1997

Environmental Assessment Brian Head Resort Master Development Plan

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Environmental Assessment

Brian Head Resort
Master Development Plan

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File Code: 1950/2720
Date: June 20, 1997

Dear Interested Citizen:

The Dixie National Forest is proposing to issue a decision that approves a Master Development Plan for the Brian Head Resort. In addition to approving the Master Development Plan, the decision would also allow Brian Head Resort to proceed with some site specific additions and/or changes in their facilities. The purpose of this effort is to provide for the orderly development and management of the Brian Head Resort in a manner that will help meet the winter and summer recreation demands of the general public and provide a reasonable business opportunity for resort owners. These objectives must be met in a way that complies with applicable laws and is sensitive to the National Forest resources.

The environmental analysis for this project is documented in the enclosed Environmental Assessment for Brian Head Resort Master Development Plan. It discloses the effects that the Proposed Action, the No Action, and Alternative B would have on the resources within the project area. It must be noted that the Proposed Action represents some changes from the Action that was originally presented for scoping in our letter of February 21, 1996. The reason for these changes is that, as the Master Development Plan progressed, some items were modified due to physical and/or economic restraints. By making these modifications in the Proposed Action, it presents a clearer portrayal, to the public, of how processing of the Master Development has evolved a slightly different version of the decision to be made.

We have identified the Proposed Action as the "Agency's Preferred Alternative". For a complete description of the Proposed Action, and mitigation measures which would be required, refer to the EA, Chapter 2, beginning on page 2-1.

To ensure that we understand any concerns that you may have with this project, we are providing you with the opportunity to review this Environmental Assessment and to provide comments to us regarding it's content.

When submitting comments on this project, please include:
1. Your name, address, and phone number
2. The title of the document (Brian Head Resort Master Development Plan)
3. Specific facts or comments, along with supporting reasons, that you believe Forest Supervisor Hugh Thompson should consider in reaching a decision.

Comments should be submitted to Forest Supervisor Hugh Thompson, P.O. Box 0627, Cedar City, UT 84721-0627.

Comments must be received, or postmarked, no later than July 21, 1997, which is 30 days following the June 22, 1997 publication of the legal notice of this comment period in The Daily Spectrum newspaper of southern Utah.

Comments submitted, as well as the names and addresses of those who comment, are considered part of the public record and will be released if requested under the Freedom of Information Act.

There will also be an open house held at Parowan High School on July 10, 1997 at 7:30 PM. The purpose of this open house will be to answer questions and solicit and receive comments related to this proposal.

Following this comment period and the open house, we will evaluate the responses, and issue a final decision on this proposal. We will consider changes to the enclosed document and/or the Agency's Preferred Alternative if errors or omission in fact or analysis surface during the comment period.

If you need additional information, or would like to meet with us to discuss this project prior to your submission of comments, please contact Kent Traveller or Mike Martin at the Dixie National Forest, P.O. Box 0627, 80 N. 100 E., Cedar City, Utah 84721-0627, or by phone at (801) 865-3200.

Thank you for your continued interest in this project.

Sincerely,

[Signature]

Hugh C. Thompson
Forest Supervisor

Enclosure

KWT/kf

Caring for the Land and Serving People
Pre-Decisional Environmental Assessment

Brian Head Resort
Master Development Plan

Dixie National Forest
Cedar City Ranger District

Iron County, Utah
1997

Lead Agency:
USDA Forest Service

Responsible Official:
Hugh C. Thompson
Forest Supervisor
Dixie National Forest

For Further Information, Contact:
Ronald S. Wilson
District Ranger
Cedar City Ranger District
P.O. Box 0627
Cedar City, UT 84721-0627
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ABSTRACT

This Pre-Decisional Environmental Assessment documents the analysis of the Proposed Action, one action alternative, and the No Action alternative developed for the Brian Head Resort Master Development Plan Project Area. The Proposed Action and action alternatives considered in detail are consistent with current management direction. Each alternative responds differently to the issues associated with the Proposed Action.

The Proposed Action would provide for the acceptance of the Brian Head Resort Master Development Plan (MDP) Proposal that provides for changes to existing facilities and for additional facilities intended to promote the long term viability and use of the committed public and private resources at Brian Head. The proposed MDP provides for interconnection of Navajo and Giant Steps terrain for all abilities of skiers. Additional intermediate and expert ski facilities to provide balance with market segments. Permit boundary amendments adding 331 acres to the existing 403 acre Dixie National Forest Special Use Permit bringing the total to 738 acres to provide for MDP elements. Various lift, trail, snowmaking, and other guest facilities projects to improve quality and to provide services in balance with need. The proposed MDP accommodates approximately 272,000 skiers per year, and an average daily capacity of 4,791 skiers (skiers at one time). The Brian Head ski terrain involves the commitment of both private and public lands. Currently, about 60% of the ski area is on private lands. The remaining 40% is on public lands. This MDP would change the mix to about 56% private and 44% public.

The agency has identified the Proposed Action as the Preferred Alternative.

Comments must be received by JULY 15, 1997.
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CHAPTER I
PURPOSE OF AND NEED FOR ACTION

INTRODUCTION

Brian Head Resort has presented the Dixie National Forest with a proposal to develop and expand winter and summer recreation opportunities, as identified in the Brian Head Resort Master Development Plan (MDP). The MDP provides for changes to existing facilities and for additional facilities intended to promote the long term viability and use of the committed public and private resources at Brian Head. The proposed project would provide for additional intermediate and expert ski facilities to provide balance with market segments, amend the existing Special Use Permit to accommodate MDP elements, lift modifications, trails, other guest facility projects to improve quality, and provide services in balance with need.

This chapter summarizes the Proposed Action, and the Purpose and Need that drove its development. It also discusses the relationship of this document to the Dixie National Forest Land Resource Management Plan (DNFRMP, 1986).

BRIAN HEAD RESORT BACKGROUND

Brian Head Resort (ski area) is a private enterprise owned by Brian Head Ski, Ltd. and adjacent lands owned by Brian Head Resorts, Ltd., and is operated through the corporate general partner (Resort). The ski area is located both on private lands within and around the Town of Brian Head (Town), and on adjacent Dixie National Forest, Cedar City Ranger District lands under Winter Sports Site, Special Use Permit.

The availability of Dixie National Forest Lands is a critical element in the quality and variety of the Brian Head ski area. The public/private partnership between the USFS and private enterprise has provided ski area recreation amenities for use by the public while carefully managing the resource.

The ski area began operations in 1964 with the installation of a rope tow lift on the northeast side of Navajo Mountain for the purpose of downhill skiing. Later operations were expanded onto the Giant Steps terrain. With the 1984 development of the Navajo Lodge Base as a principal lower ability ski product, the Resort continues to operate two functionally separate ski facilities on opposite sides of the Town and Highway 143. Shoshone Lift 1 was removed in 1992 when the lift equipment became mechanically unsafe. With the ski operations under one owner, Brian Head Resort is presented with the opportunity to prepare a complete MDP to guide the future development of the resort.

Destination markets for Brian Head include Las Vegas, Nevada (3 hours southwest) and southern California. The local markets include the Utah communities of Parowan (115 minutes north), Cedar City (30 minutes west), and St. George (1 hour 15 minutes southwest). Other smaller markets include guests from Arizona, and the Utah Wasatch Front. All weather access from Interstate 15

and Parowan is south via State Route 143. Access from Cedar City is also from the east on State Route 14 and then north on State Route 148 (subject to winter closure) and State Route 143. Brian Head Town was incorporated in 1975, beginning an evolution from a resort to a community.

PROJECT AREA

Brian Head Resort, representing the project area is located, within the Dixie National Forest, Cedar City Ranger District, and private lands in Brian Head, Utah. It is approximately 9 miles south of Parowan, Utah, on Highway 143, and is immediately adjacent to the Town of Brian Head, Utah. See Figure 1-1 for additional detail about the project area location.

The 738 acre project is located in the upper drainage of the Parowan watershed. Elevations range from 9,500 feet in the west side of the project area to 11,200 feet on Brian Head Peak on the southeast side of the project area. The forest type is Engelmann Spruce/subalpine fir, with a strong component of aspen. The forested areas are interspersed with meadows, rocky chutes, and talus slopes. Of the 3,800 acres designated as Management Area IB - Winter Sports Site (DNFRMP, 1986), 405 acres are currently under a Winter Sports Special Use Permit issued to Brian Head Resort, Inc. Downhill skiing has been the predominate use of the mountain, however, over the last five years an increasing number of snowboarders are utilizing the winter sports facilities. Additionally, the Resorts summer operating season is being extended with the rapid growth in the mountain bike industry.

Utah State Highway 143 runs through the middle of the project area connecting Cedar Breaks National Monument with the Town of Brian Head. Legal descriptions for the project area include all or part of Sections 1, 3, 10, 11 and 12 of Township 36 South, Range 8 West, Salt Lake Base Meridian, Iron County, Utah.

SUMMARY OF PROPOSED ACTION

The Brian Head Resort MDP Proposal provides for changes to existing facilities and for additional facilities intended to promote the long term viability and use of the committed public and private resources at Brian Head. The proposed MDP would provide for additional facilities necessary to support increased skier capacities, link both the Navajo and Giant Steps sides of the Resort, provide terrain and ski facilities to balance with market segments, and amend the existing Special Use Permit to incorporate MDP elements.

Outlined in the Proposed Action are guest facilities projects to improve quality and to provide service in balance with need. The MDP build-out capacity is designed to support 272-129 skiers per year. This capacity is based on an average winter season of approximately 142 days/year. Developing for this level of use several lift and trail projects are proposed. Paramount is the establishment of an Interconnect Lift between the Navajo and Giant Steps side of the Resort.

To increase Brian Head Resort's competitive position for winter sports use, a terrain balance must be achieved between beginner, intermediate, and advanced skiing opportunities. Currently, Brian Head Resort is long on beginner and intermediate and short on advanced terrain. The MDP
identifies potential areas for advanced skiing, primarily within the Brian Head Peak North Bowl area.

Additionally, to accommodate increases in skier demand guest services, parking, food services, and lodging-warming areas are proposed in the MDP. These elements are consistent with the identified capacities. Furthermore, mountain operations, roads, snow making, and avalanche control work are addressed.

Finally, to facilitate the elements identified in the MDP the Brian Head Resort Special Use Permit boundary would be enlarged to incorporate the proposed use. The current size of the permit is 405 acres. Under this proposal the permit size would increase to 738 acres of National Forest lands.

PURPOSE AND NEED FOR THIS PROJECT

The Purpose and Need (and the primary Goal) of this MDP are to promote the sustained and prosperous use of the committed resources at Brian Head by providing high quality recreation products for guests, residents, and entrepreneurs. Brian Head represents a substantial commitment of both private and public resources. The existing perception of Brian Head as a small, beginner ski area conflicts with its existing resources and its long term viability and potential. The primary Goal of this MDP is to position Brian Head as a medium sized resort with a full range of services - but not so large as to overwhelm the "low-key" image valued by its guests and residents.

The Goals of this MDP are:

a. to support on the order of 250,000 skier-days/year, with a daily capacity below 6,900 SAOT (skiers at one time)
b. to interconnect Navajo and Giant Steps into an integrated ski area.
c. to provide additional intermediate and expert terrain in balance with area capacity.
d. to provide attractive amenities in balance with natural resources and to enhance year round tourism.

Consistent with industry seasonal utilization norms¹, the facilities of this MDP have a seasonal utilization within 9% of the targets as follows:

4.791 SAOT x 40% utilization rate x 142 days/season⁴, 272,129 skier-days/year.

272,129 skier-days/year (calculated)/250,000 Skier-days/year (goal) = 109%

The average daily capacity is calculated as 4,791 SAOT. During peak holiday periods such facilities will also accommodate about one third more users as is typical in the ski industry - yielding a peak capacity on the order of 6,388 SAOT. Both average and peak capacity are within the USFS maximum of 6,900 SAOT.

¹ In practice, successful ski areas achieve Season Utilization Goals of about 40 ± 10% of the daily capacity times the number of days in the season.
² Average operating days 1992/93 through 1995/96: 142 days/season

A primary Objective of the MDP is to interconnect Navajo and Giant Steps ski terrain. The interconnect is the key feature needed to change the perception of Brian Head from one of two, small separate ski areas to a unified mid-sized full service resort and to utilize the existing facilities better. When and if realized, the Interconnect achieves several additional benefits:

a. integrates both sides of the mountain for all ability skiers;
b. allows families or groups of differing ski ability to get together (lunch, etc.);
c. brings existing developed ski terrain at Shoshone Chair 1 back into full use;
d. re-energizes the private commercial facilities at the base of Chair 1;
e. markedly improves ski-to/ski-from access to residential bed base;
f. reduces the need for expensive, quality negative surface (bus/van) transportation;
g. reduces overnight guest use of day parking;
h. improves property values; and
i. the proposed placement of lifts, skier bridge, skiways, and trails also eliminates realignment of Highway 143.

The other primary Objective of the MDP is to address ski terrain issues. Currently Brian Head has a general shortage of developed ski trail terrain in comparison with lift capacity. While there is an abundance of beginner terrain which will persist through this planned build-out, there is a shortfall of intermediate, and especially expert terrain, which the MDP corrects. Much of the intermediate shortfall can be accommodated within the existing Permit Bound ry. Much of the expert terrain to be added is in the Brian Head Bowl area for which a Permit Boundary Amendment is proposed.

Other Objectives are to improve and upgrade lift and other ski service elements in keeping with the goals and other objectives of the MDP. Lift projects include relocation of terminals for better skier circulation; equipment changes for capacity adjustment; and replacement of older equipment. Additional restaurant space and parking will be built as skier demands dictate.

STATEMENT ABOUT RESOURCE PROTECTION

The Dixie National Forest is charged with the wise stewardship of the natural resources within the 1.9 million acres designated as National Forest. Brian Head Resort, Inc. operates on 405 acres of the Dixie National Forest under a winter sports special use permit. Protecting valuable natural resources is paramount in all projects occurring on Resort and National Forest lands.

Legally, the Forest is mandated with upholding the National Environmental Policy Act, 1970, National Forest Management Act, 1976, and several other key pieces of legislation specifically designed to protect the environment. However, concurrently the Dixie National Forest is responsible for providing quality recreational opportunities to the public that they serve.

Within the parameters of the Brian Head Resort/Forest Service partnership is the commitment of protecting and enhancing the environment while providing a quality recreational experience. Activities impacting hydrology, wildlife, vegetation, soils, wetlands, quality, recreation, visuals, social economics, cultural resources, or fisheries must be evaluated to determine the direct and indirect environmental effects. To reduce unacceptable impacts to the resource, best management practices, soil and water conservation practices, and other site specific mitigation
measures may be applied to individual projects. Additionally, applicable Standards and Guidelines identified in the Dixie National Forest Land Resource Management Plan are applied to all projects occurring on National Forest lands.

The intent of Brian Head Resort and the Dixie National Forest to protect and improve resource conditions within the Winter Sports Management Area. Projects occurring within this area will be designed to protect the integrity of the resource. The Forest Service is ultimately responsible for the resource condition within the special user permit area. However, the Forest Service and Brian Head Resort will work together to insure a healthy ecosystem.

FOREST SERVICE GOALS AND OBJECTIVES

The MDP incorporates the following USFS Objectives:

1. To develop a Winter Sports Master Development Plan for expansion of Brian Head Resort in cooperation with the USDA, Forest Service, that will provide a quality recreational experience, financial opportunities, and community growth, while protecting the environment.

2. Focus ski area development on the Dixie National Forest within the Brian Head area. Expansion in this area will be according to an accepted Master Development Plan.

3. Provide recreation opportunities that are available to all segments of the public. This includes universal access for recreational activities and facilities as identified in the Americans with Disabilities Act, 1990.

4. Increase the utilization of Brian Head Resort by developing additional facilities to expand both winter and summer recreational opportunities offered at the resort.

5. Increase winter user capacity within the Brian Head Resort permit boundary up to 6,900 SAOT.

6. Promote nordic skiing through trail development where feasible, to enhance winter recreational opportunities offered to the public.

7. Increase Brian Head Resort’s competitive position for winter sports use through the addition of more intermediate and advanced terrain.

8. Enhance the partnership between Brian Head Resort and the Dixie National Forest through cooperative activities including interpretive signs, programs, and special events.

9. Provide for a visually pleasing landscape.

10. Design ski runs and lift lines that will blend into the existing environment through trail design, vegetation management and the use of existing openings. Buildings and structures on the Forest will be designed to complement features that exist naturally. Colors used on man-made structures will meet the safety requirements of a ski area and match colors found in the characteristic landscape.

11. Integrate ski area development and use with other resource management to provide healthy tree stands, vegetative diversity, forage production for wildlife, and opportunities for non-motorized recreation as identified in the DNFLRMP.

12. Minimize the environmental impacts of development through the use of prudent design, construction, and maintenance techniques that provide high quality recreation and which are sensitive to all resources, including: silviculture, cultural resources, visual, hydrologic, soils, air quality, cumulative effects, wetlands, habitat, wildlife, fisheries, and recreation.

13. Manage the ecosystem to ensure long-term vegetative cover, species diversity, restoration of native plants, and erosion control.

14. Minimize environmental impacts of past and future activities by restoring and enhancing key habitat wherever practical, e.g., soil erosion, stream channels, vegetation, wetlands, etc.

15. Continue to promote ski area development and use with other resource management to provide healthy tree stands, vegetative diversity, forage production for wildlife, and opportunities for non-motorized recreation as identified in the DNFLRMP.

16. Continue to provide multiple resource outputs in Municipal Watershed areas within the permit boundary without impairment of existing water quality or quantity utilized or potential culinary water spring sources.

INCORPORATION BY REFERENCE

In order to decrease the bulk and redundancy of this environmental assessment for the Brian Head Resort MDP analysis, this document will incorporate by reference (40 CFR 1502.21) recent previous analysis in the Cedar Mountain/Brian Head area on the Cedar City Ranger District. These documents include: the Spruce Ecosystem Recovery Project Environmental Assessment (1997), the Brian Head Recovery Project Final Environmental Impact Statement (1993), the Sidney Valley Recovery Project Environmental Assessment (1994), the Rainbow Meadows Recovery Project Environmental Assessment (1992), and the Brian Head Ski Area Snowmaking System Environmental Assessment (1994).

Where portions or sections of the Brian Head Resort MDP Environmental Assessment incorporate by reference one of the previously cited environmental analysis, the specific analysis and the specific information being incorporated shall be identified. The analysis and specific information being incorporated by reference and all appropriate literature citations used in the previous analysis would become part of this analysis. A copy of the incorporated documents may

Chapter 1 Purpose & Need
1-5

Chapter 1 Purpose & Need
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be requested from the Dixie National Forest at the Cedar City Ranger District, 82 North 100 East, P.O. Box 627, Cedar City, UT 84720-0627. Phone number (801) 865-3200.

RELATIONSHIP TO OTHER PLANNING DOCUMENTS

Both the Resort and the Town of Brian Head have undertaken master planning processes with a common goal to provide effective integrated planning to enhance the desirable lifestyle and nurture long term economic viability and stability of the community. Both plans guide the elements of this MDP.

Brian Head Town issued its amended Master Plan in August 1995. Its focus is on goals, description of underlying constraints and opportunities, and on policy. Brian Head Resort has prepared the Brian Head Resort Master Development Plan which is primarily project oriented.

While the two plans derive from separate responsibilities, the two plans are generally in close agreement regarding underlying goals and particular elements to achieve those goals. We believe that this MDP is consistent with the common goals, as well as being environmentally and economically responsible. Further, the Resort intends to work closely together with the agencies in these matters.

FOREST PLAN AMENDMENTS

A Dixie National Forest Land Resource Management Plan, Forest Plan Amendment is proposed in all action alternatives. The amendment redefines the Winter Sports 1B Management Area, and the Municipal Water Supply Watersheds 10B Management Area. At the time Management Areas 1B and 10B were developed for the DNFLRMP, assumptions were made about field conditions and they were not reflective of actual conditions. The Forest Plan Amendment is necessary to accurately reflect the management areas on the ground. All applicable Standards and Guidelines, Desired Future Conditions, and Goals & Objectives will not be amended at this time. The only correction will be the size and location of both management areas. A detailed description of the changes and proposed management area maps is located in Chapter 8 of this document.

FOREST PLAN DIRECTION


This analysis incorporates direction provided in the DNFLRMP (1986). The DNFLRMP, based on considerations addressed in the Final Environmental Impact Statement, guides natural resource management activities and has established Standards and Guidelines for management of the Dixie National Forest.

The Forest-wide Standards and Guidelines (S&G's) describe measures to be applied to all lands on the Dixie National Forest unless superseded by the specific management area S&G's. Implementation of the Forest-wide and specific management area S&G's would move the project area toward the "Desired Future Conditions" described in the DNFLRMP.

Management Area Standards and Guidelines describe measures to be applied to geographic subdivisions of the Forest, each with a different management emphasis. The DNFLRMP includes Standards and Guidelines for 19 different Management Areas (MA). Three management areas are represented in the Brian Head Resort Expansion project area:

(1) 1B - WINTER SPORTS SITES

This management area occurs in the Brian Head-Crystal Mountain area on the Cedar City Ranger District. The existing management area covers approximately 317 acres (78% of the project area) (DNFLRMP, pp IV-60 to IV-62). The proposed management area covers 439 acres (59% of the project area).

Desired Future Condition

Any ski area development on the Forest will remain in the Brian Head-Crystal Mountain area. All expansion in this area will be according to an accepted master development plan. Runs and lift lines will be blended into the existing environment through vegetation management and the use of existing openings. Buildings and structures will meet the safety requirements for a ski area and match colors found in the characteristic landscape.

(2) 2B - RURAL & ROADED RECREATION OPPORTUNITIES

This management area consists of travel corridors along major routes across the Forest or to specific recreational attractions on the Forest, including State Highway 143 and Brian Head Peak Lookout. It covers approximately 17 acres (16% of the project area) (DNFLRMP, pp IV-68 to IV-72). The proposed management area covers 0 acres (0% of the project area).

Desired Future Condition

This area is characterized by a modified natural environment. Resource modification and utilization practices usually harmonize with the natural environment. In some of the more modified zones within the area, utilization practices enhance recreation activities, maintain vegetative cover, and soil production. The opportunity to have a high degree of interaction with the natural environment and to face challenges associated with more primitive forms of recreation would not be important. Both motorized and non-motorized forms of recreation are possible in this area. The natural features of the landscape would dominate.
CHAPTER 2

ALTERNATIVES INCLUDING THE PROPOSED ACTION

INTRODUCTION

This chapter describes the Proposed Action and Alternatives to the Proposed Action developed to respond to Issues while still addressing the Purpose and Need identified in Chapter 1. As required by law, a "No Action Alternative" (continuing with existing conditions and activities) is considered. A summary of the consequences of each alternative is included at the end of this Chapter.

PUBLIC INVOLVEMENT

The Brian Head Resort Expansion Project is located adjacent to the Town of Brian Head, Utah, which contains approximately 130 year round residents and approximately 1,000 property owners. The residents and property owners retreat to Brian Head for both winter and summer recreation, solitude, and investment purposes. Additionally, Brian Head is a destination recreation resort for thousands of people each year (165,000 skier days in 1994/95, 135,000 in 1995/96). Due to the high volume of recreational use that the Brian Head area receives, the interest in the Brian Head Resort Expansion Project was expected to be substantial. Therefore, a Citizen Participation Plan was prepared to provide several opportunities for public involvement.

The Dixie National Forest, Cedar City Ranger District has taken the following actions to ensure opportunities for public comment and NEPA disclosure:

1. The first step in the public involvement process for the proposed project was to identify members of the public who could be affected by, or might have an interest in, the proposed project. A record of these individuals, area businesses, and agencies formulated the project mailing list (Project File, Exhibit 7).

2. Scoping letters were sent to approximately 850 people and organizations by way of a letter dated February 21, 1996. Recipients were informed about the Proposed Action, and kinds of decisions to be made. They were asked to comment on the Proposed Action and any alternatives to the Proposed Action. A record of these contacts, and the mailing list are found in the Project File, Exhibit 7.

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3. The Cedar City Ranger District received 71 written comments describing issues and concerns to the Proposed Action (Project File, Exhibit 8). The issues and other comments are addressed in Chapters 2, 3, and 4 and in the Project File.

4. On February 27, 1996, at the Brian Head Town Council monthly meeting, Kent W. Traveller, District Recreation & Lands Officer, and Michael A. Martin, Outdoor Recreation Planner presented information concerning NEPA/NFMA processes in relation to the Brian Head Resort Master Development Plan. Minutes from the meeting are located in the Project File, Exhibit 9.

5. During the scoping period an Open House was conducted at the Iron County Court House, 68 South 100 East, Parowan, Utah. The purpose of the February 29, 1996, meeting was to inform participants of the Proposed Action and provide the opportunity for people to ask questions and receive answers about the proposed project. Approximately 45 people attended this meeting. A record of their responses is located in the Project File, Exhibit 9.

6. News Clip on KUTV, "Brian Head Expansion," at 10:00 pm, March 2, 1996, broadcast concerning the Brian Head Resort Expansion Project. This clip reported the proposed expansion Brian Head Report and can be found in Project File, Exhibit 9.


10. Many telephone calls were received during the informal scoping period, relating to issues and concerns to the Proposed Action. A telephone log is included in the Project File, Exhibit 9.


13. A formal Open House will be conducted during the 30-day review period for the pre-decisional EA. The purpose of the Open House is to provide interested members of the public with the opportunity to speak with Forest Service Specialist about specific issues and concerns.

14. All written comments to the pre-decisional EA will be evaluated prior to the final decisions for the project.

ISSUES

The Brian Head Resort Master Development Plan, Interdisciplinary Team (IDT) met early in the planning process and identified a list of preliminary issues. These issues were directly related to the expansion proposal defined in the Brian Head Resort Master Development Plan including, visual impacts to the historic Civilian Conservation Corps. observation structure, visual impacts to the human recreation experience, disturbance to wildlife, and changes in the social economic trends within the Town of Brian Head, Utah.

Seventy-one responses to the request for comments were received from individuals, organizations and agencies. Based on their input, and on information provided by Forest Service Resource Specialist serving on the IDT, a list of two significant issues to be considered in the development and evaluation of alternatives were generated. The following is the list of significant issues:

SIGNIFICANT ISSUES THAT DROVE ALTERNATIVE DEVELOPMENT

A portion of the respondents to the scoping letter objected to the implementation of the proposed action. Their reasons varied, however, a segment of the respondents disapproved of the Bowl Lift in general, while others commented on the priority of the implementing the Bowl Lift (Chair 8) before Shoshone Lift (Chair 1). The proponents for Shoshone Lift argue that this lift should be the priority because this area has already been disturbed, utilities are present, and that the lift services popular "family" ski runs. Still others commented on, and proposed an interconnect lift to link Giant Steps with Navajo Mountain.

The issues defined below are those that other expansion options may be available to resolve, other than the No Action Alternative.

ISSUE 1: Relates to the Visual Effects of Implementing the Bowl Lift (Chair 8) and Shoshone Lift (Chair 1).

INTRODUCTION: Brian Head Peak, at an elevation of 11,307 feet above sea level, is the highest peak on the Cedar City Ranger District, and represents the dominate viewseshd in the project area.
Scenic quality is an integral part of the recreation experience and is highly sensitive to both natural and man-made intrusions on the landscape. Lift towers, cut slopes, linear ski runs, and access roads would jeopardize the integrity of the scenic quality and recreation experience within the project area.

ISSUE 1: Implementation of Brian Head Resorts Master Development Plan Proposal may affect the visual quality of the views within the Brian Head Basin and Cedar Breaks National Monument, due to the intrusion of lift towers, and the visual contrast created by cut slopes, ski runs, and access roads.

Comparison criteria for Issue 1: 1) Vcwshed Analysis.

ISSUE 2:
Relates to the Watershed Impacts of Implementing the Brian Head Resort Master Development Plan.

INTRODUCTION: The Town of Brian Head maintains two spring collection areas within and adjacent to the Brian Head Resort Master Development Plan Project Area on National Forest lands. Spring collection and recharge areas may be impacted as a result of construction activities associated with master plan elements. This may result in a short term impact to water quality. However, the overriding purpose of the Master Development Plan is to improve resource conditions, including water quality.

ISSUE 2: Implementation of the Master Development Plan elements may impact water quality through the construction of access roads, lift lines/towers, cleared ski runs, and other soil disturbing activities. This may result in a short-term impact to water quality, but a long-term improvement, as stabilization would occur over time.

Comparison criteria for Issue 2: 1) Acres Disturbed by construction activities.

ISSUE 3:
Relates to Wildlife Impacts Resulting from Implementation of the Brian Head Resort Master Development Plan.

INTRODUCTION: Brian Head Ski Area base facilities are located at an elevation of 9,600 feet above sea level. The proposed Bowl Lift would have an upper terminal location of 11,200 feet. Additionally, within four miles of the Project Area elevations drop to 7,500 feet within the Ashdown Wilderness. This diversity in elevation, within proximity of the Project Area, provides habitat for a wide range of wildlife and plant species. It is critical for the Forest Service to maintain habitat for listed and candidate species as identified in individual recovery plans. Therefore, recovery plans will be carried out and consultation with applicable agencies will occur if determined to be necessary.

ISSUE 3: Implementation of elements identified in the Brian Head Resort Master Development Plan may adversely impact unique species within, and in proximity to the Project Area.

Comparison criteria for Issue 3: 1) Level of disturbance to wildlife populations.

ALTERNATIVE DEVELOPMENT

Alternatives to the Proposed Action were developed to:

1. Meet the Purpose and Need for the project.
2. Consider a reasonable range of solutions for the issues.

The Brian Head Resort Master Development Plan, Interdisciplinary Team (IDT) developed a range of solutions to address each issue. After generating a range of solutions, alternatives were grouped and discussed. The result of this process is disclosed in the sections entitled ALTERNATIVES CONSIDERED BUT NOT STUDIED IN DETAIL, and ALTERNATIVES CONSIDERED IN DETAIL.

ALTERNATIVES CONSIDERED, BUT NOT STUDIED IN DETAIL

This section will identify alternatives that were not studied in detail, and the reasons for eliminating these alternatives.

1 - LOCATE THE BOWL LIFT (CHAIR 8) AT THE HEAD OF BRENT'S BIG BOWL
While this alternative would provide direct access to Brent's Big Bowl, it would dictate an uphill climb for people desiring to ski the chutes to the southwest. Additionally, this location would present increased visual impacts, as a longer section of the lift would be visible from the Town of Brian Head. In reviewing topography, the shelf atop Hour Glass chute provides the most advantageous location to Chair 8. The shelf is located just below the peak on the north side, and will act as a wind screen from the strong winds atop Brian Head Peak. Additionally, the proposed site is concealed from the view of the historic Civilian Conservation Corps structure, thus maintain the integrity of the National Historic Preservation Act 1966.
2 - REPLACE SHOSHONE LIFT (CHAIR 1) WITH BLACK FOOT (CHAIR 3)
Replacing Chair 1, by removing Chair 3 and installing it at the Chair 1 location, was considered by Brian Head Resort at the time Chair 1 was dismantled, and as an option during the Master Plan process. However, it was determined that removing Chair 3 and then installing it at the Chair 1 location would not be cost effective. Also, if this were to occur, a void would be left at Chair 3, which offers excellent beginner terrain for skiers moving to the Giant Steps side of the resort.

3. DEVELOP THE CRYSTAL MOUNTAIN AREA FOR ADDITIONAL INTERMEDIATE TERRAIN
This alternative was considered, but due to a lack of base facilities, accessible utilities, and private property ownership, it was not carried forward in the analysis process. Brian Head Resort, Inc. does not currently own critical sections of private property necessary for the development of skier services in the Crystal Mountain area.

4. EXPAND SNOW CAT OPERATIONS ATOP BRIAN HEAD PEAK
Offering snow cat skiing atop Brian Head Peak is a way that the Resort has assessed the demand for an extreme skiing experience. Currently, the demand is present. Unfortunately, snow cat skiing operations are not cost effective. Additionally, for an individual to ride the snow cat up, ski down, and return to the snow cat pickup point, it takes an average of 55 minutes. This time delay does not provide for a positive recreational experience. Therefore, alternatives to the cat skiing are being proposed.

ALTERNATIVES CONSIDERED IN DETAIL
This environmental assessment will describe three alternatives in detail. They are (1) The Proposed Action - Brian Head Resort Proposal; (2) No Action - Current Management; (3) Alternative A - Integrated Alternative

FEATURES COMMON TO ALL ACTION ALTERNATIVES

STANDARDS AND GUIDELINES
The action alternatives evaluated in this environmental assessment conform to direction provided in the DNFLRMP. All applicable Standards and Guidelines described by the DNFLRMP implemented as part of this project. DNFLRMP Standards and Guidelines for Management Area 1B, 2B and 10B, identified in Appendix 1, would become part of all action alternatives.

PROPOSED FOREST PLAN AMENDMENTS
Two Dixie National Forest Land Resource Management Plan - Forest Plan Amendments are proposed in all action alternatives. The amendments redefine the area and location of Winter Sports 1B Management Area, and the Municipal Water Supply Watersheds 10B Management Area. At the time Management Areas 1B and 10B were defined for the DNFLRMP, assumptions were made about field conditions and they were not reflective of the actual environment. The two Forest Plan Amendments are necessary to accurately reflect the management areas on the ground. All applicable Standards and Guidelines, Desire Future Conditions, and Goals & Objectives will not be amended at this time. The only changes will be with the size and location of both management areas. A detailed description of the changes and proposed management area maps are located in Chapter 8 of this document.

DESIGN CONCEPTS AND THEMES
Brian Head enjoys a marvelous natural setting of broad meadows in a narrow valley framed by mountain slopes blending both wooded and open ski slope areas. The slopes are capped with distinctive flat rock formations typical of this area. The profoundly beautiful Cedar Breaks National Monument lies to the south.

Visitors and residents appreciate Brian Head for its rural, friendly character and its immediacy with the natural setting and because Brian Head offers a low-key alternative to many of the big name resorts. This MDP provides resort amenities in scale and scope with the community. It retains the best of Brian Head's character while accommodating modest growth needed for long term viability.

Brian Head's ski area suitability is well established. Its uniquely high elevation generally assures snow cover for full ski season operations. Its natural snow quality and quantity rank third in all of Utah, and its high elevation produces ideal and reliable snow-making temperatures even in drought years.

The Resort recently developed its architectural design, color concept, and theme in coordination with Brian Head Town Design Guidelines as follows:
- Take advantage of, and build on the natural setting of Brian Head;
- Nurture a southwest alpine, rustic style, color palette, and continuity of appearance on structures and site furnishings;
- Preserve the low key, family orientation, and afford ability values of the Resort and the Town; and
- Avoid a glitzy, "plastic" image, and artificial "themes" (Victorian, Swiss, Post-Modern, etc.).

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DESIGN CRITERIA AND MITIGATION MEASURES COMMON TO ALL ACTION ALTERNATIVES

All Design Criteria and Mitigation Measures identified in this document are intended to represent the best management practices at the time of publishing. In the event that new technology emerges or best management practices evolve that meet the intent of the mitigation listed below, they may be substituted based upon Forest Service personnel concurrence.

Related to Soil/Hydrology:
The State of Utah's Water Quality Antidegradation Policy requires maintenance of water quality to protect existing instream Beneficial Uses on streams designated as Category 1 High Quality Waters. All surface waters geographically located within the outer boundaries of the Dixie National Forest whether public or private are considered Category 1 High Quality Waters. The Antidegradation Policy states that no new point source discharges of wastewater will be allowed, and nonpoint sources of waste shall be controlled through implementation of Best Management Practices (BMPs) or regulatory programs (Utah Division of Water Quality 1994). The State of Utah and USDA Forest Service have agreed through a 1993 Memorandum of Understanding to use Forest Plan Standard & Guidelines and the Forest Service Handbook (FSH) 2509.22 Soil & Water Conservation Practices (SWCPs) as the BMPs to meet the water quality protection elements of the Utah Nonpoint Source Management Plan. The following SWCPs are applicable to the Brian Head Lift Expansion Project, and were developed following the handbook. The SWCPs contain all the information necessary for the protection of soil and water resources.

SWCPs for this project are discussed in terms of their objectives, how they implemented in general, and their effectiveness where previously documented.

General Mitigation Measures and BMPs
- The exact location of ski runs will be agreed upon by Forest Service personnel with input from a Soil Scientist and Hydrologist.
- The amount of reshaping of ski slopes will be kept to a minimum. There will be no large cuts or excavation, and natural drainages will not be filled. All natural drainages will be preserved.
- No ground disturbing activities will occur within 50 feet of any intermittent or ephemeral channels, wetlands, seeps, or springs.
- All disturbed areas will be aggressively revegetated, using seed mixes approved by the Forest Service. If seeding is not successful, more aggressive techniques such as erosion control blanket will be used.
- 15-20 tons/acre of logging debris (slash) will be left on the glade skiing areas to improve water infiltration, protect the soil surface, and aid in vegetation reestablishment. The slash material must average between 3 and 10 inches in diameter.
- Topsoil will be stockpiled in areas where reshaping is needed. This topsoil will be placed back on the disturbed surface following reshaping.

- All cut and fill slopes and ski runs will be revegetated according to Forest Service recommendations.
- No disturbance shall take place within 100 feet of any municipal spring (State Law). Minimize disturbance within 1500 feet up gradient and 100 feet downgradient from municipal springs.
- No storage of petroleum products will be allowed within municipal watersheds.
- Road drainage and erosion control design must follow the guidelines outlined in: "Guides for controlling sediment from secondary logging roads" by Paul E. Packer and George F. Christensen, USDA Forest Service. A copy of this publication is available in the Supervisor's Office.
- Any roads used during winter or wet periods must be surfaced according to Forest Service specifications.
- Any areas that are compacted or disturbed during construction of roads, lift towers, ski runs, etc. will be rehabilitated and revegetated using appropriate methods such as rippin and seeding.
- Native seed mixes should be used on reseeding disturbed areas. All mixes must be approved by the Forest Service prior to seeding.
- No equipment will be allowed to operate within 50 feet of wetlands, seeps, or riparian areas. Trees cannot be removed from within 50 feet of wetlands, seeps, or riparian areas.
- Ground-disturbing activities will not occur on when soils are wet or very moist.

SWCP 11.02 Soil and Water Resource Monitoring and Evaluation

Objective: To determine the effects of land management activities on soil productivity and beneficial uses of water.

In order to determine what effects land management is having on soil and water resources, a comprehensive monitoring program should be implemented. The monitoring program should consist of a monitoring plan (to be updated every 5 years) that describes the objectives of the monitoring, and how those objectives will be met. Monitoring should take place annually and the results summarized in a annual report.

The watershed management plan (in the MDP) will contain a monitoring plan designed to evaluate the effects of land management in and around the resort area on soil and water resources.

SWCP 11.03 - Watershed Improvement Planning and Implementation

Objective: To improve degraded watershed conditions, to minimize soil erosion, and to improve water availability or quality.

In order to minimize cumulative watershed effects, degraded areas inside and outside the project area should be stabilized by appropriate methods such as revegetation and drainage improvement. Areas of degradation need to be identified, inventoried, and monitored prior to and following
corrective actions. Watershed improvement plans should be in place and implementation must begin prior to project implementation. This can be accomplished through implementation of the Watershed Management Plan in the MDP. To prevent or minimize cumulative watershed effects, watershed rehabilitation/improvement efforts must be commensurate with any proposed development.

SWCP 11.04 Floodplain Analysis and Evaluation

No activity should occur near the spring sources (upstream and downstream) in the municipal watershed areas adhering to the Utah Division of Drinking Water fencing requirements as follows: the spring collection area shall be fenced located 100 feet from all collection devices on land at an elevation equal to or higher than the collection device, and a distance of 15 feet from all collection devices on land at an elevation lower than the collection device. The elevation datum to be used is the surface elevation at the point of collection. The fence shall at least be stock tight (Utah Division of Drinking Water 1993). A special protection zone of 1500 feet up gradient from the municipal spring sources will be established (Dixie National Forest 1986). Trees can be removed from that special protection zone, but no storage of materials, spraying of chemicals, parking of vehicles, or landings will be allowed.

SWCP 11.07 - Oil and Hazardous Substance Spill Contingency

Objective: To prevent contamination of waters from accidental spills of fuels, lubricants, bitumens, raw sewage, wash water, and other harmful materials.

If the total oil or oil products storage exceeds 1320 gallons or if any single container exceeds a capacity of 660 gallons, the Purchaser shall prepare a SPCC plan which meets applicable EPA requirements (40 CFR 112) including certification by a registered professional engineer. Also if the purchaser maintains storage facilities of oil or oil products of any size, appropriate preventive measures will be taken to insure that any spill of such oil or oil products does not enter any stream or other waters of the United States. Examples of preventive measures are proper location outside Riparian Habitat Conservation Areas, liners, berms.

Select service and refueling areas well away from wet areas and surface watercourses (outside Riparian Habitat Conservation Areas) and use berms around such sites to contain spills.

SWCP 11.08 - Control of Activities Under Special Use Permit

Objective: To protect surface and subsurface soil and water resources from physical, chemical, and biological pollutants resulting from activities that are under Special Use Permit.

The Special Use Permit under which Brian Head Resort operates contains detailed conditions that must be met to continue operating. Brian Head Resort is required to conform to all State and local regulations governing water quality and sanitation.

SWCP 11.11 - Petroleum Storage and Delivery Facilities and Management

Objective: To protect surface and subsurface soil and water resources from petroleum fluid contamination resulting from leaking petroleum delivery systems and storage facilities.

Petroleum storage areas will be located and maintained in a manner that minimizes the potential for contamination of surface and subsurface soil and water resources.
SWCP 11.14 Management of Snow Survey Sites

Objective: To protect snow survey sites administered by the Natural Resources Conservation Service (NRCS).

If land management or land disturbing activities are to take place within 500 feet of a snow survey site, the NRCS must be contacted. Buffers widths and proper mitigation measures will be determined in the field by NRCS personnel.

SWCP 13.01 - Operating Seeding and Land Preparation Equipment on the Contour

Objective: To reduce compaction, soil erosion, and losses in soil productivity and to minimize sediment production and turbidity. This measure is implemented to provide a means of rapid infiltration and surface water detention, so that infiltration can take place. Disturbances that may occur on hillslopes as a result of heavy equipment operation must be aggressively rehabilitated by revegetation and/or installation of erosion control blanket.

SWCP 13.02 Slope Limitations for Tractor Operation

Objective: To reduce rill and sheet erosion on skid trails.

Tractor skidding will not be permitted on slopes greater than 30 percent.

SWCP 13.03 - Tractor Operation Excluded from Wetlands, Bogs, and Wet Meadows

Objective: Vehicular or skidding equipment will be excluded from wetlands, bogs, and wet meadows to limit erosion and sediment delivery to stream channels resulting from compaction, rutting, churning, and runoff concentration. Site-productivity of these sensitive areas will be maintained.

Springs, seeps, ponds, and other wet areas have been identified on the Critical Watershed Areas map for the project area. Bulldozers, tractors and skidders will not be allowed to enter these areas. This practice has been shown to be effective in protecting these areas since they are not be entered by ground-based equipment.

SWCP 13.04 - Revegetation of Surface Disturbed Areas

Objective: To protect soil productivity and water quality by establishing a vegetative cover on disturbed sites to prevent erosion.

Where soil has been severely disturbed by ground-moving equipment or other means, stabilization measures will be taken immediately to minimize soil loss. These measures include revegetation (using native species) and/or installation of erosion control matting.

SWCP 13.06 - Soil Moisture Limitations for Tractor Operation

Objective: This Forest Plan Standard & Guideline and SWCP is used to minimize soil compaction, puddling, rutting, and gullying with resultant sediment delivery to stream channels and loss of soil productivity from tractor and skidder operations.

A Forest Plan Standard & Guideline (p IV-40, item 5) directs the forest to curtail logging activities during periods of high soil moisture to minimize soil compaction and disturbance. Equipment shall not be operated when ground conditions are such that excessive damage will result. It is the responsibility of the Contracting Officer, Forest Service Representative, Timber Sale Administrator and Purchaser to monitor soil moisture conditions and shut down operations when soil moisture conditions are such that resource damage (detrimental compaction and puddling as defined in Soil Quality Standards FSH 2509.18) will occur. Operations can resume after the Contracting Officer, Forest Service Representative, and/or Timber Sale Administrator determines the ground has dried sufficiently for soil & water resource protection.

SWCP 14.08 Tractor Skidding Design

Objective: To minimize erosion and sedimentation and protect soil productivity by designing skid patterns to best fit the terrain and local conditions.

The design of skid trails and skid trail systems must be sensitive to soil and water resources. Factors such as slope, soil stability, aspect, vegetative cover should be considered in skid trail design. Sensitive areas such as meadows, and riparian areas should be avoided.

SWCP 14.12 Erosion Prevention and Control Measures During Timber Sale Operations

Objective: To ensure that the Purchaser’s operations are conducted in a way that minimizes soil erosion.

The Purchaser or the organization responsible for removing timber must be made aware of the applicable SWCPs. This can be accomplished by setting forth the Purchaser’s responsibilities in the timber sale contract.

SWCP 14.15 Erosion Control on Skid Trails

Objective: To protect soil productivity and water quality by minimizing erosion and sedimentation on skid trails.
Installation of erosion control structures are required on all skid trails, tractor roads, and temporary roads. Normally, the work involves constructing water bars (cross ditches), at appropriate locations, to drain water from the trails and prevent concentrated flow. The trails should also be seeded or covered with logging debris.

Objective: To introduce soil and water resource considerations into transportation planning.

**SWCP 15.02 - General Guidelines for the Location and Design of Roads and Trails**

Roads within forested watersheds are often the largest contributors of sediment. Roads having steep slopes, being heavily used, and located on steep slopes have the highest potential to produce sediment, and make it available for transport to streams. By paying close attention to erosion control and drainage on steep roads, the amount of sediment eroded from them can be reduced. The initial location and design of roads is critical in making erosion control successful.

Objective: To introduce soil and water resource considerations into Transportation Planning. To locate and design roads and trails with minimal soil and water resource impact while considering all design criteria.

Forest Plan Riparian Area Management Standards & Guidelines (p. IV-42) directs the forest to (5) locate and construct arterial and collector roads to maintain the basic natural condition and character of riparian areas. (A.) to locate roads outside of riparian areas except for stream crossings where other feasible alternatives do not exist, and (B.) select stream crossing points to minimize bank and channel disturbance.

Direction given in "Guides for Controlling Sediment from Secondary Logging Roads" (Packer and Christensen 1977), Reducing Erosional Impacts of Roads (Megahan 1977), and the Region 4 Technical Guide, "Erosion Prevention and Control on Timber Sale Areas" (USDA Forest Service 1981) will be used to minimize the effect of roads on watershed values. Four basic principles shall be considered collectively during location and design of roads to reduce overall erosion impacts.

1. Emphasize prevention over control. This relates to minimizing the location and extent of road projects, as well as their area of disturbance.

2. Avoid high erosion hazard areas. Fragile, unstable, sensitive, or special areas should be avoided. Early identification of these areas and flexibility in road standards to adjust to a particular site are important in preventing surface erosion. Areas which have been identified in the timber sale area are shown on the critical watershed area map in Appendix 2. In addition, smaller problem areas may exist which would be accommodated during road work. This would be done by identification of potential problems by the sale administrator and road contractor along with adjustment to avoid the resource problem. The contractor will be provided with information concerning erosion hazards and Soil and Water Conservation Practices he will be expected to use.
Roads and trails require a variety of erosion control measures. Many erosion control practices will not only protect water quality but also maintain road prism integrity, reduce maintenance costs, and improve traffic flow. Stabilization usually includes a combination of practices that promotes the reestablishment of vegetation on exposed slopes, provides physical protection to exposed surfaces, prevents the downslope movement of soil, or controls road drainage.

Since a newly constructed road is most susceptible to erosion from seasonal precipitation, the timing of erosion control practices is of primary concern. Those practices that can be accomplished concurrent with road construction shall be favored as a means of immediate protection of the water resource. To maximize effectiveness, erosion control measures must be in place and functional prior to seasonal precipitation or runoff.

Prior to the start of construction, the Purchaser shall submit a schedule for proposed erosion control work as required in the Standard Specifications. The Contracting Officer or Engineering Representative shall ensure that erosion control measures are implemented according to the approved schedule and are completed in an acceptable fashion. Field reviews by the Line Officer and/or Forest Engineer will identify any additional erosion control measures required to protect the streams that were not recognized during planning or design. Necessary correction measures shall be implemented immediately through normal administrative channels.

**SWCP 15.04 - Timing of Construction Activities**

**Objective:** To minimize erosion by conducting operations during minimal runoff periods.

Erosion and sedimentation to streams are directly related to runoff. Scheduling operations during periods when the probabilities for rain and runoff are low is an essential element of effective erosion control. Equipment shall not be operated when ground conditions are such that excessive impacts will result. Such conditions are identified by the Contracting Officer or Engineering Representative with assistance from technical resource staffs as needed. Temporary erosion control measures may be required to prevent, control, and mitigate erosion and sedimentation.

It is important to keep permanent erosion control work as current as practicable with ongoing operations. Construction of drainage facilities and performance of other contract work which will contribute to the control of erosion and sedimentation shall be carried out concurrent with earthwork operations or as soon thereafter as practicable. Limitation of the amount of area being graded at a site and any one time, and minimization of the time that an area is laid bare should be a consideration in contract preparation. Erosion control work must be kept current when road construction occurs outside the normal operating season.

**SWCP 15.06 - Mitigation of Surface Erosion and Stabilization of Slopes**

**Objective:** To minimize soil erosion from road cut slopes, fill slopes, skid trails, and travel ways.
drainage structure on it. This would vary from a culvert, ford, or cross drain depending on the site characteristics. Where the outlet of a drainage structure would be on a fill slope or unvegetated area, a rock apron or some other energy dissipator would be used to break up the force of the water before it causes erosion.

Roads should climb away from channel crossings in both directions so high water will not flow along the road surface. Surface sloped sections of the road if necessary to reduce sediment movement directly into the stream.

In addition to controlling water in the natural drains, water from precipitation falling and running off on the road surface must be directed so that erosion won't result. Road surfacing, rolling the grade, insloping, outsloping, and crowning would be used on roads in the timber sale area to control surface erosion related to roads.

Outsloping is the uniform grading of the surface of the road so that it slopes 2-5% toward the downhill side of the road. It is usually necessary to construct cross drains such as dips in the road surface of outsloped roads to help prevent erosion caused by water concentration in ruts. The spacing of these drains would depend on gradient and soil type of the road. More drains would be required for steeper gradients and easily eroded soils. Guidelines for the location and design of cross drains are found in "Reducing Erosional Impacts of Road" (Megahan 1977) and "Guides for Controlling Sediment from Secondary Logging Roads" (Packer and Christensen 1977). On road grades in excess of 10%, other surface drainage facilities besides dips, such as open-top drains or conveyor belt cross drains will be considered.

Insloping may be used on portions of permanent roads connected with the timber sale for control of roadway drainage. This practice would uniformly grade the road so that it slopes toward the uphill side of the road. On insloped roads, water draining from the road would be carried along the inside of the road in a ditch or on the road surface. The size of a ditch would be based on the gradient of the road and erodibility of the soil. Culverts and/or dips would be installed periodically to carry this water across the road. This water would not be released onto fill slopes. Culverts and dips would have outlets which are protected by rock or other types of splash basins to reduce the energy of emerging water.

Where drainageways are crossed, fords and culverts would be used. A straight section of channel is paramount to a good structure location. The grade of the culvert should be set on the average gradient of the stream channel. In some instances, sedimentation can be anticipated and culverts placed at a slightly steeper gradient than the average stream to produce self-cleaning culvert. The increased energy at the culvert outlet must be dissipated as the water leaves the culvert. Wherever drainageways are crossed, roads would climb away from these features in both directions so that high water would not flow along the road surface.

Additionally, it is recognized that during high intensity rainfalls and snow melt conditions, surface runoff concentrates and flows in linear depressions as well as established channels. Because of this, drainage emanating from these features must be considered as well. Where these features are intersected by the road, the road would be constructed to form a dip to conduct the water across the road. These dips would be hardened by road surfacing techniques to prevent erosion. Finally, road maintenance is an important part of controlling drainage on permanent roads. This will be addressed in SWCP 15.21 Maintenance of Roads.

These measures are expected to be effective in controlling drainage from permanent roads. They have been used on the Dixie National Forest for the construction of other timber sale roads. It has been observed on the Dixie National Forest that where maintenance is current and drainage control structures were properly installed and designed, road drainage is controlled and related erosion is mitigated.

SWCP 15.08 - Pioneer Road Construction

Objective: To minimize erosion, mass wasting, and sedimentation to streams associated with pioneer road construction.

1. Construction of pioneer roads shall be confined to the roadway construction limits unless approved by the Contracting Officer. Exceptions would not be allowed in natural watercourses.

2. Pioneering shall be conducted to prevent undercutting of designated final cut slopes, prevent deposition of materials outside designated roadway limits, and accommodate drainage with temporary culverts or log crossings unless approved otherwise.

3. Clearing would be done in advance of construction, not in conjunction. Slash would not be allowed to be incorporated into fill slope or roadbed material.

4. Erosion control work will be completed concurrent with equipment activity or prior to the wet season.

5. Live streams crossed by pioneer roads will use culverts or similar device.

SWCP 15.09 - Timely Erosion Control Measures on Incomplete Roads and Streamcrossing Projects

Objective: To minimize erosion of and sedimentation of streams from disturbed ground on incomplete projects.

When conditions permit operations outside the Normal Operating Season, erosion control measures must be kept current with ground disturbance, to the extent that the affected area can be rapidly "closed" if weather conditions deteriorate. Areas must not be abandoned for the winter with remedial measure incomplete. Examples of preventive measures include: installation of...
The number of crossings shall be kept to the minimum needed for access. Channel crossings should generally be as perpendicular to stream courses as possible. Streambank excavation shall be kept to the minimum needed for use of the crossings.

Crossing facilities shall be removed when the facility has served its purpose and is no longer needed. Fills associated with these facilities shall also be removed.

**SWCP 15.17 - Regulation of Barrow Pits, Gravel Sources And Quarries.**

**SWCP 15.18 - Disposal of Right-of-Way and Roadside Debris**

Objective: To maintain that debris generated during road construction and reconstruction is kept out of watercourses and to prevent slash and debris from subsequently obstructing channels.

Ensure that material does not obstruct natural drainage ways. Debris barriers from roadway clearing placed immediately below the fillslope slow the velocity of surface runoff, causing deposition of most sediments. Debris barrier (sometimes called filter windrows) construction by hydraulic excavator (backhoe) is a cost-effective method to incorporate erosion control into forest road construction (Burroughs and King 1989). This can be especially useful near streams. But hillslopes and visuals must also be taken into consideration. If the area is flat a debris barrier could hamper road drainage and would not meet visual quality objectives.

**SWCP 15.20 - Water Sources Development Consistent With Water Quality Protection.**

**SWCP 15.21 - Maintenance of Roads**

Objective: To maintain all roads in a manner which provides for soil and water resource protection by minimizing rutting, failures, side-casting, and blockage of drainage facilities.

Deterioration of roads from use and weather impacts can be minimized through proper and timely maintenance and/or restriction of use. As a minimum measure, maintenance must protect drainage facilities and runoff patterns.

This SWCP consists of two important components: maintenance during timber sale operations and long term maintenance for open system roads. Maintenance of roads associated with the timber sale would be commensurate with the Purchaser's use to prevent erosion damage to the road and adjacent lands. Long term maintenance is considered in an annual road maintenance plan developed to include all roads under Forest Service control.

Culverts, cross drains, and dips should be cleaned regularly to assure proper functioning, especially before winter or expected rainy seasons.

Debris should be removed from live drainages for a distance of 100 feet upstream from the inlet.

Cross drains and dips are often damaged during high use periods or sometimes even removed for more efficient traffic flow; they should be replaced before rainy seasons or snowfall.

Ditches should be cleared of debris and sediment accumulations with care being taken to avoid disturbing stabilized ditch bottoms. In cleaning ditches of slide debris and obstructions, the cutbank should not be undercut as this may trigger more sliding or instability.

Slide debris material should not be side cast from the roadway or placed in noncompactd fill that is susceptible to erosion.

Grade the road surface as often as necessary to retain the original surface drain age (insloped, outsloped, or crowned). Rut s should generally be removed at least once a year on most roads.

Take care to avoid side-casting graded material over the fill slope.

Carefully monitor surface drainage during wet periods and close the road if necessary to avoid undue damage. Restore surfacing on the road tread and in the road ditch if necessary following damage caused by operation in wet periods.

Haul all excess material removed by maintenance operations to safe disposal areas. Apply stabilization measures on disposal sites if necessary to assure that erosion and sedimentation do not occur.

During the winter, snow removal procedures should be adopted that will allow for proper drainage of the road (see SWCP 15.24 Snow Removal Controls).

During spring break up, road conditions require special attention relative to the freeze and thaw cycle because the potential for surface deformity is greatest when the frozen subgrade or surfacing begins to thaw. Road closures should be made as necessary to protect the road from excessive damage and to avoid the need to restore surfacing to the road tread.

These practices are expected to be effective in preventing impacts to watershed values during road use by the Purchaser.

**SWCP 15.22 - Road Surface Treatment to Prevent Loss of Materials**

Objective: To minimize the erosion of road surface materials and consequently reduce the likelihood of sedimentation to streams.

Unconsolidated road surface material is susceptible to erosion during precipitation and runoff events and/or from heavy use. Likewise, dust from roads can settle onto adjacent areas, impacting roadside plant vitality and water quality.
Spot graveling should be used wherever necessary to prevent excessive roadway erosion and maintain a usable road. Where existing roads through stand 29 cross wet areas or are susceptible to rutting when wet should be surfaced or relocated (see SWCP 14.05 Protection of Unstable Areas). Erosion from road surfaces as a result of runoff and use would be addressed by grading the road as often as necessary to retain the original road surface drainage during timber sale operations. During wet periods, the road surface would be carefully watched and the road closed if necessary to avoid undue damage.

During dry weather, road surface treatment would be needed to prevent dust from entering the air and adjacent water and lands. Water or other suitable dust abatement material would be applied to the road surface as often as necessary. This would settle the dust and prevent it from impacting roadside vegetation, water, and air quality. Sources of water have been discussed under the SWCP 15.20 Water Source Development Consistent with Water Quantity Protection. This practice has been used on the Strawberry Ride Timber Harvest where it was effective in reducing the transport of fines from the road surfaces.

SWCP 15.23 - Traffic Control During Wet Periods

Objective: To reduce road surface disturbance and rutting during wet weather and to reduce sedimentation probability.

This provision would extend beyond the timber sale area to any road used during timber sale operations. The heavy equipment used during logging could cause rutting and churning which would lead to increased sediment transport and watershed disturbances during periods of precipitation and runoff.

Roads which would be used for the timber sale during wet periods should have a stable surface and sufficient drainage to allow use with a minimum of resource impact. Roads not constructed for all weather use should be closed during the wet season. Hauling activity can be controlled by the Timber Sale Administrator within active timber sales. The decision for closure is made when the responsible Line Officer determines that a particular resource or facility needs protection from use.

The unrestricted use of many National Forest roads during wet weather often results in rutting and churning of the road surfaces. Runoff from such disturbed road surfaces often carries a high sediment load. The damage/maintenance cycle for roads that are frequently used during wet periods can create a disturbed road surface and sediment source. Research has shown that rutted roads produce about twice the sediment yield of a smooth road (Burroughs and King 1989). By limiting operations, sediment yield from these sources would be reduced.

SWCP 15.24 - Snow Removal Controls.

SWCP 15.25 - Obliteration of Temporary Roads

Objective: To reduce sediment and watershed impacts from temporary roads by obliterating them at the completion of their intended use.

To prevent continued low level casual use, temporary roads are obliterated at the completion of their intended use. Sideslopes should be reshaped and stabilized.

The reshaped slope should be effectively drained and blocked.

Temporary culverts should be removed and natural drainage configuration re-established. When removing culverts, be sure all fill material is removed from below the high water line of the stream. All material that is removed should be placed in a safe disposal area. The remaining fill material should be left at a stable angle.

Temporary roads that are allowed to remain in use beyond their prescribed time are subject to continued, uncorrected damage, and they can become chronic sediment sources.

ROAD CLOSURES

- Block the road to vehicles using gates, fences, or other types of barriers which have proven effectiveness in deterring vehicular use.
- Remove all temporary culverts. When removing culverts, be sure all fill material is removed from below the high water line of the stream. All material that is removed should be placed in a safe disposal area. The remaining fill material should be left at a stable angle.
- Outslope the road surface and remove all berms, taking care not to spill graded material over the fill slope. Grading the material towards the cut bank would achieve this. Outslope or 'y enough to divert water over the bank.
- Fill material should be left at a stable angle and revegetated with appropriate vegetation.
- Waterbar the road in accordance with the Guides for Controlling Sediment from Secondary Logging Roads (Packard and Christensen 1977) or Reducing Erosional Impacts of Roads (Megahan 1977).
- Revegetate the road surface and areas disturbed by road closure operations along with any other areas of exposed soil.
- If some roads in the timber sale would be closed permanently, these roads would require the extra measure of breaking up the road surface by ripping or other methods to reduce compaction and provide a better site for revegetation and reduce runoff.
- These methods for temporary and permanent road closure are recommended in the “Technical Guide for Erosion Prevention and Control on Timber Sale Areas” (USDA Forest Service 1981) and by Megahan (1977). The methods have been developed through experiences throughout Region 4. As a result, these mitigation measures are expected to be effective in preventing impacts from closed roads.

Related to Vegetation:
- Brian Head Resort, Inc. will prepare a Vegetation/Watershed Management Plan that will be incorporated into the terms and conditions of their Special Use Permit. For vegetation, this plan will address management objectives for forested areas within the ski area boundary by writing site specific silvicultural prescriptions. These will address steps required to maintain these stands over time and to meet recreation objectives.

As part of the Vegetation/Watershed Management Plan, new stand exam data will be collected and used to write stand-specific silvicultural prescriptions.

- Institute an annual monitoring program to evaluate the success of erosion control and revegetation efforts. Also monitor for possible infestations of noxious weeds.

- Where vegetation or soil resource damage is occurring due to off-trail use, or extremely heavy trail use, regulation, closure, or adequate trail redesign and maintenance will be required. Regular inspections should be made by the permittee and a Forest Service representative.

- To prevent the spread of noxious weeds, only certified noxious weed free hay, straw, or grain products will be stored or possessed on the National Forest.

- Monitor annually for noxious weeds. Instigate eradication actions if noxious weeds are found.

- All seed used on the National Forest will be certified as noxious weed free by State officials. Seed not certified in Utah will have samples sent to the Utah Department of Agriculture Laboratories for certification.

- Site characteristics will be considered when developing seed mixes or other plantings, to assure the greatest success.

- Existing runs, cat tracks, trails, building areas, and lift lines will be evaluated to determine the extent of establishment of introduced species used in prior seedings. The extent of invasion (if any) of introduced species into adjacent, undisturbed areas will be a factor in recommending seed mixes.

- Retain and/or recruit a minimum of 15-20 tons per acre of material greater than 3 inches diameter on all sites that support forest vegetation to provide for long term soil productivity and provide microsites for plant establishment.

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- The Vegetation Management Plan for Brian Head Resort shall include a snag management policy that includes a hazard tree policy that assesses risk of tree failure and probability of hitting a target (recreationists and/or facilities), as well as what cases in which snags may be left standing. Locations will be identified where no risk is present and snags can be left standing. This is to assure that a blanket approach to remove all snags is not implemented and snags are maintained where they are not causing hazards to people or property, in order to provide habitat for cavity excavators and other snag users.

- Protect reforested areas when leaders are no longer covered by snow until they reach a height where they are not longer easily damaged in the winter by restricting access by signing, fencing, or other method. Monitor for effectiveness.

Related to Wildlife:
The following design features, mitigation measures and enhancement projects will be a part of project implementation.

Mitigation Measures and other Design Features to Meet Wildlife Objective:
- Shoshone Lift (Chair #1) will be built such that no tower or facility is visible from Ashdown Gorge Wilderness Area to avoid potential disturbance to the peregrine falcon: nesting cliff.

- Construction of Shoshone Lift (Chair #1), logging, and associated activities will be with ground-based equipment only. If helicopters must be used they will only be allowed between September 1 and January 31 to avoid potential disturbance to nesting peregrines, and between March 16 and Nov. 1 to avoid potential disturbance to roosting bald eagles.

- No activities cited in the Master Development Plan that are not mapped and specifically addressed here will be allowed within one mile of the peregrine falcon nest cliff without additional assessment as to the effects on peregrines. This would include winter or summer trails, equestrian activities, wagon rides or any other activity.

- No activities cited in the Master Development Plan that are not mapped and specifically addressed here will be allowed within three miles of the suspected winter roost area without additional assessment as to the effects on bald eagles. This would include winter trails, equestrian activities, wagon rides or any other activity that may occur between November 1 and March 15.

- Construction of the Bowl lift and/or restaurant(s) or any other activity proposed on rock may only impact those areas surveyed for the Brian Head mountainsnail. These three areas are five meters wide and 20 meters long (see Project File). No rock work, blasting, drilling or other earth/rock movement or disturbance may occur without further analysis to minimize potential effects to the Brian Head mountainsnail. This applies only to the Proposed Action. Analysis
must be done by a professional Mollucologist. Conclusions must ensure that the species population will persist through time and that these actions will not cause a trend toward federal listing.

- Construction of the Bowl lift and/or restaurant(s) or any other activity proposed on rock may only impact those areas surveyed for the Brian Head mountain snail (see #5, for size and location) unless further analysis is conducted on pika. No rock work, blasting, drilling, other earth/rock movement, or disturbance may occur without analysis to minimize effects to pikas. This will apply only to the Proposed Action.

- Nighttime activities must be planned and outlined such that dark areas are maintained to provide darkened corridors with no activities for Mexican spotted owls, flammulated owls and bats.

- Activities and operations will be operated in such a manner as to avoid effects to threatened, endangered and sensitive species, and will be in compliance with recovery plans if they exist. This would include new or revised recovery plans developed after this analysis has been completed.

- Power lines or any other electrical equipment or lines constructed to service any of the proposed activities or facilities will be designed so that they will avoid raptor electrocution.

- Where possible connectivity of forested landscape, no less than 300-600 feet wide, should be maintained, and openings no larger than 600 feet across, in order to provide habitat for dispersing juveniles and wintering Mexican spotted owls and other wildlife.

- No activities cited in the Master Development Plan that are not mapped and specifically addressed will be allowed within the 600 acres surrounding the suspected nest area without additional assessment as to the effects on Mexican spotted owls. This would include winter trails, equestrian activities, wagon rides, or any other activity that is proposed.

- No activities shall occur within the resort area, that will increase risk of sedimentation, adverse stream channel changes, loss of additional wetlands or changes in water table, until restoration of existing conditions reduces risk to an acceptable level. This measure is to maintain conditions for Arizona willow on private land in the town of Brian Head.

- Tours operated by Brian Head resort with use of snowmobile, equestrian, foot, mountain bike or any other mode of travel on the Cedar City Ranger District will avoid known, and newly discovered, sensitive plants or unique endemic plants, so as to avoid destruction of habitat or plants. Surveys may be needed in areas where no previous surveys have been conducted.

- An assessment and/or surveys for Brian Head mountain snail and pika must be conducted in the proposed location for the up mountain restaurant prior to construction if proposed on or adjacent to suitable habitat.

- Report and record any sightings of threatened, endangered, and proposed species and implement appropriate protection measures as stated in recovery plans, LRMP or other approved plans where appropriate.

Related to Engineering:

The following paragraphs will discuss design features, specifications, codes, and reports deemed necessary for proper engineering and construction of projects in order to mitigate or minimize adverse effects.

Roads:

- Continued spot aggregate replacement and grading are required. Seasonal closure be required to protect the existing resource.

- Construction of the roads shall, as a minimum, meet Forest Service Specifications for Roads and Bridges in order to minimize the direct effects of road construction. The location, design, and specifications for each road project shall be approved by Dixie National Forest Engineers prior to implementation.

- Signs will be placed warning travelers on FSR 304 of overhead lift cables.

- To ensure maintenance of roads, trails, sanitation facilities, and recreation sites, a cooperative agreement between Federal, State, County, Resort, and Private organizations should be pursued.

- The Resort will be required to provide all inspections and material quality tests as required by specifications. Inspection reports will be regularly routed to the Dixie National Forest Officials for review.

Ski Lifts:

- All of the lifts will require engineering by a Registered Professional Engineer with experience in the design of ski lifts. The design is subject to review and approval by Intermountain Region Forest Service Engineers specializing in ski lift analysis.

- Proper geotechnical investigation and reports will be required for the installation of towers and drive equipment. The geotechnical investigation and reports are necessary for all lift construction and/or upgrades, but are especially critical for the installation of the Bowl Lift which has been identified to have potential soil problems related to installation of the top tower. The investigation shall be directed and report prepared by a Registered Professional
Engineer specializing in geotechnical analysis. As a minimum, the geotechnical report shall contain core logs showing the depth of materials, subsurface site mapping, soil and rock classification, engineering properties of soil and rock, and slope stability analysis.

- The geotechnical report shall be submitted as part of the lift design to be reviewed by Intermountain Region Forest Service Engineers.
- The Resort will be required to provide all inspections and material quality tests as required by specifications. Inspection reports will be regularly routed to the Dixie National Forest Officials for review.

Operation and Maintenance Buildings:
- Construction of the parking lots, shed, and equipment storage area, will require that plans and specifications be approved by Dixie National Forest Engineers prior to construction.
- The Resort will be required to provide all inspections and material quality tests as required by specifications. Inspection reports will be regularly routed to the Dixie National Forest Officials for review.

Snowmaking:
- An engineering feasibility study must be conducted as to the existing snow making facilities, and plans for the design and construction the proposed facilities. Reentry into the areas previously affected by excavation of existing pipelines should be discouraged even if the existing pipelines are not adequately sized to accommodate the expanded use. The feasibility study should contain a number of alternatives for Dixie National Forest Officials to analyze. The study should contain information relating to pipeline sizes, head, pump size, water use, required storage facilities, water rights required, proposed pipeline and utility locations, identification of additional water storage or pumping facilities located on National Forest land. A discussion of the preliminary design, geotechnical information, and other engineering data needed for proper evaluation is also required of the study. Additional water rights should be obtained prior to initiating construction of the proposed facilities.
- The Resort will be required to provide all inspections and material quality tests as required by specifications. Inspection reports will be regularly routed to the Dixie National Forest Officials for review.
- The Resort will submit plans and specifications for the existing snowmaking facilities, and maintenance building to Dixie National Forest Officials for inclusion in the special use permit folder.

Base Lodges, Restaurants & Other Buildings:
- A geotechnical report will be required to assure that the structure will remain stable. Soils in the area show signs of mass movement, and appear prone to instability. The geotechnical investigation and report shall be conducted and prepared by a Registered Professional Engineer specializing in geotechnical analysis. As a minimum, the geotechnical report shall contain core logs showing the depth of materials, subsurface site mapping, soil and rock classification, engineering properties of soil and rock for the site, and slope stability analysis.
- Prior to construction a set of plans, specifications, and geotechnical report shall be submitted to the Dixie National Forest for review by the Intermountain Region Facility Design Team. The plans and specifications shall contain at a minimum: building plans and elevations, waste disposal plans, utility plans, grading plans, road construction plans, parking lot plans, and all specifications related to such plans. The construction of the restaurant must be fully accessible and meet current Uniform Building Codes related to construction. Construction of the roads, and parking lots shall meet, as a minimum, Forest Service Specifications for Roads and Bridges. A copy of the plans and specifications must be submitted to the Dixie National Forest for Intermountain Region Facility Design Team review.
- The Resort will be required to provide all inspections and material quality tests as required by specifications. Inspection reports will be regularly routed to the Dixie National Forest Officials for review.

Related to Recreation and Scenic Resources:

Recreation:
- The permit area will be closed to snowmobiling except for administrative purposes.
- The permit area will be closed to all terrain vehicle use except for administrative purposes as identified in the annual operating plan.
- Summer access to all Forest Service system trails will be open to the public through the ski area except when construction activities would require temporary closures. Responsibility for repair of damage to the trail by ski area activities will belong to the permittee. Normal maintenance responsibilities will remain with the Dixie National Forest, and Brian Head Resort.
- Trail construction and maintenance will be conducted in such a way to minimize soil erosion and vegetation damage. Drainage structures and bridges/culverts will be installed and maintained as needed to minimize impacts to soils, water, or vegetation. On heavy-use trails, surfacing will be placed on areas where necessary to minimize dust or erosion.
- All facilities will be designed in accordance with requirements of the Americans with Disabilities Act.

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- Coordinate construction activities to minimize impact to area special events. This includes not operating during weekend events or holidays, and opening closed trails and roads for weekend use.

- Serious consideration should be given to performing an analysis for carrying capacity of trail use and/or outfitter guides permitted on the Cedar City Ranger District. Recommend that no additional new outfitter guide permits are issued until an analysis can be completed.

**Scenic Resources:**

- The Forest Service will review all construction plans for projects which could affect the visual resource. Measures to reduce impacts to scenic resources such as assisting in color choices for painting structures; establishing vegetation; suggesting methods to reduce soil and rock color contrasts; architectural styling; and other measures will be required.

- All access roads, utilities, structures, and facilities shall be located to minimize visual impacts. Where screening does not occur naturally, efforts through the use of vegetation, grading, or design modification shall be required.

- Recommendations for design of facilities, roads and trails will be followed as set forth in the guidelines in the Ski Area and Road handbooks, in the National Forest landscape Management Handbook Series. The Roads publication (1977) is Volume 2, Chapter 4, and the Ski Area publication is Volume 2, Chapter 7.

**Runs, Lifts, Trails and Service Roads:**

- Because of the visual sensitivity of proposed new ski trails in the Cedar Breaks National Monument viewed, the runs shall be carefully designed so as not to create the traditional cleared run appearance. These ski trails will be designed as gladed skiing trails. Proposed run designs shall be field checked with the Forest Service from key viewpoints, i.e., from Highway 143 near the Brian Head Peak turnoff. Monument overlooks and possibly from other sensitive areas prior to any site disturbance - including vegetation removal, to ensure final run appearance is acceptable.

- Minimize as much as possible, and particularly in visually sensitive areas (see list in the Project File), large swaths of timber cutting for runs and lift lines. Clearings will be created primarily by removal of selected trees or groups of trees where possible. Low-growing ground cover plants and stumps shall be left on the ground as much as possible to help reduce color contrasts of cleared areas and ground disturbance. Clearing limits will be flagged by the developer and reviewed and approved by the Forest Service prior to any clearing work. Where transplanting is an option, smaller trees should be transplanted rather than cut to areas in other leave strips where revegetation is necessary.

- Width of cleared openings for ski runs shall generally be less than 150 feet so that openings can be partially screened by adjacent forested areas. Islands of trees and shrubs should be left in the ski runs where it is possible to do so.

- Lift line clearing should be kept to the bare minimum necessary in both width and the number of trees removed. Edges shall be feathered and free flowing (not straight with vertical tree boles) where possible to do so.

- All lift towers and equipment will be painted black or non-reflective earth-tone colors to be approved by the Forest Service.

- All disturbed soils should be revegetated or stabilized to reduce contrasts on the mountain. (includes mountain roads, skier traverses, road cut and fill slopes, and all trails having cut and fill slopes). Top soil will be removed and stockpiled, to be replaced after final grading is completed. All disturbed soils should be reseeded with a native seed mix approved by the Forest Service. Erosion cloth or an acceptable alternative approved by the Forest Service will be applied after seeding to all disturbed soils. Implementation of this mitigation shall occur within the same year as the ground disturbing activity takes place.

  Where existing created openings have resulted in vegetation patterns that are inconsistent with naturally-occurring mosaics, additional treatments such as thinning, scalloping and feathering shall be considered in the overall vegetation management plan.

- If a retaining wall structure is necessary to secure the sites for the top terminal or towers for the Bowl Lift 8, any retaining walls shall be faced to appear to be a natural rock surface, similar in size, color and texture to existing talus rock.

- Roads shall be carefully constructed. Cut and fill sections should be blended into the natural terrain.

- Configuration of proposed ski runs should mimic naturally appearing openings. In general, the development of lift lines and ski runs should avoid visually hard edges or lines. Trail layout should incorporate existing tree stands. Manmade openings should be interspersed to simulate the natural surroundings and to encourage naturally occurring forbs, grasses and shrubs. New runs associated with Shoshone Lift 1 that fall within the viewshed of Cedar Breaks National Monument shall be gladed or provide islands to reduce impacts to the views from Cedar Breaks overlooks and the Rattlesnake Trail.

**Structures:**

- Building styles and colors of upper mountain warming huts, the restaurant, patrol huts and snow cat barn shall harmonize with the natural surroundings. Subdued earth tone colors should be used. Accent and trim colors may be used which reflect natural colors and hues and are complementary to the overall building materials, material, and colors. These shall be approved by the Forest Service. Highly reflective materials will not be used. Building lighting on upper slopes will be restricted to that which is absolutely necessary and will be shielded from view from the Brian Head Town or Highway 143 where possible.
- Non-reflective material for vent stacks, chimneys, and other above-the-roof equipment will be used instead of galvanized or shiny metals. Painting of reflective metals may be permitted on a case-by-case basis.

- Windows will be designed or oriented to prevent reflections toward the Brian Head or Highway 143 as much as possible.

- All power lines and other utilities will be placed underground except where rocky terrain dictates otherwise. There, lines should be placed on the ground in protective conduit or structures. Cross-ditching and seeding will be required on plowed-in or buried lines. Wherever possible, the lines will be located within roadways or existing disturbed areas.

- All exterior surfaces of aboveground structures, facilities, and utilities shall be constructed of native materials where possible, and colors will be limited to non-reflective earth tones.

- Brian Head Ski Resort should use existing and planted native vegetation. Additional vegetation shall be planted in patterns that mimic existing natural vegetation and of a scale capable of screening and reducing the visual impacts of new development. Vegetation choices must be approved by the Forest Services.

- Development shall be prohibited from penetrating the skyline from Highway 143.

- Development shall not jeopardize the integrity of the Civilian Conservation Corps Structure atop Brian Head Peak as specified in the Historic and Archeological Protection Act.

- Before any maintenance of structures occurs, approval of color treatments, materials selections, etc. shall be obtained from the Dixie National Forest on developments on Forest Service lands.

- The proposed buildings shall be designed so the architectural style and exterior harmonizes with the surrounding environs. Disturbance of vegetation on site and around the buildings should be minimized. Soil manipulation shall be minimized, and the final grading around the buildings shall simulate the natural topography, and blend with the undisturbed areas. Colors chosen for building exteriors shall blend with the site-specific landscape during both summer and winter. The recommended colors for all structures are middle to dark earth tones. The use of natural materials also allows structures to harmonize with the surrounding environs. The natural vegetation around the site should be maintained to the greatest extent practicable.

- All proposed structures, access corridors, and utilities shall be located and oriented to minimize necessary ground disturbance and vegetation removal. An attempt should be made so that the snow cat barn and expanded maintenance yard will not be visible from the Brian Head Peak Overlook.

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Noise:
- A Rock Blasting Noise Mitigation Plan will be prepared for all construction work in the Resort area (includes on mountain activities), to be approved by the Forest Service.

Related to Air Quality:
To meet the air quality standards prescribed, burning would be completed under conditions prescribed by “SASEM”, Simple Approach Smoke Estimation Model. SASEM is a computer model used to estimate maximum ground-level concentration of particulate’s, the distance from the fire at which this concentration would occur, and the range of distances from the fire over which specified ambient standards would be exceeded. The programs also estimates the minimum visual range (at the distance of a specified sensitive receptor site) for a variety of meteorological conditions. Outputs from the SASEM model have been used to formulate the following mitigation measures to be used during prescribed burning. (See Project File)

- “SESEM” outputs indicated that no more than 40 tractor slash piles may be ignited within a 24-hour period under excellent smoke dispersal conditions and still meet state standards. No more than 40 tractor piles would be ignited within a 24 hour period. Approximately 1300 hand piles may be ignited without a violation of state standards. If a combination of tractor and hand piles arc ignited burning will be monitored to ensure that no more than 200 tons per 24 hour period would be ignited.

- Complete all slash burning within 14 days.

- Complete all burning under excellent or good smoke dispersal conditions that ensure minimal effects to the town of Brian Head and Cedar Breaks National Monument. (see project file SASEM outputs).

- Burn only when the Clearing Index is greater than 500.

- Complete a Prescribed Fire and Smoke Management Plan prior to project implementation.

Within the Smoke Management Plan the following items will be quantified:

- Amount of material to be consumed in pounds/acre.
- Topography (elevation).
- Distance from any smoke sensitive areas.
- Predominant weather condition (temps, relative humidities).
- Atmospheric stability (stable air, unstable air, or partially stable).
- Mixing height for smoke dispersion.
- Wind speed and direction.
- Particulate emission factor (lbs/ton fuel consumed).
- Estimated length of burn (hours/days).
- Total particulate matter emitted (tons).
- Rate of particulate emitted (tons/hours).
DESCRIPTION OF ALTERNATIVES

Three alternatives are described in detail in this environmental assessment. They are (1) Proposed Action - Brian Head Resorts Proposal; (2) No Action - Current Management; (3) Alternative A - Integrated Alternative.

PROPOSED ACTION - BRIAN HEAD RESORT PROPOSAL

INTRODUCTION

Brian Head Resort has presented the Dixie National Forest with a proposal to develop and expand winter and summer recreation opportunities, as identified in the Brian Head Resort Master Development Plan (MDP). The primary goal of this alternative is to provide for changes to existing facilities and for additional facilities intended to promote the sustained and prosperous use of the committed resources at Brian Head by providing high quality recreation products for guests, residents, and entrepreneurs.

LIFTS

To the greatest extent practicable, existing lifts will be retained as-is through the remainder of the equipment’s useful life. However, some changes to existing lifts and new lifts are proposed. The changes and additions are needed to interconnect the Navajo and Giant Steps facilities, to develop needed added expert and intermediate terrain, to balance capacities, for improved skier circulation/quality improvements, as well as, to offer a full product to guests and residents.

LIFT DESIGN CRITERIA

Lift design will be reviewed and approved with annual construction plans. In general, however, the following shall apply. Lift design will comply with industry and regulatory norms. Lower terminal sites will be graded to the extent necessary for lift equipment, snow maintenance, maze platforms, and skier in-runs to facilitate safe and efficient operations. Upper terminal sites will be graded to the extent necessary for lift equipment, snow maintenance, skier egress and waiting areas to facilitate safe and efficient operations. Ski-under cable height will be provided along the line wherever possible. Exceptions may occur at the terminals and where particular off-site visual quality considerations may dictate.

EXISTING LIFTS RETAINED “AS-IS”

The following existing Lifts are to be retained in their current configuration. Actions regarding these lifts include routine maintenance and operation. Additionally at such time as these lifts reach the end of their useful life, they may be replaced within the current lift line as part of annual operating permit processes.

Table 2-1. Existing Lift Retained “As Is”.

<table>
<thead>
<tr>
<th>Lift</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black Foot Lift 3</td>
<td>Fixed Grip Chairlift - rated capacity 1,800 skiers/hour.</td>
</tr>
<tr>
<td></td>
<td>Length / Rise: 2,070' / 465'.</td>
</tr>
<tr>
<td>Roulette Lift 5</td>
<td>Fixed Grip Chairlift - rated capacity 1,800 skiers/hour.</td>
</tr>
<tr>
<td></td>
<td>Length / Rise: 3,075' / 762'.</td>
</tr>
<tr>
<td>Pioneer Lift 6</td>
<td>Fixed Grip Chairlift - rated capacity 1,200 skiers/hour.</td>
</tr>
<tr>
<td>Dunes Lift 7</td>
<td>Fixed Grip Chairlift - rated capacity 1,800 skiers/hour.</td>
</tr>
<tr>
<td></td>
<td>Length / Rise: 2,618' / 570'.</td>
</tr>
</tbody>
</table>

This chairlift may be removed and reused elsewhere. In this event the majority of the trails served by the Dunes Lift would be return ski to the Giant Steps Lift.

INTERCONNECT LIFTS - PHASE ONE

Figure 2-1, (below) shows the Interconnect Lift Alternatives.

The interconnect between Navajo and Giant Steps ski terrain is the key feature needed to change the perception of Brian Head from that of two, small separate ski areas to a unified mid-sized full service resort and to fully utilize the existing runs. Two lifts are needed to make the interconnect work (an Interconnect Lift and Chair 1). If a suitable Interconnect Lift alternative is not realized, there is no commitment to re-install the Shoshone Lift 1.

Three corridors under consideration. Each corridor contains several suitable Interconnect Lift alternatives. Interconnect Lift 3-B is analyzed in this MDP because its skier capacities and trails are among the higher of alternatives under consideration. Depending on which interconnect alternative is built, the lifts and associated projects should be constructed in a single season.

A) Interconnect Corridor #1:

- Lift 3B
  - Fixed Grip Chairlift - rated capacity 1,800 skiers/hour.
  - Length / Rise: 3,450' / 670'.

- Lift 3C
  - Alternative 3C serves much the same terrain as the Interconnect Lift 3B but has greater impacts to private lands.
  - Fixed Grip Chairlift - rated capacity 1,800 skiers/hour.
• Length / Rise: 3,500' / 695'.

B) Interconnect Corridor #2:

Lift 1A

• Interconnect Lift Option 1A should be retained for future development as a possible transportation link between Navajo Base and Giant Steps Base. This lift could further reduce surface transportation needs by providing many non-skiing and overnight guests and residents an attractive alternative to using cars both day and night, year round.

C) Interconnect Corridor #3:

• Three other lift alignments (1B, 2, and 3A) were evaluated and are possible. Any one of these provide the interconnection between mountains. The other alternatives remain open and viable though not ideal because of the following factors:
  ♦ Transportation lifts only - no skiing components.
  ♦ Complex private property issues.

D) Re-install Shoshone Lift

• Fixed Grip Chairlift, - rated capacity 1,800 skiers/hour.
• Length / Rise: 3,500' / 580'.
BRIAN HEAD PEAK BOWL LIFT (CHAIR 8) - PHASE ONE

Brian Head Bowl Lift (Chair 8) serves the principal expert terrain expansion area in Brian Head Bowl. It provides truly exciting advanced terrain which is sorely lacking in the existing trail system. Its proximity to the existing ski area and the recognition of its potential make it the logical choice for inclusion into the permit area. The USFS has expressed concern about soil engineering at the upper terminal location. A geotechnical study has been initiated by the resort to determine the holding requirements for this lift. Approval of this lift is being sought pending completion of site specific soils investigations probably during the summer of 1997, most particularly at the upper terminal location.

Two alignment alternatives are presented for the Bowl Lift. The USFS has identified a single upper terminal location in keeping with its Scenery Management System determination regarding off-site visual impacts at the Cedar Breaks National Monument. This site also affords good wind protection for the terminal. Either lift would provide adequate capacity for the terrain. Avalanche resistive towers may be required as part of the engineering for either Brian Head Bowl Lift proposals.

Lift 8A alternative is aligned optimally for skiing - north-south through the interior of the bowl. Lift 8B is aligned from near the top of Giant Steps Lift 2 to the same upper terminal location as Lift 8A. Lift 8B provides the added amenity of convenient summer guest access to Brian Head Peak in combination with Giant Steps Lift 2. Skiers would need to round trip both lifts to ski the Bowl if the Lift 8B alternative is constructed.

Both Lift 8A and 8B would require a single top terminal, bottom drive lift that maintains visual quality standards within the project area. The top terminal would be placed on a "shell" located on the north side of Brian Head Peak. Disturbance would be restricted to the area surveyed for the Brian Head Peak Mountain Snail. Any additional soil disturbing activities would require further soil survey’s. Equipment being used for the top terminal construction will either need to be flown on site, or place with a crane positioned on the Brian Head Peak Road (FS#047). After construction, the site will be reclaimed to improve visual quality, this includes, revegetation efforts, replacing rocks, and use of native seeds.

Either lift serves all available terrain in the bowl. For purposes of the capacity calculations Brian Head Bowl Lift 8A is used as it has slightly higher capacity.

A) Brian Head Bowl Lift 8A Alternative

- Fixed Grip Chairlift - rated capacity 1,200 skiers/hour.
- Length / Rise: 3,050’ x 740’.

B) Brian Head Bowl Lift 8B Alternative

- Fixed grip lift - rated capacity 1,200 persons/hour
- Length / Rise: 1,200’ / 385’

Chapter 2 Issues & Alternatives

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QUALITY UPGRADE LIFTS

Quality Upgrade lift projects are not expected to be held until the completion of Phases One and Two. To the extent that funding becomes available items A) and B) may be constructed concurrently with earlier phases.

A) Relocate Navajo Lift 4 Lower Terminal

- Extend lift line approximately 350 ft toward Navajo Base Lodge.
- New Lower Terminal located approximately 150 ft from Navajo Base Lodge.
- Substantially improves guest arrival lift access without skiing or congestion impacts.
- Approximately 4 acres of new trails are proposed to improve skier circulation approaching Navajo Base and to improve low snow, beginner egress to the Shoshone Lift 1.

B) Hotel Surface Lift 9

- Small surface Lift with midway unload provides transportation from both directions.
- On-skis route toward Navajo Base provides approximately 2 acres of ideal ski school teaching terrain for never-ever students and young children, and for snow play activities without congestion or interference with other skiers.

C) Replace Giant Steps Lift 2

- This project involves increased capacity, replacement and slight lift realignment.
- Improves out-of valley lift capacity and skier circulation.
- Summer and winter "flagship" product.
- Detachable Quad Chairlift - rated capacity 2,400 persons/hour.
- Length / Rise: 4,934’ / 1,150’
- 50% down load capacity.
- Will only be implemented as skier numbers or market advantage dictates.

TRAILS

The current ski trails inventory is long on beginner, but short of intermediate and especially expert trails. Most of the new trails provided for in this MDF address the shortfall of intermediate and expert skiing. The abundance of beginner trails persists even at build-out.

TRAIL DESIGN CRITERIA

Ski trails are designed to follow the fall line. Careful selection of terrain segments, along which the natural fall line varies, will allow for turns and variations in aspect to create variety and interest in the skier experience, and soften the visual impacts. Retention of vegetation islands at appropriate locations within the trail system and scalloped edge effects will address further visual and variety goals.

Chapter 2 Issues & Alternatives

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In addition to standard cleared runs, certain areas lend themselves to gladed ski spaces. In particular, gladed ski spaces can reduce sun effects on east facing slopes, and lessen visual effects. Gladed trails have limited applicability on beginner terrain because of lower skier ability.

The number of skiers that can be accommodated per acre of trails depends in part on the category of terrain. Beginner trails can accommodate more than intermediate trails, which in turn handles more than expert trails. This is due to higher speeds as ability increases. The conversion of trail acreage to skier capacity is presented in the Capacity discussion in Table 2-2 below.

**EXISTING TRAIL ACREAGE**

Table 2-2, Existing Trail Acreage.

<table>
<thead>
<tr>
<th>Terrain Type</th>
<th>Begin.</th>
<th>Intermed.</th>
<th>Adv.</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slope Gradient</td>
<td>&lt; 25%</td>
<td>25 - 45%</td>
<td>&gt;45%</td>
<td></td>
</tr>
<tr>
<td>West of Hwy. 143</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Navajo Lift 4</td>
<td>44</td>
<td>10.8</td>
<td>54</td>
<td>8</td>
</tr>
<tr>
<td>Pioneer Lift 6</td>
<td>10.5</td>
<td>10.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>West Trails (acres)</td>
<td>54.5</td>
<td>10.8</td>
<td>65</td>
<td>3</td>
</tr>
<tr>
<td>East of Hwy. 143</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Giant Steps Lift 2</td>
<td>23</td>
<td>35.5</td>
<td>52</td>
<td>110.5</td>
</tr>
<tr>
<td>Black Foot Lift 3</td>
<td>12</td>
<td>8.5</td>
<td>20.5</td>
<td></td>
</tr>
<tr>
<td>Roulette Lift 5</td>
<td>2.5</td>
<td>30</td>
<td>35</td>
<td>67.5</td>
</tr>
<tr>
<td>The Dunes Lift 7</td>
<td></td>
<td>20</td>
<td>12</td>
<td>32</td>
</tr>
<tr>
<td>East Trails (acres)</td>
<td>37.5</td>
<td>94</td>
<td>99</td>
<td>230.5</td>
</tr>
<tr>
<td>Existing Trails (acres)</td>
<td>92</td>
<td>104.8</td>
<td>99</td>
<td>295.8</td>
</tr>
</tbody>
</table>

**INTERCONNECT TRAILS AND ASSOCIATED PROJECTS - PHASE ONE**

**Shoshone Trails**
- Utilizes reactivated trails plus approximately 15 acres in 4 new trails:

Table 2-3, Shoshone Trails.

<table>
<thead>
<tr>
<th>Skier ability</th>
<th>Reactivated Trail Acres</th>
<th>New Trail Acres</th>
<th>Total Trail Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beginner</td>
<td>8</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>Intermediate</td>
<td>35</td>
<td>15</td>
<td>50</td>
</tr>
<tr>
<td>Expert</td>
<td>12</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>15</td>
<td>75</td>
</tr>
</tbody>
</table>

**Highway-143 Skier Bridge and Terminal Grading**
- Skier Bridge - width 100' x span 60' with standard highway clearances.
- Overpass ramp grading and terminal grading.

**Interconnect Trails**
These trails are to be constructed with the preferred Interconnect Lift 3B or the 3A alternatives only. Other Interconnect Lift alternatives serve as transportation lifts only and do not have associated ski trails.
- Approximately 30 acres in new trails and skiway:

Table 2-4, Interconnect Trails.

<table>
<thead>
<tr>
<th>Skier ability</th>
<th>Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beginner</td>
<td>5</td>
</tr>
<tr>
<td>Intermediate</td>
<td>15</td>
</tr>
<tr>
<td>Expert</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
</tr>
</tbody>
</table>

**BRIAN HEAD BOWL TRAILS - PHASE TWO**

The upper steep slopes of Brian Head Bowl are essentially treeless. The terrain gradient lessens and becomes forested below the upper steep faces. These lower slopes afford a good opportunity for gladed skiing though several defined routes. About 100 acres of the bowl will get the majority of traffic because of ease of lift return. Additionally we believe that a much larger, eminently skiable area is available for nordic skiers whose equipment is well suited to return skiing on flat track.

- Entirely new terrain totaling approximately 100 acres of open slope and developed trails.
Table 2-5, Bowl Lift Acres.

<table>
<thead>
<tr>
<th>Skier ability</th>
<th>Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beginner</td>
<td>0</td>
</tr>
<tr>
<td>Intermediate</td>
<td>0</td>
</tr>
<tr>
<td>Expert</td>
<td>100</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

- Some trails may be built before the lift is constructed to provide for snow cat supported skiing, including rock removal and selective blasting.
- Snow cat services would continue until such a time that the Bowl Lift is implemented.

QUALITY UPGRADE TRAIL PROJECTS

Quality Upgrade trail projects are generally smaller in scope; and thus are not intended to be delayed until after completion of Phases One and Two - though they are clearly lower priority than Phase One and Two projects. To the extent that funding becomes available they may be constructed concurrently with earlier phases.

A) Navajo Trails Projects
- New Ski Terrain
- Ski School Teaching Terrain associated with Hotel Lift.
- Beginner Terrain to avoid crowding near relocated base of Navajo Lift.
- Enhanced low snow access to Shoshone Lift 1.

Table 2-6, New Ski Terrain.

<table>
<thead>
<tr>
<th>Skier ability</th>
<th>Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ski School</td>
<td>2</td>
</tr>
<tr>
<td>Beginner</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>6</strong></td>
</tr>
</tbody>
</table>

B) Giant Steps Trail Projects
- Minor trail modifications for skier circulation and visibility which may be processed in annual construction and operating plans.

Table 2-7, Build Out Trail Acreage.

<table>
<thead>
<tr>
<th>Terrain Type</th>
<th>Begin.</th>
<th>Intermed.</th>
<th>Adv.</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slope Gradient</td>
<td>&lt; 25%</td>
<td>25 - 45%</td>
<td>&gt; 45%</td>
<td></td>
</tr>
<tr>
<td>West of Hwy. 143</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shoshone Lift 1</td>
<td>8</td>
<td>50</td>
<td>17</td>
<td>75.0</td>
</tr>
<tr>
<td>Navajo Lift 4</td>
<td>48</td>
<td>10.8</td>
<td>58.8</td>
<td></td>
</tr>
<tr>
<td>Pioneer Lift 5</td>
<td>13</td>
<td>13.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hotel Surface Lift 9</td>
<td>2</td>
<td>2.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total West Trails (acres)</strong></td>
<td><strong>71</strong></td>
<td><strong>60.8</strong></td>
<td><strong>17.1</strong></td>
<td><strong>148.8</strong></td>
</tr>
<tr>
<td>East of Hwy. 143</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Giant Steps Lift 2</td>
<td>23</td>
<td>35.5</td>
<td>52</td>
<td>110.5</td>
</tr>
<tr>
<td>Black Foot Lift 3</td>
<td>20.2</td>
<td>18.5</td>
<td>38.7</td>
<td></td>
</tr>
<tr>
<td>Roulette Lift 5</td>
<td>5</td>
<td>30</td>
<td>35</td>
<td>70</td>
</tr>
<tr>
<td>The Dunes Lift 7</td>
<td>20</td>
<td>12</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>Interconnect Lift 3B</td>
<td>5</td>
<td>15</td>
<td>10</td>
<td>30</td>
</tr>
<tr>
<td>Brian Head Bowl Lift 8</td>
<td>100</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total East Trails (acres)</strong></td>
<td><strong>53.2</strong></td>
<td><strong>119</strong></td>
<td><strong>209</strong></td>
<td><strong>381.2</strong></td>
</tr>
<tr>
<td><strong>Build-out Trails (acres)</strong></td>
<td><strong>123.2</strong></td>
<td><strong>179.8</strong></td>
<td><strong>226</strong></td>
<td><strong>530</strong></td>
</tr>
</tbody>
</table>

MOUNTAIN CAPACITY ANALYSIS

Mountain Capacity is expressed as SAOT (skiers at one time). The analysis in this section describes SAOT at normal design levels for both lifts and trails. The design elements for each are chosen conservatively to allow for peak holiday periods without substantial product quality degradation. In practice peak holiday conditions are commonly 1/4 to 1/3 over the design SAOT.

The industry recognized distribution of skier ability is about 25% beginner, 50% intermediate, and 25% advanced. The current intermediate and advanced trail acreage is consistent with an area designed for about 2,000 SAOT. This acreage is very low when compared to an existing lift capacity of 3,705 SAOT. This disparity is the physical basis for the common perception of Brian Head as a beginner area, and for the interest for more upper ability terrain - especially the truly exciting advanced terrain offered in Brian Head Bowl.

Figure 2-2 shows the MDP ski pod analysis. Currently Brian Head has a shortage of intermediate and advanced terrain in comparison with lift capacity. There is an abundance of beginner terrain now and at build-out. The projects of the MDP achieve a close balance between lift and terrain capacity - the result of which is graciously low skier densities on beginner trails, with comfortable utilization of intermediate and advanced terrain under normal and peak holiday utilization.
LIFT CAPACITY

Table 2-8 below calculates lift capacity. The calculations take into account the factors outlined below.

Table 2-8, Lift Capacity Formula

- \( C_p \) Lift Capacity expressed as the number of skiers the lift can serve.
- \( C_{L/6} \) Converts the Manufacturer’s Rated Lift Capacity (skiers/hour) into skiers/minute.
- \( LE \) Lift Efficiency - adjusts for loading miscalcs, slow downs, stops, etc. Lifts used by lower ability skiers have a lower LE values than those used by higher ability skiers.
- \( SU \) Skier Utilization - adjusts for operational factors such as transportation utilization (i.e. using the lift to access another lift rather than for return skiing) and anticipated qualitative adjustments in skier utilization (i.e. long traverses or runouts, non-contiguous terrain types, etc.).
- \( T_M \) Maze Time. Lift line wait time is a principal factor in guest perception of ski area quality. A Maze Time of 10 minutes (used in this analysis) is generally acceptable under full utilization. Under Peak conditions \( T_M \) will increase.
- \( T_L \) Lift Ride Time derived by dividing the lift length by the rope speed.
- \( T_S \) Ski Down Time. By observation at Vail, the Ski Down Time on fixed grip chairs averaged 1.2 times the ride time. With the increased rope speed for detachable chairlifts, the adjusted value is 2.4 times the 1 lift Ride Time. Longer ski down times are assigned for beginner lifts.

The formula used to determine the Lift Capacity of each lift is as follows:

\[
C_p = (C_{L/6}) (LE)(SU)(T_M + T_L + T_S)
\]

Table 2-9, Lift Capacity

<table>
<thead>
<tr>
<th>Type</th>
<th>Length</th>
<th>Rise</th>
<th>Rope Speed</th>
<th>Rated Capacity</th>
<th>E</th>
<th>E</th>
<th>M</th>
<th>E</th>
<th>L</th>
<th>S</th>
<th>Lift Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>West of Heavenly</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nasoo Lift F G-3</td>
<td>285</td>
<td>60</td>
<td>475</td>
<td>1800</td>
<td>90%</td>
<td>100%</td>
<td>10</td>
<td>9.8</td>
<td>9.8</td>
<td>75%</td>
<td></td>
</tr>
<tr>
<td>Pioneer Lift E G-2</td>
<td>919</td>
<td>139</td>
<td>300</td>
<td>1200</td>
<td>75%</td>
<td>100%</td>
<td>10</td>
<td>1.7</td>
<td>25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northstar West Side</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grant Steps Lift 2 F G-3</td>
<td>4314</td>
<td>1161</td>
<td>475</td>
<td>1800</td>
<td>90%</td>
<td>100%</td>
<td>10</td>
<td>12.5</td>
<td>8.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blackfoot Lift 3 F G-3</td>
<td>2300</td>
<td>439</td>
<td>475</td>
<td>1800</td>
<td>90%</td>
<td>100%</td>
<td>10</td>
<td>5.8</td>
<td>5.8</td>
<td>55%</td>
<td></td>
</tr>
<tr>
<td>Routeless Lift 5 F G-3</td>
<td>570</td>
<td>762</td>
<td>475</td>
<td>1800</td>
<td>90%</td>
<td>100%</td>
<td>10</td>
<td>7.8</td>
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<td>1800</td>
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<td>100%</td>
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<td>7.8</td>
<td>7.8</td>
<td>65%</td>
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</tr>
<tr>
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<td>2618</td>
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<td>100%</td>
<td>10</td>
<td>6.6</td>
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<td>Total North Lift Side</td>
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</tbody>
</table>

Notes: Comments
- 1/1 - Fixed Grip Triple Chairlift
- 1/2 - Fixed Grip Double Chairlift
- PP - Platter Pull Surface Lift - 1 person carrier
- D-4 - Detachable Quad Chairlift

SKI TERRAIN CAPACITY

Ski Terrain Capacity is an index of the number of skiers who can be accommodated on the full complement of developed and natural ski terrain. The index is stated as Skier Density in skiers/acre. Skier Density generally decreases with increased skier ability. Further, snowboard riders and shaped ski skiers tend to reduce acceptable skier density. The Ski Terrain Capacities shown in Table 2-10, Ski Terrain Capacity (below), are calculated using values of 15 skiers/acre for the Beginner abilities, 10 skiers/acre for the Intermediate, and 5 skiers/acre for the Advanced
These values are within industry norms in keeping with Brian Head’s high quality product philosophy, its guests’ desires, growth in snowboarding and riding and values of skiing, and to accommodate peak conditions as well.

Table 2-10, Ski Terrain Capacity.

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<thead>
<tr>
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<tbody>
<tr>
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<td></td>
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<tr>
<td>Shoshone Lift 1</td>
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<td>54.8</td>
<td></td>
<td></td>
<td>660 108</td>
<td>768</td>
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</tr>
<tr>
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<td>10.5</td>
<td>157.5</td>
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<tr>
<td>Subtotal West Side</td>
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<td>65.7</td>
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<td></td>
<td>817.5 108</td>
<td>926</td>
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</tr>
<tr>
<td>East of Hwy 143</td>
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</tr>
<tr>
<td>Giant Steps Lift 2</td>
<td>23</td>
<td>35.5</td>
<td>52</td>
<td>110.5</td>
<td>345</td>
<td>355 260</td>
<td>960</td>
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<td>8.5</td>
<td>20.3</td>
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<td></td>
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<td>263</td>
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<td>Roulette Lift 5</td>
<td>2.5</td>
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<td>35.7</td>
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<td></td>
<td>38 300 175</td>
<td>513</td>
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</tr>
<tr>
<td>The Dunes Lift 7</td>
<td>20</td>
<td>12</td>
<td>32</td>
<td></td>
<td></td>
<td>200 60</td>
<td>260</td>
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<td>Subtotal East Side</td>
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<td>94</td>
<td>250.5</td>
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<td></td>
<td>563 940 495</td>
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<td>Total Existing Acres/SAOJ</td>
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<td>104.8</td>
<td>99</td>
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<td>1,048 495</td>
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<tr>
<td>Skier Ability Distribution</td>
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</table>

Build-out Ski Terrain

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<td>705</td>
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<td>58.8</td>
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<td></td>
<td>720 108</td>
<td>828</td>
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<tr>
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<td></td>
</tr>
<tr>
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<td></td>
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<td>30</td>
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<td>Subtotal West Side</td>
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<td>127</td>
<td>148.8</td>
<td>1,065</td>
<td>608 85</td>
<td>1,758</td>
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<tr>
<td>East of Hwy 143</td>
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<td></td>
</tr>
<tr>
<td>Giant Steps Lift 2</td>
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<td>35.5</td>
<td>52</td>
<td>110.5</td>
<td>345</td>
<td>355 260</td>
<td>960</td>
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<td>303 185</td>
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<td>75 300 175</td>
<td>550</td>
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<tr>
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<td>12</td>
<td>32</td>
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<td></td>
<td>200 60</td>
<td>260</td>
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<td>Brian Head Bowl Lift 8</td>
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<td>500 500</td>
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<td>Total Build-out Acres/SAOJ</td>
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</tr>
</tbody>
</table>

Note: 1: Skiers/acre assumptions as follows are within industry norms:

- **Existing Build-Out**
  - Beginner: 15
  - Intermediate: 10
  - Expert: 5

- **Build-out**
  - Skiers/acre: 35%
  - Slope: 38% 24% 100%

Chapter 2 Issues & Alternatives

---

**CAPACITY BALANCE**

Table 2-11 below demonstrates an existing shortfall of terrain capacity which is corrected in the build-out configuration. At build-out lift and trail capacity are in close balance (3%) and the annual utilization is 9% above the target of 250,000 skier-days/year.

Table 2-11, Capacity Balance.

<table>
<thead>
<tr>
<th>Existing Lift Terrain Zone</th>
<th>Lift Capacity</th>
<th>Terrain Capacity</th>
</tr>
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<tbody>
<tr>
<td>West of Hwy 143</td>
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<td></td>
</tr>
<tr>
<td>Navajo Lift 4</td>
<td>757</td>
<td>768</td>
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<td>Pioneer Lift 6</td>
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<td>158</td>
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<td>Subtotal West Side</td>
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</tr>
<tr>
<td>East of Hwy 143</td>
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<td></td>
</tr>
<tr>
<td>Giant Steps Lift 2/Black Foot Lift 3</td>
<td>1,445 1,225</td>
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</tr>
<tr>
<td>Roulette Lift 6</td>
<td>565 513</td>
<td></td>
</tr>
<tr>
<td>The Dunes Lift 7</td>
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<td></td>
</tr>
<tr>
<td>Subtotal East Side</td>
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<tr>
<td>Existing (SAOT)</td>
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<tr>
<td>Build-out Lift Terrain Zone</td>
<td>Lift Capacity</td>
<td>Terrain Capacity</td>
</tr>
<tr>
<td>---------------------------</td>
<td>---------------</td>
<td>------------------</td>
</tr>
<tr>
<td>West of Hwy 143</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shoshone Lift 1</td>
<td>533</td>
<td>705</td>
</tr>
<tr>
<td>Navajo Lift 4</td>
<td>601</td>
<td>828</td>
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<tr>
<td>Pioneer Lift 6</td>
<td>251</td>
<td>195</td>
</tr>
<tr>
<td>Hotel Surface Lift 9</td>
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<td>50</td>
</tr>
<tr>
<td>Subtotal West Side</td>
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<td>1,758</td>
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<tr>
<td>East of Hwy 143</td>
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<td></td>
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<tr>
<td>Giant Steps Lift 2/Black Foot Lift 3</td>
<td>1,440 1,448</td>
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</tr>
<tr>
<td>Roulette Lift 6</td>
<td>565 550</td>
<td></td>
</tr>
<tr>
<td>The Dunes Lift 7</td>
<td>997 260</td>
<td></td>
</tr>
<tr>
<td>Interconnect Lift 3B</td>
<td>403 275</td>
<td></td>
</tr>
<tr>
<td>Brian Head Bowl Lift 8</td>
<td>434 500</td>
<td></td>
</tr>
<tr>
<td>Subtotal East Side</td>
<td>3,530</td>
<td>3,033</td>
</tr>
<tr>
<td>Total Build-out (SAOT)</td>
<td>4,943</td>
<td>4,797</td>
</tr>
<tr>
<td>Annual Utilization (skier-days/year)</td>
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</table>

**PERMIT BOUNDARY AMENDMENT**

As part of the Master Plan Revision process, the following amendments to the Special Use Permit Boundary are requested. The application includes the 333 acres described below, also shown on Figure 2-4 below. These areas are within the adopted Forest Map Unit 1-D (Winter Sports Site), as directed under the Proposed Forest Plan Amendments proposed with this project.

Chapter 2 Issues & Alternatives
Shoshone Lift 1
Amend the Permit Boundary to include an additional 94 acres. The area shown is needed to facilitate the reinstalled lift, skier circulation, and suitable terrain served by the proposed lift.

Interconnect Area
Amend the Permit Boundary to include 48 acres of USFS lands in SE1/4 of NW1/4 of Sect 11, and NE1/4 of SW1/4 of Sect 11, T36S, R9W which are within the Brian Head Town limits. Portions of preferred Interconnect Lift 3B and associated ski terrain would be sited on these lands.

Brian Head Bowl Lift
Amend Permit boundary to include 191 acres inclusive of the lift, skier circulation and skiable terrain of the bowl.

SEASONAL EMPHASIS AND OPPORTUNITIES

Brian Head Resort is principally a winter sports site dedicated to skiing. Summer utilization is substantially less at present - being shared between a large and rapidly growing mountain biking activity, tourism support for Cedar Breaks National Monument, second home owners in and around the Town, and dispersed recreationists. Spring uses are limited, with some fall seasonal support for hunting and fall color spectators. Many of the elements of this MDP provide greatly improved opportunities for both winter and summer tourism opportunities.

The principal winter season opportunities which the MDP addresses are improved skiing through improved skier circulation, adequate ski terrain and ability balance, improved lift equipment and other facilities. The opportunity for gladed trails and specialized terrain and snow grooming areas for snowboarders exist particularly in the Shoshone Lift 1 area.

Other on-mountain winter recreation opportunities in addition to typical ski area operations which may be implemented include but may not be limited to the following:

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<tr>
<th>Recreation Opportunity</th>
<th>Nighttime</th>
<th>Daytime</th>
</tr>
</thead>
<tbody>
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<td>1. lift operations</td>
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<td>X</td>
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<tr>
<td>2. skiing</td>
<td>X</td>
<td>X</td>
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<tr>
<td>3. food and beverage</td>
<td>X</td>
<td>X</td>
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<td>4. entertainment events</td>
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<td>X</td>
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<tr>
<td>5. snow play venue</td>
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<tr>
<td>6. ice skating rink</td>
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<td>X</td>
</tr>
<tr>
<td>7. guided snowmobile tours</td>
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<td>X</td>
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<tr>
<td>8. sleigh rides</td>
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<tr>
<td>9. nordic ski maintained track and shelter system</td>
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<td>X</td>
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<tr>
<td>10. future developments in ski related recreation</td>
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</tr>
</tbody>
</table>

An outdoor ice skating facility is also contemplated on private land near Navajo Base. At this time ice skating is envisioned during winter only as ambient temperatures permit.

Summer recreation opportunities may be implemented including but not limited to the following:

<table>
<thead>
<tr>
<th>Recreation Opportunity</th>
<th>Nighttime</th>
<th>Daytime</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. lift operations</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>2. food and beverage</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>3. entertainment events</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>4. mountain bike venue</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>5. equestrian trails/guide and wagon rides</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>6. summer trails and shelter system</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>7. interpretive signage/trails</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>8. alpine slide or similar venue</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>9. golf driving range and putting instruction venue</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>10. future developments in non-motorized summer recreation</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
AVACHNE PROTECTION
Avalanche Protection will be detailed in annual Operating Plans. The only areas at Brian Head requiring avalanche protection are in the upper steep slopes of Brian Head Bowl. Standard blasting, ski cutting in the starting zones are expected to provide adequate protection. Snow cat routes currently provide excellent access to the starting zones. Avalanche resistive towers may be required as part of the engineering for either Brian Head Bowl Lift alternative.

MOUNTAIN OPERATIONS AND MAINTENANCE
The Mountain Maintenance facility is a recently built, well designed facility which appears to have adequate space for mountain operations through completion of Phase One and Two. Additional snow cat barn, equipment yard, may be needed in the same vicinity at build-out. Mountain employee lockers and employee parking will be added to the site when base area facilities become fully utilized.

SNOW-MAKING
Figure 2-4 below shows existing and expansion snow making coverage areas. The recently built, existing airless snow making system covers 156 acres on Giant Steps and Navajo trails. The system will be expanded an additional 25 to 40 acres in the Shoshone Lift 1 area. Additional water supply may be needed to serve this expansion.
BASE LODGES, RESTAURANTS, AND OTHER FACILITIES

The existing facilities at Navajo Base should be sufficient through build-out. Additional facilities will be needed at Giant Steps for build-out. These facilities may be provided either at the Base Lodge or in combination with a planned on-mountain restaurant. This MDP includes the up-mountain restaurant because it provides an especially attractive year round, multiple use facility for guests and the community. In addition to the recent major upgrades of these facilities, the Giant Steps Base Lodge and Administrative Office sites may be further redeveloped in either scenario to improve the quality and image of the facilities.

For purposes of facility sizing, this analysis considers that the resort operator is the sole provider of Proprietary Services (e.g. ticket sales, ski school, first aid/ski patrol, administration, employee lockers); and the Resort provides other functions (ski rental, retail sales, food and beverage service, child care) in competition with other independent entrepreneurs operating off-site on private land and not within the permit boundary.

EXISTING FACILITIES

Table 2-14 below shows the inventory of existing base lodge, restaurant, and administration spaces.

BUILD-OUT FACILITIES

This analysis considers that the Resort will provide base lodge, restaurant and administrative spaces at the Giant Steps and Navajo Base Lodges and an Up-Mountain Restaurant near the top of Giant Steps Lift 2. Facilities are designed to provide high quality service at build-out for a guest population of 4,791 skiers/day. The facilities will also accommodate peak holiday crowds, albeit with some impact to service level quality.

The Guest Services Space Analysis below shows that the existing Navajo Base Lodge has adequate space for future needs. Some redevelopment at Giant Steps Base Lodge is needed for build-out even if the On-Mountain Restaurant is built in Phase Two. Alternatively, the Giant Steps Base Lodge could be further redeveloped to accommodate the spaces slated for the On-Mountain Restaurant. Space allocations are based on industry norms. These values are approximate and may be adjusted up or down in consideration of the Resort’s quality goals and the supply of competing facilities in the Brian Head community.

<table>
<thead>
<tr>
<th>Table 2-14, Existing Base Lodges, Restaurants and Other Facilities.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Proprietary Services</strong></td>
</tr>
<tr>
<td>Ticket Sales Pavilions</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Subtotal Ticket Sales Pavilions</strong></td>
</tr>
<tr>
<td>Children’s Ski School</td>
</tr>
<tr>
<td>First Aid/Ski Patrol</td>
</tr>
<tr>
<td>Restrooms</td>
</tr>
<tr>
<td>Administration</td>
</tr>
<tr>
<td>Employee Lockers</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
</tr>
<tr>
<td>Competitive Services</td>
</tr>
<tr>
<td>Sports Shop</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Subtotal Competitive Services</strong></td>
</tr>
<tr>
<td>Child Care</td>
</tr>
<tr>
<td>Food Services</td>
</tr>
<tr>
<td>Square feet</td>
</tr>
<tr>
<td>Seats (20sf/seat incl. back of house)</td>
</tr>
<tr>
<td><strong>Subtotal Food Services</strong></td>
</tr>
<tr>
<td>Adds to Net</td>
</tr>
<tr>
<td>General Circulation</td>
</tr>
<tr>
<td>Mechanical/Storage</td>
</tr>
<tr>
<td><strong>Subtotal Adds to Net</strong></td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>

***All figures are represented in sq. ft.***
Table 2-16, Restaurant Analysis

Guest Distribution - Lunch

<table>
<thead>
<tr>
<th>Design Population</th>
<th>4,791 Guests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Service</td>
<td>% of Total</td>
</tr>
<tr>
<td>------------------</td>
<td>------------</td>
</tr>
<tr>
<td>Resort Facilities</td>
<td></td>
</tr>
<tr>
<td>Fast Food</td>
<td>35%</td>
</tr>
<tr>
<td>Brown Bag</td>
<td>20%</td>
</tr>
<tr>
<td>Table Service</td>
<td>5%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of Service</th>
<th>Guests</th>
<th>GS Base</th>
<th>On-Mtn.</th>
<th>Resort</th>
<th>Subtotal</th>
<th>Off-Site</th>
<th>Home</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fast Food</td>
<td>2,635</td>
<td>987</td>
<td>1,648</td>
<td>1,188</td>
<td>2,875</td>
<td>958</td>
<td>958</td>
<td>4,791</td>
</tr>
<tr>
<td>Brown Bag</td>
<td>40</td>
<td>14</td>
<td>26</td>
<td>40</td>
<td>80</td>
<td>40</td>
<td>40</td>
<td>80</td>
</tr>
<tr>
<td>Table Service</td>
<td>240</td>
<td>240</td>
<td>240</td>
<td>240</td>
<td>240</td>
<td>240</td>
<td>240</td>
<td>240</td>
</tr>
</tbody>
</table>

Seating Size Recommendation

<table>
<thead>
<tr>
<th>Type of Service</th>
<th>Guests</th>
<th>GS Base</th>
<th>On-Mtn.</th>
<th>Resort</th>
<th>Off-Site</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fast Food Brown Bag</td>
<td>225</td>
<td>225</td>
<td>225</td>
<td>225</td>
<td>450</td>
<td>450</td>
</tr>
<tr>
<td>Table Service Seats</td>
<td>0</td>
<td>125</td>
<td>125</td>
<td>125</td>
<td>250</td>
<td>250</td>
</tr>
</tbody>
</table>

PARKING

Table 2-17, Peak Parking Demand Supply shows existing, interim and build-out parking demand and supply. The calculations are based on Peak Day conditions with 125% of the design SAX01. This assessment shows that the current peak day parking deficit is eliminated in the interim condition and is very close at build-out. Without the Interconnect Lift and associated projects, substantial additional parking may be needed.

Both the Town and Resort Master Plans describe day parking requirements based on current user patterns including high overnight guest use of the day parking lots. The interconnect lifts, trails, and skoways will provide good ski-to-ski from the lodges and thus reduce such uses from the resort. Additional seating on decks or snow will accommodate peak day crowds - as the truly peak events are fair weather driven.

Table 2-17, Peak Parking Demand Supply

<table>
<thead>
<tr>
<th>Type of Service</th>
<th>Guests</th>
<th>GS Base</th>
<th>On-Mtn.</th>
<th>Resort</th>
<th>Off-Site</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fast Food Brown Bag</td>
<td>225</td>
<td>225</td>
<td>225</td>
<td>225</td>
<td>450</td>
<td>450</td>
</tr>
<tr>
<td>Table Service Seats</td>
<td>0</td>
<td>125</td>
<td>125</td>
<td>125</td>
<td>250</td>
<td>250</td>
</tr>
</tbody>
</table>

Seats/Kitchen Sq. Ft. 4,500 4,500 7,000 16,000 12,500 22,500
current 75% to about 20% at build-out. The remaining 80% of overnight guests would leave their cars at their lodgings. Additional mountain employee parking will be provided at the Mountain Shop.

**Table 2-17, Peak Parking Demand/Supply.**

<table>
<thead>
<tr>
<th>Parking Demand User Category</th>
<th>P/Car</th>
<th>Current Persons Use %</th>
<th>Cars</th>
<th>Interim Persons Use %</th>
<th>Cars</th>
<th>Build-out Persons Use %</th>
<th>Cars</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day Guest</td>
<td>3</td>
<td>2,000 100%</td>
<td>66</td>
<td>2,500 100%</td>
<td>833</td>
<td>3,000 100%</td>
<td>1,000</td>
</tr>
<tr>
<td>Overnight Guest</td>
<td>2.5</td>
<td>2,300 75%</td>
<td>690</td>
<td>2,700 33%</td>
<td>60</td>
<td>3,000 20%</td>
<td>240</td>
</tr>
<tr>
<td>Mountain Employee</td>
<td>2</td>
<td>150 100%</td>
<td>75</td>
<td>200 100%</td>
<td>100</td>
<td>250 100%</td>
<td>125</td>
</tr>
<tr>
<td>Base Area Employee</td>
<td>2</td>
<td>50 100%</td>
<td>25</td>
<td>100 100%</td>
<td>50</td>
<td>150 100%</td>
<td>75</td>
</tr>
<tr>
<td><strong>Total Demand</strong></td>
<td></td>
<td><strong>4,500</strong></td>
<td><strong>1,457</strong></td>
<td><strong>5,500</strong></td>
<td><strong>1,343</strong></td>
<td><strong>6,400</strong></td>
<td><strong>1,440</strong></td>
</tr>
</tbody>
</table>

**Parking Supply**

<table>
<thead>
<tr>
<th>Lot</th>
<th>Spaces</th>
<th>Spaces</th>
<th>Spaces</th>
</tr>
</thead>
<tbody>
<tr>
<td>Giant Steps South</td>
<td>400</td>
<td>400</td>
<td>345</td>
</tr>
<tr>
<td>Giant Steps North</td>
<td>0</td>
<td>265</td>
<td>265</td>
</tr>
<tr>
<td><strong>Giant Steps Subtotal</strong></td>
<td>400</td>
<td>665</td>
<td>610</td>
</tr>
<tr>
<td>Navajo Base</td>
<td>450</td>
<td>425</td>
<td>425</td>
</tr>
<tr>
<td>Brian Head Hotel</td>
<td>200</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td><strong>Navajo Subtotal</strong></td>
<td>650</td>
<td>625</td>
<td>625</td>
</tr>
<tr>
<td>South Town</td>
<td>200</td>
<td>0</td>
<td>50</td>
</tr>
<tr>
<td>Mountain Shop</td>
<td>50</td>
<td>100</td>
<td>150</td>
</tr>
<tr>
<td><strong>Total Supply</strong></td>
<td>1,300</td>
<td>1,390</td>
<td>1,435</td>
</tr>
</tbody>
</table>

**Peak Day Surplus (Deficit) Spaces**

| (157) | 47 | (5) |

**UTILITIES**

All existing utility lines within the ski area except water tanks are buried. Future utility extensions to serve lifts and other facilities will also be buried. Power for the Bowl Lift would stem from Chair 5 and follow one of the two ski trails that would provide ingress and egress to the bottom terminal. Power for Shoshone Lift would originate from a substation on private lands and follow either the lift line or the proposed ski trail to the north of the lift, and terminate at the top tower.

**MOUNTAIN ROADS**

Figure 2-5. Mountain Roads (below) shows both the system roads to be maintained and other existing roads, ATV routes, and vehicular shortcuts to be abated on Forest Service Lands. In addition, Figure 2-5 shows roads which provide access to ski area facilities on private lands.
SUMMER CONSIDERATIONS
All summer programs and facilities will be governed by the annual operating plans. Summer lift operations and other on-mountain programs are important for year-round use of the committed resources—both public and private. Winter cross country ski routes and rehabilitated logging roads can double as summer trails for equestrian, hiking and mountain bike uses. Additional trail linkages and staffed programs may be proposed as demand for summer recreation opportunities grow. Where such elements occur on National Forest lands, administrative approval will be sought as part of this Summer Operating Plan, proposed under a special use application.

Summer on mountain food service may be provided for temporary facilities until such time as permanent facilities are provided at the on-mountain restaurant.

AMERICANS WITH DISABILITIES
All new or revised facilities in this Alternative will meet the Americans with Disabilities Act (ADA) standards. Additionally, where possible and based on market demand, guest services for people with disabilities will be provided. Accessibility for all resort users is a primary goal of the winter sports partnership.

IMPLEMENTATION AND PHASING
The timing of construction cannot be predicted with certainty. Much is dependent upon forces outside the control of the Permittee. However, it is the Permittee’s intent to implement the Interconnect (a Primary Objective) within one to five years following approval of this MDP. Brian Head Bowl and other terrain issues (another Primary Objective) not addressed as part of the Interconnect are expected to proceed within two to five years. The list of Other Objective projects will be implemented over the next 10 years at the discretion of the Resort, or as skier demands warrant. Certain quality improvements will be implemented up front. Those Other Objective projects which are dependent on skier number growth will be staged as that growth occurs.

Annual Operating plans will include detailed descriptions for project construction within the USFS Permit Boundary.

GENERAL PROJECT SEQUENCE
The Project Sequence presented below does not represent a strict time line. However, the columns numbered one through five roughly represent years with the marks within each column representing quarterly blocks. Elements marked in the last column will be implemented as needed or earlier as funding and market advantage may direct.

<table>
<thead>
<tr>
<th>Project Element</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>1 - 10</th>
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<tbody>
<tr>
<td>Master Plan/Permit Amendment</td>
<td>XX</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Primary Objective - Interconnect</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>USFS Operating Plan, Design efforts</td>
<td>XXX</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shoshone Lift 1</td>
<td></td>
<td>XXX</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Interconnect Lift 3-B</td>
<td>XXX</td>
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<td></td>
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</tr>
<tr>
<td>Interconnect Ski Trails</td>
<td>XXX XXX XXX</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shoshone Ski trails</td>
<td>XXX XXX</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ski lift bridge</td>
<td>XXX</td>
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<tr>
<td>Primary Objective - Terrain Balance</td>
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<td></td>
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<tr>
<td>USFS Operating Plan, Design efforts</td>
<td>XXX</td>
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<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Brian Head Bowl Lift 8</td>
<td></td>
<td></td>
<td></td>
<td>XXX XXX XXX</td>
<td></td>
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</tr>
<tr>
<td>Brian Head Bowl Ski trails</td>
<td>XXX XXX XXX</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Other - Quality Upgrades</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Extend Navajo Lift 4</td>
<td>XXX</td>
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<tr>
<td>Navajo Ski Trails</td>
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<tr>
<td>Hotel Surface Lift 9</td>
<td>XX</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Hotel / Ski School Ski Trails</td>
<td>XX</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Navajo Base Parking</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>XX</td>
<td></td>
</tr>
<tr>
<td>Mountain Shop Parking</td>
<td>XX</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Giant Steps Parking</td>
<td>XX</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Up - Mountain Restaurant</td>
<td>XX</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Revise Giant Steps Lift 2</td>
<td>XX</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Giant Steps Trail improvements</td>
<td>XX</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

MITIGATION MEASURES FOR THE PROPOSED ACTION:

Vegetation:
- Design runs, interconnects, and lift lines to minimize tree removal as much as practical.
- Consider windfirmness during trail and lift design and layout. Edges of ski runs, traverses, or lift lines will be designed to minimize windthrow.
- Protect residual trees during ski run and lift line construction. Use directional felling, endlining to designated skid trails, and designated landings. Protect aspen bark from damage to minimize disease spread in the clone.

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• Noncommercial timber felled during construction could be anchored and angled to the fall line of the slope to reduce surface erosion, provide organic nutrients and microclimates for plant establishment.

• Trees and small diameter slash (< 3 inches diameter) will not be left sufficient volumes to create a fire hazard. Limbs may be lopped and scattered or burned, along with excess logs.

• Slash created during any summer construction season should be used or disposed of within 1 year. Disposal would include use approved soil stabilization structures, chipping, scattering, or burning.

• All green Engelmann spruce trees of pieces greater than 14 inches diameter and/or 18 inches in length, felled or pushed over will be removed to designated landings or disposal sites to minimize risk of additional spruce beetle buildup.

• Consider the location of wetlands or riparian areas during the design of ski runs, buildings, drainages, trails, powerlines, waterlines, to avoid impacting vegetation or hydrologic functions of these areas. Activities should be at least 50 feet away.

• Major concentrations of slash will be properly disposed of, away from stream channels. Slash piles should be at least 50 feet away from riparian or wet areas. No firelines will be constructed in connection with slash disposal.

• Trees to be removed during ski operations will be flush cut, where possible, allowing stumps to remain on site unless stamps are removed for pre-approved reasons (i.e. control the spread of root rots).

• Restrict ground based equipment used for tree removal/skidding to slopes less than 40%, unless otherwise approved by the Forest Service.

Recreation & Scenic Resources:

• Provide for downhill loading or evacuation of beginner and intermediate skiers off of Brian Head Peak. This must be provided for in the design and operating plans before development is accepted.

• Restrict construction activities of the Bowl Area to weekdays, excluding Saturday and Sunday including all holidays.

• Installation of all lift towers and the top terminal for the bowl lift will be done by helicopter in order to avoid road construction; impacts to soils and vegetation; and to minimize visual impacts on steep slopes, except where there is road access and surface installation methods are approved by the Forest Service.

Engineering/Geotechnical:

• If the Bowl Lift is retained as a project element, recommendations from the geotechnical study must be carried forward into the design and construction stages.

• Geotechnical investigations (soil, rock and hydrology) will be conducted within the vicinity of the Bowl Lift and associated ski runs before final approval can be considered to better determine if mass instability concerns exist and to assure facilities are adequately designed and engineered, and can meet both safety concerns and still provide for mitigation constraints. These tests should include a geotechnical: report completed by a licensed geotechnical engineer, and the report will include: site mapping; engineering properties of the soil and rock at the site; subsurface conditions which describe depth of materials and subsurface water; and slope stability analysis. The slope stability analysis should also consider what effects the site disturbance would have on the groundwater hydrology along the slope.

• Brian Head Resort will provide the Forest Service with a Site Specific Geotechnical Study of the Bowl Lift, either 8A or 8B. Findings will be presented to the Dixie National Forest, Forest Supervisor. Upon receipt of the geotechnical report, the Forest Supervisor may elect to remove, or retain the Bowl Lift component from the Proposed Action.

• No preparation work (run clearing, blasting of rock along the bowl face, etc.) for ski trails or tower and terminal locations associated with the bowl lift can occur until a geotechnical report on the Bowl Lift feasibility has been completed and final approval has been given by the Forest Service. Some blasting along the face of the Brian Head Bowl may be permitted to occur as necessary to facilitate interim cat skiing from Brian Head Peak when there has been concurrence with the Forest Service Wildlife Biologist regarding the Brian Head snail and pikas.
NO ACTION - CURRENT MANAGEMENT

INTRODUCTION
An analysis of the "No Action" Alternative is required by regulation and is therefore a part of this environmental assessment.

The No Action Alternative, would not commit any further resources of the Dixie National Forest for development of the Brian Head Ski Area. No lifts would be installed or upgraded, trails cleared, support facilities constructed, roads created, or special use boundary adjustments made. Mountain operations would continue at current levels. Capacities would persist at current levels.

Selection of this alternative would dictate that the current management and existing facilities of Brian Head Resort would become the Resort's Master Development Plan. Therefore, any future proposal's from the Resorts would be considered under the provisions identified in NEPA, and require an amendment of the Master Development Plan.

NO ACTION EXISTING CONDITION
Under this No Action alternative the existing condition would become the current Master Development Plan. Therefore, no site specific actions would be proposed.

LIFTS
The following table outlines the existing chair lifts currently in operation at Brian Head Resort. Under the No Action Alternative, no new lifts or lift upgrades would occur on National Forest lands.

Table 2-19. Existing Lift Inventory.

<table>
<thead>
<tr>
<th>Lift</th>
<th>Length</th>
<th>Rise</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Giant Steps Lift 2</td>
<td>1.934</td>
<td>1,161</td>
<td>1,800</td>
</tr>
<tr>
<td>Giant Steps Lift 3</td>
<td>2.070</td>
<td>465</td>
<td>1,800</td>
</tr>
<tr>
<td>Navajo Lift 4</td>
<td>1.161</td>
<td>475</td>
<td>1,800</td>
</tr>
<tr>
<td>Navajo Lift 5</td>
<td>3.895</td>
<td>604</td>
<td>1,800</td>
</tr>
<tr>
<td>Pioneer Lift 6</td>
<td>3.075</td>
<td>762</td>
<td>1,800</td>
</tr>
</tbody>
</table>

EXISTING LIFT CAPACITY

Table 2-20 Existing Lift Capacity

<table>
<thead>
<tr>
<th>Lift</th>
<th>Type</th>
<th>Length</th>
<th>Rise</th>
<th>Speed</th>
<th>Rate</th>
<th>LE</th>
<th>SU</th>
<th>10</th>
<th>3.1</th>
<th>10</th>
<th>3.1</th>
<th>10</th>
<th>1.2</th>
<th>Lift Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>West of Hwy 143</td>
<td>Navajo Lift 4 FG-3</td>
<td>604</td>
<td>475</td>
<td>1800</td>
<td>90%</td>
<td>10</td>
<td>8.2</td>
<td>9.8</td>
<td>737</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>West of Hwy 143</td>
<td>Pioneer Lift 6 FG-2</td>
<td>139</td>
<td>300</td>
<td>1200</td>
<td>75%</td>
<td>10</td>
<td>3.1</td>
<td>3.7</td>
<td>251</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total West Side</td>
<td></td>
<td>1,800</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1,088</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>East of Hwy 143</td>
<td>Giant Steps Lift 2 FG-3</td>
<td>1161</td>
<td>475</td>
<td>1800</td>
<td>90%</td>
<td>10</td>
<td>10.4</td>
<td>12.5</td>
<td>887</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>East of Hwy 143</td>
<td>Black Foot Lift 3 FG-3</td>
<td>439</td>
<td>475</td>
<td>1800</td>
<td>90%</td>
<td>10</td>
<td>4.8</td>
<td>5.8</td>
<td>558</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>East of Hwy 143</td>
<td>Black Foot Lift 3 FG-3</td>
<td>2500</td>
<td>475</td>
<td>1800</td>
<td>90%</td>
<td>10</td>
<td>6.5</td>
<td>7.8</td>
<td>635</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>East of Hwy 143</td>
<td>Rope Lift 5 FG-3</td>
<td>3075</td>
<td>762</td>
<td>1800</td>
<td>90%</td>
<td>10</td>
<td>5.5</td>
<td>6.6</td>
<td>597</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total East Side</td>
<td></td>
<td>2,618</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3,765</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TRAILS
The following is a trails inventory by beginner, intermediate and advanced terrain currently offered at Brian Head Resort. This inventory would remain consistent under the No Action Alternative.

Table 2-21 Existing Trail Acreage.

<table>
<thead>
<tr>
<th>Terrain Type</th>
<th>Begin.</th>
<th>Intermed.</th>
<th>Adv.</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slope Gradient</td>
<td>&lt; 25%</td>
<td>25 - 45%</td>
<td>&gt;45%</td>
<td></td>
</tr>
<tr>
<td>West of Hwy 143</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Navajo Lift 5</td>
<td>44</td>
<td>10.8</td>
<td>54.8</td>
<td></td>
</tr>
<tr>
<td>Pioneer Lift 6</td>
<td>10.5</td>
<td></td>
<td>10.5</td>
<td></td>
</tr>
<tr>
<td>West Trails (acres)</td>
<td>54.5</td>
<td>10.8</td>
<td>65.3</td>
<td></td>
</tr>
<tr>
<td>East of Hwy 143</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Giant Steps Lift 2</td>
<td>23</td>
<td>35.5</td>
<td>52</td>
<td>110.5</td>
</tr>
<tr>
<td>Black Foot Lift 3</td>
<td>12</td>
<td>8.5</td>
<td>20.5</td>
<td></td>
</tr>
<tr>
<td>Rope Lift 5</td>
<td>2.5</td>
<td>30</td>
<td>35</td>
<td>67.5</td>
</tr>
<tr>
<td>The Dunes Lift 7</td>
<td>20</td>
<td>12</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>East Trails (acres)</td>
<td>37.5</td>
<td>94</td>
<td>99</td>
<td>230.5</td>
</tr>
<tr>
<td>Existing Trails (acres)</td>
<td>92</td>
<td>104.8</td>
<td>99</td>
<td>295.8</td>
</tr>
</tbody>
</table>
EXISTING SKI TERRAIN CAPACITY

Table 2-22 Existing Ski Terrain Capacity

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>West of Hwy 143</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Navajo Lift 4</td>
<td>44</td>
<td>10.8</td>
<td>54.8</td>
<td>660</td>
<td>108</td>
<td>768</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pioneer Lift 6</td>
<td>10.5</td>
<td>10.5</td>
<td>157.5</td>
<td>158</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subtotal West Side</td>
<td>54.5</td>
<td>10.8</td>
<td>65.3</td>
<td>877.5</td>
<td>108</td>
<td>926</td>
<td></td>
<td></td>
</tr>
<tr>
<td>East of Hwy 143</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Giant Steps Lift 2</td>
<td>23</td>
<td>35.5</td>
<td>52</td>
<td>110.5</td>
<td>345</td>
<td>355</td>
<td>260</td>
<td>960</td>
</tr>
<tr>
<td>Black Foot Lift 3</td>
<td>12</td>
<td>8.5</td>
<td>20.5</td>
<td>180</td>
<td>85</td>
<td>265</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Roulette Lift 5</td>
<td>2.5</td>
<td>30</td>
<td>35</td>
<td>67.5</td>
<td>38</td>
<td>300</td>
<td>175</td>
<td>513</td>
</tr>
<tr>
<td>The Dunes Lift 7</td>
<td>20</td>
<td>12</td>
<td>32</td>
<td>200</td>
<td>60</td>
<td>260</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subtotal East Side</td>
<td>37.5</td>
<td>94</td>
<td>99</td>
<td>230.5</td>
<td>563</td>
<td>940</td>
<td>495</td>
<td>1998</td>
</tr>
<tr>
<td>Total Existing Acres/SAO1</td>
<td>92</td>
<td>104.8</td>
<td>99</td>
<td>295.8</td>
<td>1,380</td>
<td>1,048</td>
<td>495</td>
<td>2,923</td>
</tr>
</tbody>
</table>

Skier Ability Distribution

47% 36% 17% 100%

EXISTING CAPACITY BALANCE

Table 2-23 Existing Capacity Balance

<table>
<thead>
<tr>
<th>Lift/Terrain Zone</th>
<th>Lift Capacity</th>
<th>Terrain Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>West of Hwy 143</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Navajo Lift 4</td>
<td>757'</td>
<td>768</td>
</tr>
<tr>
<td>Pioneer Lift 6</td>
<td>251'</td>
<td>158</td>
</tr>
<tr>
<td>Subtotal West Side</td>
<td>1,008</td>
<td>926</td>
</tr>
<tr>
<td>East of Hwy 143</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Giant Steps Lift 2/Black Foot Lift 3</td>
<td>1,445'</td>
<td>1,225</td>
</tr>
<tr>
<td>Roulette Lift 5</td>
<td>655'</td>
<td>513</td>
</tr>
<tr>
<td>The Dunes Lift 7</td>
<td>597'</td>
<td>260</td>
</tr>
<tr>
<td>Subtotal East Side</td>
<td>2,697'</td>
<td>1,998</td>
</tr>
<tr>
<td>Existing (SAO1)</td>
<td>3,705</td>
<td>2,923</td>
</tr>
<tr>
<td>Annual Utilization (skier-days/year)</td>
<td>166,026</td>
<td></td>
</tr>
</tbody>
</table>

PERMIT BOUNDARY

The Forest Service Special User Permit Boundary would remain at 405 acres. No additional acres would be authorized under this alternative.
AVALANCHE PROTECTION
Avalanche protection will be detailed in annual Operating Plans. The only areas at Brian Head Resort requiring avalanche protection are in the upper steep slopes of Brian Head Bowl. Standard blasting, ski cutting in the starting zones are expected to provide adequate protection. Snow cat routes currently provide access to the starting zones.

MOUNTAIN OPERATIONS AND MAINTENANCE
In 1993, Brian Head Resort constructed a mountain maintenance facility that provides adequate spaces for mountain operations. The building contains offices, garage bays, some storage, and snow-making equipment. Outside the building is space dedicated for snow cat parking, employee parking, heavy equipment storage, and fuel tanks. Under the No Action Alternative, no additional maintenance facilities or storage areas would be developed.

SNOW-MAKING
Brian Head Resort has recently installed an airless snow-making system to augment the early season natural snow, thus guaranteeing a November opening date. The snow-making systems currently cover 156 acres on Giant Steps and Navajo trails. No further snow-making facilities/equipment are proposed under the No Action Alternative.

BASE LODGES, RESTAURANTS, AND OTHER FACILITIES
Table 2-24 below shows the inventory of existing base lodge, restaurant, and administration spaces.

Table 2-24. Existing Base Lodges, Restaurants and Other Facilities.

<table>
<thead>
<tr>
<th>Use</th>
<th>Navajo Base</th>
<th>Giant Steps Base</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proprietary Services</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ticket Sales, Pavilions</td>
<td>Lift Ticket</td>
<td>360</td>
<td>640</td>
</tr>
<tr>
<td></td>
<td>Ski School</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>Subtotal Sales Pavilions</td>
<td>360</td>
<td>840</td>
<td>1,400</td>
</tr>
<tr>
<td>Childrens Ski School</td>
<td>2,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>First Aid Ski Patrol</td>
<td>800</td>
<td>880</td>
<td>1,680</td>
</tr>
<tr>
<td>Restrooms</td>
<td>1,150</td>
<td>1,700</td>
<td>2,850</td>
</tr>
<tr>
<td>Administration</td>
<td>400</td>
<td>4,050</td>
<td>4,450</td>
</tr>
<tr>
<td>Employee Lockers</td>
<td>1,200</td>
<td>2,160</td>
<td>3,360</td>
</tr>
<tr>
<td>Subtotal</td>
<td>6,110</td>
<td>9,830</td>
<td>15,400</td>
</tr>
<tr>
<td>Competitive Services</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sports Shop</td>
<td>Equipment Rental</td>
<td>3,200</td>
<td>3,600</td>
</tr>
<tr>
<td></td>
<td>Retail Sales</td>
<td>3,000</td>
<td>1,750</td>
</tr>
<tr>
<td></td>
<td>Guest Lockers, Basset Check</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Subtotal Sports Shop</td>
<td>6,700</td>
<td>5,350</td>
<td>12,050</td>
</tr>
<tr>
<td>Child Care</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subtotal</td>
<td>6,700</td>
<td>5,350</td>
<td>12,050</td>
</tr>
<tr>
<td>Food Services</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Square feet</td>
<td>6,920</td>
<td>3,960</td>
<td>10,880</td>
</tr>
<tr>
<td>Seats (20% seat incl. back of house)</td>
<td>246</td>
<td>198</td>
<td>544</td>
</tr>
<tr>
<td>Subtotal</td>
<td>6,920</td>
<td>3,960</td>
<td>10,880</td>
</tr>
<tr>
<td>Adds to Net</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Circulation</td>
<td>4,720</td>
<td>950</td>
<td>5,670</td>
</tr>
<tr>
<td>Mechanical Storage</td>
<td>2,075</td>
<td>300</td>
<td>2,375</td>
</tr>
<tr>
<td>Subtotal</td>
<td>6,795</td>
<td>1,250</td>
<td>8,045</td>
</tr>
<tr>
<td>Total</td>
<td>26,525</td>
<td>20,190</td>
<td>46,715</td>
</tr>
</tbody>
</table>

*** All figures are represented in sq. ft.***
PARKING

Table 2-25, Peak Parking Demand/Supply shows existing parking demand and supply.

Table 2-25. Parking Demand/Supply.

<table>
<thead>
<tr>
<th>Parking Demand</th>
<th>Current</th>
<th>Use %</th>
<th>Cars</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day Guest</td>
<td>3</td>
<td>2000</td>
<td>100%</td>
</tr>
<tr>
<td>Overnight Guest</td>
<td>2.5</td>
<td>2000</td>
<td>75%</td>
</tr>
<tr>
<td>Mountain Employee</td>
<td>2</td>
<td>150</td>
<td>100%</td>
</tr>
<tr>
<td>Base Area Employee</td>
<td>2</td>
<td>50</td>
<td>100%</td>
</tr>
<tr>
<td>Total Demand</td>
<td>4,500</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

PARKING SUPPLY

Lot | Spaces
---|-----
Giant Steps South | 400
Giant Steps North | 0
Giant Steps Subtotal | 400
Navajo Base | 450
Brian Head Hotel | 200
Navajo Subtotal | 650
South Town | 200
Mountain Shop | 50
Total Supply | 1,300
Peak Day Surplus (Deficit) Spaces | (157)

UTILITIES

Under the No Action Alternative, no new utilities would be installed.

MOUNTAIN ROADS

Current management of the mountain roads would persist following the provisions outlined in the annual Operating Plan. No new roads would be authorized under this alternative.

SUMMER CONSIDERATIONS

All summer programs and facilities will be governed by the annual operating plans. Summer lift operations and other on-mountain programs are important for year-round use of the committed resources—both public and private. No new trails would be authorized under this alternative.

AMERICANS WITH DISABILITIES

All new and remodel facilities will adhere to the standards and guidelines outlined in the Americans with Disabilities Act.

IMPLEMENTATION AND PHASING

If selected, the No Action Alternative would dictate that no new development would occur. Therefore, implementation and Phasing are no relevant at this time.

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FIGURE 2-7, EXISTING SITE PLAN
**ALTERNATIVE A - INTEGRATED ALTERNATIVE**

**INTRODUCTION**
Brian Head Resort has presented the Dixie National Forest with a request to develop and expand winter and summer recreation opportunities, as identified in the Brian Head Resort Master Development Plan (MDP). The Forest Service has reviewed the MDP and incorporated elements into this alternative that would help achieve the goals and objectives identified in the DNFRMP. Additionally, this alternative addresses the significant issues presented in the beginning of this chapter. The primary goal of this alternative is to provide for changes to existing facilities and for additional facilities intended to promote the sustained and prosperous use of the committed resources at Brian Head by providing high quality recreation products for guests, residents, and entrepreneurs.

**LIFTS**
To the greatest extent practicable, existing lifts will be retained as-is through the remainder of the equipment’s useful life. However, some changes to existing lifts and new lifts are proposed. The changes and additions are needed to interconnect the Navajo and Giant Steps facilities, to develop intermediate terrain, to balance capacities, for improved skier circulation/quality improvements, as well as, to offer a full product to guests and residents.

**LIFT DESIGN CRITERIA**
Lift design will be reviewed and approved with annual construction plans. In general, however, the following criteria shall apply. Lift design will comply with industry and regulatory norms. Lower terminal sites will be graded to the extent necessary for lift equipment, snow maintenance, maze platforms, and skier in-runs to facilitate safe and efficient operations. Upper terminal sites will be graded to the extent necessary for lift equipment snow maintenance skier egress and waiting areas to facilitate safe, and efficient operations. Ski-under cable height will be provided along the line wherever possible. Exceptions may occur at the terminals and where particular off-site visual quality considerations may dictate.

**EXISTING LIFTS RETAINED “AS-IS”**
The following existing Lifts are to be retained in their current configuration. Actions regarding these lifts include routine maintenance and operation. Additionally at such time as these lifts reach the end of their useful life, they may be replaced within the current lift line as part of annual operating permit processes.

**Table 2-26, Existing Lift Retained “As Is”**

<table>
<thead>
<tr>
<th>Lift</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black Foot Lift 3</td>
<td>Fixed Grip Chairlift - rated capacity 1,800 skiers/hour.</td>
</tr>
<tr>
<td></td>
<td>Length / Rise: 2.070' / 465&quot;</td>
</tr>
<tr>
<td>Roulette Lift 5</td>
<td>Fixed Grip Chairlift - rated capacity 1,800 skiers/hour.</td>
</tr>
<tr>
<td></td>
<td>Length / Rise: 3.075' / 762&quot;</td>
</tr>
<tr>
<td>Pioneer Lift 6</td>
<td>Fixed Grip Chairlift - rated capacity 1,200 skiers/hour.</td>
</tr>
<tr>
<td></td>
<td>Length / Rise: 919' / 139&quot;</td>
</tr>
<tr>
<td>Dunes Lift 7</td>
<td>Fixed Grip Chairlift - rated capacity 1,800 skiers/hour.</td>
</tr>
<tr>
<td></td>
<td>Length / Rise: 2.618' / 570&quot;</td>
</tr>
<tr>
<td></td>
<td>This chairlift may be removed and reused elsewhere. In this event the majority of the trails served by the Dunes Lift would be return ski to the Giant Steps Lift.</td>
</tr>
</tbody>
</table>

**INTERCONNECT LIFTS - PHASE ONE**
Figure 2-8, (below) shows the Interconnect Lift Alternatives.

The interconnect between Navajo and Giant Steps ski terrain is the key feature needed to change the perception of Brian Head from that of two, small separate ski areas to a unified mid-sized full service resort and to fully utilize the existing runs. Two lifts are needed to make the interconnect work (an Interconnect Lift and Chair 1). If a suitable Interconnect Lift alternative is not realized, there is no commitment to re-install the Shoshone Lift 1.

Three corridors are under consideration. Each corridor contains several suitable Interconnect Lift alternatives. Interconnect Lift 3-B is analyzed in this MDP because its skier capacities and trails are among the higher of alternatives under consideration. Depending on which interconnect alternative is built, the lifts and associated projects should be constructed in a single season.

**A) Interconnect Corridor #1**

<table>
<thead>
<tr>
<th>Lift 3B</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lift 3B</td>
<td>Fixed Grip Chairlift - rated capacity 1,800 skiers/hour.</td>
</tr>
<tr>
<td></td>
<td>Length / Rise: 3.450' / 670&quot;</td>
</tr>
<tr>
<td>Lift 3C</td>
<td>Alternative 3C serves much the same terrain as the Interconnect Lift 3B but has greater impacts to private lands.</td>
</tr>
<tr>
<td></td>
<td>Fixed Grip Chairlift - rated capacity 1,800 skiers/hour.</td>
</tr>
<tr>
<td></td>
<td>Length / Rise: 3,500' / 695&quot;</td>
</tr>
</tbody>
</table>

Chapter 2 Issues & Alternatives

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B) Interconnect Corridor #2:

Lift 1A

- Interconnect Lift Option 1A should be retained for future development as a possible transportation link between Navajo Base and Giant Steps Base. This lift could further reduce surface transportation needs by providing many non-skiing and overnight guests and residents an attractive alternative to using cars both day and night, year round.

C) Interconnect Corridor #3:

- Three other lift alignments (1B, 2, and 3A) were evaluated and are possible. Any one of these provide the interconnection between mountains. The other alternatives remain open and viable though not ideal because of the following factors:
  - Transportation lifts only - no skiing components.
  - Complex private property issues.

D) Re-install Shoshone Lift

- Fixed Grip Chairlift - rated capacity 1,800 skiers/hour.
- Length / Rise: 3,500' / 580'

Chapter 2 Issues & Alternatives
2-76
QUALITY UPGRADE LIFTS
Quality upgrade projects are not expected to be held until the completion of Phases One and Two. To the extent that funding becomes available items A) and B) may be constructed concurrently with earlier phases.

A) Relocate Navajo Lift 4 Lower Terminal
- Extend lift line approximately 350 ft toward Navajo Base Lodge.
- New Lower Terminal located approximately 150 ft from Navajo Base Lodge.
- Substantially improves guest arrival lift access without skiing or congestion impacts.
- Approximately 4 acres of new trails are proposed to improve skier circulation approaching Navajo Base and to improve low snow, beginner egress to the Shoshone Lift 1.

B) Hotel Surface Lift 9
- Small surface Lift with mid-way unload provides transportation from both directions.
- On-ski route toward Navajo Base provides approximately 2 acres of ideal ski school teaching terrain for never-ever students and young children, and for snow play activities without congestion or interference with other skier.

C) Replace Giant Steps Lift 2
- This project involves increased capacity, replacement and slight lift realignment.
- Improves out-of-valley lift capacity and skier circulation.
- Summer and winter "flagship" product.
- Detachable Quad Chairlift - rated capacity 2,400 persons/hour.
- Length / Rise: 4,934' / 1,150'.
- 50% download capacity.
- Will only be implemented as skier numbers or market advantage dictates.

TRAELS
The current ski trails inventory is long on beginner, but short of intermediate and especially expert trails. Most of the new trails provided for in the MDP address the shortfall of intermediate and some expert skiing. The abundance of beginner trails persists even at build-out.

TRAIL DESIGN CRITERIA
Skil trails are designed to follow the fall line. Careful selection of terrain segments, along which the natural fall line varies, will allow for turns and variations in aspect to create variety and interest in the ski experience, and soften the visual impacts. Retention of vegetation islands at appropriate locations within the trail system and scalloped edge effects will address further visual and variety goals.

In addition to standard cleared runs, certain areas lend themselves to gladed ski spaces. In particular, gladed ski spaces can reduce sun effects on east facing slopes, and lessen visual effects. Gladed trails have very limited applicability on beginner terrain because of lower skier ability.

The number of skiers that can be accommodated per acre of trails depends in part on the category of terrain. Beginner trails can accommodate more than intermediate trails, which in turn handles more than expert trails. This is due to higher speeds as ability increases. The conversion of trail acreage to ski capacity is presented in the Capacity discussion in Table 2-27 below.

EXISTING TRAIL ACREAGE

Table 2-27, Existing Trail Acreage.

<table>
<thead>
<tr>
<th>Terrain Type</th>
<th>Begin.</th>
<th>Intermed.</th>
<th>Adv.</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slope Gradient</td>
<td>&lt; 25%</td>
<td>25 - 45%</td>
<td>&gt; 45%</td>
<td></td>
</tr>
<tr>
<td>West of Hwy. 143</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shoshone Lift 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Navajo Lift 4</td>
<td>44</td>
<td>10.5</td>
<td>34.5</td>
<td>54.8</td>
</tr>
<tr>
<td>Pioneer Lift 6</td>
<td>10.5</td>
<td>10.5</td>
<td></td>
<td>21.0</td>
</tr>
<tr>
<td>West Trails (acres)</td>
<td>54.5</td>
<td>10.8</td>
<td>65.3</td>
<td></td>
</tr>
<tr>
<td>East of Hwy. 143</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Giant Steps Lift 2</td>
<td>23</td>
<td>35.5</td>
<td>52</td>
<td>110.5</td>
</tr>
<tr>
<td>Black Forest Lift 3</td>
<td>12</td>
<td>8.5</td>
<td>20.5</td>
<td></td>
</tr>
<tr>
<td>Roulette Lift 5</td>
<td>2.5</td>
<td>30</td>
<td>35</td>
<td>97</td>
</tr>
<tr>
<td>The Dummy Lift 7</td>
<td>20</td>
<td>12</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>East Trails (acres)</td>
<td>37.5</td>
<td>94</td>
<td>99</td>
<td>230.5</td>
</tr>
<tr>
<td>Existing Trails (acres)</td>
<td>92</td>
<td>104.8</td>
<td>99</td>
<td>296.8</td>
</tr>
</tbody>
</table>

INTERCONNECT TRAILS AND ASSOCIATED PROJECTS - PHASE ONE

Shoshone Trails
- Utilizes reactivated trails plus approximately 15 acres in 4 new trails:

Table 2-28, Shoshone Trails.

<table>
<thead>
<tr>
<th>Skier ability</th>
<th>Reactivated Trail Acres</th>
<th>New Trail Acres</th>
<th>Total Trail Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beginner</td>
<td>8</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>Intermediate</td>
<td>35</td>
<td>15</td>
<td>50</td>
</tr>
<tr>
<td>Expert</td>
<td>17</td>
<td>0</td>
<td>17</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>15</td>
<td>75</td>
</tr>
</tbody>
</table>
Enhanced low snow/beginner skiway provides circulation to and from Navajo Base.
Glade skiing would be utilized on the south facing aspect of this lift.

Highway-143 Skier Bridge and Terminal Grading
- Skier Bridge - width 100' x span 60' with standard highway clearances.
- Overpass ramp grading and terminal grading.

Interconnect Trails
These trails are to be constructed with the preferred Interconnect Lift 3B or the 3A alternatives only. Other Interconnect Lift alternatives serve as transportation lifts only and do not have associated ski trails.
- Approximately 30 acres in new trails and skiway:

Table 2-29, Interconnect Trails.

<table>
<thead>
<tr>
<th>Skier ability</th>
<th>Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beginner</td>
<td>5</td>
</tr>
<tr>
<td>Intermediate</td>
<td>15</td>
</tr>
<tr>
<td>Expert</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
</tr>
</tbody>
</table>

Table 2-30, New Ski Terrain.

<table>
<thead>
<tr>
<th>Skier ability</th>
<th>Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ski School</td>
<td>2</td>
</tr>
<tr>
<td>Beginner</td>
<td>4</td>
</tr>
<tr>
<td>Intermediate</td>
<td></td>
</tr>
<tr>
<td>Expert</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>6</td>
</tr>
</tbody>
</table>

B) Giant Steps Trail Projects
- Minor trail modifications for skier circulation and visibility which may be processed in annual construction and operating plans.

BUILD-OUT TRAIL ACREAGE

Table 2-31, Build Out Trail Acreage.

<table>
<thead>
<tr>
<th>Terrain Type</th>
<th>West of Hwy. 143</th>
<th>East of Hwy. 143</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Begin.</td>
<td>Intermed.</td>
<td>Adv.</td>
</tr>
<tr>
<td>Slope Gradient</td>
<td>&lt; 25%</td>
<td>25 - 45%</td>
<td>&gt;45%</td>
</tr>
<tr>
<td>West Trails (acres)</td>
<td>Shoshone Lift 1</td>
<td>8</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>Navajo Lift 4</td>
<td>48</td>
<td>10.8</td>
</tr>
<tr>
<td></td>
<td>Pioneer Lift 6</td>
<td>13</td>
<td>13.0</td>
</tr>
<tr>
<td></td>
<td>Hotel Surface Lift 9</td>
<td>2</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>71</td>
<td>60.8</td>
</tr>
<tr>
<td>East Trails (acres)</td>
<td>Giant Steps Lift 2</td>
<td>23</td>
<td>35.5</td>
</tr>
<tr>
<td></td>
<td>Black Foot Lift 3</td>
<td>20.2</td>
<td>18.5</td>
</tr>
<tr>
<td></td>
<td>Roulette Lift 5</td>
<td>5</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>The Dunes Lift 7</td>
<td>20</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Interconnect Lift3B</td>
<td>5</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>53.2</td>
<td>119</td>
</tr>
<tr>
<td>Build-out Trails (acres)</td>
<td>123.2</td>
<td>179.8</td>
<td>126</td>
</tr>
</tbody>
</table>

Chapter 2 Issues & Alternatives
2-80
MOUNTAIN CAPACITY ANALYSIS

Mountain Capacity is expressed as SAOT (skiers at one time). The analysis in this section describes SAOT at normal design levels for both lifts and trails. The design elements for each are chosen conservatively to allow for peak holiday periods without substantial product quality degradation. In practice peak holiday conditions are commonly 1/4 to 1/3 over the design SAOT.

The industry recognized distribution of skier ability is about 25% beginner, 50% intermediate, and 25% advanced. The current intermediate and advanced trail acreage is consistent with an area designed for about 2,000 SAOT. This acreage is very low when compared to an existing lift capacity of 3,705 SAOT. This disparity is the physical basis for the common perception of Brian Head as a beginner area, and for the interest for more upper ability terrain.

Figure 2-9 shows the MDP ski pod analysis. Currently Brian Head has a shortage of intermediate and advanced terrain in comparison with lift capacity. There is an abundance of beginner terrain now and at build-out. The projects of the MDP achieve a close balance between lift and terrain capacity - the result of which is graciously low skier densities on beginner trails, with comfortable utilization of intermediate and advanced terrain under normal and peak holiday utilization.
Fig. 2-9. Ski Pod Analysis
**LIFT CAPACITY**

Table 2-32 below calculates lift capacity. The calculations take into account the factors outlined below.

### Table 2-32, Lift Capacity Formula

<table>
<thead>
<tr>
<th>Formula</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>( C_p )</td>
<td>Lift Capacity expressed as the number of skiers the lift can serve.</td>
</tr>
<tr>
<td>( C_{L/6} )</td>
<td>Converts the Manufacturer's Rated Lift Capacity (skiers/hour) into skiers/minute.</td>
</tr>
<tr>
<td>( LE )</td>
<td>Lift Efficiency - adjusts for loading mixups, slow downs, stops, etc. Lifts used by lower ability skiers have a lower L.E. values than those used by higher ability skiers.</td>
</tr>
<tr>
<td>( SU )</td>
<td>Skier Utilization - adjusts for operational factors such as transportation utilization (i.e. using the lift to access another lift rather than for return skiing) and anticipated qualitative adjustments in skier utilization (i.e. long traverses or runouts, non-contiguous terrain types, etc.).</td>
</tr>
<tr>
<td>( T_M )</td>
<td>Maze Time. Lift line wait time is a principal factor in guest perception of ski area quality. A Maze Time of 10 minutes (used in this analysis) is generally acceptable under full utilization. Under Peak conditions ( T_M ) will increase.</td>
</tr>
<tr>
<td>( T_L )</td>
<td>Lift Ride Time derived by dividing the lift length by the rope speed.</td>
</tr>
<tr>
<td>( T_S )</td>
<td>Ski Down Time. By observation at Vail, the Ski Down Time on fixed grip chairs averaged 1.2 times the ride time. With the increased rope speed for detachable chairlifts, the adjusted value is 2.4 times the Lift Ride Time. Longer ski down times are assigned for beginner lifts.</td>
</tr>
</tbody>
</table>

The formula used to determine the Lift Capacity of each lift is as follows:

\[
C_p = (C_{L/6})/SU \cdot T_M \cdot T_L \cdot T_S
\]

---

### Table 2-33, Lift Capacity

<table>
<thead>
<tr>
<th>Lift</th>
<th>Type</th>
<th>Length</th>
<th>Rise</th>
<th>Speed</th>
<th>Rated Capacity</th>
<th>LE</th>
<th>SU</th>
<th>T_M</th>
<th>T_L</th>
<th>T_S</th>
<th>Lift Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>West of Hwy 145</td>
<td>Navajo Lift 4</td>
<td>FG-3</td>
<td>3895</td>
<td>604</td>
<td>475</td>
<td>1800</td>
<td>90%</td>
<td>100%</td>
<td>10</td>
<td>8.2</td>
<td>9.8</td>
</tr>
<tr>
<td></td>
<td>Pioneer Lift 6</td>
<td>FG-2</td>
<td>919</td>
<td>139</td>
<td>500</td>
<td>1200</td>
<td>75%</td>
<td>100%</td>
<td>10</td>
<td>3.1</td>
<td>3.7</td>
</tr>
<tr>
<td>East of Hwy 145</td>
<td>Giant Steps Lift 2</td>
<td>FG-3</td>
<td>4934</td>
<td>1161</td>
<td>475</td>
<td>1800</td>
<td>90%</td>
<td>100%</td>
<td>10</td>
<td>10.4</td>
<td>12.5</td>
</tr>
<tr>
<td></td>
<td>Black Foot Lift 3</td>
<td>FG-3</td>
<td>2360</td>
<td>439</td>
<td>475</td>
<td>1800</td>
<td>90%</td>
<td>100%</td>
<td>10</td>
<td>4.8</td>
<td>5.8</td>
</tr>
<tr>
<td></td>
<td>Roulette Lift 5</td>
<td>FG-3</td>
<td>3075</td>
<td>762</td>
<td>475</td>
<td>1800</td>
<td>90%</td>
<td>100%</td>
<td>10</td>
<td>6.5</td>
<td>7.8</td>
</tr>
<tr>
<td></td>
<td>The Dunes Lift 7</td>
<td>FG-3</td>
<td>2618</td>
<td>570</td>
<td>475</td>
<td>1800</td>
<td>90%</td>
<td>100%</td>
<td>10</td>
<td>5.5</td>
<td>6.6</td>
</tr>
</tbody>
</table>

**SKI TERRAIN CAPACITY**

Ski Terrain Capacity is an index of the number of skiers who can be accommodated on the full complement of developed and natural ski terrain. The index is stated as Skier Density in skiers/acre. Skier Density generally decreases with increased skier ability. Further, snowboard riders and shaped ski skiers tend to reduce acceptable skier density. The Ski Terrain Capacities shown in Table 2-34, Ski Terrain Capacity (below), are calculated using values of 15 skiers/acre for the Beginner abilities, 10 skiers/acre for the Intermediate, and 5 skiers/acre for the Advanced. These values are within industry norms in keeping with
Table 2-34, Ski Terrain Capacity.

<table>
<thead>
<tr>
<th>Existing Ski Terrain</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Terrain Zone</td>
<td>Acres Begin.</td>
<td>Inter.</td>
</tr>
<tr>
<td>West of Hwy 143</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shoshone Lift 1</td>
<td>44</td>
<td>10.8</td>
</tr>
<tr>
<td>Navajo Lift 4</td>
<td>10.5</td>
<td>10.5</td>
</tr>
<tr>
<td>Total West Side</td>
<td>54.5</td>
<td>10.8</td>
</tr>
<tr>
<td>East of Hwy 143</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Giant Steps Lift 2</td>
<td>23</td>
<td>35.5</td>
</tr>
<tr>
<td>Roulette Lift 5</td>
<td>2.5</td>
<td>30</td>
</tr>
<tr>
<td>The Dunes Lift 7</td>
<td>20</td>
<td>12</td>
</tr>
<tr>
<td>Total East Side</td>
<td>37.5</td>
<td>94</td>
</tr>
<tr>
<td>Total Exciting Acres</td>
<td>92</td>
<td>104.8</td>
</tr>
<tr>
<td>Skier Ability Distribution</td>
<td>44%</td>
<td>35%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Build-out Ski Terrain</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Terrain Zone</td>
<td>Acres Begin.</td>
<td>Inter.</td>
</tr>
<tr>
<td>West of Hwy 143</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shoshone Lift 1</td>
<td>8</td>
<td>10.8</td>
</tr>
<tr>
<td>Navajo Lift 4</td>
<td>48</td>
<td>10.8</td>
</tr>
<tr>
<td>Pioneer Lift 6</td>
<td>13</td>
<td>13.0</td>
</tr>
<tr>
<td>Hotel Surface Lift 9</td>
<td>2</td>
<td>2.0</td>
</tr>
<tr>
<td>Total West Side</td>
<td>71</td>
<td>60.8</td>
</tr>
<tr>
<td>East of Hwy 143</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Giant Steps Lift 2</td>
<td>23</td>
<td>35.5</td>
</tr>
<tr>
<td>Black Foot Lift 3</td>
<td>26.2</td>
<td>18.5</td>
</tr>
<tr>
<td>Roulette Lift 5</td>
<td>5</td>
<td>30</td>
</tr>
<tr>
<td>The Dunes Lift 7</td>
<td>20</td>
<td>12</td>
</tr>
<tr>
<td>Total East Side</td>
<td>53.2</td>
<td>119</td>
</tr>
<tr>
<td>Total Build-out Acres</td>
<td>124.2</td>
<td>179.8</td>
</tr>
<tr>
<td>Skier Ability Distribution</td>
<td>43%</td>
<td>42%</td>
</tr>
</tbody>
</table>

Note 1: Skier/acre assumptions as follows are within industry norms:

<table>
<thead>
<tr>
<th>Existing Build-Out</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Beginner</td>
<td>15</td>
</tr>
<tr>
<td>Intermediate</td>
<td>10</td>
</tr>
<tr>
<td>Export</td>
<td>5</td>
</tr>
</tbody>
</table>

PERMIT BOUNDARY AMENDMENT

As part of the Master Plan Revision process, the following amendments to the Special Use Permit Boundary are requested. The application includes the 333 acres described below, also shown on Figure 2-10 below. These areas are within the adopted Forest Map Unit 1-B (Winter Sports Site), as directed under the Proposed Forest Plan Amendments proposed with this project.
Shoshone Lift 1
Amend the Permit Boundary to include an additional 94 acres. The area shown is needed to facilitate the reinstalled lift, skier circulation, and suitable terrain served by the proposed lift.

Interconnect Area
Amend the Permit Boundary to include 48 acres of USFS lands in SE1/4 of NW1/4 of Sect 11, and NE1/4 of SW1/4 of Sect 11; T36S, R9W which are within the Brian Head Town limits. Portions of preferred Interconnect Lift 3B and associated ski terrain would be sited on these lands.

Brian Head Bowl Lift
Amend Permit boundary to include 191 acres inclusive of the lift, skier circulation and skiable terrain of the bowl.

SEASONAL EMPHASIS AND OPPORTUNITIES
Brian Head Resort is principally a winter sports site dedicated to skiing. Summer utilization is substantially less at present - being shared between a large and rapidly growing mountain biking activity, tourism support for Cedar Breaks National Monument, second home owners in and around the Town, and dispersed recreationists. Spring uses are limited, with some fall seasonal support for hunting and fall color spectators. Many of the elements of this MDP provide greatly improved opportunities for both winter and summer tourism opportunities.

The principal winter season opportunities which this MDP addresses are improved skiing through improved skier circulation, adequate ski terrain and ability balance, improved lift equipment and other facilities. The opportunity for gladed trails and specialized terrain and snow grooming areas for snowboarders exist particularly in the Shoshone Lift 1 area.

Other on-mountain winter recreation opportunities in addition to typical ski area operations which may be implemented include but may not be limited to the following:

Table 2-36, Winter Recreation Emphasis and Opportunities

<table>
<thead>
<tr>
<th>Recreation Opportunity</th>
<th>Nighttime</th>
<th>Daytime</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. lift operations</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>2. skiing</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>3. food and beverage</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>4. entertainment events</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>5. snow play venue</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>6. ice skating rink</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>7. guided snowmobile tours</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>8. sleigh rides</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>9. nordic ski maintained track and shelter system</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>10. future developments in ski related recreation</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

An outdoor ice skating facility is also contemplated on private land near Navajo Base. At this time ice skating is envisioned during winter only as ambient temperatures permit.

Summer recreation opportunities may be implemented including but not limited to the following:

Table 2-37, Summer Recreation Emphasis and Opportunities

<table>
<thead>
<tr>
<th>Recreation Opportunity</th>
<th>Nighttime</th>
<th>Daytime</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. lift operations</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>2. food and beverage</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>3. entertainment events</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>4. mountain bike venue</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>5. equestrian trails/guide and wagon rides</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>6. summer trails and shelter system</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>7. interpretive signage/trails</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>8. alpine slide or similar venue</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>9. golf driving range and putting instruction venue</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>10. future developments in non-motorized summer recreation</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
AVAILANCHE PROTECTION
Avalanche Protection will be detailed in annual Operating Plans. The only areas at Brian Head requiring
avalanche protection are in the upper steep slopes of Brian Head Bowl. Standard blasting, ski cutting in the
starting zones are expected to provide adequate protection. Snow cat routes currently provide excellent
access to the starting zones. Avalanche resistive towers may be required as part of the engineering for either
Brian Head Bowl Lift alternative.

MOUNTAIN OPERATIONS AND MAINTENANCE
The Mountain Maintenance facility is a recently built, well designed facility which appears to have adequate
space for mountain operations through completion of Phase One and Two. Additional snow cat barn,
equipment yard, may be needed in the same vicinity at build-out. Mountain employee lockers and employee
parking will be added to the site when base area facilities become fully utilized.

BASE LODGES, RESTAURANTS, AND OTHER FACILITIES
The existing facilities at Navajo Base should be sufficient through build-out. Additional facilities will be
needed at Giant Steps for build-out. In addition to the recent major upgrades of these facilities, the Giant
Steps Base Lodge and Administrative Office sites may be further redeveloped in either scenario to improve
the quality and image of the facilities.

For purposes of facility sizing, this analysis considers that the resort operator is the sole provider of
Proprietary Services (e.g. ticket sales, ski school, first aid/ski patrol, administration, employee lockers); and
the Resort provides other functions (ski rental, retail sales, food and beverage service, child care) in
competition with other independent entrepreneurs operating off-site on private land and not within the
permit boundary.

EXISTING FACILITIES
Table 2-38 below shows the inventory of existing base lodge, restaurant, and administration spaces.

Table 2-38, Existing Base Lodges, Restaurants and Other Facilities.

<table>
<thead>
<tr>
<th>Use</th>
<th>Navajo Base</th>
<th>Giant Steps Base</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proprietary Services</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ticket Sales Pavilions</td>
<td>Lift Ticket</td>
<td>360</td>
<td>640</td>
</tr>
<tr>
<td></td>
<td>Ski School</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>Subtotal Sales Pavilions</td>
<td></td>
<td>560</td>
<td>840</td>
</tr>
<tr>
<td>Childrens Ski School</td>
<td>2,000</td>
<td></td>
<td>2,000</td>
</tr>
<tr>
<td>First Aid/Ski Patrol</td>
<td>800</td>
<td></td>
<td>880</td>
</tr>
<tr>
<td>Restrooms</td>
<td>1,150</td>
<td>1,700</td>
<td>2,850</td>
</tr>
<tr>
<td>Administration</td>
<td>400</td>
<td>4,050</td>
<td>4,450</td>
</tr>
<tr>
<td>Employee Lockers</td>
<td>1,200</td>
<td>2,160</td>
<td>3,360</td>
</tr>
<tr>
<td>Subtotal</td>
<td>6,110</td>
<td>9,650</td>
<td>15,760</td>
</tr>
<tr>
<td>Competitive Services</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sports Shop</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Equipment Rental</td>
<td>3,200</td>
<td>3,600</td>
</tr>
<tr>
<td></td>
<td>Retail Sales</td>
<td>3,500</td>
<td>1,750</td>
</tr>
<tr>
<td></td>
<td>Guest Locker/Basket Check</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Subtotal Sports Shop</td>
<td>6,700</td>
<td>5,350</td>
<td>12,050</td>
</tr>
<tr>
<td>Child Care</td>
<td>6,700</td>
<td>5,350</td>
<td>12,050</td>
</tr>
<tr>
<td>Food Services</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Square feet</td>
<td>6,920</td>
<td>3960</td>
<td>10,880</td>
</tr>
<tr>
<td>Seats (20sf/seat incl. back of house)</td>
<td>346</td>
<td>198</td>
<td>544</td>
</tr>
<tr>
<td>Subtotal</td>
<td>6,920</td>
<td>3960</td>
<td>10,880</td>
</tr>
<tr>
<td>Adds to Net</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Circulation</td>
<td>4,720</td>
<td>950</td>
<td>5,670</td>
</tr>
<tr>
<td>Mechanical/Storage</td>
<td>2,075</td>
<td>300</td>
<td>2,375</td>
</tr>
<tr>
<td>Subtotal</td>
<td>6,795</td>
<td>1,250</td>
<td>8,045</td>
</tr>
<tr>
<td>Total</td>
<td>26,525</td>
<td>20,190</td>
<td>46,715</td>
</tr>
</tbody>
</table>

BUILD-OUT FACILITIES
This analysis considers that the Resort will provide base lodge, restaurant and administrative spaces at the
Giant Steps and Navajo Base Lodges. Facilities are designed to provide high quality service at build-out for
a guest population of 4,291 skiers/day. The facilities will also accommodate peak holiday crowds, albeit
with some impact to service level quality.

The Guest Services Space Analysis below shows that the existing Navajo Base Lodge has adequate space
for future needs. Some redevelopment at Giant Steps Base Lodge is needed for. Space allocations are based
on industry norms. These values are approximate and may be adjusted up or down in consideration of the
Resort's quality goals and the supply of competing facilities in the Brian Head community.

Chapter 2 Issues & Alternatives
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Chapter 2 Issues & Alternatives
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### Table 2-39. Build Out Base Lodges, Restaurants, and Other Facilities.

<table>
<thead>
<tr>
<th>Guest Population</th>
<th>1,430</th>
<th>2,861</th>
<th>4,291</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use</td>
<td>Typical ratio</td>
<td>Navajo Base</td>
<td>Giant Steps Base</td>
</tr>
<tr>
<td>Proprietary Services</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ticket Sales Pavilions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lift Ticket</td>
<td>0.25</td>
<td>358</td>
<td>715</td>
</tr>
<tr>
<td>Ski School</td>
<td>0.35</td>
<td>1,100</td>
<td>500</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subtotal Sales Pavilions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Childrens Ski School</td>
<td>lump sum</td>
<td>1,500</td>
<td>250</td>
</tr>
<tr>
<td>First Aid/Ski Patrol</td>
<td>0.25</td>
<td>358</td>
<td>715</td>
</tr>
<tr>
<td>Restrooms</td>
<td>0.65</td>
<td>930</td>
<td>1,859</td>
</tr>
<tr>
<td>Administration</td>
<td>lump sum</td>
<td>2,000</td>
<td>2,000</td>
</tr>
<tr>
<td>Employee Lockers</td>
<td>lump sum</td>
<td>1,000</td>
<td>500</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subtotal</td>
<td>5,245</td>
<td>6,540</td>
<td>11,785</td>
</tr>
</tbody>
</table>

#### Retail/Commercial

<table>
<thead>
<tr>
<th>Sports Shop</th>
<th>2,302</th>
<th>4,405</th>
<th>6,707</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment Rental</td>
<td>1.00</td>
<td>1,430</td>
<td>2,861</td>
</tr>
<tr>
<td>Retail Sales</td>
<td>0.25</td>
<td>358</td>
<td>715</td>
</tr>
<tr>
<td>Guest Lockers/Basket Check</td>
<td>0.15</td>
<td>215</td>
<td>429</td>
</tr>
<tr>
<td>Total</td>
<td>2,718</td>
<td>5,435</td>
<td>8,153</td>
</tr>
</tbody>
</table>

#### Child Care

<table>
<thead>
<tr>
<th>Type of Service</th>
<th>0.5</th>
<th>715</th>
<th>1,430</th>
<th>2,146</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>2,718</td>
<td>5,435</td>
<td>8,153</td>
<td></td>
</tr>
</tbody>
</table>

#### Restaurants

(See Sect IV.1.3 below)

<table>
<thead>
<tr>
<th>Seats</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fast Food</td>
<td>225</td>
<td>225</td>
<td></td>
</tr>
<tr>
<td>Table Service</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Total Subtotal</td>
<td>225</td>
<td>225</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Subtotal Restaurant Sq.Ft.</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>4,300</td>
<td>4,500</td>
<td>9,000</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Adds to Net</th>
<th>% of Above</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>General Circulation</td>
<td>25%</td>
<td>3,116</td>
<td>4,199</td>
</tr>
<tr>
<td>Mechanical/Storage</td>
<td>5%</td>
<td>623</td>
<td>824</td>
</tr>
<tr>
<td>Total</td>
<td>3,739</td>
<td>4,943</td>
<td>8,682</td>
</tr>
</tbody>
</table>

| Gross Usable Square Footage | 16,201 | 21,418 | 37,619 |

### RESTAURANTS

Three restaurants are contemplated at build-out: the existing 1) Giant Steps Base, and 2) Navajo Base. Changes to existing restaurants will be phased as user demands dictate.

Restaurants provided by the Permittee will be designed for 4,291 SAOT in the context of the other opportunities in the community. Table 2-40. Restaurant Analysis (below) below shows the expected lunch time distribution of users, and calculates seating requirements at build out of the resort. Additional seating on decks or snow will accommodate peak day crowds - as the truly peak events are fair weather driven.

### Table 2-40. Restaurant Analysis.

#### Guest Distribution - Lunch

<table>
<thead>
<tr>
<th>Design Population</th>
<th>4,291 Guests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Service</td>
<td></td>
</tr>
<tr>
<td>Resort Facilities</td>
<td>% of Popul.</td>
</tr>
<tr>
<td>Fast Food</td>
<td>35%</td>
</tr>
<tr>
<td>Brown Bag</td>
<td>20%</td>
</tr>
<tr>
<td>Table Service</td>
<td>5%</td>
</tr>
<tr>
<td>Resort Subtotal</td>
<td>100%</td>
</tr>
<tr>
<td>Off-site Lunch</td>
<td>20%</td>
</tr>
<tr>
<td>Home/Lunch</td>
<td>20%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

#### Seating Analysis - Lunch

<table>
<thead>
<tr>
<th>Design Population</th>
<th>4,291 Guests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Service</td>
<td></td>
</tr>
<tr>
<td>Fast Food Brown Bag</td>
<td>Guests</td>
</tr>
<tr>
<td>Turns</td>
<td>4.0</td>
</tr>
<tr>
<td>Table Service</td>
<td>Guests</td>
</tr>
<tr>
<td>Turns</td>
<td>2.0</td>
</tr>
<tr>
<td>Seals</td>
<td>0</td>
</tr>
</tbody>
</table>

#### Facility Size Recommendation

<table>
<thead>
<tr>
<th>Type of Service</th>
<th>Navajo</th>
<th>GS Base</th>
<th>Resort Subtotal</th>
<th>Off-site Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fast Food Brown Bag</td>
<td>Guests</td>
<td>225</td>
<td>225</td>
<td>450</td>
</tr>
<tr>
<td>Table Service Seats</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>225</td>
</tr>
<tr>
<td>Total Seats</td>
<td>225</td>
<td>225</td>
<td>450</td>
<td>350</td>
</tr>
<tr>
<td>Seating+Kitchen Sq. Ft.</td>
<td>4,500</td>
<td>4,500</td>
<td>9,000</td>
<td>12,250</td>
</tr>
</tbody>
</table>

Chapter 2 Issues & Alternatives

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PARKING

Table 2-41, Peak Parking Demand/Supply shows existing, interim and build-out parking demand and supply. The calculations are based on Peak Day conditions with 125% of the design SAOT. This assessment shows that the current peak day parking deficit is eliminated in the interim condition and is very close at build-out. Without the Interconnect Lift and associated projects, substantial additional parking may be needed.

Both the Town and Resort Master Plans describe day parking requirements based on current user patterns - including high overnight guest use of the day parking lots. The interconnect lifts, trails, and skiways will provide good ski-to/ski-from the lodgings and thus reduce such uses from the current 75% to about 20% at build-out. The remaining 80% of overnight guests would leave their cars at their lodgings. Additional mountain employee parking will be provided at the Mountain Shop.

Table 2-41, Peak Parking Demand/Supply.

<table>
<thead>
<tr>
<th>Parking Demand User Category</th>
<th>Current Persons</th>
<th>Use %</th>
<th>Cars</th>
<th>Interim Persons</th>
<th>Use %</th>
<th>Cars</th>
<th>Build-out Persons</th>
<th>Use %</th>
<th>Cars</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day Guest</td>
<td>2,000</td>
<td>100%</td>
<td>660</td>
<td>2,500</td>
<td>100%</td>
<td>833</td>
<td>3,000</td>
<td>100%</td>
<td>1,000</td>
</tr>
<tr>
<td>Overnight Guest</td>
<td>2,300</td>
<td>75%</td>
<td>690</td>
<td>2,700</td>
<td>33%</td>
<td>360</td>
<td>3,000</td>
<td>20%</td>
<td>240</td>
</tr>
<tr>
<td>Mountain Employee</td>
<td>150</td>
<td>100%</td>
<td>75</td>
<td>200</td>
<td>100%</td>
<td>100</td>
<td>250</td>
<td>100%</td>
<td>125</td>
</tr>
<tr>
<td>Base Area Employee</td>
<td>50</td>
<td>100%</td>
<td>25</td>
<td>100</td>
<td>100%</td>
<td>50</td>
<td>150</td>
<td>100%</td>
<td>75</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>4,500</strong></td>
<td></td>
<td><strong>1,457</strong></td>
<td><strong>5,500</strong></td>
<td><strong>1,343</strong></td>
<td><strong>6,400</strong></td>
<td><strong>1,440</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parking Supply Lot Space</th>
<th>Cars</th>
<th>Spaces</th>
</tr>
</thead>
<tbody>
<tr>
<td>Giant Steps South</td>
<td>400</td>
<td>400</td>
</tr>
<tr>
<td>Giant Steps North</td>
<td>265</td>
<td></td>
</tr>
<tr>
<td>Giant Steps Subtotal</td>
<td>605</td>
<td>618</td>
</tr>
<tr>
<td>Navajo Base</td>
<td>450</td>
<td>425</td>
</tr>
<tr>
<td>Brian Head Hotel</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>Navajo Subtotal</td>
<td>625</td>
<td>625</td>
</tr>
<tr>
<td>South Town</td>
<td>200</td>
<td>0</td>
</tr>
<tr>
<td>Mountain Shop</td>
<td>50</td>
<td>150</td>
</tr>
<tr>
<td><strong>Total Supply</strong></td>
<td><strong>1,200</strong></td>
<td><strong>1,239</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Peak Day Surplus (Deficit)</th>
<th>Spaces</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>47</td>
</tr>
</tbody>
</table>

UTILITIES

All existing utility lines within the ski area except water tanks are buried. Future utility extensions to serve lifts and other facilities will also be buried. Power for Shoshone Lift would originate from a substation on private lands and follow either the lift line or the proposed ski trail to the north of the lift, and terminate at the top tower.

Chapter 2 Issues & Alternatives

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MOUNTAIN ROADS

Figure 2-11. Mountain Roads (below) shows both the system roads to be maintained and other existing roads, ATV routes, and vehicular shortcuts to be abated on Forest Service Lands. In addition Figure 2-11 shows roads which provide access to ski area facilities on private lands.

SUMMER CONSIDERATIONS

All summer programs and facilities will be governed by the annual operating plans. Summer lift operations and other on-mountain programs are important for year-round use of the committed resources—both public and private. Winter cross country ski routes and rehabilitated logging roads can double as summer trails for equestrian, hiking and mountain bike uses. Additional trail linkages and staffed programs may be proposed as demand for summer recreation opportunities grow. Where such elements occur on National Forest lands, administrative approval will be sought as part of the Summer Operating Plan, proposed under a special use application. Summer on mountain food service may be provided for temporary facilities for special events.

AMERICANS WITH DISABILITIES

All new or remodeled facilities in this Alternative will meet the Americans with Disabilities Act (ADA) standards. Additionally, where possible and based on market demand, guest services for people with disabilities will be provided. Accessibility for all resort users is a primary goal of the winter sports partnership.

IMPLEMENTATION AND PHASING

The timing of construction cannot be predicted with certainty. Much is dependent upon forces outside the control of the Permittee. However, it is the Permittee’s intent to implement the Interconnect (a Primary Objective) within one to five years following approval of this MDP. The list of Other Objective projects will be implemented over the next 10 years at the discretion of the Resort, or as skier demands warrant. Certain quality improvements will be implemented up front. Those Other Objective projects, which are dependent on skier number growth, will be staged as that growth occurs.

Annual Operating plans will include detailed descriptions for project construction within the USFS Permit Boundary.

Chapter 2 Issues & Alternatives

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GENERAL PROJECT SEQUENCE

The Project Sequence presented below does not represent a strict time line. However, the columns numbered one through five roughly represent years with the marks within each column representing quarterly blocks. Elements marked in the last column will be implemented as needed or earlier as funding and market advantage may direct.

Table 2-42, General Project Sequence.

<table>
<thead>
<tr>
<th>Project Element</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>1-10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master Plan/Permit Amendment</td>
<td>XX</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary Objective - Interconnect</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>USFS Operating Plan, Design efforts</td>
<td>XXX</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shoshone Lift 1</td>
<td>XXX</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interconnect Lift 3-B</td>
<td>XXX</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interconnect Ski Trails</td>
<td>XXX XXX</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shoshone Ski trails</td>
<td>XXX</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skier bridge</td>
<td>XXX</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other - Quality Upgrades</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extend Navajo Lift 4</td>
<td>XX</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Navajo Ski Trails</td>
<td>XX</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hotel Surface Lift 9</td>
<td>XX</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hotel / Ski School Ski Trails</td>
<td>XX</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Navajo Base Parking</td>
<td>XX</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mountain Shop Parking</td>
<td>XX</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Giant Steps Parking</td>
<td>XX</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Revise Giant Steps Lift 2</td>
<td>XX</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Giant Steps Trail improvements</td>
<td>XX</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

MITIGATION MEASURES FOR ALTERNATIVE A:

Vegetation:

- Noncommercial timber felled during construction could be anchored and angled to the fall line of the slope to reduce surface erosion, provide organic nutrients and microclimates for plant establishment.
- Trees and small diameter slash (< 3 inches diameter) will not be left sufficient volumes to create a fire hazard. Limbs may be lopped and scattered or burned, along with excess logs.
- Slash created during any summer construction season will be used or disposed of within 1 year. Disposal would include use approved soil stabilization structures, chipping, scattering, or burning.
- All green Engelmann spruce trees of pieces greater than 14 inches diameter and/or 18 inches in length, felled or pushed over will be removed to designated landings or disposal sites to minimize risk of additional spruce beetle buildup.
- Consider the location of wetlands or riparian areas during the design of ski runs, buildings, drainages, trails, powerlines, waterlines, to avoid impacting vegetation or hydrologic functions of these areas. Activities should be at least 50 feet away.
- Major concentrations of slash will be properly disposed of, away from stream channels. Slash piles should be at least 50 feet away from riparian or wet areas. No firelines will be constructed in connection with slash disposal.
- Trees to be removed during ski operations will be flush cut, where possible, allowing stumps to remain on site unless stumps are remove for pre-approved reasons (i.e. control the spread of root rots).
- Restrict ground based equipment used for tree removal/skidding to slopes less than 40%, unless otherwise approved by the Forest Service.

Chapter 2 Issues & Alternatives
2-98
### SUMMARY OF THE THREE ALTERNATIVES CONSIDERED IN DETAIL

Table 2-43, Summary of the Three Alternatives Considered in Detail.

#### PROJECT ELEMENTS

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Proposed Action</td>
<td>10</td>
<td>530</td>
<td>4,791</td>
<td>738</td>
<td>196</td>
<td>1,435</td>
</tr>
<tr>
<td>No Action</td>
<td>7</td>
<td>301.5</td>
<td>2,923</td>
<td>405</td>
<td>156</td>
<td>1,300</td>
</tr>
<tr>
<td>Alternative A</td>
<td>9</td>
<td>430</td>
<td>4,291</td>
<td>738</td>
<td>156</td>
<td>1,435</td>
</tr>
</tbody>
</table>

#### COMPARISON OF ISSUES AND INDICATORS OF FULFILLMENT OF PURPOSE AND NEED, BY ALTERNATIVE

The following table provides a basis for comparing alternatives. The detail analysis which provides the foundation for this comparison is contained in Chapter 3, Affected Environment, and Chapter 4, Environmental Consequences.

Table 2-44 Comparison of Alternatives.

#### COMPARISON OF ALTERNATIVES

<table>
<thead>
<tr>
<th>Measurement Indicators</th>
<th>Proposed Action</th>
<th>No Action</th>
<th>Alternative A</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>WATERSHED:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Acres of</td>
<td>149</td>
<td>0</td>
<td>67</td>
</tr>
<tr>
<td>Disturbance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Acres of</td>
<td>1527</td>
<td>1378</td>
<td>1445</td>
</tr>
<tr>
<td>Disturbance in CEW</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent of CEW</td>
<td>22%</td>
<td>19.8%</td>
<td>20.8%</td>
</tr>
<tr>
<td>Watershed Management</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Plan</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>WILDLIFE:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peregrine falcon</td>
<td>Moderate</td>
<td>Low to Moderate</td>
<td>Low to Moderate</td>
</tr>
</tbody>
</table>

### Measurement Indicators

<table>
<thead>
<tr>
<th>Mexican Spotted Owl</th>
<th>Proposed Action</th>
<th>No Action</th>
<th>Alternative A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bald Eagle</td>
<td>Low to Moderate</td>
<td>Low</td>
<td>Low to Moderate</td>
</tr>
<tr>
<td>Three-toed woodpecker</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Moderate</td>
</tr>
<tr>
<td>Northern Goshawk</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Moderate</td>
</tr>
<tr>
<td>Western big-eared Bat</td>
<td>Low to Moderate</td>
<td>Low to Moderate</td>
<td>Low to Moderate</td>
</tr>
<tr>
<td>Spotted Bat</td>
<td>Low to Moderate</td>
<td>Low to Moderate</td>
<td>Low to Moderate</td>
</tr>
<tr>
<td>Flammulated Owl</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Rocky Mountain Elk</td>
<td>Low to Moderate</td>
<td>Low</td>
<td>Low to Moderate</td>
</tr>
<tr>
<td>Mule Deer</td>
<td>Low to Moderate</td>
<td>Low</td>
<td>Low to Moderate</td>
</tr>
<tr>
<td>Merriam’s Turkey</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Northern Flicker</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Brian Head</td>
<td>Moderate</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Mountainsnail</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pika</td>
<td>Low to Moderate</td>
<td>Moderate</td>
<td>Moderate</td>
</tr>
</tbody>
</table>

#### VEGETATION:

<table>
<thead>
<tr>
<th>Measurement Indicators</th>
<th>Proposed Action</th>
<th>No Action</th>
<th>Alternative A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Snags (acres)</td>
<td>82</td>
<td>272</td>
<td>137</td>
</tr>
<tr>
<td>Down Logs &amp; Large Woody Debris (acres)</td>
<td>15-20 ton/acre</td>
<td>15-20 tons/acre</td>
<td>15-20 tons/acre</td>
</tr>
<tr>
<td>Size Class Distribution</td>
<td>5-12”DBH</td>
<td>5-12”DBH</td>
<td>5-12”DBH</td>
</tr>
<tr>
<td>Canopy Cover</td>
<td>&lt;40%</td>
<td>&lt;40%</td>
<td>&lt;40%</td>
</tr>
<tr>
<td>Grassland (acres distribution)</td>
<td>15</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Riparian (acres)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Conifer &amp; Aspen (acres)</td>
<td>130</td>
<td>0</td>
<td>45</td>
</tr>
<tr>
<td>Acres Fragmented</td>
<td>170</td>
<td>0</td>
<td>47</td>
</tr>
</tbody>
</table>

Chapter 2 Issues & Alternatives

2-101
### CHAPTER 3

**AFFECTED ENVIRONMENT**

#### INTRODUCTION

Chapter 3 describes the portions of the physical environment that may be affected by implementation of the Proposed Action, and alternatives to the Proposed Action. Descriptions focus on resources conditions in the area potentially affected by the alternatives. The descriptions of existing conditions provides the basis for assessing the environmental effects of each alternative discussed in Chapter 4 (Environmental Consequences) and assessing how the alternative respond to the issues identified in Chapter 2.

#### VEGETATIVE STRUCTURE

In a forested environment, vegetative structure includes snags, down logs and woody debris, old growth, and size class/age distribution (VSS) and canopy closure.

**Snags:** As described in the Brian Head Recovery Project Draft EIS (1995, p. 3-9), the Brian Head project area was generally lacking in large snags, down logs, and large woody debris necessary to maintain soil productivity and meet structural diversity needs. Bark beetle activity has increased the number of large snags. However, within the current ski area permit boundary, many of the snags were removed (especially in stand 109/29) during salvage operations due to concerns about skier safety.

**Down logs and woody debris:** Down logs and large woody debris have increased in forested stands that have been harvested. Slash was hand piled along recreation trails to meet visual concerns, but most was left in place, so most forested acres probably meet or exceed 15-20 tons per acre. Additional harvests will occur in 1997 to remove spruce beetle infested trees in stands 109/21, 22, 23, 24, 25, 26, 28, 29, 30, 32 and 35 (Refer to Appendix 3 for stand location map). So additional down woody material will likely accumulate. The purchaser will be responsible for cleaning up slash in excess of the desired 15-20 tons per acre.

---

### Measurement Indicators

<table>
<thead>
<tr>
<th>Measurement Indicators</th>
<th>Proposed Action</th>
<th>No Action</th>
<th>Alternative A</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RECREATION:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skier Days/Year</td>
<td>272/000</td>
<td>1660/26</td>
<td>243/729</td>
</tr>
<tr>
<td><strong>SAOT</strong></td>
<td>479/1</td>
<td>292/3</td>
<td>429/1</td>
</tr>
<tr>
<td><strong>Terrain Distribution</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Begin. 123.3 Acres</td>
<td>Begin. 98 Acres</td>
<td>Begin. 123.2 Acres</td>
<td></td>
</tr>
<tr>
<td>Interm. 179.8 Acres</td>
<td>Adv. 226 Acres</td>
<td>Adv. 179.8 Acres</td>
<td></td>
</tr>
<tr>
<td>Total: 530 Acres</td>
<td>Total: 301.8 Acres</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interconnect Lift</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Viewshed Analysis</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Old growth. Old growth stands have a unique structure and composition that provides habitat for many plant and animal species. They also have important social values. Based on requirements outlined in *Characteristics of Old Growth Forests in the Intermountain West* (Hamilton 1993), in 1993, one stand (23 acres) in the project area met old growth structural requirements. Spruce beetle mortality has since changed the structure of the stand by decreasing the number of live large trees. The fragmented nature, heavy recreational use, and intensive management that occurs in ski areas generally makes these areas unsuitable for old growth management.

**SINCE MANAGING FOR OLD GROWTH STRUCTURE IS NOT A PRIORITY IN A 1B MANAGEMENT AREA, THIS TOPIC WILL ONLY BE ADDRESSED UNDER CUMULATIVE EFFECTS SECTIONS IN CHAPTER 4, ENVIRONMENTAL CONSEQUENCES.**

Size class distribution and canopy cover. At this time, the Dixie National Forest is drawing on the intent of the Management Recommendations for the Northern Goshawk (Reynolds et al. 1992) to provide a desired condition for vegetation structure and canopy cover across various landscapes. Not all situations described in this publication occur in the Intermountain Region (i.e. some prey species do not occur here) and some forest cover types occur here that are not addressed (i.e. extensive aspen clones and lodgepole pine). Adjustments are being made to better fit these local conditions as new information becomes available.

Based on Reynolds et al. (1992), the desired distribution of tree sizes across a landscape would be 10% in the grass/forb/shrub stage; 10% in seedlings/saplings; 20% in Young Forest; 20% in Mid-aged Forest; 20% in Mature Forest; and 20% in Old Forest. Based on information provided by Amundson et al. (1996), the desired distribution for aspen across a landscape would be 40% in the grass/forb/shrub or seedling/sapling stage; 30% in Young/Mid-aged and Mature stages; and 30% in Old Forest.

Desired canopy cover varies depending on if areas are being managed for goshawk nest areas, post-fledging family areas (PFA), or foraging. The analysis area is considered potential goshawk foraging habitat, since no nest areas have been located in the area. Desired canopy cover is only identified in Mid-aged and larger size classes (12+ inches DBH).

In 1993, stand data indicated that most stands in the analysis area were Mid-aged (12-18 inches DBH) with canopy cover generally averaging 40-60 percent. The amount of bark beetle activity exceeded levels projected in the Brian Head Recovery Project TIS (1995). Since salvage operations are still occurring in the project area, no new stand exam data has been collected. Based on the best estimates available, size distribution of trees on the 370 acres of forested land in the analysis area are:

<table>
<thead>
<tr>
<th>Size Distribution</th>
<th>Acres</th>
<th>% of forested area</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1 inch DBH</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1-5 inch DBH</td>
<td>75</td>
<td>20</td>
</tr>
<tr>
<td>5-12 inch DBH</td>
<td>211</td>
<td>57</td>
</tr>
<tr>
<td>12-18 inch DBH</td>
<td>81</td>
<td>22</td>
</tr>
<tr>
<td>18-24 inch DBH</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>24+ inch DBH</td>
<td>3</td>
<td>&lt;1</td>
</tr>
</tbody>
</table>

Stands in the 12-18 inch DBH range have a large proportion of aspen and have not been greatly impacted by bark beetles (i.e. stands 109/36, 111/26, and 111/27).

It is estimated that canopy cover in most of the analysis area generally falls below 40% due to the large amount of bark beetle mortality. The exceptions are the above-mentioned stands, which due to their large proportion of aspen probably fall into the 40-60% range.

**VEGETATIVE COMPOSITION**

Vegetative composition refers to species present and their relative abundance. In forested environments, habitat types have been used to describe the potential plant communities. Habitat types integrate environmental factors that affect vegetation (i.e. soils, aspect, topography, etc.), but they do not necessarily reflect current vegetative composition since they are based on the potential vegetative community that would develop without disturbance has affected successional processes. Non-forest areas are generally described by current species composition or vegetation community.

Non-forest communities: Dry meadows and mountain grassland sites are described in the Brian Head Recovery Project Draft EIS (1994, p. 3-2). Within the analysis area, about 368 acres are currently classified as non-forest. Of these acres, about 252 are grass/forb or low shrub and 116 acres are rock.

Ski runs currently comprise about 185 of the non-forest acres. An estimated 90% of these areas were forested prior to ski area development (1960 aerial photos, Project File) and have been reclassified to grassland to reflect the current cover type. In the past after disturbance, ski runs were seeded with the following introduced grass seed mix: smooth brome (*Bromus iner-gris*).
intermediate wheatgrass (*Agropyron intermedium*), Kentucky bluegrass (*Poa pratensis*), white clover (*Trifolium repens*), alfalfa (*Medicago sativa*), yellow sweet clover (*Melilotus officinalis*). So these species comprise most of the vegetative cover in the run. In 1996, based on recommendations received from Region 4 reclamation specialists (Brown and Zufelt 1996), a new seed mix was developed, using more native species.

Riparian areas: There are several small riparian areas in the project area that are associated with springs or seeps. Refer to the "Critical Watershed/Soils Areas" map in Appendix 2 for locations. These areas have species present that indicate moist conditions such as Carex spp., or tall forbs such as *Merionella spp.*, *Smilacina stellata,* or *Actaea rubra*.

Forest areas: Habitat types for the Forest are described in Coniferous Forest Habitat Types of Central and Southern Utah (Youngblood and Maak 1985).

In the analysis area, about 370 acres are delineated as forested cover types. These acres are classified into the following habitat types: 235 acres (65%) are classified as *Abies lasiocarpa/Ribes montigenum* (ABL/A/RI), 71 acres (20%) as *Picea engelmannii/Ribes montigenum* (PIEN/RI), and 56 acres (15%) as *Abies lasiocarpa/Berberis repens* (ABL/BER). The following table shows acres by habitat type and cover type.

<table>
<thead>
<tr>
<th>HABITAT TYPE</th>
<th>CURRENT COVER TYPE (acres)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Picea engelmannii/Ribes montigenum</em></td>
<td>E. spruce</td>
<td>73</td>
<td>0</td>
</tr>
<tr>
<td><em>Abies lasiocarpa/Ribes montigenum</em></td>
<td>spruce-fir mix</td>
<td>0</td>
<td>90</td>
</tr>
<tr>
<td><em>Abies lasiocarpa/Berberis repens</em></td>
<td>aspen</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Since, as the name implies, spruce beetles (*Dendroctonus rufipennis*) are specific to all species of spruce, the bark beetle epidemic that started northeast of Brian Head Peak (in Sidney Valley) has greatly affected stand species composition. In mixed species stands (cover type spruce-fir, which also generally includes aspen as a long-lived associate), bark beetle mortality has decreased the number of spruce, shifting the dominant species to either subalpine fir or aspen, depending on initial stand composition. In stands with a spruce cover type, stand structure has been more affected than species composition, since spruce is the dominant species. Stands classified as a PIEN/RI/PRO habitat type were heavily impacted, since spruce is the only species present in large numbers.

Chapter 3 Affected Environment

3-4

THREATENED, ENDANGERED, PROPOSED, AND SENSITIVE PLANT SPECIES

See Chapter 3 Affected Environment and Chapter 4 Environmental Consequences for discussions on Threatened, Endangered, Proposed, and Sensitive Plant Species.

**NOXIOUS WEEDS**

There are no known populations of noxious weeds in or around the project area. Common sources of noxious weeds include heavy equipment that has been operating in agricultural areas that have noxious weeds and hay or straw used for livestock feed or mulch. Due to the proximity of private lands, Highway 143, and the potential for revegetation work to be completed, there is a possibility for noxious weed seeds to be introduced into the area. However, due to mitigation measures stated in Chapter 2 and the high elevation of the area, the probability of for population establishment is considered low (R. Houston, pers. comm.). DUE TO THE LOW PROBABILITY OF NOXIOUS WEED INFESTATION AND MITIGATION MEASURES REQUIRED FOR ALL ALTERNATIVES, THIS TOPIC WILL NOT BE CARRIED INTO CHAPTER 4.

**DISTURBANCE REGIMES**

Historically, the most common disturbances to spruce-fir forests were spruce beetle epidemics and fire. These events acted at different scales to produce the structure, composition, and patterns of vegetation across the spruce-fir zone on the District. A discussion of the effects of these disturbances on the vegetation types fund in the project area is located in "Effects of Fire and Timber Harvest on Vegetation" (Project File).

Impacts of insects and diseases: Spruce beetle (*Dendroctonus rufipennis*) populations have been building in Brian Head area since before 1990. Mortality pockets were first detected by aerial surveys in 1991. In 1992, pockets of subalpine fir mortality caused by western balsam bark beetle (*Dryococcus confusus*) and fir engraver beetle (*Scolytus ventralis*) were also detected on nearby private land (FPM aerial survey maps, Project File). Detailed information about bark beetle populations and other insects and diseases affecting trees in the project area are discussed in the Brian Head Recovery Project Draft EIS, 1993 (pp. 3-4 through 3-6).

Bark beetle risk: Research has indicated that stands with the following characteristics are MOST susceptible to spruce beetle attack (Schmid and Frye 1976): 1) located in well-drained creek bottoms or drainages; 2) have large diameter spruce (averaging greater than 16 inches diameter); 3) the stand has a relatively large number of trees per acre; and 4) more than 65 percent of the overstory trees are spruce.
VEGETATIVE PATTERNS

Review of aerial photographs of the project area taken in 1960, 1975, and 1993 show the progression of changes in vegetative patterns over 33 years (Project File) primarily due to ski area development (there are also changes due to vegetative succession, but these are relatively slight). In 1960, before ski area development began, the vegetative patterns were typical of the spruce-fir zone on the District; tree cover was relatively continuous, broken mainly by either wet or dry meadows and rock outcrops. Fragmentation was low and connectivity was high. Conifer and aspen patches were relatively large. By 1975, the original Chair 1 and Chair 2 had been installed and a few runs were cut, but changes on the Forest were minimal. Between 1975 and 1993, extensive harvesting and road construction occurred to install more lift lines, add additional ski runs, and widen existing runs. On the Forest this activity was concentrated west of Highway 143 (east of Highway 143, the majority of this activity occurred on private land). This greatly changed vegetative patterns by decreasing patch size and increasing fragmentation.

As discussed previously, scattered spruce beetle mortality pockets were being detected in the project area 1991 and populations have continued to build. Salvage of dead and dying spruce began in 1996 in the project area. Since the 1993 aerial photos were taken, additional changes have occurred. West of Highway 143, stands 109/21, 22, 23, 24, 26, 28, 29, 30, 32 and 33 (see Appendix 3 for stand map) have experienced extensive mortality. East of Highway 143, stands 111/38, 48, 49, and 50 have also experienced fairly extensive mortality. All of these stands have been (or will be) harvested.

CUMULATIVE EFFECTS AREA

The project area is located in the upper portion of the Parowan watershed. The cumulative effects area (CEA) for the vegetation resource discussion is based on the distribution of similar, relatively continuous, intermixed stands of Engelmann spruce, subalpine fir, and aspen, plus meadows, lava outcrops, and riparian areas. Similar vegetation is found across the upper portions of the Parowan, Mammoth, Assay, Panguitch, and Coal Creek watersheds (52991 acres).

WILDLIFE

INTRODUCTION

The following discussion updates the "Affected Environment" section of the Brian Head Recovery Project EIS (USDA 1995) on pages 3-26 through 3-35 and identifies desired conditions. The "Affected Environment" section discussing wildlife resources is hereby...
incorporated by reference.

The Brian Head Resort area consists of fragmented habitat, lack of snags and down wood (lack of habitat for prey species), nearly year-long recreational use, and annual maintenance activities in the Brian Head Ski Area. Brian Head Ski Area winter season typically lasts from November through April (varying one month or so earlier or later depending upon snow conditions). Potentially disturbing activities that occur in this area include snow cats taking skiers and snowboarders to the top of Brian Head Peak to ski or board down, explosives for avalanche prevention, snowmobiles for Ski Patrol, maintenance of the towers and lift facilities, chainsaws to cut down hazard trees or buck up trees that have fallen on the ski runs, and recreationists. Night skiing occurs along the Navajo lift and ski runs area.

The summer mountain biking season begins early July (although trails with southern exposure open earlier) and ends when the snow prevents access and use. Maintenance activities occur throughout the summer such as chainsaw use for hazard or fallen trees and use of motorcycles or Off Road Vehicles (OHV’s) for access to facilities.

Wildlife that require large continuous forested areas, abundant snags and/or down logs, or are sensitive to disturbance from human activities would not likely be found in the resort or would only use it to pass through to reach other areas. These wildlife species would include northern goshawks, peregrine falcons, and perhaps Mexican spotted owls.

During summer of 1996, a field trip with Al Winward, Region 4 Ecologist, identified high elevation areas around Cedar Breaks National Monument that were once tall forb plant communities. These areas still have soil capable of restoring this plant community, however, the seed source is gone. This plant community, therefore, is not within proper functioning conditions. The implications for wildlife are that the conditions for supporting small mammals, birds and insects is far below potential, and not within the natural range of variability. Small mammals and birds provide prey for species such as northern goshawks and peregrine falcons. Insects provide prey for bats, flammulated owls and many other species of birds, particularly Neotropical migratory birds.

THREATENED, ENDANGERED AND PROPOSED SPECIES

Peregrine Falcon

The peregrine falcon eyrie (nest on a cliff) is within the proposed Resort Expansion project. In 1993 and 1994, adults and two young were observed flying and roosting in the area, indicating that an eyrie is present and that young were produced. In 1995, this eyrie was located and had produced two fledglings (Staats 1995). In 1996, the eyrie was occupied, but appeared to have failed. The eyrie used in 1995 was not occupied, and it appeared that an alternate nest was occupied east of the 1995 eyrie, which is within one mile of the proposed project area. This year to date (May 1997) the eyrie is occupied.

Bald Eagle

A bald eagle roost is located northwest of the project area (Hedges, pers. comm.). The number of eagles using this roost is unknown. They appear to be foraging during the day in Cedar Valley and then fly up to the roost for the night (pers. observations in winter 1994-1995, 1995-1996).

Mexican spotted owl

On June 28, 1996, a male, and possibly one female, Mexican spotted owl were heard near the project area in the same location as a juvenile radio-collared owl was detected in 1992. The site was revisited on July 15, 1996, and no owls were detected. Because the owl, or owls, were detected during the breeding season, there may be a breeding pair in the area. The Brian Head Resort Expansion area, therefore, may be within a foraging area as well as juvenile dispersal and adult wintering habitat.

Southwestern Willow Flycatcher

The Brian Head Recovery EIS (USDA 1995) discusses the southwestern willow flycatcher as a "proposed species" since that was its status at that time. It was listed as an endangered species on February 27, 1995. The project area contains only ephemeral or intermittent streams with insufficient flow to support dense vegetation necessary for suitable habitat for southwestern willow flycatchers on forest land. Willows exist on private land but they are also low-growing and high elevation, supporting Lincoln's sparrow rather than willow flycatchers (indicating high alpine riparian systems). Management activities would have no affect on this species or its habitat; therefore, the southwestern willow flycatcher will not be discussed further in this document.

SENSITIVE SPECIES

Three-toed woodpecker

The Brian Head area is experiencing a spruce beetle infestation that is creating optimum foraging for this species to complete its irruptive population cycle. Ongoing harvest activities implementing the Brian Head area have been, and will continue to be reducing this habitat.

The minimum acreage of infested trees necessary to maintain viable three-toed woodpecker populations has not been determined. In Oregon, studies regarding home range sizes in lodgepole pine habitats show a variation of 751, 351 and 131 acres, and suggest that 523 acres should be left for maintaining three-toed woodpecker habitat (Goggans et. al. 1987). Baldwin 1960, and Koplin 1967 (in USDA 1975) found an average breeding territory of 106 acres in Colorado.
Northern Goshawk

Goshawks have been observed foraging southwest of the project area during 1993 surveys (Lieke 1993), however, no nests or goshawks were found in the project area during surveys (using Kennedy/Shahleichler Goshawk Survey Protocol) in 1993, 1994, 1995 - see project files). No goshawks have been seen in the area since.

At this time, the Dixie National Forest is drawing on the intent of the management recommendations written for the Southwest Region (R-3)Reynolds et al. 1992). Goshawk nest habitat has a relatively high canopy closure (70% VSS 5B-6) with at least 40% of the forested stand in VSS 4/5/6. Key habitat components for goshawk prey species include at least 3 snags per acre, 5 large (>18") down logs per acre, and wide variety of vegetative structural stages (10-10-20-20-20-20% respectively of VSS stages 1-6). Because of the resort facilities and use of the area, the percentages of VSS classes and canopy closure is not met in the Brian Head Resort Expansion area.

Spotted bat and Western Big-eared bat

The project area may be used for foraging by either or both species. Several openings on the west side of the project area may be suitable foraging sites for these bat species, and are within the foraging distance from the cliff areas in and north of Cedar Breaks National Monument and Ashdown Gorge Wilderness Area. Snags may be used for roosting by western big-eared bats (Green 1995).

Flammulated owl

No suitable nesting sites exist within the project area and these owls have not been located in the project area. Thus, management activities will have no effect on nesting habitat. Nonetheless, they may use the more continuous forested areas on the west side of the project area closer to low elevation potential nesting habitat for opportunistic foraging.

Sensitive Plants

Soil on Brian Head Peak consists of volcanic origin soils. The elevation of the proposed project area is approximately 10,000 to 11,300 feet. Potential habitat exists in the planning area for the following species: Tuscar paintbrush (Castilleja parvula var. parvula), Zion juniper (Juniperus procera), Arizona willow (Salix arizonica), Navajo Lake milkvetch (Astragalus limnocarpos var. limnocarpos), Cedar Breaks biscuitroot (Cymopterus minus), and Maguire campion (Silene petersonii).

Surveys were conducted for sensitive plant species in the proposed Chair #1 and Bowl Lift areas by Julie Wood, Biological Technician, on August 24, 1995. No sensitive plants were found.

Chapter 3 Affected Environment

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MANAGEMENT INDICATOR SPECIES

Rocky Mountain Elk and Mule deer

Habitat and use in and around the project area is fully described in the Brian Head Recovery Plan. During the summer, the area is frequented by hikers, and especially mountain bikers which tend to make the area less suitable for deer and elk foraging except where adjacent cover is good. Much of the area has been or will be harvested with the Brian Head Recovery implementation; therefore, cover will decrease and forage will be increased for approximately the next ten years or more.

Wild (Merlin's) Turkey

Wild turkeys have not been observed in the Brian Head project area. The high elevation of the area (and snow depth) restricts potential use to mid-summer and early fall which precludes nesting (nesting dates are April 15 to May 30, UDWR). There is, however, potential suitable summer range and brood rearing habitat.

The forested area west of the project area has probably higher potential value for summer turkey use because of the proximity to lower elevation nesting sites then more fragmented forest stands due to the large open areas and recreations development surrounding the east side of the project area.

Northern Flicker

This species is a primary cavity nester and indicator species for other wildlife requiring snags for nesting, roosting, and foraging habitat (although the flicker itself uses open areas for ground foraging). According to Reynolds et al. (1992) northern flickers typically nest in mixed conifer, aspen, ponderosa pine, and spruce-fir forest edge habitats, excavating holes in dead or live trees averaging ≥16 inches dbh and ≥50 inches height. Flickers forage in open woodlands and meadows primarily on animal matter. Their diet is dominated by ants.

Much of the project area has had snags removed either from beetle-caused mortality or due to safety hazards. The best densities of snags appropriate for nesting are in aspen stands, while all the open meadow areas in the project area, regardless of size, are appropriate for foraging. Including the open areas surrounding housing developments in Brian Head town as well as those along the ski slopes if food is available. The ski slopes have no down wood and therefore lack food.

Riparian Habitat Conditions

One riparian area is present within the project area on Forest land, where Arizona willow is documented to occur. The condition of this habitat is not known. Riparian habitat also exists on private land within the project area in the town of Brian Head. Wetlands and riparian habitats in
this area have been lost due to filling in for parking areas. Erosion of the adjacent ski slopes have increased risk of channel degradation and sedimentation (see Hydrology).

OTHER SPECIES OF CONCERN

Brian Head Mountainsnail

The Brian Head mountain snail (Oreobolus parowanensis Gregg, 1941) was brought to our attention during scopeing by US Fish and Wildlife Service (England 1995). They recommended that we include this species in our analysis.

The Brian Head Mountainsnail is a rare species of Rocky Mountain land snail (genus Oreobolus) that has only been found at the type locality, a rock slide near Brian Head Peak (Clarke 1995). The snail was discovered in 1941 above timber line associated with other snails usually associated with lower wooded altitudes (Clarke 1995).

Little is known regarding the biology specific to this snail, however, general inferences may be made from knowledge of other species of the same genus. Oreobolus stay below ground among the rocks until temperatures and rain create conditions suitable for them to approach ground level to forage on plant material (Clarke 1995). Other Oreobolus species are dioecious (having male and female reproductive parts on separate individuals) and if dispersed, move into mutual proximity for copulation in the spring or summer.

Mobility of Oreobolus taxa is variable; some exhibiting relatively high mobility and its individuals and populations widely distributed, and many other species having very low mobility and very restricted distributions (Clarke 1995). One subspecies (O. bayneicorrugata Henderson and Daniels) has been shown (Clarke & Hovingh, 1994:114) to have such low migratory ability that its single population has not expanded at all in a lateral directed (although some downslope movement has occurred) even into apparently suitable adjacent habitat during the past 13,000 years. The range that subspecies occupies is a range of only about 300 acres, but other subspecies of Oreobolus have even smaller ranges (Clarke 1995). O. peripherica wasatchensis (Hemphill) has been found to have the most restricted range, confined to an area of only about one-half acre and with a population of only about seven live snails and 21 empty shells per square meter (Clarke 1995).

Clarke (pers. comm.) states that land snails are very sensitive microclimates. This species may only inhabit a particular slope of Brian Head because of the microclimate. He stated that different microclimates could support different species; there is very little known. Thus, until more research is performed on O. parowanensis no conclusions can be made regarding the distribution or population size of this species.

Chapter 3 Affected Environment

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The best time to survey for this snail is in late July or August when the monsoons have wetted the soil. The snails then come to the surface. Nighttime is also a good time to survey during these months and conditions (Clarke pers. comm.). Surveys were conducted in late November, 1995, for the snail. Urgency in completing the analysis prompted surveying in less than optimum conditions. Surveys performed in 1995 determined no O. parowanensis snails present at the 99% confidence level in the three sampling areas studied, which are the locations proposed for lift towers on Brian Head Peak (Clarke 1995).

Pika

The pika (Ochotona princeps) was brought to our attention during scopeing by US Fish and Wildlife Service. They requested that we include the pika in our analysis of this project.

The pika resembles a guinea pig by appearance but it is in the order Lagomorpha, related to rabbits and hares. The type locality of the subspecies of pika that lives on the Markagunt Plateau is Brian Head Peak (Larry England, pers. comm.). On this continent, pikas occur only in the rocky areas of high mountains. Pikas are small, with adults usually weighing less than a half a pound (Zeveloff and Collett 1988). Unlike rabbits and hares, the hind feet are not modified for jumping, and are only slightly larger than the forefeet.

Pikas live in a rocky areas in the mountains, such as talus (rock debris) slides and boulder-strewn hillsides above timberline, typically at elevations of 8,000 to 13,000 feet. They feed on a variety of green plants, mostly grasses and herbs. By late summer they begin clipping vegetation and carrying it in their mouths to the rocks near their homes. The clippings are then spread out to dry before being spread into haystacks. These stacks are usually small but some may weigh over 50 pounds. They often move their piles to protect them from storms and to expose them to better drying sites before finally moving them into their homes in between the rocks. Pikas stay active throughout the winter by foraging on their stack of dried vegetation. They also will forage on lichen occasionally (Zeveloff and Collett 1988). Juvenile dispersal can be as much as two to three miles (Player 1997).

Pikas are sociable and live in large colonies. Their sociality is revealed by a high level of chatter and other types of continuous vocal communications. They are territorial in the fall, at least. In May or June about three (ranging from two to six) young are born. A second litter can arrive by summer's end (Zeveloff and Collett 1988).

Pikas are present on Brian Head Peak. This rock talus area is one of the (if not the) largest in the area around Brian Head. During surveys for the Brian Head mountainsnail, pikas were observed at all three sampling locations (Summers, personal experience). A pika skull was found at the top of the peak during preliminary surveys of the area. Suitable habitat exists outside the project area to the northeast along Sidney Ridge and other locations of talus around the District. Specific surveys for pikas have not been conducted, however, field sheets from goshawk surveys
have documented pika on many rocky lava fields on the Cedar City District. Pikas also occur in smaller rock talus areas in Cedar Breaks National Monument, as evidenced by a pika interpretive sign near a talus slope.

CUMULATIVE EFFECTS AREA

The Cumulative Effects Area (CEA) for wildlife considers 76,800 acres (See Appendix 4). This CEA is the same as described in detail in the Brian Head Recovery EIS. It represents a landscape surrounding the project area where past present and future management actions by humans have and will occur, with special reference to the spruce beetle infestation and past timber activities. See the Brian Head EIS for specific discussions of cumulative effects areas for those species addressed here. The cumulative effects area for the Brian Head mountainsnail is the rock talus at Brian Head (Site 33). This area was selected since it is a contiguous rock area. The cumulative effects area for pika consists of the rock talus and lava areas from Cedar Breaks National Monument north to and including Sidney Ridge, south to Navajo Lake and Duck Creek, and east to Blue Springs. This area was selected based presence of suitable habitat and documented occurrences.

HYDROLOGY

A complete discussion of the affected environment (water quality, water yield, and critical watershed areas) within the Parowan Creek watershed can be found in the Brian Head Recovery Project Final EIS (1995), pp. 3-23 – 3-22. The cumulative effects watershed in this analysis is the Parowan Creek watershed, from the confluence of Parowan Creek and Dry Lakes Creek to the headwaters. This cumulative effects watershed is same as the one analyzed in the aforementioned document.

Existing conditions have changed slightly within the project area and the cumulative effects watershed since the Brian Head Recovery Project Analysis. The spruce beetle epidemic has continued, affecting approximately 727 acres at the present time. Salvage logging was implemented on approximately 240 acres of Forest Service land last year (Brian Head Recovery Project). Salvage logging has also taken place on adjacent private lands, owned by Brian Head Resort. Urban development and road construction in Brian Head Town are on-going.

Table 3-1 contains approximate acres of past and present disturbance within the project area and the Parowan Creek cumulative effects watershed. The acres of salvage logging is not included in Table 3-1 because logging has occurred within the dead spruce stands. The acres of salvage logging on adjacent private lands is unknown.

<table>
<thead>
<tr>
<th>Disturbance</th>
<th>Acres</th>
<th>Percentage of Cumulative Effects Watershed</th>
</tr>
</thead>
<tbody>
<tr>
<td>spruce mortality</td>
<td>727</td>
<td>10.5</td>
</tr>
<tr>
<td>ski runs</td>
<td>433</td>
<td>6.2</td>
</tr>
<tr>
<td>urban development</td>
<td>95</td>
<td>1.4</td>
</tr>
<tr>
<td>roads</td>
<td>180</td>
<td>1.8</td>
</tr>
<tr>
<td>Total</td>
<td>1435</td>
<td>20.7</td>
</tr>
</tbody>
</table>

The acreage of urban development was estimated from aerial photos, site maps, and a GIS. It was not feasible to include small, isolated areas of development within forested areas, and development within the basin is on-going. Therefore, the acreage of urban development in and around the project area is slightly greater than 95.

SOILS

A soil survey of the proposed project area identified eight soil map units. Following is a brief description of these map units.

223: Croydon - Rock outcrop complex, 5 to 25 percent slopes. (deep soils and rock outcrop from Tertiary volcanics on undulating old landslide topography with grass/forb vegetation).

237: Namon, cool - Geertsen, warm families complex, 0 to 15 percent slopes. (deep soils formed from Tertiary volcanic rocks with spruce/fr vegetation and associated small grass/forb meadows).

238: Namon, cool - Scout families complex, 0 to 40 percent slopes. (deep soils formed from Tertiary volcanic rocks on mountain sideslopes with spruce/fr vegetation).

239: Starley - Merino families - Rock outcrop complex, 10 to 30 percent slopes. (shallow soils and rock outcrop formed from Tertiary volcanic rocks on mountain sideslopes with sparse stands of spruce/fr).

Starley and Merino soils are susceptible to irreversible resource damage (exceed soil loss tolerance). Ground disturbance on these soils should be discouraged.
The proposed project area have low gaining stability but certain disturbances at critical locations could reactivate mass movement. Only the sparsely timbered slopes of soil map unit 239 have moderate erosion rates.

A number of critical watershed areas have been identified within the project area that would require special mitigation to ensure that the soil and water resources are properly protected.

1. The slopes on the east side of Highway 148 are rated as marginally unstable land. This entire plateau sideslope is an old slump. It is classified as marginally unstable because evidence of past landslide activity is discernible but none is of recent origin. The assumption is that the area is gaining stability but certain disturbances at critical locations could reactivate mass movement. The primary concern would be to avoid such things as cutting into the slope in areas where ground water might be intercepted which could reactivate slumping (such as cutbanks during road construction or construction of ski slopes). An example of this is along Highway 148 between Brian Head and Cedar Breaks where the highway cutbank was located through a portion of soil map unit 223.

2. Soil map unit 239 has shallow soils which are susceptible to irreversible resource damage, i.e. these soils are likely to exceed the soil loss tolerance threshold if subjected to ground disturbance. If possible, these areas should be avoided. If they must be accessed, special mitigation must be implemented to ensure minimal ground disturbance.

3. Soil map unit 654 has a significant amount of wet soils. These areas are susceptible to irreversible resource damage if disturbed. Mechanized equipment should not be allowed on these wet soils or within the recommended buffers.

In addition, there are smaller riparian areas that are too small to map out which have similar restrictions. These areas should be identified and flagged out on the ground.

**LONG TERM SOIL PRODUCTIVITY**

The long term soil productivity of forests and rangelands depends on maintaining the quality of soil properties and conditions that affect the productivity and hydrologic functioning of soils. The maintenance of soil qualities that affect soil productivity and hydrologic function are soil quality standards. Guidelines (limits of disturbance or thresholds) have been set, beyond which we are reasonably certain that there will be long term losses in inherent productivity or hydrologic function. Guidelines have been set for soil disturbance (displacement, compaction, puddling), severely burned soil, ground cover, and above ground organic matter (litter, large woody debris). (FSH 2509.18)

Under current conditions, none of the areas proposed for treatment exceed any of the soil quality standards. Current erosion rates are well within soil loss tolerance thresholds. There has been little or no displacement or compaction in the area and ground cover and above ground organic matter is at or above optimum levels for the various soil types. This is primarily due to the fact that the areas proposed for treatment have had little previous disturbance.

**CUMULATIVE EFFECTS AREA**

The area included in the cumulative effects analysis for soils (long term soil productivity and on-site soil erosion is the Brian Head ski area, including the proposed expansion area. Off-site impacts of sediment are discussed in the Hydrology section of this document. Long term soil productivity is not affected by adjacent projects. Cumulative impacts to soil productivity are the result of additional projects (management) on the same piece of ground, i.e. additional soil erosion, increased compaction, displacement, etc.
FISHERRIES

The Brian Head Resort Expansion project area encompasses a portion of the headwaters of Parowan Creek. Most of the streams are ephemeral or intermittent and flow only during periods of snowmelt or intense rainstorms. Parowan Creek becomes perennial near the Giant Steps Lodge area and is relatively small. None of the streams in the project area contain a fishery.

CUMULATIVE EFFECTS AREA

The cumulative effects analysis will occur in that portion of the Parowan Creek watershed as described in the Hydrology and Water Quality section, Chapter 3.

Parowan Creek, from its headwaters to its confluence with Bowery Creek, has a relatively steep gradient and flows through a narrow canyon for most of its length. Vegetative cover is good along the streambanks but the channel has eroded vertically along much of the stream, apparently from flooding. As a result, Parowan Creek is deeply incised within the channel, with 10 to 15 foot vertical banks in some areas. Flows during the summer range from 4 to 15 cubic feet per second. The stream channel consists of long, rather uniform riffle areas with a few pools. Cover for adult trout is limited to small pockets and pools with a very little woody debris. Trout spawning habitat is abundant and reproductive success of rainbow trout (Oncorhynchus mykiss) is good. A few brown trout (Salmo trutta) are also present.

Prior to 1984, Parowan Creek was stocked with 2,200 catchable size rainbow trout. Stocking was discontinued when sufficient natural reproduction was documented. Fishing pressure on the stream is very light and is probably a function of the limited number of pools and the incised nature of the channel making angling difficult.

Parowan Creek is classified as a Class 3 stream by UDWR. Class 3 streams are considered important since they comprise about half of the total stream fisheries habitat in Utah and support a large portion of stream fishing use.

Management Indicator Species

The National Forest Management Act (1976) required National Forests to select a group of representative aquatic species whose populations could be monitored relatively easily. Response of these species to management activities is used as an indicator of effects on other species which require similar habitat. See LRMP (II 14-17) for a discussion of the species selected. Since there are no fish species in the project area, aquatic macroinvertebrates will be the MIS species used. Rainbow trout, brown trout and aquatic macroinvertebrates are indicator species which occur in the cumulative effects analysis area and which will be used for this purpose.

AIR QUALITY

The project area and the entire Dixie National Forest is designated a Class II airshed. This means that air quality standards exceed the National Ambient Air Quality Standards. Class II airsheds may incur moderate increases in new pollution.

Class I areas are geographic areas designed for the most stringent degree of protection from future degradation of air quality. The broad National goal for this area is to prevent any future impairment of visibility. This goal however, is broad enough to include regulations on use of prescribed fire and resultant smoke.

There are 5 parameters important to the determination of air quality, and its potential effects. These include amount of airborne particulate's, gaseous pollutant, visibility, Presentation of Significant Deterioration (PSD) Designation, and proximity to residential private subdivisions and Class I airsheds.

Long term visibility impairment from human activities will not impair long term baseline visual range more than 5 percent of the 90th percentile (clean days) in Class I airsheds, nor more than 10 percent in Class II airsheds.

Short-term (14 days) visual range impairment from human activities outside the airshed such a prescribed fire smoke will not reduce pre-activity visual range more than 10 percent of the 90th percentile in Class I Airsheds or 20 percent in Class II Airsheds. This allows for the natural role of fire and smoke from prescribed natural ignitions to maintain the ecosystem (Desk Guide Bridge to Revision, USDA Forest Service, 10/93).

No visibility measurements have been made in the project area. Information received on baseline visibility for areas within the Colorado Plateau indicates that the average visibility, for clear days, 145 kilometers or approximately 9 miles (Personal conversation with Cliff Benoit, Regional Air Quality Specialist, 3/1/95).

The concentrations of total suspended particulate's (TSP) and particulate matter smaller than 10 micrometers (PM-10), are not monitored within the project area. Primary emission sources that would contribute to particulate levels would be automobile exhaust, and emissions from wood burning stoves for Brian Head Ski Resort and adjoining subdivisions. Prescribed burning by the Forest Service, or private subdivisions has not been a common practice within or adjacent to this project area.
An emission factor for particulate matter (EFp) is defined as the mass of particulate matter produced per unit mass of fuel consumed. Emission factors reported in literature for forest fuels range from four to 180 lbs/ton, depending on fuel type and arrangement and the manner of combustion.

An emission rate is defined as the amount of smoke produced per unit of time (lb/minute or grams/sec.). Downwind concentrations of particulate matter in smoke are related directly to the emission rate at the fire source. The emission rate in turn is affected by the amount of fuel being burned, the rate at which it burns, and emission factor of the fuel (Smoke Management Guidelines for Prescribed Fires, Manti-LaSal National Forest, 3/92).

No measurement of other criteria pollutants, such as carbon monoxide, sulfur dioxide, ozone, nitrogen oxides, or hydrocarbons, were made in the project area.

There are no Class I airsheds within 5 miles of the project area. The closest Class I airshed is Zion National Park which is approximately 20 air miles south of the project area.

Other Class I airsheds within Southern Utah include:

- Arches National Park
- Bryce Canyon National Park
- Canyonlands National Park
- Capitol Reef National Monument

Other Class I airsheds listed above are more than 20 miles from the project area.

There are several subdivisions associated with the town of Brian Head and one Wilderness Area within 5 miles of the project area. These areas are listed below:

- Cedar Breaks National Monument: Approximately two miles south.
- Rainbow Meadows Subdivision: Two miles south of the project area.
- Ashdown Gorge Wilderness: One mile south west of the project area.
- Brian Head Town: Within one mile north
- Ski View Estates: Within one mile north
- Green Meadow Acres: Within one mile north
- Cedar Breaks Mountain subdivision: Within one mile north
- Timbercrest subdivision: Within one mile north
- Sunset Mountain subdivision: Within one mile north

All subdivisions and the town site have private residences within their boundaries.

CUMULATIVE EFFECTS AREA

The Cumulative Effects Area for air quality will consider the area extending to the east edge of Summit Mountain, north to Yankee Meadow, east to Blue Springs Mountain, and south to the boundary of Cedar Breaks National Monument. Effects to the closest Class I airshed, Zion National Park will also be considered. All other Class I Airsheds identified above would not be measurably affected by the actions proposed in this project and therefore will not be carried into Chapter 4, Environmental Consequences.

RECREATION

UTAH STATE HIGHWAY 143

Highway 143 crosses through the project area. Highway 143 has been designated a State of Utah Scenic Byway (1990) and is a primary access route for Cedar Breaks National Monument, Brian Head Peak and passes through Brian Head community and ski resort, and provides access to Panguitch Lake. In 1993, Utah Department of Transportation (UDOT) estimates that 620,500 vehicles traveled the section of Highway 143 which crosses through the project area. This is a 15% increase over the 1991 estimate of 524,000 vehicles (Utah Department of Transportation records available in the Project File.). Traffic counters at the north boundary of Cedar Breaks National Monument on Highway 143 recorded 217,943 vehicles between June and October. No data is available for November-May because the Park Service removes these counters during the winter months. Park Service counters do not reflect the traffic volume that results from Brian Head Resort as a winter destination, or Brian Head Town as a destination. A 1994 survey conducted by the National Park Service, found that there are an average of 2,35 persons per vehicle visiting Cedar Breaks. Applying this multiplier factor to UDOT's estimates, there are approximately 1,300,000 people traveling along Highway 143 through the Brian Head area.

Seasonal travel patterns are reflected by Cedar Breaks National Monument entrance vehicle counter totals, and data from a permanent traffic recorder on Highway 14 east of Cedar City. The Highway 14 counter patterns also do not represent the impacts of Brian Head Ski Resort, because Highway 148 is closed during the winter months. As a result, the winter traffic represents a higher percentage of the total traffic volume on Highway 143 than it does on Highway 14.
UDOT Traffic Counter-Highway 14 (Monthly Total 1995)

<table>
<thead>
<tr>
<th>Month</th>
<th>Traffic Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>22,072</td>
</tr>
<tr>
<td>February</td>
<td>24,696</td>
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<td>March</td>
<td>26,381</td>
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<tr>
<td>April</td>
<td>31,680</td>
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<tr>
<td>May</td>
<td>56,761</td>
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<tr>
<td>June</td>
<td>73,170</td>
</tr>
<tr>
<td>July</td>
<td>120,683</td>
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<tr>
<td>August</td>
<td>112,716</td>
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<tr>
<td>September</td>
<td>92,550</td>
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<tr>
<td>October</td>
<td>78,988</td>
</tr>
<tr>
<td>November</td>
<td>33,030</td>
</tr>
<tr>
<td>December</td>
<td>27,001</td>
</tr>
</tbody>
</table>

Cedar Breaks National Monument-Highway 143 North Boundary Traffic Counter Monthly Totals-1996

<table>
<thead>
<tr>
<th>Month</th>
<th>Traffic Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>June</td>
<td>93,909</td>
</tr>
<tr>
<td>July</td>
<td>108,326</td>
</tr>
<tr>
<td>August</td>
<td>114,326</td>
</tr>
<tr>
<td>September</td>
<td>125,670</td>
</tr>
<tr>
<td>October</td>
<td>69,935</td>
</tr>
</tbody>
</table>

ADDITIONAL ROADS WITHIN THE PROJECT AREA

Forest Road #304 beginning at Bear Flat near the Town of Brian Head and terminating at the Dry Lakes Scenic Backway to the west, is an access route for the Shoshone Chair Lift. This is a native surface road, providing recreation opportunities for those traveling in high clearance vehicles. Activities along this road include driving for pleasure, dispersed camping, access for hunting, mountain biking, snowmobiling and cross-country skiing. The lower sections of this road are heavily used for dispersed camping during the summer season. Off road vehicle use is designated by the Dixie National Forest Travel Plan, 1989. In this plan the area adjacent to Brian Head Ski Resort's Chair Lift is prohibited to motorized vehicle travel off roads and trails, and is closed to snowmobiles in winter. The area on the western slope is open to off road vehicle travel and snowmobile use.

Table 3-2, Brian Head Resort Skier Days

<table>
<thead>
<tr>
<th>Year</th>
<th>Skier Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>88-87</td>
<td>200,000</td>
</tr>
<tr>
<td>87-88</td>
<td>150,000</td>
</tr>
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<td>88-89</td>
<td>100,000</td>
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<tr>
<td>89-90</td>
<td>50,000</td>
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</tbody>
</table>

There is a network of roads within the Brian Head Ski Resort permit boundary for servicing the lifts and snowmaking ponds and to private access to runs for grooming. These roads are closed by the Dixie National Forest Travel Plan to vehicle traffic except as necessary for resort administration. These roads are used as trails by hikers and mountain bikers during summer and fall months. This use is promoted by Brian Head Town and Brian Head Resort and this road system is considered part of the area trail network.

WINTER RECREATION

Approximately 405 acres of the Brian Head Ski Resort is under special use permit with the Dixie National Forest. The resort operates 7 lifts and 53 runs. Three lifts and 24 runs are located on National Forest lands. During the 1996-97 ski season 148,306 skier days were recorded. For a representation of the annual skier visitation from the 1986-87 season to 1996-97 see Table 3-2.

Brian Head is characterized as a family oriented resort. Facilities and terrain cater to a strong beginner and intermediate clientele with a portion of the resort offering expert terrain. As identified in Table 3-3, Brian Head Resort lacks substantial expert terrain. The Proposed Action addresses this shortfall by expanding expert skiing and snowboarding opportunities.
Table 3-3, Ski Terrain Distribution By Alternative

<table>
<thead>
<tr>
<th>Ability Level</th>
<th>Proposed Action</th>
<th>No Action</th>
<th>Alternative A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beginner</td>
<td>123.2 Acres</td>
<td>98 Acres</td>
<td>123.2 Acres</td>
</tr>
<tr>
<td>Intermediate</td>
<td>179.8 Acres</td>
<td>104.8 Acres</td>
<td>179.8 Acres</td>
</tr>
<tr>
<td>Advanced</td>
<td>226 Acres</td>
<td>99 Acres</td>
<td>126 Acres</td>
</tr>
<tr>
<td>Total:</td>
<td>530 Acres</td>
<td>301.8 Acres</td>
<td>430 Acres</td>
</tr>
</tbody>
</table>

Additionally, Brian Head Resort and area businesses provide the following winter sports recreational opportunities on both public and private land, snowmobiling, cross-country skiing, sledding, and winter special event. Special events will be discussed later in this chapter.

SUMMER RECREATION

The resort has extended their lift operation into the summer and fall seasons to accommodate mountain bikers and sight-seers, operating Chair Lift 2 which terminates within the project area. In 1994 there were 1,453 tickets sold for mountain bike users, and 3,167 sight-seers and bikers used the lifts. This is a 38% increase over the use in 1993 (the first year the lifts were operated during the summer.)

Summer Lift Use-1994

<table>
<thead>
<tr>
<th></th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>August</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mountain Bikes</td>
<td>33</td>
<td>679</td>
<td>397</td>
<td>344</td>
</tr>
<tr>
<td>Sight-seers</td>
<td>156</td>
<td>1549</td>
<td>722</td>
<td>740</td>
</tr>
<tr>
<td>Total</td>
<td>189</td>
<td>2228</td>
<td>1119</td>
<td>1084</td>
</tr>
</tbody>
</table>

High Adventure Trail Rides, a horse back riding outfitter and guide operates in cooperation with Brian Head Resort and under a Special Use Permit with the Dixie National Forest. In 1994 there were 1,083 rides taken, with 213 crossing through the project area. This was a 173% increase from the 1993 total of 623 rides taken. (No data was available for the 1995 and 1996 season)

SPECIAL EVENTS

Currently, Brian Head Resort host a variety of recreational events and festivals. Additionally, the Town of Brian Head conduct special events and weekly activities to promote the area. The special events include:

Winter
- Beach Break Santa Claus Grand Prix Snowboard Event,
- Fireworks & Torchlight Parade,
- Utah Winter Games Family Ski & Snowboard Event,
- Ski Chalet High Flyer Snowboard Event,
- Dash-4-Cash On Mountain Bike Race,
- Utah Challenge Snowboard Event,
- Look of California Half-Pipe Challenge Snowboard Event,
- Sub Skates Big Air Jam Utah Championships Snowboard Event,
- Youth Ski League Championship Ski Race,
- Annual Spring Carnival,
- Easter Egg Hunt.

Summer
- Utah Summer Games,
- Brian Head Cannonade Cup Mountain Bike Race,
- Brian Head Bash Fat Tire Festival,
- The Brian Header Mountain Bike Tour,
- Brian Head Team Big Bear 12 Hour Team Endurance Race,
- The Fall Colors Fat Tire Festival,
- Independence Day Celebration,
- The Oktoberfest,
- Brian Head Resort Naturalist Program.

BRIAN HEAD TOWN

There are 130 permanent residents living within the city limits of the Brian Head. There are 70 developed lots within the city limits. However, there are many vacation homes built within Brian Head Town and nearby subdivisions and private lots. According to Iron County property ownership
records, there are 600 private land owners near the Brian Head Resort Master Development, Project Area. Many of these lots have not yet been developed.

The primary industry for Brian Head Town is tourist related service industries. In addition to the services provided by the resort there are 7 lodging accommodations consisting of hotels and condominium rentals. There are 5,500 beds available for overnight visitor accommodations. There are also 4 restaurants and 5 sporting good shops that rent and sell skiing and mountain biking equipment.

Visitation has been increasing during the summer and fall months. The quarterly resort and sales tax collection reported by Brian Head Town for June-November has increased by 563% between 1986 and 1996. The community has been actively promoting summer visitation through sponsorship of weekend and holiday festivals.

CEDAR BREAKS NATIONAL MONUMENT

Cedar Breaks National Monument is adjacent to the Brian Head Resort Master Development Plan, Project Area, and many monument visitors pass through the project area en route to Cedar Breaks. The National Park Service reports that in 1996 there were 596,457 people to visit Cedar Breaks. There were a reported 3,790 people staying in the campground in Cedar Breaks during 1996, and 55,889 people entered the visitor center. Brian Head Town provides the nearest lodging and food service for visitors to Cedar Breaks National Monument.

BRIAN HEAD PEAK

Brian Head Peak is the highest point on the Cedar City Ranger District, Dixie National Forest at 11,307 feet above sea level. A gravel road (FS #047) provides access to an overlook at the top, providing scenic vistas hundreds of miles in every direction. A rock lookout structure was constructed during the 1930's by the Civilian Conservation Corps (CCC). There is heavy visitation during the summer. Use is moderate to light during the fall and winter, with the only winter access being on snowmobiles, skis, or snowcat skiing. A restoration project for the CCC structure was conducted in the summer of 1995.

MOUNTAIN BIKING

Mountain biking has been steadily increasing within the project and adjacent areas. The Brian Head community and resort have been actively marketing to this user group, developing a mountain bike guide and trail map, building trails within the resort permitted area, and developing a trail network within the town. Two mountain bike festivals, in July and September, and two mountain bike competition in August and September, are mountain bike events that are operated under a special use permit with the Dixie National Forest. These festivals all cross the project area. Thirty one percent of the 4,626 summer lift riders are mountain biker users. There is a network of trails within the project area that have been developed by both the resort and the Forest Service. (Roads and Trails Map located in the project file). There are two businesses in Brian Head that operate shuttle services for mountain bikers Brian Head Resort and Georg's Ski Shop. Brian Head Resort reports shuttling 900 bikers during 1994. Georg's Bike Shop shuttled 908 people during 1994. The Bunker Creek trail received the most use, with 582 people being shuttled from Brian Head to the Sidney Valley road (Forest Road #048) and being returned to Brian Head from the terminus near Panguitch Lake. The Dark Hollow trail received the second most use, with 303 people shuttled from Brian Head Town, to the top of Brian Head peak, and returned from the terminus in Parowan. Five businesses in Brian Head rent and sell mountain bike equipment.

The Sidney Peak Trail represents a major trail artery adjacent to the project area, as it provide access to the Dark Hollow, Louder Ponds and, Left and Right Fork of Bunker Creek Trails. A Forest Service trail counter has been located on Sidney Peak Trail to establish trends in recreational use. The trail counter has been in place for the past two years. No direct trends have been established, however, use has increased by 2,936 Recreational Visitor Days in one year.

### Table 3-4, Recreational Use of the Sidney Peak Trail

<table>
<thead>
<tr>
<th>Month</th>
<th>1995 Season</th>
<th>1996 Season</th>
</tr>
</thead>
<tbody>
<tr>
<td>July</td>
<td>630</td>
<td>2524</td>
</tr>
<tr>
<td>August</td>
<td>5,885</td>
<td>3650</td>
</tr>
<tr>
<td>September</td>
<td>864</td>
<td>4309</td>
</tr>
<tr>
<td>October</td>
<td>168</td>
<td>(no data)</td>
</tr>
<tr>
<td>Total:*</td>
<td>7,547</td>
<td>10,483</td>
</tr>
</tbody>
</table>

* Recreation Visitor Days

RECREATION OPPORTUNITY SPECTRUM CLASSIFICATION

The project area is managed to provide for roaded natural, semi-primitive non-motorized and rural recreation opportunities, based on the Recreation Opportunity Spectrum classification, as described in USDA Forest Service ROS Book (1986). (See ROS Map in Appendix 5)

Rural recreation opportunities occur within the ski resort boundaries, and the areas within 1/4 mile of the Brian Head community and summer home developments. The management emphasis for this Management Area 1B in the Dixie National Forest Land and Resource Management Plan is to provide for downhill skiing opportunities, design and locate improvements to provide for
the safety of users, and to harmonize with the natural environment. Year round recreation opportunities will be provided within the permitted area and facilities.

The setting for rural recreation opportunities in the Brian Head project area is that the natural setting has been modified structures associated with the ski resort and the community are readily apparent. The recreation experience in a rural area is characterized by the convenience of sites and opportunities. The frequency of contact with other users is moderate to high in the ski resort development, and moderate away from developed sites.

The semi-primitive non-motorized recreation opportunities occur in Management Area #1 areas adjacent to the Ashdown Gorge Wilderness area, and away from forest development roads. The setting for semi-primitive non-motorized recreation in the Brian Head project area is characterized by a natural environment where interaction between users is low. Motorized vehicle use is limited due to the steep slopes and lack of roads and motorized trails. The recreation experience in the semi-primitive non-motorized recreation of the Brian Head project area is characterized by the probability of experiencing isolation from the sights and sounds of other people. The natural landscape within these areas is unaltered; there is no lasting evidence of human activities.

The remaining acres adjacent to the project area is managed to provide roaded natural recreation. This includes the area between the Cedar Breaks National Monument and the Brian Head Community, and the area between the Dry Lakes road and the private lands to the east, excluding the permitted ski areas. Under the Proposed Action, Management Area 2B roaded natural recreation will be reduced by 56.29 acres. This change is necessary to accommodate MDP elements and accurately reflect management area conditions on the ground.

The setting for roaded natural recreation is characterized by a modified natural environment, but natural features of the landscape dominate. Resource modification is evident, but harmonize with the natural environment. Both motorized and non-motorized forms of recreation are possible in this area. The natural features of the landscape will dominate. The experience for roaded natural recreation is characterized by a moderate probability of interaction with other people, with evidence of other users being prevalent. There is an opportunity to have a high degree of interaction with the natural environment.

**CUMULATIVE EFFECTS AREA**

The recreation cumulative effects area of recreational features is tied to the Brian Head Ski Resort, Highway 143, and Highway 148, including Cedar Breaks National Monument, and Brian Head Town. It extends south to Highway 14, north to Parowan, east to Panguitch Lake, and west to Navajo Point, extending along the western Dry Lake Creek Drainage divide.

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Brian Head Ski Resort representing the focal point for the cumulative effects area is popular as a winter sports recreation area for downhill and Nordic skiing, and snowboard. It is also renowned for summer mountain biking and hiking activities.

The Town of Brian Head provides recreational services, food, lodging, and recreational activities. These are 130 permanent residents, and 76 developed cabin lots occupied by both permanent and seasonal residents. There are additional cabin developments in subdivisions near and adjacent to the town limits.

Panguitch Lake is included, due to mountain biking, hiking, and snowmobile trails that originate in the Brian Head area and pass through or terminate in the Panguitch Lake vicinity. There are also people who pass through the project area en route to Panguitch Lake.

Cedar Breaks National Monument is a popular scenic and geological area. Tourist will often visit the area while en route between Zion and Bryce National Parks, and the Escalante Grand Stair Case National Monument. Often they use Highway 14 located 8-10 miles south, however, many use Highway 143 from the Town of Panguitch. The project area can be viewed from several of the Monument’s overlooks of the Cedar Breaks Amphitheater.

**SCENIC RESOURCES**

**NATIONAL FOREST SCENERY MANAGEMENT SYSTEM**

The National Forest Scenery Management System is the process used for planning and design of the visual elements of multiple use land management. Scenery management is based on the criteria and guidelines in the Landscape Aesthetics Handbook for Scenery Management, USDA Handbook Number 701. This system was implemented in 1996, superseding the Visual Management System and replacing National Forest Landscape Management, Vol. 2, USDA Handbook Number 462.

There are 11 fundamental principles to the Scenery Management System:

1. Biological, physical and social factors create and influence scenery and interact to determine landscape character.

2. Landscape character varies greatly with the interaction of environmental factors.

3. People have the ability to perceive landscape character and develop expected images.
4. Through various activities, people have the ability to modify landscape character and scenic conditions and have often done so.

5. Such changes in landscape character and scenic condition often modify, suppress, or replace the original landscape character.

6. People value most highly the more scenic landscapes.

7. Generally, natural-appearing landscapes are the most valued.

8. Resource managers can design their activities to reduce adverse impacts on landscape character and scenic integrity.

9. People have the ability to establish goals to maintain or create desired landscape character.

10. People have the ability to apply ecological, technical, and design knowledge to meet scenic management goals and objectives.

11. In some situations, resource managers perpetuate or create desired scenic environments to provide an improved quality of life. (USDA 1995)

THE BRIAN HEAD TOWN VISUAL RESOURCE MANAGEMENT

The Brian Head Town Master Plan and Design Guidelines addresses scenic resource preservation. Brian Head Town has no jurisdiction over the management of scenic resources on character of Brian Head, which the plan seeks to preserve. The plan and design guidelines identify goals and objectives that relate directly and indirectly to scenic resource preservation, significant natural features and land forms. One of the primary goals of the planning guidelines is to “let the landscape setting dominate: the valley views.” The wooded setting of Brian Head development to the natural landscape is the desired unifying design theme of the Town. Community design guidelines provide guidance for using color, siting and architectural style so that structures and developments “blend” into the landscape of Brian Head Valley.

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LANDSCAPE CHARACTER

The Brian Head area on the Cedar City Ranger District is part of the Utah High Plateaus and Mountains Section, the Southern Markagunt-Paunsaugunt Plateaus and Northern Markagunt Plateau Subsections. (Nelson 1994). These designations are part of the National Hierarchical Framework of Ecological Units. Ecological units are used for ecosystem planning and management. These units are delineated by the spatial distribution of natural associations of dominant ecological factors that affect the structural and functional attributes of ecosystems.

Southern Markagunt-Paunsaugunt Plateau Subsections. The landscape of the Southern Markagunt-Paunsaugunt Plateaus is made up of limestone tablelands and cliffs at the southern end of the two large plateaus (Nelson 1994). The plateaus are relatively flat surfaces and sheer walls, alcoves, and buttresses of large dimension, benches at various levels, and sculptural small-scale erosional forms (Gregory 1950). The landform is a broad plateau surface with broad, shallow drainage ways. The pink, white and orange hued cliffs of Claron limestone formation, such as found at Cedar Breaks National Monument and Strawberry Point line the southern margin. Gregory (1950) describes the outcrops of the Claron formation: “the Pink Cliffs are brightly-colored high walls, marvelously decorated with carving, the glory of all rock work.”

Northern Markagunt Plateau. The landform of the Northern Markagunt Plateau is rolling hills that are of volcanic origin on a northward sloping plateau surface (Nelson 1994). Brian Head Peak is the most prominent point in this subsection, with volcanic ridges rising to rounded volcanic cones and glacial moraines expressed as undulating forms in the drainage ways. To the south the plateau is bounded by the pink cliffs of the Claron formation, to the north the Black Ledge of the Sidney Peaks forms the northwestern edge of the plateau.

Landscape Character Elements Common to both Subsections: The Markagunt plateau surface is “characterized by gentle slopes, slow-running streams, and the absence of conspicuous cliffs, and canyons (Gregory 1950). The plateau surface is accented by volcanic cones and the dark, rugged boulder fields of lava streams. Hochstein (1984) states that the ridges are covered with spruce-fir, aspen, and mixed conifer to the west, and ponderosa pine on the lower elevation eastern slopes. Meadows of wheatgrass-bluegrass wind along drainage ways across the plateau surface. Most of the spruce is in mature to old age classes, with few sites in the seedling/ sapling age classes. There are strong color contrasts between the dark green stands of fir and spruce, the seasonal variation in aspen stands from light green of summer, the brilliant gold of fall, and the grey of winter. Patches of op. . . . ark like meadows also add to the contrasts, with golden grasses through most of the summer and fall. The spruce/fir forests are relatively open. Mature trees grow in clumps, with a cathedral type canopy, allowing shafts of light to reach the forest floor. Aspen are more evenly distributed, with lacy canopies, and a grass covered forest floor.

The viewer perceives a predominantly natural appearing landscape with some evidence of human modification and disturbance. Prior to the current beetle infestations natural disturbances had a

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moderate influence on the vegetation patterns. These include fire, storm, insect and diseases and recovery processes from these events. The last major disturbance from insect and diseases was thought to be about 200 to 300 years ago in the spruce zone, and may have resulted in the loss of most of the older age class of trees. Fire disturbance plays a minor role in the vegetation patterns. Over the past 100 years fire disturbance is evident in the spruce zone where aspen, a disturbance dependant species is found (Eisenhower, 1997).

The Markagunt Plateau has been used by people for thousands of years, as evidenced by Native American artifacts that have been found across the plateau. The character of land use changed on the Markagunt Plateau beginning in the 1850's when Cedar City and Parowan were first settled by Mormon pioneers. The vegetation patterns of the plateau have been altered by timber harvest and sheep and cattle grazing. Recreation use and vacation homes have become important uses of the landscape during this century. Roads and trails that have been built to accommodate timber harvest, grazing and recreation use are evident across the landscape. Other developments include vacation home developments on private lands located within the National Forest Boundary, and recreation developments at Navajo Lake, Duck Creek, Cedar Breaks National Monument. There is a rural character to the landscape surrounding Brian Head Town and Brian Head Ski Resort where road corridors, ski runs and structures are apparent.

THE LANDSCAPE CHARACTER OF THE BRIAN HEAD AREA

The landscape of the Brian Head area is highly valued for its visual quality as expressed in the high recreation use, the establishment of the Brian Head Ski Resort and Brian Head Town, Ashdown Gorge Wilderness and Cedar Breaks National Monument. To the viewer, the landscape is predominantly natural appearing in middleground views, but the development associated with Brian Head Town and Ski resort give a rural character to the foreground of Highway 143 through the Master Plan area. The land use pattern of the winter sports site, with the visual presence of runs, lifts, road corridors and structures is dominant in the foreground and visually evident in the middleground of the Brian Head Basin. The inherent scenic attractiveness or variety class of the landscape surrounding Brian Head Town is Distinctive (Class A). The dominance of the rocky outcrops of Brian Head Peak and the striking red cliffs of Navajo Point are distinctive for this landscape. The landscape in the viewshed of Cedar Breaks National Monument is predominantly natural appearing with some evidence of human modification in roads, fences and some recreation and electronic site development. The inherent scenic attractiveness or variety class of the landscape in the Cedar Breaks viewshed is also Distinctive (Class A), with the dominance of pink Cliffs of the Claron formation and contrast of the dark green of the high altitude spruce fir forest.

The DNFLRMP specifies a Visual Quality Objective of Modification for the IB, Winter Sports Sites Management Areas. Under the new Scenery Management System, this would correlate to a Low Scenic Integrity Objective. The modification VQO was chosen to permit runs and structures needed to support the winter sports activities. However, there is a high concern level for quality scenery in the Brian Head area as expressed by the large number of users and the high personal investment in recreation facilities and homes in the Brian Head basin. Under the new Scenery Management System, the desired condition is High Scenic Integrity Objective, accepting that the land use theme is a winter sports sites, and that this is a valued landscape for many visitors and residents of Brian Head.

LANDSCAPE VISIBILITY AND DESIRED CONDITIONS

Primary travel routes and locations from which Brian Head Ski Resort is viewed include Utah State Highway 143, Brian Head Town and nearby subdivisions, Brian Head Peak, area trails, and Forest Road 304. Brian Head Ski Resort can also be viewed as background from Interstate 15 near Summit, Utah.

The Master Plan area is viewed as immediate foreground, foreground, and middleground, from all primary viewer locations. Immediate foreground is approximately 0-300'. At this distance people can distinguish individual leaves, flowers, and small animals. The foreground is defined as approximately 300'-1/2 mile from the viewer. Tree trunks and large branches, individual shrubs and medium to large animals can be seen at this distance. Due to the density of roads, trails and ski runs, most of the Master Plan area is within the foreground view from at least one of the critical viewer locations. Middleground views are approximately 1/2 to 4 miles from the viewer. At this distance people can distinguish individual tree forms, large boulders and small openings in the forest. Background are views greater than four miles from the viewer location. Textures have disappeared and colors are more uniform, but gross vegetative patterns can be distinguished, and land forms and ridge lines are the dominant visual elements.

Concern levels are determined by the degree of visitor concern for the visual environment. Level 1 is the highest concern for scenic quality and scenery management. Because of the intense recreation use of this area, the high degree of personal investment in primary and vacation homes, and the proximity to Cedar Breaks National Monument and the Ashdown Gorge Wilderness area, the entire Master Plan area is a concern level 1.

Brian Head Ski Resort. The Master Plan area is viewed as immediate foreground, foreground, and middleground from runs and lifts. The duration of view varies from a few hours to all day. Visual quality is a key element for skier satisfaction. Viewing outstanding scenery is a primary criteria skiers use when choosing a resort. Both skiers and summer hikers and mountain bikers area sensitive to changes in the immediate foreground, due to slower pace, and the intimacy to the environment when walking or skiing. Visitors to the area have a high expectation for quality scenery.

The desired condition for visual elements at Brian Head Ski Resort are considered from views within the resort, and views of the resort from other locations, such as Highway 143 and Brian
Head Peak. For views from within the resort and to the resort the vegetation edges are extremely important. Natural appearing run edges ideally should coincide with existing ecological edges and should be undulating with a variety of trees and shrubs to avoid a straight line effect. Tree and shrub islands contribute to the natural appearance. Edges are improved with uneven-aged vegetation edges. Feathering and scalloping of run edges and thinning or glading timber also assist in a more naturally appearing landscape. (USDA Forest Service Handbook #17, 1984)

The run edges of the existing condition are generally very linear with hard edges. The runs accessed from Dunes Lift 7 best meet the desired condition for the visual quality of the runs as viewed as foreground and middleground because of blending with natural openings and non linear nature.

Highway 143. Approximately 1,500,000 people traveled Highway 143 during 1995 (UDOT 1996). It is a primary state highway, providing access to Brian Head Ski resort, Cedar Breaks National Monument, and Parquitch Lake. Highway 143 has been designated a National Forest Scenic Byway, a State of Utah Scenic Byway and is promoted as a scenic drive. As a scenic byway and an access to recreation destinations, there is a high expectation for quality scenery from the majority of travelers. For those traveling without stopping, the Master Plan area is crossed within 10 minutes, traveling at speeds of 35-50 MPH. There is a moderate to high degree of discernible detail in foreground and middleground views.

The bottom terminals of Lifts 2 (Giant Steps), 4 (Navajo), 3 (Black Foot) and 6 (Pioneer) and associated runs are foreground views from Highway 143. Areas where revegetation has not been successful there is high contrast between the unvegetated areas and the surrounding forested strips and revegetated areas on the runs. The installation of snowmaking systems exacerbated this problem. In areas where top soil has been removed or has eroded away and white clay mineral soil has been exposed the contrast is especially great. Upper lift 2 (Giant Steps) and lift 5 (Roulette) and associated runs are middleground views. Run edges of existing runs are generally very linear, and do not mimic natural patterns and openings.

The desired condition for the Highway 143 corridor is to provide for scenic variety and protect the scenic qualities as a Scenic Byway. Maintaining a variety of visual experience is an important element in the scenic quality.

Brian Head Town and Nearby Subdivisions. There are 130 permanent residents within Brian Head Town. There are approximately 600 property owners recorded by Iron County within and adjacent to the Master Plan area, but not all lots have been developed at this time. Many of these lots have been purchased as vacation home sites can accommodate up to 5500 people per night. Residents are extremely sensitive to changes in the viewed, because of their familiarity with the view and personal investment in the area. Visitors to the area have a high expectation for quality scenery. There is a moderate to high degree of discernible detail in the foreground and middleground views.

The desired condition of National Forest Lands is to maintain and enhance a natural appearing landscape as viewed from the town. The view is dominated by the slopes within Brian Head Ski resort boundary. Therefore maintaining a natural appearing landscape within the community viewed is dependent on the management of the runs and leave strips of the resort.

Cedar Breaks National Monument. The National Park Service reports that in 1996 there were 596,457 people to visit Cedar Breaks. The Brian Head area is visible as middleground to background views from three Monument overlooks, North View, Chessman Ridge and Point Supreme. The duration of view varies from a few moments to several hours. Overlooks are frequent photo stops for many visitors. Visitors to the area have a high expectation for quality scenery. There is a moderate degree of discernible detail in the middleground views.

The desired condition for views from the National Monument overlooks is of a natural appearing landscape. Since the Brian Head area is viewed as middleground, openings created in forest cover are most likely to be a visible impact. The sparse cover in this area serves as an frame for the Cedar Breaks amphitheater, and is important in preserving the scenic quality. Currently only the lower runs associated with Lift 7 (Dunes) are visible from the Monument, and these blend with natural openings, so as not to appear as a human disturbance to the casual observer.

Brian Head Peak. Brian Head Peak is a popular overlook that provides views of most of the Master Plan area. Use is moderate to light throughout the summer and fall seasons. The duration of view is probably less than one hour for most visitors. The Master Plan area is seen in foreground and middleground views from the overlook structure and the approach road. The primary reason for this destination is the quality of the view, and viewers have a high expectation for quality scenery. Alterations to elements in this view are likely to be highly visible because landscapes viewed at angles of around 90 degrees are subject to greater visual scrutiny than landscapes viewed at more flat angles. Also, the long views afforded from this vantage point make alterations more visible. The top terminals for Lifts 2 (Giant Steps), 7 (Dunes) and 5 (Roulette) and associated runs are foreground views.

Area Hiking and Mountain Biking Trails. Area trails receive light to moderate use during summer and fall months. The Master Plan area is viewed in the immediate foreground, foreground and middleground from these trails. Trails are used for hiking, mountain biking, and horseback riding. The duration of view varies from a few hours to all day. Viewers are especially sensitive to changes in the immediate foreground, due to the slower pace, and the intimacy to the environment when walking, biking or horse back riding. Visitors to the area have a high expectation for quality scenery.

The desired condition for trails is a variety of views and visual experiences within a natural appearing landscape. A variety of views are important to providing quality experiences for trial users. Tree cover in the Brian Head Master Plan area gives definition to trail corridors, framing.
concealing and revealing views as users move along trails. Alternating aspen, spruce/fir stands and openings help to enhance visual quality.

Bear Flat Dispersed Camping Site. This site receives light to moderate use as a dispersed camping site during the summer and fall seasons. The Master Plan area is viewed in the immediate foreground, foreground and middleground views from this site. The duration of view could span several days. Visitors to the area have a high expectation for quality scenery.

Forest Road #304. This road receives light to moderate use from recreation visitors and as access to private land. The Master Plan area is viewed in the immediate foreground, foreground and middleground views while traveling this road. The duration of view is approximately one half hour on FR #304 when traveling through the Master Plan area without stopping. Visitors to the area have a high expectation for quality scenery.

The desired condition is a natural appearing landscape. As a road corridor, a variety of views is important to the quality of the experience. Maintaining stands as mature spruce, while encouraging additional aspen cover will help provide variety. Encouraging stands of uneven age classes will provide for future stands of mature spruce.

CUMULATIVE EFFECTS AREA

The visual effects cumulative effects area is Highway 148, through Cedar Breaks National Monument, Highway 143 from the Dry Lakes road junction to the Highway 148 intersection, Brian Head Peak and the summit of Forest Road #304. There are brief views from the Cedar City valley, and I-15 near Summit, Utah, but they are not significant, as they are background views with little evident detail.

SOCIAL ECONOMIC

During the scoping process, several items of concern have been mentioned related to the socioeconomic environment at Brian Head. While implementation of the Proposed Action may have the effect of influencing different parts of Brian Head Town more than others during the implementation stages, these concerns did not meet the definition of a true issue. Specifically, they did not constitute an unresolved conflict with the proposed action. In most cases, resolution of the concerns can be met simply by the manner of implementation. The one exception to this statement was the concern expressed that the individual objected to any use of National Forest lands for economic gain. By law, this is allowed on National Forest land and this concern will not be dealt with in this document.

The Brian Head resort is located in Brian Head Town, Iron County, Utah, approximately sixteen miles southeast of Parowan, the county seat, and thirty five highway miles from Cedar City, the major community in the county. Brian Head Town is an incorporated entity with just 150 permanent residents. The on mountain facilities at the project site are located in Parowan Canyon on the northwest slopes of the Markagunt Plateau and are within the boundaries of Dixie National Forest. The base facilities are all located on private land as are approximately 60% of lifts and runs. The percentage on National Forest would increase approximately 4% under the proposed action.

In order to adequately assess the social and economic effects associated with the proposed action and alternatives, a cumulative effects area must be defined. For purposes of this analysis, socioeconomic effects are considered in terms of their impact upon Brian Head Town, which is the primary area of impact, and upon Iron County, which is the cumulative effects area. Although some minor impacts may be felt beyond these boundaries, probably as far away as some isolated businesses in Las Vegas, these impacts would be very small and generally unmeasurable.

For the most part, potential impacts associated with each of the two levels of the impacted areas can be summarized as follows: (Brian Head Town) Impacts within this area include increases in local employment opportunities, changes in public utilities and service requirements, parking effects, revenues to the U.S. Treasury and Brian Head Town, increased costs to Brian Head Town and changes in retail and service patterns, (Iron County) potential impacts within the cumulative effects area include increased costs to Iron County, traffic and circulation costs, public service and housing effects, changes within the retail and service sectors, and indirect economic effects.

POPULATION, EMPLOYMENT AND ECONOMIC BASE

The population in Iron County was approximately 17,350 in 1980 and by 1990 had grown to 20,789. By the end of 1996 this had jumped to an estimated 32,100. Even if current growth rates soften somewhat, it is projected that the county population will be near 100,000 by 2020.

Although small in permanent population, Brian Head plays a significant role in the economics of Iron County. Sales tax revenues in Brian Head Town increased by 563 % during the period between 1986 to 1996. Not only is business at Brian Head expanding, it's contribution to county services continues at a high level. Of the approximately 1840 lodging rooms in the county, 916 of those rooms are at Brian Head. Although the exact percentage of total guest nights for the county, which occur at Brian Head, is not known, we do know that in the past three years, approximately 37% of transient room tax revenues are generated at Brian Head. The Brian Head total for this tax revenue now equals approximately $90,000 annually. The work force at Brian Head is also significant, employing in excess of 400 persons during the peak season. This
compares to a county labor pool of just over 12,000. Currently, this peak occurs during the winter ski season, however, the economic strength of the summer/fall period continues to grow

While revenue generation has proceeded in a positive direction the degree of participation in downhill skiing has remained relatively flat for about the past ten years. Although it varies from year to year, in the past ten years, the high use has been 156,000 skier days in one year and the low has been about 136,000. The average is about 150,000. Summer business has increased substantially, particularly since about 1991 when mountain biking started to gain in popularity at Brian Head.

It must be noted that, while the town as a whole has grown economically, not all businesses have shared in that success. Brian Head businesses, as in other locations, can be greatly affected by a major change in another business. Such was the case in the removal of the original Chair 1. When this lift was removed, the impact to businesses on the south end of town was significant and continues to be so.

**SPECIAL USE PERMIT FEES**

Use of National Forest land for profit under a special use permit agreement is subject to fee payment to the U.S. Treasury. Ski resort development fees are calculated through a system that takes into consideration, lift ticket sales, services including rentals, food services, and other revenues. Higher revenues produce a higher fee.

Over the past five years, Brian Head Resort has paid fees to the Forest Service in various amounts ranging between $33,000 and $47,500 each year. The U.S. Treasury returns 25 percent of the annual fee payment to the County. Iron County has, therefore received from $8,250 to $11,875 annually in intergovernmental revenues which can be attributed to the portions of the Brian Head Resort that are located on National Forest lands.

**HERITAGE RESOURCES**

The areas surrounding and within the project analysis area have been identified as being used by human beings for at least 8000 years. Types of sites identified include, but are not limited to, limited activity campsites, quarries, tool manufacturing areas, kiln sites and long term seasonal encampments.

Within the boundaries of the existing permit area, there are several areas identified as being used by prehistoric and historic cultures. Those areas identified for the location of the Bowl Lift, Chair 1 and the Interconnect area have been surveyed by the Forest Archaeologist. No Historic Properties were located within these immediate project areas.

**CUMULATIVE EFFECT AREA**

The cumulative effects area for Heritage Resources is the project area.

**ENGINEERING**

This section will evaluate proposed construction projects proposed in the BHIMDP, SR 143, Brian Head Peak Road (BHPR), and the Navajo Peak Road (FSR 304). For all alternatives these roads will be indirectly and cumulatively effected by an increase in summer vehicle traffic promoted by the Resort's summer activities and promotions.

While SR 143 is under Utah Department of Transportation Jurisdiction, both the BHPR and FSR 304 are Forest Service Maintenance Level 3 and Maintenance Level 4 roads with gravel and volcanic cinder surfacing respectively. Maintenance Level 3 roads are intended to serve a prudent driver in a passenger car. Maintenance Level 4 roads are intended to serve high clearance vehicles such as pickups. User comfort and convenience are not considered a priority for either maintenance levels. The BHPR provides access to a historic overlook structure and the Sidney Peaks Trail (SPT) at the top of Brain Head Peak from SR 143. FSR 304 was reconstructed in 1996 and provides access from SR 143 to the Sugarloaf Mountain Road which continues on into the town of Summit, Utah to the south and back to SR 143 to the north.

Use seems to be on the increase by mountain bike enthusiasts and hikers wanting to access the SPT. An increase in trail use would likely result in an associated increase in vehicle traffic on the BHPR. Trail counts on the SPT indicate a 28% increase in use from 1995 to 1996, but data does not go back far enough to make accurate estimates for expected use. The BHPR surfacing is degrading quickly. Aggregate replacement and grading of the road have not been able to keep up with the degradation. Reshaping of the subgrade and new aggregate surfacing are required along the entire length of road in order to maintain it at current maintenance levels. Long term objectives for the road would be to pave the road with asphalt or to treat the surface with oil and aggregate and upgrade the road to a Maintenance Level 1 or 2. Maintenance at Levels 1 and 2 are for passenger cars with increased regard for user comfort and safety.
CHAPTER 4

ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

The affected environment is that area, in and around the project area, that could experience physical biological, social and/or economic consequences resulting from the implementation of the Proposed Action, or alternatives to the Proposed Action, including the No Action Alternative. In most cases, the environmental effects of the alternatives could extend beyond the actual acres where activities occur. The affected environment is different for each resource, and the area affected and analyzed is call the analysis, project and/or cumulative effects area.

In Chapter 3 the existing conditions for the project area, by resource, were described. In this Chapter the consequences of the Proposed Action and alternatives to the Proposed Action, including the No Action Alternative, will be compared and disclosed. Where it was considered helpful to the understanding of the effects discussions, the Dixie National Forest Land and Resource Management Plan (DNFLRMP) direction is listed as a basis for the site specific disclosure.

VEGETATIVE STRUCTURE

This Chapter describes the effects on vegetative structure, composition, disturbance regimes, and patterns that would occur by implementing the Proposed Action and Alternatives to the Proposed Action, including the No Action (continuance of existing activities) alternative. Management direction in DNFLRMP (1986) relating to the vegetation resource is also included, where appropriate, to focus the discussion and tier to the decisions made as part of that analysis.

FOREST PLAN DIRECTION

DNFLRMP direction for managing snags, down logs, and woody debris include:

- In forested management areas, maintain a minimum on each treated area, an average of 20-30 snags (in all stages of development) per 10 acres, well distributed over the management areas (DNFLRMP IV-25 (A004A)).
- Retain an average length per acre of down-dead logs (where feasible) of the following minimum diameters: For ponderosa pine, Douglas-fir, and spruce-fir; 12 inch diameter and 50 linear feet per acre; for aspen - 10 inch diameter and 33 linear feet per acre (DNFLRMP IV-25(A004B)).
- Research has increased the above Standard & Guideline (S&G) to sustain long term soil productivity. A minimum of 15 tons per acre of material greater than 3 inches diameter is to be left in spruce dominated stands; a minimum of 10 tons per acre in mixed spruce/fir/aspens stands; and a minimum of 5 tons per acre in aspen dominated stands (Harvey et al. 1987; Graham et al. 1994).

DNFLRMP direction relating to vegetative composition include:

- Manage for aspen retention wherever it occurs, unless justified by ... conversion to confiers, or shrub or grass/forb serial stages for wildlife, esthetics, recreation, transportation or watershed purposes (DNFLRMP IV-25(A005A)). Forest-wise Standard & Guideline.
- Emphasize visually appealing landscapes (vista openings, rock outcroppings, diversity of vegetation, etc. (DNFLRMP IV-61(A041)). Management Area 1B.
- Manage forest cover types on the permitted area to enhance visual quality, diversity, and recreation opportunities and to provide for a healthy forest cover in existing and proposed winter sport sites... (DNFLRMP IV-61(E03.06.07). Management Area 1B.

DNFLRMP direction for managing insect and disease populations and fire are:

- Prevent or suppress epidemic insect and disease populations that threaten forest stands with an integrated pest management (IPM) approach consistent with resource management objectives (DNFLRMP IV-55 (P35(1))
- Plan and provide a level of protection from wildfire that will meet management objectives for the area considering... value of the resources threatened by fire..., the social, economic, political, cultural, environmental, life, and property concerns, ... management objectives for the area (DNFLRMP IV-54(P011(1)).

Chapter 4 Environmental Consequences
4 - 1
• Maintain fuel conditions which permit fire suppression forces to meet fire protection objectives for the area (DNFLRMP IV-54(109(1))).

DNFLRMP directions concerning vegetation patterns are:

• In forested areas, create or modify created openings so they have a Patton edgewise index of at least 1.4 and have a medium edge contrast (DNFLRMP A00(1C)).

• Retain existing medium or high contrast edges within forested management areas (DNFLRMP A00(2)).

• If medium contrast edges are created in units dominated by grassland or shrubland, create openings with a Patton edgewise index of at least 1.4 (DNFLRMP A00(1)).

• The Patton index is a measure of irregularity in the shape of ecological edge. This concept has been adapted to reflect inherent edge between two different, stable communities come together and induced edge that results when two successional stage come together (Thomas 1979).

Except where indicated, these are Forest-wide Standard and Guidelines and no others supersed them for Management Areas 1B, 2B, or 10B.

COMMON TO ALL ALTERNATIVES

Brian Head Resort, Inc. will prepare a Vegetation/Watershed Management Plan that will be incorporated into the terms and conditions of their Special Use Permit. For vegetation, this plan will address management objectives for forested and non-forest areas within the ski area boundary by writing site specific silvicultural prescriptions. These will address steps required to maintain these stands over time and to meet recreation objectives. Better information on vegetative structure will be available after the Vegetation Plan is completed.

Changes within plant communities would occur in the permit area as a result of ground disturbing activities. Types of disturbance fall into 2 categories: permanent vegetation removal for roads, parking, and building construction; and temporary vegetation removal for ski runs, lift upgrades, and other types of ground disturbance. In cleared ski runs or interconnect areas, vegetative succession would be set back to early stages (grass/forb/shrub) and likely be retained there for much of the life of the ski resort. Glided ski runs would be managed as a forested community, but would have intermediate characteristics due to the open canopy.

PROPOSED ACTION - BRIAN HEAD RESORT PROPOSAL

DIRECT AND INDIRECT EFFECT

The Proposed Action includes expanding the current permit area boundary from the present 405 acres to 738 acres. Under the DNFLRMP, most of this area is designated as Management Area (MA) 1B. Refer to Chapter 1 for acres in each management areas and Appendix 6 for a map showing management areas.

Under this alternative, the primary direct impacts to vegetative communities would be the construction of 3 new lifts, replacement of 1 lift, 145 acres of new ski trails, installation of snowmaking equipment on an additional 40 acres, expansion of the maintenance facility by about 5 acres, 0.2 miles of road construction (0.4 acres - assuming road is about 15 feet wide), and construction of an "On-mountain" restaurant (about 1 acre).

Other activities described in the Proposed Action could have effects, depending on their location, timing, and mitigation implemented. Summer activities such as mountain biking, equestrian trails, wagon rides, summer trails and shelters, slides, etc. could have direct or indirect effects. These activities will have to be evaluated when detailed proposals are submitted.

VEGETATIVE STRUCTURE

As described in Chapter 3, vegetative structure includes snags, down logs, woody debris, old growth, tree size-class distribution, and canopy closure.

Snags: The desired condition in conifer areas is to maintain a minimum of 3 snags per acre greater than 18 inches DBH, where they occur, and in aspen dominated areas retain 3 snags per acre greater than 12 inches DBH. Concerns for visitor safety have made attaining this Standard & Guideline unlikely in the majority of the ski area.

Existing narrow forested strips between cleared runs, often with roads or trails crossing through them, and the desire for more glade skiing has eliminated most areas where managing for snags in desired numbers could be done safely.

The majority of the proposed runs and interconnects on the Forest would be in forested areas (for comparison, it is assumed that 90% of the proposed activities would occur on lands currently occupied by tree cover). Some forested blocks would remain unfragmented, it should be feasible to retain snags in these areas without risking visitor safety (See project file). Under this alternative, it is estimated that about 82 of the 370 currently forested acres could be managed for
stagn retention (22% of currently forested acres).

Down logs and woody debris: With mitigation, implementation of the Proposed Action would have no effect on this method, this Standard & Guideline, except on about 54 acres where land is converted to other uses (i.e. buildings, parking). On areas retained in some degree of forest cover, mitigation would require maintaining down, woody debris on-site. As long it does not exceed 12-18 inches in height, it would not be a safety concern. On areas where movement of material is of concern, it would be anchored into the slope.

Size class distribution and canopy cover: Under this alternative, about 145 acres of land would be managed for ski runs and interconnects (an estimated 90% of which is currently forested). The amount of clearing required would depend on terrain type. Beginner and Intermediate slopes require more clearing than advanced areas, due to skier ability. This alternative would create about 5 acres of beginner, 30 acres of Intermediate, and 110 acres of Advanced. In the 110 acres of advanced terrain there would be some opportunity to for manage tree cover.

Though silvicultural prescriptions have not been written at this time, it is projected that most forested stands would be managed to remain primarily in the Young to Mid-Aged size classes (5-18 inches average DBH).

**VEGETATIVE COMPOSITION**

As described in Chapter 3, vegetative composition refers to species present and their relative abundance.

Indicators - Additional acres developed for ski area operations by community or habitat type.

Non-forest communities: The map showing the general location of proposed runs shows the potential for runs traversing some non-forest areas. As the runs themselves should not have any direct impact, but any grading, shaping, or tower construction would create revegetation needs. Though this could decrease the amount of plant diversity present in these areas. Mitigation would require seeding with native species, a relative few species have seed available commercially. Seeding generally decreases diversity, at least in the short term.

Riparian areas: Under this alternative, it is possible that the lower terminal tower on the proposed Bowl Lift 8 could come close to some seep or riparian areas. These areas could experience some local increases in water due to the extensive amount of tree mortality in the vicinity and could increase in size or extent depending on local factors. Mitigation requiring roads and lift towers to be kept at least 50 feet from the edge of these areas, and other actions to avoid impacts, should prevent any disturbance.

Forest communities: Specific situations for each stand will be addressed as part of the Vegetation Management Plan written as part of the Special Use Permit.

Based on proposed run locations, most disturbance activities under this alternative would occur in mixed species stands (habitat types Abies lasiocarpa/Ribes montigenum or Abies lasiocarpa/ Berberis repens). These stands are comprised of a mix of species (Engelmann spruce, subalpine fir, aspen, and occasional limber pine or bristlecone pine). Actual stand composition varies depending on abiotic factors (soil texture, rock percent) and types of disturbances that have occurred (fire, insects, diseases, grazing, logging, soil movement, etc.). Portions of Bowl Lift 8, or runs associated with this lift, would cross some habitat classified as a Pinus engelmannii/Ribes montigenum habitat type.

As stated previously, a spruce beetle epidemic has already altered species composition (and/or structure) in many stands. Additional disturbance may continue to result in loss of diversity locally. As more acres are intensively managed for ski area purposes, the potential for retaining aspen may be limited. Some clones could eventually be lost.

**DISTURBANCE REGIMES**

Indicators - none

As described in Affected Environment, disturbance regimes include fire, insects, diseases, timber harvesting, grazing, and human developments/recreation activities.

Changes in the vegetation due to natural phenomenon such drought, vegetative succession, insects, and diseases would still operate at some scale. Due to the amount of development in the area, efforts will be made to reduce the risk of potential large scale disturbances such as fire, avalanches, and further spruce beetle mortality.

After the current bark beetle outbreak, most conifer dominated stands are considered at low to low-moderate risk for additional bark beetle outbreaks. The Vegetation Management Plan will also identify ways to manage these areas to keep forested stands at relatively low risk and healthy condition over time.

Fire prevention/suppression would continue to be a high priority.

Harvest operations are expected to be complete by the fall of 1997. Additional activity would occur during lift installation and ski run development.

Chapter 4 Environmental Consequences
Efforts to eliminate livestock grazing on the developed ski resort would continue.

Expansion of the Brian Head facilities under the Proposed Action would increase development in the area, increasing the risk of additional disturbance to vegetation by introducing exotic plants or other type of disturbances.

VEGETATIVE PATTERNS

Indicators - acres of continuous forest that would be fragmented by new ski area activities.

The Proposed Action has the greatest potential to affect vegetative patterns, since it would have the most developed acres. An additional 5.4 acres would acres would be permanently converted from vegetation to buildings, parking areas, and roads (the assumption was the road would be about 15 feet wide and the proposed "On-mountain" restaurant would take about 1 acre). This alternative would also create about 145 acres of new ski trails. The majority of these trails would be considered advanced areas, which would primarily be glade skiing, but the open canopy could still alter existing and potential vegetative patterns depending on the location of the runs and existing vegetation. This alternative would directly affect approximately 150 acres with ski runs, buildings, parking, etc.

Most vegetation is protected by snow during winter activities. An exception to this is seedlings and saplings that grow above the snowline. At this stage these trees need to be protected by fencing or other means to prevent leader damage. Activities that occur during early spring, when conditions are still wet, can affect vegetation by creating surface compaction, so these activities need to minimized off hardened surfaces. With increased summer use, there is the potential for increased impacts to vegetation along trails and other high use areas. The Bowl Lift would carry mountain bikers and hikers to the top of Brian Head Peak to access the Dark Hollow or other trails in that area. The increase in visitor use could result in additional impacts outside the analysis area. This topic will be addressed under cumulative effects.

Any additional grading or blasting required to install lifts and runs would have the greatest effect, though many effects would be temporary, until vegetation can be reestablished.

Proposed ski trails on both sides of the resort and the interconnect would affect stands that are mostly continuous forest patches. The area around the proposed Bowl Lift has been heavily impacted by spruce beetles, but without additional development would be planted back to continuous forest. Under this alternative, the resort would manage large portions of the area for skiing even in areas where trails are not proposed. Mitigation restricting access to portions of this area, allowing reforestation and snag retention, would reduce these effects.

CUMULATIVE EFFECTS

The primary impacts to that affect vegetative structure, composition, and patterns at a landscape scale are the disturbance factors already described. The following discussion will be organized around these disturbance factors (insects, diseases, fire, timber harvest, grazing, human development/uses, etc.).

Refer to Appendix 7 for a map showing the vegetation CEA and the Project File for information on activities in the CEA that were considered.

Insect and diseases: These disturbances effect vegetative structure (snags, down logs and woody debris, old growth, size-class distribution and canopy closure), vegetative composition, and vegetative patterns.

In the CEA, diseases have acted at small scales. None have caused widespread mortality. Cutting of subalpine fir and leaving exposed stumps has the potential to increase the spread of *Fomes annosus*. No root rot pockets have been identified in the project area, but they likely exist as small pockets. Trunk or root damage can also increase the rate of disease spread by providing entry points for decay fungi. Subalpine fir and aspen are especially susceptible.

Bark beetles have been a major cause of disturbance in the north portion of the CEA since about 1991. Spruce and subalpine fir numbers have been impacted. Spruce beetles have been of most concern since, at epidemic population levels, they have caused mortality in healthy trees. Beetles effecting subalpine fir reduce more to drought and tend to infest unhealthy or stressed trees.

Spruce beetles have effected approximately 11,500 acres in the northern portion of the CEA (about 31% of the forested acres), primarily in the Parowan and Mammoth Creek watersheds. This includes stands on private and Forest lands. Many of these areas have harvested or are proposed for harvest to remove bark beetle infested trees and meet other resource objectives. Refer to Project File for CEA activities.

Insect and disease activity has increased the number of snags, down logs and woody debris (this will occur over time as snags fall); decreased the amount of old growth; decreased average stand diameter (size-class distribution); and decreased canopy cover. Species composition has also been altered in proportion to the amount of spruce present. Habitat typing has been completed for all forested stands in the CEA. About 40% of the typing has been field verified, the remaining stands were typed using information in *Coniferous Habitat Types of Central and Southern Utah* (Youngblood and Mank 1985). These will be verified as additional stand data is collected. As in the analysis area, most of the forested acres are classified as *Abies lasiocarpa/Rubus montigenum* or *Abies lasiocarpa/Berberis repens* (or a phase of these). In both of the habitat types a mix of...
species are generally present, so residual species are present. Aspen and subalpine fir have increased in dominance (occasionally Douglas-fir or white fir in warmer, drier sites).

Extensive bark beetle mortality has also changed vegetative patterns by increasing fragmentation, decreasing forest patch size and connectivity.

Fire: Fire can effect vegetative structure, composition, and patterns. The degree of disturbance depends on fire frequency and intensity. Historically, the role of fire in spruce-fir ecosystems was low frequency and high intensity generally resulting in stand replacement (Bradley et al. 1992). Based on the age of aspen, fire and other major disturbances have been absent for the last 80-150 years. Since the Forest has been keeping records (1972-Present), 29 fires have started in the CEA. Suppression activities have limited the spread on all starts. The largest was 3 acres; average size was 0.1 acre (Fay pers. comm.).

Under the "Spruce Ecosystem Recovery Project" (proposed), the Proposed Action includes re-introducing stand replacement fires back into the spruce-fir ecosystem, primarily to regenerate aspen. Under this alternative, about 5700 acres would be burned using management-ignited fire. About 1157 acres would be burned northeast of Brian Head (near Yankee Meadow Reservoir) in the Parowan watershed; about 772 acres in the Deer Creek area and about 3766 acres south of Hancock Peak (Mammoth Creek watershed).

Stand replacement fires would increase snags, down logs and woody debris; decrease old growth, average stand diameter, and canopy cover.

Timber Harvest: In the northern portion of the CEA, recent salvage operations have occurred in bark beetle infested areas. Some areas were originally marked to reduce beetle risk by decreasing stand density (Sidney Valley, Rainbow Meadows, Brian Head), but bark beetle mortality exceeded original projections. Most harvesting has been of dead or beetle infested trees. Large diameter trees have mostly been killed by spruce beetles. Harvesting has decreased the total number of snags, but has maintained more than the minimum required in most areas. Down logs and woody debris has (or will) increase. Slash disposal activities will concentrate on disposing of the small diameter, fine fuels that increase fire risk.

Green tree harvest activities are also proposed under the Spruce Ecosystem Recovery Project (in progress) in the Hancock Peak area (Mammoth Creek watershed). These treatments would be designated to reduce stand density enough to protect against bark beetle mortality. About 1678 acres are proposed for treatment.

The effects of fire and timber harvest on vegetation in the spruce-fir ecosystem is described more completely in "Effects of Timber Harvest and Fire on Vegetation" (Project File).

Chapter 4 Environmental Consequences

Grazing: Non-forest and riparian communities are generally most effected by grazing due to trampling and compaction in heavily used areas. Non-forest communities are scattered in relatively large blocks across the spruce-fir zone. About 21% of the CEA is mapped as non-forest vegetation (grass, shrub, wet meadow). Private land around the town of Brian Head has a large percentage of area mapped as grassland (about 40%) due to ski runs. On the National Forest, grasslands comprise about 19% of the vegetation. Riparian areas are located around small springs, ponds, and perennial streams.

The majority of the CEA is under permit for sheep grazing. The 2 cattle allotments are in the Bunker Creek area (Sidney Valley and the southern part of the Warren/Bunker allotment). In general, under proper management, grazing effects tend to be relatively minor. Over-grazing can change species composition over time. The effects of grazing on vegetation has been discussed in-depth in the "Effects of Livestock Grazing at Proper Use on the Dixie National Forest" (Project File), Issuance of 10-Year Term Grazing Permits, Cedar City Ranger District Cattle Allotments: Environmental Assessment (1995) and Issuance of 10-Year Term Grazing Permits, Cedar City Ranger District Sheep Allotments; Environmental Assessment (Project File).

Human development and recreational uses: Trails, roads, buildings, power line corridors, and other types of structures plus recreation uses that occur in the CEA tend to impact non-forest and riparian communities, the number of snags, amount of down logs and woody debris, and vegetative patterns (fragmentation, patch size, and connectivity).

Recreation activities in the CEA are heaviest north and west of Highway 143 and along Highway 14. The Brian Head ski area and most hiking and biking trails are located north and west of Highway 143. Some trails and roads are located in riparian areas. Most of the spruce-fir zone is popular for dispersed camping and other summer and winter uses. Popular dispersed camping sites show evidence of compaction and decreased vegetation. As summer use increases there is greater potential for users that travel off roads and trails to make a noticeable impact. As the ski area expands its summer activities, there will be increased impacts to vegetation near roads and trails.

The number of snags and amount of large woody debris tend to decrease around developed or highly used areas. Around structures or areas where people gather, snags are removed for safety reasons. In roadeed areas, snags are often cut illegally by firewood cutters. Forest regulations prohibit cutting snags greater than 14 inches diameter (at the base), but it is difficult to enforce. Down logs and large woody debris are often removed for firewood, fire prevention, or aesthetic reasons.

The following table shows a summary of how vegetative attributes are being affected by activities occurring in the CEA.
Table 4-1. Summary of general effects on vegetative attributes in the cumulative effects area as a result of disturbance factors that are occurring or proposed.

<table>
<thead>
<tr>
<th>Disease</th>
<th>Epidemic Bark Beetle Outbreak</th>
<th>High Intensity Fire</th>
<th>Salavage Harvest</th>
<th>Green Tree Harvest To Reduce Bark Beetle Risk</th>
<th>Grazing</th>
<th>Human Developments- Recreational activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-forest Communities</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Adverse impacts (1)</td>
<td>Adverse impacts (1)</td>
</tr>
<tr>
<td>Riparian Communities</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Adverse impacts (1)</td>
<td>Adverse impacts (1)</td>
</tr>
<tr>
<td>Snag Numbers</td>
<td>Increase</td>
<td>Increase</td>
<td>Increase</td>
<td>Decrease (in overall numbers)</td>
<td>N/A (7)</td>
<td>N/A</td>
</tr>
<tr>
<td>Down logs &amp; Large woody debris</td>
<td>Increase</td>
<td>Increase</td>
<td>Increase</td>
<td>Increase</td>
<td>N/A</td>
<td>Decrease (2)</td>
</tr>
<tr>
<td>Old Growth</td>
<td>Variable</td>
<td>Decrease</td>
<td>Decrease</td>
<td>N/A (8)</td>
<td>Decrease</td>
<td>N/A</td>
</tr>
<tr>
<td>Average stand diameter (size class distribution)</td>
<td>Variable</td>
<td>Decrease</td>
<td>Decrease</td>
<td>N/A (8)</td>
<td>Decrease</td>
<td>N/A</td>
</tr>
<tr>
<td>Canopy closure</td>
<td>Decrease</td>
<td>Decrease</td>
<td>Decrease</td>
<td>N/A (8)</td>
<td>Decrease</td>
<td>N/A</td>
</tr>
<tr>
<td>Species composition/diversity</td>
<td>Increase</td>
<td>Decrease (4)</td>
<td>Decrease (4)</td>
<td>Increase (4)</td>
<td>Decrease (4)</td>
<td>Decrease (4)</td>
</tr>
<tr>
<td>Fragmentation</td>
<td>N/A</td>
<td>Increase</td>
<td>Increase</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Forest Patch Size</td>
<td>N/A</td>
<td>Decrease</td>
<td>Decrease</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Patch Connectivity</td>
<td>N/A</td>
<td>Decrease</td>
<td>Decrease</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

N/A - Not applicable or neutral
(1) In heavily used areas
(2) Not directly affected, indirectly affected due to fragmentation
(3) Generally there is an initial decrease followed by an increase. Understory vegetation would increase, depending on the amount of bare soil
(4) Localized, small scale effects
(5) Adverse impacts, if it occurs
(6) The DNFLRMP Standard & Guidelines require meeting the minimum of 3 snags/acre

Table 4-2. Existing Conditions Across the Cumulative Effects Area

| (Total acres in CEA = 52,991; National Forest Land = 48,242; Private land = 4,749; Forested cover type = 34,926 NFI and 2,651 on private land). |

<table>
<thead>
<tr>
<th>National Forest Lands (ac)</th>
<th>% of forested acres</th>
<th>Private Land (acres)</th>
<th>% of forested acres on private land</th>
</tr>
</thead>
<tbody>
<tr>
<td>More than 3 snags/acre</td>
<td>34,493</td>
<td>98%</td>
<td>1,523</td>
</tr>
<tr>
<td>Acres meeting desired tons as down logs &amp; woody debris</td>
<td>22,078</td>
<td>63%</td>
<td>1,861</td>
</tr>
<tr>
<td>OLD GROWTH</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>warm moist</td>
<td>101</td>
<td>&lt;1%</td>
<td>35</td>
</tr>
<tr>
<td>cold dry</td>
<td>6,477</td>
<td>17%</td>
<td>29</td>
</tr>
<tr>
<td>SIZE CLASS DISTRIBUTION</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-1 in. DBH</td>
<td>663</td>
<td>2%</td>
<td>0</td>
</tr>
<tr>
<td>1-5 in. DBH</td>
<td>1,661</td>
<td>5%</td>
<td>4</td>
</tr>
<tr>
<td>5-12 in. DBH</td>
<td>7,406</td>
<td>21%</td>
<td>849</td>
</tr>
<tr>
<td>12-18 in. DBH</td>
<td>16,746</td>
<td>48%</td>
<td>1,723</td>
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<tr>
<td>18-24 in. DBH</td>
<td>1,947</td>
<td>6%</td>
<td>74</td>
</tr>
<tr>
<td>24- in. DBH</td>
<td>6,401</td>
<td>18%</td>
<td>0</td>
</tr>
<tr>
<td>Aspen</td>
<td>7,372</td>
<td>15% (1)</td>
<td>1,005</td>
</tr>
<tr>
<td>Grass cover type</td>
<td>8,054</td>
<td>17% (1)</td>
<td>1,783</td>
</tr>
<tr>
<td>Rock</td>
<td>3,920</td>
<td>8% (1)</td>
<td>15</td>
</tr>
<tr>
<td>Shrub cover type</td>
<td>416</td>
<td>&lt;1% (1)</td>
<td>52</td>
</tr>
<tr>
<td>Urban developed areas</td>
<td>(1)</td>
<td>210</td>
<td>4% (2)</td>
</tr>
</tbody>
</table>

(1) Percent of total acres of National Forest Lands in the CEA
(2) Percent of total acres of private land in the CEA

Below is a summary of the major effects on vegetation that would occur if the Proposed Action is implemented.
1) On the Forest, retention of the desired number of snags per acre would occur on only about 82 acres, due to high use and concerns about visitor safety. Snag management would also be addressed in the Vegetation/Watershed Management Plan. This area is a relatively small part of the spruce-fir ecosystem. Snags, down logs, and large woody debris would also likely decrease as private land around the town of Brian Head continues to develop.

2) Managing for old growth would not occur on the remaining 240 forested acres in order to meet the forest health and sustainability goals of an intensively managed ski area. The fragmented nature of a ski area also does not meet the desired pattern for blocks of old growth with minimum edge and maximum interior.

3) Additional acres on the Forest would be converted from a forest to a grassland cover type and retained in an early seral condition indefinitely to meet recreation objectives. Percent of grassland would increase on both Forest and private ownerships. These areas would need to be less diverse than natural grasslands due to limitations on available seed.

4) Continued development around the project area and the town of Brian Head would increase the risk of impacts on vegetation outside the project area. On private land it is expected that more acres will be converted from forest to a more urban or developed cover type.

**NO ACTION - CURRENT MANAGEMENT**

**DIRECT AND INDIRECT EFFECTS**

No Action would mean a continuation of the current activities on the Forest, additional development would likely occur on private land. No new lift, runs, snowmaking, buildings, or road construction would be permitted on the Forest. Giant Steps Lift 2 would be replaced in its existing location. The permit area would remain at 405 acres.

Additional development would be expected to occur on private land.

**VEGETATIVE STRUCTURE**

Snags: This alternative offers the best opportunity for retaining the desired number of snags in the analysis area. The current spruce beetle epidemic has resulted in the creation of snags in most forested acres. In harvested areas, a minimum of 3 snags per acre greater than 18 inches DBH were retained. Without additional ski area development, areas that are currently outside developed areas could be managed to retain the desired number of snags without threats to visitor safety.

Therefore, under this alternative there would be no decrease in the number of acres available to meet the desired number of snags per acre and 73 percent (272 acres/370 forest acres) of the forested acres in the analysis area would meet desired conditions. As part of mitigation, restricting visitor access by some method may be required to maintain the desired number of snags (i.e. north of Brian Head Peak). The acres available for snag retention may decrease depending on the amount of acres restricted.

Down logs and woody debris: Overall, there should be no effect on retention of the desired amount of down logs and woody debris under this alternative, except approximately 5.4 acres would be converted from vegetation to other uses. Mitigation would require retention of a minimum of 15-20 tons/acre of large woody debris per acre in areas with a forest cover.

Size class distribution and canopy cover: Since no additional acres would be permitted to managed as part of the ski area, this alternative would allow additional opportunities to reforest areas that were heavily impacted by spruce beetles to provide a more continuous forest cover in the future.

Most of the developed skiable terrain in the Resort falls into the Beginner or Intermediate levels (197 acres) and about 99 acres is considered Advance terrain. All of these runs are cleared runs and are currently classified as grassland to reflect current cover.

**VEGETATIVE COMPOSITION**

Non-forest communities: Under this alternative there would be some additional disturbance in existing ski runs when lifts are upgraded, but changes would be minor. Any additional revegetation work would require use of a native seed mix. This would have minor additional effects on these communities.

Riparian communities: There should be no additional disturbance to known seep or wet areas under this alternative.

Forest communities: Since there would be no additional ski run development, the existing situation would continue. After timber harvest and slash cleanup is completed in 1997/1998, portions of the area would be evaluated for planting. Stands north of Brian Head Peak (109/21, 22, 23, 24, 26, and 30) were heavily impacted by spruce beetle activity. These areas would likely be planted with spruce seedlings to increase stocking. There would be additional opportunities to manage for aspen retention, since fewer acres would be devoted to ski area activities.
VEGETATIVE PATTERNS

With no major additional disturbances permitted under this alternative, there would be minimal change from existing conditions. Concerns about the amount of fragmentation and small forested patches left between ski runs would be addressed in the Vegetation/Watershed Management Plan and, over time, these conditions should improve.

DISTURBANCE REGIMES

Changes in the vegetation due to natural phenomenon such as drought, vegetative succession, insects, and diseases would still operate at some scale. Due to the amount of development in the area, efforts will be made to reduce the risk of potential large scale disturbances such as fire, avalanches, and further spruce beetle mortality.

After the current bark beetle outbreak, most conifer dominated stands are considered at low to low-moderate risk for additional bark beetle outbreaks. The Vegetation/Watershed Management Plan will also identify ways to manage these areas to keep forested stands at relatively low risk and healthy condition over time.

Fire prevention/suppression would continue to be a high priority.

Harvest operations are expected to be complete by the fall of 1997. Additional activity would occur during ski run creation for the Proposed Action and Alternative A.

VEGETATIVE PATTERNS

Under this alternative, there would be no increase in fragmentation beyond what has occurred due to bark beetle mortality and subsequent harvest activity. These conditions would decrease over time as the forest is regenerated.

CUMULATIVE EFFECTS

Refer to the Appendix 7 for a map for the CEA and Project File for a list of the projects in the CEA that were considered. Refer to the Proposed Action for information on existing conditions in the CEA. Table 4-1 is a general summary of impacts of the disturbance factors operating in the CEA and their effects on vegetation.
Table 4-2 shows the best estimate of current conditions across the CEA by ownership. Below is a summary of the major effects on vegetation that would occur if the No Action alternative is implemented.

1) On the Forest, retention of the desired number of snags per acre would occur on about 272 acres, due to high use and concerns about visitor safety. There is potential for snag retention in some unfragmented areas. This area is a relatively small part of the spruce-fir ecosystem. Snags, down logs, and large woody debris would also likely decrease as private land around the town of Brian Head continues to develop.

2) Managing for old growth would not occur on forested acres in order to meet the forest health and sustainability goals of an intensively managed ski area. The fragmented nature of a ski area also does not meet the desired pattern for blocks of old growth with minimum edge and maximum interior.

3) On the Forest, no additional acres would be converted from forest to grassland. There could be conversions on private land which may increase the grassland percent.

4) Continued development around the project area and the town of Brian Head would increase the risk of impacts on vegetation outside the project area. On private land it is expected that more acres will be converted from forest to a more urban or developed cover type.

**ALTERNATIVE A - INTEGRATED ALTERNATIVE**

**DIRECT AND INDIRECT EFFECTS**

Under this alternative, the primary impacts to vegetative communities would be construction of 2 new lifts, replacement of 1 lift, 45 acres of new ski trails, expansion of the maintenance facility (5.0 acres), and 0.1 miles of road construction (<1 acre). The permit area boundary would increase from 405 acres to 738 acres.

Other activities described in the Proposed Action could have effects, depending on the location, timing, and mitigation implemented. Summer activities such as mountain biking, equestrian trails, wagon rides, summer trails and shelters, slides, etc. could have direct or indirect effects. These activities will have to be evaluated when detailed proposals are submitted.

**VEGETATIVE STRUCTURE**

Snags: Compared to the Proposed Action, this alternative would directly affect about 50 acres with ski trails, maintenance facility expansion, and road construction. Increasing the permit area boundary could have some indirect effects. Though the area north of Brian Head Peak would not be developed for use, there is potential for use by snow cat skiing, especially since the tree stands have been opened up by bark beetle mortality and subsequent logging. This activity is fairly limited at this time. Under this alternative, it was assumed that 4.2 acres (90% of the directly affected acres) would no longer be managed to maintain the desired snags. Mitigation would require restricting access to portions of the area north of Brian Head Peak, allowing retention of more snags without creating a hazard for visitors. Under this alternative, it is estimated that about 137 acres could be managed to retain the desired number of snags per acre (37% of currently forested acres).

Down logs and woody debris: Overall, there should be no effect on retention of the desired amount of down logs and woody debris under this alternative, except approximately 5.1 acres would be converted from vegetation to other uses. Mitigation would require retention of a minimum of 15-20 t/ha of large woody debris in areas maintained in forest cover.

Size class distribution and canopy cover: Under this alternative, about 45 acres of ski runs would be created. The amount of clearing depends on the type of skier terrain. Beginner terrain (5 acres) would require clearing, intermediate terrain (30 acres) would require some clearing, but more trees could be left, advanced terrain (10 acres) areas could leave additional trees.

The area north of Brian Head Peak could be planted and managed for higher densities than would be possible when used for skiing.

**VEGETATIVE COMPOSITION**

Non-forest communities: Under this alternative, it is unlikely that any non-forest areas would be affected. General run location indicate that there would be fewer acres converted from forest to grass. There would be less need for revegetation work due to the fewer acres disturbed, this would help retain natural diversity.

Riparian communities: Under this alternative there would no impacts to known seep or riparian areas.

Forested areas: Fewer acres would be devoted to ski runs under this alternative compared to the Proposed Action. This would allow more opportunity for plant or naturally regenerate forested areas that have been affected by bark beetle activity. There would also be more opportunity to manage...
for aspen regeneration. Effects would be intermediate between the No Action and Proposed Action.

**DISTURBANCE REGIMES**

Changes in the vegetation due to natural phenomenon such as drought, vegetative succession, insects, and diseases would still operate at some scale. Due to the amount of development in the area, efforts will be made to reduce the risk of potential large scale disturbances such as fire, avalanches, and further spruce beetle mortality.

After the current bark beetle outbreak, most conifer dominated stands are considered at low to low-moderate risk for additional bark beetle outbreaks. The Vegetation/Watershed Management Plan will also identify ways to manage these areas to keep forested stands at relatively low risk and healthy condition over time.

Fire prevention/suppression would continue to be a high priority.

Harvest operations are expected to be complete by the fall of 1997. Additional activity would occur during ski run creation for the Proposed Action and Alternative A.

**VEGETATIVE PATTERNS**

Under this alternative there would be fewer acres dedicated to ski run use, causing less fragmentation than the Proposed Action. At least the larger portion of the area north of Brian Head Peak could be managed for return to a forested condition in the future.

**CUMULATIVE EFFECTS**

Refer to Appendix 7 for a map for the CEA and the Project File for a list of the projects in the CEA that were considered. Refer to the Proposed Action for information on existing conditions in the CEA. Table 4-1 is a general summary of impacts of disturbance factors operating in the CEA and their effects on vegetation.

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3) Additional acres on the Forest would be converted from a forest to a grassland cover type and retained in an early seral condition indefinitely to meet recreation objectives. Percent of grassland would increase on both Forest and private ownerships. These areas would need to be less diverse than natural grasslands due to limitations on available seed.

4) Continued development around the project area and the town of Brian Head would increase the risk of impacts on vegetation outside the project area. On private land it is expected that more acres will be converted from forest to a more urban or developed cover type.

**WILDLIFE**

**PROPOSED ACTION - BRIAN HEAD RESORT PROPOSAL**

Activities identified in the Proposed Action will have effects on different habitat components, which, in turn, will affect wildlife species. Table 4-3 shows the proposed activities, their sizes and the time of day planned to occur. Table 4-4 summarizes the habitat components that may be affected by the proposed activities. Finally, Table 4-5 summarizes the principal habitat components used by selected wildlife species either directly or indirectly.

Construction of new facilities would displace wildlife by noise and activity and by removal or change of habitat. Construction of facilities such as maintenance barns, parking lots and restaurants, would directly alter habitats through changes from vegetation to facilities. The latter changes would be an irreversible loss of habitat. Changing forested plant communities to ski slopes would be an irretrievable loss of this habitat.
### Table 4-3. Wildlife Proposed Activities

<table>
<thead>
<tr>
<th>Project Element</th>
<th>Size</th>
<th>PROPOSED TIMING</th>
<th>LOCATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction of New Facilities</td>
<td>500 feet</td>
<td>Avoid Disturbance</td>
<td>FS</td>
</tr>
<tr>
<td>Shoshone Lift (extension)</td>
<td>3,500 feet</td>
<td>Avoid disturbance</td>
<td>FS</td>
</tr>
<tr>
<td>Shoshone Lift</td>
<td>94 acres</td>
<td>NA</td>
<td>FS</td>
</tr>
<tr>
<td>Interconnect Lift 1A</td>
<td>2140 feet long</td>
<td>FS &amp; Pvt.</td>
<td></td>
</tr>
<tr>
<td>Interconnect Lift 2</td>
<td>60 acres</td>
<td>FS &amp; Pvt.</td>
<td></td>
</tr>
<tr>
<td>Interconnect Lift 3B</td>
<td>50 acres</td>
<td>FS &amp; Pvt.</td>
<td></td>
</tr>
<tr>
<td>Interconnect Lift 3A</td>
<td>48 acres</td>
<td>NA FS</td>
<td></td>
</tr>
<tr>
<td>Re-activated Chair #1 trails</td>
<td>60 acres</td>
<td>FS &amp; Pvt.</td>
<td></td>
</tr>
<tr>
<td>Shoshone ski trails</td>
<td>15 acres</td>
<td>FS &amp; Pvt.</td>
<td></td>
</tr>
<tr>
<td>Ski Lift Bridge</td>
<td>101 L X 60 W</td>
<td>FS</td>
<td></td>
</tr>
<tr>
<td>Brian Head Bowl Lift 8A</td>
<td>3050 feet long</td>
<td>FS</td>
<td></td>
</tr>
<tr>
<td>Brian Head Bowl Lift 8B</td>
<td>1200 feet long</td>
<td>FS</td>
<td></td>
</tr>
<tr>
<td>Brian Head Bowl Ski Trails</td>
<td>100 acres</td>
<td>FS &amp; Pvt.</td>
<td></td>
</tr>
<tr>
<td>Bowl Permit Boundary Additions</td>
<td>191 acres</td>
<td>FS &amp; Pvt.</td>
<td></td>
</tr>
<tr>
<td>Rock work on Bowl runslip</td>
<td>Small survey areas</td>
<td></td>
<td></td>
</tr>
<tr>
<td>New roads with lift additions</td>
<td>2 miles new</td>
<td>FS &amp; Pvt.</td>
<td></td>
</tr>
<tr>
<td>Upgrades of Existing Facilities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retrofit Giant Steps Lift 2</td>
<td>4454 feet</td>
<td>FS &amp; Pvt.</td>
<td></td>
</tr>
<tr>
<td>Extend Naive Lift 4</td>
<td>350 feet</td>
<td>FS &amp; Pvt.</td>
<td></td>
</tr>
<tr>
<td>Naive Ski Trail addition</td>
<td>4 acres</td>
<td>FS</td>
<td></td>
</tr>
<tr>
<td>Hotel Surface Lift 5</td>
<td>360 feet</td>
<td>FS</td>
<td></td>
</tr>
<tr>
<td>Re-dirt School trails</td>
<td>2 acres</td>
<td>FS &amp; Pvt.</td>
<td></td>
</tr>
<tr>
<td>Mountain Shop Parking</td>
<td>105 spaces</td>
<td>FS &amp; Pvt.</td>
<td></td>
</tr>
<tr>
<td>Parking Additions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Giant Steps Trail Improvements</td>
<td>10 20 improvements</td>
<td>FS &amp; Pvt.</td>
<td></td>
</tr>
<tr>
<td>Operating Plan Activities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Avalanche Protection</td>
<td>BH &amp; Peak only</td>
<td>FS</td>
<td></td>
</tr>
<tr>
<td>Snow-making additions</td>
<td>25-40 acres</td>
<td>FS &amp; Pvt.</td>
<td></td>
</tr>
<tr>
<td>Additional snowmaking equipment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Additional snowmaking equipment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other facilities or Activities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WINTER Planned</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Snowcat barn</td>
<td>10 ac. with yard &amp; parking</td>
<td>FS</td>
<td></td>
</tr>
<tr>
<td>Equipment yard</td>
<td>10 ac. with yard &amp; parking</td>
<td>FS</td>
<td></td>
</tr>
<tr>
<td>Lifts</td>
<td>36 spaces</td>
<td></td>
<td></td>
</tr>
<tr>
<td>On Mountain Restaurant</td>
<td>1 acor 200 sq. ft.</td>
<td>Night &amp; Day</td>
<td>FS</td>
</tr>
<tr>
<td>Guided snowmobile tours</td>
<td>No specifics known</td>
<td>Day</td>
<td>Unknown</td>
</tr>
<tr>
<td>Ice skating rink</td>
<td>No specifics known</td>
<td>Night &amp; Day</td>
<td>Unknown</td>
</tr>
<tr>
<td>Sleight rides</td>
<td>No specifics known</td>
<td>Night &amp; Day</td>
<td>Unknown</td>
</tr>
<tr>
<td>Nordic ski track &amp; shelter</td>
<td>No specifics known</td>
<td>Night &amp; Day</td>
<td>Unknown</td>
</tr>
<tr>
<td>SUMMER Planned</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lift operations</td>
<td>No specifics known</td>
<td>Night &amp; Day</td>
<td>Unknown</td>
</tr>
<tr>
<td>Entertainment events</td>
<td>No specifics known</td>
<td>Night &amp; Day</td>
<td>Unknown</td>
</tr>
<tr>
<td>Mountain biking</td>
<td>Night &amp; Day</td>
<td>Unknown</td>
<td></td>
</tr>
<tr>
<td>Equestrian trails</td>
<td>Night &amp; Day</td>
<td>Unknown</td>
<td></td>
</tr>
<tr>
<td>Wagon Rides</td>
<td>Night &amp; Day</td>
<td>Unknown</td>
<td></td>
</tr>
<tr>
<td>Summer trails/shelter system</td>
<td>Night &amp; Day</td>
<td>Unknown</td>
<td></td>
</tr>
<tr>
<td>Alpine slide or similar venue</td>
<td>Day</td>
<td>Unknown</td>
<td></td>
</tr>
<tr>
<td>Self driving range &amp; putting venue</td>
<td>Day</td>
<td>Unknown</td>
<td></td>
</tr>
</tbody>
</table>

### Table 4-4. Wildlife Activities Affects to Habitat Components.

<table>
<thead>
<tr>
<th>Project Element</th>
<th>DOWN LOGS</th>
<th>SNAGS</th>
<th>FORAGE</th>
<th>COVER</th>
<th>CLIFFS ROCKS TALUS</th>
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<tbody>
<tr>
<td>Construction of New Facilities</td>
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<td>1</td>
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<tr>
<td>Shoshone Lift Incursion</td>
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<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Shoshone Lift</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Permit Boundary Addition</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Interconnect Lift 1A</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Interconnect Lift 1B</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Interconnect Lift 2</td>
<td>0</td>
<td>0</td>
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<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Interconnect Lift 3A</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Interconnect Lift 3B</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Interconnect Ski trails addition</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Interconnect Permit Boundary Addition</td>
<td>0</td>
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<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>RE-activated Chair #1 trails</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Shoshone ski trails</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Ski Lift Bridge</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Brian Head Bowl Lift 8A</td>
<td>0</td>
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<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Brian Head Bowl Lift 8B</td>
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</tbody>
</table>

Chapter 4 Environmental Consequences 4-21
Activities included in the Proposed Action such as snowmobiling, mountain biking, and skiing, could disturb wildlife either temporarily or cause them to leave the area depending upon the degree of use. The ski runs that are used in both summer and winter would not be expected to provide habitat for many species. The forested areas between ski runs may provide nesting habitat for some birds and foraging habitat. They may be used for cover for some species such as small mammals.

Subdivisions in the Town of Brian Head create urban conditions that break up the forested landscape with the ski runs and ski area development. The presence of homes always brings pets such as cats and dogs. Cats and dogs kill and disturb wildlife; cats being particularly hard on small birds and mammals, and dogs chasing small mammals and deer.

Activities in the Proposed Action that may extend out from the resort, such as mountain biking, will have affects to wildlife outside the resort permit area. These effects would vary depending upon the amount of use, location of use, and timing.

Snowmaking would reinforce characteristics of the annual snowpack on 156 acres of existing and 25 to 40 acres of future snowmaking areas. Early in the season when snowmaking begins, there is no way to determine if the snow year will be heavy or light. If it happens to be heavy, the additional snow from early snowmaking would increase total snow depths and extend the period of snowmelt. Increases in snow depth and snowmelt, particularly during high snow years, may decrease the snow-free growing season for a particular year. This could decrease productivity which may affect herbivorous animals, particularly small mammals, and subsequently the predators they prey upon them, such as raptors and foxes.

No accurate data is available on the amount of road kill that occurs on highways in and to Brian Head Resort. The Proposed Action is intended to increase visitor use, which would increase traffic. Therefore, the potential for increased road killed animals also increases.

In order to implement portions of the Master Development Plan that have been mapped, minimal acceptable standards were developed in order to minimize or avoid potential disturbance to specific wildlife species or their habitats. These standards are listed in the Design Features section of this document.

The Proposed Action, which is the Brian Head Resort Master Development Plan, includes generally planned and more detailed proposals. The general plans cannot be adequately addressed in a site specific manner because either the location has not yet been identified, or the specifics about the proposal have not been presented. Therefore, some of these general proposals may need further analysis in order to determine the effects to wildlife and habitats and/or develop mitigation measures to avoid adverse effects.

The Proposed Action includes creating new ski runs and lifts, parking lots and restaurants as well as other facilities. This will require a timber harvest in most cases. The effects of timber harvest is described in detail in the Brian Head Recovery Plan Environmental Impact Statement (USDA 1995) and Effects of Timber Harvest on Selected Wildlife Species (Summers 1997) and is incorporated here by reference.

Table 4-5, Principle Habitat Components and Species Affected by the Proposed Action

<table>
<thead>
<tr>
<th>Species</th>
<th>Canopy Cover</th>
<th>VSS Classes, Openings, Edges</th>
<th>Snags</th>
<th>Down Logs</th>
<th>Large Diameter Trees</th>
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<tr>
<td>Peregrine Falcon</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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</tr>
<tr>
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<td>X</td>
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<td>X</td>
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<td>X</td>
<td>X</td>
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<td>X</td>
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<tr>
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<td>X</td>
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<td>X</td>
<td>X</td>
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<td>Wild Turkey</td>
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<td>X</td>
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<td>X</td>
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</tr>
</tbody>
</table>

* Large diameter trees may provide big game hiding cover in some areas, and be the only cover available.
THREATENED, ENDANGERED AND PROPOSED SPECIES

Peregrine Falcon
The potential to affect peregrine falcons is moderate. This determination is based on the following considerations. The Rocky Mountain/Southwest Peregrine Falcon Recovery Plan (USDI 1984) prescribes General Protective Measures for peregrine falcons within one and ten miles of the nesting cliffs. These methods are: (1) Discourage land-use practices and development which adversely alter or eliminate the character of the hunting habitat or prey base within ten miles and the immediate habitats within one mile of the nesting cliff. Permanent disturbances, such as housing developments or recreational facilities should be prohibited within one mile of the nest cliff; (2) Restrict human activities and disturbances between February 1 and August 31 (in excess of those which have historically occurred at the sites) which occur within one mile of the nest cliff(s); (3) Discourage or eliminate the use of pesticides and other environmental pollutants which are harmful and would adversely affect the peregrine or its food source. No pesticide use is proposed with this alternative. Development described in the Proposed Action will affect the foraging habitat within ten miles and one mile of the nesting cliff. With mitigation measures implemented, nesting activities would not likely be adversely affected.

Chair #1 has not been in operation for approximately five years and wildlife in the area could have begun to use the area once again. Thus, constructing the new lift and cutting trees in the ski runs may affect peregrine foraging. Prey may change in abundance, but more likely, composition, from changes in vegetation from the ski run areas.

The resort area is not likely to be a primary use area by peregrine falcons. The Bowl Lift used in summer would increase use to the Brian Head area, which could be used by foraging due to the presence of open meadow and parkland habitat. Presently there are many visitors to Brian Head Peak. The peregrines may be affected by increased use, and the Proposed Action would affect peregrine falcons, but is not likely to cause adverse affects.

Bald Eagle
Guidelines for managing bald eagles and their habitats are outlined in The Northern States Bald Eagle Recovery Plan (USDI 1983 Page G3 - G66). Basically, they are to regulate or control human use where human use is disturbing eagles or rendering suitable habitat unsuitable, maintain perches and roosts, (large trees) and maintain or protect feeding areas. The Brian Head Resort area contains no roosts and is not used for foraging. Construction of the facilities in the Proposed Action would not likely cause effects to eagles using the suspected roost near Brian Head.

Mexican Spotted Owl
The Dixie National Forest is within the Colorado Plateau Recovery Unit (USDI 1995). Three different management areas are described in the Mexican Spotted Owl Recovery Plan (Ibid.): (1) Protected Activity Center (PAC) (600 acres) around known or historical nest and/or roost sites; (2) Restricted areas provided to define the proportion of the landscape that should be in or approaching conditions suitable for nesting and roosting; and (3) Other forest and woodland types where no specific guidelines are proposed, but general recommendations are given to manage these areas for landscape diversity within natural ranges of variation.

A PAC has not been officially delineated for the potential pair of spotted owls near Brian Head because the pair has not been confirmed and the nest area has not been identified. The 600 acres surrounding the location where they may occur would most likely be on private and BLM with a small amount of acreage on the Dixie National Forest. The Brian Head Resort Expansion project area would not likely be chosen to be included in a PAC for these owls, or any other owls. The area is likely used by wintering owls or dispersing juveniles in winter evidenced by the radio-telemetered owls in 1992.

Guidelines for Restricted Areas included are separated by vegetation cover types: mixed conifer forest, pine-oak forests and riparian areas. Except for riparian, these habitat types do not exist within the Brian Head Resort. Riparian habitats are high alpine and not likely to be used by these owls. The primary objective in managing these areas is to maintain and create replacement owl habitat, while providing a diversity of stand conditions and stand sizes across the landscape.

While there are guidelines for mixed conifer, pine-oak and riparian areas, no specific guidelines are presented for spruce-fir and aspen community types, which comprise the forested landscape in and around Brian Head Resort. The assumption is that these community types are used primarily for foraging, wintering, migration, and dispersal.

The guidelines developed for protected and restricted areas have useful applications to spruce-fir and aspen community types (Ibid.). These guidelines include managing for landscape diversity, mimicking natural disturbance patterns, incorporating natural variation in stand conditions, retaining special features such as snags and large trees (>18 inches dbh), and using fires as appropriate (Ibid.). ProActive fuels management may also be important where appropriate.

In the Brian Head Resort area, some of these guidelines have not and cannot be met. The existing ski runs and developments, as well as the Proposed Action development, do not mimic natural disturbance patterns. Large diameter trees are first hit and killed by spruce bark beetle, and are subsequently being removed to reduce risk of further infestation. Therefore, large diameter trees are becoming increasingly scarce. Incorporating natural variation in stand conditions also may not be met due to spruce mortality. Snags present safety hazards to skiers

Chapter 4 Environmental Consequences
Grazing allotments in the CEA are shown on Appendix B. All allotments are in fair to good condition with a stable or upswing trend (Dale Harris, pers. comm.). A few areas have problems with distribution of livestock that are presently being addressed. Haycock Mountain, Navajo Ridge, Bowery, Warren Bunker and Castle Valley/Hatch Mountain allotments have reduced their numbers in the last five years, resulting in lighter distribution of livestock and reduced effects of grazing.

Because the condition of the range is generally stable or improving, the cumulative effects of the Proposed Action combined with grazing is not expected to result in cumulative effects to wildlife in the long term. Stable or improving conditions would allow grasses, forbs and shrubs on which prey species depend to grow to heights and conditions that would support these species and thereby provide prey for species such as peregrine falcons and Mexican spotted owls.

Recreation in the Brian Head area has steadily been increasing. The heaviest recreation uses are downhill skiing in the winter and mountain biking in the summer, although recreation uses such as snowmobiling, hiking, horseback riding, and cross-country skiing also is prevalent. Present actions and events include a new trail construction, Utah Summer Games Mountain Bike and Horse back riding endurance competitions at Brian Head, and snowmobile trails groomed by the State of Utah Division of Natural Resources.

High Adventure Trail Rides, a horse back riding outfitter and guide operates in cooperation with Brian Head Resort and under a Special Use Permit with the Dixie National Forest. In 1994 there were 1,083 rides taken, with 213 crossing through the project area. This was a 173% increase from the 1993 season of 623 rides taken.

Brian Head Resort hosts a variety of recreational events and festivals. The Town of Brian Head also conducts special events and weekly activities to promote recreation in the area (see Recreation).

Recreation actions in the foreseeable future in the CEA can be found in the Project File. Recreation activities have been in existence in the Brian Head area since before 1960. The potential for disturbing wildlife is increasing with the increase in recreational use. Currently, there are no limits set or guidelines set for capacity of use on trails or numbers of outfitter guides.

Carbaryl treatments have been used, and will continue to be used for the next ten years, on many trees within the Brian Head Resort area and in the subdivisions in the town of Brian Head. The treatments are applied to the bole of the trees and affect only those insects. Very few insects in flight are affected. Insects are food to prey of peregrines. Therefore, peregrines may be indirectly affected (fewer birds for food because there are fewer insects on which the birds prey).

Ashdown Gorge Wilderness and Cedar Breaks National Monument lie adjacent to Brian Head Resort and offer an undisturbed area for wildlife. Timber harvest is prohibited in the national park. Forest pest management activities are allowed only to prevent the unnatural loss of the wilderness resource or to protect timber and other valuable resources adjacent to the wilderness (LRMP page IV-125). No forest pest management activities are presently planned in the Ashdown Gorge Wilderness Area. This area is important for wildlife movement and dispersal as well as raising young for some prey species.
SENSITIVE SPECIES

Three-toed Woodpecker

The potential to affect three-toed woodpeckers with the Proposed Action is assessed as moderate based on the following considerations. Because snags can be a hazard to recreationists and resort employees and are removed, it is expected that snag densities in most of the resort area will be below Forest Plan Standards and Guidelines. Because of the density of development, average snag densities may not meet guidelines as well.

These woodpeckers are adopted to find patchy food resources, following insect infestations (Koplin 1972, Hogstad 1976), so would likely move to areas where food is more abundant after the beetle infestation has subsided. Therefore, three-toed woodpeckers may be affected by this action, but there would be no effects to population viability.

Northern Goshawk

The potential to affect the northern goshawk habitat is moderate. Fragmented habitat, lack of snags and down wood (lack of habitat for pycy species), nearly year-long recreational use and annual maintenance activities in the Brian Head Ski Area have rendered the area to marginal habitat for goshawks. Although no goshawk nests have been found within the projects area, activities in the Proposed Action would increase area unsuitable for goshawk nesting in the project area by the addition of facilities, cutting trees to make more ski runs and adding area where humans would be recreating. Therefore, the Proposed Action would affect goshawks, but would not adversely affect them or their population viability.

Spotted and Western Big-eared Bat

The potential to affect spotted and western big-eared bats is low to moderate. Bats may use the project area for foraging, but they are nocturnal and project activities will take place during the day. Very little is known about spotted bat reproductive habits. They most often inhabit rough, desert like terrain characterized by suitable roosting cliffs, areas similar to those frequented by other big-eared bats. Although they are usually solitary, they may hibernate in small groups.

Western big-eared bats hibernate in winter. Most bats roost alone, but some gather in small clusters. In Utah, western big-eared bats are frequently found in caves and mines (Zevaloff and Collet 1988), but may also use snags (Green 1995). Caves will not be affected by the Proposed Action. Snag removal for safety would occur in the summer months when bats are raising young. Therefore, activities such as skiing, would not affect these bats, but would reduce habitat (snags).

In the spring and summer, female western big-eared bats remain with young in maternity colonies in caves, mines and buildings. These would not be affected by the Proposed Action.

Chapter 4 Environmental Consequences

There would be an increase in forested edge areas which may be used for foraging by bats as a result of created openings from new ski runs. Lights used at night in the summer may attract insects which would draw insects away from forested edges where these bats forage. Some species of bats forage around lights where insects gather. It is not known if spotted and western big-eared bats forage in this manner. Therefore, the Proposed Action would affect these bats, but would not likely adversely affect them nor their viability.

Flammulated Owl

The potential to affect flammulated owls is low based, on the following considerations. Flammulated owls may use this area for foraging, but are not expected to because they are generally associated with ponderosa pine habitats. Flammulated owls are migratory, leaving the area in fall and not returning until May. Therefore, winter activities would not affect flammulated owls.

Key habitat components for flammulated owls are large trees, including snags, open forests, and insect populations, particularly moths. The Proposed Action will maintain as many large diameter trees as possible (because they are visually appealing) but this is becoming increasingly difficult due to mortality of large diameter trees, and removal of them, from the becule infestation. Stands are becoming more open, with smaller diameters over all. Opening the forest canopy would increase grasses and forbs which will harbor more insects. This could increase food supplies for flammulated owls. Therefore, flammulated owls may be affected, but not adversely affected.

CUMULATIVE EFFECTS

Cumulative effects that have potential effects to key habitat components for these wildlife species consist of woodcutting, timber sales and grazing. Present and future foreseeable harvest activities are shown on Appendix 9.

Historically, this area has always experienced some tree mortality due to insect activity. The cumulative effects of this past natural disturbance and timber harvest activity, in addition to the activities in this alternative would reduce tree density, canopy, cover and the total number of snags in the area. The resulting mosaic of the remaining habitat compone ts will depend on the intensity and distribution of the bark beetle activity.

Future actions would also be treating spruce beetle infestations. They would attempt to initiate such a strategy using the intent of the Goshawk Recommendations (1992) with an objective of leaving as many green trees as possible to provide suitable nesting and foraging habitat as soon as
as possible. However, large diameter trees will continue to be infested due to the beetle infestation and mortality of large diameter trees.

Timber harvest will increase forested edges, however, edges created by harvest activities are not necessarily used more heavily by wildlife such as bats, at least initially (Christy and West, 1993, page 7). Because net populations of insects (associated with early and late successional forests) are not expected to change, no effects to bats or their viability is expected.

Carbaryl applications have occurred, and will continue for the next ten years in the resort area. This will reduce insects, particularly bark beetles in localized areas. The amount of treated acreage is about 3% of the spruce-fir belt. Because bats and flammulated owls forage mostly on moths and other insects on the wing, with less foraging by gleaners off bark, the carbaryl is not likely to adversely affect them. In addition, flammulated owls would spend less time foraging in spruce fir than in ponderosa pine and therefore would be affected less.

Three-toed woodpeckers forage on bark beetles on and in the bark of spruce trees. Therefore, reducing insects would reduce food for them. However, the beetle infestation is large enough and widespread enough that the application of carbaryl in the resort area would not likely affect food supply for three-toed woodpeckers over the landscape.

Grazing allotments in the CEA are shown on Appendix 8. All allotments are in fair to good condition with a stable or upward trend (Dale Harris, pers. comm.). A few areas have problems with distribution of livestock that are presently being addressed. Haycock Mountain, Navajo Ridge, Bowry, Warren Bunker and Castle Valley/Hatch Mountain allotments have reduced their numbers in the last five years, resulting in lighter distribution of livestock and reduced effects of grazing.

**Sensitive Plants**

Because activities will not take place in riparian areas (where Arizona willow has been documented) or in occupied sensitive plant habitat with the Brian Head Resort Expansion project area, there would be no direct effects of the proposed action to sensitive plants. These plants are *Tushar paintbrush* (*Castilleja parvula* var. *parvula*), *Zion jamaica* (*Jamaica americana*), *Arizona willow* (*Salix arizonica*), *Cymopterus minutus*, *Navajo Lake milkvetch* (*Astragalus limnocharis* var. *limnocharis*), and *Maguire campion* (*Silene petersonii*).

**CUMULATIVE EFFECTS**

The potential to cumulatively affect sensitive plants is low for *Tushar paintbrush*, *Zion jamaica*, and *Maguire campion* and moderate for *Arizona willow*. This determination is based on the following considerations.

The effects of the Proposed Action have the potential to indirectly affect stream channel morphology and water quality (see Hydrology), therefore, could affect *Arizona willow* that occurs on private land in the town of Brian Head.

Past development in and adjacent the wetland/riparian area in the town of Brian Head consisted of filling in wetlands to create a parking lot. Upslope from the riparian area activities such as resloping and reshaping the ski runs, creating summer mountain bike trails, driving on ski runs, lack of proper water drainages along slopes and timber harvest have increased sediments to Parowan Creek and the area where *Arizona willow* occurs.

Because there are no baseline data regarding sedimentation, and stream channel morphology to compare current conditions with historic conditions, it is impossible to assess affects of these cumulative effects on the willow. However, it can be assumed that degraded stream channel conditions, increased sediment and loss of wetland to parking lot would not be a beneficial effect to the willow. Further actions to increase risk of these effects, before restoration of existing conditions occurs, will increase risk of adverse effects to this population of *Arizona willow*.

**MANAGEMENT INDICATOR SPECIES**

**Elk and Deer**

The potential to of the Proposed Action to affect elk and deer is low to moderate, based on the following considerations. Activities occurring during the winter months are not likely to affect elk and deer because they move to lower elevations and winter ranges. Activities occurring during summer, however, would likely affect foraging behavior. No elk calving or fawning occurs within the Resort area, therefore, no effects would occur to fawning or calving. Elk and deer that are displaced from these areas would likely move to adjacent areas.

Opening stands for new ski runs would increase forage for big game. Areas of hiding and thermal cover would be reduced. Road density would increase slightly with the addition of .2 miles of road with Proposed Action. The new road would not be in areas that would change measurably due to new access.

The proportion of the herd ranges for elk and deer here is small, and no critical ranges are within the Resort area. Therefore, although there would be affects to elk and deer with this action, it is not likely to adversely affect nor affect population viability.

**Wild Turkey**

The potential of the Proposed Action to affect wild turkeys is low. Turkeys have not been observed in the Brian Head Resort area, however, suitable turkey habitat exists on the west side of the Brian Head Resort area. 

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of Highway 143 (Coles, pers. comm.). Shoshone Chair lift #1 and associated ski run clearing may affect turkey foraging and roosting. Because the numbers of turkeys using this area is small, and turkey populations on the Cedar City Ranger District are generally increasing (Grandison, pers. comm.) the effects of the Proposed Action may affect turkeys, but will not affect turkey population viability.

**Northern Flicker**

Northern flickers are found in small numbers, if at all, in the Brian Head area during winter. They typically migrate to lower elevations. Therefore, the Proposed Action activities in winter would not likely affect northern flickers. Northern flickers have been observed in the area during summer. Activities occurring during the summer could displace flickers temporarily in the immediate vicinity of the activity.

Removal of trees would reduce trees that could become snags in the future. Snag densities are expected to be low with the Proposed Action due to necessary removal of hazard trees and wood, therefore, affect flickers. Lack of down logs would affect flickers since snags, flickers primary prey, would be in lower numbers. Because the northern flicker is a habitat generalist, the Proposed Action would not likely affect population viability.

**CUMULATIVE EFFECTS**

Past, present, and future timber sale harvest activities are shown in Appendix 8. Although harvest units in these sales will remove large numbers of spruce trees and spruce stands the subalpine fir and aspen stands will still provide cover in some areas. This would be in a clumpy or patchy nature which is a preferred distribution for elk and deer habitat, depending on the size of the patches. In pure spruce stands, very little tree cover is expected to remain after harvest. The cumulative effects area is expected to contain adequate amounts of security and hiding cover because of aspen and mixed conifer habitats. Hiding cover lost from timber sale activity would be replaced in approximately 20-30 years with natural regeneration or native tree re-stocking.

Grazing allotments in the CEA are shown in Appendix 7. All allotments are in fair to good condition with a stable or upward trend (Dale Harris, pers. comm.). A few areas have problems with distribution of livestock that are presently being addressed. Haycock Mountain, Navajo Ridge, Bowry, Warren Bunker and Castle Valley/Hatch Mountain allotments have reduced their numbers in the last five years, resulting in lighter distribution of livestock and reduced effects of grazing.

Because the condition of the range is generally stable or improving, the cumulative effects of the Proposed Action combined with grazing is not expected to result in cumulative effects to elk or deer in the long term. Stable or improving conditions would allow grasses, forbs and shrubs on which elk and deer feed to grow to heights and conditions that would support foraging for both livestock and big game.

Road densities within the cumulative effects area are expected to increase in the short term in the CEA due to other areas being treated for spruce beetle infestations. Many temporary roads would be closed, reconvened, and revegetated following commercial timber removal, and system roads would be closed or blocked. Road kill could increase as the resort completes their developments and attracts more visitors.

Although some areas do not yet meet the maximum road density required by standards and guidelines in the LRMP (page IV-50) efforts are working toward reducing road densities to meet this goal. Difficulties have been encountered to effectively close roads. The primary difficulty is open vegetation with flat topography which allows traffic to go around closures. Signing and enforcement is being planned to address this.

Timber harvesting would improve grasses and forbs, which may attract turkeys, elk, and deer into the area. Forbs and grass understories would increase in the stands that would be harvested. Lower basal areas would result in more open stands improving roosting and foraging habitat. Turkey roosting habitat, however, is decreasing due to harvest of large diameter (infested or dead) spruce trees.

Timber sales typically reduce snag numbers, however, with the present beetle epidemic there is expected to be sufficient amounts of snags and dead and down wood to support the northern flicker. Abundant down wood and snags will be present in Cedar Breaks and Ashdown Gorge Wilderness (due to no logging) which will provide relatively high populations in these areas. Because the northern flicker is somewhat of a habitat generalist using open and closed canopy stands (and all plant communities) and snags will remain in conifer and aspen stands the Proposed Action, in conjunction with past, present, and future timber sales would not cause adverse affects to the northern flicker, or cause adverse affects to population viability.

**Riparian Habitats**

The potential of the Proposed Action to directly affect riparian habitats is low. Because no activities will take place in riparian areas with the Brian Head Resort Expansion project area, there would be no direct effects on the proposed action.

**CUMULATIVE EFFECTS**

The potential of cumulative effects on riparian habitats is moderate. The effects of the Proposed Action have the potential to indirectly affect stream channel morphology and water quality (see Chapter 4 Environmental Consequences 4 - 32.
Hydrology), therefore, could affect riparian habitat that exists on private land in the town of Brian Head as well as downstream (Parowan Creek).

Past development in and adjacent the wetland/riparian area in the town of Brian Head consisted of filling in wetlands to create a parking lot. Upslope from the riparian area activities such as reshaping and replanting the ski runs, creating summer mountain bike trails, driving on ski runs, lack of proper water drainages along slopes and timber harvest have increased sediments to Parowan Creek.

Because there is no baseline data regarding sedimentation, or stream channel morphology to compare current conditions with historic conditions, it is impossible to assess affects of these cumulative effects on the willow. However, it can be assumed that degraded stream channel conditions, increased sediment and loss of wetland to parking lot would not be a beneficial effect to the willow. Further actions to increase risk of these effects before restoration of existing conditions occurs may have adverse effects to these riparian areas.

**OTHER SPECIES OF CONCERN**

**Brian Head Mountainsnail**

The potential of the Proposed Action to affect the Brian Head mountainsnail is moderate based on the following considerations. The mountainsnail population is isolated with very little known and is, therefore, inherently at high risk to loss of viability. The Bowl Lift and the up-mountain restaurant are the activities in the Proposed Action in suitable habitat for the Brian Head mountainsnail.

Because no Brian Head mountainsnails were found in the project area where surveys were conducted on the north side of Brian Head Peak, there would be no direct effects of placing towers on these sites on the mountainsnails (Clark 1995). Installation of a ski tower would eliminate snail habitat irreversibly. Disturbance outside surveyed areas may adversely affect the snail and its viability. Therefore, it is important that the towers be placed in areas cleared by the surveys.

Very little is known regarding the distribution and population size of this species. No surveys have been conducted in or near the proposed location for the mountain top restaurant. Therefore, an assessment of suitable habitat and/or surveys for snails must be conducted prior to construction of the mountain top restaurant.

To determine if the geology and soil are suitable for lift construction on Brian Head Peak, geotechnical drilling and testing would be needed. The areas where drilling would occur (which are the areas cleared by the surveys) would be disturbed. This would consist of drilling at one or more angles into the rock and soil to determine where the tower might be anchored. The tower locations were surveyed with no snails found, therefore, it is not likely that they would be directly affected by drilling. However, habitat would be disturbed by the drilling.

**Pika**

Pika habitat would be irreversibly lost from construction of the Bowl Lift towers on 300 square meters (where towers would be placed) and where blasting would remove or destroy rock (approximately five acres). Pikas have been observed along the north side of Brian Head Peak in all three locations where mountainsnails were surveyed and along the talus near the shelter at the top of the Peak in the project area.

Since pikas are active year-round, skiing and mountain biking, along or near the Bowl may affect pikas. During the summer months, mountain bikers travel along boardwalks to reach the adjacent trails from the top tower. Presence of people will mean increased trash and potentially feeding the pikas. It is not known if this would detract from their perseverance in storing food for the winter.

Skiing has already been occurring in the Bowl with access by snow cat, and the current effects on pikas is unknown. Numbers of skiers would increase with the Bowl Lift. Compaction of snow from increased skiers may cause snow to melt off later than it would otherwise. Food storage during the summer is very important to pika survival (Player 1997). A later snowmelt would shorten an already short growing season for grasses, and the pika would not be able to store as much food. Pikas will produce two to three litters each summer. A later snowmelt and shorter growing season would produce less forage and litters born late in the summer would not be able to put up enough food for the winter.

Long winters are especially hard on pikas (Player 1997). If they experience a summer with poor food followed by a long winter, the population crashes with only a few individuals left to build up the population again. Because they have such a high reproductive rate, they usually can build populations fairly quickly, unless forage is low or another heavy or late snowpack occurs. If later snowmelt is repeated "artificially" from compacted snow every year, it may make it difficult for pikas to either build up populations after a crash or maintain populations. Therefore, pikas would be affected and habitat would be reduced.

**CUMULATIVE EFFECTS**

Other past, present and future foreseeable actions in this area include trail use below the peak on the southwestern side and visitor use on the top of the Peak. A road leads to the top of the peak and a trail traverses around the south and southwest side of the mountain. The trail is located immediately adjacent to the only documented site of the mountainsnails. During the summer, visitors have been observed throwing rocks, and trampling vegetation and using off road vehicles...
(OHV) illegally on the meadows (Summers, personal observation). In winter, snowmobilers and skiers, both nordic and downhill, visit the peak. A snow cat delivers skiers to the top and they ski down the "bowl" on the north side of the Peak.

Because the mountainsnail is an isolated population of unknown size and distribution, cumulative effects of the Proposed Action with other past, present, and future activities are not known. This risk of loss of viability is inherently high with such conditions.

Pikas are present on many rocky lava areas on the Cedar City Ranger District as evidenced by data from goshawk survey field sheets and employee knowledge of the areas. They are also present in Cedar Breaks National Monument as evidenced by their interpretive sign on pikas. There is no data on population numbers or trends. There would be continued effects of current activities in pika habitat and between habitat areas that could affect success of dispersal (such as cars traffic on roads, off-road vehicles, mountain biking and hikers). The long term effects of these activities are unknown. Because the pika is present over the cumulative effects area, it is unlikely that the Proposed Action would cause a loss of viability on the Markagunt Plateau.

**NO ACTION ALTERNATIVE - CURRENT MANAGEMENT**

Under the No Action Alternative, there would be no change from the present conditions within the ski area as described in Chapter 3. Winter and summer recreation use at Brian Head Resort area would continue at or near present levels and would operate in much the same manner as it currently operates. There would be no comprehensive planning for vegetation management, including snags, road use or other beneficial planning. Therefore, the wildlife and habitats including threatened, endangered, sensitive, and management indicator species within the area would continue with trends as described in the existing condition.

**Peregrine Falcon**

The potential of the No Action Alternative to affect peregrine falcons is low to moderate, based on the following considerations. There would be no new development within one mile of the nesting cliff with this alternative. The No Action Alternative, which is the existing condition, will have effects to peregrine falcon foraging within the ten mile radius around the nesting cliff. The presence of skiers, snowmobilers and general activities in the Brian Head area most likely determined, to some degree, where peregrines forage. However, because the ski area has been in existence for many years, and the peregrine falcons have reproduced successfully, they may have habituated to these activities. Their foraging activities have and will continue to be affected with the presence of development and recreationists.

**Mexican Spotted Owl**

The potential of the No Action Alternative to affect Mexican spotted owls is low to moderate based on the following considerations. Mexican spotted owl habitat (foraging, wintering and juvenile dispersal) in the Brian Head Resort area has been modified by ski runs, lift equipment, maintenance sheds, and trails (both summer and winter). Activities in the area in addition to downhill skiing include snowmobiling, cross-country skiing, hiking, mountain biking and night skiing. Because of this modification and use of the area in summer and winter by recreationists, it is not likely that the Brian Head Resort is used by these owls for roosting.

The No Action alternative would maintain these existing activities and structures at essentially the same levels. What use the area currently receives from Mexican spotted owls would likely continue, since there would be no appreciable change from the existing condition. Therefore, the No Action Alternative would have no adverse effects to Mexican spotted owls or their viability.

**Bald Eagle**

The No Action Alternative would likely have little to no effects to bald eagles. The suspected bald eagle roost is northwest of the project area. The eagles fly west to Cedar Valley to forage and do not likely pass over the resort except perhaps during migration. In this case they would not likely land in the resort area due to the development and people.

Therefore, the No Action Alternative would continue with the same effects as is currently occurring. There would be no adverse effects to bald eagles, nor their viability.

**CUMULATIVE EFFECTS**

Cumulative effect of the No Action Alternative with other activities occurring in the cumulative effects areas are not likely to cause adverse effects to peregrine falcons, Mexican spotted owls or bald eagles. Activities would continue much the same as they are presently and there would be no additive actions with the No Action Alternative.

**SENSITIVE SPECIES**

**Three-toed Woodpecker**

As described in the Affected Environment section, the resort development and activities have had effects to wildlife habitat. In the case of three-toed woodpeckers, snags and bug-infested trees have been removed and forested habitat has been fragmented. Habitats within and around the Brian Head Resort area may be used for foraging, but are less likely for nesting due to the fragmented habitat and lack of snags. The No Action Alternative would maintain principally the same effects that are presently occurring.
Northern Goshawk
Continued existence of present facilities and activities in the Brian Head Resort would have the same effects as described in the Affected Environment section. Habitat would remain fragmented, presence of people would discourage use of the area by goshawks, and nesting would be unlikely.

If a goshawk does nest in the project area, it would most likely already be habituated to disturbances that are discussed above. Activities in the No Action Alternative would continue to displace goshawks, but would not likely adversely affect goshawks or affect population viability.

Spotted and Western Big-eared Bats
The No Action Alternative would result in the same effects to spotted and western big-eared bats as the existing condition. Forested areas and openings would remain the same. In the ski runs where restoration work has begun, there is expected to be increased ground vegetation. This would increase habitat for insects in the summer, which is bat prey. Continued removal of beetle infested trees and spraying of carbaryl would decrease insects.

Flammulated Owl
With the No Action Alternative, the density of snags and large diameter trees would continue to decline due to the spruce bark beetle mortality and removal of snags as hazard trees. Because flammulated owls are more closely tied to ponderosa pine habitat and if they would use the Brian Head Resort area, it would likely be foraging, the existing conditions would not be expected to affect flammulated owls.

CUMULATIVE EFFECTS
Activities that could affect components for three-toed woodpeckers, northern goshawks, bats, and flammulated owls are insecticide use, woodcutting, grazing, and timber harvests.

Timber harvests are shown in Appendix 8. Harvest treatments will vary in intensity, dependent upon the bark beetle infestation and resulting mortality. Mortality to date, however, indicate that harvests will be intense. The treatments will reduce, but not entirely eliminate, the beetle infestation in the CEA. Snags will be reduced but will still remain in the CEA in unharvested areas. Large diameter snags in harvested areas are expected to be limiting because large diameter trees are infested more frequently than smaller diameter (12 to 16 inches dbh or less). Throughout this area there are stands of aspen that provide habitat for nesting three-toed woodpeckers, goshawks, and foraging bats, and will continue to do so.

Presently it is prohibited for fuelwood cutters to cut snags 12\" diameter or larger. Closing roads and marking trees for wildlife may help prevent snags from being illegally cut and assist law enforcement officers in catching violations (Ricks, 1995).

Grazing allotments in the CEA are shown in Appendix 7. All allotments are in fair to good condition with a stable or upward trend (Dale Harris, pers. comm.). A few areas have problems with distribution of livestock that are presently being addressed. Haycock Mountain, Navajo Ridge, Bowry, Warren Bunker and Castle Valley/Hatch Mountain allotments have reduced their numbers in the last five years, resulting in lighter distribution of livestock and reduced effects of grazing.

Because the condition of the range is generally stable or improving, the cumulative effects of the Proposed Action combined with grazing is not expected to result in cumulative effects in the long term.

Sensitive Plants - No Action
With the No Action Alternative, no actions would take place in riparian areas (where Arizona willow has been documented) or in occupied sensitive plant habitat with the Brian Head Resort Expansion project area, there would be no direct effects of the proposed action to sensitive plants. These plants are Tushar paintbrush (Castilleja parryi var. parryi), Zion jamea (Jamea amerciana), Arizona willow (Salix arizonicana), Cymopterus minimus, Navajo Lake milkvetch (Astragalus limnocharis var. limnocharis), and Maguire campion (Silene petersonii).

CUMULATIVE EFFECTS
The potential to cumulatively affect sensitive plants is low for Tushar paintbrush, Zion jamea, and Maguire campion and moderate for Arizona willow. This determination is based on the following considerations.

The effects of the Proposed Action have the potential to indirectly affect stream channel morphology and water quality (see Hydrology), therefore, could affect Arizona willow that occurs on private land in the town of Brian Head.

Past development in and adjacent the wetland/riparian area in the town of Brian Head consisted of filling in wetlands to create a parking lot. Upstream from the riparian area activities such as resloping and reshaping the ski runs, creating summer mountain bike trails, driving on ski runs, lack of proper water drainages along slopes and timber harvest have increased sediments to Parowan Creek and the area where Arizona willow occurs.

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Because there are no baseline data regarding sedimentation, and stream channel morphology to compare current conditions with historic conditions, it is impossible to assess affects of these cumulative effects on the willow. However, it can be assumed that degraded stream channel conditions, increased sediment and loss of wetland to parking lot would not be a beneficial effect to the willow. Further actions to increase risk of these effects, before restoration of existing conditions occurs, will increase risk of adverse effects to this population of Arizona willow.

**MANAGEMENT INDICATOR SPECIES**

**Elk and Deer**

The potential of the No Action Alternative to affect elk and deer is assessed as low based on the following considerations. As described in the Affected Environment, elk and deer may forage in the area, but are not likely to spend much time in the resort area during periods of summer use, due to the presence of people. In winter, they move to lower elevations and are not affected by current conditions. In summer they are being displaced by recreationists. This would continue with the No Action Alternative. With the No Action alternative, visitor use may stay the same or may increase, but not to the degree expected as with the Proposed Action. Therefore, there may be less road killed animals due to no increase or lower increases in traffic.

**Wild (Merriam's) Turkey**

The No Action Alternative would have effects as described in the Affected Environment. The area is marginal for habitat, is not used by very many turkeys and would continue much the same with this alternative. Therefore, there would be no affect to wild turkeys with this alternative.

**Northern Flicker**

The existing conditions described in the Affected Environment would continue with the No Action Alternative. Snags and down logs would continue to be low, recreation would be present and the mixture of forested and openings would remain the same. There would not be increased where snags would be removed (as compared to the Proposed Action), therefore, would provide more habitat for nesting. Northern flickers are habitat generalists and are found in many plant community types outside Brian Head Resort. Therefore, this alternative would affect flickers, but would not have adverse effects or effects to population viability.

**Riparian Habitats**

With the No Action Alternative there would be no actions within riparian areas. The existing risks of changes in sedimentation, channel morphology and water quality, as well as vegetation changes, would continue (see Hydrology).

**CUMULATIVE EFFECTS**

Past, present and future timber sale harvest activities are shown in Appendix 8. Although harvest units in these sales will remove large numbers of spruce trees and spruce stands the subalpine fir and aspen stands will still provide cover. This would be in a clumpy or patchy nature which is a preferred distribution for elk, deer, turkeys, and flickers. There may be some areas devoid of forested cover in pure spruce stands where mortality has been high from the spruce bark beetle infestation. The cumulative effects area would contain adequate amounts of security and hiding cover for elk and deer. Hiding cover lost would be replaced in about 20-30 years with natural regeneration or native tree re-stocking.

Aspen regeneration and maintenance would be encouraged. In areas where aspen currently exists and it is disturbed as a result of this project would replace deficiencies in cover within 5-10 years. This would provide increased forage production and cover.

Grazing allotments in the CEA are shown in Appendix 7. All allotments are in fair to good condition with a stable or upward trend (Dale Harris, pers. comm.). A few areas have problems with distribution of livestock that are presently being addressed. Haycock Mountain, Navajo Ridge, Bowery, Warren Bunker, and Castle Valley/Hatch Mountain allotments have reduced their numbers in the last five years, resulting in lighter distribution of livestock and reduced effects of grazing.

Because the condition of the range is generally stable or improving, the cumulative effects of the Proposed Action combined with grazing is not expected to result in cumulative effects to elk, deer, turkeys, or flickers in the long term. Stable or improving conditions would allow grasses, forbs, and shrubs to grow to heights and conditions that would support foraging for both livestock and big game and provide forbs and insects for turkeys. A faster improvement in tall forb plant communities would further benefit elk, deer, turkeys, and other wildlife species.

Road densities within the cumulative effects area are expected to increase in the short term in the CEA due to other areas being treated for spruce beetle infestations. Many temporary roads would be closed, recontoured, and revegetated following commercial timber removal, and system roads would be closed or blocked.

Although some areas do not yet meet the maximum road density required by standards and guidelines in the LRMP (page IV-50) efforts are working toward reducing road densities to meet this goal. Difficulties have been encountered to effectively close roads. The primary difficulty is open vegetation with flat topography which allows traffic to go around closures. Signing and enforcement is being planned to address this.
Because the northern flicker is somewhat of a habitat generalist using open and closed canopy stands and all plant communities and snags will remain in conifer and aspen stands the effects of harvest and associated activities in conjunction with past, present, and future timber sales would not cause adverse effects to the northern flicker or cause adverse effects to population viability.

Cumulative effects to riparian areas are best described in Hydrology. Please refer to this discussion. Riparian habitats in the cumulative effects area are at risk due to timber sales, resort development, and urban development in the town of Brian Head.

OTHER SPECIES OF CONCERN

Brian Head Mountainsnail
The No Action Alternative would have no effects on the Brian Head mountainsnail. There would be no rock or soil disturbance on Brian Head Peak.

Pika
Because there would be no rock disturbance with the No Action Alternative, there would be no effects to pika habitat. Continued skiing with access to Brian Head Peak by snow cat may affect pikas; however, the amount of skiing and effects from this use to date is not likely to cause adverse effects. Continued avalanche blasting, however, if conducted over or near rock talus areas may adversely affect pikas over the long term on this rock talus area.

CUMULATIVE EFFECTS

Other past, present and future foreseeable actions in this area include trail use below the peak on the southwestern side, and visitor use on the top of the Peak. A road leads to the top of the peak and a trail traverses around the south and southwest side of the mountain. The trail is located immediately adjacent to the only documented site of the mountainsnails. During the summer, visitors have been observed throwing rocks, and trampling vegetation using off road vehicles (OHV) illegally on the meadows (pers. obs.). In winter, snowmobilers and skiers, both nordic and downhill, visit the peak. A snow cat delivers skiers to the top and they ski down the "bowl" on the north side of the Peak. Sheep grazing occurs at Brian Head Peak area during the summer months.

Pikas are present on many rocky lava areas on the Cedar City Ranger District as evidenced by data from goshawk survey field sheets and employee knowledge of the areas. They are also present in Cedar Breaks National Monument as evidenced by their interpretive sign on pikas. There is no data on population numbers or trends. There would be continued effects of current activities in pika habitat and between habitat areas that could affect success of dispersal (such as cars traffic on roads, off-road vehicles, mountain biking and hikers). The long term effects of these activities are unknown. Because the pika is present over the cumulative effects area, it is unlikely that the Proposed Action would cause a loss of viability on the Markagunt Plateau.

These activities with the No Action Alternative are not anticipated to cause cumulative effects to the Brian Head mountainsnail or pikas or their habitats.

ALTERNATIVE A - INTEGRATED ALTERNATIVE

The proposed developments and activities in Alternative A are the same as the Proposed Action except that the Bowl Chair lift, snowmaking, and the mountain-top restaurant are not included.

Construction of new facilities would displace wildlife by noise and activity, and by removal or change of habitat. Construction of facilities such as maintenance barns, parking lots, and restaurants, would directly alter habitats through changes of seral classes and changes from vegetation to facilities. The latter changes would be an irretrievable loss of habitat.

Activities included in the Proposed Action such as snowmobiling, mountain biking, and skiing, could disturb wildlife either temporarily or cause them to leave the area, depending upon the degree of use. The ski runs that are used in both summer and winter would not be expected to provide habitat for many species. The forested areas between ski runs may provide nesting habitat for some birds and foraging habitat. They may be used for cover for some species such as small mammals.

Activities in Alternative A that may extend out from the resort, such as mountain biking, will have affects to wildlife outside the resort permit area. These effects would vary depending upon the amount of use, location of use, and timing.

No accurate data is available on the amount of road kill that occurs on highways in and to Brian Head Resort. The Proposed Action is intended to increase visitor use, which would increase traffic. Therefore, the potential for increased road killed animals also increases.

THREATENED, ENDANGERED AND PROPOSED SPECIES

Peregrine Falcon
Recovery Plan General Protective Measures apply to areas within one and ten miles within nesting cliffs for peregrines (USDI 1984). Development described in this alternative would affect the foraging habitat within ten miles and one mile of the nesting cliff. With mitigation measures implemented, nesting activities would not likely to be affected.
Construction of new lifts and cutting trees in the ski runs may affect peregrine foraging. It is unlikely that the construction activities and ski use of the area would affect nesting success because these activities would be out of view of the nesting cliff and would all be ground based.

Because there is abundant habitat within ten miles of the nesting cliff, the resort area is not likely to be used by peregrine falcons to any large degree. Additional development described in this alternative would affect peregrine falcons, but would not likely cause adverse affects.

Bald Eagle
The potential to affect bald eagles with Alternative A is low. Guidelines for managing bald eagles and their habitats are outlined in The Northern States Bald Eagle Recovery Plan, (USDI 1983 Page G3 - G6). Basically, they are to regulate or control human use where human use is disturbing eagles or rendering suitable habitat unusable, maintain perches and roosts, (large trees) and maintain or protect feeding areas. The Brian Head Resort area contains no roosts and is not used for foraging. Alternative A would follow the recovery plan guidelines since no roosts are in the proposed project area and the resort is not a foraging area. Construction of the facilities in the Proposed Action would not likely cause effects to eagles using the suspected roost near Brian Head.

Mexican Spotted Owl
The Dixie National Forest is within the Colorado Plateau Recovery Unit (USDI 1995). Three different management areas are described in the Mexican Spotted Owl Recovery Plan (Ibid.): Protected Activity Center (PAC) (600 acres) around known or historical nest and/or roost sites; (2) Restricted areas provided to define the proportion of the landscape that should be in or approaching conditions suitable for nesting and roosting; and (3) Other forest and woodland types where no specific guidelines are proposed, but general recommendations are given to manage these areas for landscape diversity within natural ranges of variation.

A PAC has not been officially delineated for the potential pair of spotted owls near Brian Head because the pair has not been confirmed and the nest area has not been identified. The 600 acres surrounding the location where they may occur would most likely be on private and BLM with a small amount of acreage on the Dixie National Forest. The Brian Head Resort Expansion project area would not likely be chosen to be included in a PAC for these owls, or any other owls. The area is likely used by wintering owls or dispersing juveniles in winter evidenced by the radio-telemetered owls in 1992.

Guidelines for Restricted Areas include are separated by vegetation cover types: mixed conifer forest, pine-oak forests and riparian areas. These habitat types do not exist within the Brian Head Resort. The primary objective in managing these areas is to maintain and create replacement owl habitat, while providing a diversity of stand conditions and stand sizes across the landscape.

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While there are guidelines for mixed conifer, pine-oak and riparian areas, no specific guidelines are presented for spruce-fir and aspen community types, which comprise the forested landscape in and around Brian Head Resort. The assumption is that these community types are used primarily for foraging, wintering, migration, and dispersal.

The guidelines developed for protected and restricted areas have useful applications to spruce-fir and aspen community types (Ibid.). These include managing for landscape diversity, mimicking natural disturbance patterns, incorporating natural variation in stand conditions, retaining special features such as snags and large trees (> 18 inches dbh), and using fires as appropriate (Ibid.). Practice fuels management may also be important where appropriate.

In the Brian Head Resort area, some of these guidelines cannot be met. The existing ski runs and developments, as well as the Proposed Action development, do not mimic natural disturbance patterns. Large diameter trees are first hit and killed by spruce bark beetle, and are subsequently being removed to reduce risk of further infestation. Therefore, large diameter trees are becoming increasingly scarce. Incorporating natural variation in stand conditions also may not be met due to spruce mortality. Snags present safety hazards to skiers and mountain bikers, and are removed. Using fire to maintain or improve habitat is not a viable option in the Brian Head Resort area due to risk of losing the facilities.

New lifts would expand developed acres in the resort area. This may affect Mexican spotted owl dispersal, foraging and/or wintering movements. Ashdown Gorge appears to be more used than the areas in and around the Brian Head Resort, as evidenced by radio telemetry locations of 1992 (Willey 1993). Therefore, the Proposed Action may affect Mexican spotted owls, but is not likely to cause adverse effects or population viability.

CUMULATIVE EFFECTS

Brian Head Resort area has increased in size and development substantially in the last 30 years. A comparison of aerial photos from the 1960s to 1972 show that this ten year period incurred the most development (see project file). In addition, timber sale activity has increased because of spruce beetle infestation and spruce mortality.

Activities in the past, present and foreseeable future that could affect principle habitat components such as snags, down logs, large diameter trees, canopy closure, riparian areas, and seral stages are primarily timber sales, grazing and recreational activities. Three timber sales have parts of them within the CEA for Mexican spotted owl: Brian Head, Rainbow Meadows, and Sidney Valley. Timber harvests in general have the potential for reducing snag densities, dead and down material, large trees, and crown closures (Summers 1997). Timber sales, in
general, could have the potential for displacing wildlife in meadows, open parklands, and riparian areas that lie adjacent to harvested units should they be operating concurrently.

Grazing allotments in the CEA are shown in Appendix 7. All allotments are in fair to good condition with a stable or upward trend (Dale Harris, pers. comm.). A few areas have problems with distribution of livestock that are presently being addressed. Haycock Mountain, Navajo Ridge, Bowry, Warren Bunker, and Castle Valley/Hatch Mountain allotments have reduced their numbers in the last five years, resulting in lighter distribution of livestock and reduced effects of grazing.

Because the condition of the range is generally stable or improving, the cumulative effects of Alternative A combined with grazing is not expected to result in cumulative effects to wildlife in the long term. Stable or improving conditions would allow grasses, forbs and shrubs on which prey species depend to grow to heights and conditions that would support these species and, thereby, provide prey for species such as peregrine falcons and Mexican spotted owls.

Recreation in the Brian Head area has steadily been increasing. Much of this increase has occurred in the eastern portion of the planning area. The heaviest recreation uses are downhill skiing in the winter and mountain biking in the summer, although recreation uses such as snowmobiling, hiking, horseback riding, and cross-country skiing also is prevalent. Present actions and events include a new trail construction, Utah Summer Games Mountain Bike and Horse back riding endurance competitions at Brian Head, and snowmobile trails groomed by the State of Utah Division of Natural Resources.

Recreation actions in the foreseeable future in the CEA may be found in the Project File. Recreation activities have been in existence in the Brian Head area since before 1960. It is probable that wildlife that use this area have habituated to present use in that area, or wildlife have moved into adjacent habitats.

Carbaryl treatments have been used, and will continue to be used for the next ten years, on many trees within the Brian Head Resort area and in the subdivisions in the town of Brian Head. The treatments are applied to the bole of the trees and affect only those insects. Very few, if any, insects in flight are affected. Insects are food to prey of peregrines. Therefore, peregrines may be indirectly affected (fewer birds for food because there are fewer insects on which the birds prey).

Ashdown Gorge Wilderness and Cedar Breaks National Monument lie adjacent to Brian Head Resort and offer an undisturbed area for wildlife. Timber harvest is prohibited in the national park. Forest pest management activities are allowed only to prevent the unnatural loss of the wilderness resource or to protect timber and other valuable resources adjacent to the wilderness

(LRMP page IV-125). No forest pest management activities are presently planned in the Ashdown Gorge Wilderness Area. This area is important for wildlife movement and dispersal.

**SENSITIVE SPECIES**

**Three-toed Woodpecker**

The potential to affect three-toed woodpeckers with Alternative A is moderate based on the following considerations. Because snags can be a hazard to recreationists and resort employees, it is expected that snag densities in many parts of the resort area will be below Forest Plan Standards and Guidelines. In fact, because of the density of development, average snag densities may not meet guidelines as well. Therefore, three-toed woodpeckers may be affected by this action, but there would be no effects to population viability.

**Northern Goshawk**

The potential to affect the northern goshawk habitat is moderate. Fragmented habitat, lack of snags and down wood (lack of habitat for prey species), nearly year-long recreational use and annual maintenance activities in the Brian Head Ski Area have rendered the area to marginal habitat for goshawks. Although no goshawk nests have been found within the projects area, activities in the Proposed Action would increase area unsuitable for goshawk nesting in the project area by the addition of facilities, cutting trees to make more ski runs and adding area where humans would be recreating. Therefore, the Proposed Action would affect goshawks, but would not adversely affect them or their population viability.

**Spotted and Western Big-eared Bat**

The potential to affect spotted and western big-eared bats is low to moderate. Bats may use the project area for foraging, but they are nocturnal and project activities will take place during the day. Very little is known about spotted bat reproductive habits. They most often inhabit rough, desert like terrain characterized by suitable roosting cliffs, areas similar to those frequented by other big-eared bats. Although they are usually solitary, they may hibernate in small groups.

Western big-eared bats hibernate in winter. Most bats roost alone, but some gather in small clusters. In Utah, western big-eared bats are frequently found in caves and mines (Zeveloff and Collet 1988), but may also use snags (Green 1995). Caves will not be affected by the Proposed Action. Snag removal for safety would occur in the summer months when bats are raising young. Therefore, activities such as skiing, would not affect these bats, but would reduce habitat (snags).

In the spring and summer, female western big-eared bats remain with young in maternity colonies in caves, mines and buildings. These would not be affected by the Proposed Action.
There would be an increase in forested edge areas which may be used for foraging by bats as a result of created openings from new ski runs. Lights used at night in the summer may attract insects which would draw insects away from forested edges where these bats forage. Some species of bats forage around lights where insects gather. It is not known if spotted and western big-eared bats forage in this manner. Therefore, the Proposed Action would affect these bats, but would not likely adversely affect them nor their viability.

**Flammulated Owl**

The potential to affect flammulated owls is low, based on the following considerations. Flammulated owls may use this area for foraging, but are not expected to because they are generally associated with ponderosa pine habitats. Flammulated owls are migratory, leaving the area in fall and not returning until May. Therefore, winter activities would not affect flammulated owls.

Key habitat components for flammulated owls are large trees, including snags, open forests, and insect populations, particularly moths. The Proposed Action will maintain as many large diameter trees as possible (because they are visually appealing), but this is becoming increasingly difficult due to mortality of large diameter trees, and removal of them, from the beetle infestation. Stands are becoming more open, with smaller diameters over all. Opening the forest canopy would increase grasses and forbs which will harbor more insects. This could increase food supplies for flammulated owls. Therefore, flammulated owls may be affected, but not adversely affected.

**CUMULATIVE EFFECTS**

Cumulative effects that have potential effects to key habitat components for these wildlife species consist of woodcutting, timber sales and grazing. Past, present and future foreseeable harvest activities are shown on Appendix 8.

Historically, this area has always experienced some tree mortality due to insect activity. The cumulative effects of this past natural disturbance and timber harvest activity, in addition to the activities in this alternative would reduce tree density, canopy cover, and the total number of snags in the area. The resulting mosaic of the remaining habitat components will depend on the intensity and distribution of the bark beetle activity.

Future actions would also be treating spruce beetle infestations. They would attempt to initiate such a strategy using the intent of the Goshawk Recommendations (1992) with an objective of leaving as many green trees as possible to provide suitable nesting and foraging habitat as soon as possible. However, large diameter trees will continue to be limiting due to the beetle infestation and mortality of large diameter trees.

Timber harvest will increase forested edges, however, edges created by harvest activities are not necessarily used more heavily by wildlife such as bats, at least initially (Christy and West, 1993, page 7). Because net populations of insects (associated with early and late successional forests) are not expected to change, no effects to bats or their viability is expected.

Carbaryl applications have occurred, and will continue for the next ten years in the resort area. This will reduce insects, particularly bark beetles in localized areas. The amount of treated acreage is about 3% of the spruce fir belt. Because bats and flammulated owls forage mostly on moths and other insects on the wing, with less foraging by gleaning off bark, the carbaryl is not likely to adversely affect them. In addition, flammulated owls would spend less time foraging in spruce fir than in ponderosa pine and therefore would be affected less.

Three-toed woodpeckers forage on bark beetles and in the bark of spruce trees. Therefore, reducing insects would reduce food for them. However, the beetle infestation is large enough and widespread enough that the application of carbaryl in the resort area would not likely affect food supply for three-toed woodpeckers over the landscape.

Grazing allotments in the CEA are shown on Appendix 7. All allotments are in fair to good condition with a stable or upward trend (Dale Harris, pers. comm.). A few areas have problems with distribution of livestock that are presently being addressed. Haycock Mountain, Navajo Ridge, Bowery, Warren Bunker and Castle Valley/Hatch Mountain allotments have reduced their numbers in the last five years, resulting in lighter distribution of livestock and reduced effects of grazing.

**Sensitive Plants**

Because activities will not take place in riparian areas (where Arizona willow has been documented) or in occupied sensitive plant habitat with the Brian Head Resort Expansion project area, there would be no direct effects of the proposed action to sensitive plants. These plants are Tushar paintbrush (Castilleja parvula var. parvula), Zion jemia (Jameisica americana), Arizona willow (Salix arizonica), Cymopterus minimus, Navajo Lake milkvetch (Astragalus limnochares var. limnochares), and Maguire campion (Silene petersonii).

**CUMULATIVE EFFECTS**

The potential to cumulatively affect sensitive plants is low for Tushar paintbrush, Zion jemia, and Maguire campion and moderate for Arizona willow. This determination is based on the following considerations.
The effects of the Proposed Action have the potential to indirectly affect stream channel morphology and water quality (see Hydrology), therefore, could affect Arizona willow that occurs on private land in the town of Brian Head.

Past development in and adjacent the wetland/riparian area in the town of Brian Head consisted of filling in wetlands to create a parking lot. Upslope from the riparian area activities such as resloping and reshaping the ski runs, creating summer mountain bike trails, driving on ski runs, lack of proper water drainages along slopes and timber harvest have increased sediments to Parowan Creek and the area where Arizona willow occurs.

Because there are no baseline data regarding sedimentation, and stream channel morphology to compare current conditions with historic conditions, it is impossible to assess affects of these cumulative effects on the willow. However, it can be assumed that degraded stream channel conditions, increased sediment and loss of wetland to parking lot would not be a beneficial effect to the willow. Further actions to increase risk of these effects, before restoration of existing conditions occurs, will increase risk of adverse effects to this population of Arizona willow.

MANAGEMENT INDICATOR SPECIES

Elk and Deer
The potential of Alternative A to affect elk and deer is low to moderate, based on the following considerations. Activities occurring during the winter months are not likely to affect elk and deer because they move to lower elevations and winter ranges. Activities occurring during summer, however, would likely affect foraging behavior. No elk calving or fawning occurred within the Resort area, therefore, no effects would occur to fawning or calving. Elk and deer that are displaced from these areas would likely move to adjacent areas.

Opening stands for new ski runs would increase forage for big game. Areas of hiding and thermal cover would be reduced. Road density would increase slightly with the addition of .1 mile of road with Proposed Action. The new road would not be in areas that would change measurably due to new access.

The proportion of the herd ranges for elk and deer here is small, and no critical ranges are within the Resort area. Therefore, although there would be affects to elk and deer with this action, it is not likely to adversely affect nor affect population viability.

Wild Turkey
Turkeys have not been observed in the Brian Head Resort area, however, suitable turkey habitat exists on the west side of Highway 143 (Coles, pers. comm.). Shoshone Chair lift #1 and associated ski run clearing may affect turkey foraging and roosting. Because the numbers of turkeys using this area is small, and turkey populations on the Cedar City Ranger District are generally increasing (Grandison, pers. comm.) the effects of the Proposed Action may affect turkeys, but will not affect turkey population viability.

Northern Flicker
Northern flickers are in low numbers, if at all, in the Brian Head area during winter. They typically migrate to lower elevations and therefore, the Alternative A activities in winter would not likely affects northern flickers. Activities occurring during the summer, however, could displace flickers temporarily in the immediate vicinity of the activity.

Removal of trees would reduce trees that could become snags in the future. Snag densities are expected to be low with the Alternative A due to necessary removal of hazard trees and would, therefore, affect flickers. Because the northern flicker is a habitat generalist, this will not affect population viability.

CUMULATIVE EFFECTS

Past, present and future timber sale harvest activities are shown in Appendix 8. Although harvest units in these sales will remove large numbers of spruce trees and spruce stands will still provide cover in some areas. This would be in a clumsy or patchy nature which is a preferred distribution for elk and deer habitat. In pure spruce stands, very little cover is expected to remain after harvest. The cumulative effects area is expected to contain adequate amounts of security and hiding cover because of aspen and mixed conifer habitats. Hiding cover lost from timber sale activity would be replaced in approximately 20-30 years with natural regeneration or native tree re-stocking.

Grazing allotments in the CEA are shown in Appendix 7. All allotments are in fair to good condition with a stable or upward trend (Dale Harris, pers. comm.). A few areas have problems with distribution of livestock that are presently being addressed. Haycock Mountain, Navajo Ridge, Bowery, Warren Bunker and Castle Valley/Hatch Mountain allotments have reduced their numbers in the last five years, resulting in lighter distribution of livestock and reduced effects of grazing.

Because the condition of the range is generally stable or improving, the cumulative effects of the Proposed Action combined with grazing is not expected to result in cumulative effects to elk or deer in the long term. Stable or improving conditions would allow grasses, forbs and shrubs on which elk and deer feed to grow to heights and conditions that would support foraging for both livestock and big game.

Chapter 4 Environmental Consequences

4 - 50
Road densities within the cumulative effects area are expected to increase in the short term in the CEA due to other areas being treated for spruce beetle infestations. Many temporary roads would be closed, recontoured and revegetated following commercial timber removal and system roads would be closed or blocked. Road kill could increase as the resort completes their developments and attracts more visitors.

Although some areas do not yet meet the maximum road density required by standards and guidelines in the LRMP (page IV-50) efforts are working toward reducing road densities to meet this goal. Difficulties have been encountered to effectively close roads. The primary difficulty is open vegetation with flat topography which allows traffic to go around closures. Signing and enforcement is being planned to address this.

Timber harvesting would improve foraging habitat, which may attract turkeys, elk and deer into the area. Forbs and grass understories would increase in the stands that would be harvested. Lower basal areas would result in more open stands improving roosting and foraging habitat. Turkey roosting habitat, however, is decreasing due to harvest of large diameter (infested or dead) spruce trees.

Timber sales typically reduce snag numbers, however, with the present beetle epidemic there is expected to be sufficient amounts of snags and dead and down wood to support the northern flicker. Abundant down wood and snags will be present in Cedar Breaks and Ashdown Gorge Wilderness (due to no logging) which will provide relatively high populations in these areas.

Because the northern flicker is a habitat generalist (using open and closed canopy stands and all plant communities) and snags will remain in conifer and aspen stands, Alternative A, in conjunction with past, present and future timber sales would not cause adverse affects to the northern flicker or cause adverse affects to population viability.

Riparian Habitats

Because activities would not take place in riparian areas with this alternative, there would be no direct effects of the proposed action.

CUMULATIVE EFFECTS

The effects of the Proposed Action have the potential to indirectly affect stream channel morphology and water quality (see Hydrology), therefore, could affect riparian habitat that exists on private land in the town of Brian Head as well as downstream (Parowan Creek).

Past development in and adjacent the wetland/riparian area in the town of Brian Head consisted of filling in wetlands to create a parking lot. Upslope from the riparian area activities such as resloping and reshaping the ski runs, creating summer mountain bike trails, driving on ski runs, lack of proper water drainages along slopes and timber harvest have increased sediments to Parowan Creek.

Because there are no baseline data regarding sedimentation, or stream channel morphology to compare current conditions with historic conditions, it is impossible to assess affects of these cumulative effects on the willow. However, it can be assumed that degraded stream channel conditions, increased sediment and loss of wetland to parking lot would not be a beneficial effect to the willow. Further actions to increase risk of these effects before restoration of existing conditions occurs may have adverse effects to these riparian areas.

OTHER SPECIES OF CONCERN

Brian Head Mountainsnail

No new development that would affect mountainsnail habitat is proposed with Alternative A. Therefore, there would be no direct effects to this snail with this Alternative. Effects of existing use is unknown.

Pika

No new development that would affect pika habitat is proposed with Alternative A. Since pikas are active year-round, continued skiing along the Bowl may affect pikas. Skiing and avalanche blasting have been occurring in the Bowl. Therefore, pikas could be affected by continued use. The numbers of skiers using this area have been limited thus far. Future trends in use of this area are unknown, but desired to increase.

CUMULATIVE EFFECTS

Other past, present and future foreseeable actions in this area include, trail use below the peak on the southwestern side, and visitor use on the top of the Peak. Visitors have been observed throwing rocks, and trampling vegetation using off road vehicles (OHV) illegally on the meadows (pers. obs.). There also is the road leading to the top of the peak. In winter, snowmobilers and skiers, both nordic and downhill, visit the peak. A snow cat delivers skiers to the top and they ski down the "bowl" on the north side of the Peak. Sheep grazing occurs during the late summer months which would affect grasses and forbs pikas need.

Because Alternative A will not affect mountainsnails or their habitats, cumulative effects of Alternative A with other past, present and future activities are not likely.
Pikas are present on many rocky lava areas on the Cedar City Ranger District as evidenced by data from goshawk survey field sheets and employee knowledge of the areas. They are also present in Cedar Breaks National Monument as evidenced by their interpretive sign on pikas. There is no data on population numbers or trends. There would be continued effects of current activities in pika habitat and between habitat areas that could affect success of dispersal (such as cars traffic on roads, off-road vehicles, mountain biking and hikers). The long term effects of these activities are unknown. Because the pika is present over the cumulative effects area, it is unlikely that this alternative would cause a loss of viability on the Markagunt Plateau.

HYDROLOGY

PROPOSED ACTION -BRIAN HEAD RESORT PROPOSAL

DIRECT/INDIRECT EFFECTS

To describe the potential direct/indirect effects of implementing the Master Development Plan (MDP), the proposed actions that would involve ground and/or vegetation disturbances were identified. These proposed actions and their associated acreages are listed in Table 4-6. The major proposed activities include construction of the Bowl lift, Interconnect (3B or 3C), and the Shoshone lift (Chair 1). The approximate acres of disturbance that would be associated with these proposed actions are presented in Table 4-7.

Table 4-6. Proposed Actions and associated acres as described in the MDP and FS data.

<table>
<thead>
<tr>
<th>Proposed Action</th>
<th>Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lift construction (chair 1, bowl, and interconnect)</td>
<td>39</td>
</tr>
<tr>
<td>Ski trail construction (Shoshone and Interconnect)</td>
<td>45</td>
</tr>
<tr>
<td>Snowmaking (Shoshone and Interconnect trails)</td>
<td>25-40</td>
</tr>
<tr>
<td>Mountain road closure/abatement</td>
<td>*</td>
</tr>
<tr>
<td>Base lodges, restaurants, and other construction</td>
<td>*</td>
</tr>
<tr>
<td>Mountain operations and maintenance facility expansion</td>
<td>&lt;5</td>
</tr>
</tbody>
</table>

*MDP does not provide this information.

Table 4-7. Summary of disturbance acres associated with the proposed lifts.

<table>
<thead>
<tr>
<th>Proposed Action</th>
<th>Bowl Lift</th>
<th>Shoshone Lift</th>
<th>Interconnect (3B or 3C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lift construction</td>
<td>9</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Ski trail construction</td>
<td>8</td>
<td>7</td>
<td>30</td>
</tr>
<tr>
<td>Glade skiing</td>
<td>60</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Rock work and blasting</td>
<td>5</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Road construction</td>
<td>0.27</td>
<td>0.27</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>82</td>
<td>22</td>
<td>45</td>
</tr>
</tbody>
</table>

The MDP also identifies several other proposals (MDP, pages 4 and 5. Located in the Project File). The MDP doesn’t provide any detailed information on these items in terms of location or extent of disturbance. Therefore, the effects of these actions cannot be adequately addressed.

WATER QUANTITY

The construction of the proposed lifts (Chair 1, Bowl, and Interconnect) would involve ground disturbance to install the towers. Surface runoff may increase on the disturbed areas during snowmelt and thunderstorm events until vegetation becomes reestablished. The construction of lift lines may increase on-site soil moisture and water yields (due to tree clearing), however this moisture may be used by adjacent trees and other plants. The construction of the Bowl lift on soil moisture and water yield will be negligible because most of the trees in this area are already dead. Surface runoff will likely increase on disturbed areas (around lift towers) until vegetation is reestablished. Surface runoff can be minimized though implementation of SWCPs.

Two of the 6 proposed Interconnect lifts lie, in part, on Forest Service land. The upper portions of these two lifts (3B and 3C) lie on Forest Service land, and the lower portions are on private land. The other 4 proposed Interconnect lifts lie on private land and will be discussed under cumulative effects.

The construction of ski trails will involve tree clearing. The exact locations of the proposed trail construction are not disclosed in the MDP, so their proximity to stream channels is unknown, however ski trails will not be allowed to be constructed within 50 feet of any channel. The clearing and selective removal of trees will result in decreased transpiration, which will make more water available for soil moisture, sub-surface flow, and overland flow. When clearings are created in forests, snow tends to blow from the forested areas and accumulate in clearings where transpiration demands are minimum. This process also contributes to water yield increases. The rate of snowmelt may be accelerated in the clearings due to increased exposure to solar radiation. These effects are expected to be local effects, and will not likely be detected at the watershed scale. Detailed discussions on the effects of tree removal on water yield and snow accumulation are included in “Effects of Timber Harvest on Watershed Hydrology and Water Quality”
The effects of tree clearing on surface runoff and water yield can be minimized if SWCPs are strictly adhered to.

There is a higher potential for increased water yield on proposed ski runs if snowmaking is implemented on them. Artificial snow has a high water content, and will add to the already higher levels of snow accumulation in the clearings.

Approximately 0.25 miles of dirt road are proposed for abatement. The MDP does not provide specific information on whether these roads will be obliterated, closed, and/or seeded. The location of these roads is presented in Figure IV-7 of the MDP. It is expected that the abatement of roads will result in improved hydrologic function on-site.

Approximately 0.2 miles of road construction is proposed: 0.1 miles to access the bottom of the Bowl lift, and 0.1 miles to extend the Chair 1 access road. The general effects of road construction on water quantity and hydrologic function are discussed in: "The effects of timber harvest and road construction on watershed hydrology and water quality" (Kendall 1997).

The MDP does not provide specific information on the extent and location of proposed base lodges, restaurants, or the maintenance facility expansion. Therefore, the effects of these activities cannot be disclosed or predicted.

WATER QUALITY

There is no available water quality data in Parowan Creek or its tributaries in or around the project area. Ground disturbances associated with the proposed activities have the potential to degrade water quality through sedimentation. The potential or level of risk is dependent upon many factors such as proximity of the activity to stream courses, the magnitude of disturbance, and amount of surface runoff available to transport sediment.

The lower portion of the proposed Chair 1 lift is approximately 400 feet from intermittent channels that are tributary to Parowan Creek. Many portions of the old Chair 1 lift line are void of vegetation and actively eroding. Further disturbance of this area has a high potential to increase soil loss. Construction of Chair 1 may result in an increase of sediment being delivered to Parowan Creek. This potential increase is expected to be short term, assuming SWCPs are implemented properly and the upper slopes are successfully revegetated.

The Bowl lift line is several hundred feet away from any stream courses, however, it is within a municipal watershed area. Sediment produced from on-site construction of lift terminals is not expected to reach any stream channels, assuming SWCPs are adhered to. Precautions must be taken to protect the municipal water supply from pollution. These precautions are outlined in the prescribed mitigation and SWCPs.

There are 6 alternative Interconnect lifts proposed in the MDP. Two of these proposed lifts (2B and 3C) would lie, in part, on Forest Service land (Figure IV-3 in the MDP). The lower portions of these lifts would cross Parowan Creek and its floodplain on private land. The acres of construction required for these proposed lifts is not contained in the MDP. Construction of either lift would increase the EIA and possibly affect water quality. The level of impact to water quality would be dependent upon the extent and magnitude of construction required to install the lift towers. Any construction along Parowan Creek, its floodplain, or riparian area would require a 404 permit, issued by the Army Corps of Engineers.

The potential effects of ski trail construction and snowmaking on water quality will be dependent upon hydrologic processes such as infiltration and overland flow. Detailed discussions on the general effects of tree clearing (harvest) on water quality are contained in: “Effects of timber harvest on watershed hydrology and water quality” (Kendall 1997). As mentioned in the water quantity section, clearing of trees and/or snowmaking will make more water available for overland flow, which increases the potential for accelerated erosion and transport of sediment. The locations of the proposed tree clearing are not disclosed in the MDP. The locations of proposed ski trails will be approved by the Forest Service with input from the Soil Scientist and Hydrologist. Therefore, the location of the ski trails will be sensitive to soil and water resources.

Approximately 0.2 miles of road construction is proposed: 0.1 miles to access the bottom of the Bowl lift, and 0.1 miles to extend the Chair 1 access road. The general effects of road construction on water quality are discussed in: "The effects of timber harvest on watershed hydrology and water quality" (Kendall 1997). The road that would access the bottom of the Bowl lift would be constructed near a small pond. Construction will not be allowed within 50 feet of the saturated soil adjacent to the pond. Proper implementation of SWCPs will ensure that water quality in the pond will not be adversely affected by the road construction. The extension of the Chair 1 access road would be near the top tower, several hundred feet from any stream channel. Sediment resulting from this proposed road construction is not expected to reach any stream channel, assuming SWCPs are implemented properly.

Snowmaking is proposed on the Navajo Ridge side of the resort area and near the Giant Steps area (see Figure IV-6 in the MDP). Many areas on the ski trails on the Navajo Ridge side are void of vegetation and eroding beyond acceptable standards. Snowmaking on these slopes would exacerbate the erosion problem, and increase the potential for water quality degradation in Parowan Creek. This effect could be minimized by aggressive revegetation and stabilization of the existing ski trails, and implementation of the watershed management plan.
CUMULATIVE EFFECTS

Baseline cumulative effects analyses have been completed using the watersheds risk rating (USDA 1993), and the Modified Equivalent Roaded Area (ERA) procedure described by McGurk and Fong (1995). The watershed risk rating describes the relative risk (low, moderate, or high) of cumulative effects (i.e. sedimentation, channel and aquatic habitat degradation, etc.) resulting from increased water yields, peak flows, and/or excessive erosion. The Modified ERA is an index or expression of the relative amount of disturbance within a Streamsides Impact Zone (SIZ), and is expressed as a percentage of the total SIZ area. The ERA has been shown to be directly related to water quality in terms of aquatic macroinvertebrate diversity (McGurk and Fong 1995). The Watershed Risk Model will be used to address cumulative watershed effects in terms of water yield, peak flows, and erosion. The Modified ERA model will be used to address cumulative effects in terms of water quality.

Table 4-8 contains a summary of land uses and disturbances within the cumulative effects watershed that affect water quantity, water quality, and channel morphology. Approximately 21% of the CEW is currently impacted or disturbed.

Table 4-8, Summary of present land uses and disturbances within the cumulative effects watershed.

<table>
<thead>
<tr>
<th>Land Use/Disturbance</th>
<th>Acres (approximate)</th>
<th>Percent of the CEW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ski trails (runs)</td>
<td>433</td>
<td>6.2</td>
</tr>
<tr>
<td>roads</td>
<td>180</td>
<td>2.6</td>
</tr>
<tr>
<td>spruce mortality</td>
<td>727</td>
<td>10.5</td>
</tr>
<tr>
<td>urban development</td>
<td>95</td>
<td>1.4</td>
</tr>
<tr>
<td>Total</td>
<td>1435</td>
<td>20.7</td>
</tr>
</tbody>
</table>

The Forest Service has salvage logged approximately 240 acres of dead spruce by tractor during the past two years. The resort has also logged dead spruce by tractor in the resort area. Salvage logging within the CEW is expected to continue on Forest Service land during the next year. The Forest Service is planning to log a 112 acre helicopter unit in the Giant Steps area by helicopter this year, and the resort will continue salvage logging in the resort area.

WATER QUANTITY

The factors that influence water quantity (water yield and peak flows) in the Cumulative Effects Watershed (CEW) include ski runs, roads, spruce mortality, and urban development. Snowmaking is a common practice in the operation of the resort. Snow is manufactured using water from nearby springs, and deposited over many of the ski runs where transpiration losses are minimum. Snow also tends to blow from forested areas and deposit in clearings (ski runs). The snowmaking and redistribution of snow from adjacent forested areas makes more water available for surface runoff during spring snowmelt. Approximately 40 of the ski runs are currently exceeding on-site soil erosion rates in excess of soil loss tolerance thresholds.

Road density in the CEW is 3.40 miles/square mile. This value is within the "moderate risk" range for cumulative watershed effects.

The spruce beetle epidemic has affected approximately 727 acres within the CEW. This has altered the water balance by decreasing transpiration demands and making more water available for sub-surface and possibly surface flow during snowmelt. The ski runs within the CEW account for approximately 433 acres. The combination of road density and the percentage of the watershed with stands less than 30 years old puts this watershed in the high risk category for cumulative effects (Figure 4-1).

Urban development within the cumulative effects watershed has created non-permeable surfaces such as parking areas, homes, condos, and cabins. These areas limit or prevent infiltration and percolation of water, and are sources of runoff and sediment during thunderstorms and snowmelt.
The risk model presented in Figure 4-1 does not account for urban development. Full implementation of the MDP would increase the risk of cumulative watershed effects. However, if the watershed management plan, contained in the MDP, is implemented commensurate with proposed developments and SWCPs are fully implemented, long term cumulative watershed effects resulting from proposed actions would be minimized or prevented. The watershed management plan contains planned rehabilitation and revegetation throughout the resort area. To minimize the risk of cumulative watershed effects, the resort must begin implementation of the watershed management plan commensurate with priority proposed developments. The relative risk of cumulative watershed effects can be reduced through reforestation, revegetation of ski runs and road closures.

WATER QUALITY

Currently, there is no available water quality data within the CEW. At present, 6.3% of the SIZ is in ERA condition. McGurk and Fong (1995) identified a threshold of 5% ERA, above which aquatic macroinvertebrate diversity declined with increasing ERA values. The Modified ERA value would increase only if proposed activities are implemented within 100 meters (328 feet) of any stream course within the CEW. However, proposed activities outside of the SIZ also have the potential to degrade water quality through sedimentation.

Construction of any one of the proposed Interconnects will increase the ERA and has the potential to directly affect water quality. All of the proposed Interconnects cross Parowan Creek and its floodplain on private land at some point (See Figure IV-3 in the MDP). Proposed Interconnects 2 and 3A roughly parallel the Parowan Creek riparian corridor and each crosses an intermittent tributary. The Parowan Creek riparian corridor is currently impacted by urban development, mainly parking areas and buildings. The parking areas are currently contributing sediment directly into Parowan Creek. Sediment from the Giant Steps ski trails are also contributing sediment directly into Parowan Creek (Staats 1997). Construction of proposed Interconnects 2 or 3A has a high potential to result in cumulative effects to water quality because of their proximity to the stream channel.

Proposed Interconnect 1A crosses Parowan Creek and an intermittent tributary, and 1B crosses Parowan Creek only. Interconnects 3B or 3C would have the least potential to impact water quality. Construction of any one of the proposed Interconnect lifts will require a 404 permit issued from the Army Corps of Engineers. The Army Corps of Engineers will determine the potential impacts of lift construction on wetland habitat, and stream and floodplain function. The MDP does not provide information on the extent and magnitude of disturbance that would be required to install the lift towers near Parowan Creek or its floodplain, therefore effects cannot be adequately disclosed.

CHANNEL MORPHOLOGY

Currently, there is no data available on channel conditions or characteristics for Parowan Creek or its tributaries. Within the resort area, Parowan Creek is an alluvial channel with a floodplain and riparian vegetation. However, many portions of the floodplain and riparian area have been filled in for parking areas. Downstream of the resort area, Parowan Creek becomes steeper and it is confined by Highway 143. The stream is incised 3-4 feet along some reaches.

Upper Parowan Creek may be at risk of degradation (i.e. channel downcutting or rapid adjustments), given a 50 or 100 year storm or snowmelt event. Most of the impacts and land uses within the CEW are within and around the resort area. The ski trails, spruce mortality, and urban development in the upper watershed will result in higher peak flows and local water yields, which have the potential to cause channel degradation. Upper Parowan Creek within the resort area seems to be stable, and does contain a riparian corridor. The creek also runs through two culverts within the resort area which serve as base level controls, and may prevent downcutting.

To minimize the risk of channel degradation, the watershed management must be implemented commensurate with any proposed activities.

NO ACTION - CURRENT MANAGEMENT

DIRECT/INDIRECT EFFECTS

Under this alternative, current management direction would continue. The watershed management plan contained in the MDP would not be implemented under this alternative, and therefore, watershed rehabilitation efforts would not likely occur in the resort area. Watershed rehabilitation, reforestation, revegetation, and road closures are needed to reduce surface runoff and erosion, and improve water quality.

CUMULATIVE EFFECTS

Under this alternative, the current conditions described below would remain. However, the relative risk of cumulative effects will gradually decrease as the spruce stands regenerate. Full hydrologic recovery may take 30-40 years. Urban development within the CEW is expected to continue, which may offset the hydrologic recovery of the spruce stands.

Baseline cumulative effects analyses have been completed using the watershed risk rating (USDA 1993), and the Modified Equivalent Roadded Area (ERA) procedure described by McGurk and Fong (1995). The watershed risk rating describes the relative risk (low, moderate,
or high) of cumulative effects (i.e. sedimentation, channel and aquatic habitat degradation, etc.) resulting from increased water yields, peak flows, and/or excessive erosion. The Modified ERA is an index or expression of the relative amount of disturbance within a Streamside Impact Zone (SIZ), and is expressed as a percentage of the total SIZ area. The ERA has been shown to be directly related to water quality in terms of aquatic macroinvertebrate diversity (McGurk and Fong 1995). The Watershed Risk Model is used to address cumulative watershed effects in terms of water yield, peak flows, and erosion. The Modified ERA model will be used to address cumulative effects in terms of water quality.

Table 4-9 contains a summary of land uses and disturbances within the cumulative effects watershed that affect water quantity, water quality, and channel morphology.

<table>
<thead>
<tr>
<th>Land Use/Disturbance</th>
<th>Acres (approximate)</th>
<th>Percent of the CEW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ski trails (runs)</td>
<td>433</td>
<td>6.2</td>
</tr>
<tr>
<td>roads</td>
<td>180</td>
<td>2.6</td>
</tr>
<tr>
<td>spruce mortality</td>
<td>727</td>
<td>10.5</td>
</tr>
<tr>
<td>urban development</td>
<td>95</td>
<td>1.4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1435</strong></td>
<td><strong>20.7</strong></td>
</tr>
</tbody>
</table>

The Forest Service has salvage logged approximately 240 acres of dead spruce by tractor during the past two years. The resort has also logged dead spruce by tractor in the resort area. Salvage logging within the CEW is expected to continue on Forest Service land during the next year. The Forest Service is planning to log a 112 acre helicopter unit in the Giant Steps area by helicopter this year, and the resort will continue salvage logging in the resort area.

**WATER QUANTITY**

The factors that influence water quantity (water yield and peak flows) in the Cumulative Effects Watershed (CEW) include ski runs, roads, spruce mortality, and urban development. Snowmaking is a common practice in the operation of the resort. Snow is manufactured using water from nearby springs, and deposited over many of the ski runs where transpiration losses are at a minimum. Snow also tends to blow from forested areas and deposit in clearings (ski runs). The snowmaking and redistribution of snow from adjacent forested areas makes more water available for surface runoff during spring snowmelt. Approximately 40 of the ski runs are currently exceeding on-site soil erosion rates in excess of soil loss tolerance thresholds.

Road density in the CEW is 3.40 miles/square mile. This value is within the "moderate risk" range for cumulative watershed effects.

The spruce beetle epidemic has affected approximately 727 acres within the CEW. This has altered the water balance by decreasing transpiration demands and making more water available for sub-surface and possibly surface flow during snowmelt. The ski runs within the CEW account for approximately 433 acres. The combination of road density and the percentage of the watershed with stands less than 30 years old puts this watershed in the high risk category for cumulative effects (Figure 4-2).

Urban development within the cumulative effects watershed has created non-permeable surfaces such as parking areas, homes, condos, and cabins. These areas limit or prevent infiltration and percolation of water, and are sources of runoff and sediment during thunderstorms and snowmelt.

**Table 4-9, Summary of land uses and disturbances within the cumulative effects watershed.**

**Figure 4-2. Watershed Risk Rating for the Parowan Creek CEW.** Relative risk is based on road density and percent of the watershed with stands less than 30 years old. Acres of spruce mortality and ski runs account for stands less than 30 years old.

The risk model presented in Figure 4-2 does not account for urban development. The relative risk of cumulative watershed effects could be reduced through reforestation and road closures.
WATER QUALITY

Currently, there is no available water quality data within the CEW. At present, 6.3% of the SIZ is in ERA condition. McGurk and Fong (1995) identified a threshold of 5% ERA, above which aquatic macroinvertebrate diversity declined with increasing ERA values.

CHANNEL MORPHOLOGY

Currently, there is no data available on channel conditions or characteristics for Parowan Creek or its tributaries. Within the resort area, Parowan Creek is an alluvial channel with a floodplain and riparian vegetation. However, many portions of the floodplain and riparian area have been filled in for parking areas. Downstream of the resort area, Parowan Creek becomes steeper and it is confined by Highway 143, and is incised 3-4 feet along some reaches.

Upper Parowan Creek may be at risk of degradation (i.e. channel downcutting or rapid adjustments), given a 50 or 100 year storm or snowmelt event. Most of the impacts and land uses within the CEW are within and around the resort area. The ski trails, spruce mortality, and urban development in the upper watershed will result in higher peak flows and local water yields, which have the potential to cause channel degradation. Upper Parowan Creek within the resort area seems to be stable, and does contain a riparian corridor. The creek also runs through two culverts within the resort area which serve as base level controls, and may prevent downcutting.

ALTERNATIVE A - INTEGRATED ALTERNATIVE

DIRECT/INDIRECT EFFECTS

Under this alternative, the MDP would be implemented without the bowl lift, mountain restaurant, or snowmaking. Table 4-10 provides a summary of acres that would be disturbed under this alternative.

Table 4-10, Proposed actions and associated acres as described in the MDP and FS data.

<table>
<thead>
<tr>
<th>Proposed Action</th>
<th>Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lift construction (chair 1 and interconnect)</td>
<td>30</td>
</tr>
<tr>
<td>Ski trail construction (Shoshone and Interconnect)</td>
<td>45</td>
</tr>
<tr>
<td>Mountain road closure/abatement</td>
<td></td>
</tr>
<tr>
<td>Base lodges, restaurants, and other construction</td>
<td></td>
</tr>
<tr>
<td>Mountain operations and maintenance facility expansion</td>
<td>&lt;5</td>
</tr>
</tbody>
</table>

*MDP does not provide this information*

Approximately 0.25 miles of dirt road are proposed for abatement. The MDP does not provide specific information on whether these roads will be obliterated, closed, and/or seeded. The location of these roads is presented in Figure IV-7 of the MDP. It is expected that the abatement of roads will result in improved hydrologic function on-site.

Approximately 0.1 miles of road construction is proposed to extend the Chair 1 access road. The general effects of road construction on water quantity and hydrologic function are discussed in: "The effects of timber harvest and road construction on watershed hydrology and water quality" (Kendall 1997).

The MDP also identifies several other proposals (MDP, pages 4 and 5). The MDP doesn't provide any detailed information on these items in terms of location or extent of disturbance. Therefore, the effects of these actions cannot be adequately addressed.

WATER QUANTITY

The construction of chair 1 and the Interconnect would involve ground disturbance to install the towers. Surface runoff may increase on the disturbed areas during snowmelt and thunderstorm events until vegetation becomes reestablished. The construction of lift lines may increase on-site soil moisture and water yields (due to tree clearing), however this moisture may be used by adjacent trees and other plants. The effects of lift line construction on surface runoff can be minimized if SWCPs are strictly adhered to, and revegetation is successful.

Two of the 6 proposed Interconnect lifts lie, in part, on Forest Service land. The upper portions of these two lifts (3B and 3C) lie on Forest Service land, and the lower portions are on private land (Figure IV-3 in MDP). The other 4 proposed Interconnect lifts lie on private land and will be discussed under cumulative effects.

The construction of ski trails will involve tree clearing. The exact locations of the proposed trail construction are not disclosed in the MDP, so their proximity to stream channels is unknown, however ski trails will not be allowed to be constructed within 50 feet of any channel. The clearing and selective removal of trees will result in decreased transpiration, which will make more water available for soil moisture, sub-surface flow, and overland flow. When clearings are created in forests, snow tends to blow from the forested areas and accumulate in clearings where transpiration demands are minimum. This process also contributes to water yield increases. The rate of snowmelt may be accelerated in the clearings due to increased exposure to solar radiation. These effects are expected to be local effects, and will not likely be detected at the watershed scale. Detailed discussions on the effects of tree removal on water yield and snow accumulation are included in “Effects of Timber Harvest on Watershed Hydrology and Water Quality” (Kendall 1997). The effects of tree clearing on surface runoff and water yield can be minimized if SWCPs are strictly adhered to.

Chapter 4 Environmental Consequences

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The MDP does not provide specific information on the extent and location of proposed base lodges and expansion of the maintenance facility. Therefore, the effects of these activities cannot be disclosed or predicted.

**WATER QUALITY**

There is no available water quality data in Parowan Creek or its tributaries in or around the project area. Ground disturbances associated with the proposed activities have the potential to degrade water quality through sedimentation. The potential or level of risk is dependent upon many factors such as proximity of the activity to stream courses, the magnitude of disturbance, and amount of surface runoff available to transport sediment.

The lower portion of the proposed Chair 1 lift is approximately 400 feet from intermittent channels that are tributary to Parowan Creek. Many portions of the old Chair 1 lift line are void of vegetation and actively eroding. Further disturbance of this area has a high potential to increase soil loss. Construction of Chair 1 may result in an increase of sediment being delivered to Parowan Creek. This potential increase is expected to be short term, assuming SWCPs are implemented properly and the upper slopes are successfully revegetated.

There are 6 alternative Interconnect lifts proposed in the MDP. Two of these proposed lifts (2B and 3C) would lie, in part, on Forest Service land (Figure IV-3 in the MDP). The lower portions of these lifts would cross Parowan Creek and its floodplain on private land. The acres of construction required for these proposed lifts is not contained in the MDP. Construction of either lift would increase the ERA and possibly affect water quality. The level of impact to water quality would be dependent upon the extent and magnitude of construction required to install the lift towers. Any construction along Parowan Creek, its floodplain, or riparian area would require a 404 permit, issued by the Army Corps of Engineers.

The potential effects of ski trail construction and snowmaking on water quality will be dependent upon hydrologic processes such as infiltration and overland flow. Detailed discussions on the general effects of tree clearing (harvest) on water quality are contained in: "Effects of timber harvest on watershed hydrology and water quality" (Kendall 1997). As mentioned in the water quantity section, clearing of trees and/or snowmaking will make more water available for overland flow, which increases the potential for accelerated erosion and transport of sediment.

The locations of the proposed tree clearing are not disclosed in the MDP, therefore, the effects of this proposed activity cannot be adequately disclosed or predicted. However, the location of proposed ski trails must be approved by the Forest Service with input from the Soil Scientist and Hydrologist, and ski trails will not be allowed within 50 feet of any stream channel. Therefore, the location of proposed ski trails would be sensitive to soil and water resources.

Approximately 0.1 miles of road construction is proposed to extend the Chair 1 access road. The general effects of road construction on water quality are discussed in: "The effects of timber harvest and road construction on watershed hydrology and water quality" (Kendall 1997). The extension of the Chair 1 access road would be near the top tower, several hundred feet from any stream channel. Sediment resulting from this proposed road construction is not expected to reach any stream channel, assuming SWCPs are implemented properly.

**CUMULATIVE EFFECTS**

Baseline cumulative effects analyses have been completed using the watershed risk rating (USDA 1993), and the Modified Equivalent Roaded Area (ERA) procedure described by McGurk and Fong (1995). The watershed risk rating describes the relative risk (low, moderate, or high) of cumulative effects (i.e. sedimentation, channel and aquatic habitat degradation, etc.) resulting from increased water yields, peak flows, and/or excessive erosion. The Modified ERA is an index or expression of the relative amount of disturbance within a Streamside Impact Zone (SIZ), and is expressed as a percentage of the total SIZ area. The ERA has been shown to be directly related to water quality (McGurk and Fong 1995). The Watershed Risk Model will be used to address cumulative watershed effects in terms of water yield, peak flows, and erosion. The Modified ERA model will be used to address cumulative effects in terms of water quality.

Table 4-11 contains a summary of land uses and disturbances within the cumulative effects watershed that affect water quantity, water quality, and channel morphology.

**Table 4-11, Summary of land uses and disturbances within the cumulative effects watershed.**

<table>
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The Forest Service has salvage logged approximately 240 acres of dead spruce by tractor during the past two years. The resort has also logged dead spruce by tractor in the resort area. Salvage logging within the CEW is expected to continue on Forest Service land during the next 2 years. The Forest Service is planning to log a 112 acre helicopter unit in the Giant Steps area by helicopter this year, and the resort will continue salvage logging in the resort area.

**WATER QUANTITY**

The factors that influence water quantity (water yield and peak flows) in the Cumulative Effects Watershed (CEW) include ski runs, roads, spruce mortality, and urban development.
Snowmaking is a common practice in the operation of the resort. Snow is manufactured using water from nearby springs, and deposited over many of the ski runs where transpiration losses are at a minimum. Snow also tends to blow from forested areas and deposit in clearings (ski runs). The snowmaking and redistribution of snow from adjacent forested areas makes more water available for surface runoff during spring snowmelt. Approximately 40 of the ski runs are currently exceeding on-site soil erosion rates in excess of soil loss tolerance thresholds.

Road density in the CEW is 3.40 miles/square mile. This value is within the “moderate risk” range for cumulative watershed effects.

The spruce beetle epidemic has affected approximately 727 acres within the CEW. This has altered the water balance by decreasing transpiration demands and making more water available for sub-surface and possibly surface flow during snowmelt. In terms of transpiration losses, the spruce beetle epidemic is similar to a clearcut. The ski runs within the CEW account for approximately 433 acres. The combination of road density and the percentage of the watershed with stands less than 30 years old puts this watershed in the high risk category for cumulative effects (Figure 4-3).

Urban development within the cumulative effects watershed has created non-permeable surfaces such as parking areas, homes, condos, and cabins. These areas limit or prevent infiltration and percolation of water, and are sources of runoff and sediment during thunderstorms and snowmelt.

The risk model presented in Figure 4-3 does not account for urban development. Full implementation of the MDP would increase the risk of cumulative watershed effects. However, if the watershed management plan, contained in the MDP, is implemented commensurate with proposed developments and SWCPs are fully implemented, long term cumulative watershed effects resulting from proposed actions would be minimized or prevented. The watershed management plan contains planned rehabilitation and revegetation throughout the resort area. To minimize the risk of cumulative watershed effects, the resort must begin implementation of the watershed management plan commensurate with priority proposed developments. The relative risk of cumulative watershed effects can be reduced through reforestation, revegetation of ski runs and road closures.

**WATER QUALITY**

Currently, there is no available water quality data within the CEW. At present, 6.3% of the SIZ is in ERA condition. McGurk and Fong (1995) identified a threshold of 5% ERA, above which aquatic macroinvertebrate diversity declined with increasing ERA values. The Modified ERA value would increase only if proposed activities are implemented within 100 meters (328 feet) of any stream course within the CEW. However, proposed activities outside of the SIZ also have the potential to degrade water quality through sedimentation.

Construction of any one of the proposed Interconnects will increase the ERA and has the potential to directly affect water quality. All of the proposed Interconnects cross Parowan Creek and its floodplain on private land at some point (See Figure IV-3 in the MDP). Proposed Interconnects 2 and 3A roughly parallel the Parowan Creek riparian corridor and cross each an intermittent tributary. The Parowan Creek riparian corridor is currently impacted by urban development, mainly parking areas and buildings. The parking areas are currently contributing sediment directly into Parowan Creek. Sediment from the Giant Steps ski trails are also contributing sediment directly into Parowan Creek (Staats 1997). Construction of proposed Interconnects 2 or 3A has a high potential to result in cumulative effects to water quality because of their proximity to the stream channel.

Proposed Interconnect 1A crosses Parowan Creek and an intermittent tributary, and 1B crosses Parowan Creek only. Interconnects 3B or 3C would have the least amount of impact to water quality. Construction of any one of the proposed Interconnect lifts will require a 404 permit issued from the Army Corps of Engineers. The Army Corps of Engineers will determine the potential impacts of lift construction on wetland habitat, and stream and floodplain function. The MDP does not provide information on the extent and magnitude of disturbance that would be required to install the lift towers near Parowan Creek or its floodplain, therefore effects cannot be adequately disclosed.
CHANNEL MORPHOLOGY

Currently, there is no data available on channel conditions or characteristics for Parowan Creek or its tributaries. Within the resort area, Parowan Creek is an alluvial channel with a floodplain and riparian vegetation. However, many portions of the floodplain and riparian area have been filled in for parking areas. Downstream of the resort area, Parowan Creek becomes steeper and it is confined by Highway 143, and is incised 3-4 feet along some reaches.

Upper Parowan Creek may be at risk of degradation (i.e. channel downcutting or rapid adjustments), given a 50 or 100 year storm or snowmelt event. Most of the impacts and land uses within the CEW are within and around the resort area. The ski trails, spruce mortality, and urban development in the upper watershed will result in higher peak flows and local water yields, which have the potential to cause channel degradation. Upper Parowan Creek within the resort area seems to be stable, and does contain a riparian corridor. The creek also runs through two culverts within the resort area which serve as base level controls, and may prevent downcutting.

To minimize the risk of channel degradation, the watershed management must be implemented commensurate with any proposed activities.

SOILS

During the environmental analysis, a critical watershed area map was developed which identified all the areas that would have a possible impact on the soil and water resources. Specific mitigation (soil and water conservation practices) were developed to either avoid completely or to minimize the potential damage to these resources.

Soil and water specialists were involved throughout the course of the project including environmental analysis and alternative formulation to ensure that all alternatives would result in protection of the soil and water resources.

PROPOSED ACTION - BRIAN HEAD RESORT PROPOSAL

DIRECT/INDIRECT EFFECTS

Ground disturbance associated with clearing and shaping of ski runs, tower construction, road construction, snowmaking operations and construction of restaurant and parking facilities will result in a temporary increase in on-site soil erosion. There will be approximately 217 acres disturbed under this alternative. Implementation of the recommended mitigation measures will ensure that increases in erosion do not exceed soil loss tolerance thresholds.

The clearing of ski runs, including stump removal, and tower construction will result in areas of detrimental soil disturbance, particularly soil displacement and compaction. Implementation of the recommended mitigation will ensure that the amount of detrimental disturbance does not exceed soil quality standards.

The acres of land converted from forest to grass covered ski slopes will be an irretrievable commitment of resources (i.e. these acres will be lost to timber production so long as they are dedicated to use as a ski slope, but soil productivity will be maintained and they could be returned to timber production at some future date. The acres of land dedicated to roads are also an irretrievable commitment of a resource, but also could be returned to production at some later date.

CUMULATIVE EFFECTS

The cumulative effects analysis area for long term soil productivity and on-site soil erosion is the project area itself as well as the remainder of the present ski area, including the adjacent private lands of Brian Head Village. The intent is to ensure that proposed management does not result in reduced long term soil productivity. The cumulative effects analysis evaluates past management activities, proposed management activities, and foreseeable future management activities.

Other current management activities that are occurring within the cumulative effects analysis area include the Brian Head Ski Resort, livestock grazing (Brian Head and Navajo Ridge sheep allotments); the Brian Head Resort Salvage Sale which was logged in 1996; the Bear Flat Salvage Sale which was completed in 1996; and the Brian Head II Salvage Sale which is scheduled to be logged in 1997.

A future proposed project within the cumulative effects area is the Navajo Ridge Salvage Sale which is scheduled to be logged in FY 98.

As disclosed in the environmental analysis of the Brian Head Recovery Project, approximately 40 acres of the existing ski runs of the Brian Head Ski Resort are experiencing on-site soil erosion rates in excess of soil loss tolerance thresholds. These areas are considered to be an irreversible resource commitment (long term soil productivity has been reduced on these areas). A future foreseeable project for these areas is a rehabilitation plan to correct the drainage problems and to rehabilitate the ground cover on the eroding ski slopes. Rehabilitation efforts consisting of seeding, fertilization and slope stabilization are proposed to begin early this field
season. Some of this rehabilitation work was completed on the Bear Paw ski run in the fall of 1996.

Brian Head Village which is adjacent to the project area has experienced a significant amount of development, particularly in the past 20 years. Construction of roads, shaping of lots, construction of homes, condominiums, businesses, parking lots, etc. has resulted in a considerable amount of soil disturbance and associated soil erosion. Much of the management related activity on private lands was done with less stringent mitigation than occurs on National Forest administered lands. Most of the management related (man-caused) increase in erosion in the upper Parowan watershed comes from the private lands of Brian Head Village. In addition, the acres of land converted from forest and rangeland to roads, structures, etc. are an irreversible resource commitment. Long term soil productivity has been lost on those acres. The productivity of some of the wetlands in Bear Flat were irreversibly lost in the development of Brian Head Village.

The portion of the cumulative effects analysis area proposed for lift expansion has had little, if any, prior management activity that would affect the soil resource, therefore there are no cumulative impacts from the proposed action with past management activities on long term soil productivity for those areas.

The cumulative impacts from previous and current management activities for the entire cumulative effects analysis area combined with impacts associated with the proposed action and foreseeable future activities is well within soil quality standards for the soil resource. The mitigation recommended for the past, present and future projects is designed to ensure that soil erosion and detrimental soil disturbance does not exceed soil quality guidelines. It has been recognized that even though the approximately 40 acres of ski runs that are exceeding soil loss tolerance thresholds, the resource damage is still within Regional soil quality standards for areal extent (i.e. 85 percent of the activity area has soils in satisfactory condition). Even so, the Forest Service has been working with Brian Head Ski Resort to correct the damage and to ensure that adjacent ski runs do not exceed soil quality standards.

One additional cumulative impact that has occurred on the ski area is a loss of large woody debris in the forested leaf strips adjacent to the ski runs. This has resulted from the removal of down material by ski resort personnel in an attempt to remove material that posed safety problems as well as to enhance glade skiing. The result is that there is insufficient large woody debris for nutrient cycling to ensure long term soil productivity. The Brian Head Resort Salvage Sale that was recently completed required that 10 to 15 tons/acre of large woody debris was left on site within these leave strips for maintenance of long term soil productivity.

### NO ACTION - CURRENT MANAGEMENT

#### DIRECT/INDIRECT EFFECTS

On-site soil erosion would continue at current rates as described in the "affected environment" section of this document. The soils of the project area have low erosion rates, except for the two small areas of soil map unit 239 which have a moderate erosion rate. Long term soil productivity would be maintained on soils of the project area.

#### CUMULATIVE EFFECTS

Within the project area, there would be no additional cumulative effects to the soil resource with the implementation of this alternative.

Other current management activities that are occurring within the cumulative effects analysis area include the Brian Head Ski Resort; livestock grazing (Brian Head and Navajo Ridge sheep allotments); the Brian Head Resort Salvage Sale which was logged in 1996; the Bear Flat Salvage Sale which was completed in 1996; and the Brian Head II Salvage Sale which is scheduled to be logged in 1997.

A future proposed project within the cumulative effects area is the Navajo Ridge Salvage Sale which is scheduled to be logged in FY 98.

As disclosed in the environmental analysis of the Brian Head Recovery Project, approximately 40 acres of the existing ski runs of the Brian Head Ski Resort are experiencing on-site soil erosion rates in excess of soil loss tolerance thresholds. These areas are considered to be an irreversible resource commitment (long term soil productivity has been reduced on these areas). A future foreseeable project for these areas is a rehabilitation plan to correct the drainage problems and to rehabilitate the ground cover on the eroding ski slopes. Rehabilitation efforts consisting of seeding, fertilization and slope stabilization are proposed to begin early this field season. Some of this rehabilitation work was completed on the Bear Paw ski run in the fall of 1996.

Brian Head Village which is adjacent to the project area has experienced a significant amount of development, particularly in the past 20 years. Construction of roads, shaping of lots, construction of homes, condominiums, businesses, parking lots, etc. has resulted in a considerable amount of soil disturbance and associated soil erosion. Much of the management related activity on private lands was done with less stringent mitigation than occurs on National Forest administered lands. Most of the management related (man-caused) increase in erosion in the upper Parowan watershed comes from the private lands of Brian Head Village. In addition, cust
the acres of land converted from forest and rangeland to roads, structures, etc. are an irreversible resource commitment. Long term soil productivity has been lost on those acres. The productivity of some of the wetlands in Bear Flat were irreversibly lost in the development of Brian Head Village.

**ALTERNATIVE A - INTEGRATED ALTERNATIVE**

**DIRECT/INDIRECT EFFECTS**

Ground disturbance associated with clearing and shaping of ski runs, tower construction and road construction will result in a temporary increase in on-site soil erosion. There will be approximately 68 acres disturbed under this alternative. Implementation of the recommended mitigation measures will ensure that increases in erosion do not exceed soil loss tolerance thresholds.

The clearing of ski runs, including stump removal, and tower construction will result in areas of detrimental soil disturbance, particularly soil displacement and compaction. Implementation of the recommended mitigation will ensure that the amount of detrimental disturbance does not exceed soil quality standards.

The acres of land converted from forest to grass covered ski slopes will be an irretrievable commitment of resources (i.e. these acres will be lost to timber production so long as they are dedicated to use as a ski slope, but soil productivity will be maintained and they could be returned to timber production at some future date. The acres of land dedicated to roads are also an irretrievable commitment of a resource, but also could be returned to production at some later date.

**CUMULATIVE EFFECTS**

The cumulative effects analysis area for long term soil productivity and on-site soil erosion is the project area itself as well as the remainder of the present ski area, including the adjacent private lands of Brian Head Village. The intent is to ensure that proposed management does not result in reduced long term soil productivity. The cumulative effects analysis evaluates past management activities, proposed management activities, and foreseeable future management activities.

Other current management activities that are occurring within the cumulative effects analysis area include the Brian Head Ski Resort; livestock grazing (Brian Head and Navajo Ridge sheep allotments); the Brian Head Resort Salvage Sale which was logged in 1996; the Bear Flat Salvage Sale which was completed in 1996; and the Brian Head II Salvage Sale which is scheduled to be logged in 1997.

A future proposed project within the cumulative effects area is the Navajo Ridge Salvage Sale which is scheduled to be logged in FY 98.

As disclosed in the environmental analysis of the Brian Head Recovery Project, approximately 40 acres of the existing ski runs of the Brian Head Ski Resort are experiencing on-site soil erosion rates in excess of soil loss tolerance thresholds. These areas are considered to be an irreversible resource commitment (long term soil productivity has been reduced on these areas). A future foreseeable project for these areas is a rehabilitation plan to correct the drainage problems and to rehabilitate the ground cover on the eroding ski slopes. Rehabilitation efforts consisting of seeding, fertilization and slope stabilization are proposed to begin early this fall season. Some of this rehabilitation work was completed on the Bear Paw ski run in the fall of 1996.

Brian Head Village which is adjacent to the project area has experienced a significant amount of development, particularly in the past 20 years. Construction of roads, shaping of lots, construction of homes, condominiums, businesses, parking lots, etc. has resulted in a considerable amount of soil disturbance and associated soil erosion. Much of the management related activity on private lands was done with less stringent mitigation than occurs on National Forest administered lands. Most of the management related (man-caused) increase in erosion in the upper Parowan watershed comes from the private lands of Brian Head Village. In addition, the acres of land converted from forest and rangeland to roads, structures, etc. are an irreversible resource commitment. Long term soil productivity has been lost on those acres. The productivity of some of the wetlands in Bear Flat were irreversibly lost in the development of Brian Head Village.

The portion of the cumulative effects analysis area proposed for lift expansion has had little, if any, prior management activity that would affect the soil resource, therefore there are no cumulative impacts from the proposed action with past management activities on long term soil productivity for those areas.

The cumulative impacts from previous and current management activities for the entire cumulative effects analysis area combined with impacts associated with the proposed action and foreseeable future activities is well within soil quality standards for the soil resource. The mitigation recommended for the present and future projects is designed to ensure that soil erosion and detrimental soil disturbance does not exceed soil quality guidelines. It has been recognized that even though the approximately 40 acres of ski runs that are exceeding soil loss tolerance thresholds, the resource damage is still within Regional soil quality standards for areal extent (i.e. 85 percent of the activity area has soils in satisfactory condition). Even so, the Forest Service has been working with Brian Head Ski Resort to correct the damage and to ensure that adjacent ski runs do not exceed soil quality standards.
One additional cumulative impact that has occurred on the ski area is a loss of large woody debris in the forested leaf strips adjacent to the ski runs. This has resulted from the removal of down material by ski resort personnel in an attempt to remove material that posed safety problems as well as to enhance glade skiing. The result is that there is insufficient large woody debris for nutrient cycling to ensure long term soil productivity. The Brian Head Resort Salvage Sale that was recently completed required that 10 to 15 tons/acre of large woody debris was left on site within these leave strips for maintenance of long term soil productivity.

**FISHERIES**

**INTRODUCTION**

Even when small streams are not directly used by fish, they are vitally important to the quality of downstream habitats. The channels of these streams carry water, sediment, nutrients and wood debris from the upper portions of the watershed (Chamberlin et al 1991). Small streams are responsible for a high proportion of salmonid production in a basin, and they influence the quality of habitat in larger tributaries downstream. They are also the streams that can be the most easily altered by management activities. Small streams are closely associated with their riparian zones and are highly responsive to alterations in riparian vegetation and the surrounding watershed.

Potential increases in instream sediment is the primary concern to fisheries in Parowan Creek. Excessive amounts of sediment can be detrimental by reducing the success of fry emergence and by filling in pools, thereby reducing juvenile and adult trout habitat.

**PROPOSED ACTION - BRIAN HEAD RESORTS PROPOSAL**

**DIRECT/INDIRECT EFFECTS**

None of the streams within the project area are used by fish. Most are either ephemeral or intermittent with only a short segment of Parowan Creek being perennial. The ground disturbing activities associated with the proposed action have the potential to degrade water quality, fish and aquatic macroinvertebrate habitat through sedimentation. As described in the Water Quality section in Chapter 4, construction of Chair 1 is the only activity on Forest Service administered land that will likely result in an increase in sediment to Parowan Creek. This increase is expected to be short term if SWCP's are implemented properly and revegetation of the upper slopes is successful. As a result, there could be a decrease in the number of sediment intolerant macroinvertebrates in Parowan Creek for a short period of time. The other actions should not result in increased amounts of sediment provided that the prescribed SWCP's are implemented in a proper and timely manner. As such there should be no effect to the macroinvertebrate communities.

The two Interconnect lifts (2B and 3C) which partially lie on Forest Service administered land should not effect water quality or aquatic habitat for fish and macroinvertebrates. However, the lower portions of these two lifts which are on private land, will be subject to review by the Army Corp of Engineers. The Corp will determine any potential impacts that may result from this construction as well as prescribing proper mitigation to minimize effects to aquatic resources.

**CUMULATIVE EFFECTS**

The effects to fish and aquatic macroinvertebrates within the cumulative effects analysis area will be minimal and short term provided the watershed management plan, SWCP's, and any mitigation required by the Army Corp of Engineers is properly implemented. If these are not implemented properly, one could expect further impairment of the downstream aquatic resources. This could result in fewer, shallower pools, increase in riffles, increased imbeddedness, and a shift to more sediment tolerant macroinvertebrate species.

**NO ACTION - CURRENT MANAGEMENT**

**DIRECT/INDIRECT EFFECTS**

Under the No Action alternative, current management would continue. The watershed management plan in the MDP would not likely be implemented which would reduce the opportunities to improve the health of the watershed and aquatic habitat.

**CUMULATIVE EFFECTS**

Under the No Action alternative the cumulative effects would be the same as those described in the Brian Head Recovery Project Final EIS (1995), pp 4-64 - 4-65.

**ALTERNATIVE A - INTEGRATE ALTERNATIVE**

**DIRECT/INDIRECT EFFECTS**

Under Alternative A, the MDP would be implemented without the bowl lift, mountain restaurant, or snowmaking. Provided that the required mitigation is implemented as described for the
Proposed Action the effects to fish and aquatic macroinvertebrates would be the same as those in the Proposed Action.

CUMULATIVE EFFECTS

The cumulative effects for Alternative A are the same as those described in the Proposed Action. Assuming that the project features not included in this alternative would be adequately mitigated in the Proposed Action, there is little difference in effects to aquatic resources between the two alternatives.

AIR QUALITY

The principal impact to air quality from prescribed burning and wildfire is the temporary visibility impairment caused by smoke. This may reduce the quality of forest recreation experiences as seen by Forest users.

Because of the dynamic nature of the air resource, effects on air quality at a given location are highly unpredictable. Sources of pollutants such as dust and smoke may be many miles from the location that is experiencing diminished air quality. Recognized sources of pollutants that are import to the air quality within the project area are discussed in this section.

NO ACTION ALTERNATIVE

Under this alternative, no clearing of ski runs, lift lines, or building sites would occur, and there would be no immediate effects on air quality by prescribed fire. There would be no direct of indirect effects to air quality with the implementation of the No Action alternative.

CUMULATIVE EFFECTS

Since no action would occur under this alternative there would be no cumulative effects.

EFFECTS COMMON TO ALL ACTION ALTERNATIVES

DIRECT AND INDIRECT EFFECTS

Direct effects on air quality within the project area and for smoke sensitive areas in southern Utah, would vary only slightly by alternative. Under all action alternatives adverse effects to air quality within 5 miles of the proposal area may occur from the incomplete combustion of fuels in motorized equipment and vehicles, from road dust produced by construction and moving vehicles, and from smoke generated by prescribed burning of slash piles within the project area.

Due to current fuel loading on the sire (average 13 tons/acre) and additional fuels created through logging (5 to 10 tons/acre), slash would be treated by piling and burning or jackpot burning. Fuels deposited at landing locations could be sold as firewood, chipped and scattered or piles and burned.

The fumes and road dust produced by the project activities would be short-term, but would occur on an intermittent basis for 2-4 years. Road dust may cause more visible degradation of air quality than fumes. This would be mitigated through dust abatement provisions in the annual operating plan and construction plans required by the resort before any construction activities could commence.

Air Quality in the closest class 1 airsheds, Bryce Canyon National Park, and Zion National Park, would not be effected during periods of prescribed burning. Visual quality, looking outside the park toward the burn, may be effected for short periods of time (3/10 hours/day).

Approximately, 85 acres of pile/jackpot burning would be completed under the Proposed Action. Approximately, 55 acres under Alternative A. Burn sites would range in size from 1/300th acre to approximately 1 acre. Nearly 5 to 10 tons slash/acre would be treated. Burning would occur during the late fall or early spring. All piles would be burned within a 14 day period. Burning would be accomplished during periods of good smoke dispersal as outlined in the Smoke Management section of the Prescribed Fire Burn Plan. Smoke Management regulations, “Clearing Index”, for the State of Utah would be followed during all Prescribed Fire activities.

CUMULATIVE EFFECTS

No measurable long-term cumulative effects occur within the identified cumulative effects area, from implementation of any of the action alternatives (refer to Appendix 10 for map of CEA). No measurable long-term cumulative effects would occur in Brian Head Town, Zion National Park, Bryce Canyon National Park or Ashdown Gorge Wilderness Area. Smoke from prescribed fire would be short-term and would disperse shortly after project implementation. A minimal increase in carbon monoxide, TSP, and PM-10 pollutants would be expected as a result of implementing any action alternative. The burning of slash accumulations would result in some short term cumulative impacts relative to the production of carbon monoxide, TSP, and PM-10 pollutants.
RECREATION

INTRODUCTION

Recreation can be affected by several factors associated with each alternative including the No Action. Implementation of MDP action alternatives will likely result in an increase in recreational use within the cumulative effects area. Access to recreational opportunities and the outstanding high elevation setting are paramount to users traveling to Brian Head. Activities associated with the actions alternatives could also have a direct and indirect effect on short-term and long-term recreation use and trends. Direct impacts would be the closing of roads during construction of lifts, trails, and facilities on National Forest lands necessary to support MDP elements. Indirect effects would be the result of implementation of MDP elements on private lands.

PROPOSED ACTION - BRIAN HEAD RESORT PROPOSAL

DIRECT AND INDIRECT EFFECTS

Under this alternative the quality of the recreational experience would increase at Brian Head Resort and the Town of Brian Head. Direct effects to recreationist within the project area would include short-term displacement during construction activities associated with MDP elements. Specifically, dispersed summer recreation occurring in Bear Flat, along FS road #304, and area hiking and biking trails (see Recreational Features Map in Appendix 11). Construction impacts are expected to be short-term, resulting in trail and road closures lasting a few days to a week or more. Effected trails FS #3218, 3219, 3220, trails within the Resort permitted area, and FS road #304.

UTAH STATE HIGHWAY 143

Minor indirect effects are expected by the Proposed Action to use of Highway 143 for purposes of driving for pleasure and viewing scenery. It is not anticipated that there will be any road closures, however, travelers may experience delays or detours during construction of the skier bridge at the base of Shoshone Lift (1). These potential delays are not expected to deviate from standard traffic control during road construction activities. Additionally, indirect effects include encounters with construction equipment associated with MDP construction activities. These encounters are expected to be minimal as several passing opportunities are present throughout Highway 143.

ADDITIONAL ROADS WITHIN THE PROJECT AREA

Forest Road #304 will be the most impacted of area roads. As the primary access for the top tower of the Shoshone Lift (1), construction activities may require temporary closure of this route. These direct effects to recreation traffic are anticipated to last 2-5 working days. There would also be increased encounters with construction equipment throughout the installation of Chair 1. Additionally, recreationist using the Brian Head Peak Road FS#047 would be directly impacted as a result of development of the Brian Head Peak north bowl area. This includes either Bowl Lift option A or B.

WINTER RECREATION

Overall, implementation of the Proposed Action would improve the quality of the alpine skiing experience for those skiers attracted to the area by increased ski terrain, and improved ski facilities. With the addition of 145 acres of new ski terrain, and 60 acres of reactivated trails, the system of trails for beginner, intermediate, and advanced skiers would be expanded (Table 4-12). This expansion would bring the terrain distribution by skier ability at Brian Head Resort closer to demand and industry norms (Kerling, 1996).

Table 4-12, Build-Out Terrain

<table>
<thead>
<tr>
<th></th>
<th>Acres</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beginner</td>
<td>123.2</td>
<td>26%</td>
</tr>
<tr>
<td>Intermediate</td>
<td>179.8</td>
<td>34%</td>
</tr>
<tr>
<td>Advanced</td>
<td>226</td>
<td>40%</td>
</tr>
<tr>
<td>Total:</td>
<td>530</td>
<td>100%</td>
</tr>
</tbody>
</table>

The improved network of lifts would increase access to new skiing terrain. The Interconnect Lift either 3B or 3C would provide for a more positive recreational experience over the other four interconnect alternatives. The advantage of Interconnect Lift 3B or 3C includes the vertical terrain available for skiing, and a lift that is in line with the expectations of resort visitors. While surface lifts do move people, they are typically less desirable than vertical chair lifts to the skiing public. Installation of Shoshone Lift Chair 1, and the Highway 143 Skier Bridge, both associated with the Interconnect Lift are expected to increase the recreational opportunities available at Brian Head Resort.

The installation of the Bowl Lift Chair 8 would address the need for additional advanced terrain at Brian Head. However, over the years individuals have hiked to the top of Brian Head Peak in
search of more challenging terrain. Typically, this users group is comprised of area residents. Development of the Bowl Area with a chair lift may displace this historical backcountry use.

Under the Proposed Action Bowl Lift 8A has a projected length of 3,050 feet, and a vertical rise of 740 feet. Most of the vertical terrain is covered within the first 1,000 linear feet. Following the vertical relief would be substantial glade skiing opportunities. Skiing the chutes and bowls off of Brian Head Peak provides for an extreme skiing experience at Brian Head Resort.

Under the Proposed Action three quality lift upgrade projects are proposed. The quality lift upgrades include relocating the lower terminal of Navajo Lift, Chair 4, installing a Hotel Lift, Chair 9, and replacing Giant Steps, Chair 2 with a detachable quad chair lift. All three quality upgrades would improve the caliber of the skiing experience at Brian Head Resort.

For the past four years snowmaking systems have enabled the Resort to consecutively open in mid November. This success has prompted the Resort to include in their proposal an additional 25-40 acres of snowmaking off of the runs associated with the Shoshone Lift. Installing snowmaking in the Chair 1 area would permit the Resort to expand the amount of terrain available early in the season, and maintain the consistency of a November opening.

Additionally, under the Proposed Action, Brian Head Resort proposes the development of seasonal emphasis and opportunities. Detail is lacking as to the specific location and operation of each emphasis item, however, they are to include: a snowplay venue, food and beverage service, entertainment and events, ice skating rink, snowmobile tours, sleigh rides, improvement of Nordic skiing trails and shelter system, and future developments in ski related recreation. Implementation of this alternative would indirectly increase the number of people participating in these activities.

The new On Mountain Restaurant to be constructed at the top of Chair 2 and 7 would allow skiers to stay on the mountain longer. Additionally, by providing restrooms, food and beverage service, and warming areas congestion at the other base lodges would be reduced. Further improvements and remodeling of the Navajo and Giant Steps Base Lodges would improve skier services at Brian Head Resort.

Associated with the proposed increase in capacity are the construction of support facilities. These facilities include additional parking, a 10 acre expansion of maintenance operations, 2 miles of additional mountain roads to access new lifts, and avalanche control. All associated activities would assist in indirectly improving the quality of the services offered at Brian Head Resort.

Finally, a portion of recreationist visiting Brian Head Resort during the winter take advantage of other recreational activities available throughout the Markagunt Plateau. These activities include, but are not limited to, snowmobiling, Nordic skiing, snowshoeing, and sledding. Implementation of this alternative would indirectly increase the number of people taking advantage of these other recreational opportunities.

**SUMMER RECREATION**

Under the Proposed Action, recreational opportunities available at Brian Head Resort during the summer also would be expanded because several of the facilities would be available for summer use. Direct effects of summer recreational activities include rides on Chair 2 and Chair 8 for the purpose of viewing scenery and mountain biking, and special events. It is expected that use of summer facilities would increase with MDP development.

Additionally, Brian Head Resort proposes the enhancement of seasonal emphasis and opportunities. Detail is lacking as to the location and specifics of each summer emphasis item, however, they include lift operations, food and beverage service, entertainment events, mountain bike venue, equestrian trials/guide and wagon rides, summer trails and shelter system, interpretive signage and trails, alpine slide or similar venue, golf driving range and putting instruction venue, and future developments in non-motorized summer recreation.

Elements proposed in the MDP would both directly and indirectly expand the summer recreational opportunities. Special events and mountain biking will be addressed later in this section.

**SPECIAL EVENTS**

Winter Special Events will directly benefit from implementation of the Brian Head Resort proposal. Additional lifts, trails, and guest service facilities will be available for new race courses, snowboarding events, parades, the annual spring carnival and Easter egg hunt. The increase in facilities capacities will provide opportunities for growth of winter sports events.

Summer Special Events may be impacted as a result of construction activities. The Cannondale Cup Mountain Bike Race, Brian Head Bash Fat Tire Festival, Brian Hender Mountain Bike Tour, Brian Head Team Big Bear 12 Hour Team Endurance Ride, and Fall Colors Fat Tire Festival use area trails for each event. Construction activities and event schedules will need to be coordinated to minimize associated impacts. It is not anticipated that the Independence Day Celebration, Oktoberfest, and Brian Head Resort Naturalist program will not be impacted by construction activities.
BRIAN HEAD TOWN AND VACATION HOME SITES

The economy of Brian Head Town is dependent on recreation visitors. Most of the businesses provide services to recreation visitors. There is expected to be no substantial impacts to winter or summer recreation as a result of construction of MDP elements. Conversely, implementation of the MDP elements will expand the recreational opportunities available at Brian Head, therefore, the potential for increased revenue for area businesses. For a detail analysis of the Social/Economic effects, please see the Social/Economic analysis found in this chapter.

CEDAR BREAKS NATIONAL MONUMENT

Implementation of Brian Head Resorts proposal will indirectly effect the winter and summer recreational use of Cedar Breaks National Monument. Many residents and visitors to Brian Head enjoy snowmobiling, Nordic skiing and snowshoeing on trails passing through Cedar Breaks National Monument. Additionally, summer use activities such as driving for pleasure, viewing scenery, and hiking are popular with resort visitors. With the expected increase in visitation of Brian Head Resort and Town of Brian Head, as a result of implementation of the Proposed Action, use at Cedar Breaks National Monument is expected to increase. This increase in use is anticipated to correlate with the level of MDP development and national trends.

BRIAN HEAD PEAK

Brian Head Peak represents the dominate viewpoint of the project area. Use of the Civilian Conservation Corps overlook atop Brian Head Peak is moderate on weekdays and moderate to heavy on weekends. There will be evidence of MDP elements and construction activities from the overlook on Brian Head Peak (see Visual effects discussion later in this chapter). Construction activities associated with the Bowl Lift will directly impact visitors to Brian Head Peak, as heavy equipment, staging activities and noise will be apparent to visitors atop Brian Head Peak.

MOUNTAIN BIKING

There is expected to be reduction in mountain biking and trail use within the project area during construction of lifts, trails, and support facilities. This reduction is the direct result of closures and displacement while cutting, yarding, facility construction, and clean up is occurring. It is difficult to predict how much reduction will take place, or the duration. However, it is anticipated to be minor in nature lasting only a few days. Following slash disposal and after grasses and ground covers have reestablished, the views may actually be preferred by some visitors, increasing the quality of their experience (McCool and Benson, 1989).

RECREATION OPPORTUNITY SPECTRUM

Under this Proposed Action, Management Area 2B, Roaded Natural would reduce by 56.29 acres. This change is addressed in Chapter 8 Forest Plan Amendment. Minor changes in the roaded natural recreation will not change the Standard & Guidelines, characteristics, or experiences perceived by users. Additionally, Management Area 1B, Rural Recreation would be increased by 56.29 acres. This modification is intended to facilitate MDP elements and to accurately reflect actual management area conditions.

CUMULATIVE EFFECTS

Brian Head Ski Area originated in 1964 with the installation of a rope tow lift on Navajo Peak. Since that time a progression of lifts, ski trails, snowmaking and guest service facilities have been developed within the project area. Brian Head Resorts current capacity is 2,923 SAOT and has a capacity of 166,026 skiers per year. Concurrently, the community of Brian Head has evolved to form the Town of Brian Head.

The direct and indirect impacts of implementing the Proposed Action will result in an increase in SAOT, and potential skiers per year. At build-out, Brian Head Resort will be able to support 4,791 SAOT, and yield an annual capacity of 272,000 skiers per year. Full development of the Brian Head Resort MDP is anticipated to take 10 plus year. Individual projects are targeted for the next one to five years as identified in the Project Schedule.

Additionally, the Cedar City Ranger District is experiencing a bark beetle epidemic throughout the spruce ecosystem. Brian Head Resort is located within the spruce belt. The Brian Head Recovery Project Final Environmental Impact Statement, 1996 identified several salvage/sanitation timber sales within and adjacent to the project area. Past, present and future timber sales include Brian Head Resort Salvage, 1996, Bear Flat Salvage, 1996, and the Brian Head Resort II, 1997. Please refer to the Brian Head Recovery Project Final Environmental Impact Statement for additional details about the effects of the bark beetle epidemic on recreation.

The cumulative effects of combining the existing development of Brian Head Resort with the proposed Master Development Plan will increase the recreational opportunities available to the public within the Brian Head Area. Growth is predicted to increase as identified in the Town of Brian Head Master Plan. Additionally, impacts from the spruce bark beetle may affect the recreational experience, however, over time conditions will become more favorable for forest users. Implementation of the Brian Head Resort Master Development Plan will benefit both the present and future recreational opportunities at Brian Head.
NO ACTION - CURRENT MANAGEMENT

DIRECT AND INDIRECT EFFECTS

Under the No Action Alternative, Brian Head Resort would continue to operate at current levels. No new lifts or ski trails would be installed. Thus, the recreational experience would remain virtually unchanged. The ski terrain would continue to favor beginner and intermediate skiers. Therefore, families and individuals seeking more challenging terrain would be at a deficit at Brian Head. No additional snowmaking or on mountain restaurant facilities would be permitted. Parking, guest service facilities, and some quality lift and trail upgrades may be improved or developed on private land at the discretion of the land owner. The permit boundary would remain 405 acres under this alternative.

Summer recreation would likely continue to increase, as Brian Head is cultivating a regional and even national reputation as a premier mountain biking destination. Residential and commercial development would likely persist as identified in the Town of Brian Head Master Plan.

CUMULATIVE EFFECTS

Implementation of this alternative would maintain the recreational experience on National Forest lands. However, because Brian Head Resort operates or both public and private lands (60% private, 40% public. Traveller, 1997) some activities may occur within the cumulative effects area on private land that may influence this experience. These potential activities include: Summer and Winter Emphasis and Opportunities, Lift and Trail Quality Upgrades, Parking, and Base Lodges projects.

Additionally, the salvage program initiated in the Brian Head Recovery Project, including the Brian Head Resort Salvage, 1996, Bear Flat Salvage Sale, 1996, and the Brian Head Resort II Salvage Sale, 1997 are located within the cumulative effects area. Effects to recreation are disclosed in the Brian Head Recovery Project, EIS, 1996. Based on the previous analysis, salvage activity would increase the encounters of recreationist and logging systems, therefore impacting the recreational experience.

The cumulative effects of the past development and potential recreational enhancement within the Town of Brian Head and private lands of the Resort will enhance the recreation opportunities available at Brian Head. However, combined with past and proposed salvage activity this recreational experience impacted over short term with long term benefits.

ALTERNATIVE A - INTEGRATED ALTERNATIVE

DIRECT AND INDIRECT EFFECTS

Under this alternative the quality of the recreational experience would increase at Brian Head Resort and the Town of Brian Head. Direct effects to recreationist within the project area would include short-term displacement during construction activities associated with MDP elements. Specifically, dispersed summer recreation occurring in Bear Flat, along FS road #304, and area hiking and biking trails (see Recreational Features Map in Appendix 11). Construction impacts are expected to be short-term, resulting in trail and road closures lasting a few days to a week or more. Effected trails include FS #3218, 3219, 3220, trails within the Resort permitted area, and FS road #304.

UTAH STATE HIGHWAY 143

Minor indirect effects are expected by the Proposed Action to use of Highway 143 for purposes of driving for pleasure and viewing scenery. It is not anticipated that there will be any road closures, however, travelers may experience delays or detours during construction of the skier bridge at the base of Shoshone Lift (1). These potential delays are not expected to deviate from standard traffic control during road construction activities. Additionally, indirect effects include encounters with construction equipment associated with MDP construction activities. These encounters are expected to be minimal as several passing opportunities are present throughout Highway 143.

ADDITIONAL ROADS WITHIN THE PROJECT AREA

Forest Road #304 will be the most impacted of area roads. As the primary access for the top tower of the Shoshone Lift (1), construction activities may require temporary closure of this route. These direct effects to recreation traffic are anticipated to last 2-5 working days. There would also be increased encounters with construction equipment throughout the installation of Chair 1.

WINTER RECREATION

Overall, implementation of the Proposed Action would improve the quality of the alpine skiing experience for those skiers attracted to the area by increased ski terrain, and improved skier facilities. With the addition of 60 acres of reactivated trails, the system of trails for beginner, intermediate, and advanced skiers would be expanded (Table 4-13).
Table 4-13, Build-Out Terrain

<table>
<thead>
<tr>
<th>Beginner</th>
<th>123 Acres</th>
<th>29%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intermediate</td>
<td>180 Acres</td>
<td>42%</td>
</tr>
<tr>
<td>Advanced</td>
<td>126 Acres</td>
<td>29%</td>
</tr>
<tr>
<td>Total</td>
<td>430 Acres</td>
<td>100%</td>
</tr>
</tbody>
</table>

The improved network of lifts would increase access to new skiing terrain. The Interconnect Lift either 3B or 3C would provide for a more positive recreational experience over the other four interconnect alternatives. The advantage of Interconnect Lift 3B or 3C includes the vertical terrain available for skiing, and a lift that is in line with the expectations of resort visitors. While surface lifts do move people, they are typically less desirable than vertical chair lifts to the skiing public. Installation of Shoshone Lift Chair 1, and the Highway 143 Ski Bridge, both associated with the Interconnect Lift are expected to increase the recreational opportunities available at Brian Head Resort.

Under the Proposed Action three quality lift upgrade projects are proposed. The quality lift upgrades include relocating the lower terminal of Navajo Lift, Chair 4, installing a Hotel Lift, Chair 9, and replacing Giant Steps, Chair 2 with a detachable quad chair lift. All three quality upgrades would improve the caliber of the skiing experience at Brian Head Resort.

For the past four years snowmaking systems have enabled the Resort to consecutively open in mid November. This success has prompted the Resort to include in their proposal an additional 25-40 acres of snowmaking off of the runs associated with the Shoshone Lift. Installing snowmaking in the Chair 1 area would permit the Resort to expand the amount of terrain available early in the season, and maintain the consistency of a November opening.

Additionally, under the Proposed Action, Brian Head Resort proposes the development of seasonal emphasis and opportunities. Detail is lacking as to the specific location and operation of each emphasis item, however, they are to include, a snowplay venue, food and beverage, entertainment and events, ice skating rink, snowmobile tours, sleigh rides, improvement of Nordic skiing trails and shelter system, and future developments in ski related recreation. Implementation of this alternative would indirectly increase the number of people participating in these activities.

Associated with the proposed increase in capacity are the construction of support facilities. These facilities include additional parking, a 10 acre expansion of maintenance operations, 2 miles of additional mountain roads to access new lifts, avalanche control, and remodeling of Giant Steps and Navajo Base Lodges. All associated activities would assist in indirectly improving the quality of the services offered at Brian Head Resort.

Finally, a portion of recreationist visiting Brian Head Resort during the winter take advantage of other recreational activities available throughout the Markagunt Plateau. These activities include, but are not limited to, snowmobiling, Nordic skiing, snowshoeing, and sledding. Implementation of this alternative would indirectly increase the number of people taking advantage of these other recreational opportunities.

SUMMER RECREATION

Under the Proposed Action, recreational opportunities available at Brian Head Resort during the summer also would be expanded because several of the facilities would be available for summer use. Direct effects of summer recreational activities include rides on Chair 2 for the purpose of viewing scenery and mountain biking, and special events. It is expected that use of summer facilities would increase with MDP development.

Additionally, Brian Head Resort proposes the enhancement of seasonal emphasis and opportunities. Detail is lacking as to the location and specifics of each summer emphasis item, however, they include lift operations, food and beverage service, entertainment events, mountain bike venue, equestrian trials/guide and wagon rides, summer trails and shelter system, interpretive signage and trails, alpine slide or similar venue, golf driving range and putting instruction venue, and future developments in non-motorized summer recreation.

Elements proposed in the MDP would both directly and indirectly expand the summer recreational opportunities. Special events and mountain biking will be addressed later in this section.

SPECIAL EVENTS

Winter Special Events will directly benefit from implementation of the Brian Head Resort proposal. Additional lifts, trails, and guest service facilities will be available for new race courses, snowboarding events, parades, the annual spring carnival and Easter egg hunt. The increase in facilities capacities will provide opportunities for growth of winter sports events.

Summer Special Events may be impacted as a result of construction activities. The Cannondale Cup Mountain Bike Race, Brian Head Bash Fat Tire Festival, Brian Header Mountain Bike Tour, Brian Head 12 Hour Team Endurance Ride, and Fall Colors Fat Tire Festival are trails for each event. Construction activities and event schedules will need to be coordinated to minimize associated impacts. It is not anticipated that the Independence Day Celebration, Oktoberfest, and Brian Head Resort Naturalist program will be impacted by construction activities.

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BRIAN HEAD TOWN AND VACATION HOME SITES

The economy of Brian Head Town is dependent on recreation visitors. Most of the businesses provide services to recreation visitors. There is expected to be no substantial impacts to winter or summer recreation as a result of construction of MDP elements. Conversely, implementation of the MDP elements will expand the recreational opportunities available at Brian Head, therefore, the potential for increased revenue for area businesses. For a detail analysis of the Social/Economic effects, please see the Social/Economic analysis found in this chapter.

CEDAR BREAKS NATIONAL MONUMENT

Implementation of Brian Head Resorts proposal will indirectly effect the winter and summer recreational use of Cedar Breaks National Monument. Many residents and visitors to Brian Head enjoy snowmobiling, Nordic skiing and snowshoeing on trails passing through Cedar Breaks National Monument. Additionally, summer use activities such as driving for pleasure, viewing scenery, and hiking are popular with resort visitors. With the expected increase in visitation of Brian Head Resort and Town of Brian Head, as a result of implementation of the Proposed Action, use at Cedar Breaks National Monument is expected to increase. This increase in use is anticipated to correlate with the level of MDP development and national trends.

BRIAN HEAD PEAK

Brian Head Peak represents the dominate viewpoint of the project area. Use of the Civilian Conservation Corps overlook atop Brian Head Peak is moderate on weekdays and moderate to heavy on weekends. There will be evidence of MDP elements and construction activities from the overlook on Brian Head Peak (see Visual effects discussion later in this chapter).

MOUNTAIN BIKING

There is expected to be reduction in mountain biking and trail use within the project area during construction of lifts, trails, and support facilities. This reduction is the direct result of closures and displacement while cutting, yarding, facility construction, and clean up is occurring. It is difficult to predict how much reduction will take place, or the duration. However, it is anticipated to be minor in nature lasting only a few days. Following slash disposal and after grasses and ground covers have reestablished, the views may actually be preferred by some visitors, increasing the quality of their experience (McCool and Benson, 1989). (See Visuals discussion of effects).

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RECREATION OPPORTUNITY SPECTRUM

Under this Proposed Action, Management Area 2B, Roaded Natural would reduce by 56.29 acres. This change is addressed in Chapter 8 Forest Plan Amendment. Minor changes in the roaded natural recreation will not change the Standard & Guides, characteristics, or experiences perceived by users. Additionally, Management Area 1B, Rural Recreation would be increased by 56.29 acres. This modification is non-significant and is intended to facilitate MDP elements and to accurately reflect actual management area conditions.

CUMULATIVE EFFECTS

Brian Head Ski Area originated in 1964 with the installation of a rope tow lift on Navajo Peak. Since that time a progression of lifts, ski trails, snowmaking and guest service facilities have been developed within the project area. Brian Head Resorts current capacity is 2,923 SAOT and has a capacity of 166,026 skiers per year. Concurrently, the community of Brian Head has evolved to form the Town of Brian Head.

The direct and indirect impacts of implementing the Proposed Action will result in an increase in SAOT, and potential skiers per year. At build-out, Brian Head Resort will be able to support 4,291 SAOT, and yield an annual capacity of 243,729 skiers per year. Full development of the Brian Head Resort MDP is anticipated to take 10 plus year. Individual projects are targeted for the next one to five years as identified in the Project Schedule.

Additionally, the Cedar City Ranger District is experiencing a bark beetle epidemic throughout the spruce ecosystem. Brian Head Resort is located within the spruce belt. The Brian Head Recovery Project Final Environmental Impact Statement, 1996 identified several salvage/sanitation timber sales within and adjacent to the project area. Past, present and future timber sales include Brian Head Resort Salvage, 1996, Bear Flat Salvage, 1996, and the Brian Head Resort II, 1997. Please refer to the Brian Head Recovery Project Final Environmental Impact Statement for additional details about the effects of the bark beetle epidemic on recreation.

The cumulative effects of combining the existing development of Brian Head Resort with the proposed Master Development Plan will increase the recreational opportunities available to the public within the Brian Head Area. Growth is predicted to increase as identified in the Town of Brian Head Master Plan. Additionally, impacts from the spruce bark beetle may affect the recreational experience, but over time conditions will become more conducive for forest users. Implementation of the Brian Head Resort Master Development Plan will benefit both the present and future recreational opportunities at Brian Head.
The objective of scenic resource management in ski areas is to provide quality recreation experiences and opportunities without detracting from the essence of the landscape. Blending all facilities with the landscape setting is the basic concept of Scenery Management. Scenery is a key element in determining resort preference and skier satisfaction. Viewing outstanding scenery while participating in winter sports activities is the primary reason skiers are attracted to winter sports sites on National Forest lands.

The visual quality of the Brian Head Master Plan area is important to the many people who live in this area and visit this area for its unique visual qualities. Many visitors to Cedar Breaks National Monument, Ashdown Gorge Wilderness Area, Dark Hollow and Bunker Creek Trails, and Pauniquit Lake pass through the Brian Head Master Plan Area. Brian Head Town and Resort also provide lodging to visitors touring southwestern Utah and the National Parks. The visual resources of this area are critical to the experience and perceptions of visitors and residents.

PROPOSED ACTION-BRIAN HEAD RESORT PROPOSAL

DIRECT EFFECTS

The proposed action would result in both short and long term alterations to the visual quality and character of Brian Head Valley. Contrasts in color will be created by clearing (trees and other vegetation) and grading (slope modification for runs, towers, and terminals) where they do not completely follow the natural lines in the existing characteristic landscapes for most proposed ski terrain expansion activities. Textures of cleared and graded runs will appear much smoother than the adjacent sometimes rocky slopes or shrubby vegetation patches. Structures will increase the likelihood of reflected light. Under this alternative, several roads that are poorly placed or no longer needed would be closed and revegetated. This would improve the scenic quality. Proposed lift replacements, using existing alignments, would have limited visual impacts except to possibly make lifts more prominent when the replacement is a higher capacity lift.

The capability of the existing Ski Area to absorb the proposed developments and enhancements ranges from high to low. The low visual absorption capability (VAC) would occur in forested areas on steep slopes, rock outcrop faces, and areas in direct line with critical view points. In these areas, it will require careful design and placement of facilities and vegetation manipulation to maintain a natural appearance. Forested areas on flat benches are considered high VAC areas, as they are ideal for screening facilities.

Shoshone Lift 1

Shoshone Lift 1 will be placed within the existing clearing of the original Lift 1 with the exception of the top terminal area, which will be placed into previously uncleared, forested terrain on Navajo Ridge. The service road will be extended to the top terminal location, and there will be utility corridor clearings, and a ski patrol/lift operator warming hut included near the top drive terminal. The top drive terminal is located north of the ridge line, and will not be visible from Cedar Breaks National Monument or the Ashdown Gorge Wilderness. The lift cables and chairs and lower towers may be visible from Highway 143 south of mile marker 17 in the Cedar Breaks National Monument viewed near the Brian Head Peak Road junction.

The majority of the runs associated with the Shoshone Lift 1 skiing pod are existing, having been cleared for use with the previous Lift 1. Two new runs are proposed to the south of the Navajo Ridge divide. The existing ski trails are only visible near the bottom of the ridge, and appear as natural openings when traveling north on Highway 143 toward Brian Head Town from Cedar Breaks National Monument. These trails will be glazed skiing to reduce visual impacts from Cedar Breaks National Monument and the Ashdown Gorge Wilderness. However, especially prior to the revegetation of disturbed areas, contrast of the cleared areas will be visible from Highway 143 south of mile marker 17 and the Rattlesnake Trail, that crosses into the Ashdown Gorge Wilderness. This contrast will be more pronounced in the winter, when the dark spruce contrast with the white snow. Navajo Ridge is visible as the "cap" above Cedar Breaks National Monuments northern amphitheater. Navajo Ridge is important to the scenic quality of this view from Chessman Ridge, Sunset View and Point Supreme overlooks in Cedar Breaks National Monument. With glazed and island skiing for these runs, a textural change in this ridge may be perceived by persons familiar with the view from these overlooks, but shouldn't be noticeable to the casual observer. The contrast between exposed soil and grasses on the existing runs is expected to be reduced with the implementation of a vegetation plan. (Visual simulations available in Figure 4-4)

From the viewshed of the Brian Head Valley the Shoshone Lift 1 would meet or exceed Low Scenic Integrity, which correlates to Modification under VMS in the DNFRMP. Using glazed and island skiing the expansion lifts to the south of Navajo Ridge would meet High Scenic Integrity, which correlates to Retention under VMS, on the Highway 143 approach to Brian Head Town from Cedar Breaks National Monument.
Interconnect Options 3B and 3C

Both options would create similar visual alterations to the landscape. Either option would be visible as a foreground view from Highway 143 and homes and lodging on the south end of Brian Head Town, crossing the steep slope that is visually prominent above the south end of the community. Additional trails would be cleared on this slope face. The vegetation tends to be low density in the areas where additional ski runs are proposed, so that possibility of blending these runs into the existing landscape is improved.

Bowl Lift 8

Both options A and B for the Bowl Lift 8 would expand into areas that are currently undeveloped and are naturally evolving landscapes. Option A is a fixed grip, bottom drive chair lift that rises along the southern edge of the Brian Head "Bowl" to just below the top of Brian Head Peak (visual simulations available in the Figure 4-5, 4-6). The bottom drive terminal would be located near Mud Flat. Option B is a pulse gondola lift that would cross the face of Brian Head Peak from near the top terminal of Giant Steps Lift 2 to the same top terminal location as Option A (visual simulations available in Figure 4-5, 4-6). With both options an elevated walkway would cross the talus to provide access to the top of the peak. A small operator warming hut would also be located on the cleared pad of the top terminal in both options. There would be limited ski trail clearing, as most of the bowl area is above tree line. Most clearing would be graded or island trails near the bottom of either lift option. This analysis is based on the assumption that tie down structures to the top of Brian Head Peak will not be necessary to secure the top terminal of Bowl Lift 8, and that it will not be necessary to disturb more than the 5 meters across slope by 20 meters down slope area that was surveyed for the Brian Head Mountain Ski fall for the top terminal. There will be visible contrast from the raw scar where there is excavation to construct the top terminal pad for an unloading area.

Since both Options A and B rise above treeline on Brian Head Peak, once they rise above the forested area they will both be clearly visible. Both options would be visible from Brian Head Town and nearby subdivisions, Highway 143 as it crosses through Brian Head Valley, and many area trails. Option A would not be visible from the Brian Head Peak overlook, and would only be visible to visitors to Brian Head Peak, if they walk along the rim of the peak. The top of the elevated walkway may be visible from the Brian Head Peak Road. Option B would be visible in the foreground from Brian Head Peak overlook. Option B may also be visible from Highway 143 south of milepost 17 and Rattlesnake Trail and North View Overlook of Cedar Breaks National Monument. The trail clearings of either option would not be visible from Highway 143 or the Brian Head Town. They may be visible from the top of Brian Head Peak to visitors who walk along the edge of the rim, or Sidney Peaks trail near the western trailhead. However, many Engelmann spruce in this area have been killed by the spruce bark beetle, and will be removed as a part of the Brian Head Recovery Project, so it is anticipated that few additional trees will need to be removed. The perceived texture of the bowl area may change, since some large rocks will be blasted to improve skiing options and safety. This may give a smoother textural appearance, depending on the extent of the blasting.
Existing Condition

Figure 4-5

Existing Condition as viewed from Brian Head Hotel Parking Lot
Bowl Lift 8-Option 1
Photographic Simulation

Visual Simulation of the Proposed Action as viewed from
Brian Head Hotel Parking Lot

Figure 4-6
Bowl Lift 8-Option 2
Photographic Simulation

Visual Simulation of the Proposed Action as viewed from
Brian Head Hotel Parking Lot

Figure 4-7
Both options would meet Low Scenic Integrity objectives which correlate to the VQO of Modification specified for 1B Winter Sports Management Areas in the DNFLRMP, under the Forest Plan Amendment proposed with this project. The current management designation of the Option A area is 2A Semi-primitive Recreation and VQO is Retention (or the correlation of High Scenic Integrity under SMS) for this area. This proposal would not meet High Scenic Integrity for a Semi-primitive Recreation Management Area, because the lifts would be visually evident.

**Expanded Snow-Making**

The primary visual effects of snow-making are short term (less than five years) when utility corridors are regraded to match the surrounding terrain and revegetated and are routed through existing clearings. There would be an expected contrast between the disturbed areas and the surrounding areas for up to five years. This disturbance would be visible from Highway 143, locations in Brian Head Town and the Brian Head Peak Overlook. Compressor buildings may be visible, depending on viewer locations.

**Mountain Top Restaurant**

The mountain top restaurant may be visible as a middleground view from Highway 143, since it will be located near the top terminal of Giant Steps Lift 2, which is visible from many points along Highway 143. However, depending on the location chosen, it is likely to be screened from being visible from Highway 143 and Brian Head Town. It may be visible from some home sites on the upper slopes of the western side of Brian Head Valley. It will be visible from summer trails that leave from the top terminal of Lift 2. The restaurant will be visible from Brian Head Peak Overlook as a foreground view from above, making the design of the roof and roofing material choice critical from a scenic quality perspective. There would be a short term contrast from disturbed areas, if utility corridors are placed in existing clearing, until revegetation takes place. There would not be a need for additional road construction because the service road already exists for the top terminals of Lifts 2 and 7. From the vantage of the Brian Head Valley the mountain top restaurant would meet or exceed Low Scenic Integrity, which correlates to Modification under VMS in the DNFLRMP.

**Expanded Equipment Yard, Snow Cat Barn and Employee Parking**

The current maintenance yard is well sited, so that it is not visible from Highway 143 or the Brian Head Overlook. It is possible that expansion of this facility will be visible from the highway and especially from Brian Head Overlook. If this occurs, this facility may not meet Low Scenic Integrity (which correlates to Modification specified in the DNFLRMP), due to the increased contrast from the parking area and additional service roads required by this area.

**Seasonal Emphasis Opportunities**

The anticipated locations of proposed seasonal emphasis opportunities were not disclosed in the Brian Head Master Development Plan. It is assumed the following items may be located on National Forest Lands: a snow play venue, snowmobile tours, sigeich rides, a nordic ski track and shelter system, a mountain bike venue, equestrian trails and horse drawn wagon rides, a summer trails and shelter system, interpretive trails with signage, and an alpine slide or similar venue.

The trails activities (snowmobile tours, sigeich rides, a nordic ski track and shelter system, equestrian trails, summer trails including interpretive trails) would have low visual impacts when specified mitigation is followed. A snow play venue with limited development would have low visual impacts, the addition of a tow lift and additional clearing would increase those impacts. If a mountain bike venue incorporated elements beyond traditional trails, additional analysis would be necessary to assess impacts.

Of the seasonal emphasis opportunities, the alpine slide or similar venue has the greatest potential for visual impacts. This would likely be located in an existing ski trail, accessing the top terminal of a lift. If it were located in a prominent run, such as Giant Steps Lift 2 lift line, it may be very visible from Highway 143 and locations in Brian Head Town. An alpine slide could create a highly visible, unnatural, linear element within a visible clearing. There is insufficient information in the proposed Master Development Plan to adequately analyze the visual impacts of an alpine slide.

**INDIRECT EFFECTS**

Indirect effects (the effects of elements proposed for private land in the Master Development Plan) would impact the scenic resource. This includes trail modifications to portions of Giant Steps lift 2 on private land, increased parking near Highway 143, golf driving range, relocation of lower terminal of Navajo Lift 4, Hotel Lift 9, an ice skating rink, a snow play venue and an alpine slide or similar venue. If all developments comply with Brian Head Town’s Design Guidelines as specified in the Master Development Plan, the visual impacts should be subordinate to the surrounding landscape. The appearance of these elements increases the visual prominence of human modification and the visual presence of development to those in Brian Head Town and travelers on Highway 143.

The skier bridge that is associated in the construction of Shoshone Lift 1 will be visible in the foreground and immediate foreground from Highway 143 and will be a prominent visual element. This bridge will be approximately 25 feet high and have a span of up to 300 feet to meet Utah Department of Transportation clearances and acceptable slopes for returns to the bottom terminal. The MDP specifies that the bridge will be about 60 feet wide. Shoshone Lift 1 may also cross the highway at this point, adding additional vertical presence to the bridge, approximately 40 feet overall height. The bridge and lift will also be visible as middleground from the overlook at Brian Head peak and many locations in the town.

The resort has indicated that the Vegetation and Hydrology plans will also be implemented on private land. This will improve visual quality, by decreasing the contrast of the areas with

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exposed soil were revegetation has not been successful on the lower areas of Giant Steps Lift 2 and the existing runs that are associated with Shoshone Lift 1.

**NO ACTION - CURRENT MANAGEMENT**

**DIRECT AND INDIRECT EFFECTS**

There would be no additional direct impacts the scenic resource. Operation and maintenance of existing facilities and ski trails would continue but no new impacts would occur. The area would continue to meet Low Scenic Integrity, the SMS correlative of the Modification Visual Quality Objective specified in the DNFLRMP. but would not meet the High Scenic Integrity Objective which more closely responds to the high concern level of the residents and visitors to the Brian Head area. In this alternative a vegetation and hydrology plan will be still be completed and implemented by the USFS which assist in improving the scenic quality of the area by incorporating a revegetation regime for both run clearings and forested slope areas where erosion is occurring and where tree removal has been heavy as a result of spruce bark beetle mortality.

Indirect effects (elements proposed for private land in the Master Development Plan) would impact the scenic resource on private lands. This includes: trail modifications to portions of Giant Steps Lift 2 on private land, increased parking near Highway 143, a golf driving range, relocation of lower terminal of Navajo Lift 4, Hotel Lift 9, an ice skating rink, a snow play venue and an alpine slide or similar venue. If all developments comply with Brian Head Town's Design Guidelines as specified in the Master Development Plan, the visual impacts should be subordinate to the surrounding landscape. The appearance of these elements increases the degree of human modification and the presence of development visible to those in Brian Head Town and travelers on Highway 143. The resort has indicated in the MDP that the vegetation and hydrology plans will also be implemented on private land. This will improve visual quality, by decreasing the contrast of the areas with exposed soil where revegetation has not been successful on the lower areas of Giant Steps Lift 2 and the runs visible from the west side of Highway 143.

**ALTERNATIVE A - INTEGRATED ALTERNATIVE**

**DIRECT EFFECTS**

Alternative A differs from the Proposed Action by removing the Bowl Lift R, the mountain top restaurant, and the snowmaking from MDP at this time. This alternative would have fewer impacts to the scenic resource, primarily because of the removal of Bowl Lift 8.

This alternative would result in both short and long term alterations to the visual quality and character of Brian Head Valley. Contrasts in color will be created by clearing (trees and other vegetation) and grading (slope modification for runs, towers, and terminals) where they do not completely follow the natural lines in the existing characteristic landscapes for most proposed ski terrain expansion activities. Textures of cleared and graded runs will appear much smoother than the adjacent sometimes rocky slopes or shrubby vegetation patches. Structures will increase the likelihood of reflected light. Under this alternative, several roads that are poorly placed, or no longer, needed would be closed and revegetated. This would improve the scenic quality.

Proposed lift replacements, using existing alignments, would have limited visual impacts except to possibly make lifts more prominent when the replacement is a higher capacity lift.

The capability of the existing Ski Area to absorb the proposed developments and enhancements ranges from high to low. The low visual absorption capability (VAC) would occur in forested areas on steep slopes, rock outcrop faces, and areas in direct line with critical view points. In these areas, it will require careful design and placement of facilities and vegetation manipulation to maintain a natural appearance. Forested areas on flat benches are considered high VAC areas, as they are ideal for screening facilities.

**Shoshone Lift 1**

Shoshone Lift 1 will be placed within the existing clearing of the original Lift 1 with the exception of the top terminal area, which will be placed into previously uncleared, forested terrain on Navajo Ridge. The service road will be extended to the top terminal location, and their will be utility corridor clearings, and a ski patrol/lift operator warming hut included near the top drive terminal. The top drive terminal is located north of the ridge line, and will not be visible from Cedar Breaks National Monument or the Ashdown Gorge Wilderness. The lift cables and chairs and lower towers maybe visible from Highway 143 south of mile marker 17 in the Cedar Breaks National Monument viewed near the Brian Head Peak Road junction (visual simulations available in Figure 4-4).

The majority of the runs associated with the Shoshone Lift 1 skiing pod are existing, having been cleared for use with the previous Lift 1. Two new runs are proposed to the south of the Navajo Ridge divide (see Fig. 2-6, page 62). The existing ski trails are only visible near the bottom of the ridge, and appear as natural openings when traveling north on Highway 143 toward Brian Head Town from Cedar Breaks National Monument. These trails will be graded runs to reduce visual impacts from Cedar Breaks National Monument and the Ashdown Gorge Wilderness. However, especially prior to the revegetation of disturbed areas, contrast of the cleared areas will be visible from Highway 143 south of mile marker 17 and the Rattlesnake Trail, that crosses into the Ashdown Gorge Wilderness. This contrast will be more pronounced in the winter, when the dark spruce contrast with the white snow. Navajo Ridge is visible as the "cap" above Cedar Breaks National Monuments northern amphitheater. Navajo Ridge is important to the scenic quality of this view from Chessman Ridge, Sunset View, and Point Supreme overlooks in Cedar Breaks National Monument. With gladed and island skiing for these runs, a textural change in this ridge may be perceived by persons familiar with the view from these overlooks, but shouldn't be noticeable to the casual observer. The contrast between exposed soil and grasses on the existing runs is expected to be reduced with the implementation of a vegetation plan.

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From the viewshed of the Brian Head Valley, the Shoshone Lift 1 would meet or exceed Low Scenic Integrity, which correlates to Modification under VMS in the DNFLRMP. Using gladed and island skiing the expansion lifts to the south of Navajo Ridge would meet High Scenic Integrity, which correlates to Retention under VMS, on the Highway 143 approach to Brian Head Town from Cedar Breaks National Monument.

Interconnect Options 3B and 3C
Both options would create similar visual alterations to the landscape. Either option would be visible as a foreground view from Highway 143 and homes and lodging on the south end of Brian Head Town. crossing the steep slope that is visually prominent above the south end of the community. Additional trails would be cleared on this slope face. The vegetation tends to be low density in the areas where additional ski runs are proposed, so that possibility of blending these runs into the existing landscape is improved.

Expanding Equipment Yard, Snow Cat Barn and Employee Parking
The current maintenance yard is well sited, so that it is not visible from Highway 143 or the Brian Head Overlook. It is possible that expansion of this facility will be visible from the highway and especially from Brian Head Overlook. If this occurs, this facility may not meet Low Scenic Integrity (which correlates to Modification specified in the DNFLRMP), due to the increased contrast from the parking area and additional service roads required by this area.

Seasonal Emphasis Opportunities
The anticipated locations of proposed seasonal emphasis opportunities were not disclosed in the Brian Head Master Development Plan. It is assumed the following items may be located on National Forest Lands: a snow play venue, snowmobile tours, sleigh rides, a nordic ski track and shelter system, a mountain bike venue, equestrian trails and horse drawn wagon rides, a summer trails and shelter system, interpretive trails with signage, and an alpine slide or similar venue.

The trails activities (snowmobile tours, sleigh rides, a nordic ski track and shelter system, equestrian trails, summer trails including interpretive trails) would have low visual impacts when specified mitigation is followed. A snow play venue with limited development would have low visual impacts. The addition of a tow lift and additional clearing would increase those impacts. If a mountain bike venue incorporated elements beyond traditional trails, additional analysis would be necessary to assess impacts.

Of the seasonal emphasis opportunities, the alpine slide or similar venue has the greatest potential for visual impacts. This would likely be located in an existing ski trail, accessing the top terminal of a lift. If it were located in a prominent run, such as Giant Steps Lift 2 lift line, it may be very visible from Highway 143 and locations in Brian Head Town. An alpine slide could create a highly visible, unnatural, linear element within a visible clearing. There is insufficient information in the proposed Master Development Plan to adequately analyze the visual impacts of an alpine slide.

Indirect Effects
Indirect effects (the effects of elements proposed for private land in the Master Development Plan) would impact the scenic resource. This includes trail modifications to portions of Giant Steps Lift 2 on private land, increased parking near Highway 143, golf driving range, relocation of lower terminal of Navajo Lift 4, Hotel Lift 9, an ice skating rink, a snow play venue and an alpine slide or similar venue. If all developments comply with Brian Head Town’s Design Guidelines as specified in the Master Development Plan, the visual impacts should be subordinate to the surrounding landscape. The appearance of these elements increases the visual prominence of human modification and the visual presence of development to those in Brian Head Town and travelers on Highway 143.

The skier bridge that is associated in the construction of Shoshone Lift 1 will be visible in the foreground and immediate foreground from Highway 143 and will be a prominent visual element. This bridge will be approximately 25 feet high and have a span of up to 300 feet to meet Utah Department of Transportation clearances and acceptable slopes for returns to the bottom terminal. The MDP specifies that the bridge will be about 60 feet wide. Shoshone Lift 1 may also cross the highway at this point, adding additional vertical presence to the bridge, approximately 40 feet overall height. The bridge and lift will also be visible as middleground from the overlook at Brian Head peak and many locations in the town.

The resort has indicated that the Vegetation and Hydrology plans will also be implemented on private land. This will improve visual quality, by decreasing the contrast of the areas with exposed soil were revegetation has not been successful on the lower areas of Giant Steps Lift 2 and the existing runs that are associated with Shoshone Lift 1.

SOCIAL/ECONOMIC
During the scoping process, several items of concern were mentioned related to the socioeconomic environment at Brian Head. As mention in Section III, these concerns did not meet the definition of a true issue in that they did not constitute an unresolved conflict with the proposed action. Also, because socioeconomic issues did not emerge, the response to socioeconomic principles will be in rather broad terms but adequate enough to identify general environmental consequences.
ALL ALTERNATIVES

DIRECT/INDIRECT EFFECTS

Although the effects of implementing the Proposed Action or alternatives have differences as far as the winter activities of Brian Head are concerned, one common element is that they all provide opportunities for Brian Head Resort to expand into a quality, year round resort. The infrastructure needed to provide more opportunities in the spring/summer/fall seasons are now in place or could be accomplished with the minor additions needed as a part of any of the Proposed Action or any of the alternatives. Each has the potential to sustain or increase the visitation to Brian Head as was recommended in the Brian Head Town Master Plan.

PROPOSED ACTION - BRIAN HEAD RESORTS PROPOSAL

DIRECT/INDIRECT EFFECTS

Infrastructure changes would occur which would increase the capacity of the ski lifts to accommodate up to 250,000 skier visits per year. This increase in visitation would not only add employment simply because there are more lift facilities to operate but the lodging, food, and other services in both Brian Head and other communities in Iron County would have increased business. All of this would have the effect of adding jobs and additional dollars circulating in the economy. The ability of Brian Head Resort to attract not only more but also a higher level of skier will be enhanced due to the greater availability of advanced terrain. Because the interconnects and Lift 1 will be accomplished in the first phase, the businesses at the south end of Brian Head would, once again, have greater potential markets.

CUMULATIVE EFFECTS

The cumulative effects related to socioeconomic impacts would, generally speaking, be positive. The business climate in not only Brian Head but also in other parts of Iron County would be stimulated. As numbers of visitors increase the demand on public services such as law enforcement, roads, and emergency services would also increase.

NO ACTION - CURRENT MANAGEMENT

DIRECT/INDIRECT EFFECTS

Probably the most noticeable effect to the community of Brian Head under this alternative would be that the balance of business opportunity that has existed since Chair 1 was removed, would not be restored or dealt with in any way. There would still be opportunity for growth in skier days simply because lifts are not now operating at capacity. The possibility to increase marketing appeal by adding more advanced skiing would not be fulfilled under this alternative. Summer business could continue to grow.

CUMULATIVE EFFECTS

The ripple effect that is felt in service based economies when one segment of the economy grows would not be as far reaching because, without more advanced skiing terrain offered, the ability of Brian Head Resort to effectively market is limited

ALTERNATIVE A - INTEGRATED ALTERNATIVE

DIRECT/INDIRECT EFFECTS

The effects of this alternative are very similar to those of the Proposed Action. A balance of business opportunity would be returned to Brian Head Town in the early phase of the implementation. Additional intermediate and advance ski runs would be added which would provide for greater marketing strength. While this alternative omits the inclusion of the Bowl Lift, it does not preclude its consideration at a later date. It also allows for the continuation of cat skiing in the chutes and bowl off the top of Brian Head Peak. The goal of 250,000 skier days per year could be realized and a healthy business structure that would enhance both Brian Head Town and Iron County could be fostered.

CUMULATIVE EFFECTS

Cumulative effects are the same as those for the Proposed Action.
HERITAGE RESOURCES

ALL ALTERNATIVES

DIRECT AND INDIRECT EFFECTS

Within the proposed permit area three archaeological surveys have been conducted since 1972. A total of 180 acres have been intensively surveyed and 3 sites have been recorded, these have been determined to be eligible for the National Register of Historic Places. These Historic Properties will be avoided by the proposed Bowl Lift, Chair 1 and the Interconnect development projects. Brian Head Resort has acquired the services of a private archaeological firm to completely survey the proposed expansion of the permit area (738 acres). This has not been completed but is scheduled for the summer of 1997. Those areas where sites identified as being Historic Properties and eligible for the National Register of Historic Properties will be avoided by all future development activities within the permit area. Proposed development projects will be redesigned to avoid those sites or mitigation measures will be developed on a case by case basis.

The Dixie National Forest has adhered to all federal and state laws concerning the protection of Heritage Resources within in the boundary of the Brian Head Resort Master Development Plan project.

CUMULATIVE EFFECTS

Cumulative effects for Heritage Resources are the same as described above.

ENGINEERING

PROPOSED ACTION - BRIAN HEAD RESORT PROPOSAL

Direct effects of the proposed action are related to the engineering and construction practices required to minimize environmental impacts, while assuring public safety during the construction of the roads, lifts, mountain restaurant, snowmaking facilities, trail construction, and vehicle parking facilities as implemented. Effects of the proposed road reclamation is primarily hydrologic and will be disclosed in other resource sections. Each of the proposed projects which would require engineering and/or construction expertise are discussed in the following subheadings.

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Rocks - Degradation on the Brian Head Peak road is currently so fast that maintenance can not keep up, creating a direct effect to user comfort, safety, and road stability.

Approximately 0.2 miles of new road construction on National Forest land roads is proposed to provide access to the Bowl Lift 8A, and the Shoshone Lift 1. New construction is 0.1 miles of additional access road for each lift. Direct effects of the road construction are the clearing of trees and other vegetation, and ground disturbance.

Indirect and cumulative effects would be upon hydrology of the watershed and to open road density. These effects will be disclosed in other resource sections.

Existing roads may be indirectly and cumulatively effected by increases in vehicle traffic if more people are attracted to the Resort. An increase in vehicle traffic is not anticipated as a result of additional road construction at the end of access roads. Safety of vehicular traffic on the BHPR is a prime concern especially as an increase in use creates a corresponding degradation of road conditions affecting user safety. Vehicle traffic on FSR 304 under Shoshone lift 1 after installation is a concern due to the hazards of overhead cables and chairs crossing the road. The safety of visitors at the historic Brian Head Overlook during lighting is also a concern. Increased use of roads and trails will also increase required maintenance of current and the need for construction of new toilet facilities.

Ski Lifts - A total of 3 new lifts and the replacement and upgrade to 3 existing lifts are proposed. Direct effects of the construction proposed is the life/safety issue related to proper installation of the lifts.

Indirect and cumulative effects of constructing the new lifts would be an increased volume of traffic on the road and trail infrastructure in the area. Due to a lack of studies it is impossible at this time to judge what the increase would be. Both Utah Department of Transportation (UDOT) and Forest Service traffic counts were investigated. Phone conversations with UDOT found data readily available only as far back as 1994. It is impossible to make assumptions attributable to use until more data is accumulated, but as use of roads and trails increases, increased degradation of surface condition can be expected. Thus increased maintenance to road and trail surfaces can be expected.

Highway 143 Skier Bridge - This facility is planned for construction on private land and/or State of Utah Road 143 right-of-ways. Direct effects of construction will be limited to private and/or State lands.

Indirect and cumulative effects will be limited to visual impacts of the bridge to travelers accessing National Forest lands, and will be discussed in other resource sections.

Chapter 4 Environmental Consequences

4 - 104
**Operation and Maintenance Buildings** - Direct effects are limited to construction of additional parking spaces, shed, and equipment storage area.

Indirect and cumulative effects are limited to the visual impacts of the bridge to travelers accessing National Forest lands, and will be discussed in other resource sections.

**Snowmaking** - 40 acres of additional snowmaking is proposed. The direct effects are related to the construction of new water and utility lines to facilitate manmade snow production.

Indirect and cumulative effects are discussed in other resource sections.

**Base Lodges, Restaurants & Other Buildings** - The BHMDP proposes various redevelopment projects including additional restaurants in two of the existing facilities, and construction of a new restaurant on National Forest land at the top of lifts 2 and 7.

The direct effects of constructing a new restaurant, are the disturbance required to construct footings and foundation, install utilities, provide access to the building, to ensure proper drainage around the structure, and increased vehicle use of the access road to lifts 2 and 7.

An indirect and cumulative effect of the mountain restaurant is the attraction of a greater number of guests to the area. The greater number of guests adds to the toilet facilities needed in surrounding recreation areas to accommodate the increased use.

Other indirect and cumulative effects are discussed in other resource sections.

**Parking** - The BHMDP indicates the need for 135 additional vehicle parking spaces to accommodate use. The direct effects of these parking facilities is disturbance to the area of construction. The construction does not directly effect National Forest land as the parking will be entirely on Private land.

Indirect and cumulative effects are primarily hydrologic and will be discussed in other resource sections.

**Seasonal Emphasis and Opportunities** - The direct effect of these activities both winter and summer is to increase the number of guests to the resort, which will likely result in an increase of vehicular traffic.

Indirect and cumulative effects will be discussed in other resource sections.
NO ACTION - CURRENT MANAGEMENT

DIRECT, INDIRECT, AND CUMULATIVE EFFECTS

Direct effects are related to the engineering and construction practices required to minimize environmental impacts and assuring public safety during the construction of parking lots and upgrading of ski lifts. Effects of the proposed road reclamation is primarily hydrologic and will be disclosed in other resource sections. Each of the proposed projects which would require engineering are discussed in the following subheadings.

Roads - Degradation on the Brian Head Peak road is currently so fast that maintenance cannot keep up, creating a direct effect to user comfort, safety, and road stability.

Existing roads will be indirectly and cumulatively affected by increases in vehicle traffic as more people are attracted to the Resort. Safety of vehicular traffic on the BHPR is a prime concern especially as an increase in use creates a corresponding degradation of road conditions affecting user safety. Safety of visitors at the historic Brian Head Overlook during lightning is also a concern. Increased use of roads and trails will also increase required maintenance of current and construction of new toilet facilities.

Indirect and cumulative effects are primarily hydrologic and will be discussed in other resource sections.

Ski Lifts - Upgrade to 3 existing lifts are proposed. Direct effects of the construction proposed is the life/safety issues of proper installation of the lifts themselves. Indirect and cumulative effects will be discussed in other resource sections.

Snowmaking - Reentry into areas where current snowmaking facilities exist must be minimized to mitigate adverse hydrologic effects to the watershed. These effects will be discussed in other resource sections.

Base Lodges, Restaurants & Other Buildings - The BHMDP proposes various redevelopment including additional restaurants in two of the existing facilities. The redevelopment is all within private land so no direct effects to National Forest Land are recognized.

Indirect or Cumulative effects would be an increase in vehicle traffic attributed to improved facilities at the Resort, and increased marketing by the Resort.

Parking - The Resort indicates the need for 135 additional vehicle parking spaces to accommodate use. The direct effects of these parking facilities is disturbance to the area of construction.

The construction does not directly affect National Forest land as it is entirely on Private land.

Indirect and cumulative effects are primarily hydrologic and will be discussed in other resource sections.

Seasonal Emphasis and Opportunities - The direct effect of these activities both winter and summer is to increase the number of guests to the resort. An increase in guests results in an increase of vehicular traffic.

ALTERNATIVE A - INTEGRATED ALTERNATIVE

DIRECT, INDIRECT, AND CUMULATIVE EFFECTS

Direct effects of the proposed action are related to the engineering required to minimize environmental impacts, and assuring public safety during the construction of roads, lifts, trail construction, and vehicle parking facilities as implemented. Effects of the proposed road reclamation is primarily hydrologic and will be disclosed in other resource sections. Each of the proposed projects which would require engineering and/or construction expertise are discussed in the following subheadings.

Roads - Degradation on the Brian Head Peak road is currently so fast that maintenance cannot keep up, creating a direct effect to user comfort, safety, and road stability.

Approximately 0.1 miles of new road construction on National Forest land roads is proposed to provide access to the Shoshone Lift 1. An increase in vehicle traffic is not anticipated due to additional road construction at the end of access roads. Direct effects of the road construction are the clearing of trees and other vegetation, and ground disturbance.

Existing roads will be indirectly and cumulatively affected by increases in vehicle traffic as more people are attracted to the Resort. Safety of vehicular traffic on the BHPR is a prime concern especially as an increase in use creates a corresponding degradation of road conditions affecting user safety. Vehicle traffic on ESR 304 under Shoshone lift 1 after installation is a concern due to the hazards of overhead cables and chairs crossing the road. The safety of visitors at the historic Brian Head Overlook during lightning is also a concern. Increased use of roads and
trails will also increase required maintenance of current and the need for construction of new toilet facilities.

Other indirect and cumulative effects would be upon hydrology of the watershed and to open road density. These effects will be disclosed in other resource sections.

**Ski Lifts** - A total of 2 new lifts and the replacement and upgrade to 3 existing lifts are proposed. Direct effects of the construction proposed is the life/safety issues of proper installation of the lifts.

Indirect and cumulative effects of constructing the new lifts could be an increased volume of traffic on the road and trail infrastructure in the area. Due to a lack of studies it is impossible at this time to judge what the increase would be. Both Utah Department of Transportation (UDOT) and Forest Service traffic counts were investigated. Phone conversations with UDOT found data was readily available only as far back as 1994. It is impossible to make assumptions attributable to use until more data is accumulated. As use of the roads and trails increase, increased degradation of surface condition can be expected. Thus increased maintenance to road and trail surfaces can be expected. Another cumulative effect of increased use of roads and trails would be an increase in the maintenance of current and construction of new toilet facilities.

**Snowmaking** - Reentry into areas where current snowmaking facilities exist must be minimized to minimize hydrologic effects to the watershed. These effects will be discussed in other resource sections.

**Highway 143 Skier Bridge** - This facility is planned for construction on private land and/or State of Utah Road 143 right-of-ways. Direct effects of construction will be limited to private and/or State lands.

Indirect and cumulative effects be limited to visual impacts of the bridge to travelers accessing National Forest lands.

**Operation and Maintenance Buildings** - Direct effects are limited to construction of additional parking spaces, shed, and equipment storage area.

Indirect and cumulative effects will be discussed in other resource sections.

**Base Lodges, Restaurants & Other Buildings** - The BHMDP proposes redevelopment of two additional restaurants in two of the existing facilities. The redevelopment is all within private land so no direct effects to National Forest Land are recognized.

Indirect or Cumulative effects will be an increase in vehicle traffic attributed to improved facilities at the Resort, and future marketing by the Resort.

**Parking** - The BHMDP indicates the need for 135 additional vehicle parking spaces to accommodate use. The direct effects of these parking facilities is disturbance to the area of construction. The construction does not directly effect National Forest land as the parking will be entirely on Private land.

Indirect and cumulative effects are primarily hydrologic and will be discussed in other resource sections.

**Seasonal Emphasis and Opportunities** - The direct effect of these activities both winter and summer is to increase the number of guests to the resort. A direct effect of an increase in guests is an increase in vehicular traffic.

## FOREST PLAN CONSISTENCY

As disclosed in Chapter 1, this EA is tiered to the Final Environmental Impact Statement for the Dixie National Forest Land and Resource Management Plan (DNFLRMP), and the Dixie National Forest Land and Resource Management Plan (DNFLRMP). It documents the analysis in the second level of planning. Changes in land use designation which have been established in the DNFLRMP were not evaluated in this analysis, except for the boundary correcting in MA 1B, 10B, and 2B. This corrected effected 56 acres.

In the DNFLRMP, the National Forest lands within the Dixie National Forest has been divided into Management Areas which differ from each other in resource emphasis. The Management Areas that fall within the Brian Head project area were fully disclosed in Chapter 1 of this EA; spatial locations of these Management Areas within the Brian Head project area can be found in Appendix 6 of this EA.

A detailed discussion of DNFLRMP standard and guideline consistent for each resource area can be found in each resource report located in the Project File.

Disclosure within this EA and project file resources reports clearly display that implementation of the Proposed Action, or action alternatives to the Proposed Action, including their specific mitigation, would be consistent with DNFLRMP standards and guidelines, goals and objectives, and desired future conditions.
219.27(b)(5): “Avoid permanent impairment of site productivity and ensure conservation of soil and water resources.”

SWCPs implemented in project design and other mitigation measure (Design Features) would result in av/dance of impairment of site productivity and ensure conservation of soil and water resources.

219.27(b)(6): “Provide the desired effects on water quantity and quality, wildlife and fish habitat ... and other resource yields”

Refer to Hydrology report and Hydrology section in Chapter 4.

219.27(b)(7): “Be practical in terms of transportation and harvesting requirements, and total cost of preparation, logging, and administration.”

This project is designed to meet objectives of the Brian Head Ski Resort, Inc. Any trees designated to be removed will be sold to the resort or a commercial operator.

Silvicultural Practices

219.27(c)(1): “No timber harvesting shall occur on lands classified as not suited for timber production pursuant to 219.14 except for salvage sales ... These lands shall continue to be treated for reforestation purposes if necessary to achieve the multiple-use objectives of the plan.”

Lands in the project area are considered to be withdrawn from the suitable land base and would be considered as developed for non-forest use.

219.27(c)(2): “The selected sale schedule provides the allowable sale quantity for the first planning period. Within the planning period, the volume of timber to be sold in any one year may exceed the annual allowable sale quantity so long as the total amount does not exceed the allowable sale quantity. Nothing in this paragraph prohibits salvage or sanitation harvesting of timber stands which are substantially damaged by fire, windthrow, or other catastrophe, or which are in imminent danger of insect or disease attack and where such harvests are consistent with silvicultural and environmental standards. Such timber may either substitute for timber that would otherwise be sold under the plan or, if not feasible, be sold over and above the planned volume.”

Volume to be sold under the Proposed Action or other Action Alternatives would NOT contribute to the allowable sale quantity (ASQ) for the first planning period for the DNFLRMP since the area is classified as unsuited for timber harvest.
219.27 (c)(3): "When trees are cut to achieve timber production objectives, the cuttings shall be made in such a way as to assure that the technology and knowledge exists to adequately restock the lands within 5 years after final harvest. Research and experience shall be the basis for determining whether the harvest and regeneration practices planned can be expected to result in adequate restocking...."

Timber production was not part of any of the Alternatives evaluated in this analysis.

219.27 (c)(4): "Cultural treatments such as thinning, weeding and other partial cutting may be included in the forest plan where they are intended to increase the rate of growth of remaining trees, favor commercially valuable tree species, favor species age classes which are most valuable for wildlife, or achieve other multiple-use objectives."

These types of treatments are not part of the alternatives evaluated in this analysis.

219.27 (c)(5): "Harvest levels based on intensified management practices shall be decreased no later than the end of each planning period if such practices cannot be completed substantially as planned."

This applies to Forest Plan level decisions, not to project level decisions.

219.27(c)(6): "Timber harvest cuts designed to regenerate an even-aged stand of timber shall be carried out in a manner consistent with the protection of soil, watershed, fish resources, and the regeneration of the timber resource."

No even-aged treatments are proposed under the alternatives evaluated in this analysis.

219.27(c)(7): "Timber harvest and other silvicultural treatments shall be used to prevent potential damaging population increases of forest pest organisms. Silvicultural treatments shall not be applied where such treatments would make stands susceptible to pest-caused damage levels inconsistent with management objectives."

No stand treatment silvicultural prescriptions are being evaluated as part of this analysis. The Resort will prepare as Vegetation Management Plan to address long term needs and desired conditions for each timber stand. Stand health, over the long term, will be an important part of these prescriptions.

Chapter 4 Environmental Consequences

Even-Aged Management

Optimization of Clear cutting: The National Forest Management Act states that Clear cutting is to be used on National Forest System lands only where it is determined to be the optimum method.

The Dixie National Forest has interpreted this requirement to mean that Clear cutting would be used only where it is consistent with the DNFLRMP standards and guidelines, and where it would accomplish Forest Plan objectives that cannot be accomplished through other harvest methods.

Clear cutting would be used under the Proposed Action or Alternative A to create additional ski runs. This is the only harvest method that will meet the desired conditions, especially in Beginner ski terrain. In advanced terrain, gladed skiing will be the desired condition. This would leave some tree ever.

Appropriateness of even-aged management: The National Forest Management Act (NFMA) places special requirements on the use of even-aged silviculture systems on National Forest Systems lands. This is contained in NFMA (16 USC 1604 (g)(3), (F) and (i)) which states that "cuts designed to regenerate an even-aged stand of timber would be used as a cutting method...only where...such cutting is determined to be appropriate, to meet the objectives and requirements of relevant land management plan."

The objective of Clear cutting under the Proposed Action or Alternative A is not to achieve regeneration.

219.27 (d)(1): "Openings shall be located to achieve the desired combination of multiple-use objectives...Regional Guides shall provide guidance on dispersion of openings... As a minimum, openings in forest stands are no longer considered openings once a new forest is established. Forest plans may set forth variations to this minimum based on site-specific requirements for achieving multiple-use objectives... Regional guides shall provide guidance for determining variations to this minimum in the forest plan...."

Refer to the discussion under 219.27 (d)(2), below.

219.27 (d)(2): "Individual cut blocks, patches, or strips shall conform to the maximum size limits for areas to be cut in one harvest operation established by the regional guide... This limit may be less than, but will not exceed... 40 acres for all other forest types except as provided in paragraphs (d)(2)(i) through (iii) of this section. (i) Cut openings larger than those specified may be permitted where larger units will produce a more desirable combination of net public benefits... (ii) Size limits exceeding those established in paragraphs (d)(2) and (d)(2)(i) of this..."
section are permitted on an individual timber sale basis after 60 days' notice and review by the Regional Forester ... (iii) The established limit shall not apply to the size of areas harvested as a result of natural catastrophic condition such as fire, insect and disease attack, or windstorm."

No openings created as part of the Proposed Action or Alternative A would exceed 40 acres.

The definition of an opening, according to the DNFLRMP S&G (E03, 06 and 07 (IV-65 thru 67). Based on this S&G, for management purposes, a cut-over area is considered an opening until:

1. Forage and/or browse production drops below 40 percent of potential production;
2. Deer and elk hiding cover reaches 60 percent of potential;
3. Minimum stocking standards by forest cover type and site productivity are met; and
4. The area appears as a young forest rather than a restocked opening, and takes on the appearance of the adjoining characteristic landscape.

WILDLIFE

219.27(a)(8). "Include measures for preventing the destruction or adverse modification of critical habitat for threatened and endangered species."

As discussed in Chapter 3 WILDLIFE and VEGETATION; Threatened, Endangered and Proposed Species, there is no habitat designated on the Dixie National Forest as critical for any threatened, endangered or proposed species.

As discussed in Chapter 3 WILDLIFE; Threatened, Endangered and Proposed Species, there is habitat for proposed or listed species in the analysis area; Peregrine falcon, bald eagle, and Mexican spotted owl.

Chapter 4, WILDLIFE section, Threatened, Endangered and Proposed Species subsection discloses all potential effects to peregrine falcon, bald eagle, and Mexican spotted owl. Mitigation measures to avoid adverse effects are discussed under Features Common to All Alternatives; Project Design Features.

219.27(b)(6). "Provide the desired effects on water quality and quantity, wildlife and fish habitat...and other resource yields."

The WILDLIFE section of the Environmental Consequences section for each alternative show that the desired effects to wildlife habitat would not be obtained with the alternatives due to the safety concerns and development in the area.

219.27(g). "Management prescriptions, where appropriate and to the extent practicable, shall preserve and enhance the diversity of plant and animal communities...".

Diversity of wildlife species as described for Threatened, Endangered, Proposed, Sensitive and MIS will be not always be met under the Proposed Action and all action alternatives due to safety concerns and development. The Vegetation Management plan will incorporate providing for the diversity of plant and animal communities to the extent practicable.

FISHERIES

219.27 (a)(4): "Protect streams, streambanks, lakes, wetlands...

Numerous SWCP's are designed specifically to protect these resources. Refer to the SWCP's in Soil/Hydrology, 2-7 through 2-23.

219.27 (a)(6): "Provide for adequate fish habitat to maintain viable populations of existing native vertebrate species...consistent with multiple-use objectives established in the plan."

Analysis in Chapter 4 shows that existing fish habitat should not be degraded with the implementation of any action alternative. The SWCP's are designed to reduce the potential for on site soil erosion and sediment transport which would protect water quality and instream fish habitat.

219.27 (c): "Special attention shall be given to land and vegetation for approximately 100 feet from the edges of perennial streams, lakes, and other bodies of water...No management practices causing detrimental changes in water temperature or chemical composition...or deposits of sediment shall be permitted within these areas that will seriously and adversely affect water conditions or fish habitat".

The SWCP's are designed to minimize the potential for sediment to enter the streams.
AIR QUALITY

219.27 (a)(12): “Be consistent with maintaining air quality at a level that is adequate for the protection and use of National Forest System resources and that meets or exceeds applicable Federal, State and/or local standards or regulations.”

Mitigation measures will ensure that air quality standards are maintained (refer to the air quality discussion item 4 and 5). Prior to any prescribed burning, the District Fire Management Officer will contact adjacent landowners, the town of Brian Head, and Cedar Breaks National Monument. Burn days will occur only when Utah State Division of Air Quality certifies an adequate Clearing Index for the area.

ENDANGERED SPECIES ACT OF 1973, AS AMENDED

Based on Discussions in Chapters 2 and 4 concerning threatened, endangered and proposed plant and wildlife species; correspondences with US Fish and Wildlife Service; and detailed discussions contained in the Biological Assessment located in the project file, it has been determined that there would be no adverse effects to populations of threatened, endangered wildlife or plant species relative to the Proposed Action or any alternative.

CLEAN WATER ACT

The Clean Water Act (CWA) requires each state to implement its own water quality standards. The State of Utah’s Water Quality Antidegradation Policy requires maintenance of water quality to protect existing instream Beneficial Uses on streams designated as Category 1 High Quality Waters. All surface waters geographically located within the outer boundaries of the Dixie National Forest, whether on private or public lands are designated as High Quality Waters (Category 1). This means they will be maintained at existing high quality. New point sources will not be allowed, and non-point sources will be controlled to the extent feasible through implementation of Best Management Practices (BMP’s) or regulatory programs (Utah Division of Water Quality 1994). The State of Utah and the Forest Service have agreed through a 1993 Memorandum of Understanding to use Forest Plan Standards & Guidelines and the Forest Service Handbook (FSH) 2509.22 Soil and Water Conservation Practices (SWCP’s) as the BMP’s. The use of SWCP’s in the BMP’s meet the water quality protection elements of the Utah Nonpoint Source Management Plan.

The Beneficial Uses and High Quality of water in Parowan Creek would be maintained during and following project implementation through the proper implementation of BMP’s (SWCP’s) as described in Chapter 2 (Mitigation).

EXECUTIVE ORDER 11990 OF MAY 24, 1977

This order requires the Forest Service to take action to minimize destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands. In compliance with this order, Forest Service direction requires that an analysis be completed to determine whether adverse impacts would result.

The location of wetlands in the Project Area were identified in the delineation and inventory of critical watersheds areas. No ground disturbing activities will occur within 50 feet of any wetland, seep, or spring. These areas have been identified on the critical watershed map. Impacts from adjacent or nearby areas will be prevented through implementation of SWCP’s as described in Chapter 2 (Mitigation). With a 50 foot buffer area around wetlands, seeps, or springs and implementation of SWCP’s, any of the alternatives would be in compliance with Executive Order 11990.

EXECUTIVE ORDER 11988 OF MAY 24, 1977

This order requires the Forest Service to provide leadership and to take action to (1) minimize adverse impacts associated with occupancy and modification of floodplains and reduce risks of flood loss, (2) minimize impacts of floods on human safety, health, and welfare, and (3) restore and preserve the natural and beneficial values served by flood plains. In compliance with this order, the Forest Service requires an analysis be completed to determine the significance of proposed actions in terms of impacts to flood plains.

The streams within the project area are intermittent and ephemeral with no substantial floodplain areas. No ground disturbing activities will be allowed within 50 feet of any intermittent or ephemeral channel. Therefore any of the proposed alternatives will be in compliance with Executive Order 11988.

CLEAN AIR ACT AS AMENDED IN 1977

Based on discussions in item 3 and 5 concerning air quality, it has been determined that there would be no measurable effects to air quality in Class I or II airsheds relative to any of the alternatives.

Based on the discussions in Chapters 3 and 4 concerning Heritage Resource, and project file documentation, it has been determined that there will be no measurable effects to any Historic Properties relative to any of the alternatives.

PLANS AND POLICIES OF OTHER JURISDICTIONS

As evidenced from responses to scoping, and other public involvement solicitations, no conflicts have been identified between the objectives of other Federal, state, and local governments and Indian tribes, and the Proposed Action or Action Alternatives. Nor have any been identified relative to No Action.

MONITORING PLAN

Monitoring Plans, which would be part of the Project Action, or any Action Alternative to the Proposed Action, have been prepared. These plans include the item to be monitored, frequency of monitoring, person responsible, and project costs. The monitoring plans are located in the Project File.

CHAPTER 5 - LIST OF PREPARERS

The following individuals were members of the Interdisciplinary Team or provided technical support. Their credential are located in the Project File.

INTERDISCIPLINARY TEAM MEMBERS

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TECHNICAL SUPPORT:

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Marian Jacklin  Forest Archaeologist  
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Laurie Parry  Zone GIS Assistant  
Arlene Heap  SUEG Data Base Manager  
Dale Harris  District Range Conservationist  
Randy Davis  District Forestry Technician  
Trina Lowry  District Forestry Technician  
Nicole Redd  Resort Naturalist  
Robyn Whitaker  Intern/trainee  

Chapter 6--LITERATURE CITATIONS


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Staats, J. 1994. Letter to Randy Hayman documenting a visit to Duck Creek with Mike Van Dyke and Keith Stansworth, watershed concerns and recommended Best Management Practices for Duck Creek Campground Pesticide Project. May 6, 1994. This letter can be found in the Duck Creek Campground Spray project analysis folder at the Cedar City Ranger District office, Cedar City, Utah.


GLOSSARY

50-11-40 Rule- Criteria used to measure suitable Mexican spotted owl habitat; 50% of the forested stands containing an average tree diameter of 11 inches and 40% crown closure.

abiotic- Non-living. Climate is an abiotic component of ecosystems.

adaptive management- A type of natural resource management that implies making decisions as part of an on-going process. Monitoring the results of actions will provide a flow of information that may indicate the need to change a course of action. Scientific findings and the needs of society may also indicate the need to adapt resource management to new information.

aerial logging- Removing logs from a timber harvest area by helicopter. Fewer roads are required, so the impact to an area is minimized.

affected environment- The natural environment that exists at the present time in an area being analyzed.

age class- An age grouping of trees according to an interval of years, usually 20 years. A single age class would have trees that are within 20 years of the same age, such as 1-20 years or 21-40 years.

airshed- A geographic area that shares the same air.

allotment (range allotment)- The area designated for use by a prescribed number of livestock for a prescribed period of time. Though an entire Ranger District may be divided into allotments, all land will not be grazed, because other uses, such as recreation or tree plantings, may be more important at a given time.

anadromous fish- Species of fish that mature in the sea and migrate into streams to spawn.

aspect- The direction a slope faces. A hillside facing east has an eastern aspect.

ASQ (allowable sale quantity)- The amount of timber that may be sold within a certain time period from an area of suitable land. The suitability of the land and the time period are specified in the Forest Plan.

aquatic macroinvertebrates- Invertebrates living within aquatic systems that are large enough to be seen with the naked eye (e.g. most aquatic insects).

aquifer- A body of rock that is saturated with water or transmits water. When people drill wells, they tap water contained within an aquifer.

AUM (animal unit month)- The quantity of forage required by one mature cow and her calf (or the equivalent, in sheep or horses, for instance) for one month.

bark beetle- An insect that bores through the bark of forest trees to eat the inner bark and lay its eggs. Bark beetles are important killers of forest trees.

basal area- The area of the cross section of a tree trunk near its base, usually 4 and 1/2 feet above the ground. Basal area is a way to measure how much of a site is occupied by trees. The term basal area is often used to describe the collective basal area of trees per acre.

big game- Large mammals, such as deer, elk, and antelope that are hunted for sport.

biological control- The use of natural means to control unwanted pests. Examples include introduced or naturally occurring predators such as wasps, or hormones that inhibit the reproduction of pests. Biological controls can sometimes be alternatives to mechanical or chemical means.

biological diversity- The number and abundance of species found within a common environment. This includes the variety of genes, species, ecosystems, and the ecological processes that connect everything in a common environment.

biomass- The total weight of all living organisms in a biological community.

biome- The complex of living communities maintained by the climate of a region and characterized by a distinctive type of vegetation. Example of biomes in North America include the tundra, desert, prairie, and the western coniferous forests.

biota- The plant and animal life of a particular region.

biotic- Living. Green plants and soil microorganisms are biotic components of ecosystems.

BMP (Best Management Practices)- Practices designed to prevent or reduce water pollution. Also, referred to as Soil and Water Conservation Practices (SWCPs).

board foot- A measurement term for lumber or timber. It is the amount of wood contained in an unfinished board 1 inch thick, 12 inches long, and 12 inches wide.
broadcast burn- A prescribed fire that burns a designated area. These controlled fires can reduce wildfire hazards, improve forage for wildlife and livestock, or encourage successful regeneration of trees.

browse- Twigs, leaves, and young shoots of trees and shrubs that animals eat. Browse is often used to refer to the shrubs eaten by big game, such as elk and deer.

buffer- A land area that is designated to block or absorb unwanted impacts to the area beyond the buffer. Buffer strips along a trail could block views that may be undesirable. Buffers may be set aside next to wildlife habitat to reduce abrupt change to the habitat.

cable logging- Logging that involves the transport of logs from stump to collection points by means of suspended steel cables. Cable logging reduces the need for the construction of logging roads.

canopy- The part of any stand of trees represented by the tree crowns. It usually refers to the uppermost layer of foliage, but it can be used to describe lower layers in a multi-storied forest.

canopy cover- see cover class.

capture (input)- one of the ways functions are described; resources (organisms, materials, and energy) brought into the system (i.e. photosynthesis, migration onto summer range, pollution brought in by wind or water).

cavity- A hole in a tree often used by wildlife species, usually birds, for nesting, roosting, and reproduction.

chemical control- The use of pesticides and herbicides to control pests and undesirable plant species.

clear cut- A harvest in which all or almost all of the trees are removed in one cutting.

clearing index- Directly related to atmospheric stability, indicating periods of increased potential for ambient pollutant increases. The critical value has been found to be 500; lower values indicate atmospheric stagnation.

climax- The culminating stage in plant succession for a given site. Climax vegetation is stable, self-maintaining, and self-reproducing.

coarse filter management- Land management that addresses the needs of all associated species, communities, environments, and ecological processes in a land area. (See fine filter management.)

collector roads- These roads serve small land areas and are usually connected to a Forest System road, a county road, or a state highway.

common (Class B) landscape- Areas where features contain variety in form, line, color, and texture or combinations thereof, but which tend to be common throughout the character type and are not outstanding in visual quality.

composition- What an ecosystem is composed of. Composition could include water, minerals, trees, snags, wildlife, soil, microorganisms, and certain plant species.

conifer- A tree that produces cones, such as a pine, spruce, or fir tree.

connectivity (of habitats)- The linkage of similar but separated vegetation stands by patches, corridors, or "stepping stones" of like vegetation. This term can also refer to the degree to which similar habitats are linked.

consumptive use- Use of resources that reduces the supply, such as logging and mining.

contour- A line drawn on a map connecting points of the same elevation.

corridor- Elements of the landscape that connect similar areas. Streamside vegetation may create a corridor of willows and hardwoods between meadows where wildlife feed.

cover- Any feature that conceals wildlife or fish. Cover may be dead or live vegetation, boulders, or undercut streambanks. Animals use cover to escape from predators, rest, or feed.

cover class- Represents a percentage range for a fixed area covered by the crowns of plants. It is measured as a vertical projection of the outermost portion of the foliage. Cover class A <40% canopy cover; cover class B = 40-60% canopy cover; cover class C = >60% canopy cover.

cover forage ratio- The ratio of hiding cover to foraging areas for wildlife species.

cover type (forest cover type)- Stands of a particular vegetation type that are composed of similar species. The aspen cover type contains plants distinct from the pinyon-juniper cover type.
creviced opening- An opening in the forest cover created by the application of even-aged silvicultural practices.

critical habitat- Areas designated for the survival and recovery of federally listed threatened or endangered species.

crown closure- see cover class.

crown height- The distance from the ground to the base of the crown of a tree.

cultural resource- The remains of sites, structures, or objects used by people in the past; this can be historical or pre-historic.

cumulative effects - Effects on the environment that result from separate, individual actions that, collectively, become significant over time.

cycling- One of the ways functions are described; resources which are transported within the system (i.e. animal migration, nutrient cycling in a forest stand, snow melt becoming part of the surface or groundwater flow).

DBH (diameter at breast height)- The diameter of a tree 4 and 1/2 feet above the ground on the uphill side of the tree.

decision criteria- The rules and standards used to evaluate alternatives to a proposed action on National Forest land. Decision criteria are designed to help a decision maker identify a preferred choice from the array of alternatives.

decking area- A site where logs are collected after they are cut and before they are taken to the landing area where they are loaded for transport.

DEIS (Draft Environmental Impact Statement)- The draft version of the Environmental Impact Statement that is released to the public and other agencies for review and comment.

desired future condition- Land or resource conditions that are expected to result if goals and objectives are fully achieved.

developed recreation- Recreation that requires facilities that, in turn, result in concentrated use of the area. For example, skiing requires ski lifts, parking lots, buildings, and roads. Campgrounds require roads, picnic tables, and toilet facilities.

dispersed recreation- Recreation that does not occur in a developed recreation site, such as hunting, backpacking, and scenic driving.

distinctive (Class A) landscape- Areas where features of landform, vegetative patterns, water forms, and rock formations are of unusual or outstanding visual quality.

disturbance- Any event, such as forest fire or insect infestations that alter the structure, composition, or functions of an ecosystem.

eyearly forest succession- The biotic (or life) community that develops immediately following the removal or destruction of vegetation in an area. For instance, grasses may be the first plants to grow in an area that was burned.

ecological approach- An approach to natural resource management that considers the relationships among all organisms, including humans, and their environment.

ecology- The interrelationships of living things to one another and to their environment, or the study of these interrelationships.

ecoregion- An area over which the climate is sufficiently uniform to permit development of similar ecosystems on sites that have similar properties. Ecoregions contain many landscapes with different spatial patterns of ecosystems.

ecosystem- An arrangement of living and non-living things and the forces that move among them. Living things include plants and animals. Non-living parts of ecosystems may be rocks and minerals. Weather and wildfire are two of the forces that act within ecosystems.

ecosystem management- An ecological approach to natural resource management to assure productive, healthy ecosystems by blending social, economic, physical, and biological needs and values.

ecotone- The transition zone between two biotic communities, such as between the Ponderosa pine forest type and the mixed conifer forest, which is found at higher elevations than the pine.

ectype- A population of a species in a given ecosystem that is adapted to a particular set of environmental conditions.

edge- The margin where two or more vegetation patches meet, such as a meadow opening next to a mature forest stand, or a ponderosa pine stand next to an aspen stand.
edge effect- the increased richness of plants and animals resulting from the mixing of two communities where they join.

clement (of ecosystems)- An identifiable component, process, or condition of an ecosystem.

endangered species- A plant or animal that is in danger of extinction throughout all or a significant portion of its range. Endangered species are identified by the Secretary of the Interior in accordance with the Endangered Species Act of 1973.

demic plant/organism- A plant or animal that occurs naturally in a certain region and whose distribution is relatively limited geographically.

environmental analysis- An analysis of alternative actions and their predictable long and short-term environmental effects. Environmental analyses include physical, biological, social, and economic factors.

environmental assessment- A brief version of an Environmental Impact Statement. (See Environmental Impact Statement.)

Environmental Impact Statement- A statement of environmental effects of a proposed action and alternatives to it. The EIS is released to other agencies and the public for comment and review.

ephemeral streams- Streams that flow only as the direct result of rainfall or snowmelt. They have no permanent flow.

erosion- The wearing away of the land surface by wind or water.

escape cover- Vegetation of sufficient size and density to hide an animal, or an area used by animals to escape from predators.

even aged management- Timber management actions that result in the creation of stands of trees in which the trees are essentially the same age.

eyrie- a ledge along a cliff used for nesting by peregrine falcons.

fauna- The animal life of an area.

felling- Cutting down trees.

final cut- The removal of the last seed bearers or shelter trees after regeneration of new trees has been established in a stand being managed under the shelterwood system of silviculture.

fine filter management- Management that focuses on the welfare of a single or only a few species rather than the broader habitat or ecosystem. (See coarse filter management.)

fire cycle- The average time between fires in a given area.

fire regime- The characteristics of fire in a given ecosystem, such as the frequency, predictability, intensity, and seasonality of fire.

fisheries habitat- Streams, lakes, and reservoirs that support fish, or have the potential to support fish.

flood plain- A lowland adjoining a watercourse. At a minimum, the area is subject to a 1% or greater chance of flooding in a given year.

flora- The plant life of an area.

forage- All browse and non-woody plants that are eaten by wildlife and livestock.

forb- A broadleaf plant that has little or no woody material in it.

foreground- The part of a scene or landscape that is nearest to the viewer.

forest cover type- See cover type.

Forest Vegetation Simulation- A computer model for timber growth and yield. It projects per acre growth and volume yield for commercial timber stands. Formerly known as "Prognosis".

forest health- A measure of the robustness of forest ecosystems. Aspects of forest health include biological diversity; soil, air, and water productivity; natural disturbances; and the capacity of the forest to provide a sustaining flow of goods and services for people.

Forest Roads and Trails- Roads and trails under the jurisdiction of the Forest Service.
Forest Supervisor- The official responsible for administering National Forest lands on an administrative unit, usually one or more National Forests. The Forest Supervisor reports to the Regional Forester.

fragmentation- The splitting or isolating of patches of similar habitat, typically forest cover, but including other types of habitat. Habitat can be fragmented naturally or from forest management activities, such as clearcut logging.

frost heave- A land surface that is pushed up by the accumulation of ice in the underlying soil.

fuels- Plants and woody vegetation, both living and dead, that are capable of burning.

fuels management- The treatment of fuels that would otherwise interfere with effective fire management or control. For instance, prescribed fire can reduce the amount of fuels that accumulate on the forest floor before the fuels become so heavy that a natural wildfire in the area would be explosive and impossible to control.

Fuel wood- Wood cut into short lengths for burning.

function- All the processes within an ecosystem through which the elements interact, such as succession, the food chain, fire, weather, and the hydrologic cycle.

game species- Any species of wildlife or fish that is harvested according to prescribed limits and seasons.

glacial action.

geomorphic processes- Processes that change the form of the earth, such as volcanic activity, running water, and glacial action.

glaciology- The science that deals with the relief features of the earth's surface.

GIS (geographic information systems)- GIS is both a database designed to handle geographic data as well as a set of computer operations that can be used to analyze the data. In a sense, GIS can be thought of as a higher order map.

ground fire- A fire that burns along the forest floor and does not affect trees with thick bark or high crowns.

ground water- The supply of fresh water under the earth's surface in an aquifer or in the soil.

group selection- A method of tree harvest in which trees are removed periodically in small groups. This silvicultural treatment results in small openings that form mosaics of age class groups in the forest.

habitat- The area where a plant or animal lives and grows under natural conditions.

habitat capability- The ability of a land area or plant community to support a given species of wildlife.

habitat diversity- A number of different types of wildlife habitat within a given area.

habitat diversity index- A measure of improvement in habitat diversity.

habitat type- A way to classify land area. A habitat type can support certain climax vegetation, both tree and undergrowth species. Habitat typing can indicate the biological potential of a site.

hiding area/covev- Vegetation capable of hiding 90% of an adult elk or deer from human's view at a distance of 200 feet or less.

horizontal diversity- The distribution and abundance of different plant and animal communities or different stages of plant succession across an area of land; the greater the numbers of communities in a given area, the higher the degree of horizontal diversity.

hydrologic cycle- Also called the water cycle, this is the process of water evaporating, condensing, falling to the ground as precipitation, and returning to the ocean as run-off.

hydrology- The science dealing with the study of water on the surface of the land, in the soil and underlying rocks, and in the atmosphere.

igneous rock- Rocks formed when high temperature, molten mineral matter cooled and solidified.

indicator species- A plant or animal species related to a particular kind of environment. Its presence indicates that specific habitat conditions are also present.

indigenous (species)- Any species of wildlife native to a given land or water area by natural occurrence.

individual tree selection- The removal of individual trees from certain size and age classes over an entire stand area. Regeneration is mainly natural, and an uneven aged stand is maintained.
induced edge- an edge that results from the meeting of two successional stages or vegetative conditions within a plant community. These can be created by disturbance (i.e. grazing, timber harvest, fire, insect outbreaks).

inherent edge- an edge that results from the meeting of two plant community types. These often result from abrupt changes in soil type, topographic differences, geomorphic differences, and changes in microclimate.

instream flow- The quantity of water necessary to meet seasonal stream flow requirements to accomplish the purposes of the National Forests, including, but not limited to fisheries, visual quality, and recreational opportunities.

integrated pest management- IPM evaluates alternatives for managing forest pest populations, based on consideration of pest-host relationships.

interdisciplinary team- A team of individuals with skills from different disciplines that focuses on the same task or project.

intermediate cut- The removal of trees from a stand sometime between the beginning or formation of the stand and the regeneration cut. Types of intermediate cuts include thinning, release, and improvement cuttings.

intermittent stream- A stream that flows only at certain times of the year when it receives water from streams or from some surface source, such as melting snow.

Intermountain Region- The portion of the USDA Forest Service, also referred to as Region Four, that includes National Forests in Utah, Nevada, southern Idaho, and southwestern Wyoming.

irretrievable- One of the categories of impacts mentioned in the National Environmental Policy Act to be included in statements of environmental impacts. An irretrievable effect applies to losses of production or commitment of renewable natural resources. For example, while an area is used as a ski area, some or all of the timber production there is irretrievably lost. If the ski area closes, timber production could resume; the loss of timber production during the time that the area was devoted to winter sports is irretrievable. However, the loss of timber production during that time is not irreversible, because it is possible for timber production to resume if the area is no longer used as a ski area.

irreversible- A category of impacts mentioned in statements of environmental impacts that applies to non-renewable resources, such as minerals and archaeological sites. Irreversible effects can also refer to effects of actions that can be renewed only after a very long period of time, such as the loss of soil productivity.

key summer range- The portion of a wildlife species' summer range that is essential for the animal's pre, post, and reproduction cycles. Deer require "fawning areas" where does give birth and hide their fawns for an essential period of time in the spring.

key winter range- That portion of big game's range where the animals find food and cover during severe winter weather.

ladder fuels- Vegetation located below the crown level of forest trees which can carry fire from the forest floor to tree crowns. Ladder fuels may be low-growing tree branches, shrubs, or smaller trees.

land class- The topographic relief of a unit of land. Land classes are separated by slope; this coincides with the timber inventory process. The three land classes used in the Forest Plan are defined by the following slope ranges: 0 to 35 percent; 36 to 55 percent; and greater than 55 percent.

landing- Any place where cut timber is assembled for further transport from the timber sale area.

landline- The boundary lines for National Forest land.

landscape- A large land area composed of interacting ecosystems that are repeated due to factors such as geology, soils, climate, and human impacts. Landscapes are often used for coarse grain analysis.

land use planning- The process of organizing the use of lands and their resources to best meet people's needs over time, according to the land's capabilities.

late forest succession- The stage of forest succession in which most of the trees are mature or overmature.

life zone- Areas or "belts" of land that have distinct plant and animal characteristics determined by elevation, latitude, and climate. When ascending a high mountain, you will pass through these life zones. Examples of life zones include the Upper Sonoran, where Cedar City is located and gramma grasses, sagebrush, and scattered pinyon juniper predominate, and the Transition zone, where Ponderosa pine is predominant.

litter (forest litter)- The freshly fallen or only slightly decomposed plant material on the forest floor. This layer includes foliage, bark fragments, twigs, flowers, and fruit.
logging residue (slash)- The residue left on the ground after timber cutting. It includes unutilized logs, uprooted stumps, broken branches, bark, and leaves. Certain amounts of slash provide important ecosystem roles, such as soil protection, nutrient cycling, and wildlife habitat.

M- Thousand. Five thousand board feet of timber can be expressed as 5M board feet.

macro climate- The general, large scale climate of a large area, as distinguished from the smaller scale micro climates within it.

management action- Any activity undertaken as part of the administration of the National Forest.

mass movement/wasting- The down-slope movement of large masses of earth material by the force of gravity. Also called a landslide.

matrix- The least fragmented, most continuous pattern element of a landscape; the vegetation type that is most continuous over a landscape.

mature timber- Trees that have attained full development, especially height, and are in full seed production.

MBF- Thousand Board Feet (See board feet.)

mean annual increment of growth- The total increase in size or volume of individual trees. Or, it can refer to the increase in size and volume of a stand of trees at a particular age, divided by that age in years.

microclimate- The climate of a small site. It may differ from the climate at large of the area due to aspect, tree cover (or the absence of tree cover), or exposure to winds.

middleground- A term used the management of visual resources, or scenery. It refers to the visible terrain beyond the foreground where individual trees are still visible but do not stand out distinctly from the stand.

mineral soil- Soil that consists mainly of inorganic material, such as weathered rock, rather than organic matter.

MIS (management indicator species)- A wildlife species whose population will indicate the health of the ecosystem in which it lives and, consequently, the effects of forest management activities to that ecosystem. MIS species are selected by land management agencies. (See "indicator species").

mission (of the USDA Forest Service)- "To Care for the Land and Serve the People". As set forth in law, the mission is to achieve quality land management under the sustainable multiple-use management concept to meet the diverse needs of people.

mitigation- Actions taken to avoid, minimize, or rectify the impact of a land management practice.

mixed stand- A stand consisting of two or more tree species.

MM- Million

MMBF- Million Board Feet (See board feet.)

modification- A visual quality objective; management activities may visually dominate the original characteristic landscape, but they must borrow from naturally established form, line, color, or texture so that the activity blends with the surrounding area.

monitoring and evaluation- The periodic evaluation of forest management activities to determine how well objectives were met and how management practices should be adjusted. See "adaptive management".

mortality- Trees that were unusable and have died within a specified period of time. The term mortality can also refer to the rate of death of a species in a given population or community.

mosaic- Areas with a variety of plant communities over a landscape, such as areas with trees and areas without trees occurring over a landscape.

mountain pine beetle- A tiny black insect, ranging from 1/8 to 3/4 inch in size, that bores through a pine tree's bark. It stops the tree's intake and transport of the food and nutrients it must have to stay alive, thus killing the tree.

multiple use management- The management of all the various renewable surface resources of National Forest lands for a variety of purposes such as recreation, range, timber, wildlife and fish habitat, and watershed.

National Park Service- The agency of the US Department of the Interior responsible for the administration of National Parks, Monuments, and Historic Sites. It is distinct from the USDA Forest Service both administratively and by mission.
natural barrier- A natural feature, such as a dense stand of trees or downfall, that will restrict animal travel.

natural disturbance- See disturbance.

natural range of variability- See range of variability.

natural resource- A feature of the natural environment that is of value in serving human needs.

NEPA (National Environmental Policy Act) - Congress passed NEPA in 1969 to encourage productive and enjoyable harmony between people and their environment. One of the major tenets of NEPA is its emphasis on public disclosure of possible environmental effects of any major action on public lands. Section 102 of NEPA requires a statement of possible environmental effects to be released to the public and other agencies for review and comment.

nest survey- A way to estimate the size of a bird population by counting the number of nests in a given area.

NFLRMP (National Forest Land and Resource Management Plan) - Also called the Forest Plan or just the Plan, this document guides the management of a particular National Forest and establishes management standards and guidelines for all lands of that National Forest.

NFMA (National Forest Management Act) - This law was passed in 1976 and requires the preparation of Regional Guides and Forest Plans.

NFRS- National Forest recreation sites that have been inventoried.

No Action alternative- The most likely condition expected to exist in the future if management practices continue unchanged.

noncommercial vegetative treatment- The removal of trees for reasons other than timber production.

nonconsumptive use- The use of a resource that does not reduce the supply. For instance, bird watching is a non-consumptive use of wildlife. Boating and fishing are non-consumptive uses of water.

nongame- Wildlife species that are not hunted for sport.

nonpoint source pollution- Pollution whose source is not specific in location. The sources of the discharge are dispersed, not well defined, or constant. Rain storms and snowmelt often make this type of pollution worse. Examples include sediments from logging activities and runoff from agricultural chemicals.

non-renewable resource- A resource whose total quantity does not increase measurably over time, so that each use of the resource diminishes the supply.

notice of intent- A notice in the federal register of intent to prepare an environmental impact statement on a proposed action.

nutrient cycle- The circulation of chemical elements and compounds, such as carbon and nitrogen, in specific pathways from the non-living parts of ecosystems into the organic substances of the living parts of ecosystems, and then back again to the non-living parts of the ecosystem. For instance, nitrogen in wood is returned to the soil as the dead tree decays; the nitrogen again becomes available to living organisms in the soil, and upon their death, the nitrogen is available to plants growing in that soil.

old growth- Old forests often containing several canopy layers, variety in tree sizes and species, decadent old trees, and standing and dead woody material.

organic soil- Soil at least partly derived from living matter, such as decayed plant material.

ORV- Off-road vehicles, such as motor cycles, 4-wheel drive vehicles, and 4-wheelers.

output- one of the ways functions are described; resources which leave a system (i.e. animals migrating out of an area, mass erosion, removal of commercial timber from an area).

overmature timber- Trees that have attained full development, particularly in height, and are declining in vigor, health, and soundness.

overstory- The upper canopy layer; the plants below comprise the understory.

parent material- The mineral or organic matter from which the upper layers of soil are formed.

park-like structure- Stands with large scattered trees and open growing conditions, usually maintained by ground fires.

partial retention- A visual quality objective which, in general, means human activities may be evident, but must remain subordinate to the characteristic landscape.
patch- An area of homogeneous vegetation, in structure and composition.

patch cut- A clearcut that creates small openings in a stand of trees, usually between 15 and 40 acres in size. On the Dixie National Forest and elsewhere, patch cuts are used to provide the disturbance needed to regenerate aspen.

percolation- Downward flow or infiltration of water through the pores or spaces of rock or soil.

perennial stream- A stream that flows throughout the year and from source to mouth.

permitted grazing- Grazing on a National Forest range allotment under the terms of a grazing permit.

personal use- The use of a forest product, such as firewood, for home use and not for commercial use.

persons-at-one-time (PAOT)- A recreation capacity measurement term indicating the number of people who can use a facility or area at one time.

planning area- The area of National Forest land covered by a Regional Guide or Forest Plan.

planning period- The 50 year time frame for which goods, services, and effects were projected in the development of the Forest Plan.

pole/sapling- The stage of forest succession in which trees are between 3 and 7 inches in diameter and are the dominant vegetation.

pole timber- Trees at least 5 inches in diameter, but smaller than the minimum size for sawtimber.

PNV- See present net value.

precommercial thinning- Removing some of the trees from a stand that are too small to be sold for lumber or house logs, so the remaining trees will grow faster.

pre-existing use- Land use that may not conform to a zoning ordinance but existed prior to the enactment of the ordinance.

preparatory cut- The removal of trees near the end of a rotation to open the canopy so the crowns of seed bearing trees can enlarge. This improves seed production and encourages natural regeneration. (See rotation.)

prescribed fire- Fire set intentionally in wildland fuels under prescribed conditions and circumstances. Prescribed fire can rejuvenate forage for livestock and wildlife or prepare sites for natural regeneration of trees.

prescription- Management practices selected to accomplish specific land and resource management objectives.

present net value (PNV), also called present net worth- The measure of the economic value of a project when costs and revenues occur in different time periods. Future revenues and costs are "discounted" to the present by an interest rate that reflects the changing value of a dollar over time. The assumption is that dollars today are more valuable than dollars in the future. PNV is used to compare project alternatives that have different cost and revenue flows.

presuppression- Activities carried out in advance of fire occurrence to ensure effective suppression when the need arises.

primitive ROS (Recreation Opportunity Spectrum)- A classification of wilderness and recreation opportunity. It is characterized by an essentially unmodified environment, where trails may be present but structures are rare, and where it is highly probable to be isolated from the sights and sounds of people. (See ROS.)

production- One of the ways functions are described: resources which are "manufactured" within the system (i.e. plant growth, animal reproduction, snags falling and becoming down woody material).

productive- The ability of an area to provide goods and services and to sustain ecological values.

public domain- The territory ceded to the Federal government by the original thirteen states, plus additions by treaty, cession, and purchase.

public land- Land for which title and control rests with a government—Federal, state, regional, county, or municipal.
public involvement- The use of appropriate procedures to inform the public, obtain early and continuing public participation, and consider the views of interested parties in planning and decision making.

quadratic mean diameter (QMD)- indicates the diameter of the cross-section of average area. This number is used for determining basal area and volume.

range- Land on which the principle natural plant cover is composed of native grasses, forbs, and shrubs that are valuable as forage for livestock and big game.

range management- The art and science of planning and directing range use intended to yield the sustained maximum animal production and perpetuation of the natural resources.

range of variability (Also called the historic range of variability or natural range of variation).- The components of healthy ecosystems fluctuate over time. The range of sustainable conditions in an ecosystem is determined by time, processes (such as fire), native species, and the land itself. For instance, ecosystems that have a 10 year fire cycle have a narrower range of variation than ecosystems with 200-300 year fire cycle. Past management has placed some ecosystems outside their range of variability. Future management should move such ecosystems back toward their natural, sustainable range of variation.

Ranger District- The administrative sub-unit of a National Forest that is supervised by a District Ranger who reports directly to the Forest Supervisor.

raptor- A bird of prey such as a eagle or hawk.

RARE II- Roadless Area Review and Evaluation. The national inventory of roadless and undeveloped areas within the National Forests and Grasslands.

recharge- The addition of water to ground water by natural or artificial processes.

recreation visitor days (RVD)- Twelve visitor hours, which may be aggregated continuously, intermittently, or simultaneously by one or more persons.

reforestation- The restocking of an area with forest trees, by either natural or artificial means, such as planting.

regeneration- The renewal of a tree crop by either natural or artificial means. The term is also used to refer to the young crop itself.

Regional Forester- The official of the USDA Forest Service responsible for administering an entire region of the Forest Service.

release cutting- Removal of competing vegetation to allow desired tree species to grow.

removal cut- The removal of the last seed bearers or shelter trees after regeneration is established.

residual stand- The trees remaining standing after an event such as selection cutting.

resilience- The ability of an ecosystem to maintain diversity, integrity, and ecological processes following a disturbance.

Responsible official- The Forest Service employee who has been delegated the authority to carry out a specific planning action.

restoration (of ecosystems)- Actions taken to modify an ecosystem to achieve a desired, healthy, and functioning condition.

retention- A visual quality; objective; management activities are not visually evident; activities repeat form, line, color, and texture characteristics found in the landscape.

revegetation- The re-establishment and development of a plant cover by either natural or artificial means, such as re-seeding.

riparian area- The area along a watercourse or around a lake or pond.

riparian community- The ecosystems around or next to water areas that support unique vegetation and animal communities as a result of the influence of water.

riparian ecosystem- The ecosystems around or next to water areas that support unique vegetation and animal communities as a result of the influence of water.

ROD- Record of Decision. A official document in which a deciding official states the alternative that will be implemented from a prepared EIS.

ROS- Recreation Opportunity Spectrum. The land classification system that categorizes land by its setting and the probable recreation experiences and activities it affords.

rotation- The number of years required to establish and grow timber crops to a specified condition of maturity.
roundwood- Timber and fuelwood prepared in the round state, such as house logs and telephone poles.

run-off- the portion of precipitation that flows over the land surface or in open channels.

sacrifice area/site- In range management, a site allowed to be overgrazed to obtain efficient overall use of the management area. In cultural resource management, it may refer to a site intentionally sacrificed to extensive public use in order to preserve the larger cultural area.

salvage harvest- Harvest of trees that are dead, dying, or deteriorating because they are overmature or have been materially damaged by fire, wind, insects, fungi, or other injurious agents, before the wood becomes unusable.

sanitation harvest- The harvest of dead, damaged or susceptible trees done primarily to prevent the spread of pests or disease and to promote forest health.

sapling- A loose term for a young tree more than a few feet tall and an inch or so in diameter that is typically growing vigorously.

sawtimber- Trees that are 9 inches in diameter at breast height or larger that can be made into lumber.

scale- In ecosystem management, it refers to the degree of resolution at which ecosystems are observed and measured.

scoping- The ongoing process to determine public opinion, receive comments and suggestions, and determine issues during the environmental analysis process. It may involve public meetings, telephone conversations, or letters.

second growth- Forest growth that was established after some kind of interference with the previous forest crop, such as cutting, fire, or insect attack.

seed tree harvest- Removal of the mature timber crop from an area in one cut, except for a certain number of seed bearers.

sensitive species- Plant or animal species which are susceptible to habitat changes or impacts from activities. The official designation is made by the USDA Forest Service at the Regional level and is not part of the designation of Threatened or Endangered Species made by the US Fish and Wildlife Service.

seral- The stage of succession of a plant or animal community that is transitional. If left alone, the seral stage will give way to another plant or animal community that represents a further stage of succession.

shelterwood- A cutting method used in a more or less mature stand, designed to establish a new crop under the protection of the old.

silvicultural system- The cultivation of forests; the result is a forest of a distinct form. Silvicultural systems are classified according to harvest and regeneration methods and the type of forest that results.

silviculture- The art and science that promotes the growth of single trees and the forest as a biological unit.

single tree selection- See individual tree selection.

site preparation- The general term for removing unwanted vegetation, slash, roots, and stones from a site before reforestation. Naturally occurring wildfire, as well as prescribed fire can prepare a site for natural regeneration.

size class- One of the three intervals of tree stem diameters used to classify timber in the Forest Plan data base. The size classes are: Seedling/Sapling (less than 5 inches in diameter); Pole Timber (5 to 7 inches in diameter); Sawtimber (greater than 7 inches in diameter)

skidding- Hauling logs by sliding, not on wheels, from stump to a collection point.

skid trail- narrow path on which logging equipment travel when moving logs from the forest to a designated landing location.

skier days- Twelve skier hours, which may be aggregated continuously, intermittently, or simultaneously by one or more persons.

Chapter 7 - Glossary

7-21
slump- A landslide where the underlying rock masses tilt back as they slide from a cliff or escarpment.

small game- Birds and small animals normally hunted or trapped.

snag- A standing dead tree. Snags are important as habitat for a variety of wildlife species and their prey.

soil compaction- The reduction of soil volume. For instance, the weight of heavy equipment on soils can compact the soil and thereby change it in some ways, such as in its ability to absorb water.

soil productivity- The capacity of a soil to produce a specific crop. Productivity depends on adequate moisture and soil nutrients, as well as favorable climate.

sound wood- Timber that is in solid, whole, good condition. Sound wood is free from damage, decay, or defects.

special use permit- A permit issued to an individual or group by the USDA Forest Service for use of National Forest land for a special purpose. Examples might be a Boy Scout Jamboree or a mountain bike race.

stand- A group of trees that occupies a specific area and is similar in species, age, and condition.

stand density index (SDI)- The index number is the number of trees per acre at an average stand diameter of 10 inches. This index changes for different species, since some trees are more shade tolerant than others (i.e. the maximum trees per acre for Engelmann spruce-subalpine fir stand is 670 and for ponderosa pine is 450).

standards and guidelines- Requirements found in a Forest Plan which impose limits on natural resource management activities, generally for environmental protection.

stewardship- Caring for the land and its resources to pass healthy ecosystems to future generations.

stocking level- The number of tree in an area as compared to the desirable number of trees for best results, such as maximum wood production.

storage- one of the 8-yrs functions are described, resources which are conserved within the system (i.e. sediments and water retained in wetlands, carbon and other nutrient storage in don woody material).

stringer- A strip of vegetation different from surrounding vegetation, such as a stringer of aspen in a area of spruce.

structure- How the parts of ecosystems are arranged, both horizontally and vertically. These parts include vegetation patches, edge, fragmentation, canopy layers, snags, down wood, steep canyons, rocks in streams, and roads. For example, structure might reveal a pattern, or mosaic, or total randomness of vegetation.

suitability- The appropriateness of certain resource management to an area of land. Suitability can be determined by environmental and economic analysis of management practices.

successional stage - A stage of development of a plant community as it moves from bare ground to climax. The grass-forb stage of succession precedes the woody shrub stage.

succession- The natural replacement, in time, of one plant community with another. Conditions of the prior plant community (or successional stage) create conditions that are favorable for the establishment of the next stage.

surface resources- Renewable resources that are on the surface of the earth, such as timber and forage, in contrast to ground water and minerals which are located beneath the surface.

sustainability- The ability of an ecosystem to maintain ecological processes and functions, biological diversity, and productivity over time.

sustainable- The yield of a natural resource that can be produced continually at a given intensity of management is said to be sustainable.

sustained yield- The yield that a renewable resource can produce continuously at a given intensity of management.

Soil and Water Conservation Practices (SWCPs)- Refer to BMPs.

target- A National Forest's annual goals for accomplishment for natural resource programs. Targets represent the commitment the Forest Service has with Congress to accomplish the work Congress has funded, and are often used as a measure of the agency's performance.
thermal cover- Cover used by animals against weather. For elk, thermal cover can be found in a stand of coniferous trees at least 40 feet tall with a crown closure of at least 70%.

thinning- A cutting made in an immature stand of trees to accelerate growth of the remaining trees or to improve the form of the remaining trees.

threatened species- Those plant or animal species likely to become endangered throughout all or a specific portion of their range within the foreseeable future as designated by the U.S. Fish and Wildlife Service under the Endangered Species Act of 1973.

timber classification- The classification of forested lands into land management alternatives according to how the land relates to management of the timber resource there.

tractor logging- A logging method that uses tractors to carry or drag logs from the stump to a collection point.

treatment area- The site-specific location of a resource improvement activity.

tree opening- An opening in the forest created by even-aged silvicultural practices.

TSI (Timber Stand Improvement)- Actions to improve growing conditions for trees in a stand, such as thinning, pruning, prescribed fire, or release cutting.

type conversion- The conversion of the dominant vegetation in an area from forested to non-forested or from one species to another.

underburn- A burn by a surface fire that can consume ground vegetation and "ladder" fuels.

understory- The trees and woody shrubs growing beneath the overstory in a stand of trees.

uneven-aged management - Actions that maintain a forest or stand of trees composed of intermingling trees that differ markedly in age. Cutting methods that develop and maintain uneven-aged stands are single-tree selection and group selection.

unregulated harvest- Tree harvest that is not part of the allowable sale quantity (ASQ). It can include the removal of cull or dead material or non-commercial species. It also includes volume removed from non-suitable areas for research, to meet objectives other than timber production (such as wildlife habitat improvement), or to improve administrative sites (such as campgrounds.)
water table- The upper surface of groundwater. Below it, the soil is saturated with water.

water yield- The runoff from a watershed, including groundwater outflow.

wetlands- Areas that are permanently wet or are intermittently covered with water.

wilderness (Wilderness Area)- Undeveloped federal land retaining its primeval character, without permanent human habitation or improvements. It is protected and managed to preserve its natural condition. Wilderness Areas are designated by Congress.

wildfire- Any wildland fire that is not a prescribed fire.

wildlife habitat diversity- The distribution and abundance of different plant and animal communities and species within a specific area.

windthrow- Trees uprooted by wind.

wood fiber production- The growing, tending, harvesting, and regeneration of harvestable trees.

woodland products- Harvestable items from pinyon-juniper woodlands. These include fuelwood, posts, pine nuts and Christmas trees.

yarding- Moving the cut trees from where they fell to a centralized place (landing) for hauling away from the stand.

ZOI (Zone of Influence)- The area influenced by Forest Service management activities.

CHAPTER 8

PROPOSED FOREST PLAN AMENDMENTS

PROPOSED FOREST PLAN AMENDMENTS

A Forest Plan Amendments are proposed in all action alternatives. The amendment changes Management Areas 1B, Winter Sports Site, 10B municipal Watersheds, and 2B Roaded Natural to accurately reflect actual management conditions in the field. Additionally, the Management Area changes are necessary to accommodate MDP elements associated with the northwest side of the project area. The changes increase Management Area, 1B and 10B by 56.29 acres, while it decreases Management Area, 2B by 56.29 acres. No Goals and Objectives or Standards and Guidelines will change with the Management Area corrections. The Management Area changes are strictly a correction of the Management Area boundaries to accurately reflect management conditions on the ground.

The following pages specify pages and changes for the DNF Forest Plan. The changes are in bold print. These pages would replace those in the Forest Plan. The pages to be replaced in the Forest Plan include: IV-60, IV-68, and IV-156. Additionally, the following two maps present the existing Management Area conditions and the proposed corrections.
PROPOSED FOREST PLAN AMENDMENTS

MANAGEMENT AREA 1B
WINTER SPORTS SITES

Characteristics

This management area occurs in the Brian Head-Crystal Mountain area on the Cedar City Ranger District.

Desired Future Condition

Any ski area development on the Forest will remain in the Brian Head-Crystal Mountain area. All expansion in this area will be according to an approved master plan. Runs and lift lines will be blended into the existing environment through vegetation management and the use of existing openings. Buildings and structures on the Forest will be designed to duplicate features that exist naturally. Colors used on man-made structures will meet the safety requirements of a ski area and match colors found in the characteristic landscape.

Size

This management area contains 3,856 acres. Three thousand ninety-six acres are unsuitable for timber harvest.

Management Area Direction

Management emphasis provides for downhill skiing on existing sites and mountains selected inventoried sites for future downhill skiing recreation opportunities. Management integrates ski area development and use with other resource management to provide healthy tree stands, vegetative diversity, forage production for wildlife and livestock, and opportunities for non-motorized recreation.

Visual resources are managed so that the character is one of forested areas interspersed with openings of varying widths and shapes. Facilities may dominate, but harmonize and blend with the natural setting. Harvest methods in ponderosa pine and mixed conifers, and group selection in Engelmann spruce-subalpine fire, or as specified in the permittee's site-specific development plan.

IV-60

Chapter 8 Forest Plan Amendments 8-2

PROPOSED FOREST PLAN AMENDMENTS

MANAGEMENT AREA 2B
ROADED NATURAL RECREATION

Characteristics

This management area consists of travel corridors along major traveled routes across the Forest or to specific recreational attractions on the Forest.

Desired Future Condition

This area is characterized by a modified natural environment. Resource modification and utilization practices usually harmonize with the natural environment. In some of the more modified zones within this area utilization practices enhance recreation activities, maintain vegetative cover, and soil. The opportunity to have a high degree of interaction with the natural environment and to face challenges associated with more primitive forms of recreation will not be important. Both motorized and non-motorized forms of recreation are possible in this area.

Size

This management area contains 131,644 acres. One hundred twenty four thousand two hundred forty two acres are unsuitable for timber harvest.

Management Area Direction

Management emphasis is for rural and roaded-natural recreation opportunities. Motorized and non-motorized recreation activities such as driving for pleasure, viewing scenery, picnicking, fishing, snowmobiling, and cross-country skiing are possible. Conventional use of highway-type vehicles is provided for in design and construction of facilities. Motorized travel may be prohibited or restricted to designated routes, to protect physical and biological resources.

Visual resources are managed so that management activities maintain or improve the quality of recreation opportunities. Management activities are not evident, remain visually subordinate, or may be dominant, but harmonize and blend with the natural setting. Landscape rehabilitation is used to restore landscapes to a desirable visual quality. Enhancement aimed at increasing positive elements of the landscape to improve visual variety is also used.

The harvest method by Forest cover type is clearcutting in aspen, shelterwood in ponderosa pine, mixed conifer and Engelmann spruce-subalpine fir.
PROPOSED FOREST PLAN AMENDMENTS

MANAGEMENT AREA 10B
MUNICIPAL WATER SUPPLY WATERSHEDS

Characteristics
This management area occurs within or is conterminous with the boundary of identified municipal water supply watersheds, including those supplying Teasdale, Escalante, Panguitch, Parowan, Brian Head, Enterprise, and St. George.

Desired Future Condition
Area continues to provide multiple resource outputs without impairment of existing water quality or quantity at presently utilized or potential culinary water spring sources. Quantity and/or quality is improved where feasible.

Size
This management area contains 9344 acres. Eight thousand two hundred fifty acres are unsuitable for timber harvest.

Management Area Direction
Management emphasis is to protect or improve the quality and quantity of municipal water supplies. Management practices are modified.

APPENDICES

APPENDIX 1 - Dixie National Forest LRMP, Standards and Guidelines.
2 - Critical Watershed Areas Map.
3 - Vegetation Stand Inventory Map.
4 - Wildlife Cumulative Effects Area Map.
5 - Recreational Opportunity Spectrum Map.
6 - Management Areas.
7 - Vegetation Cumulative Effects Area Map.
8 - Range Cumulative Effects Area.
9 - Past, Present and Future Foreseeable Harvest Actions.
10 - Air Quality Cumulative Effects Area Map.
11 - Recreation Features Map.
This section describes the management direction and standards and guidelines which are applicable forest-wide and apply on all management areas, except where the specific direction in a management area supercedes. The purpose of this section is to avoid duplicating the forest-wide direction and Standards and Guidelines in each area. The Standards and Guidelines contained in this plan incorporate the planning guidance and requirements of the Regional Guide for the Intermountain Region.

This section and the section following (Management Area Direction) provide specific direction for day to day management of the National Forest. In practice, the land manager would use the Forest map and this section to find management direction. When the map indicates a management area is involved the specific direction contained in the management prescription (next section) also applies.
<table>
<thead>
<tr>
<th>Management Prescription</th>
<th>General Direction</th>
<th>Standards and Guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diversity on National Forests and National Grasslands (A00)</td>
<td>1. Maintain structural diversity of vegetation on management areas that are dominated by forested ecosystems.</td>
<td>A. Maintain or establish a minimum of 20 percent of the forested area within a management area to provide vertical density.</td>
</tr>
<tr>
<td></td>
<td>2. Retain existing medium- or high-contrast edges within forested management areas.</td>
<td>B. Maintain or establish a minimum of 30 percent of the forested area within a management area to provide horizontal diversity.</td>
</tr>
<tr>
<td></td>
<td>3. If medium-contrast edges are created in units dominated by grassland or shrubland, create openings with Patton edgshape index of at least 1.4.</td>
<td>C. In forested areas, create or modify created openings so they have a Patton edgshape index of at least 1.4 and have at least a medium-edge contrast.</td>
</tr>
<tr>
<td></td>
<td>4. In forested management areas, maintain a minimum on each treated area, an average of 20-30 snags (in all stages of development) per 10 acres, well distributed over the management areas.</td>
<td>A. Maximum size of individual treated areas is 500 acres.</td>
</tr>
<tr>
<td></td>
<td>5. Manage aspen for retention wherever it occurs, unless justified by one of the following:</td>
<td>A. Provide at a minimum, an average of 2-12 hard snags per 10 acres of the following minimum diameters (where biologically feasible):</td>
</tr>
<tr>
<td></td>
<td>A. Conversion of determinate aspen to conifers, or shrub-or grass/forb seral stages for wildlife, esthetic, recreation, transportation, or watershed purposes.</td>
<td>- Ponderosa pine, Douglas-fir and spruce-fir: 10 inches dbh.</td>
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<td>- Aspen: 8 inches dbh</td>
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<td>B. Retain an average length per acre of down-dead logs (where feasible) of the following minimum diameters:</td>
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<td>- Ponderosa pine, Douglas-fir and spruce-fir: 12 inch diameter 50 linear feet per acre</td>
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<td></td>
<td></td>
<td>- Aspen: 10 inch diameter 33 linear feet per acre</td>
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<td></td>
<td>A. Silvicultural standards: (These standards may be exceeded in areas managed for old growth.)</td>
<td>A. Silvicultural standards: (These standards may be exceeded in areas managed for old growth.)</td>
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<td></td>
<td>1. Clearcut (Stand or Clone) Rotation Age: 80-120 years Thinning Cycle: N/A</td>
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<tr>
<td>MANAGEMENT PRESCRIPTION</td>
<td>GENERAL DIRECTION</td>
<td>STANDARDS AND GUIDELINES</td>
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<tr>
<td><strong>B. MANAGEMENT PRESCRIPTION</strong></td>
<td><strong>C. Areas of aspen which are larger than are needed for</strong></td>
<td><strong>2. Limit individual regeneration acres</strong></td>
</tr>
<tr>
<td><strong>MANAGEMENT ACTIVITIES</strong></td>
<td><strong>wildlife or esthetic purposes.</strong></td>
<td><strong>to a maximum of 40, or the size of a</strong></td>
</tr>
<tr>
<td><strong>C. Areas of aspen which are larger than are needed for</strong></td>
<td><strong>clone, whichever is smaller.</strong></td>
<td><strong>clone.</strong></td>
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<tr>
<td><strong>wildlife or esthetic purposes.</strong></td>
<td><strong>6. If determinant aspen stands are managed for regeneration,</strong></td>
<td><strong>B. Conversion of determinate aspen to conifers on sites with</strong></td>
</tr>
<tr>
<td><strong>6. If determinant aspen stands are managed for regeneration,</strong></td>
<td><strong>treat contiguous areas no larger than 40 acres, unless larger</strong></td>
<td><strong>a high demand for softwood, or</strong></td>
</tr>
<tr>
<td><strong>treat contiguous areas no larger than 40 acres, unless larger</strong></td>
<td><strong>areas are needed to protect aspen regeneration or prevent</strong></td>
<td><strong>C. Areas of aspen which are larger than are needed for</strong></td>
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<td><strong>areas are needed to protect aspen regeneration or prevent</strong></td>
<td><strong>decadence. Treat entire clones in determinate (climax) aspen</strong></td>
<td><strong>wildlife or esthetic purposes.</strong></td>
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<td><strong>decadence. Treat entire clones in determinate (climax) aspen</strong></td>
<td><strong>stands can be converted to other cover types if needed to meet</strong></td>
<td><strong>stands can be converted to other cover types if needed to meet</strong></td>
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<td><strong>stands can be converted to other cover types if needed to meet</strong></td>
<td><strong>other objectives.</strong></td>
<td><strong>other objectives.</strong></td>
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<td><strong>other objectives.</strong></td>
<td><strong>Visual Resource Management (A04)</strong></td>
<td><strong>A. Follow direction provided in FSM 2380 and FSH 2309.16 through FSH 2309.25.</strong></td>
</tr>
<tr>
<td><strong>Visual Resource Management (A04)</strong></td>
<td><strong>A. Follow direction in FSH 2360.</strong></td>
<td><strong>A. Follow direction in FSH 2360.</strong></td>
</tr>
<tr>
<td><strong>Visual Resource Management (A04)</strong></td>
<td><strong>A. Complete cultural resource surveys prior to any ground-</strong></td>
<td><strong>A. Complete cultural resource surveys prior to any ground-</strong></td>
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<td><strong>Visual Resource Management (A04)</strong></td>
<td><strong>disturbing project,</strong></td>
<td><strong>disturbing project,</strong></td>
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<tr>
<td><strong>Visual Resource Management (A04)</strong></td>
<td><strong>B. Avoid disturbance of known cultural resources until</strong></td>
<td><strong>B. Avoid disturbance of known cultural resources until</strong></td>
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<tr>
<td><strong>Visual Resource Management (A04)</strong></td>
<td><strong>evaluated and determined not significant,</strong></td>
<td><strong>evaluated and determined not significant,</strong></td>
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<tr>
<td><strong>Visual Resource Management (A04)</strong></td>
<td><strong>C. Mitigate sites where there is no other way to protect</strong></td>
<td><strong>C. Mitigate sites where there is no other way to protect</strong></td>
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<td><strong>Visual Resource Management (A04)</strong></td>
<td><strong>the properties,</strong></td>
<td><strong>the properties,</strong></td>
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<tr>
<td><strong>Visual Resource Management (A04)</strong></td>
<td><strong>D. Issue antiquities permits to qualifying academic</strong></td>
<td><strong>D. Issue antiquities permits to qualifying academic</strong></td>
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<td><strong>Visual Resource Management (A04)</strong></td>
<td><strong>organizations or other organizations for the study and</strong></td>
<td><strong>organizations or other organizations for the study and</strong></td>
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<td><strong>Visual Resource Management (A04)</strong></td>
<td><strong>research of sites.</strong></td>
<td><strong>research of sites.</strong></td>
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<tr>
<td><strong>Visual Resource Management (A04)</strong></td>
<td><strong>1. Apply the visual management system to all National</strong></td>
<td><strong>1. Apply the visual management system to all National</strong></td>
</tr>
<tr>
<td><strong>Visual Resource Management (A04)</strong></td>
<td><strong>Forest System (NFS) lands. Travel routes, use areas and</strong></td>
<td><strong>Forest System (NFS) lands. Travel routes, use areas and</strong></td>
</tr>
<tr>
<td><strong>Visual Resource Management (A04)</strong></td>
<td><strong>water bodies determined to be of primary importance such as</strong></td>
<td><strong>water bodies determined to be of primary importance such as</strong></td>
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<tr>
<td><strong>Visual Resource Management (A04)</strong></td>
<td><strong>Sensitivity Level 1 and appropriate visual quality objectives</strong></td>
<td><strong>Sensitivity Level 1 and appropriate visual quality objectives</strong></td>
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<tr>
<td><strong>Visual Resource Management (A04)</strong></td>
<td><strong>which are established according to the Visual Management System.</strong></td>
<td><strong>which are established according to the Visual Management System.</strong></td>
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<tr>
<td><strong>Visual Resource Management (A04)</strong></td>
<td><strong>2. Rehabilitate all existing projects and areas which do not</strong></td>
<td><strong>2. Rehabilitate all existing projects and areas which do not</strong></td>
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<tr>
<td><strong>Visual Resource Management (A04)</strong></td>
<td><strong>meet the adopted visual quality objective(s) (VQO)</strong></td>
<td><strong>meet the adopted visual quality objective(s) (VQO)</strong></td>
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<tr>
<td><strong>Visual Resource Management (A04)</strong></td>
<td><strong>specified for each management area. Set priorities for</strong></td>
<td><strong>specified for each management area. Set priorities for</strong></td>
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<tr>
<td><strong>Visual Resource Management (A04)</strong></td>
<td><strong>rehabilitation, considering the following:</strong></td>
<td><strong>rehabilitation, considering the following:</strong></td>
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</tbody>
</table>
### B. MANAGEMENT PRESCRIPTION

#### MANAGEMENT ACTIVITIES

| A. Relative importance of the area and the amount of deviation from the adopted VQO. Foreground areas have the highest priority. |
| B. Length of time it will take natural processes to reduce the visual impacts so that they meet the adopted VQO. |
| C. Length of time it will take rehabilitation measures to meet the adopted VQO, and |
| D. Benefits to other resource management objectives to accomplish rehabilitation. |

3. Achieve enhancement of landscapes through addition, subtraction or alteration of elements of the landscape such as vegetation, rockform, water features or structures, examples of these include:
   A. Addition of vegetation species to introduce unique form, color or texture to existing vegetation.
   B. Vegetation manipulation to open up vistas or screen out undesirable views.

4. Plan, design and locate vegetation manipulation in a scale which retains the color and texture of the characteristic, borrowing directional emphasis of form and line from natural features.

5. Blend soil disturbance into natural topography to achieve a natural appearance, reduce erosion and rehabilitate ground cover.

6. Revegetate disturbed soils. In large projects, this may have to be done in stages.

7. Choose facility and structure design, color of materials, location and orientation to meet the adopted visual quality objective(s) for the management area.

#### STANDARDS AND GUIDELINES

| A. Meet the visual quality objectives of retention and partial retention one full growing season after completion of a project. Meet modification and maximum modification objectives three full growing seasons after completion of a project. |
| B. Determine sensitivity levels in accordance with FSH 2309.16, Agriculture Handbook Number 462, Volume 2, Chapter 1, Sensitivity Levels. |

#### GENERAL DIRECTION

Recreation Site Construction and Rehabilitation (AO5 and 06)

1. Provide appropriate development facilities where the private sector is not meeting the demand.

2. Provide for 10 percent of new or rehabilitated facilities to be accessible to handicapped persons.
B. MANAGEMENT PRESCRIPTION

MANAGEMENT ACTIVITIES

---------------------------------------------------------------
GENERAL DIRECTION

3. Facilities proposed for construction or reconstruction which lie within identified 100-year floodplains will be evaluated as to the specific flood hazards and values involved with the site. Practicable alternatives will be thoroughly evaluated.

4. Past and probable flood heights in inventoried 100-year floodplains will be posted to provide visible warnings to the public about possible periodic flooding of over one foot in depth.

Management of Developed Recreation Sites (A08, 09, 11 and 13)

1. As need dictates, design, construct and operate developed sites which are adjacent to, or provide an access into, a wilderness to complement wilderness management objectives.

2. Construct, reconstruct and maintain developed sites in accordance with the established recreation opportunity spectrum (ROS) classification for the management area.

3. Manage Development Scale 3 and 4 for full service when at least one of the following are met and funding is available to meet them.
   A. A campground is designated as a fee site;
   B. More than 20 percent of theoretical capacity is being utilized;
   C. A group campground or picnic ground has a reservation system and/or user fee; or
   D. The site is a swimming site, a boating site with a constructed ramp, or a staffed visitor information center.

Dispersed Recreation Management (A14 and 15)

1. Provide a broad spectrum of dispersed recreation opportunities in accordance with the established Recreation Opportunity Spectrum (ROS) classification for the management area.
B. MANAGEMENT PRESCRIPTION

MANAGEMENT ACTIVITIES

GENERAL DIRECTION

2. Close or rehabilitate dispersed sites where unacceptable environmental damage is occurring.

3. As needed to prevent deterioration, manage dispersed recreation activities to not exceed the established ROS/PAOT/ACRE capacity. Manage use of trails in dispersed areas to not exceed the established PAOT/MILE of trail guidelines. Manage dispersed areas around developed campground facilities by those who are unwilling to pay.

STANDARDS AND GUIDELINES

A. Close sites that cannot be maintained in Frissel Condition Class 1, 2 or 3 (Campsite Condition, Frissel, S.S., Journal of Forestry, August 1978).

B. Rehabilitate sites that are in Frissel Condition Class 4. Close and rehabilitate sites in Condition Class 5.

A. STANDARDS AND GUIDELINES

RECREATION USE AND CAPACITY RANGE DURING THE SNOW-FREE PERIOD (PAOT/ACRE)

TRAIL USE AND CAPACITY RANGE (PAOT/MILE OF TRAIL):

<table>
<thead>
<tr>
<th>USE LEVEL</th>
<th>VERY LOW</th>
<th>LOW</th>
<th>MODERATE</th>
<th>HIGH</th>
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<tr>
<td>ROS CLASS</td>
<td>- PRIMITIVE</td>
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<td>ON 0.5</td>
<td>1.0</td>
<td>2.0</td>
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<tr>
<td>TRAILS PAOT/MILE</td>
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<td>AREA</td>
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<td>WIDE PAOT/ACRE</td>
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<tr>
<td>ROS CLASS</td>
<td>- SEMI-PRIMITIVE</td>
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<td>ON 2.0</td>
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<td>TRAILS PAOT/MILE</td>
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<tr>
<td>WIDE PAOT/ACRE</td>
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<td>ROS CLASS</td>
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<tr>
<td>TRAILS PAOT/MILE</td>
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</table>
4. Discourage camping within a minimum of 100 feet from lakes and streams unless exceptions are justified by terrain or specific design which protects the riparian and aquatic ecosystems.
<table>
<thead>
<tr>
<th>B. MANAGEMENT PRESCRIPTION MANAGEMENT ACTIVITIES</th>
<th>GENERAL DIRECTION</th>
<th>STANDARDS AND GUIDELINES</th>
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<tbody>
<tr>
<td>Recreation Management (Private and Other Public Sector) (A16)</td>
<td>1. Ensure that permitted private and public sector sites on Forest lands which are adjacent to, or provide an access point into, or compliment wilderness management objectives.</td>
<td></td>
</tr>
<tr>
<td>Wilderness Area Management (B02)</td>
<td>1. Do not provide interpretive facilities at cultural resources sites, or restore or enhance cultural resources for recreation purposes.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Provide opportunities for human isolation, solitude, self-reliance and challenge while traveling cross-country and on system trails.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Utilize a permit system to manage use levels and patterns during the summer use period based upon the following criteria: A. When acceptable use levels, as specified in the individual prescriptions, are exceeding during 20 percent of the summer use season, or B. When acceptable capacities, as specified in the individual prescriptions, in primitive or pristine management areas are exceeded on 10 percent or more of the day during the summer use season. C. Apply a permit system to an entire wilderness, not just impacted portions of a wilderness.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Do not impose party-size limits during traditionally light use seasons or during fall hunting seasons unless necessary to prevent unacceptable levels of change to the biological and physical resources.</td>
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</tr>
<tr>
<td></td>
<td>5. Maximum party-size limit for the summer use period is 25 people and/or recreational stock. Party-size limits less than 25 people and/or recreational stock will be established where biological and physical resource capability cannot support that level of use. Party-sizes established for protection of biological resources will set limits for both people and recreational stock. Parties larger than established limits may be allowed under permit on a case-by-case basis when compatible with other wilderness management objectives.</td>
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<tr>
<td></td>
<td>6. Do not authorize competitive contest events, group demonstrations, ceremonies, and other similar events.</td>
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<tr>
<td></td>
<td>7. Protect spring sources of drinking water near trails from contamination by recreation stock and livestock where culinary sources are scarce or heavily used by recreationists.</td>
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</tr>
<tr>
<td></td>
<td>8. Prohibit recreational stock along lake shores and stream-banks except for watering and through-travel.</td>
<td></td>
</tr>
<tr>
<td>B. MANAGEMENT PRESCRIPTION</td>
<td>GENERAL DIRECTION</td>
<td>STANDARDS AND GUIDELINES</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>MANAGEMENT ACTIVITIES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Restore soil disturbances caused by human use (past mining, grazing, trail construction and use, camping, etc.) to soil loss tolerance levels commensurate with the natural ecological processes for the treatment area.</td>
<td>A. Use FSM 2323.4 as guidance.</td>
<td></td>
</tr>
<tr>
<td>10. Construct or implement soil and water restoration measures so as to meet the visual quality standard prescribed for the prescription area. Utilize native materials whenever possible to help meet visual quality objectives.</td>
<td>A. Base range condition on the standards in Range Analysis Handbooks (FSH 2209.21).</td>
<td></td>
</tr>
<tr>
<td>11. Control overnight grazing of recreational stock in subalpine ecosystems according to use standards established by range allotment analysis.</td>
<td>A. Base range condition on the standards in the Range Analysis Handbook (FSH 2209.21).</td>
<td></td>
</tr>
<tr>
<td>12. Prohibit new range improvement structures other than corrals, fences or water developments essential to sustain current permitted numbers.</td>
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</tr>
<tr>
<td>13. Implement revegetation only for rehabilitation of areas in less than fair range condition based upon their natural potential. See only native species for revegetation. Implement only where natural vegetation possibilities are poor, and only where degradation was due to human activities.</td>
<td>A. Base range condition on the standards in the Range Analysis Handbook (FSH 2209.21).</td>
<td></td>
</tr>
<tr>
<td>14. Permit fish and wildlife research and management utilizing guidelines adopted by the International Association of Fish and Wildlife Agencies (FSH 2323.3).</td>
<td></td>
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<tr>
<td>15. See mining law compliance and administration and minerals management activities in Forest Direction for minerals direction.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. Maintain fire dependent ecosystems using prescribed fires ignited naturally. Reclaims areas disturbed as part of fire control activities to meet the visual quality objective of retention.</td>
<td>A. See criteria and standards in FSM 2120.</td>
<td></td>
</tr>
<tr>
<td>18. Protect air quality related values from adverse effects from air pollution.</td>
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<tr>
<td>19. Control natural insect or disease outbreaks in wilderness only when justified by predicted loss of resource values outside of wilderness. Conduct analysis in accordance with FSM 3430.</td>
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<td></td>
</tr>
<tr>
<td>20. Control problem animals on a case-by-case basis in cooperation with other agencies (FSM 2610) using methods directed at the offending animal but which present the least risk to other wildlife, and/or visitors.</td>
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<td></td>
</tr>
</tbody>
</table>
Wildlife and Fish
Resource Management
(C01)  

B. MANAGEMENT PRESCRIPTION
MANAGEMENT ACTIVITIES

<table>
<thead>
<tr>
<th>STANDARDS AND GUIDELINES</th>
</tr>
</thead>
<tbody>
<tr>
<td>GENERAL DIRECTION</td>
</tr>
</tbody>
</table>

1. Where present, the following indicator species are management activities:

- Deer,
- Elk, and
- All federally-listed endangered or threatened plant and animal species that might be affected by management activities.

2. In addition to the above, use indicator species that represent the following categories:

A. Riparian and/or wetland dependent species (yellow-breasted chat).
B. Species dependent on either climax plant communities or one seral stage of a plant community or communities (goshawk, wild turkey).
C. Tree cavity-dependent species, (common flicker).
D. Game fish (brook, brown, rainbow, and cutthroat trout).
E. Species which have particular scientific, local or national interest, and species needing special management to prevent federal listing as threatened or endangered (Bonneville cutthroat, mule deer, elk).

3. Manage habitat for viable populations of all existing vertebrate wildlife species.

4. Allow for re-establishment of deer herds to the population levels outlined in the Utah Deer Herd Unit Management Plans.

5. Cooperate in the establishment of elk, pronghorn, bighorn sheep, or other suitable species, and threatened and endangered species on sites that can supply the habitat needs of the species and the population levels and distribution agreed to with the State and other concerned parties only where conflict with established uses can be established. (FSM 2610)

6. Manage waters capable of supporting self-sustaining trout populations to provide for those populations.

Where natural geologic and biologic conditions will allow, maintain the following stream habitat conditions:

A. Maintain 40 percent or more of overhanging grasses, forbs, sedges and shrubs along banks of streams.

B. Maintain 50 percent or more of total streambank length in stable condition.

C. No more than 25 percent of stream substrate should be covered by inorganic sediment less than 3.2 mm in size (use R-4 GAWS Aquatic Habitat Surveys Handbook).
B. MANAGEMENT PRESCRIPTION

MANAGEMENT ACTIVITIES

GENERAL DIRECTION

STANDARDS AND GUIDELINES

D. Maintain overall stream habitat condition at or above 40 percent of optimum (use R-A GAWS Aquatic Habitat Surveys Handbook).

Wildlife Habitat Improvement and Maintenance (02, 04, 05, and 06)

7. Manage and provide habitat for recovery of endangered and threatened species.

1. Use appropriate silvicultural practices to accomplish wildlife habitat objectives forestwide.

A. In forested areas, where biologic-hiding cover is defined as that needed to hide 90 percent of a standing deer or elk at a distance of at least 200 feet.

2/ Road design speed and vehicle and animal safety need to be considered on a case-by-case basis.

B. In management areas dominated by non-forested ecosystems, maintain deer and elk hiding cover as follows:

<table>
<thead>
<tr>
<th>% of Unit</th>
<th>% of Forested Area in Cover</th>
</tr>
</thead>
<tbody>
<tr>
<td>35-50</td>
<td>At least 50%</td>
</tr>
<tr>
<td>20-34</td>
<td>At least 60%</td>
</tr>
<tr>
<td>Less than 20</td>
<td>At least 75%</td>
</tr>
</tbody>
</table>

These levels may be exceeded temporarily during periods when stands are being regenerated to meet the cover standard, or to correct tree disease, problems, in aspen stands, or where windthrow or wildfire occurred. In critical big game habitat maintain hiding cover along at least 75 percent of the edge of arterial and collector roads, and at least 60% along streams and rivers, where trees occur.
2. Improve habitat capability through direct treatments of vegetation, soil, and waters.

3. Where possible, conduct habitat improvement projects jointly or cooperatively funded with the UDWR.

4. Provide maximum wildlife habitat diversity.

5. Plan timber harvest on a drainage by drainage basis.

C. Alter age classes of browse stands in a management area, no more than 25 percent within a ten-year period.

A. Where silviculturally practical, maintain edge contrast\(^\text{a}\) of at least medium or high between tree stands created by evenaged management.

**CONTRAST**

<table>
<thead>
<tr>
<th>AGE</th>
<th>S</th>
<th>S</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLASS</td>
<td>G</td>
<td>M</td>
<td>P</td>
</tr>
<tr>
<td>G</td>
<td>L</td>
<td>M</td>
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<td>P</td>
<td>M</td>
<td>M</td>
<td>L</td>
</tr>
<tr>
<td>SSS</td>
<td>H</td>
<td>H</td>
<td>L</td>
</tr>
<tr>
<td>GF</td>
<td>H</td>
<td>H</td>
<td>M</td>
</tr>
<tr>
<td>SHR</td>
<td>H</td>
<td>H</td>
<td>L</td>
</tr>
<tr>
<td>GRA</td>
<td>H</td>
<td>H</td>
<td>M</td>
</tr>
</tbody>
</table>

B. Utilize both even and unevenaged timber management systems and a variety of harvest methods.

A. A portion of each drainage should be in each age class. Seven to ten percent should be managed as old growth and no less than 10% should be grassland. The remainder should be more or less evenly distributed in the other age class (20% ± 3% in each).

* OG = Old Growth
  M = Mature
  P = Poles
  SSS = Shrub-Seedling-Sapling
  GF = Grass-Forb
  SHR = Shrubland
  GRA = Grassland

** H = High Contrast
  M = Medium Contrast
  L = Low Contrast
B. MANAGEMENT PRESCRIPTION
MANAGEMENT ACTIVITIES

<table>
<thead>
<tr>
<th>Wildlife and Fish Cooperation With Other Agencies (C12)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Manage animal damage in cooperation with the Utah Division of Wildlife Resources (Utah DWR), the Fish and Wildlife Service and other appropriate agencies, and cooperators to prevent or reduce damage to other resources and direct control toward preventing damage or removing only the offending animals.</td>
</tr>
<tr>
<td>2. Allow trapping denning or aerial gunning under the following conditions:</td>
</tr>
<tr>
<td>A. Methods and locations are specified in the Forest Animal Control Plan,</td>
</tr>
<tr>
<td>B. Aerial gunning is done by an authorized individual.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Range Resource Management (D07)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Provide forage to sustain local dependent livestock industry.</td>
</tr>
<tr>
<td>2. Remove livestock from allotments for the remainder of the grazing season when proper use is reached.</td>
</tr>
<tr>
<td>3. Manage livestock and wild herbivores forage use by implementing allowage use guides.</td>
</tr>
</tbody>
</table>

GENERAL DIRECTION

STANDARDS AND GUIDELINES

A. Livestock and wild herbivores allowable forage use by grazing system and range type are:

1. Rest Rotation System:
   A. Use by Range Type:
      -Mainly seed reproduction
        (Bunchgrass, grassland, foothills shrub and subalpine range types):
        - Up to 60 percent on heavy use pastures.
        - Up to 50 percent on other use areas.
   B. Allowable soil disturbance or recovery criteria:
      Soil and vegetation condition must be restored to at least the pretreatment condition by the return to the same point in the grazing cycle.

2. Deferred Rotation System:
   A. Use by Range Type:
      - Up to 50 percent on all species except crested wheatgrass reseedings and wet meadows where 60 percent is allowable.
   B. Allowable soil disturbance or recovery criteria:
### B. MANAGEMENT PRESCRIPTION

#### MANAGEMENT ACTIVITIES

<table>
<thead>
<tr>
<th>Range Improvement and Maintenance (D03, 04, 05 and 06)</th>
<th>GENERAL DIRECTION</th>
<th>STANDARDS AND GUIDELINES</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Achieve or maintain satisfactory range conditions on all rangelands.</td>
<td>5. Salt blocks shall be placed so as to minimize impact upon riparian ecosystem.</td>
<td>A. All suitable rangelands currently in &quot;poor&quot; condition, as determined according to FSH 2209.21 (R-4) will be improved to &quot;fair&quot; or better condition by 2030.</td>
</tr>
<tr>
<td></td>
<td>6. Control noxious farm weeds in the following priority:</td>
<td></td>
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<tr>
<td></td>
<td>A. Musk thistles, Scotch thistle, Canada thistle.</td>
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<tr>
<td></td>
<td>B. Invasion of new plant species classified as noxious farm weeds;</td>
<td></td>
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<tr>
<td></td>
<td>C. Infestation in new areas;</td>
<td></td>
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<tr>
<td></td>
<td>D. Expansion of existing infestations of Scotch, Musk and Canada thistle, and other noxious farm weeds; and</td>
<td></td>
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<tr>
<td></td>
<td>E. Reduce acreage of current infestation.</td>
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<tr>
<td></td>
<td>7. Protect and manage the North Hills wild horse herd in cooperation with BLM.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Timber Resource Management Planning and Inventories</th>
<th>1. Structural range improvement should be designed to benefit wildlife and livestock.</th>
<th>A. Structural improvements and maintenance will be in accordance with FSH 2209.22 (R-4) and 2609.11.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Identify lands available and suitable for timber production on a sale-by-sale basis.</td>
<td>2. To facilitate the control of soil erosion within acceptance tolerance, soil survey or site specific soils data will be used to develop revegetation projects.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Silvicultural Prescriptions (E03, 06 and 07)</th>
<th>1. Provide for wildlife habitat improvement and enhancement of other renewable resources in sale area improvement plans.</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Stand volume growth data will be collected during stand examination.</td>
<td></td>
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</tr>
</tbody>
</table>
2. Apply a variety of silviculture systems and harvest methods which best meet resource management objectives.

A. The appropriate harvest methods by forest cover type are:

<table>
<thead>
<tr>
<th>DESIRED FOREST CHARACTER</th>
<th>STANDARDS AND GUIDELINES</th>
</tr>
</thead>
<tbody>
<tr>
<td>EVEN-AGE UNEVEN-AGE</td>
<td></td>
</tr>
</tbody>
</table>

**Two-Storied**
- SW, ST: N/A

**Veg. Moslaca**
- CC, SW, ST: GS

**Old Growth**
- ST: STS, GS

**Closed Canopy**
- CC, SW, ST: N/A

**Continuous**
- SW, ST: AS

**Site Occupancy**
- With Trees

**HARVEST CUTTING METHODS**

<table>
<thead>
<tr>
<th>COMPETING TYPE</th>
<th>EVEN</th>
<th>UNEVEN</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGE</td>
<td>AGE</td>
<td></td>
</tr>
</tbody>
</table>

**High Elev.**
- SW: AS

**Low Elev.**
- CC, ST: N/A

**Grasses**
- SW: AS

**Grasses (Warm Site)**
- SW: GS

**Grasses (Cool Site)**
- SW: GS

**COMPETING KEY HAB. CRITICAL TYPE SERIES ASPECT**

**High Elev.**
- AP: A1

**Low Elev.**
- DF: S and W with

**Grasses (Warm Site)**
- PP, DF: S and W

**Grasses (Cool Site)**
- DF, AP: A1
3. Clearcuts may be applied to dwarf mistletoe infected stands of any forest cover type.

4. Assure that all even-aged stands scheduled to be harvested during the planning period will generally have reached the culmination of mean annual increment of growth.
5. Minimize soil surface compaction and disturbance by curtailing logging activities during periods of high soil moisture. Design skid trail system to minimize extent of area impacted.

6. The maximum size of openings created by the application of even-aged silviculture will be 40 acres regardless of forest cover type. Exceptions are:
   A. Proposals for larger openings are subject to a 60-day public review and are approved by the Regional Forester.
   B. Larger openings are the result of natural catastrophic conditions of fire, insect or disease attack, windstorm, or
   C. The area does not meet the definition of created openings.

7. Acceptable management intensity activities to determine harvest levels are:

<table>
<thead>
<tr>
<th>Tree Imp.</th>
<th>Site Prep.</th>
<th>Reforestation</th>
<th>Planting</th>
<th>Seeding</th>
<th>Natural</th>
<th>Regeneration</th>
<th>Protection</th>
<th>Stocking</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>N</td>
<td>N</td>
<td>X</td>
<td>X</td>
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</table>

<table>
<thead>
<tr>
<th>Cutting Methods:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clearcut</td>
</tr>
<tr>
<td>Shelterwood</td>
</tr>
<tr>
<td>Selection</td>
</tr>
</tbody>
</table>

### SIZE OF OPENINGS

- **Patch Clearcuts:** 1-10 acres
- **Clearcuts:** 10-40 acres

---

*Various combinations of these activities provide the acceptable range of management intensity for timber production (36 CFR 291.2(B)2).

I = Appropriate Practice
O = Not an Appropriate Practice
N = Appropriate, but not a Standard Practice.

May be Acceptable Where Justified.
## B. MANAGEMENT PRESCRIPTION
### MANAGEMENT ACTIVITIES

<table>
<thead>
<tr>
<th>General Direction</th>
<th>Standards and Guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>8.</strong> Make Christmas trees available in areas where other resource objectives can be accomplished through commercial or personal use Christmas tree sales.</td>
<td></td>
</tr>
</tbody>
</table>
A. Reference FSH 2409.26b - Reforestation Handbook. |
| **9.** Examine modifications to silvicultural techniques and harvest practices in the spruce-fir and mixed conifer timber types to increase water yield. Implement changes when not inconsistent with other multiple use management goals. | B. The Silvicultural Prescriptions will be followed on a stand basis. |

### Reforestation (E04)

1. Establish a satisfactory stand on cutover areas, emphasizing natural regeneration within five years, where feasible, after final harvest except:
   A. For permanent openings that serve specific management objectives;
   B. When other resource objectives dictate a different period, such as spruce-fir clearcuts where planting must occur within three years after harvest;
   C. When provided for otherwise in specific management prescriptions.

2. Do not apply final shelterwood removal cut until the desired number (as specified) of well-established seedling/acre are expected to remain following overwood removal.

3. Use trees of the best genetic quality available which are adapted to the planting site.
   (Reference FSH 2475)

### Riparian Area Management (F03)

1. Special protection and management will be given to land and vegetation for a minimum of 100 feet from the edges of all perennial streams, lakes and other bodies of water or to the outer margin of the riparian ecosystem if wider than 100 feet.

2. Design and implement activities in management areas to protect and manage the riparian ecosystem.

3. Prescribe livestock grazing systems to achieve riparian objectives.
   A. Allow a maximum of 60 percent use (season-long system), of desirable and intermediate species forage production to riparian areas.
   B. Allow a maximum of 50 percent use of current year's growth on browse species in riparian areas.
   C. Maintain ground cover of at least 70 percent within riparian areas.
<table>
<thead>
<tr>
<th>MANAGEMENT PRESCRIPTION MANAGEMENT ACTIVITIES</th>
<th>GENERAL DIRECTION</th>
<th>STANDARDS AND GUIDELINES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>B. Maintain at least 70 percent of the linear distance of all riparian ecosystems in at least an upper mid-serial successional stage.</td>
</tr>
<tr>
<td>5. Locate and construct arterial and collector roads to maintain basic natural condition and character of riparian areas.</td>
<td></td>
<td>A. Maintain fish passage during all flow levels except peak flow events. Follow Guidelines in Evans and Johnston, 1980.</td>
</tr>
<tr>
<td>(0087)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. Locate roads outside of riparian areas except for stream crossing where other feasible alternatives do not exist.</td>
<td></td>
<td>A. Utilize methodology in draft FSH 2509.17, Chapter 30, &quot;Procedure for Quantifying Channel Maintenance Flows&quot;.</td>
</tr>
<tr>
<td>B. Select stream crossing points to minimize bank and channel disturbance.</td>
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<tr>
<td><strong>Water Uses Management (P04)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Determine and obtain rights to instream flows needed to protect and maintain stream channel stability and capacity and for other National Forest purposes.</td>
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</tr>
<tr>
<td>2. Protest water right applications of others when such uses will lower streamflows, springflows, lake levels, or ground-water tables below levels acceptable for National Forest uses and purposes.</td>
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<tr>
<td>(0602)</td>
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<tr>
<td>3. Special use permit, easements, rights-of-way, and similar authorizations for use of NFS lands shall contain conditions and stipulations to maintain instream or bypass flows necessary to fulfill all National Forest uses and purposes.</td>
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<tr>
<td>(0604)</td>
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<tr>
<td>4. Determine and obtain rights to instream flow and conservation pools in cooperation with Utah DWR to support a yield of natural fisheries resources.</td>
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</tr>
<tr>
<td><strong>Water Resource Improvement and Maintenance (P05 and 06)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Maintain needed instream flows and protect public property and resources.</td>
<td></td>
<td>A. Determine instream flows by R4 GAWS Aquatic Habitat Surveys or other accepted methodology.</td>
</tr>
<tr>
<td>2. Improve or maintain water quality to meet State water quality standards. However, where the natural background water pollutants cause degradation, it is not necessary to implement improvement actions. Short-term or temporary failure to meet some parameters of the State standard, such as increased sediment from road crossing construction or water resource development may be permitted in special cases.</td>
<td></td>
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</tbody>
</table>
### GENERAL DIRECTION

<table>
<thead>
<tr>
<th>Management Activities</th>
<th>General Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. Evaluate all management activities within 100 feet of any spring for impacts on springflow, riparian habitat and soil disturbance.</td>
<td></td>
</tr>
<tr>
<td>4. Rehabilitate disturbed areas that are contributing sediment directly to perennial streams as a result of management activities to maintain water quality and re-establish vegetation cover.</td>
<td></td>
</tr>
<tr>
<td>5. Limit use of herbicides, insecticides, rodenticides, or other chemicals which are harmful to either the aquatic ecosystem, desired terrestrial fauna or human health. Use these chemicals only when and where possible transport to surface water has a low probability of occurrence. Follow all label requirements concerning water quality protection.</td>
<td></td>
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</tbody>
</table>

### STANDARDS AND GUIDELINES

<table>
<thead>
<tr>
<th>Standards and Guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Reduce to natural rate any erosion due to management activities in the season of disturbance and sediment yields within one year of the activity through necessary mitigation measures such as water barring and revegetation.</td>
</tr>
<tr>
<td>B. Administration areas with producing sites and known reserves with consideration of ongoing and potential mineral activities.</td>
</tr>
<tr>
<td>C. Avoid or minimize significant public or private investments in and near areas where mineral activities can be expected in the foreseeable future. This includes consideration for reserved and outstanding rights.</td>
</tr>
<tr>
<td>D. In designated Wilderness, ensure that provisions in operating plan satisfy the rights of the claimant while creating the least impact on wilderness values and for restoration of disturbed lands as near as practical to their natural condition as soon as possible during and/or after the mining activity.</td>
</tr>
<tr>
<td>E. Other classified lands not withdrawn from operations under the general mining laws: such lands may include research natural areas, national recreation areas, national recreation trails, special interest areas such as scenic and geologic, national historic sites, or some other special classification; the status of the land must be determined before an operating plan is processed. Provide reasonable protection for the purposes for which the lands were classified and for reasonable reclamation of disturbed lands to a condition suitable for those purposes.</td>
</tr>
<tr>
<td>F. On unclassified (remaining) lands, provide for reasonable reclamation of disturbed lands to achieve the planned uses specified in the Forest plan, when those lands are no longer needed for mining operations.</td>
</tr>
</tbody>
</table>
B. MANAGEMENT PRESCRIPTION

<table>
<thead>
<tr>
<th>MANAGEMENT ACTIVITIES</th>
<th>GENERAL DIRECTION</th>
<th>STANDARDS AND GUIDELINES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mining Law Compliance and Administration (Locatables)</td>
<td>1. Minimize or, as appropriate, prevent adverse impacts on surface resources.</td>
<td>A. All leasable and salable minerals: Activities may be denied or limited where the current uses or activities exceed, or the proposed activities may result in exceeding, the established critical resource(s) or use thresholds.</td>
</tr>
<tr>
<td>Minerals Management Leasables</td>
<td>2. Review cases of suspected abuse of the mining laws such as occupancy of the land for purposes other than prospecting, mining, and related activities. Initiate appropriate action to resolve.</td>
<td>B. Oil and gas, geothermal, and CO2 activities may be limited by standard and current Regionally approved special stipulations, which are listed in Appendix C.</td>
</tr>
<tr>
<td></td>
<td>1. Leasing, permitting, or licensing of National Forest System lands will be based on site specific considerations using appropriate standards and guidelines for the management unit concerned. Criteria for these actions should minimize impacts on or conflicts with other resource uses and should return disturbed lands to planned surface resources or uses.</td>
<td>C. Coal and leasable uranium and non-energy minerals activities may be limited where: 1. Terrain does not provide for adequate waste dumps and tailings disposal, leaving them unstable or unreclaimable. 2. Surface-based access, product transportation and ancillary facilities necessary to production and related operations, would be irreversible 1/ and irretrievable 2/ with low potential for reclamation. Negative recommendations or consent denials will be based on site-specific consideration using the appropriate standards and guidelines.</td>
</tr>
</tbody>
</table>

---

1/ Irretrievable. Applies to losses of production, harvest, or commitment of renewable natural resources. For example, some or all of the timber production from an area is irretrievably lost during the time an area is used as a winter sports site. If the use is changed, timber production can be resumed. The production lost is irretrievable, but the action is not irreversible.

2/ Irreversible. Applies primarily to the use of nonrenewable resources, such as minerals or cultural resources, or to those factors that are renewable only over long time span, such as soil productivity. Irreversible also includes loss of future options.
### B. MANAGEMENT PRESCRIPTION

#### MANAGEMENT ACTIVITIES

<table>
<thead>
<tr>
<th>Minerals Management</th>
<th><strong>GENERAL DIRECTION</strong></th>
<th><strong>STANDARDS AND GUIDELINES</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Salable Withdrawals</td>
<td>1. Forest Service Authorizes common variety exploration and disposal under terms and conditions to prevent, minimize or mitigate adverse impacts on surface resources and uses. The objective of reclamation requirements will be to return disturbed land to the planned uses.</td>
<td>A. See the standards and guidelines for leasable minerals.</td>
</tr>
<tr>
<td>Modifications and Revocations</td>
<td>1. Withdrawals must be for the purpose of protecting specific existing or proposed uses. Initiate action for withdrawal from entry when other applicable laws and regulations will not provide the capability for protection of the surface resources and uses.</td>
<td>A. Withdrawals from entry under the general mining laws will be in conformance with Section 204 of the Federal Land Policy and Management Act of 1976 (P.L. 94-579). Withdrawals under the Minerals Leasing Act will be in exceptional situations because of the discretion allowed in each case for disposal.</td>
</tr>
</tbody>
</table>
| Special Use Management (Non-Recreation) (J01) | 1. Act on Special Use applications according to the following priorities:  
   - A. Land and land use activity requests relating to public safety, health and welfare, e.g., highways, powerlines and public service improvements.  
   - B. Land and land use activities contributing to increased economic activity associated with National Forest resources, e.g., oil and gas, and energy minerals.  
   - C. Land and land use activities that benefit only private users, e.g., road permits, rights-of-way for powerlines, telephones, waterlines, etc.  
2. Do not approve any Special Use applications that can be reasonably met on private or other Federal lands unless it is clearly in the public interest.  
3. Bury electrical utility lines of 33 KV or less and telephone lines except when:  
   - A. Visual quality objectives of the area can be met using an overhead line.  
   - B. Burial is not feasible due to geologic hazard or unfavorable geologic conditions.  
   - C. It is not economical as determined by a cost analysis.  
   - D. Greater long-term site disturbance would result.  
   - E. It is not technically feasible.  
4. Do not approve Special Use applications for areas adjacent to developed sites unless the proposed use is compatible with the purpose and use of the developed site. | C. Common variety mineral withdrawals are unnecessary since full authority for disposal is held by the Forest Service. |
B. MANAGEMENT PRESCRIPTION

MANAGEMENT ACTIVITIES

5. Hydropower. Standards and guidelines for small hydro-

The Forest’s ID team will review proposed projects when notices of application for licensing are received from the Federal Energy Regulatory Commission.

Management concerns identified by the ID team will be resolved in the environmental assessment before approval of Special-Use Permits.

Minimum instream flow needs required by the Forest Service to secure favorable water flows as outlined in the Organic Act and to protect minimum viable populations of trout will be quantified by the Forest Service.

In addition to the above items, Forest Service input to the environmental assessment or EIS will include cumulative effects of actions proposed in the Plan and the proposed hydropower project.

Forest management area direction contained in Chapter IV will discuss the specific management requirements listed in 36 CFR 219.27 and give direction through the management multiple-use prescriptions for the resource areas listed in 36 CFR 219.13-219.2b.

STANDARDS AND GUIDELINES

Land use decisions for small hydro-
projects will be guided by the above-
referenced Forest-wide standards and guidelines in conjunction with other resource uses and values. Therefore, when implementing a Plan:

1. Assess small hydro-project proposals in response to Forest-wide standards and
2. Assess cumulative effects in context to both resource tradeoffs and other hydro-project proposals. The Cumulative Effects Study will address instream flow needs required by the Forest Service and impacts on fisheries and other resources. The actual feasibility of this land use for individual projects may occur prior to the completion of the Forest Plan or after a Plan is completed in a coordinated NEPA effort with the FERC, and resulting in a decision at the Washington Office level.

3. NEPA process. An Environmental Assessment (EA) or Environmental Impact Statement (EIS) is required for each project proposal. FERC requires the applicant to prepare an environmental report. The Forest Service will provide input into the report to FERC on cumulative effects, resources activities, and other land uses on National Forest Lands. If an EIS is necessary, the FERC will act as lead agency and the Forest Service will be a cooperating agency unless otherwise agreed.

The environmental report prepared by the applicant may be used by the Forest Supervisor to complete site-specific EA/EIS for land use occupancy.

On exempt licenses (small hydro less than 5 megawatts) the Forest Supervisor is responsible for the preparation of EA/EIS.

Rights-of-Way and Land Adjustments

(J02, 13, 15, 16, 17 and 18)

1. Acquire rights-of-way on existing Forest System roads and trails that cross private land.

2. Ensure floodplain and wetland values are approximately equal on both offered and selected tracts in proposed land exchanges or that values are in favor of the United States.
### Management Activities

#### General Direction

3. Classify lands or interest in lands for acquisition where lands are valuable for NFS purposes according to the following priorities:
   - A. In designated wilderness areas and other Congressionally-classified areas.
   - B. Where lands or rights-of-way are needed to meet resource management goals and objectives.
   - C. Lands which provide habitat for threatened and endangered species of animals or plants.
   - D. Lands which include floodplain or wetlands.
   - E. On lands having historical or cultural resources, outstanding scenic values or critical ecosystems, when these resources are threatened by change of use or when management may be enhanced by public ownership.

4. Classify lands for disposal according to the following priorities:
   - A. To States, counties, cities, or other Federal agencies when disposal will serve a greater public interest.
   - B. In small parcels intermingled with mineral or homestead patents.
   - C. When suitable for development by the private sector, if development (residential, agricultural, industrial, recreational, etc.) is in the public interest.
   - D. When critical or unique resource (wetlands, floodplains, essential big game winter range, threatened or endangered species habitat, historical or cultural resources, critical ecosystems, etc.) exist. Effects are mitigated by reserving interests to protect the resource, or by exchange where other critical resources to be acquired are considered to be of equal or greater value.

5. Effect jurisdiction transfers which achieve the following objectives:
   - A. Reduce duplication of efforts by users and agencies in terms of time, cost, and coordination.
   - B. Improve or maintain user access to the administering agency.
   - C. Decrease travel and enhance management.
   - D. Improve public understanding of applicable laws, regulations, policies, and procedures.
   - E. Develop more effective and efficient work units.
   - F. Reduce administrative cost.
B. MANAGEMENT PRESCRIPTION

MANAGEMENT ACTIVITIES

GENERAL DIRECTION

<table>
<thead>
<tr>
<th>Property Boundary</th>
<th>1. Locate, mark, and post landlines according to the following priorities:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location (J06)</td>
<td>A. Lines needed to meet planned activities,</td>
</tr>
<tr>
<td></td>
<td>B. Lines needed to protect NFS lands from encroachment</td>
</tr>
<tr>
<td></td>
<td>C. All other lines.</td>
</tr>
</tbody>
</table>

Soil Resource Management (KA1)

<table>
<thead>
<tr>
<th>1. Maintain soil productivity, minimize man-caused soil erosion, and maintain the integrity of associated ecosystem.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Use site preparation methods which are designed to keep fertile, friable topsoil essentially intact.</td>
</tr>
<tr>
<td>B. Give roads and trails special design considerations to prevent resource damage on capability areas containing</td>
</tr>
<tr>
<td>soils with high shrink-swell capacity.</td>
</tr>
<tr>
<td>C. Provide adequate road and trail cross drainage to reduce sediment transport energy.</td>
</tr>
<tr>
<td>D. Revegetate all areas capable of supporting vegetation, disturbed during road construction and/or reconstruction</td>
</tr>
<tr>
<td>to stabilize the area and reduce soil erosion.</td>
</tr>
<tr>
<td>E. Prevent livestock and wildlife grazing which reduces the percent of plant cover to less than the amount needed</td>
</tr>
<tr>
<td>for watershed protection and plant health.</td>
</tr>
<tr>
<td>F. Place tractor-built firelines on the contour where practical, and avoid use of tractors on highly erodible</td>
</tr>
<tr>
<td>sites.</td>
</tr>
<tr>
<td>G. Provide natural channel drainage and establish protective vegetative cover on all new roads or equipment ways,</td>
</tr>
<tr>
<td>and all existing roads which are being removed from the transportation system.</td>
</tr>
<tr>
<td>H. Minimize soil compaction by limiting vehicle travel; skidding on snow, frozen or dry soil; or using off-ground</td>
</tr>
<tr>
<td>logging systems.</td>
</tr>
<tr>
<td>I. Restore disturbed soil areas caused by human use to soil loss tolerance levels commensurate with the natural</td>
</tr>
<tr>
<td>ecological processes for the treatment areas.</td>
</tr>
</tbody>
</table>

2. Repair and improve degraded watershed areas through initiation of watershed restoration projects. 

3. Maintain watershed improvement structures as necessary. 

STANDARDS AND GUIDELINES

A. Use the following standards and guidelines unless more site specific requirements are developed during project design.

1. Limit intensive ground disturbing activities on unstable slopes and highly erodible sites.
3. Chisel or rip compacted soils. Soils are considered compacted where there is a 15 percent increase in bulk density or 50 percent decrease in macro pore space.

A. Eliminate watershed restoration backlog by year 2000.
B. Base priority of watershed restoration projects on watershed improvement needs inventory & cost-benefit analysis emphasizing improvement opportunities in wet meadows and riparian areas.

A. Develop a watershed maintenance plan, including inventory and inspection schedules, for all watershed improvement structures.
B. MANAGEMENT PRESCRIPTION

MANAGEMENT ACTIVITIES

GENERAL DIRECTION

STANDARDS AND GUIDELINES

4. Identify at the project level, upland areas that are immediately adjacent to riparian (prescription 9A) management areas. Adjacent upland areas are those portions of a management area which, when subjected to management activities have a potential for directly affecting the condition of the adjacent riparian management area. The magnitude of effects is dependent upon slope steepness, and the kind, amount, and location of surface and vegetation disturbance within the adjacent upland unit.

A. The following is a guide to identifying the approximate extent of adjacent upland areas:

<table>
<thead>
<tr>
<th>% Slope Range</th>
<th>Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-20</td>
<td>100</td>
</tr>
<tr>
<td>20-30</td>
<td>180</td>
</tr>
<tr>
<td>30-40</td>
<td>280</td>
</tr>
<tr>
<td>40-50</td>
<td>480</td>
</tr>
<tr>
<td>50-60</td>
<td>520</td>
</tr>
<tr>
<td>60-70</td>
<td>640</td>
</tr>
<tr>
<td>70-80</td>
<td>760</td>
</tr>
<tr>
<td>80-90</td>
<td>880</td>
</tr>
<tr>
<td>90-100</td>
<td>1000</td>
</tr>
<tr>
<td>100-150</td>
<td>1000-1300</td>
</tr>
</tbody>
</table>

B. Reduce, through designed management practices and appropriate erosion mitigation and vegetation/restoration measures, the project caused on-site erosion rates (calculated with appropriate universal soil loss equation methodology) by 75% within the 1st year after disturbance. Reduce project caused on-site erosion by 95 percent within five years after initial disturbance.

C. Design continuing mitigation/restoration practices and follow-up maintenance activities to ensure that 80 percent original ground cover (vegetation) recovery occurs within five years after disturbance.

Transportation System Management (LO1 and 20)

1. Classify areas as to whether off-road vehicle use is permitted.

2. Manage road use by seasonal closure if:
   A. Use causes unacceptable damage to soil and water resources due to weather or seasonal conditions.

   A. Specify off-road vehicle restrictions based on ORV use management.
**Arterial and Collector Road Construction and Reconstruction (L02 thru L09, L16 thru L18)**

1. Construct and reconstruct arterial and collector roads to meet multiple resource needs.

**A. Construction and reconstruction standards for arterial and collector roads are:**

<table>
<thead>
<tr>
<th>Standard</th>
<th>Arterial</th>
<th>Collector</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Travel</strong> AVERAGE</td>
<td>30-35 MPH</td>
<td>10-30 MPH</td>
</tr>
<tr>
<td><strong>Speed</strong></td>
<td>Generally</td>
<td>2 lanes</td>
</tr>
<tr>
<td><strong>Surface</strong></td>
<td>All weather generally gravel or native asphalt or gravel</td>
<td>Generally asphalt or gravel surface, sometimes asphalt</td>
</tr>
</tbody>
</table>
### B. MANAGEMENT PRESCRIPTION

#### MANAGEMENT ACTIVITIES

| Local Road Construction and Reconstruction (L11, 12 and 13) | 1. Construct and reconstruct local roads to provide access for specific resource activities such as campgrounds, trailheads, timber sales, range allotments, mineral leases, etc., with the minimum amount of earthwork. |

#### GENERAL DIRECTION

<table>
<thead>
<tr>
<th>Width</th>
<th>Typically 24 to 28 feet, but some single lane with intervisible 10 foot turnouts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drainage</td>
<td>Permanent, not to impede traffic</td>
</tr>
</tbody>
</table>

#### STANDARDS AND GUIDELINES

<table>
<thead>
<tr>
<th>TRAVEL</th>
<th>AVERAGE LESS THAN 5-15 MPH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lanes</td>
<td>Usually single lane, except for developed recreation sites.</td>
</tr>
<tr>
<td>Surface</td>
<td>Varies from asphalt to native surface, majority are native surface.</td>
</tr>
<tr>
<td>Width</td>
<td>Typically 14 feet; turnouts optional, depending upon traffic management, usually intervisible.</td>
</tr>
<tr>
<td>Drainage</td>
<td>Dips and culverts</td>
</tr>
</tbody>
</table>

---

#### Road Maintenance (L19)

1. Maintain all roads to the following minimum requirements:
   - A. All arterial and open collectors - Level 1 and above,
   - B. All open local roads - Level 2 and above, and
   - C. All closed roads - Level 1.

A. Levels of maintenance:

1. Basic custodial maintenance is performed to protect the road investment and to keep damage to adjacent resources to an acceptable level. Drainage facilities and runoff patterns are maintained while being maintained at Level 1, roads are closed or blocked to traffic.
2. Roads in this maintenance level are normally characterized as single lane, primitive type facilities intended for use by high clearance vehicles. Passenger car traffic is not a consideration.
B. MANAGEMENT PRESCRIPTION
MANAGEMENT ACTIVITIES

GENERAL DIRECTION

STANDARDS AND GUIDELINES

Level 3. Roads at this maintenance level are normally characterized as low speed, single lane with turnouts and spot surfacing. Some roads may be fully surfaced with either native or processed material. The functional classification of these roads is normally local or minor collector.

Level 4. This level is assigned where management direction requires the road to provide a moderate degree of user comfort and convenience at moderate travel speeds. Traffic volumes are normally sufficient to require a double lane aggregate surfaced road. Some roads may be single lane and some may be paved and/or dust abated. The functional classification of these roads is normally collector or minor arterial.

Level 5. This level is assigned where management direction requires the road to provide a high degree of user comfort and convenience. These roads are normally double lane, paved facilities. Some may be aggregate surfaced and dust abated. Functional classification of these roads is normally arterial.

2. Maintain structures, bridges, cattleguards, etc., to be structurally sound and safe for use.

Trail System Management (L23)

1. Maintain all trails travel unless specifically closed to either or both class of user.

2. Maintain all trails in accordance with the standards in the Trail Handbook (FSH 7709.12).

Trail Construction and Reconstruction (L22)

1. Construct or reconstruct trails when needed as part of the transportation system.

Dam Administration and Maintenance (L28)

1. Design impoundments to conform to visual quality objectives established for the project.

A. Cross drains and conveyance structures are planned according to Forest design standards.
2. Provide opportunities for dispersed and developed recreation adjacent to the impoundment site that are commensurate with land and water capabilities and the multiple use goals for the project.

3. Require new impoundment projects to provide recreation facilities in one of two ways:
   A. Proponent will provide facilities meeting Forest Service standards and requirements.
   B. Forest Service will construct facilities at expense of proponent.

4. Allow hunting and fishing subject to State laws and regulations.

5. Design impoundments so that a lake fishery is created or enhanced.

6. Provide the instream flows and conservation pools necessary to maintain fisheries and wildlife habitat. Provide mitigation or compensation measures as determined in cooperation with the Utah DWR and the U.S. Fish and Wildlife Service.

7. Encourage riparian habitat by establishing vegetation on potential areas around the periphery of the impoundment.

8. Resolve conflicts between livestock use and recreation/water quality/wildlife in favor of the latter.

9. Clear merchantable and unmerchantable trees and shrubs to a line two feet above the high water line when this vegetation will later substantially interfere with water level regulation, recreation use or public safety.

A. Base tree removal on an evaluation of: clearing costs, wildlife habitat, fire danger, site esthetics, public safety and utilization for recreation, dam spillway capacity and plugging problems and maintenance (FSM 7531.4)

B. Clear the entire pool area if the brush remaining creates greater use, maintenance, user safety and dam safety costs than clearing costs.

10. Coordinate design, water rights, diversions, etc., with State laws and regulations.

11. Revegetate areas of exposed soils.
<table>
<thead>
<tr>
<th><strong>B. MANAGEMENT PRESCRIPTION</strong></th>
<th><strong>GENERAL DIRECTION</strong></th>
<th><strong>STANDARDS AND GUIDELINES</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MANAGEMENT ACTIVITIES</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fire Planning and</td>
<td><strong>1. Plan and provide a level of protection from wildfire that will meet management objectives for the area, considering the following:</strong>&lt;br&gt; A. The values of the resources that are threatened by fire,&lt;br&gt; B. The probability of fire occurrence,&lt;br&gt; C. The fuelbed that fires will probably occur in,&lt;br&gt; D. The weather conditions that will probably influence fires that occur,&lt;br&gt; E. The costs of fire protection programs (FFP and FPF),&lt;br&gt; F. The social, economic, political, cultural, environmental, life and property concerns, and&lt;br&gt; G. Management objectives for the area. Use the National Fire Management Analysis Process (NFMAS).**</td>
<td></td>
</tr>
<tr>
<td>Suppression (PO1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Escaped Fire Suppression</strong></td>
<td><strong>1. Take suppression action on all escaped fires considering the following:</strong>&lt;br&gt; A. The values of the resources threatened by the fire (both positive and negative),&lt;br&gt; B. Management objectives for the threatened area(s),&lt;br&gt; C. The fuelbeds the fire may burn in,&lt;br&gt; D. The current and projected weather conditions that will influence fire behavior,&lt;br&gt; E. Natural barriers and fuel breaks,&lt;br&gt; F. Social, economic, political, cultural, and environmental concerns,&lt;br&gt; G. Public safety,&lt;br&gt; H. Firefighter safety, and&lt;br&gt; I. Costs of alternative suppression strategies. Use the Escaped Fire Situation Analysis (EFSA) to make this determination.**</td>
<td></td>
</tr>
<tr>
<td>(PO9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fuel Treatment</td>
<td><strong>1. Maintain fuel conditions which permit fire suppression forces to meet fire protection objectives for the area.</strong></td>
<td><strong>A. Reduce or otherwise treat all fuels so the potential fireline intensity of an area will not exceed 400 BTU's/sec/ft (B.I.-68) on 90 percent of the days during the regular fire season,</strong>&lt;br&gt; <strong>OR</strong>&lt;br&gt; <strong>Break up continuous fuel concentrations exceeding the above standard into manageable units with fuel breaks or fire lanes,</strong>&lt;br&gt; <strong>OR</strong>&lt;br&gt; <strong>Provide additional protection for areas exceeding the above standards when such protection will not be required for more than five years.</strong></td>
</tr>
<tr>
<td><strong>B. MANAGEMENT PRESCRIPTION</strong></td>
<td><strong>GENERAL DIRECTION</strong></td>
<td>STANDARDS AND GUIDELINES</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>------------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td><strong>MANAGEMENT ACTIVITIES</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Vegetation Treated by</strong></td>
<td>1. Use prescribed fire to accomplish resource management objectives, such as reducing fuel load buildup, wildlife habitat improvement, etc.</td>
<td>A. Prescribed burning on National Forest System lands will be planned in accordance with existing direction and forest direction must be consistent with Federal and State laws.</td>
</tr>
<tr>
<td>Burning (P15)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Air Resource Management</strong></td>
<td>2. Limit use of prescribed fire on areas in or adjacent to riparian areas to protect riparian and aquatic values.</td>
<td></td>
</tr>
<tr>
<td>(P16)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Insect and Disease</strong></td>
<td>1. Comply with State and Federal Air Quality Standards. (FSM 2120 and 5180)</td>
<td></td>
</tr>
<tr>
<td>Management/Suppression (P35)</td>
<td>1. Prevent or suppress epidemic insect and disease populations that threaten forest stands with an integrated pest management (IPM) approach consistent with resource management objectives.</td>
<td></td>
</tr>
</tbody>
</table>
This section describes the 20 Management Areas on the Forest, and the management direction, and standards and guidelines that apply to each area. The standards and guidelines which apply universally to all management areas are discussed earlier in the Chapter. The proposed and probable management practices which list, by resource, specific projects to be accomplished in each Management Area are shown Chapter VII, Appendix B.

The Forest was divided into Management Areas to facilitate implementation of the Forest Plan. Each Management Area is composed of lands to which the management prescription will apply.

The Forest Plan map displays the location(s) of the Management Areas using a number and letter code that identifies the prescription.

The Management Areas, listed by code number, name, acres, and page number follow:

<table>
<thead>
<tr>
<th>Area Number</th>
<th>Name</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1A</td>
<td>Developed Recreation</td>
<td>IV-57</td>
</tr>
<tr>
<td>1B</td>
<td>Winter Sports Sites</td>
<td>IV-60</td>
</tr>
<tr>
<td>2A</td>
<td>Semi Primitive Recreation</td>
<td>IV-63</td>
</tr>
<tr>
<td>2B</td>
<td>Roaded Natural Recreation</td>
<td>IV-68</td>
</tr>
<tr>
<td>4A</td>
<td>Fish &amp; Aquatic Habitat</td>
<td>IV-73</td>
</tr>
<tr>
<td>4B</td>
<td>Wildlife Habitat-Mix. Species</td>
<td>IV-82</td>
</tr>
<tr>
<td>4C</td>
<td>Wildlife Habitat-Brushy Range</td>
<td>IV-88</td>
</tr>
<tr>
<td>4D</td>
<td>Aspen Mgt. for Wildlife</td>
<td>IV-93</td>
</tr>
<tr>
<td>5A</td>
<td>Big Game Winter Range</td>
<td>IV-97</td>
</tr>
<tr>
<td>5B</td>
<td>Big Game Winter Range</td>
<td>IV-102</td>
</tr>
<tr>
<td>6A</td>
<td>Livestock Grazing</td>
<td>IV-109</td>
</tr>
<tr>
<td>7A</td>
<td>Wood Prod. &amp; Utilization</td>
<td>IV-114</td>
</tr>
<tr>
<td>8A</td>
<td>Wilderness</td>
<td>IV-121</td>
</tr>
<tr>
<td>8A1</td>
<td>Antone Bench Exclusion</td>
<td>IV-126</td>
</tr>
<tr>
<td>8A2</td>
<td>Other Box Death Hollow Enclosure</td>
<td>IV-131</td>
</tr>
<tr>
<td>9A</td>
<td>Riparian Management</td>
<td>IV-135</td>
</tr>
<tr>
<td>9B</td>
<td>Riparian Management Int.</td>
<td>IV-144</td>
</tr>
<tr>
<td>10A</td>
<td>Research Natural Area</td>
<td>IV-153</td>
</tr>
<tr>
<td>10B</td>
<td>Municipal Watersheds</td>
<td>IV-156</td>
</tr>
<tr>
<td>PRACTICES/MIN CODE</td>
<td>MANAGEMENT DIRECTION</td>
<td>STANDARDS AND GUIDELINES</td>
</tr>
<tr>
<td>--------------------</td>
<td>----------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>Visualization Resource Management (AO4)</td>
<td>1. Emphasize visually appealing landscapes (vista openings, rock outcroppings, diversity of vegetation, etc.)</td>
<td>A. Do not go below an adopted VIS Quality Objective (VQO) of: -Partial retention in development level 2 sites. -Modification in development level 3, 4 and 5 sites.</td>
</tr>
<tr>
<td>Recreation Site Construction and Rehabilitation (AO5 and 06)</td>
<td>2. Facilities may dominate, but will harmonize and blend with the natural foreground and middleground landscape.</td>
<td>B. Sensitivity Level: Development level 3, 4 and 5 sites are sensitivity level one.</td>
</tr>
<tr>
<td>Management of Developed Recreation Sites (AO8, 09, 11 and 13)</td>
<td>1. Design facilities and access to provide site protection, efficient maintenance, and user convenience. Design developed sites to ensure that capacity is not exceeded except during heavily used weekends and holidays.</td>
<td>C. Apply rehabilitation practices where the above objectives are not currently being met.</td>
</tr>
<tr>
<td></td>
<td>2. Provide at least 10 percent of the units in level 3 and 4 camp and picnic sites to accommodate two or more family groups.</td>
<td>A. Construct and reconstruct existing and new developed sites in accordance with the guideline in FSM 2331.</td>
</tr>
<tr>
<td></td>
<td>1. Maintain all developed sites in accordance with Regional acceptable work standards (FSM 1310)</td>
<td></td>
</tr>
<tr>
<td>PRACTICES/MIN CODE</td>
<td>MANAGEMENT DIRECTION (01A)</td>
<td>STANDARDS AND GUIDELINES</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>--------------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Range Resource Management</td>
<td>1. Manage livestock grazing to enhance recreation opportunities in existing and proposed recreation sites.</td>
<td>A. Construct fences of material other than barbed wire around developed sites.</td>
</tr>
<tr>
<td>(D07)</td>
<td>2. Exclude grazing of recreational stock and livestock in developed recreation sites.</td>
<td>A. Maintain vegetation in fair or better range condition.</td>
</tr>
<tr>
<td>Silvicultural Prescriptions</td>
<td>1. Manage tree stands to enhance visual quality and recreation opportunities on existing and proposed recreation sites.</td>
<td></td>
</tr>
<tr>
<td>(E03, 06, and 07)</td>
<td>2. Remove unsafe or dead trees in developed sites. Plant new trees to provide desired tree cover.</td>
<td></td>
</tr>
<tr>
<td>Mineral Management</td>
<td>1. Review and process mineral lease applications, permits, and licenses in a timely fashion, recommending to Bureau of Land Management measures and stipulations necessary to protect surface resources.</td>
<td>A. Include applicable no surface occupancy special stipulations (See Appendix C)</td>
</tr>
<tr>
<td>Oil, Gas and Geothermal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water Resource Improvement and</td>
<td>1. Within riparian areas apply management direction in riparian area prescription except as amended by the direction in this prescription.</td>
<td>A. Use &quot;Chapter 6 of State of Utah Public Drinking Water Regulations as a guide.</td>
</tr>
<tr>
<td>Maintenance</td>
<td>2. Provide for special protection zone within 1500 feet up gradient and 100 feet down gradient of spring sources of water supplies.</td>
<td>B. Consider mineral entry withdrawals or restrictive lease stipulations to protect quantity and quality of water supplies.</td>
</tr>
</tbody>
</table>
MANAGEMENT AREA 1B
WINTER SPORTS SITES

Characteristics

This management area occurs in the Brian Head-Crystal Mountain area on the Cedar City Ranger District.

Desired Future Condition

Any ski area development on the Forest will remain in the Brian Head-Crystal Mountain area. All expansion in this area will be according to an approved master plan. Runs and lift lines will be blended into the existing environment through vegetation management and the use of existing openings. Buildings and structures on the Forest will be designed to duplicate features that exist naturally. Colors used on man-made structures will meet the safety requirements of a ski area and match colors found in the characteristic landscape.

Size

This management area contains 3800 acres. Three thousand forty acres are unsuitable for timber harvest.

Management Area Direction

Management emphasis provides for downhill skiing on existing sites and maintains selected inventoried sites for future downhill skiing recreation opportunities. Management integrates ski area development and use with other resource management to provide healthy tree stands, vegetative diversity, forage production for wildlife and livestock, and opportunities for nonmotorized recreation.

Visual resources are managed so that the character is one of forested areas interspersed with openings of varying widths and shapes. Facilities may dominate, but harmonize and blend with the natural setting. Harvest methods in forested areas between ski runs is clearcutting in aspen, shelterwood in ponderosa pine and mixed conifers, and group selection in Engelmann spruce-subalpine fir, or as specified in the permittee's site-specific development plan.
<table>
<thead>
<tr>
<th>PRACTICES/HI CODE</th>
<th>MANAGEMENT DIRECTION (O1B)</th>
<th>STANDARDS AND GUIDELINES</th>
</tr>
</thead>
</table>
| Visual Resource Management (A04) | 1. Emphasize visually appealing landscapes (vis-a-vis openings, rock outcroppings, diversity of vegetation, etc.) | A. Do not go below an adopted Visual Quality Objective (VQO) of modification  
B. Apply rehabilitation practices where the above objectives are not currently being met. |
| Recreation Site Construction and Rehabilitation (A05 and 06) | 1. Design and locate improvements on winter sport sites to provide safety to users and to harmonize with the natural environment. | A. Follow construction, reconstruction standards specified in the approved master development plan. |
| Management of Developed Recreation Sites (A08, 09, 11 and 13) | 1. Provide opportunities for year-round recreation use of the permitted area and facilities. | |
| Range Resource Management (D07) | 1. Manage livestock grazing to enhance recreation opportunities in existing and proposed recreation sites. | A. Maintain vegetation in fair or better range condition. |
| Silvicultural Prescriptions (E03, 06 and 07) | 1. Manage forest cover types on the permitted area to enhance visual quality, diversity, and recreation opportunities and to provide for a healthy forest cover in existing and proposed winter sports sites. Specific timber management prescription to be determined by certified silviculturist.  
2. Limit timber harvest activities to periods of low recreation use activity or to coincide with ski area construction activity.  
4. The combined water yield effects of type conversion on ski runs and increased on-site water from stand regeneration must be determined. Do not exceed threshold limits of water quality and drainage system stability.  
6. For management purposes of forested areas between ski trails or other openings, a cut-over area is considered an opening until such time as:  
-Forage and/or browse production drops below 40 percent of potential production;  
-Deer and elk hiding cover reaches 60 percent of potential; | A. When the visual quality objective of an area is modification or maximum modification the regenerated stand shall meet or exceed all of the following characteristics before a cutover area is no longer considered an opening: |


- Minimum stocking standards specified in the silvicultural prescription are met; and
- The area appears as a young forest rather than a restocked opening, and takes on the appearance of the adjoining characteristic landscape.

<table>
<thead>
<tr>
<th>FOREST COVER TYPE</th>
<th>STANDARDS AND GUIDELINES</th>
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</thead>
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<tr>
<td>MINIMUM STANDING</td>
<td>TREE STANDING</td>
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<tr>
<td>(TREES/ACRE)</td>
<td>(FEET) 1/</td>
</tr>
<tr>
<td>Ponderosa Pine</td>
<td>150 2/ 6</td>
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<tr>
<td>Mixed Conifers</td>
<td>150 2/ 6</td>
</tr>
<tr>
<td>Engelmann Spruce-Subalpine Fir</td>
<td>150 2/ 6</td>
</tr>
<tr>
<td>Aspen</td>
<td>300 6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FOREST COVER TYPE</th>
<th>STANDARDS AND GUIDELINES</th>
</tr>
</thead>
<tbody>
<tr>
<td>CROWN CLOSURE DISTRI-PERSION</td>
<td>3/</td>
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<tr>
<td>(PERCENT)</td>
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</tr>
<tr>
<td>Ponderosa Pine</td>
<td>30 60%</td>
</tr>
<tr>
<td>Mixed Conifers</td>
<td>30 60%</td>
</tr>
<tr>
<td>Engelmann Spruce-Subalpine Fir</td>
<td>30 60%</td>
</tr>
<tr>
<td>Aspen</td>
<td>30 75%</td>
</tr>
</tbody>
</table>

1/ Applies to trees specified at minimum stocking level
2/ Or as otherwise specified in the Silvicultural Prescription
3/ Percent of plots or transects that are stocked.

**Local Road Construction and Reconstruction (L11, 12 and 13)**

1. Design and locate local roads in the permitted area.
   A. To facilitate management of tree stands and wildlife as well as recreation; and
   B. With the minimum of mileage and earthwork.

**Mineral Management**

1. Review and process mineral lease applications, permits, and licences in a timely fashion recommending to Bureau of Land Mgt. measures and stipulations necessary to protect surface resources.
   A. Include applicable no surface occupancy special stipulations. (See Appendix C)
Characteristics

This management area consists of travel corridors along major traveled routes across the Forest or to specific recreational attractions on the Forest.

Desired Future Condition

This area is characterized by a modified natural environment. Resource modification and utilization practices usually harmonize with the natural environment. In some of the more modified zones within this area utilization practices enhance recreation activities, maintain vegetative cover, and soil. The opportunity to have a high degree of interaction with the natural environment and to face challenges associated with more primitive forms of recreation will not be important. Both motorized and non-motorized forms of recreation are possible in this area. The natural features of the landscape will dominate.

Size

This management area contains 131,700 acres. One hundred twenty four thousand two hundred seventy eight acres are unsuitable for timber harvest.

Management Area Direction

Management emphasis is for rural and roaded-natural recreation opportunities. Motorized and nonmotorized recreation activities such as driving for pleasure, viewing scenery, picnicking, fishing, snowmobiling, and cross-country skiing are possible. Conventional use of highway-type vehicles is provided for in design and construction of facilities. Motorized travel may be prohibited or restricted to designated routes, to protect physical and biological resources.

Visual resources are managed so that management activities maintain or improve the quality of recreation opportunities. Management activities are not evident, remain visually subordinate, or may be dominant, but harmonize and blend with the natural setting. Landscape rehabilitation is used to restore landscapes to a desirable visual quality. Enhancement aimed at increasing positive elements of the landscape to improve visual variety is also used.

The harvest method by Forest cover type is clearcutting in aspen, shelterwood in ponderosa pine, mixed conifer and Englemann spruce-subalpine fir.
**PRACTICES/MIH CODE** | **MANAGEMENT DIRECTION** | **STANDARDS AND GUIDELINES**
---|---|---
**MANAGEMENT PRESCRIPTION 2B - EMPHASIZE RURAL AND ROADED NATURAL RECREATIONAL OPPORTUNITIES**

**Visual Resource Management (A04)**

1. Design and implement management activities to provide a visually appealing landscape. Enhance or provide more viewing opportunities and increase vegetation diversity in selected areas.

**Dispersed Recreation Management (A14 and 15)**

1. Provide roaded natural or rural recreation opportunities along Forest arterial, collector and local roads which are open to public motorized travel. Manage recreation use to provide moderate to high incidence of contact with other groups and individuals.

Where arterial, collector or local roads or areas are closed to public motorized recreation travel, provide for dispersed non-motorized recreation with a moderate to high incidence of contact with other groups and individuals in a roaded natural or rural setting.

---

A. Do not go below an adopted Visual Quality Objective (VQO) of partial retention.

B. Maintain or establish a minimum of 30 percent of the forested area within a unit to provide horizontal diversity.

A. Maximum use and capacity levels are:

- Trail and camp encounters during peak use day may exceed 30 other parties per day.

- Trail and area-wide use capacities:

  ROS CLASS - ROADED NATURAL

  USE | VERY | LOW | LOW | MOD. | HIGH
  --- | --- | --- | --- | --- | ---
  On Trails PAOT/Mile | -- | -- | -- | -- |
  Area-Wide PAOT/Acre | .04 | .08 | 1.2 | 2.5 |

  ROS CLASS - RURAL

  On Trails PAOT/Mile | -- | -- | -- | -- |
  Area-Wide PAOT/Acre | .5 | .8 | 5.0 | 7.5 |

Reduce the above use level co-efficients as necessary to reflect usable acres, patterns of use, and general attractiveness of the specific management area type as described in the ROS User’s Guide, Chapter 25.

Reduce the above use levels where unacceptable changes to the biophysical resources will occur.
<table>
<thead>
<tr>
<th>PRACTICES/MIN CODE</th>
<th>MANAGEMENT DIRECTION (2B)</th>
<th>STANDARDS AND GUIDELINES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recreation Management (Private and Other Public Sector) (A16)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range Resource Management (D07)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silvicultural Prescriptions (E03,05, 06 and 07)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Permit undesignated sites in Frissell Condition Class 1 through 3 where unrestricted camping is permitted.

3. Manage site use and occupancy to maintain sites within Frissell Condition Class 3 except for designated sites which may be Class 4. Close and restore Class 5 sites.

4. Facilities provided include development level 1 and 2 campgrounds, trails suitable for motorized trail bike use, local roads with primitive surface and parking lots at trailheads. Provide signing compatible with intended use.

5. Prohibit motorized vehicle use off Forest System roads and trails (except snowmobiles operating on snow) in subalpine, and other ecosystems, where needed to protect soils, vegetation, or special wildlife habitat.

6. Close roads and trails to motorized travel when the surface would be damaged to the degree that resulting runoff into adjacent water bodies would exceed sediment yield threshold limits.

A. Encourage development of private sector recreation oriented support services.

B. Specify off-road vehicle restrictions based on ORV use management (FSM 2355).
2. Manage forest cover types using the following harvest methods:
   - Clearcut in aspen
   - Shelterwood in ponderosa pine, mixed conifer and Engelmann spruce-subalpine fir
   - Selection/group selection in any forest type except aspen
   - Clearcut (patch) in dwarf mistletoe infected ponderosa pine and Douglas-fir.
   - Or as specified by the silvicultural prescription.

3. Apply intermediate treatments to maintain growing stock level standards as specified in the silvicultural prescription.

4. Utilize firewood material using both commercial and non-commercial methods.

5. For management purposes, a cutover area is considered an opening until such time as:
   - Forage and/or browse production drops below 40 percent of potential production;
   - Deer and elk hiding cover reaches 60 percent of potential;
   - Minimum stocking standards by forest cover type and site productivity are met; and
   - The area appears as a young forest rather than a restocked opening, and takes on the appearance of the adjoining characteristic landscape.

A. When the Visual Quality Objective of an area is partial retention, the regenerated stand shall meet or exceed all of the following characteristics before a cutover area is no longer considered an opening:

<table>
<thead>
<tr>
<th>FOREST COVER TYPE</th>
<th>MINIMUM STOCKING LEVEL</th>
<th>STAND HEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ponderosa Pine</td>
<td>150 2/</td>
<td>25</td>
</tr>
<tr>
<td>Mixed Conifers</td>
<td>150 2/</td>
<td>25</td>
</tr>
<tr>
<td>Engelmann Spruce-Subalpine Fir</td>
<td>150 2/</td>
<td>25</td>
</tr>
<tr>
<td>Aspen</td>
<td>300 2/</td>
<td>25</td>
</tr>
</tbody>
</table>

1. Review and process mineral lease applications, permits, and licenses in a timely fashion referring to Bureau of Land Mgt. measures and stipulations necessary to protect surface resources.

A. Include applicable special stipulations. (See Appendix C)
### Special Use Management (Non-Recreation) (J01)

1. Permit special uses which are complimentary and compatible with the kind and development level of the associated Forest Service facilities within the area.

### Transportation System Management (L01 and 20)

1. Manage public use of roads with techniques such as, seasonal closure, time of day closures, etc.

### Trail System Management (L23)

1. Maintain existing motorized routes or construct new routes needed as part of the transportation system. Develop loop routes and coordinate them to compliment semi-primitive motorized opportunities in adjacent semi-primitive motorized ROS class areas.

### Standards and Guidelines

<table>
<thead>
<tr>
<th>Mixed Conifers</th>
<th>30</th>
<th>60%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engelmann Spruce-Subalpine Fir</td>
<td>30</td>
<td>60%</td>
</tr>
<tr>
<td>Aspen</td>
<td>30</td>
<td>75%</td>
</tr>
</tbody>
</table>

1/ Applies to trees specified at minimum stocking level
2/ Or as otherwise specified in the Silvicultural Prescription
3/ Percent of plots or transects that are stocked.

A. Reference the ROS User's Guide.

A. On all nonforested areas, motorized trail and local road density is not to exceed 2 miles/square mile.
Characteristics

This management area occurs within or is conterminous with the boundary of identified municipal water supply watersheds, including those supplying Teasdale, Escalante, Panguitch, Parowan, Brian Head, Enterprise, and St. George.

Desired Future Condition

Area continues to provide multiple resource outputs without impairment of existing water quality or quantity at presently utilized or potential culinary water spring sources. Quantity and/or quality is improved where feasible.

Size

This management area contains 9100 acres. Eight thousand six acres are unsuitable for timber harvest.

Management Area Direction

Management emphasis is to protect or improve the quality and quantity of municipal water supplies. Management practices are modified.
## B. MANAGEMENT REQUIREMENTS

<table>
<thead>
<tr>
<th>PRACTICES/MIN_CODE</th>
<th>MANAGEMENT DIRECTION</th>
<th>STANDARDS AND GUIDELINES</th>
</tr>
</thead>
<tbody>
<tr>
<td>MANAGEMENT PRESCRIPTION 10E - PROVIDE FOR MUNICIPAL WATERSHEDS AND MUNICIPAL WATER SUPPLY WATERSHEDS</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Visual Resource Management (A04)</strong></td>
<td>1. Management activities in foreground and midground dominate, but harmonize and blend with the natural setting. Management activities may also dominate but appear natural when seen as background.</td>
<td></td>
</tr>
<tr>
<td><strong>Dispersed Recreation Management (A14 &amp; 15)</strong></td>
<td>1. Allow motorized travel only on established roads and trails. Close watershed to all travel when the road or trail surfaces could be damaged to the degree that water quality would be degraded.</td>
<td></td>
</tr>
</tbody>
</table>
| **Range Resource Management (D07)** | 1. Confine livestock trailing to established driveways and historic trailing routes.  
2. Reduce or remove livestock if municipal use water quality is endangered.  
3. Stabilize and/or regenerate areas disturbed by livestock prior to resuming grazing use of the area. |
| **Mineral Management Oil, Gas and Geothermal** | 1. Review and process mineral lease applications, permits and licenses in a timely fashion recommending to Bureau of Land Management measures and stipulations necessary to protect surface resources. |
| | A. Do not go below an adopted visual quality objective (VQO) of maximum modification |
| | A. Include special Stipulation #1. (No-surface-occupancy) for designated areas. (See Appendix C.) |
1. Harvest forest cover types using any harvest method that is silviculturally appropriate and will not contribute to a decrease in water quality.

2. Apply intermediate treatments to maintain growing stock level standards as specified in the silvicultural prescriptions.

3. For management purposes, a cut-over area is considered an opening until such time as:
   - Forage and/or browse production drops below 40 percent of potential production;
   - Deer and elk hiding cover reaches 60 percent of potential;
   - Minimum stocking standards by Forest cover type and site productivity are met;
   - The area appears as a young forest rather than a restocked opening, and takes on the appearance of the adjoining characteristic landscape.

A. When the visual quality objective of an area is modification or maximum modification the regenerated stand shall meet or exceed all of the following characteristics before a cut-over area is no longer considered an opening:

<table>
<thead>
<tr>
<th>Forest Cover Type</th>
<th>Minimum Tree Stocking Level</th>
<th>Tree Stand Height (Trees/Acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ponderosa pine</td>
<td>150 2</td>
<td>6</td>
</tr>
<tr>
<td>Mixed conifers</td>
<td>150 2</td>
<td>6</td>
</tr>
</tbody>
</table>

(See Appendix C.)
1. Immediately rehabilitate man-caused disturbances and restore burned areas. Inspect rehabilitated areas annually and provide maintenance necessary to protect the watershed.

2. Provide for special protection zone within 1500 feet up gradient and 100 feet down gradient of spring sources of Municipal water supplies.

A. Use "Chapter 6 of State of Utah Public Drinking Water Regulations" as a guide.

B. Consider mineral entry withdrawals or restrictive lease stipulations to protect quantity and quality of Municipal water supplies.
APPENDICES 2
The Forest Service uses the most current and complete data available. GIS data and product accuracy may vary. They may be developed from sources of differing accuracy, accurate only at certain scales, based on modeling or interpretation, incomplete while being created or revised, etc.

Using GIS products for purposes other than those for which they were created, may yield inaccurate or misleading results. The Forest Service reserves the right to correct, update, modify, or replace, GIS products without notification.

For specific data source dates and/or additional digital information, contact the Forest Supervisor, Dixie National Forest, Cedar City, Utah.

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Stand In Location 111

Stands In Location 109

Private Land

---

Proposed permit boundary
APPENDICES 5
Dixie National Forest

Brian Head Resort Master Development Plan
Existing Management Areas

Management Areas
1B General Forest Direction
2B Winter Sport Sites
8A Rural and Roaded Recreation Opportunities
10B Municipal Supply Watersheds

* No surface occupancy stipulation for mineral entry

Management Area Boundary (with Code and Acres)

Private Land

Cedar Breaks National Monument

846.76
1B

510.15
1B

4370.13

1077.41
2B#

10B#
119.07

6970.35

29308.17
APPENDICES 7

BRIAN HEAD LIFT EXPANSION
Vegetation Cumulative Effects Area

Timber Sales within the CEA
1. Delong Flat
2. Lowder Creek
3. Hancock Peak/Hancock Peak 2 (proposed)
4. Reifer Ridge (proposed)
5. Blowhard
6. Sage Valley
7. Midway Face
8. Deer Valley
9. Rainbow Meadows/Boundary
10. Sidney Valley
11. Bunker Creek (proposed)
12. Irland/Holycross/Adams (private)
13. Smith/Nichols/Lampman (private)
14. Brian Head
15. Spruces (proposed)
16. Steam Engine Meadows (proposed)
APPENDICES 8
APPENDIX 10, ITEM h - VEGETATION MANAGEMENT

<table>
<thead>
<tr>
<th>SA/A PROJECT</th>
<th>EA DECISION DATE</th>
<th>EA ANALYSIS AREA ACRES</th>
<th>TOTAL TREATED ACRES/DATE</th>
<th>TREATMENT TYPE</th>
<th>REPORT ACRES/ YEAR</th>
<th>THIN ACRES/YEAR</th>
<th>NEW HQ CON MILES/YEAR</th>
<th>OTHER KW</th>
<th>*SPRING/FALL ZONE</th>
<th>ELA</th>
<th>MBO</th>
<th>PEI</th>
<th>VEG</th>
<th>RANGE</th>
<th>RECEIVED</th>
<th>AIR</th>
<th>CULTURAL RESOURCES</th>
<th>SOIL</th>
<th>HYDROGRAPHY</th>
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<tbody>
<tr>
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<td>1984</td>
<td>534</td>
<td>506/68</td>
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<td>3920</td>
<td>3235/99</td>
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<tr>
<td>Blue Springs</td>
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<td>3521</td>
<td>1182/71</td>
<td>int-1183</td>
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** Abbreviations:  
PA: Patch Cut  
CC: Clear Cut  
EV: Even Aged  
Gr: Group Selection  
imp: Improvement  
int: Intermediate  
nm: individual  
ja: jobs  
Cmn: Commercial Precommercial  
Ob: Overlay Removal  
Psd: Patch Cut Aspen  
Po: - Precommercial  
Rpp: - Riparian Protection  
Sel: Sedge  
Sec: Shrubwood Seed Cuts  
Tm: - Total improvement  
Un: Unmerchantable  
Sbn: - Suction

* - SF Habitat includes  
- 8-Tree Whipplecer  
- Red-tailed Hawk  
- Northern Mockingbird  
- Western Scrub Jay  
- Northern Flicker  
- 35% of 30 ac acs of Deer Valley Sedges were included in these acres  
- 25 yrs as of Timp Peak in Veg CEA

**255 ac of Timp Peak in Veg CEA

***Assumed 30% of Deer Valley Sedges were included in these acres

10,293 acres

10,343 acres

*NEPA/Decision Documents unavailable
APPENDICES 10
APPENDICES 11