with management measures included in the WCPH.

Sawmill Gulch

Approximately 6.7 acres of forest clearing within Sawmill Gulch watershed are proposed under Alternative 3. Such acreage represents 1.5 percent of the existing Sawmill Gulch forest. Approximately 2.5 percent of the proposed forest clearing would occur within the WIZ (0.17 acre). Additionally, Alternative 3 proposes to expand snowmaking operations to cover an additional 8.7 acres of ski trails; this

would require importing 6.5 AF of water into the watershed, a 19 percent increase relative to snowmaking water currently imported into Sawmill Gulch.

Alternative 3 also proposes to widen and re-grade existing ski trails. Currently, the majority of guests ski to Peak 9 by way of *Four O'Clock*, *Crosscut* and *Lower Sawmill* trails. These existing trails have sections that are too flat (less than 3 percent grade) in places and far too steep in others (35 to 45 percent grades). BSR proposes to re-grade and widen this trail beginning at the *Four O'Clock* trail, continuing through *Crosscut* and *Lower Sawmill* trails. The proposed project would improve these trails where the maximum grade will be 20 percent and a minimum grade of 10 percent. This project would increase the minimum width on *Four O'Clock* trail from 50 feet to 120 feet, *Crosscut* trail from 90 feet to 120 feet, and *Lower Sawmill* trail from 30 feet to 60 feet.

This grading project crosses Sawmill Creek near the existing C-Chair bottom terminal. At the crossing location, the proposed grade would be approximately 30 feet above the existing grade. To accommodate this fill, a retaining wall would be constructed on each side of Sawmill Creek for the width of the ski trail. A skier bridge measuring approximately 100 feet wide and 40 feet long would be constructed to span Sawmill Gulch at this location. This grading project would involve 12.5 acres within the Sawmill Gulch watershed. The majority of this area, 10.4 acres, corresponds to terrain already graded. In other words, only 2.1 acres would be added to the existing graded terrain within this watershed. Moreover, only 0.05 acre of the additional grading would occur within 200 feet of the stream channel.

The proposed forest clearing and expanded snowmaking operations would increase Sawmill Gulch water yield by 7.4 AF and peak streamflow by approximately 0.1 cfs, or 0.3 percent and 0.4 percent relative to current conditions (refer to Tables 3K-17and 3K-18).

All four stream health metrics analyzed for Sawmill Gulch classified as Robust. However, bank stability on this reach was measured at 124 percent of its reference value and the limit for the At-Risk class is 126 percent. Thus, new activities in this watershed with potential to increase bank instability, such as vegetation clearing within the WIZ and increased streamflow peak values, will require properly designed and implemented mitigation measures.

Analysis of the Mountain Drainage Plan field data shows that approximately 19 acres of currently connected graded terrain (ski trails and roads) could be effectively disconnected from the stream channel. This would reduce the connected graded area by approximately 50 percent. Furthermore, disconnection of these 19 acres would reduce the connected road drainage length by 5,550 feet and ultimately bring the increase in channel network length to just above 10 percent. Mitigation measures necessary to achieve this goal must be carefully designed and implemented. Examples of such actions include reducing flow velocities at locations where road-side ditches discharge into forested areas, protecting drainage channels through forested areas to avoid channel degradation, and installing sediment control BMPs before discharging into the creek or WIZ.

Proposed Drainage Management Measures within the Sawmill Creek Watershed:

- Water bars must be designed and constructed to discharge surface runoff originating within the proposed and improved ski trails away from the WIZ and into well vegetated areas, effectively disconnecting disturbed areas from the stream channel. When appropriate, the downstream end of water bars will include BMPs that encourage sediment separation and dispersion of flow, such as straw bales and fiber logs. Water bars and associated BMPs must be constructed immediately after construction of the ski trail; inspect water bars during the first snowmelt period following construction.[429]
- Disconnect 5.9 acres of graded connected terrain, located approximately 300 feet south of the Peak 8 SuperConnect top terminal. Drainage channel runs through moderately forested area and discharges into road-side ditch which, in turn, discharges within WIZ. Drainage channel shows evidence of severe incision (~3 feet deep), supplying additional sediment to the stream channel network. Restore drainage channel and install two to three check dams within the upper section; protect lower section of drainage channel with 8-inch riprap; evaluate installation of sediment pond before discharging into WIZ. The reader is referred to the Mountain Drainage Plan for more details.

Construction and implementation of Alternative 3 within the Sawmill Gulch watershed as described above would be consistent with management measures included in the WCPH.

Cucumber Gulch

Approximately 13.6 acres of forest within the Cucumber Gulch watershed would be cleared under Alternative 3 to open four new ski trails. The proposed acreage to be cleared corresponds to 3.1 percent of the existing Cucumber Gulch forest. Almost 15 percent of the proposed tree removal (2.0 acres) would occur within Cucumber Gulch WIZ. These 2.0 acres represent 3.5 percent of the vegetated WIZ. Also under Alternative 3, snowmaking coverage would expand to include these four new trails, requiring 11.5 AF of water to be imported to the watershed. This additional snowmaking water represents a 5.5 percent increase in current snowmaking water usage within the Cucumber Gulch watershed. The new and additional activities proposed under Alternative 3 would result in increases in water yield and peak streamflow. As shown in Tables 3K-17 and 3K-18, these increases would be 13.9 AF and 0.3 cfs respectively (1.0 percent and 1.5 percent relative to current conditions).

Stream channel health metrics are not currently available for Cucumber Gulch. However, this watershed has been heavily impacted by ski area development (see Tables 3K-9 and 3K-10) and thus the additional and new activities proposed under Alternative 3 must be fully addressed. Current CDA within Cucumber Gulch watershed totals 49.9 acres (all of this disturbed area is also graded). This connected disturbance results in a 30 percent increase in the channel network length. Analysis of Mountain Drainage Plan field

[429] Ibid.

data indicates that several opportunities for improvements to existing conditions exist, including potential disconnection of approximately 50 acres of terrain currently connected to the stream. This would decrease the length of connected roads by approximately 10,500 feet, reducing the percent increase of channel length from 29.8 percent to less than the 10 percent limit included in MM-1. These drainage management measures would benefit the stream system. Implementation of the following drainage management measures would comply with the direction of "maintain or improve long-term stream health" included in MM-3.

Proposed Drainage Management Measures within the Cucumber Gulch Watershed:

- Water bars must be designed and constructed to discharge surface runoff originating within the proposed and improved ski trails away from the WIZ and into well vegetated areas, effectively disconnecting disturbed areas from the stream channel. When appropriate, the downstream end of water bars will include BMPs that encourage sediment separation and dispersion of flow, such as straw bales and fiber logs. Water bars and associated BMPs must be constructed immediately after construction of the ski trail; inspect water bars during the first snowmelt period following construction.[430]
- Fell trees into the intertrail islands that exist within the WIZ to improve LWD density. In addition, scatter cut branches on trails or piled along the edge of ski runs.
- Discourage guests from skiing the interior of intertrail islands in the WIZ to promote maximum vegetative growth in the riparian areas.
- Protect wetlands to increase wetland vegetation.
- Identify and reclaim areas where vegetation could be re-established, particularly in the WIZ.
- Disconnect a minimum of 14 acres of graded connected terrain and a minimum of 4,000 feet of roads. BSR's Mountain Drainage Plan identified approximately 2 miles of roads and 50 acres of terrain that are connected to the channel network. The reader is referred to the Mountain Drainage Plan for more details.
- Capture and re-route a minimum of 15 AF during the snowmelt period; this would offset the increase in yield produced under Alternative 3. Capturing and re-routing basin yield in excess of the minimum 15 AF would assist in improving long-term stream health. For example, construct sediment ponds at selected location within the watershed; pipe outflow from these ponds and convey downstream; and dissipate flow energy before discharging into the stream channel. This type of drainage management was successfully implemented in 2008 as part of the Park Lane Project.

[430] Ibid.

Construction and implementation of Alternative 3 within the Cucumber Gulch watershed as described above would be consistent with management measures included in the WCPH.

Cucumber Creek

Implementation of Alternative 3 involves clearing 4.8 acres and thinning 55.4 acres of forested areas currently existing within the Cucumber Creek watershed. The impacted forest within the WIZ totals 8.0 acres (7.1 acres of glading and 0.9 acre of clearing). No additional snowmaking is proposed for the Cucumber Creek watershed under Alternative 3.

The South Fork of Cucumber Creek channel reach surveyed by the WRNF was classified as Robust for bank stability and large woody debris; however, as discussed in the Stream Health analysis under Alternative 2, the condition for this reach was classified as Diminished for fine sediment and as At-Risk for Residual Pool Depth. Therefore, new and additional activities in the Cucumber Creek watershed would require appropriate project design criteria in order to "maintain or improve" stream health in accordance with WCPH MMs 1, 3, 5, and 8 along with Forest Plan Management Area 8.25 Standard 3.

For example, mitigation measures would be designed and implemented to "maintain or reduce watershed-scale Connected Disturbed Area" as indicated by Design Criteria included in MM-1. Analysis of field data collected during development of BSR's Mountain Drainage Plan indicates that up to 12.9 acres of the existing 18.3 acres of CDA for Cucumber Creek (refer to Table 3K-9) could be effectively disconnected from the stream channel. This represents 70 percent of the total Cucumber Creek existing CDA. For instance, 1.85 acres of disturbed area could be disconnected by redirecting two ski trail water bars away from the creek's WIZ (in other words, changing the direction to where the water bars currently drain). Additional opportunities for disconnecting disturbed areas in this watershed involve improving ski trail drainage and road-side ditches.

Proposed activities under Alternative 3 involve clearing 0.9 acre of forested areas within Cucumber Creek's WIZ. This represents 0.8 percent of the approximate total of 107.8 acres of forested areas within Cucumber Creek's WIZ. Existing large woody debris frequency on the Cucumber Creek and on the South Fork of Cucumber Creek was measured at 51 and 52 pieces/100 meters (#/100 m) of stream respectively. These measurements correspond to 210 percent and 214 percent relative to the reference reach (Table 3K-8) and therefore these two streams classify as Robust for the large woody debris metric. It is unlikely that the proposed reduction of less than 1 percent of riparian vegetation would result in coarse wood frequency dropping below the minimum Robust level of 18 #/100 m of stream (i.e., 74 percent of the reference stream).

Unstable banks on the main stem of Cucumber Creek and on the South Fork of Cucumber Creek were measured at 10 meters per 100 meters (m/100 m) and 0 m/100 m respectively. Under Alternative 3, the Cucumber Creek watershed yield would increase by 0.1 percent and the increase in peak flow would be approximately 0.4 percent (refer to Tables 3K-11 and 3K-12). It is not expected that these changes in

yield and peak flows would increase bank instability beyond the 14 m/100 m threshold for Robust classification (126 percent of the reference value of 11 m/100 m unstable banks). However, prevention and mitigation measures would be designed and implemented to protect stream banks stability.

Of the 60.2 acres of total ground disturbing activities proposed under Alternative 3, 8.0 acres would impact the WIZ. Less than 1.0 acre of this impact (0.9 acre) corresponds to forest clearing and the remaining 7.1 acres to forest glading. Impacts to the watershed outside of the WIZ include 1.2 acres of grading necessary for the construction of the proposed Peak 6 lift. The proposed grading would occur outside of the 200-foot buffer along the stream channel.

Approximately 1.4 acres of disturbance under Alternative 3 would be added to the existing CDA within the Cucumber Creek watershed. As indicated by Design Criteria included in MM-1, mitigation measures would be designed and implemented to "maintain or reduce watershed-scale Connected Disturbed Area." Table 3K-9 shows that the existing CDA within Cucumber Creek's watershed totals 18.3 acres. Analysis of field data collected during development of BSR's Mountain Drainage Plan indicates that up to 12.9 acres could be effectively disconnected from the stream channel.

Proposed Drainage Management Measure within the Cucumber Creek Watershed:

- 1.85 acres of currently disturbed area could be disconnected by redirecting two ski trail water bars away from the creek's WIZ (in other words, changing the direction to where the water bars currently drain). These water bars drain sections of the Angels Rest and Wirepatch ski runs.

This measure would off-set the proposed impacts and be consistent with WCPH Design Criteria.

South Barton Gulch

Table 3K-17 shows that implementation of Alternative 3 would clear approximately 1.9 acres of forests within the South Barton Gulch watershed. In addition, 16.5 acres of existing forested areas would be thinned to create terrain for intermediate skiers. No snowmaking coverage is proposed for the South Barton Gulch watershed under Alternative 3.

As discussed in the Stream Health analysis under Affected Environment, the South Barton Gulch currently has a CDA of approximately 13 acres. This existing disturbance corresponds to non-ski area roads and private homes. The analysis of CDA within South Barton Gulch also shows that the channel network length has been increased by approximately 22 percent due to connected non-ski area roads.

Increases in watershed yield and peak streamflow calculated for South Barton Gulch under Alternative 3 are negligible (0.0 percent and 0.1 percent respectively). Impacts within the South Barton Gulch WIZ total 1.5 acres (1.2 acres of glading and 0.3 acre of tree clearing). This represents less than 1 percent of the 195.3 acres currently forested within the South Barton Gulch WIZ. As Table 3K-8 shows, the South Barton Gulch stream channel exhibits Robust classification for all four metrics. Furthermore, the

surveyed values for the four stream health metrics are well beyond the thresholds for the Robust classification. For example, the Main Stem of South Barton Gulch survey measured 11 m/100 m of unstable banks and the threshold for the Robust classification for this stream is 14m/100 m. This means that unstable banks on this channel would have to increase by more than 27 percent to be classified as At-Risk. The percentage of fine sediments were surveyed on this stream at 19 percent and the Robust/At-Risk threshold for this stream and this metric is 29 percent. In other words, the amount of fine sediments in the streambed would have to increase by more than 52 percent to be classified as At-Risk. Implementation of Alternative 3 within this watershed, following the applicable Design Criteria included in the WCPH, would not adversely impact the health of South Barton Gulch.

Water Quality Data

Zinc and cadmium are currently being monitored by the Colorado Department of Public Health and Environment along the Blue River. With PDC to minimize sedimentation in streams proximate to project areas, Alternative 3 is not anticipated to contribute increased levels of zinc and cadmium to the Blue River. The Forest Service will continue annual monitoring in Cucumber Creek and South Barton near disturbance areas to ensure increased levels of zinc and cadmium do not occur.

Aquatic Macroinvertebrates

Alternative 3 would result in approximately 130 acres of forest clearing (refer to Table 3K-17) spread out through five hydrologic drainages ranging from Carter Gulch on the south, to South Barton Gulch on the north. With the exception of a small amount of tree clearing in South Barton Gulch, forest cover in all of the other drainages has been substantially fragmented by ski trail development. Runoff from this additional snowmaking would be additive to the considerable acreage of existing snowmaking whose runoff now flows into ski areas creeks. Additional ski area development under proposed Alternative 3 could contribute further, detectable, water quality impacts, because approximately one-half to two-thirds of the existing ski area supports lodgepole or lodgepole-dominated forest.

Implementation of these drainage management measures as project design criteria would offset the effects of additional ground disturbance and tree removal, and would thereby satisfy WCPH requirements to maintain or improve stream health in the project area watersheds. Therefore, the macroinvertebrate community and habitat is expected to remain stable or improve, in terms of sampling metrics. Thus, Alternative 3 would meet Forest Plan direction for macroinvertebrate communities.

CUMULATIVE EFFECTS

Scope of the Analysis

The effects analyzed in the cumulative effects section apply to all alternatives, including the No Action Alternative. For a detailed description of past, present, and reasonably foreseeable future projects, the reader is referred to Appendix A in this document.

Spatial Bounds

The stream health effects of increased peak flows are most evident in the directly affected on-mountain drainages. These watersheds all drain (ultimately) to the Blue River, where the effects of changes in flow are comparatively small relative to the hydrology of this larger watershed. Thus, from a stream health and water yield perspective, the Blue River as it flows near the base of BSR defines the downstream spatial boundary for analysis of water yield and stream health cumulative effects.

Temporal Bounds

The temporal extent of the analysis commences with conditions before the development of BSR, extending through the history of BSR to the present, and includes the lifespan of current proposed projects as well as those that are current reasonably foreseeable future actions, in general 10 to 20 years into the future from the date of this document.

Present and Reasonably Foreseeable Future Actions

- Breckenridge Ski Resort Projects
- Forest Health and Fuels Projects
- Historic Mining Activities
- Transportation Projects
- Forest Service Programmatic Projects
- Resort and Residential/Commercial Development Projects
- In-holding Property
- Weber Gulch Hut

Watersheds subjected to activities associated with ski area management, including trail construction and snowmaking, tend to exhibit cumulative changes to channel conditions, with differing corresponding dynamic equilibria, as compared to watersheds in undeveloped conditions. These changes are caused by increases in peak snowmelt magnitude and duration due to the effects of trail clearing, trail grading, and snowmaking. Affected channel reaches typically exhibit long term, continuing adjustments to their dynamic equilibria due to accelerated water inputs caused by both snowmaking and trail construction. The cumulative effects of the development of BSR are reflected in the prevalence of gully erosion and headcuts throughout the existing ski area operational boundary (a direct result of increased water yield and disturbed soils).

The following previously approved projects could take place:

- Installation of a new gondola
- Construction of the Peak 7 Restaurant
- Grading on *Silverthorne* trail
- Snowmaking operations would expand to cover existing terrain
- 6-Chair would be upgraded to a high-speed quad chairlift

New and upgraded lifts, grading, facility construction and additional snowmaking could increase sedimentation, connected disturbed area and water inputs to already affected stream channels. As identified under the No Action, three of the five streams within the SUP area already display less than "Robust" stream health. If no further management is implemented within the SUP area (beyond what is currently taking place), existing concerns regarding the condition of the watersheds and health of the streams are expected to continue.

Timber harvest, heavy metals mining and associated tailings and waste rock, road construction and development for Highway 9, Forest Service projects, recreation projects and private residential development have affected watershed resources on WRNF and private lands within the Blue River watershed (For more detail on these projects refer to Appendix A, Cumulative Effects). On-going human influence within the Blue River watershed has substantially altered land cover, resulting in changes to riparian ecosystems and hydrologic function via a variety of impact mechanisms:

- Increasing peak flows due to stormwater runoff from developed areas;
- Increases in stream temperature due to loss of shading from removal of riparian vegetation;
- Increased erosion and sediment transport within the watershed due to residential, mining, and transportation development;
- Sediment impacts within the Blue River watershed associated with traction sanding on Highway 9;
- Snowmaking diversions for BSR;
- Impacts to fisheries habitat caused by timber harvest, mining, development, grazing and transportation; and
- Impacts to water quality caused by heavy metals loading from mining waste rock and tailings.

Cumulatively, these changes have resulted in an altered watershed ecosystem, with the associated impacts resulting in degraded watershed conditions within all of BSR's drainage areas. Considering the project effects in addition to past, present, and reasonably foreseeable future actions, under Alternative 1 existing

concerns regarding the condition of the watersheds and health of the streams are expected to continue. Resource damage such as down-cutting and lateral erosion to drainage channels may worsen as the causal mechanism of said damage would continue to exist. However, under Alternative 1 BSR would continue to work with the WRNF with the purpose of protecting the mountain's natural resources through mitigation and improvement of the on-mountain drainage infrastructure. BSR has dedicated substantial resources to proactively develop its Mountain Drainage Plan, which assessed the current condition of the on-mountain drainage network and prioritized areas where drainage conditions could be improved. Implementation of the Mountain Drainage Plan would minimize future degradation.

Considering the project effects in addition to past, present, and reasonably foreseeable future actions, implementation of Alternative 2 is anticipated to maintain stream health through successful implementation of PDC described in the Environmental Consequences section above. By maintaining the health of surface drainage, the proposed action would not exhibit any negative influence upon watershed conditions in a cumulative context.

Alternative 3 projects along with all other past, present and reasonably foreseeable future actions could be implemented to maintain stream health in Jones, Lehman, Sawmill, Cucumber Creek, Cucumber Gulch and South Barton Gulch, with successful implementation of identified PDCs.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

No irreversible or irretrievable commitments of watershed resources associated with any of the alternatives have been identified.

L. WATERS OF THE U.S., INCLUDING WETLANDS

SCOPE OF THE ANALYSIS

The scope of waters of the U.S. (WOUS), including wetlands analysis, focuses on resources within the Breckenridge SUP area with potential to be affected by implementation of any of the alternatives. This analysis describes existing and anticipated conditions of WOUS, including wetlands, within the study area. For purposes of clarity, the study area for this resource includes the eight Hydrologic Unit Codes (HUC) or sub-watersheds which are listed below:

- Carter Gulch – South side of Peak 10
- Upper Lehman Gulch – North side of Peak 10 and the south side of Peak 9
- Jones Gulch – Peak 9
- Lower Lehman Gulch – Lower portion of Peak 9
- Sawmill Gulch – The north side of Peak 9 and south side of Peak 8
- Cucumber Gulch – Peaks 7 and 8
- Upper Cucumber Creek – Peak 7 and Peak 6.5
- South Barton Gulch – Peak 6 and Peak 5

U.S. ARMY CORPS OF ENGINEERS DIRECTION

The *U.S. Army Corps of Engineers Wetlands Delineation Manual*, hereinafter referred to as 1987 Manual, and the Interim Regional Supplement, defines wetlands as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions."[431] Wetlands generally include swamps, marshes, bogs, and similar areas. Activities within and near these areas, including tree removal, culvert installation, grading, and changes in runoff regimes may affect the ecological functions of wetland resources. Impacts to wetlands are regulated by Section 404 of the Clean Water Act (CWA), and such activities would require issuance of a permit from the U.S. Army Corps of Engineers (USACE).

According to the 1987 Manual, wetlands that have been disturbed through natural and/or anthropogenic alteration of hydrology, soils, and/or vegetation do not necessarily exist under "normal circumstances."[432] "Normal circumstances" has been further defined as "the soil and hydrologic conditions that are normally present, without regard to whether the vegetation has been removed."[433] Examples of alteration may

[431] Environmental Laboratory, 1987; U.S. Army Corps of Engineers, 2008; Cowardin et al., 1979
[432] Id.
[433] RGL 90-7, 1990

include: removal of vegetation, removal of soil, placement of fill, construction of dams and levees, conversion of agriculture, channelization, drainage, fires, beaver dams, etc. Areas that do not exist under "normal circumstances" require modified wetland delineation techniques identified as the "Atypical Method for Delineation" in the 1987 Manual. Due to grading and vegetation removal for ski trail development, portions of the study area were determined to exist under "atypical circumstances." Therefore wetlands within the study area were delineated using one of the appropriate protocols for either the "routine approach" or the "atypical method."

FOREST PLAN DIRECTION

The 2002 Forest Plan includes one pertinent guideline outlining management direction for riparian areas and wetland resources on NFS lands (specified below). Pursuant to the Forest Plan, as amended, stream health management measures and design criteria are provided in the Region 2 Watershed Conservation Practices Handbook (WCPH) to ensure applicable Federal and State laws are met on NFS lands in Region 2.[434] The WCPH contains several Management Measures of relevance regarding the protection of riparian areas and wetlands.

Forest-wide: Water and Riparian Resources

- Guideline 2. Keep vehicles and equipment out of streams, lakes, and wetlands except to cross at designated points, build crossings, do restoration work, or where protected by 1 foot of snowpack or frozen soil.

Applicable WCPH Management Measures (MM)

- MM-1. Manage land treatments to conserve site moisture and to protect long-term stream health from damage by increased runoff.
- MM-2. Manage land treatments to maintain enough organic ground cover in each activity area to prevent harmful increased runoff.
- MM-3. In the water influence zone (WIZ) next to perennial and intermittent streams, lakes, and wetlands, allow only those actions that maintain or improve long-term stream health and riparian ecosystem condition.
- MM-4. Design and construct all stream crossings and other in stream structures to provide for passage of flow and sediment, withstand expected flood flows, and allow free movement of resident aquatic life.
- MM-6. Maintain long-term ground cover, soil structure, water budgets, and flow patterns of wetlands to sustain their ecological function.

[434] USDA Forest Service, 2002a; USDA Forest Service, 2006

- MM-10. Construct roads and other disturbed sites to minimize sediment discharge into streams, lakes, and wetlands.
- MM-11. Stabilize and maintain roads and other disturbed sites during and after construction to control erosion.

EXECUTIVE ORDER 11990

Additional direction regarding wetlands management for the USACE and Forest Service is provided by Executive Order 11990 – Protection of Wetlands. Presidential Executive Order 11990 requires federal agencies to avoid to the extent practicable, long- and short-term adverse impacts associated with the destruction or modification of wetlands. More specifically, the Order directs federal agencies to avoid new construction in wetlands unless there is no reasonable alternative. The Order states further that where wetlands cannot be avoided, the proposed action must include all practicable measures to minimize harm to wetlands. As required by Executive Order 11990 and the CWA, avoidance and minimization measures must be considered through the planning process. Therefore, this section also identifies planning constraints with regard to terrain development.

AFFECTED ENVIRONMENT

Waters of the U.S., Including Wetlands

WOUS, including wetlands within the study area consist of groundwater seeps and riparian wetland systems fed by Carter Gulch, Lehman Gulch, Jones Gulch, Sawmill Gulch, Cucumber Gulch and South Barton Gulch. Jurisdictional and proposed non-jurisdictional (isolated) wetlands (according to the USACE) with potential to be affected by the action alternatives were identified.[435] The Forest Service takes jurisdiction over both types, so for the purposes of this analysis, all wetlands are considered jurisdictional. Some of the wetlands delineated were disturbed during previous resort development by grading, rerouting water and/or vegetation removal. Many of these disturbances were authorized and/or occurred prior to the CWA and/or were authorized by a 404 Permit. Wetlands that have been previously disturbed are in various stages of regeneration and continue to exhibit the necessary characteristics of a wetland under “atypical situations” though hydric soil, vegetation or hydrology indicators may have been lacking at the time of the delineation. These wetlands that have been previously disturbed are generally reduced in value for wildlife due to impacts that have reduced vegetative cover and or changed characteristics of the hydrology.

WOUS, including wetlands, identified within the South Barton Gulch and Upper Cucumber Creek watersheds on Peak 6 and Peak 5 primarily consist of high quality riparian wetland systems. Cucumber Creek, South Barton, and Middle Barton are main perennial systems fed by intermittent and ephemeral

[435] Portions of the watershed with potential to be effected during project implementation were surveyed for WOUS, including wetlands. WOUS, including wetlands, identified during the surveys were within were delineated and are included in this analysis.

drainages and adjacent springs and seeps. In addition to three main drainages, wetlands were identified throughout the study area. Figure 28 depicts all identified WOUS, including wetlands present within the BSR study area.

Wetlands within the study area offer varying degrees of value as wildlife and plant habitat, water storage locations and for water filtration. Wetlands within the South Barton Gulch and Upper Cucumber Creek watersheds generally have deep soils, are well vegetated, and have natural hydrologic flows. These wetlands have the necessary features to function well for habitat and water resources. Similarly, many of the wetlands within the Carter, Lehman, Jones, Sawmill and Cucumber drainages have these characteristics and are functioning wetlands. Some wetlands disturbed during trail development or lift, facility or utility construction lack depth of soils, vegetation or hydrologic flow, reducing their function and value to the habitat and water resources (refer to Chapter 3H – Vegetation and Chapter 3I – Wildlife for specific habitat values within the study area).

Wetland classification is based on the Cowardin classification system.[436] The Cowardin system classifies wetlands primarily by dominant plant community. Two types of wetlands were identified within the study area consisting of palustrine emergent and palustrine shrub/scrub. Dominant riparian and wetlands vegetation at BSR includes *Senecio triangularis*, *Mertensia ciliata*, *Saxifraga arguta*, *Cardamine cordifolia*, *Salix sp*., *Carex sp*., *Equisetum arvense*, *Veratrum viride*, *Abies lasiocarpa*, *Pinus contorta*, and *Picea engelmannii*.

Over 470 segments of WOUS, including 143 wetland areas, were identified within the study area. The main drainages—Carter Gulch, Lehman Gulch, Jones Gulch, Sawmill Gulch, Cucumber Gulch and South Barton Gulch—include the majority of the wetland features (tributaries, adjacent wetlands, abutting wetlands, and riparian vegetation). Large wetland complexes can be found at the headwaters of Sawmill Creek (18 acres) and Cucumber Creek (21 acres), and on Peak 7 (57 acres) down-slope from the BSR SUP boundary, but the majority of wetlands within the study area are less than 1 acre.

Additionally, as noted above, approximately 330 stream segments were identified within the study area (refer to Chapter 3K – Water Resources for more analysis of stream health and drainage conditions). Identified wetland type and acreage and stream type, acreage and linear feet are presented Table 3L-1.

[436] Cowardin et al., 1979

Table 3L-1:
WOUS, Including Wetlands, Identified within the Study Area

Watershed	Water Resource Wetland Class/Channel	Acreage	Length (ft)
Carter Gulch	PSS	0.5	--
	PEM	0.19	--
	Stream Channel	6.04	32,861.42
	Total	*6.73*	*32,861.42*
Cucumber Gulch	PEM	66.81	--
	PEM/PSS	0.59	--
	PSS	6.83	--
	Stream Channel	6.77	36,853.98
	Total	*81*	*36,853.98*
Jones Gulch	FEN	1.63	--
	PEM	1.78	--
	PEM/PSS	1.53	--
	PSS	1.46	--
	Stream Channel	2.41	13,147.32
	Total	*8.81*	*13,147.32*
Lower Lehman Gulch	PEM	0.42	--
	PEM/PSS	0.74	--
	PSS	2.25	--
	Stream Channel	0.67	3,650.98
	Total	*4.08*	*3,650.98*
Sawmill Gulch	PEM	21.13	--
	PEM/PSS	6.18	--
	PSS	6.27	--
	Stream Channel	7.87	42,851.32
	Total	*41.45*	*42,851.32*
South Barton Gulch	PEM	9.29	--
	PSS	2.79	--
	Stream Channel	8.84	48,129.75
	Total	*20.92*	*48,129.75*
Upper Cucumber Creek	PEM	26.62	--
	PEM/PSS	2.93	--
	PSS	20.16	--
	Stream Channel	4.11	22,372.26
	Total	*53.82*	*22,372.26*
Upper Lehman Gulch	PEM	3.54	--
	Stream Channel	3.17	17,237.11
	Total	*6.71*	*17,237.11*
Wetlands Total		**183.6**	**--**
WOUS Total		**39.9**	**219,736.16**
Grand Total		***223.5***	***219,736.16***

Note: Stream acreage based on an average 8-foot wide stream channel.

Palustrine Emergent Wetlands

Palustrine emergent wetlands (PEM) have been identified over a total of 136 acres across the study area. This wetland class is characterized by the presence of erect, rooted, usually perennial, herbaceous hydrophytic plants.[437] *Carex* sp., *Senecio triangularis*, *Cardamine breweri* and *Mertensia ciliata* were the dominant plants. Low chroma soil matrices exhibiting 10YR 2/1 at 8 inches or a thick organic layer 6 inches or greater were characteristic of these hydric soils. The primary hydrologic input for PEM wetlands throughout the entire study area is groundwater (i.e., a high water table).

Palustrine Shrub/Scrub Wetlands

Palustrine shrub/scrub (PSS) wetlands represent the majority of wetlands delineated within the study area, totaling 40 acres. Cowardin et al. has defined this type of wetlands as being dominated by a woody vegetation community composed of shrubs and young trees less than 6 feet tall.[438] The dominant species present within these wetlands includes *Salix planifolia*. The majority of the PSS wetlands found within the study area were within riparian zones of the major drainages in the area.

PSS/PEM Wetlands

Approximately 12 acres of PEM/PSS mosaic wetlands were delineated within the study area. These wetlands were dominated by a mix of PEM/PSS dominant species including *Salix planifolia*, *Senecio triangularis*, and *Mertensia ciliata*, as well as *Pedicularis groenlandica*. The PEM/PSS mosaic wetlands were primarily located in Sawmill Gulch and on the upper reaches of Peak 7. These wetlands were saturated in the top 12 inches and had up to an 18-inch organic horizon.

FEN Wetlands

One fen, a ground water fed peat forming wetland, was identified about 500 feet downhill of the bottom terminal of C-Chair (on private lands). The entire fen was inundated by 12 to 24 inches of standing water. Dominant vegetation in this wetland varied from *Salix planifolia* to a variety of *Carex* sp., such as *Carex aquatilis*, and *Juncus* sp. Generally, the soil organic horizon was greater than 24 inches.

Waters of the U.S.

The study area includes intermittent and perennial drainages (refer to Table 3L-1). The intermittent channels primarily result from groundwater springs and include a surface and/or groundwater connection to the BSR drainages listed in Table 3L-1. Additionally, the majority of these channels include adjacent wetland (PSS) vegetation, and were classified in Table 3L-1 as wetlands and stream channels. The drainages included in this delineation report included all of the previously delineated WOUS, and several additional jurisdictional WOUS were identified.

[437] Ibid.
[438] Ibid.

DIRECT AND INDIRECT ENVIRONMENTAL CONSEQUENCES

Table 3L-2:
Summary of WOUS, including Wetlands, Resource Effects by Issue and Indicator

No Action	Alternative 2	Alternative 3
Issue: Identified wetlands throughout the study area could be temporarily and/or permanently affected by construction and implementation of proposed projects.		
Indicator: Area of wetlands and riparian areas existent within the study area (acres/linear feet)		
183.6 acres of WOUS, including wetlands have been delineated within the study area. 219,736 linear feet of stream channel was identified within the study area.	Same as under the No Action.	After construction and rehabilitation of temporarily impacts wetlands, 183.2 acres of identified wetlands and 219,736 linear feet of identified stream channel would remain within the study area.
Indicator: Disclosure of wetland functions and values within the study area		
No effects to function and value of wetlands and riparian areas would occur under the No Action Alternative.	Temporary impacts to PEM wetlands would affect these wetlands function and values over the short-term but would be rehabilitated and return to function within three to five years.	Temporary impacts to PEM, PSS and PEM/PSS wetlands would affect these wetlands function and values over the short-term but would be rehabilitated and return to function within three to five years. Removal of PEM and PEM/PSS wetlands would remove wetland habitat and water resource function and value at these locations. However, due to the minor amount of permanent impacts, these values would be realized elsewhere in the study area.
Indicator: Narrative description of wetland communities and riparian areas classifications and disclosure of anticipated temporary and/or permanent impacts (acres/linear feet)		
There would be no impact to the 136 acres of PEM, 40 acres of PSS, PEM/PSS, 12 acres of FEN and 226,930 linear feet of WOUS, delineated within the study area.	Installation of the power line would temporarily impacts to less than 0.1 acre of PEM wetland at the Cucumber Creek crossing.	Installation of the power line and snowmaking infrastructure would temporarily impact 0.32 acre of wetlands and 0.01 acre of riparian habitat. Additionally, trail grading would remove 0.15 acre of PEM and PEM/PSS wetlands from the study area.

Alternative 1 – No Action

No operational or infrastructural changes/additions would occur on NFS lands within the BSR SUP area as a result of the No Action Alternative. Therefore, the No Action Alternative would have no direct or indirect environmental impacts to WOUS, including wetlands.

Alternative 2 – Proposed Action

In accordance with EO 11990, the Proposed Action was designed to avoid and minimize impacts to wetlands wherever possible. Although due to the scale of the project some temporary impacts to wetlands would occur, no permanent impacts to WOUS, including wetlands would occur under this alternative.

Alternative 2 includes installation of two new lifts, a power line from the Peak 7 road to the top terminal on Peak 6, a restroom facility, new trail development and improvements to existing access roads. During project design modifications were made to the proposal to: locate lift terminals outside known wetlands, route the power line uphill of the headwaters of Cucumber Creek, use existing road crossings to route power to the bottom terminal of the lower lift from the Peak 7 maintenance road, and design trail crossings to be nearly perpendicular to Cucumber Creek and South Barton Gulch.

Temporary Impacts

The power line would cross Cucumber Creek where it flows through an abutting wetland. Temporary wetland impacts at this location would be less than 0.1 acre. If it is deemed appropriate at this location, the power line may be bored under the stream channel and wetland to avoid temporary impacts. Due to the minor extent and temporary nature of the crossing, impacts to wetlands would be negligible and would be restored. The remainder of the power line would be installed south of South Barton Gulch until it gets above the headwaters of the gulch at which time it would travel north to the top terminal.

During construction, the stream channel would be routed around the disturbed area through a flexible hose to minimize stream impacts. Heavy equipment would be kept out of wetland and stream channel to avoid impacts to long-term hydrologic flow through the area. By stock piling topsoil, revegetating wetlands with appropriate hydrophytic vegetation and restoring natural hydrologic flows within the disturbed area, these wetlands would maintain necessary features to function as habitat and water storage and treatment centers, retaining existing wetland function and value within the study area.

Permanent Impacts

No permanent impacts to WOUS, including wetland would occur as a result of the Proposed Action.

Vegetation Removal

Overstory vegetation would be flush-cut within approximately 1.2 acres of delineated PEM wetlands; however, vegetation within these wetlands would experience little change (refer to the Affected Environment for dominant PEM wetland vegetation). Overstory tree removal within wetlands would be performed by hand to minimize ground disturbance. Trees in these wetlands are currently widely spread; however, flush-cutting may result in increased amounts of solar radiation reaching the ground and increased available moisture (resulting from decreased evapotranspiration (ET) rate) which would favor some plants over others. Despite these changes, the wetlands and plant communities would persist; no

wetland type conversion would occur as these wetlands are already classified as PEM due to the dominant understory hydrophytic vegetation.

Table 3L-3:
Overstory Vegetation Clearing Within Wetlands – Alternative 2

Watershed	Class	Acres
Cucumber Gulch	PEM	0.23
South Barton Gulch	PEM	0.82
Upper Cucumber Creek	PEM	0.10
Total		**1.15**

An intermittent stream channel with an abutting PEM wetland is located adjacent to the proposed connector trail between *Pioneer* and *Wirepatch* trails. Although tree clearing within the wetland is disclosed in Table 3L-3, when construction occurs, clearing within the wetland may be able to be minimized by slightly changing the trail alignment. Grading would not occur within this wetland. Avoidance and minimization would continue to occur during final submittal of construction plans and in the field, where possible.

Alternative 3

In accordance with EO 11990, the Proposed Action was designed to avoid and minimize impacts to wetlands wherever possible. Alternative 3 was designed to upgrade and develop infrastructure primarily within the developed terrain network, while responding to the Purpose and Need to better accommodate existing visitation. Trail development and lift upgrades within Cucumber Gulch, Sawmill Gulch, Jones Gulch, Upper Lehman and Carter Gulch would all be within the developed terrain network. New trails and snowmaking were located to avoid and minimize stream crossings and wetlands impacts. Lift upgrades would use existing terminal and tower locations where appropriate.

The only component of Alternative 3 that would be constructed outside the existing operational boundary is the Peak 6½ lift and glading project, which would occur within the Upper Cucumber Creek and South Barton watersheds. The lift was repositioned and realigned to avoid the large wetland complex which forms at the headwaters of Cucumber Creek and lift towers will be placed outside delineated wetlands. The area that is proposed to be gladed would require some flush cutting over the snow; however, removal for gladed skiing is anticipated to be minimal. Overstory vegetation within these wetlands is limited and vegetation would be removed by hand.

Temporary Impacts

Although impacts have been minimized, 0.32 acre of temporary impacts due to installation of power lines and snowmaking infrastructure would occur. These impacts would include:

- 0.23 acre of PEM wetlands for installation of power and snowmaking lines, (including 0.06 acre of overstory vegetation removal);
- 0.07 acre of PEM/PSS wetlands for installation of power lines and the *Sawmill* bridge,(including 0.01 acre of overstory vegetation removal); and
- 0.02 acre of impacts to PSS wetlands for installation of power and the *Sawmill* bridge (including 0.1 acre of overstory vegetation removal).

Impacts to wetlands from trenching would include temporary soil and vegetation removal; however, soils would be stockpiled and replaced after construction and appropriate hydrophytic plants and seed mixes would be used for vegetation to rehabilitate wetland in kind. Impacts to hydrology during construction are minimal, and infrastructure would be installed to allow water to flow freely. Included in the calculation above is approximately 0.01 acre of PEM/PSS and 0.01 acre of PSS wetlands which may be disturbed during installation of the bridge over Sawmill Gulch. The bridge and footers would be constructed outside the wetland, although some temporary disturbance may occur during construction. Upon completion, the wetlands would be rehabilitated to their existing condition.

Eight stream crossings would occur during installation of power and snowmaking lines. Seven of these stream crossings would occur within the wetlands disturbance discussed above. An additional stream crossing would occur on Carter Gulch requiring less than 0.01 acre of temporary disturbance adjacent the stream. During installation of power and snowmaking lines that cross stream channels, the stream would be rerouted around the construction zone using flex hose and energy dissipaters such as large rocks would be placed within the channel where the water is reintroduced.

To maintain hydrologic flow through the area, heavy equipment would be kept out of wetlands and stream channels. By stock piling topsoil, revegetating wetlands with appropriate hydrophytic vegetation and restoring natural hydrologic flows within the disturbed area, these wetlands would maintain features to function as habitat and water storage and treatment centers.

Table 3L-4:
Temporary Stream Crossing Impacts – Alternative 3

Watershed	# of Crossings
Cucumber Gulch	2
Carter Gulch	1
Sawmill Gulch	2
Upper Cucumber Creek	3
Total	**8**

Permanent Impacts

As stated above, the top terminal of the Peak 6½ lift would be located adjacent to and outside the boundary of a wetland complex. However, the proposed top terminal would be adjacent to the wetland complex. The location would require a "cut/fill" to balance the terminal site from a grading standpoint. BSR would import fill material to create a platform for the top terminal. Due to the remote location of the lift, it would be difficult to import fill material to this location. Therefore, should BSR not be able to import material, approximately 0.5 acre of the adjacent wetland would be indirectly impacted as the top terminal site would be "cut" to create the platform for the lift. The material cut would be placed on the downhill side of the lift terminal.

The existing *Sawmill* trail requires re-contouring to provide an appropriate ability level skiing experience. Impacts to wetlands from grading would include:

- 0.12 acre of PEM wetlands; and
- 0.03 acre of PEM/PSS wetlands (including 0.01 acre of clearing).

Re-grading the existing *Sawmill* trail would remove wetland soils and vegetation to provide a more even slope for skiers. Due to the permanent removal of soils and vegetation within the wetland on *Sawmill* trail, wetland function and values would be eliminated at this location. A U.S. Army Corps of Engineers (USACE) permit would be required prior to wetland impacts. A condition of the permit would be to mitigate wetland loss at a ratio identified by the USACE. Implementation of wetland mitigation would be required prior to or concurrent with wetland disturbance for the top terminal location, if necessary, and on Sawmill.

Vegetation Removal

As discussed under Alternative 2, overstory vegetation removal within wetlands would be flush cut to minimize soil, vegetation and hydrologic impacts within wetlands. Overstory vegetation removal would likely result in increase ET rates within these wetlands; however, the existing overstory is widely spread and it is unlikely that this amount of tree removal would have a distinguishable affect wetland hydrology and vegetative community. Glading would require approximately 50 percent tree removal from the proposed skiable area on Peak 6½; therefore, minimizing affects to ET rates and solar radiation. Furthermore, under Alternative 3, proposed glading construction would occur over-the-snow, thereby avoiding impacts from vehicles in wetlands.

Table 3L-5:
Overstory Vegetation Clearing Within Wetlands – Alternative 3

	Clearing	Glading	Total
Carter Gulch			
PEM	0.04	--	0.04
PSS	0.05	--	0.05
Total	*0.09*	--	*0.09*
Cucumber Gulch			
PEM	0.03	--	0.03
Total	*0.03*	--	*0.03*
South Barton Gulch			
PEM	0.03	0.04	0.07
PSS		0.01	0.01
Total	*0.03*	*0.05*	*0.08*
Upper Cucumber Creek			
PEM	0.18	2.58	2.77
PEM/PSS	0.04	--	0.04
PSS		1.70	1.70
Total	*0.23*	*4.28*	*4.51*
Upper Lehman Gulch			
PEM	0.12	--	0.12
Total	*0.12*	--	*0.12*
Grand Total	**0.50**	**4.33**	**4.82**

CUMULATIVE EFFECTS

Scope of the Analysis

The effects analyzed in the cumulative effects section apply to all alternatives, including the No Action Alternative. For a detailed description of past, present, and reasonable foreseeable future projects, the reader is referred to Appendix A in this document.

Temporal Bounds

The temporal bounds for this cumulative effects analysis for the wetlands resource extend from BSR's inception as a resort in 1961, through the foreseeable future in which BSR can be expected to operate.

Spatial Bounds

The spatial extent of the cumulative effects analysis are the WOUS, including wetlands impacts to on-mountain wetlands and drainages within the study area.

Past, Present, and Reasonably Foreseeable Future Actions

Watersheds subjected to activities associated with ski area management, including trail construction and infrastructure, as well as private and commercial development, tend to exhibit cumulative reductions to wetland acreage and function and value as compared to watersheds in undeveloped conditions.

Present and Reasonably Foreseeable Future Actions

Past, present, and reasonably foreseeable actions that have cumulatively affected or that are likely to affect watershed resources on WRNF and private lands within the Blue River watershed include:

- Breckenridge Ski Resort Projects
- Resort and Residential/Commercial Development Projects
- Forest Health and Fuels Projects
- Forest Service Programmatic Projects
- Transportation Projects

Cumulatively, these projects have altered WOUS, including wetlands, within the study area resulting in reduced watershed function and value.

Breckenridge Ski Resort Projects

Resort development has occurred across the 3,300-acre operational boundary. Typical long-term impacts to wetlands from resort development include vegetation and soil removal, and re-routing hydrologic flow/ inputs resulting in dewatering wetlands and impacts from resort infrastructure. Resort development since 1961, when BSR opened, as well as development within the Town of Breckenridge (refer to Resort/ Residential/Commercial Development below), has caused a dramatic decrease in wetland acreages within the Blue River Watershed. Alternative 2 would temporarily impact wetlands, which would be rehabilitated after construction. Therefore, Alternative 2 would not increase the cumulative loss of wetlands in the watershed. When combined with base developments, the proposed *Sawmill* trail grading project under Alternative 3 would have had a cumulative negative effect, albeit minimal, on wetlands within the Blue River watershed. The No Action alternative would have no further long-term impacts to WOUS including wetlands.

Resort and Residential/Commercial Development Projects

Residential build-out within the Town of Breckenridge has occurred across approximately 1,700 acres and approximately 443 acres of additional residential development is anticipated.[439] Further residential development would be subject to appropriate Town and County permitting and approval.

[439] Summit County, 2010a

Commercial developments have occurred within the Town of Breckenridge, covering approximately 1 mile in length and 0.1 mile in width. In addition, commercial/residential development projects have occurred in the base areas of Peaks 7, 8, and 9 creating permanent developments across approximately 0.5 mile of land. The extent of impacts to WOUS including wetlands from resort residential and commercial development is unknown as much of the development occurred prior to permit approval; however, more recent developments such as One Ski Hill Place, the Grand Lodge and Crystal Peak Lodge have gone through extensive permitting, mitigation and monitoring processes. In addition, during the One Ski Hill Place and Crystal Peak Lodge development permit review, the Town of Breckenridge established the Cucumber Gulch Overlay Protection District, which includes the protection of wetlands and the creation of conservation easements. Although the Town of Breckenridge granted a variance for the construction of the BreckConnect Gondola, annual wetland monitoring reports have been prepared and submitted to the U.S. Army Corps of Engineers during and post construction of One Ski Hill Place and Crystal Peak Lodge to ensure success of created and protected wetlands, plant species, and hydrologic function down slope from the developments.

Under Alternative 3, wetland acreage, function, and values that have been affected in the past would be further reduced by 0.15 acre. Together the reduction in wetland acreage has resulted in a cumulative negative impact to wetlands within the Blue River watershed. The No Action alternative, or implementation of Proposed Action would have no long-term impacts to WOUS including wetlands. Further commercial development would be subject to appropriate Town and County permitting and approval.

Forest Health and Fuels Projects

Although Forest health and fuels projects have occurred or are occurring over a large area, approximately 82,000 acres of the 2,482,000 acres within the WRNF, Forest Health and fuels projects are generally able to minimize direct impacts to known WOUS, including wetlands. Indirect impacts including increased localized sediment delivery to wetlands and stream systems generally occurs where stabilizing vegetation is removed. With implementation of appropriate BMP and PDC to reduce overland flow and erosion, particularly adjacent WOUS, impacts such as increased sediment delivery to the water and wetlands resource can be minimized. Clearing overstory vegetation can result in increased solar radiation both in stream and wetlands, effecting stream habitat and wetland vegetation composition. Alternatives 2 and 3 would also reduce overstory vegetation within and adjacent wetlands and would have the potential to further effect stream habitat and wetland vegetation composition within the study area. No further overstory vegetation would occur as a result of Alternative 1.

Forest Service Programmatic Projects

The 2002 WRNF Land and Resource Management Plan manages the Forest for multiple uses therefore some areas would remain in a predominantly natural setting maintaining WOUS, including wetlands ecosystems, and others allow more use, development, and vegetation removal. The Land and Resource

Management Plan was designed to manage activities and maintain or restore ecosystem structure, function and composition.

The WRNF Travel Management Plan is designed to accommodate transportation needs as well as protection of natural resources. Impacts to WOUS, including wetlands, have occurred in the past from road and trail development; however, the plan would likely help manage existing and future development.

When combined with Forest Service programmatic projects, Alternative 3 would have a negligible cumulative impact to NFS lands. Alternatives 1 and 2 would have no long-term impacts that would cumulatively affect the WOUS, including wetlands, resource.

Transportation Projects

Past Highway 9 developments have had impacts to WOUS, including wetlands, and future improvements along the Interstate 70 corridor are likely to impacts WOUS, including wetlands. Appropriate permits have been, and would continue to be, required for development and impacts to wetlands in accordance with Section 404 of the CWA. Impacts to wetlands as a result of Alternative 3 would be negligible when considered cumulatively with transportation projects within and adjacent the study area. Alternatives 1 and 2 would have no long-term impacts that would cumulatively affect the WOUS, including wetlands, resource.

Cumulative Effects Summary

In summary, considering the project effects in addition to past, present, and reasonably foreseeable future actions, with continued maintenance of all BMPs and implementation of PDC, the Proposed Action and Alternative 3 would maintain wetlands and watershed function and avoid additional cumulative impacts in sub-watersheds within BSR's SUP area. Alternative 3 would result in 0.65 acre of wetland removal; however, the cumulative impact to wetlands and watersheds within BSR's SUP area would be negligible.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

No irreversible and/or irretrievable commitments of WOUS, including wetland resources have been identified in association with either alternative analyzed in this document due to the requirement of no net loss of wetland function and value.

M. AIR QUALITY

SCOPE OF THE ANALYSIS

This air quality analysis focuses on the Breckenridge SUP area (NFS lands), and areas proximate to BSR on private lands. The only Class 1 airshed close to the project area is the Eagle's Nest Wilderness area (approximately 4.5 miles to the west). Other Class 1 airsheds within approximately 50 miles include Rocky Mountain National Park and the Maroon Bells-Snowmass Wilderness area.

REGULATORY DIRECTION

The goal for air quality on NFS lands in Colorado is to manage emissions generated in or near Federal land management areas such that air quality will meet the National Clean Air Act and Colorado State air quality requirements. Specific requirements can be found in the Forest Service Air Quality Program, Colorado Smoke Management Program Memorandum of Understanding (SMP MOU), and Colorado Air Quality Control Commission Regulation No. 9.[440] In addition, National Ambient Air Quality Standards (NAAQS) for particulate matter (PM_{10}) and the Prevention of Significant Deterioration (PSD) Total Suspended Particulate (TSP) increment for Class 1 and 2 areas must be met.

Forest Service direction regarding air resources is found in the 2002 WRNF Forest Plan. No specific air quality related standards or guidelines have been promulgated for the 8.25 Management Area; however, forest-wide standards require that activities "[c]omply with local, state, and federal air quality regulations and maintain conformity with the State Implementation Plan."[441]

Applicable Air Quality Regulations

Federal

The Clean Air Act (CAA) was enacted in 1955, but it contained few requirements for reducing air pollutant emissions. It was amended numerous times from 1963 through 1990 to address reductions in vehicular and stationary source emissions and to establish national air pollution concentration limits. It also established several programs, including: NAAQS, which limited air concentrations to protect public health and welfare; the New Source Performance Standards, which set emission standards for major sources; and the State Implementation Plan (SIP) procedures, which were designed to bring areas that exceeded NAAQS levels (non-attainment areas) to within the standards. In addition, the PSD program was established to help protect attainment areas of the country (Class 1 and 2 areas). The PSD Class 2 designation allows for moderate growth or degradation of air quality within certain limits above baseline air quality. The PSD program also included protection of National Parks, and Wilderness areas greater than 5,000 acres (Class 1 areas). Finally, the PSD program established visibility impairment restrictions on major sources impacting the Class 1 areas.

[440] USDA Forest Service, 2000
[441] USDA Forest Service, 2002a

Air quality effects of greatest concern as related to implementation of the action alternatives, are emissions during construction and from emissions related to increased vehicular traffic. Table 3M-1 lists the National Ambient Air Quality Standards.

Table 3M-1:
National Ambient Air Quality Standards for Criteria Pollutants

Pollutant	Primary Standards[a]	Averaging Times	Secondary Standards
Carbon Monoxide	9 ppm (10 mg/m^3) 35 ppm (40 mg/m^3)	8-hour[b] 1-hour[b]	None None
Lead	0.15 μg/m^3 1.5 μg/m^3	Rolling 3-month Average Quarterly Average	Same as Primary Same as Primary
Nitrogen Dioxide	0.053 ppm (100 μg/m^3) 0.100 ppm	Annual (Arithmetic Mean) 1-hour[h]	Same as Primary
Particulate Matter (PM) PM_{10} $PM_{2.5}$	 150 μg/m^3 15.0 μg/m^3 35 μg/m^3	 24-hour[bc] Annual[d] (Arithmetic Mean) 24-hour[e]	 Same as Primary Same as Primary Same as Primary
Ozone	0.075 ppm (2008 std) 0.08 ppm (1997 std)	8-hour[g] 8-hour[f]	Same as Primary Same as Primary
Sulfur Dioxide	0.03 ppm 0.14 ppm	Annual (Arithmetic Mean) 24-hour[b] 3-hour[b]	 0.5 ppm (1300 μg/m^3)

[a] ppm = parts per million, μg/m3 = micrograms per cubic meter, mg/m3 – milligrams per cubic meter
[b] Not to be exceeded more than once per year.
[c] 3-year average of the weighted annual mean PM10 concentration at each monitor within an area must not exceed 50 μg/m.
[d] 3-year average of the weighted annual mean PM2.5 concentrations from single or multiple community-oriented monitors must not exceed 15.0 μg/m.
[e] 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 65 μg/m.
[f] 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.
[g] 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm.
[h] 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 0.100 ppm
Source: U.S. Environmental Protection Agency. 2009a. Air and Radiation: National Ambient Air Quality Standards (NAAQS). http://www.epa.gov/air/criteria.html. Accessed May 28, 2010.

The CAA designates two different air quality areas that receive different levels of protection. Class 1 areas generally include National Parks, federally-designated Wilderness areas that are in excess of 5,000 acres and that were created prior to 1977, National Monuments, National Seashores, and other areas of special national or regional value. Class 1 designation warrants the highest level of protection afforded to an area. Class 2 designation typically applies to non-Class 1 areas.

Class 1 and 2 areas are either designated as attainment, non-attainment, or unclassifiable areas. Unclassifiable designations apply where pollution is not anticipated to exceed national standards and where insufficient information is available to either substantiate or reject this assumption. Unclassified

areas generally have little, if any, industrial development and comparatively sparse populations. The low likelihood of air quality problems makes these areas a lower priority for expensive monitoring programs.

In addition to the NAAQS discussed above, the EPA has promulgated regulations to protect and enhance air quality. The PSD regulations are intended to help maintain good air quality in areas that attain the national standards and to provide special protections for National Parks, federally designated Wilderness areas, National Monuments, National Seashores, and other areas of special national or regional natural, recreational, scenic, or historical value.[442] These regulations stipulate that new sources must not cause a decline in ambient air quality and must use best available control technology to limit emissions.

PSD permits are required for, "major emitting facilities" which emit, or have the potential to emit, 100 tons or more per year of any air pollutant.[443] EPA regulations specifically list the sources that are considered "major emitting facilities"—this list does not include ski areas.[444] However, the regulations note that the term "major emitting facilities" also includes "any other source with the potential to emit 250 tons per year or more of any air pollutant."[445] A PSD permit is not required for BSR because ski areas are not classified as stationary sources and BSR does not have the potential to emit over 250 tons of any regulated air pollutant.

In an effort to eliminate or minimize the severity and number of exceedances of the NAAQS and to achieve expeditious attainment of these standards, the EPA promulgated the Conformity Rule in 1993. Conformity regulations apply to federal actions and environmental analyses in non-attainment areas completed after March 15, 1994. The conformity regulations do not apply to Summit County or to the BSR area because they are classified as attainment areas or as unclassifiable for all criteria pollutants.

Mobile Source Air Toxics Regulations

As Stated in 40 CFR Parts 59, 80, 85 and 86 Control of Hazardous Air Pollutants from Mobile Sources:

> *Mobile source air toxics (MSATs) are compounds emitted from highway vehicles and non-road mobile equipment (e.g., construction equipment). Some of these toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. Metal air toxics also result from engine wear or from impurities in oil or gasoline. The EPA has identified six priority MSATs: benzene, formaldehyde, acetaldehyde, diesel particulate matter/diesel exhaust organic gases, acrolein, and 1,3-butadiene.*

[442] 42 USC 7470-7479
[443] 42 USC 7475[a] and 7479[1]
[444] 42 USC 7479[1]
[445] Ibid.

> *The EPA has issued a number of regulations that will significantly decrease MSATs by requiring the use of cleaner fuels and cleaner engines. The MSAT regulations were issued under the authority in Section 202 of the Clean Air Act. In its regulations, EPA examined the impacts of existing and newly promulgated mobile source control programs, including the reformulated gasoline program, national low emission vehicle standards, Tier 2 motor vehicle emissions standards, gasoline sulfur control requirements, proposed heavy-duty engine and vehicle standards, and on-highway diesel fuel sulfur control requirements.*[446]

State

The EPA retains oversight authority but has delegated enforcement of the CAA to the states. In Colorado, the Air Pollution Control Division of the Department of Public Health and Environment acts as the lead agency. The state is required to develop and administer air pollution prevention and control programs; state standards must be either the same as, or more stringent than, Federal CAA standards. In Colorado, the state has adopted all federal ambient air quality standards as reflected in the CAA with an additional particulate standard; the standard for total suspended particulate emissions is 75 micrograms/cubic meter over 24 hours and 260 micrograms/cubic meter annually.

AFFECTED ENVIRONMENT

Climate

Summit County experiences a typical mid-continental, high-elevation climate with cool summers and cold winters. Humidity is low and diurnal temperature fluctuations are high. Prevailing winds are generally from the northwest, and the region receives the majority of its precipitation from Pacific storms. Precipitation is generally higher in the winter than in the summer. Winter precipitation occurs as abundant snowfall, while summer precipitation often occurs as localized thunderstorms. BSR's average annual snowfall totals approximately 300 inches. However, snow accumulation varies within the ski area due to wind loading, scouring, the shadowing effect of peaks and ridges, and differences in elevation. Wind speeds on the mountain are generally higher than winds experienced within lower elevations of the Upper Blue River Basin valley. Within the basin, lower wind speeds can reduce dispersion, which could potentially increase the likelihood of temperature inversions in the area. Average wind direction as measured at BSR is predominantly from the west and it is unlikely that any emissions generated directly or indirectly by BSR's operations currently affect the Eagle's Nest or Rocky Mountain National Park Class 1 Areas (Maroon Bells Snowmass Wilderness area is approximately 50 miles west of BSR).

[446] 40 CFR 59, 80, 85 and 86

Greenhouse Gas Emissions and Carbon Dioxide

Emissions which contribute to climate change are called greenhouse gases (GHG), as they allow more solar radiation in at the upper atmospheres and trap heat in the lower atmosphere. The primary GHGs are carbon dioxide (CO_2), ozone (O_3), methane (CH_4), and nitrous oxide (N_2O). Natural sources of CO_2 occur within the carbon cycle where billions of tons of atmospheric CO_2 are removed from the atmosphere by oceans and growing plants, also known as "sinks," and are emitted back into the atmosphere annually through natural processes also known as "sources."

GHG discussions generally focus on CO_2, as it constitutes approximately 85 percent of all GHG emissions worldwide. Within the United States, fossil fuel combustion accounted for approximately 94.1 percent of CO_2 emissions in 2008. The largest source of these CO_2 emissions was from the burning of fossil fuels such as coal, oil and gas in power plants, automobiles, industrial facilities, and other sources.[447] Electricity generation contributed the greatest percentage of total United States GHG emissions 34 percent, while transportation was the second greatest source with 28 percent. In 2008 the United States contributed 19 percent of the world's CO_2 emissions through the combustion of fossil fuels.[448]

An analysis of existing traffic created by guests accessing facilities at BSR is summarized in Chapter 3C – Traffic, Parking and Ski Area Access. Based on this analysis, it is possible to estimate the GHG emissions by existing vehicular traffic produced by visitors accessing facilities at BSR. Assumptions were developed related to the origin of guests (e.g., Denver), and the number of guests who utilize lodging. For example, 60 percent of BSR's visitors are destination guests and either arrive by plane at Denver International Airport or drive from within or outside Colorado.

From the airport, guests typically either use a shuttle service or rent a car for the approximately two-hour drive to the mountains. Many destination guests stay within the Town of Breckenridge or at lodging adjacent to BSR and only drive to and from the resort at the beginning and end of their vacation. It is acknowledged that other sources of GHG emissions are present at BSR (e.g., grooming equipment, emissions associated with heating and cooking fuels, and snowmobiles); however, the majority of GHG emissions are produced by vehicle trip generation specific to the use of the ski area. Additionally, GHG emissions created by vehicle trips are able to be more accurately calculated than other sources.

Discussed above, GHG emissions include a variety of compounds, most notably CO_2, CH_4, and N_2O. However, for on-road tailpipe emissions, CO_2 is by far the most significant contributor to GHG emissions. For purposes of comparing GHG emissions, the overall GHG emissions associated with BSR's existing guests are assumed to consist entirely of CO_2. The CO_2 emissions were calculated from the fuel usage of vehicles traveling to and from BSR, based on the average fuel economy data (i.e., miles per

[447] US EPA, 2010
[448] US Energy Information Administration, 2009

gallon of fuel) published by the EPA. Since not all visitors to BSR stay overnight, a percentage of these visitors were assumed to travel round-trip each day from Denver or other communities. The CO_2 emission factors (e.g., CO_2 emitted per gallon gasoline burned) were then applied to the calculated total fuel usage to get the CO_2 emissions emitted from motor vehicles traveling to utilize BSR facilities. The detailed quantification is located in the Project File. Based on the above assumptions and a 1.6 million annual visitation level (average visitation over previous five seasons), it is estimated that GHG emissions currently generated by BSR visitors contribute approximately 28,861 metric tons CO_2 equivalent (CO_2e) per operating season, or approximately 206 metric tons CO_2e/day, to the local and regional environment.[449] For clarity, this calculation includes motor vehicle emissions generated by BSR guests as they drive from the Denver metropolitan area or other origination points to visit BSR.

The average fuel economy was based on the EPA average for passenger cars and light duty trucks. The assumed fleet average was 20.4 miles per gallon.[450] It is important to note that future fleet-average fuel economy will improve as new Corporate Average Fuel Economy (CAFE) standards are enacted. The Energy Independence and Security Act signed into law on December 19, 2007, mandates a 40 percent increase in fleet-average fuel economy by 2020, equal to 35 miles per gallon.[451]

Air Quality Monitoring

Summit County has not monitored and is not currently monitoring SO_2, CO, O_3, Pb, NO_2, or $PM_{2.5}$. It is believed that the probability of these pollutants becoming an impediment to attainment is unlikely.[452] This, combined with the expense of monitoring, has made it impracticable to oversee these pollutants. Particulate matter has been monitored as PM_{10} in the Towns of Breckenridge, Frisco, and Silverthorne. Continuous PM_{10} monitoring commenced in June of 1992 atop the Summit County Justice Center, in the Town of Breckenridge. In December 2006, EPA revoked the PM_{10} annual standard due to a lack of evidence linking health problems to long-term exposure to coarse particle pollution. Before its revocation, the level of the annual standard was 50 micrograms per cubic meter of air (μg/m3) of air.[453]

Table 3M-2 below presents the results of ten years of monitoring from 1998 to 2008 at the PM_{10} monitoring site within the Town of Breckenridge. The annual mean standard continues to be met, and Summit County continues to be classified as an attainment area for PM_{10}. The nearest non-attainment area for PM_{10} is the Denver metropolitan area.

[449] "CO_2e is a metric used to compare the emissions from various greenhouse gases based upon their global warming potential." (EPA, 2011)
[450] In 2007 the weighted average combined fuel economy of cars and light trucks combined was 20.4 miles per gallon. (FHWA 2008)
[451] Pub. L. 110 – 140 Energy Independence and Security Act of 2007
[452] Heavner, 1997; Pocius, 1997
[453] EPA, 2010

Table 3M-2:
PM_{10} ($\mu g/m^3$) Monitored in Breckenridge (1998–2008)

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
24-hr max	125	61	182	107	98	82	82	170	86	81	104
Annual Mean	19	18	22	24	22	17	17	21	17	17	16

Source: EPA, 2010

The EPA measures regional air quality by utilizing Air Quality Index (AQI) value which are calculated for five major air pollutants regulated by the CAA: ground-level ozone, particle pollution (also known as particulate matter), carbon monoxide, sulfur dioxide, and nitrogen dioxide. The AQI rates an area's air quality using a list of determinations ranging from "Good" to "Hazardous". In 2008 Summit County experienced "Good" air quality 295 days out of 301 measured days (98 percent), and "Moderate" air quality six days out of the 301 days measured (2 percent).[454] The EPA provides the following definition for an AQI of "Good" and "Moderate":[455]

> *Good – The AQI value for your community is between 0 and 50. Air quality is considered satisfactory, and air pollution poses little or no risk.*
>
> *Moderate – The AQI for your community is between 50 and 100. Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people. For example, people who are usually sensitive to ozone may have respiratory symptoms.*

Air Pollution Control Measures in Summit County

Air pollution control measures have been enacted for Summit County. Control measures are not extensive, due to the absence of current violations and the low likelihood of future violations of federal air quality standards. The county requires that only EPA Phase II or III certified wood stoves or solid fuel burning devices be installed in newly constructed buildings, and that only one device be permitted per residential dwelling unit. Solid fuel burning devices are not permitted in newly constructed apartments, condominiums, or commercial properties. Similarly, modification, replacement, or relocation of an existing wood stove requires upgrading to a certified unit.

Other air quality control measures in effect for Summit County include: the County Engineering Department's routine application of magnesium chloride to gravel roads, which is applied as needed to reduce dust, and the incorporated communities within Summit County routinely sweep the streets to reduce the amount of dust re-entering the atmosphere.

[454] Ibid.
[455] Ibid.

Forest Plan

Forest Service direction regarding air resources is found in the Forest Plan for the WRNF. No specific air quality related standards or guidelines have been promulgated for the 8.25 Management Area; however, forest-wide standards require that activities "[c]omply with local, state, and federal air quality regulations and maintain conformity with the State Implementation Plan."[456] BSR is currently consistent with and/or not applicable with HB 93-1340, SB 95-110, and the State Implementation Plan.

DIRECT AND INDIRECT ENVIRONMENTAL CONSEQUENCES

Table 3M-3 summarizes potential effects on air quality resources under each alternative by issue and indicator.

Table 3M-3:
Summary of Air Quality Resource Effects by Issue and Indicator

Alternative 1	Alternative 2	Alternative 3
Issue: Short-term, construction related activity, as well as potential increases in vehicular traffic related to increased annual visitation could negatively impact air quality in the region.		
Indicator: Narrative description of air quality in the study area		
It is anticipated that Summit County would continue to be classified as an attainment area for all monitored criteria pollutants and no additional air quality issues would be anticipated due to existing regulations, climate and topography.	No long-term air quality impacts are expected at BSR or adjacent NFS or Summit County lands as a result of the Proposed Action. Short-term impacts to air quality associated with the proposed projects would not result in changes from existing air quality.	No long-term air quality impacts are expected at BSR or adjacent NFS or Summit County lands as a result of Alternative 3. Short-term impacts to air quality associated with the proposed projects would not result in changes from existing air quality.
Indicator: Estimated increase in GHG emissions related to BSR vehicular traffic		
Long-term – 9.9% increase over existing conditions. Under Alternative 1, construction-related air quality impacts would not occur.	Long-term – 24.2% increase over existing condition. Short-term construction related GHG emissions are expected to contribute approximately 213.7 metric tons of CO_2e to the local environment over the life of the project.	Long-term – 16.0% increase over existing condition. Short-term construction related GHG emissions are expected to contribute approximately 639.0 metric tons of CO_2e to the local environment over the life of the project.
Indicator: Compliance with local, state and federal regulations regarding air quality		
No adverse impacts. No operational emissions would exceed ambient air quality standards. Predicted increases in CO_2 and toxic air pollutants due to increased traffic would remain below local, state and federal regulations regarding air quality.	No adverse impacts. No operational emissions would exceed ambient air quality standards. Predicted increases in CO_2 and toxic air pollutants due to increased traffic would remain below local, state and federal regulations regarding air quality.	No adverse impacts. No operational emissions would exceed ambient air quality standards. Predicted increases in CO_2 and toxic air pollutants due to increased traffic would remain below local, state and federal regulations regarding air quality.

[456] USDA Forest Service, 2002a

Greenhouse Gas Emissions

Because greenhouse gases from vehicle emissions mix readily into the global pool of greenhouse gases, it is not currently possible to accurately discern the effects of this project from the effects of all other greenhouse gas sources worldwide, nor is it expected that attempting to do so would provide a practical or meaningful analysis of project effects. Currently, the Forest Service does not have a standard tool for measuring greenhouse gas emissions. However, the EPA has provided guidance on how to calculate GHG emissions related to mobile sources, this guidance was used to determine the impact of the anticipated increase in vehicle trips associated with the alternatives. It is important to note that it is impossible to measure the incremental cumulative impact on global climate from emissions associated with this project. For purposes of this analysis the estimated GHG emissions and increase in motor vehicle traffic are based on projected visitation estimates at BSR ten years post implementation (refer to Chapter 3B – Recreation, Mountain Operations and Guest Services).

Based on the assumptions described above, the estimated GHG emissions generated by BSR visitors for the action alternatives are presented below in Table 3M-4.

Table 3M-4:
CO_2e Generated by Alternative Ten Years Post Implementation

	Average Daily Visitation (guests)	Average Daily Metric Tons CO_2e[a]	Annual Metric Tons CO_2e[a]	Percent Change CO_2e over Existing Condition (%)
Existing Conditions	11,429	206	28,861	N/A
Alternative 1	12,689	222	31,100	7.8
Alternative 2	15,080	251	35,181	21.9
Alternative 3	13,599	233	32,678	13.2

[a] The ratio of carbon dioxide emissions to total emissions (including carbon dioxide, methane, and nitrous oxide, all expressed as carbon dioxide equivalents) for passenger vehicles was 0.977.
Source: U.S. Environmental Protection Agency, 2009

Alternative 1 – No Action

Under the No Action Alternative, no new projects would be implemented at BSR. GHG emissions and air quality impacts would be associated with maintaining existing operations, including the lifts and ski trail network and associated infrastructure. No project related changes would occur to the current trends in air quality. Ongoing commercial and residential growth within Summit County would continue independently of activities at BSR. There would be no new projects approved under Alternative 1, therefore no new short-term construction related greenhouse gases would be emitted. Visitation at BSR is anticipated to continue to increase as demand for skiing grows and previously approved projects are implemented. In total, guests visiting BSR under Alternative 1 are estimated to contribute approximately 31,100 metric tons of CO_2e annually for ten years post implementation (refer to Table 3M-4). This represents an increase of 7.8 percent over the existing condition. It is important to note that the GHG contribution of BSR's guests would incrementally increase commensurate with anticipated increases in

visitation. However, due to existing regulations, climate, and topography, future exceedances of NAAQS would be unlikely. It is probable that Summit County would continue to be classified as an attainment area for all monitored criteria pollutants and no additional air quality issues would be anticipated. Incremental increases in emissions would be unlikely to violate PSD regulations for criteria pollutants.

Any change in emissions would be extremely unlikely to adversely affect air quality in the Eagle's Nest or Ptarmigan Peak Wilderness areas. Upper level winds are predominantly from the north, and BSR is downwind from both the Eagle's Nest wilderness (a Class I airshed) and Ptarmigan Peak Wilderness (a Class II airshed). Beyond the scope of this project, new CAFE vehicle standards will continue to make progress toward the effort of introducing more fuel efficient vehicles to reduce greenhouse gas emissions and help reduce carbon monoxide and ozone pollutants in the project area.

Alternative 2 – Proposed Action

Long-Term Air Quality Effects

No emissions permits would be required for implementation of the Proposed Action. Overstory vegetation would be chipped and buried on-site and/or hauled off-site. No long-term air quality impacts are expected at BSR or adjacent NFS or Summit County lands as a result of the Proposed Action. Effects to air quality associated with projects occurring on public lands would not result in any changes to existing air quality effects. The impacts of public lands projects are expected to be within the acceptable standards for both particulate matter and visibility.

Under Alternative 2, daily visitation at BSR is projected to increase by approximately 3,651 skier visits over the existing condition and by 2,391 skier visits over the No Action Alternative. This increase would be accompanied by a corresponding increase in vehicular traffic and GHG emissions from mobile sources. Under Alternative 2, annual GHG emissions generated from mobile sources as guests visit the resort is anticipated to be approximately 35,181 metric tons CO_2e, representing an increase of 21.9 percent over existing conditions (refer to Table 3M-4) and a 13.1 percent increase over the No Action Alternative. For comparison, the EPA estimates that the average annual household emissions in the United States are approximately 11.3 metric tons CO_2e.[457]

No long-term effects to air quality in the Summit County basin are expected to be measureable. Likewise, Alternative 2 is not anticipated to result in violations of state or federal air pollution control laws and regulations or to have an appreciable effect on air quality.

Short-Term Air Quality Effects

Vehicles and equipment used for the purposes of workers commuting to construction sites or construction activities will use either diesel or gasoline for fuel. The EPA Office of Transportation and Air Quality

[457] Environmental Law Resource, 2010

developed *Emission Facts: Average Carbon Dioxide Resulting from Gasoline and Diesel Fuel, 2005*, to ensure consistent assumptions and practices in the calculation of emissions of greenhouse gases from transportation and mobile sources. It is intended to be used as a reference for estimating emissions from mobile sources.[458] Based on this fact sheet, a gallon of diesel emits approximately 22.2 lbs CO_2. A gallon of gasoline emits approximately 19.4 lbs CO_2.

Short-term, construction related emissions were modeled to determine the amount of CO_2e that would be generated by workers accessing the site to implement projects. For purposes of this analysis, the following assumptions were made for construction equipment:

- Six employee trucks to access the project sites
- Employees would travel to work sites from Breckenridge during construction
- Each vehicle would travel 10 miles round trip/day
- There would be a two-year construction schedule
- There would be a five-day operating week and a 16-week construction window per season
- Employee trucks average 15 miles per gallon
- Construction equipment would consist of two front-end loaders, one track-hoe and a dump truck burning a total of 4 gallons of diesel per hour per vehicle of vehicle operation

Using the EPA data above it is possible to estimate the CO_2e contribution of heavy equipment and workers vehicles that would be used to implement the Proposed Action using the assumptions listed above. Over the lifespan of the project each piece of heavy equipment would burn approximately 20,480 gallons of diesel fuel and worker vehicles would burn 640 gallons of gasoline. This would result in an additional 208.1 and 5.6 metric tons CO_2e entering the local environment from heavy equipment and worker vehicles, respectively. For comparison, motor vehicle GHG contributions from guests accessing facilities at BSR are expected to be on the order of 222 metric tons CO_2e per day under Alternative 2. To clarify, short-term construction related GHG emissions over the lifespan of the project are anticipated to be less than the daily contribution from guests.

Additionally, construction activities can produce fugitive dust. Much of the fugitive dust generated by construction activities consists of relatively large-sized particles, which generally settle within a short distance of the construction site. Best Management Practices (BMPs) would be utilized (e.g., fugitive dust control) as part of the construction process for projects proposed under Alternative 2, in order to reduce

[458] Because these numbers are an estimate, and because this number may have been slightly reduced by changes to Alternative 2, these CO emission calculations were not changed between DEIS and FEIS despite the reduction in vehicle/equipment trips related to removing the restaurant from the proposal,

fugitive emissions of dust. In the short-term, dust generated from construction would be dispersed by typical diurnal wind currents.

Alternative 3

Long-Term Air Quality Effects

No emissions permits would be required for implementation of Alternative 3. Alternative 3 would result in only negligible changes to air quality effects as compared to the existing condition. Effects to air quality associated with projects occurring on public lands would not result in any changes to existing air quality effects. The impacts of public and private lands (grading project between Peak 8 and 9 includes a portion on private lands) projects assessed under Alternative 3 are expected to be within the acceptable standards for air quality and are not anticipated to result in any violations of state or federal air pollution control laws and regulations or to have an appreciable effect on air quality.

Under Alternative 3, daily visitation at BSR is projected to increase by approximately 2,170 skier visits over the existing condition and by 910 skier visits over the No Action Alternative. This increase would be accompanied by a corresponding increase in vehicular traffic GHG emissions from mobile sources. Under Alternative 3, annual GHG emissions generated from mobile sources as guests visit the resort is anticipated to be approximately 32,678 metric tons CO_2e, representing an increase of 13.2 percent over existing conditions (refer to Table 3M-4) and a 5 percent increase over the No Action Alternative.

No long-term effects to air quality in Summit County are expected to be measureable. Likewise, Alternative 3 is not anticipated to result in violations of state or federal air pollution control laws and regulations or to have an appreciable effect on air quality.

Short-Term Air Quality Effects

Like Alternative 2, implementation of projects contained in Alternative 3 would lead primarily to short-term air quality impacts derived from construction activities that would be controlled by the use of BMP's as outlined in Table 2-4 in Chapter 2, which are designed to reduce idling time of construction machinery and to control fugitive dust and other incidental emissions. With prescribed PDCs and BMPs in Table 2-4, including dust abatement practices, air quality impacts associated with construction activities on public lands under Alternative 3 would not exceed those of Alternative 1.

Similar to Alternative 2, short term, construction related emissions were modeled to determine the amount of CO_2e that would be generated by workers accessing the site to implement projects. For purposes of this analysis the following assumptions were made for construction equipment:

- Employees would travel to work sites from Breckenridge during construction
- Each employee vehicle would travel 10 miles round trip/day

- Construction of the snowmaking projects would require one worker truck and one piece of heavy equipment over a 12-week construction season lasting six years
- Trail construction projects would require three worker trucks and two pieces of heavy equipment over a 12-week construction season lasting seven years
- Grading projects would require two worker trucks and two pieces of heavy equipment over a 12-week construction season lasting one year
- Lift construction and replacement projects would require two worker trucks and one piece of heavy equipment over a 12-week construction season lasting four years
- Employee trucks average 15 miles per gallon

EPA data was used estimate the CO_2e contribution of heavy equipment and workers vehicles that would be used to implement Alternative 3 using the assumptions listed above. The detailed approach and analysis are located in the project record. Over the lifespan of the project, each piece of heavy equipment would burn approximately 61,248 gallons of diesel fuel and worker vehicles would burn 1,892 gallons of gasoline. This would result in an additional 622.3 and 16.6 metric tons CO_2e entering the local environment from heavy equipment and worker vehicles respectively. For comparison, motor vehicle GHG contributions from guests accessing facilities at BSR are expected to be on the order of 222 metric tons CO_2e per day under Alternative 2.

Additionally, construction activities can produce fugitive dust. Much of the fugitive dust generated by construction activities consists of relatively large-sized particles, which generally settle within a short distance of the construction site. BMPs would be utilized (e.g., fugitive dust control) as part of the construction process for projects proposed under Alternative 3, in order to reduce fugitive emissions of dust. In the short-term, dust generated from construction would be dispersed by typical diurnal wind currents.

CUMULATIVE EFFECTS

Scope of the Analysis

The effects analyzed in the cumulative effects section apply to all alternatives, including the No Action Alternative. For a detailed description of past, present, and reasonable foreseeable future projects, the reader is referred to Appendix A in this document.

Temporal Bounds

The temporal bounds for the cumulative effects analysis for air quality extend from BSR's inception as a tourist destination through the foreseeable future during which BSR can be expected to operate.

Spatial Bounds

The spatial bounds for the cumulative effects analysis for the air quality resource include the project area and Summit County, as well as the proximal Class I airshed of the Eagles Nest Wilderness.

Past, Present, and Reasonably Foreseeable Future Projects

Past, present, and reasonably foreseeable future projects with potential to cumulatively affect air quality include:

- Continued Town of Breckenridge and Upper Blue Residential Build-out
- BSR Master Development Plan[459]
- Breckenridge Forest Health and Fuels EA
- North Summit Wildland Urban Interface Fuels Reduction Project EA
- Red Tail Ranch Wildland Urban Interface Project
- Ophir Mountain Forest Health and Fuels Reduction Project EA
- On-going Highway 9 Widening

Past actions that have impacted air quality in the area include: resort development, mining, forest management, population changes within the Town of Breckenridge and the Upper Blue River Basin, and construction activities associated with Highway 9 from Frisco to Breckenridge. Residential and commercial growth within Summit County and the increased population and traffic levels associated with such development is more likely to impact air quality than impacts associated with improvements to BSR. Analysis of future projects contained in the BSR MDP will include disclosure of associated short- and long-term, direct and indirect effects to air quality; although, additional projects in the BSR MDP that are not currently proposed would not be anticipated to generate additional vehicular traffic.

Prescribed burning and construction-related dust related to forest health projects on public and private lands could temporarily impair visibility, create unpleasant odors, and cause eye irritation. Smoke generated from burn treatments has the largest impact on visibility. Direct effects would be greatest in the immediate vicinity of the prescribed burn operations. Because most smoke is dispersed within 24 hours of burning, indirect effects to people would occur after one day. These indirect effects would be caused by residual smoke from smoldering fuel concentrations. Outlying areas may also experience indirect effects such as impaired visibility due to diluted, dispersed smoke. Typically, the timing of prescribed burn treatments is chosen based on meteorological conditions in order to limit smoke impacts. Burn treatments

[459] BSR MDP projects would require a site-specific review via the NEPA process prior to potential project decision and implementation.

would occur outside of any designated high pollution season under atmospheric conditions that encourage mixing and transport, minimizing the amount and duration of particulate emissions.

As disclosed in the Highway 9 Frisco to Breckenridge EIS, the preferred alternative would be consistent with the NAAQS, and dust emissions would be minimized with the application of BMPs. The Highway 9 widening project is not anticipated to generate additional traffic.[460]

The impacts to air quality associated with the current proposal would be transient in nature and would not represent a cumulative impact.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

No irreversible and/or irretrievable commitments of resources in relation to air quality have been identified in association with any of the alternatives analyzed in this document.

[460] Colorado Department of Transportation, 2004

N. GEOLOGY AND SOIL RESOURCES

SCOPE OF THE ANALYSIS

The study area for this analysis focuses on geologic and soil resources proposed for direct disturbance within the SUP boundary and adjacent private lands within the Lehman Gulch, Blue River, Sawmill Gulch, Cucumber Creek, and Barton Gulch watersheds. This geologic summary is based on a review of the Holy Cross Area, and field surveys and laboratory analysis completed from October 2 to October 15, 2010.[461] Although 3rd-order soil surveys (which include extensive data collection) have been completed for the area in the past, this survey scale is not intended for site-specific planning as soils are natural bodies that have a great deal of heterogeneity. Field verification of soil map units helps define that range of variability in soil properties that may affect use and management, as related to project implementation.

Sample sites related to this project represent land-type level soil map units and cover a range of topographic relief within the project disturbance areas. In addition, aerial photographs were reviewed to assess active or recent soil and slope movement in areas previously mapped as landslide deposits. The full geology and soils technical report covering the site-specific review of soils within study area is contained in the December 20, 2010 report: Breckenridge Peak 6 Soil Sampling Report.[462]

AFFECTED ENVIRONMENT

Geology

The study area lies within the Rocky Mountain physiographic region ranging from 9,800 to 12,500 feet above mean sea level (amsl). This region is dominated by pre-Cambrian bedrock with numerous isolated remnants of sedimentary rocks, primarily of Cretaceous age (65 to 135 million years old). The Williams Fork Mountains and the Tenmile Range form an inter-montane structural trough, which extends from south of Breckenridge through the county in a north-northwesterly direction. The trough is bounded along the southwest by the Gore and Tenmile Ranges, to the east by the Continental Divide and to the south by Hoosier Pass. Upper Cretaceous rocks of Pierre shale dominate the eastern edge of the trough along the Continental Divide. East of the Pierre exposures, separating them from pre-Cambrian is the Williams Range thrust fault, which has caused the pre-Cambrian formations to overlay sediments that are up to 4,000 feet deep. Pre-Cambrian rocks occurring along the Williams Fork, Gore, and Tenmile Ranges consist of gneiss and schist, greenstone, granite, and related rocks. Upper Cretaceous rocks of the Benton shale and Niobrara formation occur to the west of the Pierre exposures. Sedimentary rocks ranging in age from Pennsylvanian Maroon formation (280 to 325 million years ago), to the Upper Cretaceous Pierre shale are common south of Breckenridge, and in the Kokomo Pass region. Quaternary glacial and stream deposits (less than 3 million years old) occupy an extensive area along the Blue River Valley, which runs

[461] USDA Forest Service, 1995a; Wright, 2010
[462] Wright, 2010

the length of Summit County and approximately 1,000 feet east of BSR's SUP boundary. Early and Late Tertiary intrusive rocks (200 to 240 million years ago) are common in large portions of southern Summit County.[463] Refer to the 1998 EA for a more detailed description of geologic characteristics of the area.[464]

Geology underlying the BSR SUP boundary is dominated by glacial moraine and Terrace gravel. Terrace gravel extends upslope from below the BSR's base portals, to a horizontal band located at an approximate elevation of 10,000 feet. Pre-Cambrian rock dominates above the tree line.[465]

Evaluation of slope stability within the study area considers surface landform features and soil physical properties. A historical landslide deposit was mapped on Peak 7 within the study area in 1999 by the WRNF.[466] To assess the current stability of this feature, two sample sites were located within the mapped boundary. Soil control sections for both sites are loamy-skeletal, estimated percent clay ranging from 5 to 23 percent to a depth of 100 centimeters (relatively non-plastic soils). Slope gradients are under 22 percent for both sites. The weathering products of the aforementioned geologic parent materials are coarse-textured sands with a high percentage of gravel, cobble and stone fragments from mixed granitic (schist/gneiss) sources for both sites. Based on these characteristics, the slope stability hazard rating at these sites was determined to be low. Analysis of aerial photography confirmed that no active or recent soil/slope movement was observed at either sample site on Peak 7.

Soils

Fourteen soil map units were identified within the study area. These soils range from shallow to deep, and are generally classified as upland soil over bedrock; however, one site located near Cucumber Gulch had deep riparian soil with a high water table.

Table 3N-1:
Soil Management Units Identified within the SUP Boundary

Soil Management Unit	Slope (%)	Area (acres)
100A Cryoborolls – Cryaquolls association, 0 to 15% slopes	0 to 15	391.33
225B Leighcan family – Cryaquolls complex, 0 to 25% slopes	0 to 25	22.27
254D Rock outcrop – Leighcan-Hechtman families complex, 40 to 150% slopes	40 to 150	31.18
290B Leighcan family, 5 to 40% slopes	5 to 40	1,797.28
290C Leighcan family, till substratum, 40 to 60% slopes	40 to 60	166.03
604C Leighcan family, 40 to 60% slopes	40 to 60	253.58
604D Leighcan family – Rock outcrop complex, 40 to 150% slopes	40 to 150	180.20

[463] Taranik, 1974
[464] USDA Forest Service, 1998
[465] US Geological Survey, 1951
[466] USDA Forest Service, 1999

Table 3N-1:
Soil Management Units Identified within the SUP Boundary

Soil Management Unit	Slope (%)	Area (acres)
650B Leighcan – Leighcan families, moderately deep complex, 5 to 40% slopes	5 to 40	66.55
670C Leighcan – Tolby families complex, 40 to 65% slopes	40 to 65	145.00
901B Moran family – Rubble land complex, 5 to 40% slopes	5 to 40	438.12
901D Moran family – Rock outcrop - Teewinot family complex, 40 to 150% slopes	40 to 150	1,374.25
904A Moran family, 0 to 25% slopes.	0 to 25	44.30
908A Moran family – Cryaquolls - Borohemists complex, 0 to 25% slopes	0 to 25	107.95
908B Moran family – Rock outcrop - Cryaquolls complex, 0 to 40% slopes	0 to 40	128.08
CQ Cirque land, 40 to 150% slopes	40 to 150	182.01
RL Rubble land	0 to 40	47.54
RO/RL Rock outcrop – Rubble land complex, 0 to 40% slopes	0 to 40	230.25
UNCL		85.41
W		7.81
Grand Total		**5,699.13**[a]

[a] This area is different from the BSR SUP boundary based on soils GIS data.
CQ = Cirque Land
ML = Mire Land
RO/RL = Rock Outcrop/Rubble Land
W = Water
UNCL=Unclassified
Source: USDA Forest Service, 1999

The management units can be grouped into seven soil families, plus miscellaneous land types including cirque lands, rock outcrops, rubble land, unclassified land and standing water. Some survey areas were made up of soil complexes or associations where two or more soils are shown as one map unit. Soils within the SUP boundary range from very poorly to excessively drained, and have variable runoff potential. Generally, revegetation limitations are severe within the project area due to short growing season, slope, low available water capacity and low inherent fertility. Six management units within the project area were identified as having severe cut/fill slope stability potential. These areas may have greater erosion potential than other management units within the SUP boundary. Mass landslide movement potential of soils within the project area are low to moderate.

Generally, soils in the study area are cobbly and have moderately high permeability, with correspondingly high infiltration rates and low water holding capacity. Surface water runoff is directly related to slope angle and vegetative cover, but the speed of runoff is generally slow to moderate due in large part to soil porosity and rapid infiltration. Surface and subsurface soil erodibility is low to moderate within the

project areas (K values of the whole soil [kw] ranging from 0.02 to 0.21).[467] Using the whole soils K factor values best reflect natural soil conditions in the field as rock fragment serve to "armor" soil and make them less erodible overall.[468] Additional details regarding K values soil erodibility can be found in the soils technical report prepared by Landtype Resources Services in the Project File. Soil organic matter can also be related to soil erodibility as organic horizons allow infiltration and provide productive soils for stabilizing vegetation.[469] Within the study area, the depth of soil organic matter varies from 0 to 41 cm (for additional soil characteristics refer to soils technical report contained in the Project File).

DIRECT AND INDIRECT ENVIRONMENTAL CONSEQUENCES

Table 3N-2 summarizes potential effects on geology and soil resources under each alternative by issue and indicator.

Table 3N-2:
Summary of Geology and Soil Resources Effects by Issue and Indicator

Alternative 1	Alternative 2	Alternative 3
Issue: Proposed ground disturbance and snowmaking may (individually and/or collectively) affect erosion and slope hazards.		
Indicator: Analysis of increased erosion hazard due to ground disturbance		
Because no ground disturbance is proposed under the No Action Alternative, there is no potential to increase the erosion hazard of soils within the SUP boundary as a result of implementation of this alternative.	Alternative 2 would result in 58 acres of tree removal and 28.4 acres of grading. 7.1 acres of clearing and/or grading would occur within soils with sever cut/fill slope stability, but none in soils with mass movement potential. Potential soil erosion would be reduced to a manageable level through the project design, revegetation of disturbed areas immediately following construction activities, and application of appropriate PDCs. None of the soils display high mass landslide movement potential.	Alternative 3 would result in 31.6 acres of 100% tree removal, 88.6 acres of 50% tree removal, and 40.6 acres of grading. 15.6 acres of clearing and/or grading would occur within soils with sever cut/fill slope stability, but none in soils with mass movement.
Indicator: Analysis of slope stability and geological constraints associated with project components		
Because no ground disturbance is proposed under the No Action Alternative, no slope stability or geological constraints were identified as part of the No Action Alternative.	With implementation of PDC, no stability and geological constraints were identified within the study area.	Same as Alternative 2.

[467]The factor K represents the soil's susceptibility to erosion in their plot condition based on soil texture. Soils that are resistant to erosion have low K values (0.02 to 0.15); display moderate erosion are in the middle of the range (0.25 to 0.40); and highly erodible soils tend to have values greater than 0.4. National Resource Conservation Service, 2008
[468] McCormick et al., 1982
[469] Franzluebbers, 2002; McMullen, 2011

Alternative 1 – No Action

Under the No Action Alternative, new development projects would not occur. The resort would continue to operate under its current configuration and capacity. Because no ground disturbance is proposed under the No Action Alternative, there is no potential to affect geologic and soil resources within the area of potential effect as a result of the No Action Alternative.

Alternative 2 – Proposed Action

Project implementation related to Alternative 2 would result in 58 acres of tree removal. To minimize impacts to the soils resource, stumps and root wads would be left in place unless approved by the WRNF soil scientist and hydrologist. Stump retention would also improve revegetation success, further reducing the effects of erosion. In addition to tree removal, 28.4 acres of grading would occur under Alternative 2 (22 acres of this grading would require tree removal).

The effects of soil disturbance due to tree removal and grading can include loss of organic matter, changes in soil chemistry, bare soil exposure, and increased short-term erosion, as well as altered soil infiltration and surface flow regimes. Retention of stumps can minimize these impacts; however, construction vehicles, transferring trees, and grading can result in a loss of top soil and decreased soil organic matter associated with disturbances to the rooting zone. These impacts can reduce hydrologic function, soil productivity and negatively impact vegetative growth capability. PDC's such as stockpiling and re-spreading topsoil and incorporation of organic amendments would minimize detrimental impacts caused by the loss of organic matter.

Although 7.1 acres of disturbance would occur in soil management areas that may be limited by the severe soil stability hazard for cut/fill slopes, these project components have been identified and appropriate PDCs would be implemented to manage soil erosion. As noted in the description of the Affected Environment, soils in the area generally have low mass movement potential, and no soils were identified as having high mass landslide movement potential. The scope of potential effects would be minor in relation to the amounts of each soil management unit within each project watershed.

All construction activities would require proper design, installation, and maintenance of PDCs. PDCs include but are not limited to: avoidance of sensitive areas in the project design phase, utilization of sediment fencing, installation of cross slope drainage (i.e., water bars), and revegetation immediately following construction activities. Installation of PDCs in order to protect erosion prone soils and prevent sedimentation in receiving waters would be conducted in accordance with Forest Service guidelines. Revegetation within the ski area would need to be monitored for success, as many areas could require repeated seed applications to achieve successful vegetative cover.

Table 3N-3:
Comparison of Ground Disturbance By Alternative

Watershed/Soil Management Unit	Clearing (acres)	Clearing/ Grading (acres)	Glading (acres)	Grading (acres)	Grand Total (acres)
ALTERNATIVE 2					
Acres with Severe Cut/fill Slope Stability	5.8	0.1	0.0	1.1	7.1
Alternative 2 Total	***57.9***	***22.0***	***0.0***	***6.4***	***86.4***
ALTERNATIVE 3					
Acres with Severe Cut/fill Slope Stability	4.0	1.2	6.5	3.8	15.6
Alternative 3 Total	***31.6***	***14.8***	***88.6***	***25.8***	***160.9***

Under Alternative 2, approximately 0.6 acre of soil resources would be replaced with structures through the installation of lifts (primarily lift terminals), the food and beverage facility, and the ski patrol/warming facility. These areas would therefore not be reestablished with vegetation. Both as a percentage of total soil resources within the SUP boundary and as a percentage of respective soil management units within each watershed, these losses of soil productivity would have an inconsequential effect.

The Proposed Action would not affect geologic resources. Effects of soil movement and loss would be primarily temporary in nature and minimized by design components such as spot grading, leaving stumps in sensitive areas such as wetlands and adjacent streams, and minimizing new road construction. With PDCs such as stock piling and re-spreading topsoil, surface netting and mulch applications, proper timing of soil disturbance, and sub-soiling or scarification of compacted soils, the Proposed Action is not anticipated to result in significant long-term impacts.

Alternative 3

Ground disturbance related to Alternative 3 would result in 31.6 acres of 100 percent tree removal, 88.6 acres of 50 percent tree removal, and 40.6 acres of grading (14.8 acres of grading would also require tree removal). Except where grading is proposed or in specific areas approved by the WRNF soil scientist and hydrologist, stumps and root wads would be left intact to minimize impacts to the soils resource. However, some level of soil impacts would occur within all areas of tree removal from transferring trees, and construction vehicle access throughout the stands. Loss of top soil and decreases in soil organic matter associated with disturbances to the rooting zone can reduce hydrologic function, soil productivity and negatively impact vegetative growth capability. PDC’s such as stockpiling and re-spreading topsoil and incorporation of organic amendments would minimize detrimental impacts caused by the loss of organic matter.

Although 15.6 acres of disturbance would occur in soil management areas that may be limited by the severe slope stability hazard for cut/fill slopes, no soils were identified as having high mass landslide movement potential. Grading within these soils would be limited to 5.0 acres. PDCs would minimize

potential effects, such as increased erosion in these areas; however, monitoring revegetation success would be critical to reduce increased short-term erosion and altered soil infiltration and surface flow regimes.

Under Alternative 3, *Sawmill* trail would be regraded and widened in specific areas so that skiers and snowboarders could move along the trail without having to self-propel. This project would require approximately 14 acres of grading resulting in cut/fill banks up to 70 feet tall. These cut/fill banks would be designed at a 2:1 slope to minimize erosion. In addition, adjacent to Sawmill Creek, the project would likely require 10- to 20-foot tall retaining walls to protect the stream channel. The entire project would warrant an engineered design plan and drainage management plan subject to Forest Service and Town of Breckenridge review, as the project would be located on NFS and private lands. Based on the preliminary design, 1.8 acres of grading would occur within a management unit with severe cut/fill slope stability (100A). In order to minimize erosion and surface flow on these particular soils, PDC such as silt fences, straw bales, and straw wattles should be used during construction in addition to jute-netting or other appropriate erosion-control matting deemed necessary to protect soils and enhance conditions for vegetation re-establishment after construction.

While much of the soil displacement and translocation is temporary in nature, 0.4 acre of soils would be lost to replacement by permanent infrastructure. These areas would not be replaced with soil materials and as such, would represent a long-term commitment of the soils resource. This long-term impact would be negligible in relation to the amounts of each soil management unit within each project watershed.

CUMULATIVE EFFECTS

Scope of the Analysis

The effects analyzed in the cumulative effects section apply to all alternatives, including the No Action Alternative. For a detailed description of past, present, and reasonable foreseeable future projects, the reader is referred to Appendix A in this document.

Temporal Bounds

The temporal bounds for this cumulative effects analysis for the geology and soils resource extend from BSR's inception as a destination resort in 1961 through the foreseeable future in which BSR can be expected to operate.

Spatial Bounds

The spatial bounds for this cumulative effects analysis are limited to soils resources within the project area (soils directly or indirectly effected by the project components).

Past, Present, and Reasonably Foreseeable Future Projects

Past, present, and reasonably foreseeable future projects with potential to cumulatively affect soil and geology resources within the project area include:

- Breckenridge Ski Resort Projects

Breckenridge Ski Resort Projects

BSR development has resulted in tree removal, grading, and installation of facilities across BSR's 3,125-acre operational boundary. BSR has a current Drainage Management Plan and is required by the Forest Service to implement erosion control techniques such as water bars and revegetation that are constantly monitored and managed to minimize impacts to soil and water resources. These management plans have been effective in the stabilization of soils within the operational boundary; however, soil compaction and productivity reflect changes in land use, management, and vegetative cover between pre-development and the present day conditions. In addition, snowmaking has increased site moisture and therefore, increased the potential for mass soil movement within the SUP area; although as referenced in the Affected Environment, mass movement potential remains low to moderate within the project area. The reader is referred to the Drainage Management Plan in the Project File and the Watershed analysis of this FEIS for a description of current soil resource concerns.

Cumulatively, construction on NFS lands and private lands within the project area have changed sediment yield, soil compaction and impermeable surface between pre-development conditions and present day ski area development. Changes in sediment yield and soil compaction are primarily temporary and associated with construction activities; however, permanent developments such as roads and buildings would continue to result in increased impermeable surfaces.

In the context of past, present and reasonably foreseeable effects, the contribution of the action alternatives to overall long-term cumulative impacts is minimal, 0.6 acre for Alternative 2 or 0.4 acre for Alternative 3, with respect to permanent structures being constructed. Again, on-going implementation of projects contained in the Drainage Management Plan would help manage soil movement and sedimentation within the BSR SUP boundary.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Approximately 0.6 acre or 0.4 acre of soil resources would be replaced with permanent structures under Alternatives 2 and 3, respectively. These minor irreversible and/or irretrievable commitments of soil resources have been identified, but the effect would be negligible.

Chapter 4
Consultation and Coordination

4. CONSULTATION AND COORDINATION

A. PREPARERS

FOREST SERVICE TEAM

The following people participated in initial scoping, were members of the Interdisciplinary Team, and/or provided direction and assistance during the preparation of the DEIS and this FEIS.

Scott Fitzwilliams	White River National Forest Supervisor, Responsible Official
Jan Cutts	Dillon District Ranger, Line Officer
Joe Foreman	Current ID Team Leader, Winter Sports Administrator, Dillon RD
Roger Poirier	Former ID Team Leader, Winter Sports Program Manager, SO
Peech Keller	Environmental Coordinator, Dillon RD
Skye Sieber	West Zone NEPA Coordinator, Rifle RD
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Donna Graham	Landscape Architect, SO
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Corey Lewellen	Fisheries Biologist, Dillon RD
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CONSULTANT TEAM

The use of a third party consulting firm for preparation of an EIS is addressed in the Code of Federal Regulations at 40 CFR Title 40, Part 1506.5(c). If an EIS is prepared with the assistance of a consulting firm, the firm must execute a disclosure statement, as indicated below:

> *Except as provided in §§1506.2 and 1506.3 any environmental impact statement prepared pursuant to the requirements of NEPA shall be prepared directly by or by a contractor selected by the lead agency or where appropriate under §1501.6(b), a cooperating agency. It is the intent of these regulations that the contractor be chosen solely by the lead agency, or by the lead agency in cooperation with cooperating*

> *agencies, or where appropriate by a cooperating agency to avoid any conflict of interest. Contractors shall execute a disclosure statement prepared by the lead agency, or where appropriate the cooperating agency, specifying that they have no financial or other interest in the outcome of the project. If the document is prepared by contract, the responsible Federal official shall furnish guidance and participate in the preparation and shall independently evaluate the statement prior to its approval and take responsibility for its scope and contents. Nothing in this section is intended to prohibit any agency from requesting any person to submit information to it or to prohibit any person from submitting information to any agency.*

Furthermore, the use of a third party contractor in preparing an EIS is specifically addressed by the Council on Environmental Quality (CEQ) in its "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations" in question #17a.[470] Per this CEQ direction:

> *When a consulting firm has been involved in developing initial data and plans for the project, but does not have any financial or other interest in the outcome of the decision, it need not be disqualified from preparing the EIS. However, a disclosure statement in the draft EIS should clearly state the scope and extent of the firm's prior involvement to expose any potential conflicts of interest that may exist.*

Accordingly, disclosure statements were signed by all entities that make up the third party consulting team. These disclosure statements are included in the project record. SE Group has been involved in several other projects at BSR. SE Group has been a prime consultant for the Forest Service for the preparation of six previous NEPA processes at BSR, including: 1998 EA and DN/FONSI, 2002 EA and DN/FONSI, 2002 EA and DN/FONSI, May 2003 EA and DN/FONSI, October 2003 Supplemental DN/FONSI, 2005 EA and DN/FONSI. In addition, SE Group prepared the 2001 BSR Summer Construction Plan, 2007 BSR MDP (refer to the 40 Most Asked Questions statement above), and the 2010 BSR VMP. From a design perspective, SE Group has prepared site planning documents for the Peak 8 base area (specific to Chair 7 re-grade and the Peak 8 Fun Park in 2009), halfpipe grading projects for Freeway Terrain Park (2008–2010), and the Peak 8 SuperConnect to T-Bar re-grading project (2004). SE Group has also been involved in NEPA and planning projects at all other Vail Resorts ski areas. A disclosure of those projects is contained in the Project File.

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B. AGENCIES, ORGANIZATIONS, TRIBAL GOVERNMENTS, AND PERSONS CONTACTED

FEDERAL GOVERNMENT

US Army Corps of Engineers
US Environmental Protection Agency
US Fish and Wildlife Service

TRIBAL GOVERNMENT

Southern Ute Indian Tribe
Ute Indian Tribe
Ute Mountain Indian Tribe

STATE GOVERNMENT

Colorado Department of Transportation
Colorado Department of Natural Resources
Colorado Division of Water Resources
Colorado Division of Wildlife
State Historic Preservation Office (SHPO)

LOCAL GOVERNMENT

Summit County Government
Town of Breckenridge

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Chapter 5
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Chapter 7

Glossary

7. GLOSSARY

Ability level: The relative rank of a skier or snowboarder, or the relative rank given to alpine terrain. The six ability levels are as follows: Beginner, Novice, Low-Intermediate, Intermediate, Advanced-Intermediate, and Expert.

Acre foot: The amount of water necessary to cover 1 acre to a depth of 1 foot; equals 43,560 cubic feet or 325,851 gallons.

Action alternatives: Any alternative that includes upgrading and/or expansion of existing winter and summer recreational development within the area.

Affected environment: The physical, biological, social, and economic environment that would or may be changed by actions proposed and the relationship of people to that environment.

Airshed: A geographical area that, because of topography, meteorology, and climate, shares the same air. The Clean Air Act establishes three air quality classes (I, II, and III), each with defined air quality standards.

> **Class I airsheds** are areas designated for the most stringent degree for protection from future degradation of air quality.
>
> **Class II airsheds** are areas where a moderate amount of development could occur.
>
> **Class III airsheds** are areas where significant development could occur as long as National Ambient Air Quality Standards are not exceeded.

Alternative: One of several conceptual development plans described and evaluated in the EIS.

Annual Average Daily Traffic (AADT): Annual average two-way daily traffic volume represents the total traffic on a section of roadway for the year, divided by 365. It includes both weekday and weekend traffic volumes.

Army Corps of Engineers (USACE): The federal agency charged with enforcing the Clean Water Act by regulation of dredge and fill activities in waters of the United States, including wetlands.

Artifact: A simple object (such as a tool or ornament) showing early human workmanship or modifications.

Assessment area: The geographical area and/or physical, biological, and social environments which are analyzed for specific resources in the EIS.

Average Daily Traffic (ADT): Average daily two-way traffic volume represents the total traffic on a section of roadway for a given day or sampling period, but not necessarily for a given year. It is equivalent to VPD, defined below.

Backcountry access point: Signed locations along the ski area operational boundary where it is permitted to leave the maintained terrain of the resort to enter unmaintained terrain outside the operational boundary.

Backcountry terrain: All terrain that is beyond the ski area operational boundary (defined below). Within this DEIS, backcountry terrain is described both within and beyond the ski area special use permit boundary (defined below). Backcountry terrain offers an undeveloped, unmaintained experience with the feeling of solitude.

Background: A landscape viewing area visible to a viewer from approximately 3 to 5 miles to infinity. Also, in economics, naturally occurring; uninduced.

Baseline condition: The existing dynamic conditions prior to development, against which potential effects are judged.

Best Management Practices (BMPs): Methods, measures, and practices specifically adopted for local conditions that minimize or avoid impacts to resources. BMPs include, but are not limited to, construction practices, structural and nonstructural controls, operations protocol, and maintenance procedures.

Biodiversity: The variety of biotic communities, species, and genes and their interaction with ecological processes and functions, within ecosystems and across landscapes. The number of species present is the basic unit of measurement. More complex measurements also exist.

Biological Evaluation: An evaluation conducted to determine whether a proposed action is likely to affect any species which are listed as sensitive (USFS), candidate (USFS), or other special designations.

CO_2e: The carbon dioxide equivalent is a metric used to compare the emissions from various greenhouse gases based upon their global warming potential.

Candidate species: Those plant and animal species that, in the opinion of the U.S. Fish and Wildlife Service, may become threatened or endangered. Not protected under the Endangered Species Act.

Canopy: The more-or-less continuous cover of leaves, needles and/or branches collectively formed by the crowns of adjacent trees in a stand or forest.

CDPHE: Colorado Department of Public Health and Environment. The State of Colorado Department responsible for overseeing water quality regulation within Colorado.

Clean Water Act: An act that was enacted by the U.S. Congress in 1977 to maintain and restore the chemical, physical, and biological integrity of the waters of the United States. This act was formerly known as the Federal Water Pollution Control Act (33 U.S.C. 1344).

Comfortable Carrying Capacity (CCC): Comfortable Carrying Capacity is a planning tool used to determine the optimum level of utilization that facilitates a pleasant recreational experience. This is a planning figure only and does not represent a regulatory cap on visitation. CCC is used to ensure that different aspects of a resort's facilities are designed to work in harmony, that capacities are equivalent across facilities, and sufficient to meet anticipated demand. CCC is based on factors such as vertical transport and trail capacities.

Consumptive use: Use of a resource that reduces the supply.

Cooperating agency: A federal agency, other than a lead agency, which has jurisdiction by law or special expertise with respect to any environmental impact associated with the proposed action or one of the alternatives. A state or local agency or an Indian tribe may be a cooperating agency with agreement from the lead agency.

Core season: The period when the ski area is fully functioning (i.e., all trails and lifts are operational). Normal natural snowfall combined with present snowmaking capabilities, do not typically allow the ski area to become fully operational until approximately December 20th each season. In addition, April typically experiences much lower than average visitation (averaging approximately 7,000 skier visits per day) due to BSR's reliance upon destination guests (who book vacations primarily within the Core Season) and warm temperatures in the Colorado Front Range (which cause day-visitors to begin pursuing warm weather interests). The Core Season is defined as December 20th to March 31st annually.

Corridor: A linear strip of land identified for the present or future location of transportation or utility rights-of-way within its boundaries. Also, a contiguous strip of habitat suitable to facilitate animal dispersal or migration.

Council on Environmental Quality (CEQ): An advisory council to the President established by the National Environmental Policy Act of 1969. It reviews federal programs for their effect on the environment, conducts environmental studies, and advises the President on environmental matters.

Cover: Vegetation used by wildlife for protection from predators and weather conditions, or in which to reproduce.

Cover density: Forest cover density is an index which theoretically ranges from zero to less than one. It references the capability of the stand or cover to integrate and utilize the energy input to transpire water.

Cover density represents the efficiency of the three-dimensional canopy system to respond to the energy input. It varies according to crown closure, vertical foliage distribution, species, season, and stocking.

Critical habitat: A formal designation pursuant to the Endangered Species Act which may be applied to a particular habitat that is essential to the life cycle of a given species, and if lost, would adversely affect that species. Critical habitat can have a less formal meaning when used outside the context of the Endangered Species Act.

Cubic feet per second (cfs): Unit measure of streamflow or discharge, equivalent to 449 gallons per minute or about 2 acre feet per day.

Cultural resource: Cultural resources are the tangible and intangible aspects of cultural systems, living and dead, that are valued by a given culture or contain information about the culture. Cultural resources include, but are not limited to sites, structures, buildings, districts, and objects associated with or representative of people, cultures, and human activities and events.

Cumulative impact: The impact on the environment which results from the incremental impact of the action when added to other past, present and reasonable foreseeable future actions regardless of what agency or person undertakes such other actions. Each increment from each project may not be noticeable but cumulative impacts may be noticeable when all increments are considered together.

Day Skier: Visitors that arrive in the morning to ski and drive back home at the end of the day (as opposed to a Destination Visitor).

Design Day: The Design Day is considered to be the level of visitation that is commonly experienced at a ski area and is used for planning and analysis purposes. For most destination resorts in the Colorado market, the Design Day visitation level is typically reflective of the visitation level on approximately the tenth busiest day of the season or approximately 75 to 80 percent of “Peak Day” visitation.

Destination Visitor: A visitor that stays overnight within the resort community (as opposed to a Day Skier).

Developed recreation site: An area with characteristics that enable to accommodate, or be used for intense recreation. Such sites are often enhanced to augment the recreational value. Improvements range from those designed to provide great comfort and convenience to the user to rudimentary improvements in isolated areas.

Developed terrain network: consists of its named, defined, lift-served, maintained (groomed) runs. These trails represent the baseline of the terrain at any resort, as they are where the majority of guests ski, and are usually the only place to ski during the early season, periods of poor or undesirable snow conditions, avalanche closures, and certain weather conditions.

Direct impact: An effect which occurs as a result of an action associated with implementing the proposal or one of the alternatives, including construction, operation, and maintenance.

Dispersed recreation: Recreation that occurs outside of a developed recreation site and includes such activities as scenic driving, hunting, backpacking, and recreation activities in primitive environments.

Distance zone: One of three categories used in the visual management system to divide a view into near and far components. The three categories are (1) foreground, (2) middleground, and (3) background. See individual entries.

District Ranger: The official responsible for administering the National Forest System lands on a Ranger District.

Diversity: The distribution and abundance of different plant and animal communities and species within the area covered by a land and resource management plan.

Ecosystem: The system formed by the interaction of a group of organisms and their environment, for example, marsh, watershed, or lake.

Effects: Results expected to be achieved from implementation of the alternatives relative to physical, biological, economic, and social factors. Effects can be direct, indirect, or cumulative and may be either beneficial or detrimental.

Endangered species: An official designation for any species of plant or animal that is in danger of extinction throughout all or a significant portion of its range. An endangered species must be designated in the Federal Register by the appropriate Federal Agency Secretary.

Environmental analysis: An analysis of alternative actions and their predictable short- and long-term environmental effects, which include physical, biological, economic, social and environmental design factors and their interactions.

Environmental Assessment (EA): A concise public document required by the regulations implementing the National Environmental Policy Act which briefly provides sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact.

Environmental Impact Statement (EIS): A disclosure document required by the National Environmental Policy Act (NEPA) that documents the anticipated environmental effects of a proposed action that may significantly affect the quality of the human environment.

Environmental Protection Agency (EPA): The federal agency charged with lead enforcement of multiple environmental laws, including review of Environmental Impact Statements.

Erosion: The detachment and movement of soil from the land surface by wind, water, ice, or gravity.

Erosion control: Materials, structure, and techniques designed to reduce erosion. Erosion control may include rapid revegetation, avoiding steep or highly erosive sites, and installation of cross-slope drainage structures.

Erosion hazard: Soil ratings to predict the erosion hazard or potential to be eroded.

Fall-line: The fall-line is defined as the path an object would naturally take as it descends a slope under the influence of gravity. Fall-line paths indicate the natural flow of potential trails, from the top of ridges to the elevations below. Fall-line terrain allows skiers and snowboarders to make equally weighted, left and right turns.

Finding of No Significant Impact (FONSI): A document that is prepared if the agency finds, in an environmental assessment, that the proposed action will not significantly affect the human environment. It must set forth the reasons for such a decision.

Forage: All browse and non-woody plants used for grazing or harvested for feeding livestock or game animals.

Forb: Any non-grass-like plant having little or no woody material on it. A palatable, broadleaved, flowering herb whose stem, above ground, does not become woody and persistent.

Foreground: The landscape area visible to an observer from the immediate area to 0.5 mile.

Forest Service: The agency of the United States Department of Agriculture responsible for managing National Forests and Grasslands.

Forest Supervisor: The official responsible for administering the National Forest System lands in a Forest Service administrative unit who reports to the Regional Forester.

Forest Plan: A comprehensive management plan prepared under the National Forest Management Act of 1976 that provides standards and guidelines for management activities specific to each National Forest. The WRNF Forest Plan was approved in 2002.

Full-Time Equivalent (FTEs): Sufficient work to keep one person employed full-time for one year. In seasonal industries one FTE may be represented by several employment positions.

GIS: Geographic information system, a computer mapping system composed of hardware and software.

Glades: Trees stands that are naturally thin, or have been thinned specifically in varying degrees to improve the skiing experience by increasing the spacing between individual trees. Stands with tree clearing to the extent that they can be groomed are described as "Groomable Glades."

GPS: Global Positioning System, a satellite-based surveying system

Gradient: The vertical distance divided by the horizontal distance, usually measured as percent. Gradient is used to describe streams and ski slopes.

Grading: the practice of moving or re-contouring earthen materials to achieve a specified slope in the landform.

Grooming: The preparation and smoothing of the developed trail network's snow surface, using large over-the-snow vehicles (commonly referred to as "snow cats" or "groomers"). Groomers are equipped with front-mounted blades to push snow and rear-mounted implements to flatten and/or till the snow to an the desired consistency.

Groundwater: Subsurface water in the part of the ground that is wholly saturated.

Guest Services Facilities or Guest Services: Facilities or services that are supplied by a resort – both on-mountain and at the base area – to accommodate guests' needs and to enhance the quality of the recreational experience. Examples of guest services facilities include: restaurants, warming huts, general information desks, resort lost and found departments, restrooms and lounges, ski school, daycare, public lockers and ski-check facilities, ski patrol, first aid clinics, etc.

Guideline: Is a preferred course of action designed by policy to achieve a goal, respond to variable site conditions, or respond to an overall condition.

Habitat: The sum of environmental conditions of a specific place that is occupied by an organism, a population, or a community.

Habitat type: A classification of the vegetation resource based on dominant growth forms. The forested areas are more specifically classified by the dominant tree species.

Hydric soils: Soils characterized by, or requiring an abundance of moisture, used in the identification of wetlands.

Impacts: See effects.

Indicator species: An animal species used to represent a group of species that utilize the same habitat. For monitoring purposes, the well being of the indicator species is assumed to reflect the general health of the community.

Indirect impact: Secondary consequences to the environment resulting from a direct impact. An example of an indirect impact is the deposition of sediment in a wetland resulting from surface disturbance in the upland.

Instream flow: The volume of surface water in a stream system passing a given point at a given time.

Interdisciplinary Team (ID Team): A group of individuals each representing specialty resource areas assembled to solve a problem or perform a task through frequent interaction so that different disciplines can combine to provide new solutions.

K-factor: A measure of soil erodibility based on soil texture, organic matter, structure and runoff potential.

Legacy tree: Trees that have characteristics indicative of advanced age, including: very large diameter, taller than the surrounding canopy layer, rounded crown tops, non-conical shape and sparse foliage.

Lift-Line Wait Times: Time spent in lift lines throughout the course of the season.

Management Area 8.25: according to the 2002 Forest Plan, is administered for "winter sports activities and other intensively managed outdoor recreation opportunities for large numbers of national and international visitors in highly developed settings."

Management direction: A statement of multiple-use and other goals and objectives, the associated management prescriptions, and standards and guidelines for attaining them.

Management emphasis: Long-term management direction for a specific area or type of land.

Management indicator species (MIS): A representative group of species that are dependant of a specific habitat type. The health of an indicator species is used to gauge function of the habitat on which it depends.

Management practice: A specific activity, measure, course of action, or treatment.

Master Development Plan (MDP): A document that is required as a condition of the ski area term special use permit, designed to guide resort planning and development in the long- and short-term – typically across both public and private lands.

Middleground: The landscape area visible to a viewer from 0.5 mile to about 3 to 5 miles.

Mitigation: Actions taken to avoid, minimize, or compensate for adverse environmental impacts.

Mountain roads: On-mountain primary and secondary roads that provide summertime access to mountain buildings and lift terminal locations.

National Ambient Air Quality Standards (NAAQS): Established under the Clean Air Act of 1963, there are primary standards, designed to protect public health, and secondary standards, designed to protect public welfare from known or anticipated air pollutants.

National Environmental Policy Act (NEPA): A law enacted by Congress in 1969 that requires federal agencies to analyze the environmental effects of all major federal activities that may have a significant impact on the quality of the human environment.

National Forest Management Act (NFMA): A law passed in 1976 as an amendment to the Forest and Rangeland Renewable Resources Planning Act that requires the preparation of regulations to guide that development.

National Forest System (NFS) lands: National Forests, National Grasslands, and other related lands for which the Forest Service is assigned administrative responsibility.

National Historic Preservation Act (NHPA): An act that was enacted by the U.S. Congress in 1966 to protect historic sites and artifacts (16 U.S.C. 470). Section 106 of the Act requires consultation with members and representatives of Indian tribes.

National Register of Historic Places: A listing maintained by the National Park Service of areas which have been designated as historically significant. The register includes places of local and state significance, as well as those of value to the nation in general.

No action alternative: The management direction, activities, outputs, and effects that are likely to exist in the future if the current trends and management would continue unchanged. Under NEPA, it means following the current approved Forest Plan management direction and guidance.

Objective: A concise, time-specific statement of measurable planned results that respond to pre-established goals. An objective forms the basis for further planning to define the precise steps to be taken and the resources to be used in achieving identified goals.

Off-piste: refers to skiing terrain that is left in a natural Alpine snow condition, receives very infrequent grooming (if any) and presents natural, variable surface conditions and textures.

Particulates: Small particles suspended in the air and generally considered pollutants.

Peak Day Visitation: Days during which skier visitation exceeds the CCC by as much as 25 percent.

Piste: a term borrowed from French vernacular meaning skiing terrain that provides a traditional, groomed, prepared sliding surface.

Pod: a lift and all of the terrain that is serviced by that lift.

Preferred alternative: The alternative selected from the range of alternatives which is favored by the lead agency.

Project area: The area encompassed by the development proposal including base area and the permit area.

Project Design Criteria: Specific measures designed to minimize or avoid impacts anticipated to occur as a result of implementation of the action alternatives. PDC are incorporated within the proposal of specified action alternatives.

Record of Decision (ROD): A document prepared within 30 days after the final EIS is issued which states the agency's decision and why one alternative was favored over another, what factors entered into the agency's decision, and whether all practicable means to avoid or minimize environmental harm have been adopted, and if not, why not.

Revegetation: The re-establishment and development of self-sustaining plant cover. On disturbed sites, this normally requires human assistance such as seedbed preparation, reseeding, and mulching.

Revegetation potential: The ability or capacity of a site to be revegetated after a disturbance, which often depends on the quantity and quality of topsoil remaining in place.

Rilling: Erosion by concentrated overland flow.

Riparian habitat or area: Land situated along the bank of a stream or other body of water and directly influenced by the presence of water (e.g., streamsides, lake shores, etc).

Risk Susceptibility: As it pertains to lodgepole pine mortality due to mountain pine beetle, risk susceptibility is determined by three risk factors: elevation, latitude and average age of a lodgepole pine stand. Stands are assigned risk factor values of 1, 2, or 3, depending upon the stand conditions for each risk factor. The three risk factor scores are then multiplied together to arrive at a final ‘risk susceptibility’ score (ranging from 1-27). If the product of the three scores equals: 1-9 the overall risk is considered Low; 12-18 the overall risk is considered Moderate; and 19-27 the overall risk is considered high.

Scenic Integrity: State of naturalness or, conversely, the state of disturbance created by human activities or alteration. Integrity is stated in degrees of deviation for the existing landscape character in a national forest.

Scenic Integrity Objectives (SIOs): The objectives that define the minimum level to which landscapes are to be managed from an aesthetics standpoint. There are five objectives that describe the landscape in varying degrees from naturalness: Very High (Unaltered), High (Appears Unaltered), Moderate (Slightly Altered), Low (Moderately Altered), Very Low (Heavily Altered).

Scenery management: The art and science of arranging, planning and designing landscape attributes relative to the appearance of places and expanses in outdoor settings.

Scoping process: A process that determines the issues, concerns, and opportunities which should be considered in analyzing the impacts of a proposal by receiving input from the public and affected agencies. The depths of analysis for these issues identified are determined during scoping.

Sediment: Solid material, both organic and mineral, that has been transported from its site of origin by air, water, or ice.

Sensitive species: Species which have appeared in the Federal Register as proposed additions to the endangered or threatened species list; those which are on an official State list or are recognized by the Regional Forester to need special management in order to prevent them from becoming endangered or threatened.

Short-Term: In this analysis, short-term describes the period from construction up to five years after project completion.

Significant impact: A somewhat subjective judgement based on the context and intensity of the impact. Generally, a significant impact is one that exceeds a standard, guideline, law, or regulation.

Ski Area Operational Boundary: Within the SUP boundary, the boundary which defines the current extent to which ski patrol conducts snow safety activities and maintains a presence. The ski area operational boundary includes developed (i.e., maintained) and undeveloped (i.e., hike-to and off-piste) terrain.

Skier: At ski areas, one may see people using Alpine, snowboard, telemark, cross-country, and other specialized ski equipment, such as that used by disabled or other skiers. Accordingly, the terms “ski, skier, and skiing” in this document encompass all lift-served sliding sports typically associated with a winter sports resort.

Skier circulation: How guests navigate throughout a ski area; specifically, how a guest would migrate from one side of the ski area to the other and potentially back again.

Skier visit: One skier utilizing the ski area for any length of time; a skier visit is typically recorded as a ticket scan. Regardless of how many times a single ticket is scanned, it counts a one skier visit.

Soil: A dynamic natural body on the surface of the earth in which plants grow, composed of mineral and organic materials and living forms.

Soil productivity: The capacity of a soil for producing plant biomass under a specific system of management. It is expressed in terms of volume or weight/unit area/year.

Special Use Permit (SUP): A legal document, similar to a lease, issued by the U.S. Forest Service. These permits are issued to private individuals or corporations to conduct commercial operations on National Forest System lands. They specify the terms and conditions under which the permitted activity may be conducted.

Special use permit area: That area of National Forest lands encompassed within the permit boundary held by Breckenridge Ski Resort and designated for recreational use (e.g., downhill skiing and Nordic skiing). Excludes private land.

Special use permit boundary: The extent of the special use permit area, within which Breckenridge Ski Resort is permitted to provide operational facilities and guest services.

Stand: A community of trees or other vegetation, which is sufficiently uniform in composition, constitution, age, spatial arrangement, or condition to be distinguishable from adjacent communities and to thus, form a management entity.

Study area: The geographical area that was analyzed to predict the possible effect that may be associated with proposed alternatives. This area varies depending on the resource, but often coincides with the special use permit boundary.

Standard: a course of action which must be followed; adherence is mandatory.

Task Force: Members from BSR, Town of Breckenridge, Summit County, and the Breckenridge business community assembled in 2008 to identify social issues that BSR, the Town and County, and business community share with respect to growth, and to identify a process for dealing with these issues in a comprehensive manner.

Threatened species: Any species which is likely to become an endangered species within the foreseeable future and which has been designated in the Federal Register as a threatened species.

Trail density: The number of skiers per acre on any trail at one time.

Understory: Low-growing vegetation (herbaceous, brush or reproduction) growing under a stand of trees. Also, that portion of trees in a forest stand below the overstory.

U.S. Fish and Wildlife Service (USFWS): The agency of the Department of the Interior responsible for managing wildlife, including non-ocean going species protected by the Endangered Species Act.

Vehicles Per Day (VPD): The total two-way daily traffic volume on a section of roadway.

Vehicle trips: The number of times vehicles use a segment of road.

Visual resource: The composite of basic terrain, geologic features, water features, vegetative patterns, and land use effects that typify a land unit and influence the visual appeal the unit may have for visitors.

Water rights: The legal right to use water.

Watershed: The entire area that contributes water to a drainage system or stream.

WCPH: Watershed Conservation Practices Handbook. A Forest Service Region 2 manual suggesting design criteria and guidelines for watershed projects.

WEPP: Water Erosion Prediction Project. A computer erosion model developed by the USDA Agricultural Research service (ARS) in cooperation with the Forest Service to model the physical processes involved in soil erosion mechanics, to produce erosion estimates.

Wilderness: Under the 1964 Wilderness Act, wilderness is undeveloped federal land retaining its primeval character and influence without permanent improvements of human habitation. It is protected and managed so to preserve its natural conditions.

Winter range: That part of the home range of a species where 90 percent of the individuals are located during the winter at least five out of ten winters.

WIZ (Water Influence Zone): The land next to water bodies where vegetation plays a major role in sustaining long-term integrity of aquatic systems. It includes the geomorphic floodplain (valley bottom), riparian ecosystem, and inner gorge. Its minimum horizontal width (from top of each bank) is 100 feet or the mean height of mature dominant late-seral vegetation, whichever is most.

WRENSS: The Environmental Protection Agency's Handbook *An Approach to Water Resources Evaluation of Non-Point Silvicultural Sources* (WRENSS).

Yo-Yo skiing: Utilizing the developed lift network to gain access to sidecountry or backcountry terrain, skiing the unpatrolled, unmaintained terrain, and returning to the developed ski area and repeating the process.

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