III. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

A. INTRODUCTION

Chapter III describes the existing physical, biological, and social and economic components of the project area, which may be affected by each of the alternatives. The purpose of this chapter is to give a detailed overview of the study area's immediate and surrounding environment. CEQ regulations direct agencies to succinctly describe the environment that may be affected by the alternatives under consideration, including the No Action alternative.[1] The description of existing conditions for each resource in this chapter is followed by an analysis of the environmental consequences associated with the selection of each alternative. The direct, indirect, and cumulative effects anticipated to result with the implementation of each alternative are disclosed.

Chapter III is organized by resource section and follows the following order:

INTRODUCTION

This provides background information pertaining to the resource area, and why it is applicable to this analysis.

SCOPE OF THE ANALYSIS

The scope briefly describes the geographic area(s) likely to be affected by the alternative for each resource. Spatial areas may be different for direct, indirect, and cumulative effects.

FOREST PLAN DIRECTION

This section summarizes pertinent Forest Plan direction and defines the management objectives for each resource.

CURRENT CONDITION

The current condition describes the existing condition of the resource, based upon current uses and management.

DIRECT AND INDIRECT ENVIRONMENTAL EFFECTS

This section describes and analyzes the direct and indirect effects anticipated to result with the selection of each of the respective alternatives.

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

[1] 40 CFR 1502.15

CUMULATIVE EFFECTS

Cumulative effects are the result of the incremental effects of any action when combined with other past, present, and reasonably foreseeable future actions, and can result from individually minor, but collectively significant actions taking place over time.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

An irreversible commitment is a permanent or essentially permanent use or loss of resources; it cannot be reversed, except in the extreme long term. Examples include minerals that have been extracted or soil productivity that has been lost. An irretrievable commitment is a loss of production or use of resources for a period of time. One example is the use of suited timber land for a logging road. Timber growth on the land is irretrievably lost while the land is a road, but the timber resource is not irreversibly lost because the land could be altered to effectively grow trees in the future. The Forest Service recognizes the fact that certain management activities have the potential to produce irreversible or irretrievable commitments of resources, but these actions follow federal and state laws and Forest Plan standards and guidelines that keep the commitments within acceptable limits.

FOREST PLAN CONSISTENCY

This section demonstrates whether the predicted effects of each alternative are consistent with Forest Plan standards and guidelines and/or follow Forest Plan direction.

B. AIR QUALITY

INTRODUCTION

The internal scoping process conducted by the Forest Service ID Team identified potential effects to air quality from motor vehicle emissions as a minor issue for evaluation within this document. The general intent of this section is to analyze potential changes in air quality anticipated to result from the incremental increase in visitation to Mt. Rose as a result of the implementation of either action alternative.

Air Quality Regulations

Federal Regulations

The Clean Air Act (CAA) was enacted in 1955, but contained few requirements for reducing air pollutant emissions. It was amended numerous times from 1963 through 1990 to address reductions in vehicle and stationary source emissions and establish national air pollution concentration limits. It also established several programs, including: the National Ambient Air Quality Standards (NAAQS), which limited air concentrations to protect public health and welfare; the New Source Performance Standards, which set emission standards for major sources; and the State Implementation Plan (SIP) procedures, which were designed to bring areas that exceeded NAAQS levels (non-attainment areas) to within the standards. In addition, a program called the Prevention of Significant Deterioration (PSD) was established to help protect clean areas of the country (Class I & II areas). The PSD program established allowable concentration increases from all major sources that could potentially exceed the NAAQS. The PSD program also includes protection of National Parks and Wilderness areas greater than 10,000 acres (Class I areas). Finally, the PSD program established visibility impairment restrictions on major sources impacting the Class I areas.

The Clean Air Act promulgated NAAQS for six criteria pollutants including particulate matter less than 10 microns and 2.5 microns (PM_{10} and $PM_{2.5}$), carbon monoxide and ozone, and a PSD Total Suspended Particulate (TSP) increment for Class I and II areas.

Table III-1 lists the NAAQS and Class II PSD increment values for particulate matter.

Table III-1
National Ambient Air Quality Standards and PSD Increments

Pollutant	Averaging Period	NAAQS (microgram/m^3) unless otherwise noted	Class II PSD Increments (microgram/m^3)
PM_{10} (particulate matter less than 10 microns)	24-Hour Annual	150 50	30 17
$PM_{2.5}$ (particulate matter less than 2.5 microns)	24-hour Annual	65 15	--- ---
CO (Carbon monoxide)	1-hour 8-hour	35 ppm 9 ppm	--- ---
O_3 (Ozone)	1-hour 8-hour	0.12 ppm 0.08 ppm	--- ---

Source: 40 CFR 50

Federal agencies must also conform to the SIPs in areas that exceed the NAAQS. This conformity requirement affects major highway projects and other new traffic generating (indirect) sources. For most ski areas, the level of emissions generated from traffic is small enough such that no conformity demonstration is required.

State Regulations

The State of Nevada has its own air quality standards that are generally based on the federal standards for air quality. The State of Nevada is divided into three jurisdictions, which manage their own air programs, by designation of the Nevada State Legislature.[2] Mt. Rose is situated in Washoe County and is under the jurisdiction of the Washoe County District Health Department, Air Quality Management Division. Currently, the EPA has designated this jurisdiction as a non-attainment area for the following criteria pollutants: carbon monoxide (CO), particulate matter (PM_{10}), and ozone. As required by the EPA under the Clean Air Act, Washoe County has developed State Implementation Plans for this non-attainment area to control emissions from automobiles and other sources.[3] An inspection and maintenance program is in place to reduce automobile exhaust emissions from mobile sources, which includes vehicle registration, annual smog checks, use of oxygenated fuels, and Phase II vapor recovery systems. In addition, PM_{10} reduction requirements include controls for road sanding and fugitive dust emissions from construction projects.

SCOPE OF THE ANALYSIS

The primary area that may be directly, indirectly, and/or cumulatively affected is the area in the vicinity of the Mt. Rose airshed where air emissions associated with increased traffic might occur.

[2] State of Nevada Department of Conservation and Natural Resources Division of Environmental Protection Bureau of Air Quality, Ambient Air Quality Trends 1989 - 2000

[3] Washoe County District Health Department, Air Quality Management Division, personal communication with Linda O'Brien

All Class I and/or sensitive airsheds are located a distance greater than 62 miles (100km) of the project area. Guidance documents released by the EPA Office of Air Quality and Planning state that 62 miles (100km) is an acceptable range for assessing air quality effects on Class I areas.[4] The nearest Class I Wilderness area (the Jarbidge Wilderness Area) is located approximately 270 miles to the northeast.

FOREST PLAN DIRECTION

No specific direction (forest-wide or management area) is provided for air quality in the current Forest Plan. Therefore, the analysis presented in this section was guided by county, state and other federal standards.

CURRENT CONDITION

Air quality in the project area, which is located immediately southwest of the City of Reno, generally meets Washoe County air quality regulations and CAA standards. However, the immediate Reno urban area fails to meet some of the NAAQS. Although the Reno area is not in attainment of the standards for carbon monoxide, ozone, and PM_{10}, the CO and ozone standards have not been exceeded since 1991.[5] These particular pollutants are most closely associated with automobile emissions. Washoe County has exceeded the annual PM_{10} standard at one air quality monitoring site on several occasions. Washoe County intends to undergo a re-designation process for CO and ozone by 2003 to change its current EPA classification from non-attainment to maintenance.[6]

DIRECT AND INDIRECT ENVIRONMENTAL EFFECTS

Effects to air quality anticipated to result with implementation of the Proposed Action or Alternative 3 are emissions related to motor vehicles, such as CO and particulate matter.

Alternative 1 – No Action

Historic traffic data for the Mt. Rose Highway indicates that the average annual daily traffic (AADT) has increased each year, and it is projected to continue to increase in the future.[7] Growth in skier related automobile trips would be expected to continue at current levels under the No Action Alternative. Therefore, no additional contribution to the current growth in AADT on the Mt. Rose Highway would occur under this alternative. Parking facilities would likely be expanded on private lands at the Mt. Rose side (by 175 spaces). The additional parking capacity is intended to ameliorate overcrowded parking conditions on the days when the existing CCC is exceeded. Since growth in ski area related traffic and vehicle trips would remain the same as the existing condition, no specific additional air quality effects would be attributable to the Alternative 1.

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[4] EPA Office of Air Quality Planning and Standards, Research Triangle Park, NC, Memorandum: Clarification of Prevention of Significant Deterioration (PSD) Guidance for Modeling Class 1 Area Impacts, Author: John S. Seitz, Director, October 19, 1992

[5] State of Nevada Department of Conservation and Natural Resources Division of Environmental Protection Bureau of Air Quality, Ambient Air Quality Trends 1989 - 2000

[6] Washoe County District Health Department, Air Quality Management Division, personal communication with Linda O'Brien

[7] See the Traffic and Parking section of this Chapter for a presentation of the specific data.

Alternatives 2 and 3 – The Action Alternatives

Implementation of either of the action alternatives would expand the East Bowl parking lot by approximately 1.75 acres, which would provide approximately 225 additional parking spaces at Mt. Rose. The proposed projects are primarily designed to more effectively accommodate the existing level of daily skier visitation. The proposed ski area improvements would also include vegetation thinning and removal; however, no burning treatment would occur.

Under either of the action alternatives, facility and parking improvements would increase the CCC by 13 percent, resulting in approximately 210 additional vehicle trips per day.[8] Based on the current AADT data, the additional vehicle trips would equate to a two percent increase in the AADT. However, this increase would only be realized during the ski season, and only on those days when the resort is at capacity (typically weekends and holidays). Since exhaust emissions are directly related to vehicle usage, a minor increase in automobile emissions is expected as a result of Alternatives 2 and 3. However, these additional emissions would be negligible and would not have any incremental effect on air quality in the region. Mobile source emissions due to ski area traffic would be well below federal, state, and county air quality standards.

CUMULATIVE EFFECTS

Emissions from ski area traffic are not considered a major source of emissions. General growth in the region may result in increases in traffic, wood burning, and construction activities; these could cumulatively contribute to air emissions. The cumulative effects on existing air quality from past, present, and reasonably foreseeable future actions in the project area would not be significant.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

As a result of slight increases in average winter visitation, minor increases in vehicular emissions would be expected over the long-term. Negligible effects to air quality in the analysis area would result from implementation of the Proposed Action. Although effects to air quality are technically unavoidable, none of them would have a significant effect on the air quality in the area. No irreversible or irretrievable commitment of air resources is expected as a result of alternatives 2 and 3.

FOREST PLAN CONSISTENCY

Forest Plan direction for air quality is not specifically provided, therefore an assessment of the consistency of this air quality analysis with the 1986 Forest Plan is not applicable.

[8] Based on 2.4 people per vehicle

C. CULTURAL RESOURCES

INTRODUCTION

Cultural surveys were completed for all non-surveyed portions of NFS lands proposed for disturbance, as detailed below. The purpose of these surveys was to locate, identify, and evaluate for National Register significance, all historic and/or archaeological artifacts within areas that could potentially be affected by the proposed project.

SCOPE OF THE ANALYSIS

This cultural resources analysis is limited to NFS lands at the East Bowl side of Slide Mountain, as well as the NFS land composing The Chutes area.

FOREST PLAN DIRECTION[9]

Forest-wide Standards and Guidelines

Direction in the Forest Plan calls for full implementation of State Historic Preservation Office (SHPO) standards, as well as standards supported by the archaeological community. Full implementation of these standards and guidelines to manage cultural resources on the Forest and to comply with applicable Federal laws and regulations would include adhering to: the National Historic Preservation Action (NHPA), as amended; Executive Order 11593; the implementing regulations in 36 CFR 800 and 36 CFR 60; supplementary Advisory Council guidelines; the Antiquities Act; and the Archaeological Resources Protection Act.

The Forest Plan also states that a cultural resource inventory will be conducted prior to surface disturbing projects and when there is an agency decision which could have an effect on significant sites in areas where previous survey and evaluation have not been accomplished.

CURRENT CONDITIONS

Two separate surveys were conducted for this proposal to meet Forest Plan requirements. The first was conducted in September 2000 and included three distinct areas within the project area: a five-acre block on the southeast portion of The Chutes (area 1), a 40-acre block to the west of The Chutes (area 2), and the proposed Chutes Return Lift corridor. A second survey conducted in July 2002 covered project elements proposed on NFS lands, including: trails (73 acres); snowmaking (74.8 acres); parking (9.9 acres); picnic areas (one acre); the Chutes Return Lift corridor (2.6 acres); and the snowmaking reservoir (three acres) for a total of approximately 165 acres.

Pre-field research

A Class I file review of The Chutes area was conducted on September 12 and 13, 2000 at the Nevada State Museum and the Carson Ranger District, respectively. The results of the file searches indicated that nine previous inventories have been conducted within one mile of the project area. These inventories were associated with ski resort development, sewer line

[9] USDA Forest Service, 1986

construction, utilities, and road upgrades. One previous inventory encompassed much of The Chutes area – about 160 of the 205 total acres. Two cultural resource sites were recorded within The Chutes area in the previous inventory.

An additional site was noted on the Forest Service Cultural Resource maps but was not found in the Nevada State Museum files. No site form was located for this site. The site was mentioned in a 1987 inventory report as being in the vicinity of the project area, but was not discussed in detail, relocated, or assessed.

Further research included the review of an 1870 Government Land Office (GLO) map of the area. No historic features were noted on this map within the project area.

The two sites previously recorded in the current project area include 26Wa5016 and 26Wa5017. Site 26Wa5016, is a possible log flume, that was recommended ineligible for the National Register of Historical Places (NRHP). Site 26Wa5017 is a possible rock lined depression with a few fragments of aqua glass; this site was recommended ineligible for the NRHP as well. Both of these sites are located on private lands.

Additional pre-field research for areas outside of The Chutes entailed a detailed literature search to determine the prehistoric and historic themes for the project area and to locate previously discovered resources that would be encountered during the field survey. During this literature review the Forest Service and the Nevada State archives in Carson City were consulted, as was the Nevada State Museum Archaeological Records Manager and historic maps at the Nevada State Bureau of Land Management Office in Reno. A total of 274 acres of the entire project area appear to have been previously surveyed.

A total of 14 surveys have been conducted in the present project area; each bisects small areas of the area of potential effect. Of the fifty-one sites identified within one mile of the area potentially affected, only five have been described within the present project's area. Sites located within the present area potentially effected include abandoned portions of the Old Mt. Rose Highway,[10] another short historic road segment,[11] an earthen ditch that may have been the base of a flume with an association of aqua glass with a maker's mark,[12] and a rock lined depression with two associated aqua bottles[13] that was subsequently relocated.[14] Of these few sites, all were evaluated as ineligible for nomination to the National Register except for the rock lined depression, which remains unevaluated.[15]

The lack of a significant number of prehistoric and historic sites within the project area appears to be attributable to the area's elevation and, particularly, its steep topography. Transportation routes across and near the area potentially effected include an informal historic road segment that

[10] Lindström, 2001 and 1998; Zeanah, 1997a, b, and c; and Waechter, 1995
[11] Lindström, 2001
[12] Burke, 1987
[13] Ibid.
[14] Mahoney, 2000
[15] 26Wa5017/TY-3811; Burke 1987 Temporary site #463-18

has been heavily impacted by development[16] and portions of the Old Mt. Rose Highway.[17] All of these historic road segments were determined not eligible for nomination to the NRHP due to integrity issues.

Survey Methods in the Field

The 2000 survey included a Class III inventory was completed by two individuals conducting pedestrian surveys, which transected the project areas. Area 1 was inventoried in its entirety. Area 2 is comprised of 40 acres and contains areas of very steep slopes that were not inventoried (18 acres), as determined by the Forest Archaeologist. The remaining acreage is highly vegetated in the moderately sloped areas (22 acres). Because of this, the areas were intuitively inventoried. The sloping ridge top was examined and areas that were accessible within the highly vegetated portion were examined.

Findings

The pedestrian inventories of the project area resulted in the location and recordation of four previously recorded sites and 13 previously unidentified cultural resources, consisting of five archaeological sites and eight isolated artifacts. A detailed description of each previously unidentified site and isolate is contained within the administrative record for this analysis.[18]

Isolates

Eight isolated artifacts were located and recorded during the survey. These included seven prehistoric artifacts and one possible historic item. Additional data relevant to each isolate is provided in the table that follows. There were areas of heavy accumulation of pine needle duff in the vicinity of isolates 5-7, which limited actual visibility of the ground surface.

Previously Recorded Sites

In addition to the newly identified sites, several previously recorded sites were reported as being within the project's area potentially affected. These sites were identified by means of background research undertaken prior to entering the field. Of the six sites potentially within the area potentially effected, only four are actually within the areas surveyed (TY-50-74, 26Wa6536/TY-4445, 26Wa5016, and 26Wa5017/TY-3811). All four of these previously recorded sites were relocated. Two of these sites are road segments that were recently identified, recorded, and evaluated as being non-significant cultural resources.[19] The revisit to these sites noted no changes to the initial site recordation and an update of their site records has been completed.

The two remaining sites include a possible log flume with aqua bottle glass in association. Because of extremely dense vegetation that was impassable, the area where this site is reportedly located was not accessible. This site was recommended ineligible in 1997. The other site, a possible structural depression also with aqua bottle glass, was recommended unevaluated

[16] Lindström, 2001
[17] Zeanah, 1997a, 1997b, and 1997c; Lindström, 1998
[18] Kautz Environmental, 2002
[19] Lindström 2001.

pending testing. The mapping and descriptions put this site within the general project area but outside the area of proposed direct effects.

NATIONAL REGISTER RECOMMENDATIONS

It is recommended that none of the cultural resource sites or isolated artifacts located and recorded during the course of this survey meet the criteria for eligibility to the National Register of Historic Places. In general, the prehistoric tool scatters do provide a chronological framework consisting of the late Martis Phase of the Middle Archaic period in the Great Basin (1300 - 3000 before present).[20] This date is based upon identification of at least one temporally sensitive projectile point at each site. However, the remaining assemblage is too limited in quantity, form, and functional representation. These sites appear to represent kill or carcass processing sites, have no subsurface deposits, and the potential for recovery of further substantive information important to furthering our understanding of local or regional prehistory is negligible.

The historic sites also are limited and are not historically significant cultural resources, particularly since a definitive chronology with respect to construction and period of use cannot be reliably ascertained. These components and sites are not associated with significant events or persons, do not embody distinctive characteristics of a significant type, period, or method of construction, and the generally limited nature of the assemblages or features suggests that these sites are also unlikely to yield additional information important for furthering our understanding of local and/or regional history.

DIRECT AND INDIRECT ENVIRONMENTAL EFFECTS

Alternative 1 – No Action

Selection of Alternative 1 would result in no direct, indirect, or cumulative impacts to cultural resource sites in the project area. Alternative 1 would continue existing management practices without changes, additions, or upgrades to the portion of the ski area operating on NFS lands.

Alternatives 2 and 3 – The Action Alternatives

No new cultural resource sites or isolated artifacts were identified in the 2000 survey. One of two previously recorded cultural resource sites was encountered. Site 26WA5017 appears as it did when initially recorded and remains unevaluated for the NRHP; it is not located in an area of proposed disturbance and would not be impacted or negatively affected by the proposed projects. The other previously recorded site, 26Wa5016 was recommended ineligible for the NRHP during the initial recordation. Therefore, the Proposed Action would have no effect on any significant cultural resource properties.

The pedestrian inventory in 2002 located, recorded, and evaluated for NRHP significance, five previously unidentified archaeological sites (TY-5173, -5174, -5175, 5176 and -5178). These sites have been recommended as non-significant and, as such, the project will have no effect on significant historic properties. The proposed project will also have no effect on two previously recorded sites, TY-50-74 and TY-4445 (historic road segments), which were previously determined to be non-significant. However, two additional previously recorded sites within the

[20] Elston et al., 1995

project area were not relocated or revisited. One site, 26Wa5016, a possible log flume, is reportedly located in an area which is presently inaccessible because of extremely dense vegetation. It has been evaluated as a non-significant feature not requiring further investigation. Based upon the background research, site 26Wa5017 remains unevaluated with respect to NRHP eligibility. It is outside the area proposed for project improvements.

In areas where lithic tool sites and isolates were observed (basins, picnic areas on ridge tops), pine needle duff frequently covered much of the open area among boulders and outcrops. In the event that previously undiscovered resources (i.e., chipped or ground stone, historic debris, building foundations, or human bone) are identified during ground disturbing activities associated with project implementation, Mt. Rose would cease all work and immediately notify the Forest Service who, in turn, would implement the procedures specified in 36 CFR 800.11(b)(2).

CUMULATIVE EFFECTS

No cumulative effects to cultural resources were identified through this analysis.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

The action alternatives present no irreversible or irretrievable commitments of cultural resources within the area of potential effect because there would be no effects to cultural resources.

FOREST PLAN CONSISTENCY

This analysis indicates no inconsistencies with the 1986 Forest Plan.

D. GEOTECHNICAL ANALYSIS

INTRODUCTION

This geotechnical analysis of the proposed snowmaking pond is excerpted from the document titled: Geotechnical Report, 2001 Mount Rose/Slide Mountain Facilities Improvement Proposed Snowmaking Pond Site.[21] The entire report is part of the project file and is available for review at the Carson Ranger District.

FOREST PLAN DIRECTION

The 1986 Forest Plan contains no standards and guidelines (forest-wide or management area specific) pertaining to engineering of facilities such as the proposed snowmaking pond or associated geotechnical analyses.

SCOPE OF THE ANALYSIS

This analysis specifically addresses the geotechnical feasibility and associated hazards of constructing the proposed snowmaking pond site located above the *Zephyr Traverse* at the East Bowl side of the resort.

CURRENT CONDITION

The SUP lies at the western border of the Great Basin physiographic province and the eastern edge of the Sierra Nevada Physiographic province. The site of the proposed snowmaking pond is at an elevation of approximately 9,500 feet and drains eastward into Washoe Lake through Winters Creek.

Topography

Site topography is relatively flat with steep slopes immediately below the pond site ranging from 16 to 68 percent. Bedrock at the site consists of plutonic igneous rock, specifically a hornblende-biotite granodiorite of upper Cretaceous age. It is predominantly gray and occasionally yellow-gray to pink or white. Outcrops are very common along the ridgelines and somewhat less common on the slopes. Other commonly observed materials include glacial debris (moraines and outwash), debris flow material, and landslide debris.

Geologic Hazards

Potential geologic hazards that were considered in this analysis include landslide, debris flow, avalanche, rockfall, subsidence, expansive soils, and earthquake.

Landslide

Large landslides are not particularly common despite the steep terrain. Most of the mapped landslides are older features that align with faults to the east of the site and are likely the result of past seismic events.

[21] Myers Design Engineering, Inc., 2002

Debris Flow

Debris flow activity is relatively common in the area, although the majority of the activity to date would appear to be associated with the Ophir Creek drainage to the south where a sequence of at least nine separate debris flow events have been mapped. The drainage path for any significant hydrologic event at the snowmaking pond site (including a dam breach flood) is eastward down Winters Creek to the west shore of Washoe Lake. Mapped debris flow deposits are absent on Winters Creek. However, the detailed site topography shows evidence of past debris flow activity and what may be landslide debris approximately one-half mile downstream of the snowmaking pond site and the *Flood and Related Debris Flow Hazards Map*[22] shows a potential debris flow hazard on the Winters Creek fan at US 395. The estimated flood discharge for Winters Creek shown on the hazard map is 500 cubic feet per second (cfs) for a return frequency of 100 years.

Avalanche

Generally, there exists a substantial avalanche risk on all slopes between 26° and 45° (approximately 50 to 100 percent), which is further aggravated in areas that receive high wind loading (at this site, steep northeast facing slopes located just below the ridgeline). However, at Mt. Rose the avalanche hazard is greatly minimized due to routine monitoring and control work by ski patrol.

Rockfall

A rockfall hazard exists on steep slopes located immediately below rock outcrops. The rockfall hazard is increased during and immediately after earthquake events. A severe rockfall hazard exists along the southeast face of Slide Mountain above the Ophir Creek drainage. However, at the snowmaking pond site there is no substantial rockfall hazard. Slopes are gentle to moderate and the exposed rock is massive with widely spaced and poorly organized joints.

Subsidence

The total absence of carbonate rocks (limestone and dolomite) precludes the existence of any karst topography or associated sinkhole development and therefore also precludes the associated subsidence risk. Similarly, although extrusive volcanic rocks are present in the general vicinity of the project area, they are absent from the proposed pond site and there can be no shallow lava tubes that could create a subsidence hazard. No mining activity has existed at the pond site and therefore there are no shafts or stopes that could present a subsidence risk. Subsidence associated with groundwater pumping is not an issue in the massive plutonic rocks at this site.

Expansive Soils

Mechanical weathering dominates over chemical weathering at this relatively high altitude and the residual and colluvial soil products from breaking down the granodiorite tend to be coarse to medium grained sands with little or no clay (i.e., non-plastic). Therefore, the soils are non-expansive (little shrink-swell activity).

[22] Nevada Bureau of Mines and Geology

Earthquake

The Mt. Rose site lies near the western boundary of the Great Basin, a region characterized by spreading and crustal thinning. Analysis of the historic earthquake record shows the following characteristics for the design earthquake (the event which should be used for the design of important facilities) for a facility design life of 100 years:

- Magnitude = 7.5
- Annual Exceedance probability = 1.0%
- Probability of Occurrence During Design Life of 100 years = 63.21%
- Idealized Length of Fault Slip (Rupture Length) = 70 miles
- Probable Maximum Offset = 1.88 meters (6.2 feet)
- Expected Duration of Strong Ground Motion = 30 sec
- Expected Duration of Acceleration greater than 5%g = 31 sec
- Expected Duration of Acceleration greater than 10%g = 15 sec

The above event could occur anywhere within the seismic source area defined by the 100-kilometer (62-mile) radius around the site. However, the effects of earthquake shaking (acceleration, particle velocity, etc.) attenuate quickly with distance. Therefore, the worst-case conditions are likely to come from a nearby source, even if the magnitude of that event is less than the magnitude of the design event from within the entire seismic source area.

Maximum Credible Earthquake

The concept of Maximum Credible Earthquake (MCE) uses the characteristics of a specific fault system to set a practical limit on the magnitude of the event it can generate. It is based primarily on the length and character of the mapped fault rupture. The most likely source of large seismic events in the vicinity of the site is the range front fault system located approximately five miles to the east. These faults have been assigned a MCE magnitude of 7.25.[23]

Seismic Risk

Seismic risk must necessarily consider the potential consequences of the seismic hazard on facilities, equipment, and personnel associated with the project. The nature of the potential impacts varies depending on whether facilities are considered temporary, have a fixed life, or are considered permanent. Facilities can be affected in a number of ways, including liquefaction, surface ground rupture, and seismically induced instability.

DIRECT AND INDIRECT ENVIRONMENTAL CONSEQUENCES

Alternative 1 – No Action Alternative

Because the proposed water impoundment would not be constructed with selection of Alternative 1, there would be no associated safety hazards due to dam breach.

Alternatives 2 and 3

The proposed snowmaking pond is not expected to affect any of the geologic or geotechnical conditions that exist in the project area with the exception of a flood and debris flow hazard in

[23] Bell, 1984

the event of a total failure of the dam embankment and the associated release of the water stored in the reservoir pool. The remainder of this section describes the potential effects of the failure of the dam embankment (the hazard), the likelihood that such a failure might actually occur (the risk), and measures that might be taken to reduce the risk (mitigation).

Modeling

In order to evaluate the potential hazard, a dam breach flood model was developed for the proposed snowmaking pond using the Flood wave program (FLDWAV) developed by the National Weather Service. FLDWAV calculates the peak discharge through the breached dam and routes the flood wave downstream.

In the event of a failure of the snowmaking pond dam, the resulting flood would flow out onto *Bonanza* and subsequently into the Winters Creek channel near the bottom of the run, and eastward down Winters Creek approximately 4.3 miles to the shoreline of Washoe Lake. Most of the flow path is steep and narrow. At approximately three miles the flood would break out onto the Winters Creek alluvial fan and the flow would spread out into a wide, shallow, and potentially divergent flow. A few structures exist on the fan in this area (the USGS quad map indicates the presence of five structures in close proximity to the creek, four to the west of US 395 and one to the east). At a distance of 3.5 miles, the flood would reach US 395. Beyond US 395, at a distance of about 4.3 miles, the flow would be captured and contained by Washoe Lake.

Given the sandy, cohesionless, and erodible nature of the embankment soils, it is expected that the elapsed time from the beginning of a failure to the maximum breach development would be measured in minutes. The proposed snowmaking pond would be installed with a geosynthetic liner that is expected to limit the ultimate breach formation to an elevation approximately seven feet above the pond floor. After some attempts at optimization, the following breach parameters were selected:

- Average breach width = 17.5 feet
- Max width at bottom of breach = 7.0 feet
- Breach side slopes = 1.27:1
- Maximum breach height = 8.0 feet
- Time required for breach development: 7.2 minutes to 12.6 minutes

Two different failure mechanisms were considered; a piping failure (internal erosion), and an overtopping failure. This produced four separate scenarios that were modeled (two failure modes and two breach times). The maximum discharge through the breach varies considerably among the scenarios ranging from 470 cubic feet per second (cfs) to 549 cfs for the piping failure mode and from 311 cfs to 445 cfs for the overtopping failure mode. However, by the time the modeled flood wave reaches the Winters Creek fan near US 395, there is very little difference in the magnitude of the flood discharge in all four scenarios (between 190 cfs and 220 cfs). In the narrow confined channels of the mountainous section of the modeled flow path, flow depth can be as great as 3.5 feet (although the typical depth range is one (1.0) to two (2.0) feet). Once the flow reaches the alluvial fan, the depth falls from roughly 1.0 feet to something less than 0.5 feet just before reaching US 395. Velocities in the steep upper reaches can be as high as 32 feet per second (fps). However, most of the time, the flow velocity would range between 10 and 15 fps.

On the surface of the Winters Creek fan the modeled flow velocity declines from about 10 fps near the apex of the fan to less than four (4) fps near the toe of the fan at US 395. The time required for the flood wave to reach US 395 after the start of a failure is approximately 32 minutes (for a time to peak of 7.2 minutes) and 39 minutes (for a time to peak of 12.6 minutes).

The existing drainage facilities at US 395 are not well equipped to handle a large flood. A 24-inch corrugated metal pipe crosses US 395 at the very tip of the fan with no headwater capacity. Some of the flow would proceed north where an 18-inch culvert in a shallow ditch passes beneath an access road. However, much of the flow would proceed to the south down a riprap-lined ditch to a 24-inch concrete culvert with approximately six feet of headwater capacity. Excess flow reaching this culvert would overtop the pavement at Franktown Road that would act as a wide broadcrested weir (with a maximum width on the order of 600 feet and a maximum flow depth on the order of 1.4 feet). Flows passing over Franktown Road would then proceed southward along the west side of US 395 to the next major drainage at Davis Creek. The combined capacity of the 24-inch concrete culvert and the overtopping of Franktown Road is estimated to be approximately 990 cfs. Depending on the amount and direction of flow distribution on the surface of the fan, the potential exists for US 395 becoming overtopped during a dam breach flood. The flow could be several inches deep and include some sediment and debris.

Hazard Classification

With knowledge of the character of a potential dam breach flood and a map of the areas that would be inundated, it is possible to assign a hazard classification to the dam embankment.

Hazard classifications are based solely on downstream conditions and not on the design of the structure, operating procedures, or the condition of the dam. For structures assigned a low or moderate/significant hazard classification, periodic review of the hazard classification is appropriate to account for potentially changing downstream conditions. A review frequency on the order of five years is typical.

Hazard classifications affect design criteria (primarily spillway design), and the need for and nature of an emergency action plan. An emergency action plan defines appropriate response scenarios for all potential modes of failure and includes specific notification plans (updated at least every two years with current phone numbers), and evacuation plans. All responsible operating staff must be familiar with the emergency action plan.

Conditions downstream of the proposed snowmaking pond are summarized as follows:

- The dam breach flood would be discharged onto *Bonanza*, entering the Winters Creek channel near the base of the run.
- There are no habitable structures within the inundation area for the first 3.4 miles downstream of the dam.
- Five inhabited structures are located beyond 3.4 miles on the alluvial fan.
- The USGS 7.5 minute quad map shows four structures on the Winters Creek fan associated with the Winters Creek Ranch.
- The maximum flow depth at 3.4 miles is expected to be 1.2 feet. Flow depth is rapidly falling at this point as the flow disperses across the surface of the alluvial fan.

Flow depths at structure sites are likely to be less than one foot. Economic loss at this point would be minor to moderate at most.

- The flow path crosses US 395 at a distance of approximately 3.5 miles downstream.
- Existing drainage structures across US 395 do not have sufficient capacity to carry the attenuated dam breach flood of 190 to 220 cfs. Much of the flow would be directed south along the edge of the Highway embankment to an intersection with a secondary road at the southeast corner of the fan. Flow would pond at this point until the secondary road was overtopped, acting as a broad crested weir. A rough estimate of the capacity of this weir (without overtopping US 395) is on the order of 990 cfs. Due to the complexity of flow on the surface of the alluvial fan and the additional uncertainty created by potential debris flow activity, it is not possible at this time to determine with certainty whether or not the flow would overtop US 395. If US 395 were rapidly and unexpectedly overtopped (even though the flow would be only a few inches deep), there would be a potential for loss of human life and moderate economic damage.

There is no simple, quantifiable method for the assignment of a hazard classification to a reservoir. Classification is a matter of judgment and most systems consider two main factors:

- The potential for loss of human life
- The potential for property damage

The approach to hazard classification also varies with the administering entity (usually a state or a federal agency). Two sets of criteria were examined in this study - State of Nevada and Forest Service.

Although there are no habitable structures along the inundation path immediately below the proposed snowmaking pond, a dam breach flood would be released into the ski area at the top of *Bonanza*. Flow would pass to the south of the East Bowl Base lodge, which sits well above the peak water surface elevation. However, unlike other areas with no habitable structures where the potential for loss of life would depend on only the rare, chance occurrence of an individual being in the path of the flood, the ski area is a public facility where it is reasonable to expect that the slopes could potentially be populated with skiers at the time of the passage of a dam breach flood wave, should a breach occur during operating hours and during the ski season. For this reason, the Forest Service staff considers any water storage reservoir having potential to release a flood into the publicly accessible potions of a ski area to be a *high* hazard structure. In addition, there is a credible risk of overtopping US 395 in the event of a failure, which would produce another risk of loss of human life at the US 395 location. Therefore, the proposed impoundment at Mt. Rose would be treated as a *high* hazard structure for purposes of design and subsequent operation.

Risk[24]

The principle determinant of the risk of experiencing a dam breach flood is the structural stability of the dam embankment. Potential failure modes were evaluated to assess failure risk along with the identification of mitigation measures that could reduce failure risk.

Potential dam embankment failure modes considered include the following:

- Overtopping of the embankment crest due to an extreme hydrologic event.
- Overtopping of the embankment crest due to operator error.
- Piping development in the downstream toe of the embankment or in the foundation.
- Static failure of the embankment.
- Embankment failure due to excessive displacement during an earthquake.
- Liquefaction of the embankment foundation.
- Excessive settlement.

Overtopping of the Embankment Crest Due to an Extreme Hydrologic Event or to Operator Error

For a high hazard rating, the required uncontrolled spillway design criterion is the Probable Maximum Flood (PMF). Estimation of the Probable Maximum Precipitation (PMP) and the associated PMF is beyond the scope of this study. However, based on the estimate of the inflow hydrograph for the 100-year, 24-hour flood using the National Oceanic and Atmospheric and Administration (NOAA) Atlas value for the 100-year, 24-hour rainfall depth of five inches, the estimated Qpeak-100yr is 34.2 cfs. The design PMF is likely to be less than 100 cfs. This level of discharge can be easily carried through a modest sized emergency spillway placed in one of the dam abutments. The dam abutments contain granodiorite rock at or very near the surface. Therefore the erosion potential in the floor of the spillway channel would be minimal. The uncontrolled emergency spillway should be checked routinely and frequently as part of normal operations for potential blockage by snow, ice, or debris and cleared if significant blockage is found.

Operator error could result in overfilling the reservoir if pumps were inadvertently left running unattended. However, using an automatic cutoff switch that would shut down pumps when the water surface in the pond reached its maximum storage level would mitigate this risk. A pressure sensing transducer on the bottom of the pond should be used in lieu of a float device at the surface of the pond to prevent interference by ice. Even if automated systems were to experience a total mechanical failure, the uncontrolled emergency spillway would still prevent overtopping. A pump discharge on the order of 300 gallons per minute (gpm) is equivalent to 0.67 cfs and would be orders of magnitude less than the spillway capacity. Due to the very low probability of occurrence of the sequence of events that might lead to an overtopping failure and

[24] It is extremely important to understand the distinction between *hazard* and *risk*. A hazard is a condition, either natural or man-made, that poses a *potential* danger to life and/or property. Hazards exist everywhere around us. The existence of a hazard says absolutely nothing about the likelihood of being impacted by the hazard. Risk is the probability of occurrence of the event that would cause the impact. Stated another way, the hazard associated with a potential dam breach flood is exactly the same whether the dam embankment is a state of the art structure in good condition or a poorly designed/sloppily constructed structure. However, the risk or the probability that the embankment might fail, leading to the occurrence of a dam breach flood, would be dramatically different for those two extremes.

the degree of redundancy possible in mitigation design, there is a very low risk of failure by overtopping.

Piping Development in the Downstream Toe of the Embankment or in the Foundation

Piping involves the transport of solid particles from within an embankment or foundation soil in response to high seepage pressures or seepage velocities. The risk is greatest where certain fine-grained soil types are present and in high head dams (high embankments impounding water to great depth) that can produce high exit gradients (rapidly changing upward pressure gradients in the toe area of the dam). Fine sands and silts that are poorly graded (nearly all the same grain size) are very susceptible to piping. A particularly dangerous soil group is called "dispersive clay." These very fine-grained soils (less than two microns) disaggregate in the presence of water and become extremely mobile. None of these high-risk soils are present at the proposed snowmaking pond site. The soils observed on site consist of medium- to coarse-grained, well-graded sands. "Well graded" refers to a wide variety of different particle sizes that impart good filtering characteristics (large particles hold back the medium sized particles which hold back the small particles and so on) creating a soil with good drainage characteristics and very limited particle mobility. These soils have a low piping potential.

The maximum embankment height is on the order of 17 feet making the structure a small, low head structure. The reservoir area would be lined with a synthetic liner to create a "bathtub" configuration that during normal operations would prevent any release of water to the soil and rock below the reservoir. However, all liners leak at some point in their life through defects in the liner or more often in the seams that that join sheets of liner. The most common defect is a small pinhole leak producing orifice flow through the liner and into the porous soil beneath. Such leaks, even if they were numerous, would not result in saturation of the foundation and embankment, but would perch and flow harmlessly beneath the structure and out on the bedrock/soil interface. A large leak (a major slice or tear in the liner or a long rip in a seam) could release enough water to saturate the foundation and embankment. Due to the shallow depth to rock, a portion of the back of the reservoir is likely to expose rock or even excavate a short distance into weathered rock. If this process were to expose any open, high continuity (long) joints, then it would be possible for water to directly enter these joints and be delivered with little head loss to the area immediately beneath the toe of the dam producing strong upward flow and high exit gradients leading to a piping risk even in the well-graded sands.

This risk can be mitigated in a number of ways. A composite liner system consisting of a synthetic liner above a minimum six-inch thick bedding of compacted clay would restrict the flow volume sufficiently to prevent saturation of the foundation and embankment soils and create enough head loss to reduce high exit gradients in the toe area of the dam. Another approach would be to grout any open fractures exposed during excavation prior to covering with the local sand bedding and the liner. The process of filling open fractures from the surface is sometimes referred to as "dental" grouting or "slush" grouting. The plugging of these fractures would either prevent the entry of water into the fractures or at least create enough head loss to reduce exit pressures at the embankment site. A third option would be injection grouting beneath the embankment foundation. Again, the plugging of fractures in the foundation below the embankment would create enough head loss to reduce exit pressures beneath the downstream toe of the embankment.

Piping does represent a risk to the stability of the structure, but the piping risk can be mitigated to a low risk by taking appropriate measures during final design and construction.

Static Failure of the Embankment

Slope stability failure in the embankment can cause a loss of crest height and an associated risk of overtopping. The risk of instability is increased in the presence of saturated soil conditions and high pore pressure. Under normal operating conditions the embankment and foundation would be expected to be dry. Even in the presence of small to moderate leakage through the liner, the embankment would be expected to remain dry. Slope stability models were developed and analyzed for the downstream embankment of the snowmaking pond. Rapid drawdown conditions were not analyzed for the upstream embankment slopes because the embankment soils are expected to be free draining and incapable of preserving excess pore pressure following a reduction in reservoir water levels, and under normal operating conditions, there is no connection between reservoir water levels and pore water pressures in the embankment soils. Using an embankment slope of 3:1, the factor of safety under both of these conditions is 2.29 indicating a very low risk of instability. Under worst-case conditions of major leakage through the liner, the embankment soils would saturate and establish a steady state seepage profile. The factor of safety under this condition is 1.69 indicating a low risk of instability.

For the proposed embankment slope of 3:1, the risk of static instability is low.

Embankment Failure Due to Excessive Displacement During an Earthquake

Strong ground motion during an earthquake can cause displacements in the embankment that in turn can cause a loss of crest height and an associated risk of overtopping. The potential for unacceptable displacements during an earthquake is checked in a hierarchy of analyses beginning with a psuedostatic limit equilibrium analysis. If the psuedostatic analysis indicates a factor of safety equaling or exceeding 1.15, then there is no need for any additional analysis. For the condition of no leakage or even small to moderate leakage through the liner, the factor of safety is 1.25 indicating a low risk of excessive displacement and no need for further analysis. The combined conditions of major leakage with the development of a steady state seepage profile, and the occurrence of a major earthquake would produce a factor of safety less than 1.15. However, the probability of a large leak going undetected and unmitigated coinciding with the timing of a large earthquake is extremely low (i.e., it is not a reasonable worst case design condition for this structure).

The risk of excessive displacement during an earthquake is low.

Liquefaction of the Embankment Foundation

Test pits revealed loose, cohesionless soils in the upper two feet of the soil profile. However, these soils would not be saturated under conditions in which no leakage, or even small to moderate leakage through the liner, occurs and therefore would not be subject to liquefaction. The combined conditions of major leakage with the development of a steady state seepage profile, and the occurrence of a major earthquake would have an extremely low probability for the same reasons described in the earlier section on excessive displacement. Test pits indicate that the cohesionless soils densify with depth transitioning into hard residual soils and weathered rock at a depth of less than 10 feet. However, the lower portion of the soil profile could be

saturated with only a small to moderate level of leakage through the liner. Based on observations in the test pits these deeper soils are too dense to be liquefiable. However, it would be prudent to check the relative density of entire soil profile and quantify the liquefaction potential of the deeper soils through a site-specific drilling program at the time of final design.

If a liquefaction risk is identified at the time of final design, it can be easily mitigated. Loose soil can simply be removed and replaced with compacted, densified soil, or deep layers can be stabilized with grout. The liquefaction risk is believed to be low, but needs to be verified by site-specific investigation at the time of final design.

Excessive Settlement

Excessive settlement can lead to a loss of crest height and an associated risk of overtopping. Large settlements are typically associated with low-density clay soils. The soils in the foundation area are cohesionless sands becoming progressively denser with depth and terminating against rock at depths of 10 feet or less. Settlement movements in such soils are small, elastic in nature, and immediate. Therefore, little or no settlement movement would be expected after completion of construction. The risk of excessive settlement is very low.

CUMULATIVE EFFECTS

No cumulative effects for dam breach hazard were identified in this geotechnical analysis.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Construction of a five to seven acre-foot capacity water impoundment would entail earth disturbance and installation of an impermeable liner. Thus, for the duration of Mt. Rose's utilization of the impoundment, the area would be committed to water storage. However, construction of the water impoundment is not considered irreversible, as it could be drained and deconstructed should it become obsolete.

Hazard associated with potential dam breach (including loss of life and/or property) could be both irreversible and irretrievable, depending on the timing (i.e., operating vs. off season for Mt. Rose), extent and magnitude of the breach.

FOREST PLAN CONSISTENCY

No forest-wide or management area-specific direction is provided in the 1986 Forest Plan.

E. GUEST SERVICES AND RESORT INFRASTRUCTURE

INTRODUCTION

The majority of the Mt. Rose guest services facilities and infrastructure are located on county and private land. Proposed modifications and expansions to these facilities require approvals that are outside of this NEPA process. However, because these facilities and infrastructure support the recreational experience and the overall use of NFS lands, a description of their current condition and proposed changes is provided.

SCOPE OF THE ANALYSIS

This analysis of guest services and resort infrastructure extends from the NFS lands to the county, and private lands which comprise the two base areas at Mt. Rose.

FOREST PLAN DIRECTION

The Forest Plan directs the agency to: 1) maintain buildings, structures, and utility systems to protect capital investments and, 2) manage, monitor, and maintain all water and wastewater systems to preserve water quality, protect public health, and eliminate potential sources of pollution.[25]

CURRENT CONDITION

Buildings

Mt. Rose Side

The main lodge at the Mt. Rose side was constructed in the 1960s and is approximately 45,000 square feet in size (over three floors). This building houses a restaurant, 800 indoor and outdoor seats, a bar/lounge, restrooms, guest service facilities, ski school, daycare, rentals, retail sales, ticket sales, administration, storage, and circulation/waste. The Mt. Rose lodge is currently compliant with the Americans with Disabilities Act (ADA) and is considered to be in very good condition

A public/employee locker room was constructed in 1998 and is approximately 3,000 square feet in size. Part of this building was converted to a snowboard rental shop in the summer of 2002. Mountain operations at Mt. Rose are conducted out of a 3,400 square foot building constructed in 1992. First aid/ski patrol functions are located in this building.

East Bowl Side

Buildings at the East Bowl side include a small day lodge and a maintenance shop. The East Bowl day lodge was constructed in the 1950s and is approximately 5,700 square feet in size. The day lodge houses a restaurant, 96 indoor seats, restrooms, ticket sales, and ski patrol/first aid. It is not ADA compliant and is considered to be in sub-standard condition.

[25] USDA Forest Service, 1986, pg. IV-56

The maintenance shop is approximately 3,000 square feet in size, and was constructed in the 1970s. These buildings, including the bottom terminal of the Zephyr Lift, are located on Washoe County land.

Septic

Both the Mt. Rose and East Bowl sides rely on septic systems to meet the resort's wastewater treatment needs. Half of the Mt. Rose system is located on private land, while the other half is located on NFS land. This septic system has a 50,000-gallon per day (gpd) treatment capacity. The East Bowl septic system is located on county land and has a 5,000 gpd treatment capacity. Both septic systems are considered by resort management to be inadequate to accommodate anticipated growth concerning Mt. Rose's wastewater treatment needs.

Parking

Parking facilities at East Bowl and Mt. Rose are detailed in the Traffic and Parking section of this Chapter.

Water

Mt. Rose

Domestic water needs on the Mt. Rose side are met by a spring. The spring, located at the bottom of the *Kit Carson* trail, provides a flow of 40 gallons per minute (gpm), which is stored in a 100,000-gallon wooden tank. Water from the spring generally meets guests' needs at the resort (analyzed at five gallons per day/guest).

A well, located at the southwest corner of the private property, provides a flow of 550 gpm, which is stored in a 500,000-gallon steel tank located above the *Galena* trail. Water from the well is used exclusively for snowmaking. Although preliminary tests conducted by the Washoe County District Health Department indicate that water from the well is likely acceptable for domestic use, another year of testing is required before this can occur.

East Bowl

Domestic water at the East Bowl is provided by four separate springs with a variable flow rate ranging from 20 to 50 gpm. Water is stored in two 100,000 gallon steel tanks that are adequate to meet guests' needs on the East Bowl side.

Power

Sierra Pacific Power supplies power to both sides of the resort. Mt. Rose also has a full time auxiliary electric generating facility for use during emergency situations.

Fuel

Diesel fuel is stored in a 10,000-gallon, above ground, tank located at the main parking lot on the Mt. Rose side. Gasoline is stored in a 1,000-gallon, above ground, tank located at the Mountain Operations building on the Mt. Rose side.

Slide Mountain Communication Site

Slide Mountain has been used as an electronic communications site since the 1950s. However, in an effort to restrict unplanned growth until a site plan could be developed, little construction or site development has occurred since 1987. Providing broadcast coverage to Lake Tahoe, Reno, Carson City and surrounding areas, Slide Mountain has grown into one of the largest communications site on NFS lands in the area. The Slide Mountain Communication Site (SMCS) currently serves private and public broadcasting needs for both high and low power users. Current use includes television and radio broadcast facilities, microwave relay, law enforcement agencies, private business communications, and other government agencies. Buildings generally house several users although there are some facilities with only one user. Antennae are mostly self-supporting and are less than 200 feet in height to minimize lightning issues. High power antennae are located on the middle peak; low power uses are scattered across the site and on the tower located on the south peak.

The SMCS is accessed under SUP to the Slide Mountain Users Association, via NFS lands from the Mt. Rose Highway (detailed below). Current summer and winter SCMS traffic between the summit of Slide Mountain and the Mt. Rose Highway typically does not exceed six vehicles per day.

Summer Access

A maintenance road was constructed between the summit of Slide Mountain and the Mt. Rose Highway. The road starts south of Mt. Rose's private property at the Mt. Rose Highway and heads northeast for approximately 500 feet, at which point it intersects the *Around the World* ski trail. The road follows the *Around the World* trail for approximately 1,200 feet. The road then abandons the *Around the World* trail and traverses in an easterly direction to the summit of Slide Mountain.

Theoretically, communication site vehicles traveling to the SMCS could utilize the entire maintenance road; however, the lower section of *Around the World* is too steep for vehicles carrying large loads. Therefore, communication site users typically bypass the lower third of the maintenance road by driving through the Forest Service Mt. Rose campground, which is accessed further south along the Mt. Rose Highway (see Figure II-1). From the campground, the maintenance road can be accessed higher up on *Around the World*. From this point on, the maintenance road is of a suitable grade for vehicular travel. The Forest Service considers the current use of the campground by summertime SMCS vehicle access to be undesirable due to the potential safety hazard that through vehicles pose.

Winter Access

As is the case in the summer, SMCS vehicular access along the portion of the maintenance road that overlaps *Around the World* is deemed unsafe due to the road grade. In addition, it creates safety concerns for descending skiers potentially conflicting with communication site vehicles. Therefore, winter communication site traffic currently bypasses the steep portion of the road on *Around the World* by traveling through the campground.[26] However, in order to avoid potential

[26] Wintertime use of the NFS campground by communication site vehicles is not of particular concern to the Forest Service since the campground does not operate in the winter.

conflicts between descending skiers and communication site vehicles on *Around the World*, each season Mt. Rose constructs an over-the-snow road that is specifically intended for communication site traffic using over-the-snow vehicles. The snow road is approximately 1,800 feet long and 12 feet wide, and it is created entirely on NFS lands; the first half lies within the Mt. Rose SUP, and the remainder is outside of the SUP. By constructing the snow road, communication site vehicles avoid using the *Around the World* trail entirely, and eventually intersect the maintenance road as it approaches the summit of Slide Mountain. From this point to the summit, communication site traffic generally follows the maintenance road corridor for access to various communication sites.

On occasion, communication site traffic enters the *Mt. Rose Return* and/or *Zephyr Traverse* trails to access sites that are further south along the ridge of the summit of Slide Mountain. On these occasions, Mt. Rose ski patrol is notified and skiers are warned and stopped/rerouted to avoid interaction with snow vehicle traffic.

DIRECT AND INDIRECT ENVIRONMENTAL EFFECTS

Alternative 1 – No Action

Buildings

Located on County land, improvements to the East Bowl base area infrastructure could proceed under the No Action Alternative. However, without the accompanying on-mountain improvements to terrain and snowmaking, base area improvements would likely not be warranted. Under the No Action Alternative, the East Bowl day lodge would remain out of compliance with ADA.

A mountain-top restaurant and skier services facility is proposed on private land located between the tops of the Northwest Magnum 6 and Lakeview chairlifts. Although the exact size and specifics have not yet been developed, conceptually, this facility would provide approximately 100 indoor and 75 outdoor seats.

A view/picnic deck is also proposed on private land along the skier's left side of the *Enchanted Forest* trail, just below the base of the Galena Chairlift. This 500-square foot deck would include picnic tables and would be fully ADA accessible. There would not be any utilities (power and water) installed to this structure.

Septic

Septic systems at both East Bowl and Mt. Rose are considered to be inadequate for Mt. Rose's current wastewater treatment needs. While the resort's CCC would not increase under the No Action Alternative, Mt. Rose may choose at some point to expand the septic system at the East Bowl side. The Mt. Rose side septic system could not be expanded under the No Action Alternative due to its partial location on NFS land. Mt. Rose is currently pursuing an opportunity to tie the Mt. Rose side into the municipal wastewater treatment system.

Water

In order to better meet guests' needs at the Mt. Rose side, Mt. Rose would likely further investigate the possibility to utilize water from the current snowmaking well to augment domestic use on peak days. This action would be contingent upon Washoe County District Health Department findings.

The spring and storage tanks at the East Bowl are considered adequate to meet guests' needs and therefore would not need to be expanded under the No Action Alternative.

Power

No substantial changes to the resort's power supply or demand would occur under the No Action Alternative.

Fuel

No increase in fuel storage would be necessary under the No Action Alternative.

Slide Mountain Communication Site

Under Alternative 1, summer and winter access to the SMCS would continue to be available as under the current scenario. Potential conflicts between over-the-snow vehicles accessing the communication site and descending skiers is not currently perceived as a problem. However, because the proposed *Around the World* trail grading would not occur, communication site traffic would continue to travel through the Forest Service's Mt. Rose campground.

Under the No Action Alternative, the Forest Service and Mt. Rose would continue to assess the potential for over-the-snow vehicle/skier conflicts through the annual Winter Operating Plan insuring that communication site user traffic continues to interface with the *Mt. Rose Return* trail and *Zephyr Traverse* in the safest manner possible.

Alternative 2 – The Proposed Action

Buildings

In an effort to revitalize the East Bowl side, the existing Day Lodge (located on county lands) would be razed and replaced with a more modern facility that would accommodate approximately 300 seats. This building would also be fully ADA compliant, enhanced by on-grade access from the parking lot.

A mountain-top restaurant and skier services facility is proposed on private land between the tops of the Northwest Magnum 6 and Lakeview chairlifts. As with Alternative 1, the exact size and specifics have not yet been developed. Conceptually, however, this facility would provide approximately 100 indoor and 75 outdoor seats.

A view/picnic deck is also proposed along the skier's left side of the *Enchanted Forest* trail, just below the base of the Galena Chairlift (on private land). A second deck is proposed to the skier's right edge of the proposed *Lakeside Trail.* Both of these 500 square foot decks would be

fully ADA accessible during the winter and could offer limited food service on special occasions. There would not be any utilities (power and water) installed to these structures.

Septic

The proposed capacity increase at the East Bowl Day Lodge would necessitate a replacement and expansion of the existing East Bowl septic system, located on county land. This system would be installed using state-of-the-art technology. Mt. Rose is currently investigating opportunities of using biologically active pre-treatment technologies which have the ability to substantially reduce the strength and volumes of effluent reaching the septic system.

Similarly, the capacity of wastewater treatment at the Mt. Rose day lodge would need to be upgraded. Due to the presence of wetlands and a perennial stream proximate to the existing septic system, enlargement of the current system would be problematic. Mt. Rose is presently exploring opportunities to tie the Mt. Rose side into the municipal wastewater treatment system.

Water

The Proposed Action would include enlarging the existing water storage tank located on NFS land along the skier's right edge of *Fremont*. The capacity of the new tank would be approximately 250,000 gallons. Additionally, the water line that runs between the storage tank and the proposed East Bowl Day Lodge would be upgraded.

In conjunction with the development of the proposed snowmaking system, a water impoundment located along the skier's right side of the *Zephyr Traverse* above *Bonanza* would be constructed. The proposed pond would have a storage capacity of five-to-seven acre-feet (approximately 1.6 to 2.2 million gallons). Mt. Rose currently holds water rights adequate to supply both the existing and proposed snowmaking coverage areas. Most of the proposed snowmaking lines would be buried within areas also proposed for terrain modification. Water lines would generally be buried to a depth of between six to eight feet – to reduce the risk of freezing – and would generally be buried on the skier's left (windward) side of each trail.

Power

Two new lifts would be constructed on NFS lands under the Proposed Action, the Chutes Return and the Terrain Park lifts. Both would require upgrades in Mt. Rose's power supply. Sierra Pacific Power would supply this additional power.

Fuel

The nature of terrain additions under the Proposed Action would not lead to a substantial increase in nightly grooming activities. The only new trails that would necessitate grooming are *East Bowl/Chutes Skiway* and *Lakeside Trail*, with some grooming likely in The Chutes run-out area, to facilitate access to the Chutes Return Lift. Therefore, it is unlikely that fuel consumption and/or storage (gasoline or diesel) would need to be expanded under the Proposed Action.

Slide Mountain Communication Site

Under Alternatives 2, the lower, overly steep portion of the *Around the World* trail would be regraded in order to accommodate beginner-level skiers. The *Around the World* regrade would

also allow for summertime utilization of the maintenance road, which currently is too steep for vehicular access. This aspect of the Proposed Action would effectively dissuade use of the NFS campground by communication site users, and would satisfy Forest Service management guidelines. Aside from this action, summer-time access to the SMCS would not change.

During the winter, the Mt. Rose campground would continue to be utilized for over-the-snow vehicular access to the maintenance road and SMCS. Wintertime utilization of the campground by vehicular traffic is not of particular concern to the Forest Service. There would be minor modifications to portions of the over-the-snow road to prevent skier/snow-vehicle conflicts. The two small reroutes of the proposed over-the-snow road are not anticipated to hinder or tangibly alter access to the SMCS. Due to proposed construction of *Jim's Run*, the current snow road alignment would be modified in two ways. First, the bottom section of *Jim's Run* has been designed to intersect existing snow road at a 90-degree angle, signage would be installed on both the snow road and *Jim's Run* warning all over-the-snow vehicle drivers and skiers of the potential for each others' presence. Next, the second switchback of the snow road be modified in order to avoid overlapping with the proposed *Lakeside Trail.* Both modifications to the current snow road are considered minor, and would not hinder current access to the SMCS. While the intersection between the proposed *Jim's Run* and the realigned snow road could potentially introduce conflict between ascending/descending communication site traffic and descending skiers, appropriate signage and instruction to drivers would mitigate safety concerns.

CUMULATIVE EFFECTS

Proposals on NFS lands are relatively minor to those proposed on private and county lands. However, none of the proposals are considered cumulatively significant. No other current or future proposals to infrastructure or utilities in the area have been identified.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

No irreversible or irretrievable commitments of resources on NFS lands would occur under any of the alternatives. Lifts could be removed and trails allowed to regenerate at any point in time.

FOREST PLAN CONSISTENCY

This analysis indicates no inconsistencies with the 1986 Forest Plan.

F. RECREATIONAL OPPORTUNITIES AND EXPERIENCES

INTRODUCTION

Due to the rich history of developed and dispersed winter recreation at what is now Mt. Rose Ski Tahoe, an analysis of current and potential recreational opportunities is included in this environmental assessment.

SCOPE OF THE ANALYSIS

The scope of the analysis for recreational opportunities in this environmental assessment is limited to NFS lands within, and adjacent to, Mt. Rose's permit boundary(s), Washoe County lands at the East Bowl base area, and private lands on the Mt. Rose side.

MANAGEMENT DIRECTION

No specific forest-wide or management area direction is given concerning Mt. Rose (ski area) and recreation. However, the 1986 Forest Plan states that Management Area 2 will be managed to provide a diversity of recreational opportunities. Intensive management emphasis on NFS lands along the Mt. Rose Highway and US 50 corridors will be conducted. Management emphasis will provide roaded natural experiences along major corridors and semi-primitive motorized and non-motorized experiences in other areas.[27]

One of the management goals listed under Forest Management Direction in the 1986 Forest Plan states "The Toiyabe will increase the quality and quantity of developed and dispersed recreation opportunities with particular emphasis in the Sierra Nevada …"[28]

Under Desired Future Condition, the 1986 Forest Plan states: "The Forest will offer a variety of opportunities for developed and dispersed experiences… Expected demand for developed recreation will be met."[29]

CURRENT CONDITION

Recreational History of the Analysis Area

Mt. Rose Ski Tahoe opened for business in 1964, and Reno and Washoe County locals have been skiing in the vicinity of Mt. Rose since approximately 1930. Shortly after World War II, the Sky Tavern lodge was built in proximity of an area where a few surface lifts had been operating since the late 1930s. Eventually the Sky Tavern was sold to the City of Reno where the city's Junior Ski Program continues to operate today.

From the Sky Tavern, skiers hiked up the 9,700-foot Slide Mountain and eventually cut some of the first ski trails in the Sierra Nevada in the present location of Mt. Rose. In 1950, the Old Mt. Rose Highway was a summer road that connected Reno with Lake Tahoe. Over the years, the Mt. Rose Highway has been improved allowing winter travel to higher elevations. As a result,

[27] USDA Forest Service, 1986, pg. IV-79
[28] USDA Forest Service, 1986, pg. IV-1
[29] USDA Forest Service, 1986, pg. IV-2

more ski terrain has become more easily accessible. The original Reno Ski Bowl was constructed on the east slope of Slide Mountain (currently the East Bowl), and at one point the old Ringer Chair connected it to the Sky Tavern area. This lift spanned Bum's Gulch taking it to the base of the Reno Ski Bowl. Remnants of this lift can still be seen on the Mt. Rose Highway about two miles below the Mt. Rose main lodge.

From the late 1950s to the mid 1960s skiers were allowed in The Chutes area (described below) at their own risk. For a time, shuttle buses briefly transported skiers from the Slide Mountain Junction to the base of the Reno Ski Bowl. This service was for skiers utilizing the terrain at Mt. Rose's north facing runs as well as those who ventured into The Chutes. The mid-1960s saw the closure of this area.

The year 1965 saw large changes on the slopes of Slide Mountain. Two independent ski resorts opened that winter at an elevation of 8,260 feet, which is the highest base elevation in the Lake Tahoe basin, the Mt. Rose Ski Resort on the north facing slopes, and Slide Mountain Ski Area occupied the eastern runs. The Slide Mountain Ski Area was formed on the Reno Ski Bowl, whereas the Mt. Rose Ski Resort adopted the terrain on what was then considered the backside. The Mt. Rose Development Company was formed to direct the future of the ski resort. Over the years, the Slide Mountain Ski Area and the Mt. Rose Ski Resort operated independently, each changing in their own ways with more lifts and lodge improvements. The Mt. Rose lodge rented over 40 hotel rooms until they discontinued lodging guests in 1984.

In 1980, 180 acres of new trails were cut at the Mt. Rose Ski Resort between the *Sunset* ski trail and the Mt. Rose Highway. The Lakeview chair was built, which increased uphill capacity. The 1984/85 season saw the 20th anniversary of developed skiing on Slide Mountain and the installation of two new chairlifts: the existing Northwest Passage chairlift was replaced with a new triple chair, and the new Galena triple chair provided increased terrain for beginner and intermediate skiers. In 1985, the *Around the World* trail was cut, adding a new 2.5-mile long ski run.

In 1987 the Mt. Rose Ski Resort acquired the Slide Mountain Ski Area terrain under a lease and operations agreement. The "Slide Side" (as it is commonly referred to by locals) became the "East Bowl" of Mt. Rose. The combined Mt. Rose Ski Resort included more than 900 acres of skiing terrain. Improvements continued to take place in the East Bowl with the upgrading of the Zephyr chair to a quad lift in 1989. In 1994, the main lodge underwent a $2.5 million remodel, which included a large outdoor deck and a 300 percent expansion of the indoor dining area. On the Mt. Rose side, slope recontouring occurred primarily during the summers of 1994 through 1997 and snowmaking infrastructure was installed in the summers of 2000 and 2001. In 1993 the Ponderosa lift was replaced with a new fixed-grip four person chairlift; and in 2000 the Northwest Magnum 6 lift was upgraded to a high-speed, detachable, six-person lift.

Land Administration

Mt. Rose is operated on a mix of NFS, Washoe County, and private lands, with three SUPs from the HTNF and a Lease and Concession Agreement from Washoe County, Nevada. An additional portion of the resort is located on private lands owned by Mt. Rose. The East Bowl is composed of NFS and County lands. NFS lands on the East Bowl side are permitted under a 40-year SUP

encompassing approximately 560 acres. The Mt. Rose side is composed primarily of private lands, however, a 30-acre parcel of NFS lands is permitted under a separate, shorter duration SUP.

The east and north slopes of Slide Mountain are separated by an area referred to as The Chutes. While portions of The Chutes area are within private land, the majority of The Chutes are on NFS land, lying primarily outside of the SUP area. Avalanche control work on 131 acres of NFS lands in The Chutes area is conducted under a separate SUP.[30] The Chutes (public and private lands) are closed to skiing.

Visitation

National Trends

In light of recent events (notably September 11th and a downturn in the national economy), the ski industry performed well in the 2001/02 season. Overall, on a national basis, skier visits decreased in the 2001/02 season to approximately 54.4 million, which is down 5.1 percent from the record 2000/01 season. This is still among the top seasons on record. All regions except for the Pacific West (including Alaska, Washington, Oregon, California, Nevada and Arizona) experienced a decline in visits during 2001/02, primarily due to poor snow conditions. The Pacific West was up 7.5 percent, enjoying its highest visitation in history. The nation as a whole was up 1.1 percent when compared to the 10-year average.[31]

Mt. Rose

The demographic composition of Mt. Rose's clientele is as follows:

Table III-2
Guest Demographics

Area	Percent
Reno/Truckee Meadows	50
San Francisco/Bay Area	15
Southern California	10
Northern California	10
Texas	5
Other	10

Strong interest in the Value Pass that was first introduced at $199 in 2000/01 (now selling at $299) has helped boost visitation by locals in recent seasons.

Table III-3 provides information on annual skier visitation at Mt. Rose over the past eleven seasons.

[30] Approximately 18 acres of The Chutes are currently within the Mt. Rose SUP area. An additional 42 acres of The Chutes terrain lies on Mt. Rose private land. The remaining 131 acres of The Chutes were acquired by the Forest Service as a portion of the 3,700-acre Galena land exchange and are bounded by the existing ski area (west and south), Slide Road (east), and the Mt. Rose Highway (north).
[31] National Ski Areas Association, 2002

Table III-3
Annual Skier Visitation
1991 through 2002

Year	Number of Guests
1991/92	105,235
1992/93	116,611
1993/94	56,655
1994/95	160,732
1995/96	161,816
1996/97	181,202
1997/98	205,528
1998/99	203,235
1999/00	129,145
2000/01	165,178
2001/02	214,020

A substantial amount of the increase and stabilization in visitation in recent years is the direct result of terrain improvements (during the late 1990s) and snowmaking installation (between 2001 and 2002) on the Mt. Rose side. With the terrain improvements (i.e., recontouring) that occurred in the 1990s, Mt. Rose was able to open trails to the public that had remained closed in previous years under the same snow conditions. Coupled with the addition of snowmaking infrastructure, the resort experienced record attendance during the 2001/02 season.

Guest Capacities

The existing CCC at Mt. Rose is 3,720. The total downhill (skiable terrain) capacity between Mt. Rose and East Bowl is approximately 5,340. Total uphill lift capacity at the resort is 3,720 skiers per hour.

Lifts

Mt. Rose's lift network currently consists of one high-speed, detachable six-place chairlift; two fixed-grip quad chairs; two fixed-grip triple chairs; and one surface lift. Combined, the six lifts have a daily capacity of 3,720 guests and form the basis for Mt. Rose's CCC.

Mt. Rose Side

Seventy-five percent of the resort's uphill capacity is realized on the Mt. Rose side. Four lifts – Northwest Magnum 6, Lakeview, Ponderosa, and Galena – are operated on private lands at the Mt. Rose side. Daily lift capacity (guests) at the Mt. Rose side is 2,830.

East Bowl Side

The existing Zephyr Lift was installed in 1989 as a fixed-grip, four-person chairlift. The lift is approximately 3,905 feet long and contributes 890 guests to Mt. Rose's resort-wide daily lift capacity.

Snowmaking

Mt. Rose currently holds water rights allowing for the diversion of 100 acre-feet of water, and presently utilizes a portion of this to provide snowmaking coverage on approximately 84 acres (28 percent) of the terrain on the privately owned portion of the Mt. Rose side. Approximately

eight to 10 inches of augmented snow coverage is required to ski the terrain covered by the snowmaking infrastructure. No snowmaking infrastructure is in place on the East Bowl side.

Season Length

Opening days for both the Mt. Rose and East Bowl sides are provided in Table III-4.

Table III-4
Opening Dates for East Bowl and Mt. Rose

Season	Mt. Rose	East Bowl
1987/88	Dec. 11	Dec. 30
1988/89	Nov. 18	Dec. 23
1989/90	Dec. 1	Jan. 19
1990/91	March 6	March 8
1991/92	Nov. 20	Dec. 30
1992/93	Dec. 9	Dec. 18
1993/94	Dec. 15	Feb. 26
1994/95	Nov. 18	Nov. 26
1995/96	Dec. 13	Dec. 20
1996/97	Nov. 23	Dec. 14
1997/98	Nov. 26	Dec. 10
1998/99	Nov. 13	Dec. 1
1999/00	Dec. 26	Jan. 21
2000/01	Nov. 17	Feb. 10
2001/02	Nov. 28	Dec. 4
Average Date	*Nov. 30*	*Dec. 29*

Source: Mt. Rose Ski Tahoe

As evidenced by this data, on average, the Mt. Rose side has opened one month earlier than the Slide Side over the past 15 seasons.

Terrain

The overall skiing terrain at Mt. Rose consists of roughly 12 percent beginner, 64 percent intermediate, and 24 percent advanced. There are forty-three named trails (258 acres) and numerous un-named gladed areas within the SUP. In addition, two terrain parks (*Badlands* and *Doubledown*) are located near the East Bowl base area.

The East Bowl side of the resort encompasses the area east of Slide Mountain proper and the nine skiing trails leading to the eastern base area. The East Bowl presently has no snowmaking infrastructure; therefore, the rocky and irregular terrain necessitates more snow to open the terrain to skiing/riding. Terrain at the East Bowl is significantly underutilized compared to the Mt. Rose side and frequently does not open until after the peak holiday period. In addition, the *Zephyr Traverse* is composed of grades that are too flat for most skiers (and particularly snowboarders) to enjoy; they cause guests to pole and/or walk in order to access the intermediate and advanced terrain south of the Zephyr Lift.

Nearly one hundred percent of the terrain at the Mt. Rose side is on private land.

The Chutes[32]

Physical Characteristics

The Chutes area consists of a series of steep slots, gullies and narrow paths separated by rocky ridges and trees. For the most part, this terrain is considered strictly expert, with some "advanced" opportunities on the flanks (in *Millertime* and the lower part of *Patroller's Playground*).

The majority of The Chutes has a due north aspect with some flanks presenting a east- or west-facing aspect. Aside from two isolated areas that receive some early morning or late afternoon sun (*Hornets Nest*, *Beehive*, and *Nightmare*), The Chutes area stays shaded during the winter. *El Cap* and *Nick's* are the steepest runs, measuring up to 50 degrees in places. However, the majority of the runs in The Chutes are between 37 and 42 degrees from the top down through the middle portions.

El Cap is the highest point in The Chutes, with an elevation of 9,280. All runs in The Chutes bottom out at approximately 8,000 feet elevation, which is just above the Mt. Rose Highway. Approximately two-thirds of the way down, the pitch decreases to 30 to 35 degrees before flattening to the final run-out of 10 to 20 degrees.

History

Historically, it was rare for skiers to venture into The Chutes until the 1960s, when equipment advances enabled skiers to attempt more challenging terrain. In the mid 1960s, ski lifts within the Mt. Rose terrain provided access to The Chutes, but soon, signs were posted, indicating that the area was closed due to the high avalanche danger. The closure was violated frequently as the area became more popular for expert skiers. In 1966, the Mt. Rose Ski Patrol began periodic avalanche control with three purposes in mind: 1) to protect the Mt. Rose Highway, 2) to stabilize the areas below towers seven through nine of the (old) Northwest Passage lift, and 3) in case an emergency lift evacuation, to protect skiers who inadvertently ventured into the closed area. The Chutes area was officially closed in 1978, when Washoe County Ordinance 412 prohibited trespass into the area. Ordinance 412 reduced the number of violators, but local skiers frequently ignored the closure. Mt. Rose ski patrol currently estimates that between 500 and 1,000 runs are made annually in The Chutes, in violation of the closure. Only a handful of violators are typically apprehended.

In 1983, economic constraints prohibited Mt. Rose Ski Patrol from performing avalanche control work routinely within in The Chutes; this resulted in very large slides when control work was finally performed. The last close call with the Mt. Rose Highway was in 1985, when the protocol to initiate control measures was amended to state that one foot of snow was enough to conduct control work regardless of Highway or ski area closures. Since that time, routine avalanche control measures have effectively decreased avalanche sizes by increasing their frequency.

[32] An avalanche control and snow safety plan is prepared, updated and submitted annually to the Forest Service as a portion of the Mt. Rose Winter Operating Plan.

Avalanche Control and Monitoring in The Chutes

Under a signed agreement with the Nevada Department of Transportation (NDOT), Mt. Rose conducts avalanche control work in The Chutes in an attempt to protect the Mt. Rose Highway from large-scale avalanches.[33] This control work is performed on both private and NFS lands; control work performed on NFS lands is done so under a separate, temporary SUP from the Forest Service. Control teams adhere to the guidelines set forth in the Mt. Rose Winter Operating Plan as well as the Forest Service Avalanche Handbook.[34]

Mt. Rose staff has been monitoring The Chutes' ability to accommodate developed skiing for several years. Between the Mt. Rose ski patrol staff and mountain operations staff there exists a well-documented modern history of The Chutes behavior.

During the 2000/01 season, which saw approximately 200 inches of snowfall, a total of 1,045 pounds of explosives were used on 15 separate mornings. This work resulted in 105 witnessed releases and another 20-30 possible slides that were unable to be verified due to weather/site conditions. The majority of slides were Class 1 or 2; however, four Class 3 slides were documented. Due to consistent control work and a lack of deposition build-up, maximum run-out distances were not reached on any of the slide paths.

Despite the lack of substantial snowfall during the 2000/01 winter, snow-pit data revealed no lingering weak layers deep in the snow-pack. Often The Chutes area exhibits the characteristics of a continental snow-pack in low snow years due to its predominant north face. The 2000/01 season's early high moisture content storms laid the foundation for very few slides penetrating into old snow layers. All of the slides that did penetrate old layers occurred in the Green Route area that is the most north facing of all the Chute's slide paths.

The focus of the avalanche control program currently being conducted within The Chutes area is for the protection of the Mt. Rose Highway. By design, the current program is not intended to insure the safety of skiers illegally entering The Chutes area. Currently, the frequency and intensity of the avalanche control work is specifically structured only for the protection of the Mt. Rose Highway.

Slide Mountain Communication Site (SMCS)

Slide Mountain has been used as an electronic communications site since the 1950s. The SMCS is accessed under special use permit to the Slide Mountain Users Association, via NFS lands from the Mt. Rose Highway. Current summer and winter SCMS traffic between the summit of Slide Mountain and the Mt. Rose Highway typically does not exceed six vehicles per day. Currently there are operations protocols in place to minimize potential public safety issues relating to skier/vehicular traffic. Refer to the Guest Services and Resort Infrastructure section within this Chapter for additional information on the SMCS.

[33] Mt. Rose bears the expense for all control work performed in The Chutes.
[34] USDA Forest Service, 1978

Dispersed Winter Recreation

Backcountry Travel

The Forest Service officially allows backcountry access to NFS lands from three historic entry points which leave the East Bowl SUP boundary. The following three backcountry areas are well known to locals who are familiar with Mt. Rose's terrain.

Unemployment Bowl

This entrance is located off the *Zephyr Traverse* at the highest point before the trail enters Upper *Bruce's*. Just over the rise between the communication towers on the summit is an open bowl that backcountry skiers take westward toward the Mt. Rose meadows and campground.

Manzanita Bowl

Before dropping into the southern-most runs of the East Bowl (*Washoe Zephyr* and *South Rim*), this historic location skirts the ski area boundary and extends to the big landslide section of Slide Mountain that occurred in 1983.

Davis Creek

At the finish of *Washoe Zephyr* trail where the *Zephyr* trail returns to the East Bowl lodge, this downhill exit drains to the 4,400-foot valley floor in the Davis Creek/Bower's mansion area off the Mt. Rose Highway.

Nordic Skiing

The Atoma Nordic Center, which was located across the Mt. Rose Highway from Mt. Rose, closed in 1992. The Tahoe Meadows/Mt. Rose area to the west on the Mt. Rose Highway is a popular Nordic and backcountry area; however, it is not part of Mt. Rose's SUP or operation.

Non-Winter Recreation

Due to the close proximity of Lake Tahoe, very little non-winter recreation takes place at Mt. Rose Ski Area or on Slide Mountain. No multiple use trails exist within the ski area; therefore, there is no designated hiking, biking, or horseback riding. The knob on the easternmost edge of the East Bowl parking lot is recognized by the US Hang Gliding Association as a premier launch site for hang gliders.

DIRECT AND INDIRECT ENVIRONMENTAL EFFECTS

Alternative 1 –No Action

Lands Administration

Administration of NFS lands at Mt. Rose would not change under the No Action Alternative. Two separate SUPs would remain in place with a combined acreage of 590 acres. The Chutes area would remain closed to the skiing public. Avalanche control activities would continue under a third SUP allowing Mt. Rose to manage the area for the protection of the Mt. Rose Highway.

Visitation

Nationally, the ski industry achieved its third best season during 2001/02. This relatively strong national skier visit performance speaks to the resiliency of the ski industry in light of terrorist attacks, the national recession, travel concerns, and poor snow conditions in much of country. The Pacific West region achieved its highest visitation in history. While it is impossible to predict what the future may hold in terms of visitation, recent national and regional trends are promising.

Washoe and Douglas counties, as well as Carson City, rank within the top ten percent across the nation in terms of growth over the last decade.[35] The population of Washoe County is projected to increase by an average annual growth rate of roughly 1.7 percent through 2010.[36] Under Alternative 1, visitation at Mt. Rose would be expected to increase commensurate with regional population gains. However, resort-wide visitation would be expected to fluctuate, as Table III-3 indicates, due to the absence of terrain and infrastructure improvements and unreliable opening dates within the East Bowl.

Guest Capacities

The existing CCC of 3,720 would not change under the No Action Alternative. Nor would existing uphill or downhill capacities change.

Lifts

No improvements to the National Forest portions of the Mt. Rose lift network would occur under the No Action Alternative.

Snowmaking, Season Length, and Utilization of the East Bowl

Under this alternative, Mt. Rose would likely complete the private land portions of the snowmaking system. However, the development of snowmaking capabilities would not be approved on NFS lands within the East Bowl. Mt. Rose would continue to provide snowmaking coverage on approximately 84 acres of terrain within the Mt. Rose portion of the ski area (on private land).

The No Action Alternative would not affect opening and closing dates for either the East Bowl or Mt. Rose sides. Because the East Bowl would not receive snowmaking coverage, the annual opening date for this portion of the resort would continue to be subject to fluctuations in annual snowfall.

As previously described, currently the East Bowl portion of the resort is significantly underutilized. The irregularity of the terrain, lack of snowmaking, and substandard service facilities cause guests to gravitate toward the more modern facilities and reliable snow conditions found on the Mt. Rose side. Under the No Action Alternative, the existing imbalance of use would continue. Guests would continue to encounter overcrowded conditions on the Mt. Rose side during periods of low natural snowfall when the East Bowl terrain is either inoperable or marginalized.

[35] USDA Forest Service, 2001
[36] Nevada State Demographer's Office, 2000

Terrain

Under the No Action Alternative, Mt. Rose could continue to improve the existing trail network on private land, but would not be permitted to make changes on NFS lands.

The Chutes

The terrain within The Chutes area is currently closed to skiing and would remain so under the No Action Alternative. Mt. Rose in coordination with the NDOT would likely continue to perform avalanche control work in this area in order to protect the Mt. Rose Highway from large-scale slides. Regardless of whether or not skiing in The Chutes is authorized, Mt. Rose plans to purchase an avalauncher to aid in avalanche control of The Chutes for protection of the Mt. Rose Highway. The avalauncher will be located on private land, on top of the *Showoff* trail. Because the terrain within The Chutes area is extremely attractive to expert level skiers, it is likely that skiers will continue to illegally enter and ski The Chutes terrain despite active attempts to sign and close the area. As evidenced by a recent fatality within The Chutes terrain (December 2002), the current management of the area does not entirely eliminate the potential hazards. Under the No Action Alternative, this condition would continue. The primary focus of the avalanche control program within The Chutes area would continue to be for the protection of the Mt. Rose Highway. The safety and stability of the snowpack within the area would not be specifically increased above the existing condition. The full protection of the skiing public within The Chutes area would require a change in the focus of the avalanche control program which would not be realized with selection of the No Action Alternative. Mt. Rose and the Forest Service would not be equipped with the full ability to ensure the safety of the public entering The Chutes area. Due to the attractive nature of The Chutes Terrain, it is likely that skiers would continue to illegally enter The Chutes area and would continue to be injured or killed.

Slide Mountain Communication Site

Under Alternative 1, summer and winter access to the SMCS would continue to be available as under the current scenario. Potential conflicts between over-the-snow vehicles accessing the communication site and descending skiers are not currently perceived as a problem. However, because the proposed *Around the World* trail grading would not occur, communication site traffic would continue to travel through the Forest Service's Mt. Rose campground.

Under the No Action Alternative, the Forest Service and Mt. Rose would continue to assess the potential for over-the-snow vehicle/skier conflicts through the annual Winter Operating Plan insuring that communication site user traffic continues to interface with the *Mt. Rose Return* trail and *Zephyr Traverse* in the safest manner possible.

Dispersed Winter Recreation

No changes to opportunities for dispersed winter recreation would occur under the No Action Alternative.

Non-Winter Recreation

As previously discussed, non-winter recreation is virtually non-existent within the Mt. Rose SUP. The East Bowl parking lot would continue to be utilized by hang gliders and occasional

hikers and bikers would access the ski area.

Alternative 2 – The Proposed Action

Lands Administration

The Proposed Action would amend and consolidate Mt. Rose's existing 40-year SUP to incorporate the 30-acre area currently under separate permit, add approximately 131 acres encompassing The Chutes terrain, and add a 25-acre area located to the southwest of the ski area. Once consolidated, the single Mt. Rose SUP area would encompass approximately 746 acres of NFS land. This would enhance the administration of the area by producing one cohesive management theme for the Mt. Rose operation on NFS lands.

Visitation

Resort-wide visitation at Mt. Rose is expected to increase commensurate with regional population growth under the action alternatives, which is approximately two percent. In addition, snowmaking and terrain recontouring at the East Bowl, would offer a more reliable snow surface and opening date. These projects are anticipated to produce similar effects to guest attendance as snowmaking and recontouring did at the Mt. Rose side. Coupled with the opening of The Chutes terrain for expert skiers, the Proposed Action is expected to would likely generate heightened interest in the resort and an overall increase in resort-wide visitation.

The installation of snowmaking capabilities coupled with terrain improvements at the Mt. Rose side will continue to bolster utilization of this portion of the resort and allow it to open earlier and remain open later than the East Bowl.

The effects of the improvements proposed within the East Bowl are anticipated to parallel those of the late 1990s and early 2000s at the Mt. Rose side; that is, energizing the East Bowl area , significantly decreasing the current over utilization of the Mt. Rose portion of the resort. This is expected to lead to a more effective and even distribution of guests throughout the resort thereby enhancing the recreation experience.

Guest Capacities

The proposed would efficiently accommodate the existing and proposed levels of daily visitation. The CCC would increase by 500 guests (13 percent) from 3,720 to 4,220. Development of a new day lodge in the East Bowl base area would provide an additional 200 food service seats compensating for the current resort-wide seating deficit of 220 seats and greatly improving the quality of the guest experience.

Lifts

Under the Proposed Action, resort-wide lift capacity would increase from 9,820 people/hour to 12,220 people/hour, an increase of 20 percent. This increase in lift capacity would be matched by a commensurate increase in terrain.

The Chutes Return Lift would be installed as a four-person, fixed-grip chairlift with a top-drive terminal. Ride time would be approximately three minutes; guests would then ski to the bottom

of the Northwest Magnum 6 Lift to access The Chutes terrain again. The Chutes Return Lift would likely stop running earlier than other lifts at Mt. Rose to allow ski patrol to conduct a thorough sweep of the area.

Upgrading the Zephyr Lift to a six-person, detachable lift would decrease the ride time to less than four minutes resulting in an increased utilization of the East Bowl terrain. Installation of the terrain park surface lift would allow round-trip skiing/riding within the proposed terrain park.

Extending the top terminal of the Lakeview Lift would provide ready access for skiers to the proposed *Lakeside Trail*, and the proposed picnic deck as well as the terrain traditionally accessed by the lift.

Snowmaking, Season Length, and Utilization of the East Bowl

The effects of implementation of terrain improvements and snowmaking at the East Bowl would be a more reliable snowpack and an extended season length at the East Bowl on both ends (i.e., early winter and spring) leading to an improved skiing product. With the proposed grading on terrain at the East Bowl, utilization of this portion of the resort could occur earlier and extend later in the season, as comparably smaller amounts of natural and artificial snow would be necessary for use. In addition to extended use during the early and late portions of the ski season, proposed improvements to the East Bowl facilities and terrain would produce increased utilization of this portion of the resort throughout the year.

Terrain[37]

Under the Proposed Action, new trail construction (including the *East Bowl/Chutes Skiway*, *Jim's Run*, *Lakeside Trail*, *Around the World Bypass*, *Showoff* and The Chutes terrain) would add approximately 185 acres of additional terrain to Mt. Rose's developed trail network, for a total of 443 acres. Terrain breakdown would be as follows: 20 percent beginner/novice, 50 percent low-intermediate/intermediate, and 30 percent advanced.

The *Zephyr Traverse* would be graded to create an average slope gradient of approximately ten percent from the lift terminal to the top of *Upper Bruce's* trail enabling skiers to negotiate this terrain more easily. To facilitate a functional traverse, one additional trail segment would be created to bypass one of the larger curves along the existing traverse.

A new run, tentatively named *Jim's Run*, is proposed on the southwest side of Slide Mountain. Requiring hike-to access, this run would originate approximately halfway across the Zephyr Traverse on the south side of the SMCS. Offered as an off-piste style experience, skiers would have access into this sparsely treed area, exit onto the proposed *Lakeside Trail*, and traverse to *Around the World* on the Mt. Rose side of the resort. Approximately 4.2 acres would be lightly gladed with removal of five-to-ten percent of the existing trees.

[37] Specific rescue and evacuation procedures for expansion terrain are beyond the scope of this analysis and would be detailed in a forthcoming Winter Operating Plan completed by Mt. Rose and approved by the Forest Service.

A terrain park is proposed for the skier's left edge of The Bowl, beneath the Zephyr Lift. The park features themselves would be constructed entirely of snow, allowing the design of the terrain park to change seasonally with user preferences.

Two separate trail modification prescriptions would be used on selected trails in order to improve the skiing experience; grading and stumping/smoothing.

Grading within the East Bowl is proposed to alter slope contours and smooth the terrain. Specific trails proposed to receive grading include: *Bonanza, Bonanza Traverse, Central Pacific, Fremont, Mt. Rose Return, Silver Dollar, Upper Bruce's, Zephyr,* and *Zephyr Traverse*. Stumping/smoothing and rock blasting is proposed in areas where full grading is not specifically necessary. The proposed stumping/smoothing would improve the skiing experience by lessening the severity of terrain irregularities on: *Gold Run, South Rim*, and the *Washoe Zephyr*.

The Chutes

The Mt. Rose ski patrol has been studying the number of possible days The Chutes area could be open compared to total operating days of the resort since 1996. This data was combined with the assumption that thinning would be allowed at the bottom of the area and that a viable means of transporting customers back to the main ski area would be available. An anticipation of The Chutes being open or closed on any given day was formulated based on visual inspection, weather, snow-pack depth and stratification. Furthermore, it was assumed that certain regions of The Chutes might open earlier in the season than others due to less snow being required to produce adequate coverage. Partial opening of The Chutes would be affected by spring melt freeze and coverage factors. Table III-5 provides an estimation of how often The Chute's would have been skiable between 1996 and 2001 compared with the actual days of operation for Mt. Rose.

Table III-5
Mt. Rose's Days of Operation Compared to Estimated Skiability of The Chutes

Season	Mt. Rose Days of Operation	Number of Days Chutes Completely Open[a]	Number of Days Chutes Partially Open
2000/01	145	132	18
1999/00	123	43	16
1998/99	162	85	56
1997/98	151	79	19
1996/97	154	119	10

[a] Completely open days are inclusive of partially open days.

An analysis of the data indicates that The Chutes terrain is expected to have been operational approximately 61.5 percent of the days that Mt. Rose was in operation over the past five seasons.

If approved for opening, the specific details for snow safety, opening procedures, and operations of The Chutes area would be thoroughly documented within the annual Mt. Rose Winter Operating Plan.

While no snow safety program can completely eliminate related hazards, Mt. Rose, in cooperation with the Forest Service and NDOT, has demonstrated a level of avalanche control well within regional and national norms. The current snow safety program results in smaller, more frequent, and less damaging slides ensuring the safety of the Mt. Rose Highway. Avalanches originating within The Chutes have not reached the Mt. Rose Highway since 1983.

With selection of Alternative 2, the primary focus of the avalanche control program within The Chutes area would shift from being specifically intended for the protection of the Mt. Rose Highway to ensuring the safety of the skiing public. The safety and stability of the snowpack within The Chutes area would be increased above the existing condition through routine skiing of the area which increases snowpack stabilization by providing consistent/continuous skier compaction of the snow. Under Alternative 2, the protection of the skiing public within The Chutes area would be ensured by providing full authorization for Mt. Rose to significantly increase the frequency and intensity of the management of the snowpack within The Chutes area.

Under the Proposed Action, the goal would be to conduct control work and get skiers into The Chutes area as soon as possible after storm cycles in order to greatly reduce lingering weak layers that may cause problems if left unconsolidated and uncontrolled. As with the No Action Alternative, Mt. Rose plans to purchase an avalauncher to aid in avalanche control of The Chutes for protection of the Highway. The avalauncher would be located on private land, on top of the *Showoff* trail.

With the elimination of virtually all large, destructive avalanches, small reproductive vegetation has reestablished itself within The Chutes. Approximately 12 of the existing natural paths in The Chutes are proposed to receive thinning and incidental trimming of vegetation. Tree removal would be primarily focused on the smaller diameter reproductive growth, which has occurred since the cessation of historic large avalanches. Large, mature clumps of trees would be avoided unless absolutely necessary. The proposed glading would be implemented in a manner that effectively connects and links the existing openings, creating continuous and consistent skiing lines. Vegetation removal efforts would strive to maintain large/mature clumps wherever possible. Nine of these trails would originate from the East Bowl side, while the remaining three would be extensions of trails from the Mt. Rose side. Vegetation manipulation required to make The Chutes skiable would range from incidental thinning to 100 percent removal.

The existing boundary between The Chutes and the existing skiing terrain would be maintained but moved towards the existing ski area to serve as a protective buffer. Six locations have been identified as entry points (gates) into The Chutes area. These gates would be incorporated directly into the boundary line and serve as a mechanism to open and close specific sections of The Chutes as conditions warrant. Additionally, each gate would be posted with signs alerting skiers to the difficulty and potential conditions of the terrain.

The proposed *East Bowl/Chutes Skiway* would facilitate access to The Chutes Return Lift. The trail would start at the northern edge of the East Bowl parking lot and extend to the proposed bottom terminal of the lift. This skiway would additionally allow skiers to park in the East Bowl parking lot and to ski to the bottom of the proposed Chutes Return Lift, enabling easy access to

The Chutes area and the Mt. Rose base area. Additionally, the skiway would facilitate lift maintenance and ski patrol access to the base of The Chutes area.

Two to four towers of the lower portion of The Chutes Return Lift could potentially be located in a 50- to 100-year slide path. These towers would be reinforced, and frequent and diligent avalanche control work would be the best defense against the potential for large, damaging slides to affect the lift alignment. Because avalanche control activities are carried out prior to opening the lift and terrain, there would be no passengers on the lift if a potential slide were to reach any of the lift towers.

Slide Mountain Communication Site

Summer and winter access to the SMCS and the potential for skiers conflicting with over-the snow vehicles is detailed in the Guest Services and Resort Infrastructure section of this chapter.

Utilization of East Bowl

The proposed improvements would serve to enhance the guest experience within the East Bowl by upgrading existing infrastructure and terrain, and by adding snowmaking capabilities. The improvements proposed for the East Bowl are intended to energize this portion of the resort thereby relieving overcrowded conditions on the Mt. Rose side. By installing snowmaking infrastructure at the East Bowl side, Mt. Rose would achieve a more cohesive management scenario, ensure a reliable opening date, and offer a more balanced recreational experience across both East Bowl and Mt. Rose.

Dispersed Winter Recreation

No effects to winter dispersed recreation are anticipated.

Non-Winter Recreation

As previously detailed, non-winter recreation within the SUP is limited to dispersed hikers and bikers. The Proposed Action does not propose any specific projects or activities that would alter the current condition. However, under the Proposed Action, Mt. Rose would allow summer parking in the upgraded East Bowl parking lot, providing improved access for the existing hang glider use. The Proposed Action would not affect the ability for hang gliders

Alternative 3

The effects to recreational opportunities and experiences under Alternative 3 would be as disclosed under the Proposed Action, with the following exceptions:

Specific trails and traverses proposed to receive grading under Alternative 3 include: *Bonanza*, *Bonanza Traverse*, *Central Pacific*, *Fremont*, *Lower Silver Dollar*, *Upper Bruce's*, *Zephyr Trail*, the *Zephyr Traverse*, and *Around the World*. Overall, the area proposed for grading would result in approximately 42 acres of ground disturbance. A 2.8-acre area atop *Gold Run* is the single area proposed to receive stumping and smoothing. The total grading and stumping and smoothing of skiing terrain proposed under Alternative 3 would total 44.8 acres, a reduction in ground disturbance of 27.6 acres (38 percent) as compared to the Proposed Action. The 27.6-acre reduction in grading at the East Bowl would translate to decreased skiability in the early and

late season periods, as more natural snowfall would be necessary to achieve appropriate snow depths on ungroomed trails.

The only other component of Alternative 3 that differs from the Proposed Action (with respect to recreation) is lands administration. Alternative 3 includes the same additions and consolidations as the Proposed Action, however, this alternative would compensate for the additional terrain by removing a commensurate amount (approximately 156 acres) of unutilized terrain below the East Bowl. Once consolidated and reduced, the single Mt. Rose SUP area would encompass approximately 590 acres of NFS land. This would provide for more consistency and efficiency in managing NFS lands within the Mt. Rose SUP.

CUMULATIVE EFFECTS

No cumulative effects to recreational resources in the vicinity of Mt. Rose have been identified through this analysis.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Development of additional ski trails and infrastructure in previously undisturbed areas of the SUP would represent an essentially permanent commitment of the area to a relatively high intensity, developed, recreational use. This additional development would not constitute a completely irreversible or irretrievable commitment of resources; from a practical standpoint, it could be considered as such. However, at any time, ski area infrastructure could be removed and vegetation could be reestablished on disturbed terrain.

FOREST PLAN CONSISTENCY

There is no specific management direction pertaining to recreation within the Carson Front management area; however, recreation is a key resource value on the HTNF and the action alternatives are considered to be consistent with current management practices within Management Area 2.

G. SOCIAL AND ECONOMIC RESOURCES

INTRODUCTION

Northern Nevada's attractive year-round climate and abundant cultural and social offerings provide a world-class setting for outdoor recreation and tourism.

This socioeconomic assessment provides a brief overview of trends in population, employment, unemployment, income, and taxes in Washoe County and Nevada. While not all of the information presented can be directly correlated to the project proposal, it is provided to promote an understanding of the social and economic character of the analysis area.

SCOPE OF THE ANALYSIS

The greater Reno area provides the majority of Mt. Rose's clientele, due to the ski area's proximity to the city. Washoe County, Nevada provides the primary extent of this socioeconomic analysis. However, economic indicators for the State of Nevada are also provided for comparison.

FOREST PLAN DIRECTION

No specific management area direction is provided for economics in the Forest Plan. However, forest-wide goals for economic efficiency on the HTNF include "producing a mix of goods and services within the bounds of its physical, biological, social, and economic environment."[38]

CURRENT CONDITION

Population

Nevada has experienced dramatic growth over the past decade, becoming the fastest growing state in the country. The classic formula for describing how a population grows is births minus deaths plus migration. Between 1990 and 1999, births and deaths in Nevada totaled 227,622 and 110,437, respectively. However, net migration (domestic and international) was the dominating factor behind Nevada's growth, accounting for approximately 81 percent of the State's overall population increase, with 488,790 people moving to the state in the ten-year period. The 2001 population estimate for Nevada was 2,106,074, which is an approximate 66 percent increase over the 1990 census.[39]

In 1970, 194,000 people lived in Washoe County. By 1990, the county had grown to 307,000 people.[40] By the year 2000, the official population estimate for Washoe County had grown to 333,566. The 2000 population of Reno, the largest city in Washoe County, was 182,818.[41] Thus, the formerly rural landscape has become increasingly urbanized.

[38] USDA Forest Service, 1986
[39] US Census Bureau, 2002
[40] Nevada Commission on Economic Development, 2002
[41] Nevada State Demographer, 2002

A July 2001 estimate of Washoe County's population is 353,271. Reno accounted for 186,883 people, while Sparks accounted for 71,753.[42] The ratio of people moving to Washoe County compared to those moving out is 1.19 to 1.0[43]

Employment

Unemployment in Nevada averaged 5.6 percent between January and September 2002, with approximately 59,000 people unemployed statewide. For the same period of time, Washoe County's average unemployment rate was 4.7 percent, with approximately 9,000 people unemployed.[44]

In 2002, hotels, gaming, and recreation industry employment in Nevada remained below 2001 levels, but the over-the-year decline of 4,500 jobs is the smallest reported since September 2001. In October 2001, following massive post-September 11th layoffs, the year-over-year decline in gaming jobs was 11,400. Employment in the state's largest industry (gaming) has rebounded slowly and remains well below its peak, which had been reached in August 2000. Gaming-related employment is down by nearly 6,000 jobs statewide (5,000 in the Las Vegas Metropolitan Statistical Area (MSA), alone). However, employment in Nevada's other industries has increased by more than 75,000 jobs. Until tourism returns to the previous peak, reached in 2000 and early 2001, or major new hotel-casino facilities are constructed, gaming employment is unlikely to increase substantially.

In the fall of 2002, the Reno area concluded a particularly strong series of special events. Hot August Nights, the Best-in-the-West Nugget Rib Cookoff, and the Reno National Air Races set or approached attendance records. The Reno-Sparks convention center reopened after renovation and expansion. Major bowling tournaments will be held in the city in each of the next two years.[45]

Mt. Rose Employment

Mt. Rose currently employs 25 full-time, year-round employees. An additional 400 employees are seasonal. Approximately 25 percent of these seasonal employees are full-time, and the remainder are part-time.

Income

The average annual growth rate (AAGR) of personal income between 1969 and 2000 in Nevada was 11.3 percent. Personal income fell approximately three percent between 1997/98 and 1999/2000. For Washoe County, the AAGR between 1969 and 2000 was 10.3 percent, falling between 2.4 and 2.1 percent between 1997/1998 and 1999/2000, respectively.[46] Table III-6 presents per capita personal income in Washoe County between 1995 and 2000.

[42] Nevada Department of Taxation and Nevada State Demographer, 2002
[43] Nevada Department of Taxation, 2000
[44] Nevada Department of Employment, Training, and Rehabilitation, 2002a
[45] State of Nevada, Department of Employment, Training and Rehabilitation, 2002
[46] US Department of Commerce, Bureau of Economic Analysis, 2002

Table III-6
Washoe County Per Capita Personal Income
1995 through 2000

2000	1999	1998	1997	1996	1995
$34,879	$33,636	$32,502	$30,769	$29,749	$28,603

Source: Nevada Department of Taxation and Nevada State Demographer 2002

Taxes

The Sales and Use tax in Washoe County is currently 7.25 percent. Business tax is $25 per full-time equivalent employee, per quarter; property tax is assessed at 35 percent of full cash value.

Taxable gaming revenue is the measure of all revenue actually collected at all non-restricted establishments within a given time period. During the second quarter of 2002, taxable gaming revenue for the State of Nevada totaled $2.3 billion, down 0.6 percent from the year before. Taxable gaming revenues in Washoe County for the second quarter of 2002 totaled $262 million.[47]

Tax Revenues

Tax revenues generated directly and indirectly by Mt. Rose's operations and realized by Washoe County stem directly from lift ticket, retail, and restaurant sales at Mt. Rose; short-term lodging in surrounding communities; and other service sector transactions (e.g., food and gas).

Sales Taxes

Table III-7 presents sales taxes paid by Mt. Rose between 1997 and 2002.

Table III-7
Mt. Rose Sales Tax Paid: 1997 through 2002

Year	Taxes
1997	$71,682
1998	$86,794
1999	$88,062
2000	$65,068
2001	$97,953
2001	$120,177

Ski Area Permit Rental Charge Fees

The US Government collects fees from ski areas operating on NFS lands based on the Ski Area Permit Rental Charge (SAPRC); the calculations are pursuant to Section 3 of the National Forest Ski Area Permit Act of 1986.[48] Ski area permit rental charges vary considerably on an annual basis and are calculated according to the following factors: 1) the permittee's gross revenues from lift ticket/year-round pass sales, 2) revenue from ski school ticket operations, and 3) slope transport feet (lifts) percentage on NFS land. The first two factors are subject to fluctuating

[47] Nevada Gaming Board, 2002
[48] 16 USC 497b

social, economic, and weather conditions. The third factor is typically constant and is only subject change when the resort installs or removes lifts. A portion of SAPRC payments is redistributed by the US Treasury to Washoe County for schools and road maintenance. Table III-8 summarizes the SAPRC fees paid to the US Government by Mt. Rose over the past three years.

Table III-8
Ski Area Permit Rental
Charges for Mt. Rose's SUP
1998 - 2002

Year Ended	SAPRC Fees
2001/02	$18,735
2000/01	$13,310
1999/00	$12,428

DIRECT AND INDIRECT ENVIRONMENTAL EFFECTS

Alternative 1 – No Action

Population

The population of Washoe County is projected to increase approximately 67,000 people by 2010. This would equate to an average growth rate of roughly 1.7 percent between 1999 and 2010.[49]

Employment

Mt. Rose's staffing varies slightly according to seasonal needs. Under the No Action Alternative, no changes to Mt. Rose's current staffing would occur.

Ski Area Permit Rental Charge Fees

Because SAPRC fees are calculated according to both fixed (slope transport feet percentage) and subjective (lift ticket/season pass and ski school sales) factors, revenues generated by SAPRC fees vary considerably on an annual basis. Because slope transport feet on NFS lands would not change with selection of the No Action Alternative, this portion of the SAPRC calculation would remain the same. However, lift ticket/season pass and ski school sales are a reflection of a number of factors, primarily weather and economic trends. While it is not possible to precisely quantify the degree to which SAPRC fees would change under the No Action Alternative, it is safe to assume that skier visitation, particularly for East Bowl portion of the resort, would experience minimal growth due to the continuation of a current lack of snowmaking and sub-standard facilities. Mt. Rose is unable to charge a full ticket price when the Mt. Rose side is open and the East Bowl is closed due to low snow conditions. This has the effect of reducing the revenues portion of the SAPRC fee calculation and therefore fees paid to the United States.

Tax Revenues

Tax revenues generated directly and indirectly by Mt. Rose's operations and realized in Washoe County are not anticipated to change substantially under the No Action Alternative.

[49] Nevada State Demographer's Office, 2000

Alternatives 2 and 3 – The Action Alternatives[50]

Population

The effects to population under alternatives 2 and 3 would be the same as those disclosed under Alternative 1. While the project proposal is not anticipated to specifically elicit any changes in population growth, it would allow Mt. Rose to more fully accommodate the existing and anticipated growth within the region.

Employment

The action alternatives are designed to bolster enthusiasm for recreating in the East Bowl by improving terrain, adding snowmaking, and improving guest service facilities. It is anticipated that these improvement would generate increased attendance levels. Increased visitation at the resort directly translates to a need for additional full- and part-time staff positions. Mt. Rose would likely add one full time, year-round staff position and approximately 15 seasonal positions to accommodate additional operational needs associated with implementation of either of the action alternatives.

In addition to direct, albeit minor, staffing increases at Mt. Rose, short-term construction benefits would be realized for construction of proposed skier service facilities, parking lots, lifts, and trails. Because of the specialized and technical requirements of lift construction, an out-of-town manufacturer would most likely supply the majority of labor necessary to construct the lift related project elements. The remaining development projects (buildings, snowmaking, utilities) would temporarily contribute regional employment levels. Positive indirect effects would occur as a result of expenditures by project suppliers and those employed during construction.

Tax Revenues

The proposed improvements at Mt. Rose are anticipated to act as a catalyst, which could potentially promote increased regional and, to a lesser degree, destination visitation. This increased visitation coupled with a heightened level of guest services would translate to higher retail, food service, and miscellaneous guest expenditures, which would, in turn, increase tax revenues in Washoe County.

Ski Area Permit Rental Charge Fees

SAPRC fees generated by Mt. Rose as related to ticket/season pass and ski school sales would be anticipated to increase as a result of improved facilities, snowmaking and visitation. The relationship these elements have to specific fees is very difficult to quantify. However, total slope transport feet at Mt. Rose can be quantified for the action alternatives. Slope transport feet on NFS land would increase by approximately 3,000 feet to approximately 6,680 feet.[51] Because SAPRC fees calculations are subject to numerous unpredictable variables, it is not possible to foresee what they may be under the action alternatives. However, barring any substantial negative economic or environmental trends, coupled with the proposed increase in CCC and

[50] Because the variations between Alternatives 2 and 3 are specifically related to ground disturbances, the socioeconomic effects of implementing either alternative are anticipated to be identical.

[51] This is attributable to the Chutes Return Lift (80 percent of which would be on NFS lands), the extension of the Lakeview Lift, and the Terrain Park Lift.

improved facilities, it is reasonable to assume that SAPRC fees would increase under implementation of either action alternative.

CUMULATIVE EFFECTS

No cumulative socioeconomic effects associated with Alternatives 1 through 3 are anticipated.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

No irreversible or irretrievable commitments of socioeconomic resources are anticipated under alternatives 1 through 3.

FOREST PLAN CONSISTENCY

As stated, no specific management area direction is provided for economics in the 1986 Forest Plan. However, the action alternatives do help meet stated forest-wide goals for economic efficiency on the HTNF, including "producing a mix of goods and services within the bounds of its physical, biological, social, and economic environment."[52]

[52] USDA Forest Service, 1986

H. TRAFFIC AND PARKING

INTRODUCTION

Mt. Rose is accessed via the Mt. Rose Highway (State Highway 431) from either Lake Tahoe or Reno, NV. The ski area is approximately 25 miles from downtown Reno and 11 miles from Incline Village on the northeast shore of Lake Tahoe. The drive to Mt. Rose is approximately 25 minutes from the Reno/Tahoe International Airport. From Sacramento and San Francisco the resort is approximately 130 and 230 miles, respectively. Salt Lake City is approximately 530 miles west. Mt. Rose offers the closest skiing of all Tahoe-area resorts to the Reno/Tahoe International Airport. With the expansion of US 395 in Reno, Mt. Rose is considered to be the closest ski resort of its size to an international airport in the world.

SCOPE OF THE ANALYSIS

The scope of this traffic analysis is limited to parking facilities located on County and private land at Mt. Rose, and to traffic flow on the Mt. Rose Highway.

FOREST PLAN DIRECTION

Forest-wide Standards and Guidelines

The Forest Plan requires the agency to develop a transportation analysis for the zone of influence associated with each proposed development project.[53]

CURRENT CONDITION

Traffic on the Mt. Rose Highway

Traffic volume data was reviewed for the past 10 years. The data analyzed was collected in seven-day periods. The seven average days (Sunday through Saturday) were averaged to provide a monthly average daily traffic (MADT). The twelve MADTs (January through December) were then averaged, yielding the average annual daily traffic (AADT). AADT for four seven-day monitoring stations in the vicinity of Mt. Rose is provided in Table III-9.

[53] USDA Forest Service, 1986

Table III-9
AADT at Seven-Day Monitoring Stations Near Mt. Rose

Station	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
0368 (SR-431, 0.1 mi. S of Joy Lake Rd.)	4,540	5,100	5,760	5,505	5,200	5,600	6,200	6,300	6,300	6,500
0369 (SR-431, 0.1 mi. N of Sky Tavern)	4,145	4,700	5,310	5,000	4,600	5,400	5,850	5,950	5,950	5,700
0370 (SR-878 to East Bowl, 0.3 mi. E of SR-431)	105	105	120	95	95	105	90	80	90	90
0930 SR-431, 0.2 mi. E of Callahan Ranch Rd.	**	7,450	8,420	8,875	9,300	9,600	9,700	10,800	11,000	11,500

Source: NDOT 2001

During 2001, hourly traffic volumes were monitored continuously at 71 locations statewide. These sites are commonly referred to as automatic traffic recorders (ATRs). The ATR in closest proximity to Mt. Rose is #3171209, located on the Mt. Rose Highway approximately 4.8 miles west of US-395. AADT for the past 10 years of continuous monitoring at this location is provided in Table III-10.

Table III-10
Historical AADT at
ATR #3171209

Year	AADT	Percent of Previous Year
2001	9,765	105.5
2000	9,260	106.2
1999	8,720	104.4
1998	8,350	105.3
1997	7,930	108.1
1996	7,335	106.8
1995	6,870	106.0
1994	6,480	113.5
1993	5,710	97.3
1992	5,870	N/A

Source: NDOT 2001

AADT at ATR #3171209 has increased by an average of 106 percent for each of the 10 years in monitoring period.

Table III-11 provides the percent of AADT by month for 2001.

Table III-11
Percent of AADT by Month for 2001

Month	MADT	% of AADT
January	8,893	91.1
February	9,086	93.0
March	9,689	99.2
April	8,729	89.4
May	9,738	99.7
June	10,490	107.4
July	11,206	114.8
August	12,130	124.2
September	9,912	101.5
October	9,382	96.1
November	8,324	85.2
December	9,617	98.5

Source: NDOT 2001

The AADT for 2001 was 9,765 vehicles. Based on the data in Table III-11, the highest monthly traffic on the Mt. Rose Highway, in 2001, was monitored between June and September with a summer average of 10,935. Weekday traffic averaged 9,888 vehicles (101 percent of AADT), while weekend traffic averaged 9,071 vehicles (93 percent of AADT) during 2001. The weekday averages are indicative of the use of the Mt. Rose Highway by weekday commuters traveling between the Lake Tahoe area and Reno.

With a comfortable capacity of 3,720 visitors, Mt. Rose contributes roughly 1,550 automobiles to the daily traffic along the Mt. Rose Highway on a busy day.[54] Therefore, Mt. Rose currently contributes approximately 17 percent of the AADT during ski season period (November through April) which averages 9,056 vehicles.

Parking Facilities

Mt. Rose's parking facilities are not located on NFS lands and are therefore not subject to review under the NEPA process. However, a description of parking facilities located on private and county lands is provided for reference.

Mt. Rose received Washoe County approval through a special use permit to expand their parking facilities on private land (Mt. Rose side) by approximately 500 spaces. This expansion was approved for construction in two phases. Phase I, completed during the summer of 2002, added approximately 325 spaces. Phase II, which is yet to be completed and is contingent upon final construction permits, would add the remaining 175 spaces.[55]

By providing 1,442 parking spaces on the Mt. Rose side and 651 spaces at the East Bowl, the

[54] This is based on an average vehicle occupancy of 2.4 people.
[55] One additional lot would provide 125 spaces and widening the existing Upper lot would accommodate an additional 50 spaces.

resort can currently accommodate approximately 2,093 vehicles. At approximately 2.4 persons per vehicle, this provides parking capacity for over 5,000 guests.

DIRECT AND INDIRECT ENVIRONMENTAL EFFECTS

Alternative 1 – No Action

Traffic

Based on Table III-11, the highest monthly traffic on the Mt. Rose Highway in 2001 was monitored between June and September, outside of Mt. Rose's seasonal operations. Historic data, as presented in Table III-10, has shown that AADT has increased each year, and would likely continue to increase under the No Action Alternative.

Parking

Under the No Action Alternative, parking facilities would continue to be well balanced for Mt. Rose's existing CCC. However, facilities occasionally become overtaxed on peak days when the CCC is exceeded. Phase II of the Mt. Rose-side parking area expansion (on private lands) would add an additional 175 spaces. Although parking facilities located on county lands at the East Bowl side could potentially be expanded under the No Action Alternative,[56] this would likely be unnecessary, as on-mountain and facilities improvements on the East Bowl would not occur.

Alternatives 2 and 3 – The Action Alternatives

Traffic

As previously described AADT is expected to continue to increase on the Mt. Rose Highway, regardless of which alternative is selected. Under both action alternatives, a 13 percent increase in the comfortable capacity of the resort is proposed which would translate to approximately 210 vehicles[57] on a comfortably busy day. However, Mt. Rose would only contribute to increases in AADT during the ski season when measured traffic volumes are lower. When compared to the November-to-April AADT (9,056), the proposed increase in skier capacity at Mt. Rose would increase the winter AADT by approximately 2.3 percent (increasing the November-to-April AADT to approximately 9,275 vehicles). When compared to the 2001 AADT of 9,765 or the AADT for the summer months (June through September averages 10,935), the incremental increase associated with implementation of either action alternative between November and April would remain well below the existing year-round (approximately five percent below) and summer (approximately 15 percent below) average daily traffic levels.

Parking

Under the Proposed Action, Phase II of the previously-approved parking expansion on private lands at the Mt. Rose side would add an additional 175 spaces. Contingent upon County approval, the parking lot located on East Bowl county lands would be regraded, facilitating on-grade access to the Zephyr Lift and the proposed Day Lodge from the parking area. Additionally, the north and west margins of the parking lot would be expanded by approximately

[56] This is contingent upon County approval.
[57] This is based on 2.4 people per vehicle.

1.75 acres, which would provide approximately 225 additional parking spaces. Total parking in the East Bowl lot would increase to 876 vehicles. With the implementation of the second phase of the Mt. Rose side parking expansion (175 spaces), total parking availability at the resort would increase to 2,493 vehicles or approximately 5,983 people.

CUMULATIVE EFFECTS

Mt. Rose has County approval to construct an additional 175 parking spaces on private land for the Mt. Rose side of the ski area. This project will likely be completed in the summer of 2003. Selection of either of the action alternatives would require Mt. Rose to seek county approval for expansion of parking facilities on county lands at the East Bowl side.

No cumulative actions that would affect traffic flow on the Mt. Rose Highway were identified. In addition, conversations with officials at NDOT revealed no future plans to expand or alter the Mt. Rose Highway.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

No irreversible or irretrievable commitments of resources are anticipated in regards to traffic and access to Mt. Rose's facilities.

FOREST PLAN CONSISTENCY

This parking and traffic analysis indicates no inconsistencies between Mt. Rose's proposed projects and Forest Plan direction.

I. VEGETATION

INTRODUCTION

The vegetation type most common in the project area is conifer forest, with small wetland/riparian zones, and un-forested shrub land. Portions of the existing vegetation have been disturbed in the past by construction of roads, ski runs, ski lifts, buildings, and parking facilities. The summit of Slide Mountain is the site of numerous communications towers and buildings that house related equipment.

A series of sensitive plant surveys have been completed in the project area, beginning with a survey of The Chutes expansion area in 2000.[58] In August 2002, the remainder of the project area on NFS and private lands was surveyed for listed and sensitive plant species.[59] This survey identified additional locations where Tahoe draba was present but no other listed or sensitive plant species were identified.

SCOPE OF THE ANALYSIS

The defined project area for potential effects to overstory vegetation is limited to NFS lands currently within the SUP areas that make up Mt. Rose, as well as NFS lands in The Chutes area. Regarding effects to Tahoe draba, approximately 1,309 acres of *potential* habitat were identified within six miles of the project area. Approximately 206 acres of potential Tahoe draba habitat on NFS lands surrounding the Mt. Rose project area were *surveyed*. Although the Galena Creek rockcress had been observed in The Chutes expansion area during the 2000 survey, none were observed in the 2002 survey area.[60]

FOREST PLAN DIRECTION

With regard to threatened, endangered, and sensitive plant species, the goal of the 1986 Forest Plan is to recognize and protect these plants through habitat management. Habitat will be in good-to-excellent condition.[61] Additionally, Forest direction requires the agency to manage forest habitats and activities to achieve recovery of threatened and endangered plant species and to ensure that sensitive plant species do not become threatened or endangered. Forests must also determine the distribution, status, and trend of threatened, endangered, and sensitive species and their habitats on NFS lands.[62]

The 1986 Forest Plan states that as SUPs are issued or re-issued, the Forest Service should consider site-specific measures to maintain coarse woody material. However, Forest-wide Standards and Guidelines, as amended by the Sierra Nevada Forest Plan Amendment,[63] allow for vegetation management standards to be waived for incidental removal of vegetation for certain uses and activities. This standard and guideline is intended to provide for the operation,

[58] JBR Environmental Consultants, Inc. 2000
[59] JBR Environmental Consultants, Inc. 2002b
[60] JBR Environmental Consultants, Inc. 2002
[61] USDA Forest Service, 1986 IV-6
[62] USDA Forest Service, 1986 IV-51
[63] USDA Forest Service, 2001a

maintenance and development of existing permitted recreation services and resorts and other existing recreation developments, trails and roads. It provides an exception from the vegetation management standards and guidelines for these uses within existing permit boundaries. In keeping with this intent, vegetation removal is considered "incidental" when it occurs to facilitate recreation activity and the maintenance, operation, and development of the supporting infrastructure and recreational uses.[64]

Where necessary and in compliance with other existing law and policy, this standard and guideline allows trees to be removed within existing recreation development sites and for trails and roads and to administer special use permits and in support of resort development. Examples include tree removal for such activities as widening a ski run, building a new run; repairing, improving or replacing cabins; adding sites to a developed campground, etc.[65]

CURRENT CONDITION

Overstory Vegetation

Existing vegetation types within the project area include xeric shrub, which is dominated by greenleaf manzanita (*Arctostaphylos patula*), at lower elevations on south facing slopes. A mixed subalpine conifer forest, which is dominated by western white pine (*Pinus monticola*) and mountain hemlock (*Tsuga mertensiana*), is found at higher elevations. Lodgepole pine (*Pinus contorta*) and red fir (*Abies magnifica*) are found on lower elevation, north facing slopes. There are patches of wetland and riparian vegetation at the base of The Chutes area and in the East Bowl of the ski area. Wetland and riparian areas in The Chutes are dominated by aspen (*Populus tremuloides*), willow (*Salix* spp.), and alder (*Alnus incana*). Wetland and riparian areas in the East Bowl are dominated by several species of willows. There are also areas of alpine cushion vegetation on the highest and most exposed areas of the project.

Habitat types were mapped for the portion of the projects on proposed NFS lands.[66] Table III-12 summarizes the areas of different habitat by type:

Table III-12
Areas of Habitat Types

Habitat Type	Area (acres)	Percent
Conifer Forest-Dense	15	2.6
Conifer Forest-Moderate Density	166	29.2
Conifer Forest-Low Density	212	37.3
Willow/Aspen/Alder	31	5.4
Unforested (Shrubs, Disturbed)	145	25.5
Total	*569*	*100.0*

Federally Listed and Sensitive Species

There are no Federally listed plant species present in the project area,[67] and none were observed

[64] USDA Forest Service, 2002
[65] Ibid.
[66] JBR Environmental Consultants, Inc. 2002a
[67] USFWS, 2001 and NNHP, 2001

during vegetation surveys.[68] Two Forest Service sensitive species were found in the project area during vegetation surveys in 2000 and 2002: the Galena Creek rockcress (*Arabis rigidissima* var. *demota*) and the Tahoe (or star) draba (*Draba asterophora* var. *asterophora*). The Galena Creek rockcress is found near the base of The Chutes[69] and the Tahoe draba is found on both NFS and private lands on sparsely vegetated northwest to northeast facing slopes above 8,700 feet.[70]

Galena Creek Rockcress

As noted, although the Galena Creek rockcress had been observed in The Chutes expansion area during the 2000 survey, none were observed in the 2002 survey area.[71]

This species is known from Galena Creek in the Carson Range, 1.5 miles southeast of Mt. Rose Peak.[72] The closest previously reported occurrence to the project area is approximately 1.5 miles to the southwest of the project area at an elevation of 7,760 feet. Habitat for Galena Creek rockcress includes rocky areas at the edge of aspen groves and brushy slopes on moderate to steep slopes of northerly aspects.[73] It has been found on sandy to rocky soils on granitic or volcanic outcrops, generally between 7,020 and 10,020 feet in elevation.[74] This species is identified primarily by its siliques and lowest basal leaves.[75] The only noted similar appearing species is *Arabis platysperma*, which differs from Galena Creek rockcress in having wider seedpods and winged seeds. Both species may occur together but it is possible to differentiate between them in the field if siliques are present.

Tahoe Draba

Tahoe draba is a low growing perennial forb in the mustard family (Brassicaceae). The plant is known from within the Lake Tahoe basin and the surrounding area. The plant is known to reproduce both sexually by seed dispersal and asexually by rhizomes and stolons. It occurs on northern aspects of talus slopes, decomposed granite slopes, and rock crevices between 8,500 and 10,500 feet elevation.[76] Tahoe draba can be found on hollows and benches where snow accumulates, but also on steep, disturbed terrain (e.g., ski trails), avalanche chutes, and road cuts. The plants have been found on slopes in excess of 45 degrees.[77] It is found in areas with little to no canopy cover, sparse or no surface litter, and areas that accumulate deep snow during the winter months.[78]

Populations have been found both above the tree line and in openings in subalpine coniferous forest. The available literature reports that Tahoe draba is usually found on granitic substrate; however, at least two populations have been found on metamorphic substrate.[79] All populations

[68] JBR Environmental, Inc. 2000, 2002b, and 2002c
[69] JBR Environmental, Inc. 2000
[70] JBR Environmental, Inc, 2000, 2002b, and 2002c
[71] JBR Environmental Consultants, Inc. 2002
[72] Kartesz, 1988
[73] USDA, 1990 and NNHP, 2001a
[74] NNHP, 2001a.
[75] USDA Forest Service, 1990
[76] CNDDB, 2002; CalFlora, 2002; and NNHP, 2001b
[77] Personal communication with Richard Duncan, JBR Environmental, December 31, 2002.
[78] Parsons, 2001; NNHP, 2001b; CalFlora, 2002; and CNDDB, 2002
[79] Durham, 2002

in the survey areas on and in the vicinity of the project area are on granitic substrate in talus fields, rock crevices, or a range of decomposed granite slopes in openings in the subalpine coniferous forest.

Tahoe draba appears to be restricted to slopes with a northwest to northeast aspect and seems to establish best in areas that accumulate deep snow.[80] This is evidenced by the aspects and local topography it prefers. In many areas it is found in hollows or on benches that accumulate snow, which melts later in the season and provides soil moisture at the beginning of the growing season. The species may occur in association with other alpine and subalpine species as well as in monocultures. Tahoe draba does not appear to have an association with any other species, and in fact, it is often the only species present.

Four areas that were helpful in determining potential project-related effects and potential mitigation measures were investigated as part of the 2002 survey work. These include: 1) the Tahoe draba management history at Heavenly Ski Area; 2) the history of recent ground disturbances at Mt. Rose, and its apparent effects on Tahoe draba; 3) using a Geographic Information System (GIS) to map potential suitable habitat for Tahoe draba within the broader landscape; and 4) a field survey for Tahoe draba plants outside the project area but in the nearby vicinity.

Tahoe Draba Management at Heavenly Ski Area

There is little recorded data on Tahoe draba's response to disturbance. However, during the construction of a new ski lift at the Heavenly Ski Area in 1997, a monitoring plan was implemented to assess the affects of disturbance, transplanting, and seeding of Tahoe draba.[81] This report represents the only known source of quantitative data on Tahoe draba's response to disturbance. Prior to disturbance resulting from construction of the lift at Heavenly Ski Area, 240 Tahoe draba plants were transplanted.[82] During the first two years, survival was based only on the presence of the original "mother plant" in the transplant plot. Between 4,000 and 8,000 collected Tahoe draba seeds were also planted as mitigation for impacts to Tahoe draba. The seeded plots had much lower survival than the transplants with 80 percent survival in 1998, decreasing to 15 percent in 2001.

During the lift construction project in 1997, 56 (52 colonies) Tahoe draba plants were obliterated by grading and blasting. When this same area was monitored in 2001, 273 plants (20 colonies) were found. Production of new ramets from underground roots and new sprouts from rhizome fragments was the apparent source of the new plants, although some establishment from seed is possible.

History of Some Recent Disturbance at Mt. Rose Ski Area

There has been historic disturbance to Tahoe draba and potential habitat in the Mt. Rose ski area since the mid-1940s. Past ground disturbance on the private land portions of the Mt. Rose ski area include clearing of trees and stumps, blasting boulders, ripping of soil, grading, application

[80] USFS, 2002; Miller, 2002; and CNDDB, 2002
[81] Sycamore, 1997
[82] Ibid.

of topsoil and erosion control materials, and seeding. Tahoe draba has been found in areas that were subjected to blasting and tree removal only one year earlier.

Tree removal may actually create additional Tahoe draba habitat if existing canopy cover is removed and there is no litter. Suitable Tahoe draba habitat was likely created when conifer forests were cleared during development of the north-facing slopes on Mt. Rose property in the 1950s.[83] Tahoe draba was found in these areas in the recent survey. There were few occurrences of Tahoe draba in the areas recently disturbed for the installation of snowmaking pipelines on private lands; however, these disturbances were recent (2001) and Tahoe draba may yet become established.

On the project area, Tahoe draba was frequently found in avalanche chutes as well as along road cuts and fill areas that appear to be very unstable decomposed granite slopes. These observations of Tahoe draba's response to past disturbances on the Mt. Rose ski area are only qualitative. However, they confirm that the species has persisted in the ski area despite a long history of disturbance and they provide an estimate of the time period required for Tahoe draba to establish under various types of disturbance.

The history of ground disturbance at the Mt. Rose ski area suggests, as did the history at Heavenly Ski Area, that Tahoe draba is resilient and able to re-establish in disturbed areas. Tahoe draba has persisted in the Mt. Rose ski area despite considerable disturbance (in some cases repeatedly over many years) and with no recognition or attempts to manage or protect the species.

Identification of Potential Tahoe Draba Habitat

Published information and subsequent surveys for Tahoe draba indicate that the plant occurs in fairly predictable habitat, with affinities that may be modeled by GIS. These affinities include: minimum elevation of 8,700 feet, aspect between northwest and east-northeast, granite substrate, and 20 percent minimum slope. In order to estimate the amount of potential habitat that might be present in a fairly large area, GIS was used to map the areas that met all the known habitat requirements on five U.S. Geological Survey (USGS) 7.5 minute quads in the north Lake Tahoe region.[84]

The total land area on the five quads is approximately 260 square miles, after excluding the area covered by Lake Tahoe. The Truckee and Tahoe City quads were found to have no likely Tahoe draba habitat because elevations are below 8,700 feet. The Martis Peak quad had a small area that met all requirements except for a granite substrate, but no portion of the quad met all criteria. The Marlette Lake quad had 66 acres of potential habitat and the largest area of potential habitat was found on the Mt. Rose quad with a total of 1,243 acres. Locations of actual surveyed Tahoe draba were found to be in general agreement with the modeled habitat. However, not all known locations occupied modeled habitat.

[83] However, there is no information on the past distribution and trends of Tahoe draba on Slide Mountain. It is unknown if disturbance activities have created,, altered, or destroyed habitat.
[84] Marlette Lake, NV; Martis Peak, CA-NV; Mt. Rose, NV; Tahoe City, CA; and Truckee, CA

This analysis demonstrated that it is possible to model potential Tahoe draba habitat on the basis of known affinities, and that a considerable amount of habitat is likely present in the higher elevations of the eastern Sierra. Approximately 1,309 acres of potential habitat were identified within six miles of the project area. Of the surveyed habitat, only 18 percent was occupied by Tahoe draba.

A specific inventory of Tahoe draba individuals and aggregations was conducted within the project area in 2002. Each location of Tahoe draba was recorded using GPS receivers. However, the data collected by GPS did not distinguish between individuals and clusters of individual plants (aggregations). Each of the GPS points represents from one to five or more plants. An analysis was later conducted to determine the number of actual Tahoe draba individuals/aggregations that exist and that would be affected by the proposed ground disturbances. Approximately 115 acres of Tahoe draba occupied habitat is known to exist at the ski area across NFS and private lands. Approximately 83 acres of Tahoe draba habitat are located on NFS land and the remaining 32 acres are located on Mt. Rose private property. Within the project area, 249 individuals/aggregations of Tahoe draba were GPSed on NFS land in the 2002 survey.[85] (This does not include the 2000 Chutes survey, because GPS technology was not used at that time. The 2000 Chutes survey mapped the limits of occupied Tahoe draba habitat. However, an *estimated* 80 additional individual/aggregations of Tahoe draba would likely have been GPSed had the technology been utilized at that time.[86]) The 2002 survey GPSed another 227 individuals/aggregations on private property owned by Mt. Rose.[87]

Tahoe Draba Surveys Outside the Project Area

Approximately 206 acres of potential Tahoe draba habitat on NFS lands surrounding the Mt. Rose project area were surveyed. The areas were surveyed on August 22, 2002, and Tahoe draba was found in each location. In all, 177 locations of Tahoe draba individuals/aggregations were recorded on Global Positioning System (GPS) receivers in the survey areas. Each of these GPS points represents from one to five or more plants (no attempt was made to distinguish ramets from genetically unique plants). Approximately 38 acres of plants and habitat were identified in the survey of the 206 acres of NFS lands in the vicinity (within two miles) of the project area.

DIRECT AND INDIRECT ENVIRONMENTAL EFFECTS

Alternative 1 – No Action

Selection of Alternative 1 would result in no direct or indirect effects to vegetation in the project area. Alternative 1 would continue existing management practices without changes, additions, or upgrades to the portion of the ski area operating on NFS lands.

[85] JBR Environmental, 2002b
[86] Correspondence with JBR Environmental on December 31, 2002
[87] JBR Environmental, 2002b

Alternative 2 – The Proposed Action

Vegetation Removal

All slash associated with construction of the *East Bowl/Chutes Skiway* can be chipped. The timber with structural value can be sold to a local mill, all the rest can be stored for use as fire wood in lodges. This are has a high percentage of insect-damaged and/or dead timber. In constructing the *Skiway*, every effort would be made to remove the dead timber first and save the healthy trees.

Vegetation removal proposed for the Chutes terrain and *Jim's Run* would utilize a glading techniques. Glading in this proposal calls for removing between five and eighty percent of the overstory vegetation in a given area, depending on site-specific characteristics. Glading is prescribed in areas meant for advanced/expert skiers and riders. For example, Most of the trees in The Chutes are small diameter, and generally are clustered as a result of damage from snow creep and slides. Vegetation removal here would be approached from a conservative standpoint, favoring dead and dying trees first, and clearing just enough to make the skiing experience safe and fun for advanced/expert skiers and riders. *Jim's Run* could be constructed by removing five to ten percent of the overstory vegetation. This area could be made skiable by selective limbing and removal of dead and dying trees.

The construction of *Lakeside* and the *Around the World Bypass* would necessitate removal of 100 percent of the overstory vegetation. Harvested timber associated with construction of *Lakeside* could be stockpiled for use as fire wood in lodges; branches could be chipped for use as ground cover. *Lakeside* could be constructed with minimal effect to large overstory specimens and still provide a safe and appropriate zone for novice skiers.

Selection of Alternative 2 would result in some disturbance to vegetation in the project area. On the East Bowl side, improvements to the lodge and parking areas would affect mostly currently un-vegetated areas. A new trail segment of the *Zephyr Traverse* would require minimal vegetation removal and grading in an approximately 0.5-acre area. Approximately 4.2 acres would be lightly gladed with removal of five-to-ten percent of the trees to construct *Jim's Run*. Installation of water lines for snowmaking coverage would require the excavation of trenches to a depth of six to eight feet and a disturbance area approximately 40 feet wide. The disturbance would be along existing trails for a total distance of about 3.9 miles. Overall, Alternative 2 would result in approximately 55.8 acres of grading and an additional 16.6 acres of stumping and smoothing on existing trails in the East Bowl. Vegetation on the existing trails is generally sparse, however some areas are well-vegetated with a variety of species.

A snowmaking water impoundment, which would inundate approximately one surface acre, is proposed above the *Zephyr Traverse*. Approximately 4.2 acres of conifer forest in the East Bowl would be thinned by removal of less than ten percent of the trees. Tree removal would involve cutting the boles near ground level, leaving the roots intact to minimize ground disturbance and potential erosion.

In The Chutes area, approximately 0.7 acres of vegetation would be cleared by removing trees for installation of the Chutes Return Lift. Construction of the portion of the lift on NFS land

would include four new towers and a loading area at the bottom terminal. Approximately 12 of the existing avalanche chutes in the area would receive thinning and incidental trimming of vegetation for ski run construction. Vegetation removal would concentrate on smaller diameter trees, which have become reestablished due to avalanche control. Vegetation thinning to construct trails in The Chutes area would affect approximately 39 acres in total. Construction of the *East Bowl/Chutes Skiway*, which would allow access from the East Bowl parking lot to the base of the Chutes Return Lift, would require clearing approximately 4.5 acres of conifer forest. In summary, the project would clear approximately 5.2 acres and thin 39 acres of forest in The Chutes. The Proposed Action would avoid all ground disturbances in the 31 acres of willow/aspen/alder. Some incidental vegetation trimming[88] in this habitat type is proposed in The Chutes (refer to the Wetlands section of this Chapter for additional detail).

Tahoe Draba

The results of the survey of the limited area adjacent to the project area suggest that Tahoe draba numbers are much higher than current records indicate and that the plant may be more common than believed. The new locations found in the vicinity, but outside the project area, make it less likely that effects to portions of the Mt. Rose population of Tahoe draba would place the species at risk of extinction. The new plant locations found during the 2002 surveys on Mt. Rose and the surrounding NFS land exceeded the estimated number of Tahoe draba plants (2,066) in Nevada.[89] There exists a potential that a systematic search of potential habitat in California and Nevada could locate enough plants that the Tahoe draba could be removed from the sensitive species list.

The effects of Alternative 2 on the two sensitive plant species found in the project area are analyzed in the Biological Assessment/Biological Evaluation prepared for the project. Approximately 115 acres of Tahoe draba occupied habitat is known to exist at Mt. Rose. Approximately 83 acres are located on NFS land and the remaining 32 acres are located on Mt. Rose private property. Implementation of Alternative 2 would directly affect 124 Tahoe draba individuals or aggregations on 12.6 acres of known Tahoe draba occupied habitat on NFS land. As indicated, 249 individuals/aggregations of Tahoe draba were GPSed on NFS land in the 2002 survey.[90] This represents 11 percent of the known occupied habitat within the Mt. Rose ski area and 15 percent of the occupied habitat on NFS land. Because the Tahoe draba is adapted to disturbance and capable of recovering by sprouting new plants from roots and rhizomes, the effects are expected to be temporary. The 32 acres of occupied habitat on Mt. Rose property are not proposed for disturbance at this time. An additional 38 acres of potential Tahoe draba habitat has been identified outside the project area on nearby NFS lands, and within the five quad GIS survey area (260 square miles), there were 1,309 acres of potential habitat identified.

The investigations described above suggest that Tahoe draba is adapted to disturbance and can recover, provided that the disturbance does not alter its habitat requirements. Tahoe draba

[88] Incidental vegetation removal would be carried out by hand.
[89] NNHP, 2001b
[90] No ground disturbance would occur to identified Tahoe draba habitat in The Chutes, where a five-to-ten percent clearing prescription (by hand) is proposed. While higher-elevation portions of the proposed Chutes terrain do overlap with Tahoe draba habitat, identification of Tahoe draba locations prior to hand vegetation removal would eliminate the risk to trampling plants during the construction phase.

appears to be much more locally common than previously known, making the population in the project area less likely to be critical to the species' survival. Specific mitigation measures and a Species Conservation Plan (Appendix A) have been developed to detail the conditions under which the projects effecting Tahoe Draba would be subject. With these specific construction and plant management requirements in place, it is believed that the long-term consequences of Alternative 2 on Tahoe Draba would be relatively minor and would not tangibly contribute toward a federal listing of the species.

Galena Creek Rockcress

No ground disturbance is proposed for the area at the base of The Chutes where the Galena Creek rockcress was found in the 2000 survey; incidental vegetation trimming and glading the proposed new runs by removal of selected trees should not affect this species.

Alternative 3

Alternative 3 substantially reduces the level of proposed ground disturbing activities and separates the remaining trail grading projects into two phases. Under Alternative 3, initial disturbance to Tahoe draba plants and habitat would be reduced from the 12.6 acres proposed in Alternative 2 to 4.2 acres, which is the minimum amount required to meet the project's purpose and need. This represents five percent of the Tahoe draba on NFS lands within the project area.

Within the 4.2 acres of terrain proposed as "test areas," specific details regarding transplanting, reseeding, irrigation/maintenance, and monitoring would be implemented. These practices are outlined in Appendix A – The Species Conservation Plan. Subsequent to disturbance, the "test areas" would be regularly monitored by professional botanists and evaluated against established performance criteria for both transplants and seed establishment. Provided that the "test areas" meet the performance criteria within the specified period, the remaining 8.4 acres of terrain, categorized as "contingent upon the success of the test areas," would be approved for grading and Tahoe Draba reestablishment.

Alternative 3 would initially affect 40 Tahoe draba individuals or aggregations. Provided that the "test areas" meet the performance criteria within the specified period, an additional 52 Tahoe draba individuals/aggregations would be subsequently affected by the remaining grading and snowmaking disturbances.

As under Alternative 2, this analysis suggests that Tahoe draba is adapted to disturbance and can recover, provided that the disturbance does not alter its habitat requirements. Tahoe draba appears to be much more locally common than previously known, making the population in the project area less likely to be critical to the species' survival. Specific mitigation measures and a Species Conservation Plan (Appendix A) have been developed to detail the conditions under which the projects effecting Tahoe Draba would be subject. With these specific construction and plant management requirements in place, it is believed that the long-term consequences of Alternative 3 on Tahoe Draba would be relatively minor and would not tangibly contribute toward a federal listing of the species.

Galena Creek Rockcress

As with Alternative 2, there would be no effects to the Galena Creek rockcress under Alternative

3.

CUMULATIVE EFFECTS

There is little recorded data on Tahoe draba's response to disturbance. The 1997 Heavenly Ski Area monitoring plan[91] represents the only known source of quantitative data on Tahoe draba's response to disturbance.

As noted, there has been historic disturbance to Tahoe draba and potential habitat in the Mt. Rose ski area since the mid-1940s. Past ground disturbance on the private land portions of the Mt. Rose ski area include clearing of trees and stumps, blasting boulders, ripping of soil, grading, application of topsoil and erosion control materials, and seeding. Tahoe draba has been found in areas that were subjected to blasting and tree removal only one year earlier.

Observations of Tahoe draba's response to past disturbances on the Mt. Rose ski area are only qualitative. However, they confirm that the species has persisted in the ski area despite a long history of disturbance and they provide an estimate of the time period required for Tahoe draba to establish under various types of disturbance. The history of ground disturbance at the Mt. Rose ski area suggests, as did the history at Heavenly Ski Area, that Tahoe draba is resilient and able to re-establish in disturbed areas. Tahoe draba appears to be much more locally common than previously known, making the population in the project area less likely to be critical to the species' survival.

In addition to the population of Tahoe draba plants in the vicinity of the project area, the species is also found on Freel Peak/Job's Sister, near Star Lake, and near Cup Lake in California (Freel Peak USGS Quad). In Nevada (Mt Rose USGS Quad), plants are found on East Peak/Monument Peak (near Heavenly Ski Area), and on the east face of Dick's Peak. These sites are on public lands and Tahoe draba plants at these locations could be affected by skiing, hiking, and other outdoor recreation activities."

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

The action alternatives would not result in any irreversible or irretrievable commitments of vegetative resources. At any time, the developed ski area could return to its natural state, and the vegetation could reestablish itself.

FOREST PLAN CONSISTENCY

This analysis demonstrates consistency with direction provided in the 1986 Forest Plan. Under Alternative 2, Tahoe draba, a Forest Service sensitive species, would be affected. However, affecting 11 percent of the known occupied habitat in the ski area, which also equates to 0.9 percent of potential habitat within the five quad areas, would not trend the species toward threatened or endangered status. Under Alternative 3, the effects to Tahoe draba would be further reduced.

For consistency with the 1986 Forest Plan under the action alternatives, a noxious weed risk assessment would be conducted prior to any construction. There are three priorities established

[91] Sycamore, 1997

in FSM 2081.2. These are 1) prevent the introduction of new invaders, 2) conduct early treatment of new infestations, and 3) contain and control established infestations. To achieve these priorities, BMPs and specific mitigation measures have been incorporated in Table II-5 - Potential Effects to be Mitigated and Proposed Mitigation Measures. Weed prevention practices in the Region 5 Noxious Weed Management Strategy have been utilized to develop these mitigation measures.

J. VISUAL RESOURCES

INTRODUCTION

The public scoping process revealed concerns regarding the potential visual effects of the Proposed Action on NFS lands, particularly within The Chutes. This visual analysis was completed to determine the level of visual disturbance associated with existing trails and facilities to provide a basis for which to compare the effects of the Proposed Action.

SCOPE OF THE ANALYSIS

This analysis of visual resources is limited to NFS lands within the Mt. Rose SUP and those that are proposed for incorporation into the SUP.

FOREST PLAN DIRECTION

Forest Management Direction

The Forest landscape will be managed with sensitivity for visual quality.[92]

Management Area 2 – Carson Front

Maintain a visual quality objective (VQO) of *Retention* along the Mt. Rose, US 50, and Kingsbury highways.[93]

Manage the "seen" area as viewed from US 395 and other major highways along the Sierras as *Partial Retention*.

FOREST SERVICE LANDSCAPE MANAGEMENT

The goal of landscape management on all NFS lands is to manage for the highest possible visual quality, commensurate with other appropriate public uses, costs, and benefits. Since the mid-1970s, the Forest Service has operated under the guidance of the Visual Resource Management System (VMS)[94] for inventorying, evaluating, and managing scenic resources. In 1995, the Forest Service developed the Scenery Management System (SMS), which supersedes the previous VMS. Guided by advances in research and technology since the introduction of the VMS in 1974, as well as an increase in demand for high quality scenery, the revision of the VMS to the SMS is intended to incorporate human values into ecosystem management. The manual, Landscape Aesthetics: A Handbook for Scenery Management[95] was released to assist with the transition to the SMS. National direction has been given to incorporate, as applicable, the methods and philosophy of the SMS with each new planning project.[96] Complete incorporation of the SMS will occur with each forest's revised forest plan.

[92] USDA Forest Service, 1986, pg. IV-3
[93] USDA Forest Service, 1986, pg. IV-81
[94] FSM 2380
[95] USDA Forest Service, 1995(a)
[96] USDA Forest Service, 8-22-94, 3-10-97 and 6-4-98

Because the SMS was developed in 1995, it has not been fully integrated into the current Forest Plan. However, adoption of the Northern Sierra Amendment to the Land and Resource Management Plan for the Humboldt-Toiyabe National Forest[97] should occur at some point in the future and will incorporate the SMS. Until the SMS is integrated on the HTNF, the VMS will continue to be utilized to inventory, evaluate, and manage scenic resources.[98]

The basic approach of the VMS is to define the visual quality of landscapes and their sensitivity, and from these parameters to establish visual quality objectives (VQOs). VQOs are based on the physical characteristics of the land and the sensitivity of the landscape setting as viewed by humans. VQOs define how the landscape will be managed; the level of acceptable modification permitted in the area, and under what circumstances modification may be allowed to occur.

A *Retention* VQO is specified along the Mt. Rose Highway. The *Retention* VQO emphasizes management activities that are not visually evident to the casual observer. Activities may only repeat form, line, color, and texture, which are frequently found in the characteristic landscape. Changes in the qualities of size, amount, intensity, direction, and pattern should not be evident.

As part of this analysis, Mt. Rose's existing facilities were evaluated as to how they conform with the *Retention* VQO, including the inherent ability of the landscape to absorb the effects of historic change (i.e., the physical characteristics of the area and their ability to overcome the effects of alteration). Slope,[99] vegetation (i.e., type, pattern and contrast), landform, and viewing distance are important factors affecting the landscape's ability to accommodate alteration.

VMS Distance Zones

Distance zones are divisions of the landscape being viewed; they are based upon the proximity of the observer. These are used to describe the part of a characteristic landscape that is being inventoried or evaluated. Viewing distance affects how change is perceived in a landscape. Generally, landforms and special landscape features have more visual effect when viewed within the foreground zone (zero to ½ mile) and are particularly vulnerable to disturbances in that distance zone.

Foreground: The limit of this zone is based upon distances at which details can be perceived. Normally in foreground views, the individual boughs of trees form texture. It is usually limited to areas within ¼ to ½ mile of the observer, but must be determined on a case-by-case basis - as should any distance zoning.

Middleground: Alterations in the middleground (½ to four miles) become much less distinctive. This zone extends from the foreground zone to three-to-five miles from the observer. Texture normally is characterized by the masses of trees in stands or uniform tree cover. Individual tree forms are usually only discernable in very open or sparse stands.

[97] The FEIS for the Northern Sierra Forest Plan Amendment was released in 2001 and a record of decision is forthcoming.
[98] The SMS was considered although not fully applied, throughout this analysis. A discussion of consistency with the SMS is also provided.
[99] Steep slopes are more vulnerable to visual disturbance because a greater proportion of their surface area is visible.

Background: As the perspective shifts to the background, distance has a modifying and diluting effect to both landscape texture and color. This zone extends from the middleground to infinity. In very open or sparse timber stands, textures lose their identity and can be seen as groups or patterns of trees. Shape, however, may remain evident beyond 10 miles, especially if it is inconsistent with other landscape forms. Beyond 10 miles, alteration in landscape character becomes obscured.

CURRENT CONDITION

The 30-acre SUP on the Mt. Rose side, which contains portions of the *Around the World* and *Switchback* trails, is visible in the foreground and middleground views when traveling south on the Mt. Rose Highway. In the foreground to middleground views, developed trails at the East Bowl and the Zephyr Lift can be distinguished. When viewed in the background distance zone, the Zephyr Lift cannot be perceived, but the East Bowl terrain can be distinguished on Slide Mountain. Because some developed trails, the Zephyr Lift, and supporting infrastructure on NFS lands at the East Bowl are visually evident to the observer in the fore- and middlegrounds, the *Retention* VQO is currently not being met. The developed portions of the East Bowl do, however, meet the *Partial Retention* VQO as viewed from US 395 (from the background distance zone).

The individual, undeveloped slide paths of The Chutes area are clearly visible in the foreground and middleground views along the Mt. Rose Highway. From the background view (points as far north/northeast as downtown Reno), the individual slide paths of The Chutes area can still be detected; however, they are difficult to identify individually.

Washoe County Regional Open Space Program

The Regional Open Space Plan identifies the lands in the southern portion of Washoe County that should be considered as open space resources requiring protection. The Forest Service currently manages 59,000 acres of public land within the Washoe County Regional Open Space Plan area boundary.[100] The preservation of the area's natural, cultural and visual resources is of the utmost importance to maintaining the quality of life in the Truckee Meadows. Appropriate management of Forest Service managed lands plays an integral part in maintaining this quality of life.[101]

DIRECT AND INDIRECT ENVIRONMENTAL EFFECTS

Alternative 1 – No Action

Selection of Alternative 1 would not result in any alteration to the appearance of NFS lands, either at the East Bowl or Mt. Rose sides of Slide Mountain. Facilities and trails on NFS lands (i.e., the entire SUP area) would continue to be out of compliance with the identified *Retention* VQO.

Under the SMS, VQOs are replaced with scenic integrity levels (SILs). A *Retention* VQO under the VMS is equivalent to a *High* SIL. A *High* SIL refers to landscapes where the valued

[100] Washoe County 1994.
[101] Washoe County Commission 2000.

landscape character appears intact. Deviations may be present but must repeat the form, line, color, texture, and pattern common to the landscape character so completely and at such scale that they are not evident.[102] Under the No Action Alternative, Mt. Rose's existing facilities on NFS lands would not be in compliance with a *High* SIL when the SMS is officially integrated into visual management for the Forest.

Alternative 2 – The Proposed Action

Much of the exiting development at Mt. Rose predates the creation of the Forest Plan. As detailed above, portions of the existing Mt. Rose facilities are presently incompliant with Forest Plan direction. As a component of the Proposed Action, the Forest Plan would be amended, to change the VQO for the existing and proposed Mt. Rose SUP areas from *Retention* to *Partial Retention*. The proposed amendment was compared against the four criteria for determining the significance of a Forest Plan amendment, per Forest Service Handbook 1909.12, and the amendment was determined to be non-significant. The proposed amendment to the forest Plan is further detailed in Appendix B of this document.

The definition of the *Partial Retention* VQO is:[103]

> *Any activity must be visually subordinate to the natural characteristics of the landscape. Activities may repeat form, line, color, or texture common to the characteristic landscape but changes in their qualities of size, amount, intensity, direction, pattern, etc. remain visually subordinate to the characteristic landscape.*

A *Partial Retention* VQO under VMS is equivalent to a *Moderate* SIL. A *Moderate* SIL refers to landscapes where the valued landscape character appears slightly altered. Noticeable deviations must remain visually subordinate to the landscape character being viewed.[104]

Based on this definition, the Forest Service determined that the proposed non-significant Forest Plan amendment would bring current facilities and trails within the SUP into compliance, as well as proposed facilities and trails.[105] This determination was based on the definition of *Partial Retention* but also on visual simulations and comparative analysis of the proposed facilities and trails.

In Figure III-1, developed and undeveloped portions of the ski area (on public and private lands) are seen in the background view from Reno. Based on this photo simulation, it is apparent that the existing and proposed facilities would blend well with the natural form, line and color of Slide Mountain. Strategic vegetation removal throughout the slide paths in The Chutes, done to accommodate expert skiing, would be difficult to detect from this vantage point, as would the proposed Chutes Return Lift. It was determined that the Proposed Action presents no reduction in the visual integrity of Slide Mountain when viewed from Reno. This aspect of the proposal would comply with the *Partial Retention* VQO and the *Moderate* SIL.

[102] USDA Forest Service, 1995, pg. 2-4
[103] USDA Forest Service, 1974, 32
[104] USDA Forest Service, 1995, 2-4
[105] This includes trails and facilities as viewed in the foreground, middleground and background views.

In Figure III-2, The Chutes area is clearly visible in the foreground view. Individual trees can easily be differentiated, and the slide paths that give The Chutes area its name are clearly distinguishable. While it is apparent from examining the simulated view that removal of small trees and brush in the slide paths would be noticeable, the proposed disturbance would be conducted to accommodate the natural pattern, lines and texture of the landscape. The Proposed Action represents an unsubstantial, incremental effect to the visual integrity of The Chutes. The Chutes Return Lift would be constructed in the lower run-out zone of The Chutes terrain, and can be completed with minimal vegetation removal (i.e., approximately 0.5 acre of overstory vegetation removal associated with construction of the top terminal, and incidental removal of understory vegetation and limbs along the lift corridor). In addition, the bottom terminal of the proposed Chutes return Lift has been strategically sited behind a large knob, which effectively screens the terminal from view. As depicted in Figure III-2, a small portion of the proposed Chutes Return Lift would be briefly visible from the Mt. Rose Highway. As a portion of the proposed lift design, Mt. Rose intends to select a light green color for use in the construction of the lift towers to make them less obtrusive. To further reduce the visual effects of the proposed lift, the chairs would be removed during the non-winter seasons. Vegetation removal in The Chutes is not anticipated to be evident from vantage points outside of the foreground view from the Mt. Rose Highway.

An additional visual analysis of The Chutes area projects was conducted to determine the sensitivity of the landscape as viewed from several points along the *Mt. Rose Summit* trail which leads to the summit of Mt. Rose proper across the valley and directly north/northwest of Slide Mountain and the ski area. Several points from along the trail as well as the view from the summit were examined. While The Chutes themselves are readily apparent from these locations in the middleground and background, the lower portion of The Chutes area, where lift would be installed is not visible due to the topography. It was determined that the vegetation removal/trimming proposed in The Chutes would be visually subordinate to the surrounding features and line forms within the characteristic landscape, therefore this aspect of the proposal would meet the *Partial Retention* VQO, as well as the *Moderate* SIL.

The visual effects of grading at the East Bowl side considered short-term and minor. Once vegetation is reestablished (one to two years) the effects of grading would not be discernable from the current condition. The water impoundment would not be visible from the base area. The upgraded water tank at East Bowl would not pose any incremental effects to visual resources. Glading associated with *Jim's Run* and vegetation removal associated with *Lakeside Trail* and the *Around the World Bypass* would add to the developed nature of the Mt. Rose side, but would remain within the *Partial Retention* VQO.

Washoe County Regional Open Space Program

The Proposed Action is in line with the Washoe Board of County Commissioners' (BCC) desire to allow for the expansion of downhill skiing in The Chutes area adjacent to Mt. Rose Ski Tahoe. No visual concerns were raised by the BCC, which stated that allowing for this expansion is

important to support Washoe County's tourism economy and expansion of recreational opportunities.[106]

Alternative 3

Grading and stumping/smoothing of terrain within the East Bowl proposed under Alternative 3 would total 44.8 acres, a reduction in ground disturbance of 27.6 acres (38 percent) as compared to the Proposed Action. This would represent a *temporary* reduction in visual disturbance in the East Bowl area, because the disturbed area would be revegetated under Alternative 3 and returned to the current state in the longer-term. However, visual alteration to The Chutes area under Alternative 3 would remain the same as in the Proposed Action. When viewed from the critical viewpoints (Reno and the Mt. Rose Highway), the visual alteration associated with Alternative 3 would be identical to the Proposed Action in the long-term. Alternative 3 also proposes the non-significant amendment to the Forest Plan, which would change the VQO for the existing and proposed SUP area from *Retention* to *Partial Retention*. Therefore, the project elements proposed under Alternative 3 would also be in compliance with the VQO of *Partial Retention* and the SIL of *Moderate.*

[106] Washoe County Commission 2000.

Mt. Rose
SKI TAHOE

Figure III -1

Before

Existing view from Reno towards Mt. Rose

After

View of the proposed Chutes area

Mt. Rose SKI TAHOE

Figure III -2

Before

Existing view of the Chutes area from the intersection of The Mt. Rose Highway and the East Bowl Road

After

View of the Chutes area from the intersection of The Mt. Rose Highway and the East Bowl Road with the proposed Chutes Return Lift and vegetation trimming

CUMULATIVE EFFECTS

No projects that could be pursued by Mt. Rose on private lands in lieu of selection of either of the action alternatives would cumulatively detract from the scenic integrity of Slide Mountain.

While no overstory vegetation would be removed on NFS lands to construct the Chutes Return Lift, approximately 0.25 of an acre of vegetation would be removed for construction of the top terminal on private lands.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

The action alternative presents no irreversible or irretrievable commitments of visual resources in the foreground, middleground, or background views. At any point in time, trails could be allowed to regenerate with native under- and overstory vegetation and infrastructure could be removed.

FOREST PLAN CONSISTENCY

As indicated in this analysis, the existing trails and facilities on NFS lands are presently out of compliance with the *Retention* VQO as specified in the current Forest Plan. Under the No Action Alternative, these facilities would continue to be out of compliance with the Forest Plan and would not meet the *High* SIL under the future SMS. The action alternatives would bring existing and proposed trails and facilities into compliance with both the current VMS and the future SMS through incorporation of a non-significant Forest Plan amendment. The proposed amendment to the forest Plan is further detailed in Appendix B of this document.

K. WATER AND SOILS

INTRODUCTION

Mt. Rose is located on Slide Mountain, approximately 15 miles southwest of Reno, Nevada, within the Carson Ranger District of the Humboldt-Toiyabe National Forest. It is situated approximately 5.6 miles northeast of Lake Tahoe, the largest alpine lake in North America. There are several primary drainages within the Mt. Rose vicinity. Galena Creek, Browns Creek, and Ophir Creek drain from the western (primarily private lands) portions of Mt. Rose. The East Bowl, located on NFS lands, is drained by Winters and Davis creeks. All of these streams flow eastward into Nevada; none of the watersheds within the Mt. Rose vicinity/project area are tributary to the Tahoe Basin. Winters, Davis, and Ophir creeks all flow into Washoe Lake, while Browns and Galena creeks are both tributaries to Steamboat Creek, which flows northeast from Washoe Lake toward its confluence with the Truckee River.

SCOPE OF ANALYSIS

The scope of the water and soils analysis entails the primary drainages into which water flows from the ski areas, on private, county, and NFS lands. These five watersheds include Galena, Browns, Ophir, Winters, and Davis creeks.

FOREST PLAN DIRECTION

The 1986 Forest Plan requires the agency to implement BMPs for the protection and improvement of water quality and soil productivity. It also requires that projects meet or exceed state water quality standards.

CURRENT CONDITION

Climate

Mt. Rose is situated within an extremely variable climatic zone, positioned within a transition zone from the Sierra Nevada mountain range to the basin-and-range geographic zone to the east. Mt. Rose lies on the eastern, lee side of the Sierra Nevada Range, a massive mountain barrier that substantially influences the climate of the region. Some of the most extreme contrasts in precipitation found within a short distance in the United States occur between the western slopes of the Sierras in California and the valleys just to the east of the range. The prevailing winds come from the west. As the warm moist air from the Pacific Ocean ascends the western slopes of the Sierra Range, the air cools, condensation takes place, and most of the moisture falls as precipitation. As the air descends the eastern slope, it is warmed by compression, and very little precipitation occurs. The effects of this mountain barrier are felt not only in the west but also throughout the State of Nevada, with the result that the lowlands of Nevada are largely desert or steppes.

Snowfall is usually heavy in the mountains, particularly in the northern Sierra. Twenty-four hour snowfall amounts can accumulate to over 45 inches, while seasonal totals of over 300 inches are common. Average annual precipitation in Reno, located within the arid valley to the east, is 7.4 inches per year, at an elevation of 4,400 feet. Mt. Rose is situated between elevations ranging

from approximately 8,260 feet at its base to approximately 9,700 feet at its summit. Average annual precipitation within this elevation zone is approximately 40 inches per year.

Winter snowfall is the predominant source of moisture, and spring runoff forms the main source of water for streamflow. Approximately 75 percent of the annual precipitation occurs as snowfall between November and April. Precipitation within the summer months is sparse and typically orographic in nature, as convective heating from the low-elevation valleys to the east produce cumulonimbus clouds that deposit rain in the form of short duration thunderstorms, sometimes of high intensity. Average monthly precipitation at Mt. Rose in July and August is less than one inch, and summer months where no precipitation is registered are not uncommon.

Water Resources

Water Rights

Mt. Rose has developed water supplies to serve its mountain restaurants and snowmaking operations. Water supplies for these activities are derived from ground water sources originating from a high capacity well and multiple spring sources. The right to divert and put this water to beneficial use has been granted by the State Engineer of Nevada through issuance of various permits approving ground water withdrawals for ski area uses. Each permit defines an instantaneous rate of diversion and annual volume of water that may be diverted for the intended uses. The permits contain other provisions as necessary to protect other water users in the State.

Mountain Restaurants

The Mt. Rose base lodge obtains its water supply from the Kit Carson spring located on the lower *Kit Carson Bowl* trail, approximately 250 feet northeast of the top terminal of the Ponderosa lift. Water is collected at this location in an underground collection box and delivered to a 10,000-gallon storage tank from which water is pumped to a larger 100,000-gallon tank prior to delivery via buried pipeline to the lodge. The spring source was originally permitted by the State Engineer's office in 1961. Subsequent to this date, Mt. Rose placed the water to beneficial use and obtained a Certificate of Appropriation of water. The Certificate was issued April 25, 1968 for an instantaneous amount of diversion of 0.2 cfs, not to exceed 4.82 acre-feet (AF) annually.

The Big Springs Well may serve water demand in excess of 4.82 AF annually at the Mt. Rose lodge. The Big Springs Well is described in more detail below in the section covering snowmaking water rights. The well is permitted to provide up to 100 AF annually for snowmaking and quasi-municipal use at the lodge.

The existing East Bowl day lodge facility derives its water from a collection of three spring sources originating from locations on or adjacent to the *Fremont* trail. The three sources include: the Davis Spring, the Winters Spring, and an un-named spring.

The Davis Spring and the Winters Spring hold permits to appropriate ground water for use at the East Bowl side, where it is used for commercial purposes at the ski resort for the lodge, housing, landscaping and snowmaking. These permits were obtained in the name of the Forest Service. These sources originate on NFS lands that are under SUP to the Mt. Rose Ski Area. The right to

appropriate water from these sources was obtained in 1979 in the amounts of 0.1 cfs and 0.15 cfs for the Davis and Winters springs respectively. The intended use of the water is to provide domestic and recreational uses at the East Bowl day lodge facility. The State Engineer has not recorded proof of beneficial use of water from these sources; consequently, final Certificates of Appropriation of water have not been issued.

A final Certificate of Appropriation has been issued for the third source, an un-named spring originating from the top of the Fremont Trail. Certificate No. 9629 was issued by the State Engineer on November 6, 1981 in an amount of 0.05 cfs, with a total annual use of 36.2 AF.

Snowmaking

Mt. Rose's existing snowmaking diversions are obtained from the Big Springs Well, located east of the ski area. The well was constructed in 1998 and has a reported yield of 1.22 cfs. Presently the well provides a source of snowmaking water for coverage of 84 acres of terrain on the Mt. Rose private lands.

The Big Springs Well has five permits for appropriation of water for snowmaking and quasi-municipal uses. Each of the five permits was granted by the State Engineer on September 17, 2002.[107] These recent permits were issued by the State Engineer in response to Mt. Rose's request to change the point of diversion and place of use of water as issued under previous permits. Under the conditions specified in the new permits, total diversions from the well, under all five permits, cannot exceed 1.069 cfs and a total of 100 AF per year. Also, the full allocation of water must be placed to beneficial use on or before September 17, 2004, and proof of such beneficial use must be filed by Mt. Rose on or before October 17, 2004. A summary of the various permits to appropriate water under the Big Springs Well is shown in the following table:

Table III-13
Big Springs Well
Permits and Allowed Uses

Current State Engineer's	Original	Amount[a]		Authorized Uses[b]
Permit Number	Permit Number	cfs	AF	
67914	63697	0.0438	31.669	Quasi-municipal
67915	63698	0.0100	4.99	Quasi-municipal
67916	63890	0.9280	100.00	Quasi-municipal
67917	63695	0.0438	31.669	Quasi-municipal
67918	63696	0.0438	31.669	Quasi-municipal

Source: Resource Engineering, 2002

[a] The combined annual diversion under all of the above-referenced permits is limited to 100.0 AF per year at a maximum pumping rate of 1.069 cfs.

[b] Specific uses allowed include snowmaking, ski lodge and other domestic use.

The Big Springs Well is the source of supply for existing snowmaking diversions. Water has not yet been appropriated for quasi-municipal purposes pending further review by the state Health Department of the adequacy of water quality for a source for drinking water.

[107] Permit numbers 67914 through 67918.

Water Yield

Snowmelt-dominated streamflow hydrographs are characterized by a high flow period during spring/early summer and by periods of relatively low flow during the remainder of the year. This flow regime means that most of the runoff is delivered during a relatively short period, resulting in high-energy streamflow characteristics, with a correspondingly high potential for stream channel modification and related effects, such as lateral channel movement, channel scour, and bank sedimentation.

Various land management actions can have the effect of increasing water yield. For example, a variety of studies[108] have demonstrated that timber harvest or eradication, as by wildfire, tends to increase water yield and streamflow.[109] The creation of openings for ski trails involves timber harvest and, as a result, increases the amount of water potentially available for streamflow. The mechanisms for this include: 1) decreasing the amount of evapotranspiration (use of water by plants) through timber removal; 2) decreasing snow loss associated with interception (the trapping of snow in the forest canopy until it is sublimated[110] or evaporated to the atmosphere); 3) accelerating runoff (more rapidly removing water from the forest thereby reducing the amount available on-site for plant use); and 4) increasing deposition in openings (reducing airborne snow particle ablation[111] and loss.) In addition, in the case of groomed ski areas it is theorized that snow grooming affects water yield through modifications in snowpack density by grooming equipment and skiers. Snowmaking can be viewed as an increase in precipitation during the months of its application. As a result, snowmaking "precipitation" adds to the water available for runoff during snowmelt and thereby to the energy available for stream channel effects.

There are no continuous runoff records available to assess the annual water yield produced by the small, high-elevation watersheds draining the Mt. Rose vicinity. Therefore, runoff hydrographs for existing conditions were developed using water balance techniques and snowmelt modeling as outlined in detail in two publications: An Approach to Water Resources Evaluation of Non-Point Silvicultural Sources[112] and the Water Management Research Project Handbook.[113]

Present water yields from these watersheds are affected by the existence of the trail system currently in place, as well as the input of additional water in the form of existing snowmaking. Determining existing runoff requires an estimation of the amount of runoff generated from forested and open areas under pre-developed conditions, and a subsequent determination of the relative change produced by the trail system and snowmaking.

To accomplish this, a water balance is computed that determines the amounts of precipitation and evapotranspiration associated within each contributing area, the remainder being water

[108] Troendle, C. A., et. al., 2001b, p. 179
[109] See for example Wilm, H.G., and E.G. Dunford, 1948; Satturlund, D.R.and H.F. Haupt, 1967; Hoover, M.D. 1971; H.L. Gary, 1974; Troendle, C.A., 1979 and 1987; Schmidt, R.A., 1991; and Birkeland, K.W., 1996
[110] Sublimation is the change of snow or ice directly into water vapor without passing through the liquid phase.
[111] Ablation is the mechanical destruction of snow and ice particles.
[112] WRENSS, 1980
[113] Colorado Ski County USA, 1986

potentially available for runoff. A computer model, called the Subalpine Water Balance Simulation Model,[114] has been developed by the Forest Service to create such a balance.

In concept, the model takes seasonal precipitation applied to a locale that is defined in terms of vegetation, by type and density, and aspect and then subtracts the evapotranspirational demands of the vegetation to compute the amount of water potentially available for runoff. To reflect changes in vegetation due to timber removal, the model modifies evapotranspirational demands to reflect altered vegetation density, defined as basal area or cover density.

The Subalpine Water Balance Model was used to develop a procedure and a set of nomographs to aid analysts in making non-point source pollution assessments. That procedure and its nomographs formed the hydrology chapter (Chapter III) of the EPA document An Approach to Water Resources Evaluation of Non-point Silvicultural Sources (WRENSS).[115] The numerous detailed data inputs required by the model were reduced in the WRENSS procedure by making a large number of model runs and using the results to develop the above-mentioned nomographs. This simplification and the use of evapotranspiration modifier coefficients facilitate the analysis while not significantly diminishing the value of the output.

The water balance of the WRENNS model is coupled with a snowmaking hydrology computation process developed as a result of the 1986 study, commissioned by Colorado Ski Country USA. This study assessed water consumption attributable to snowmaking uses. The study found that initial losses, those essentially occurring at the snowmaking gun, average approximately six percent.[116] Additional watershed losses include sublimation, evaporation, and evapotranspiration, and occur as a function of aspect, elevation, and vegetation. Total consumptive use was found to range from approximately 18 to 26 percent.

The water balance computed via the WRENNS model is modified to reflect the contributions of snowmaking water computed via the above procedures. Together these calculations allow estimates for water yield hydrographs typical of sub-alpine mountain watersheds. It is important to note that this computational process does not account for routing of runoff water through the watershed to the stream system. Basin-wide stream flow routing is very complex in sub-alpine forested watersheds. Nonetheless, snowmelt on the rising limb of the hydrograph is an efficient process and once the soil mantle has been recharged, the snowmelt water is frequently realized as direct stream flow in watersheds with distinct stream channels. In the case of most of the watersheds within the Mt. Rose area, which have a distinct stream channel systems, the resultant hydrographs may be conceptualized as streamflow. However, in the case of basins lacking distinct channel systems, it is important to keep in mind that the water yield hydrographs do not represent streamflow per se, but rather basin-wide water yield to the receiving waters. In all cases it is important to recognize that the hydrographs and yield calculations are computed as a basin-wide effect, and do not account for localized effects to streamflow or excess runoff.

[114] Leaf and Brink, 1973a and 1973b
[115] Troendle, C.A., and Leaf, C.F., 1980
[116] Leaf, C.F., 1986, p. 2-37

Current watershed characteristics are summarized in the following table, which outlines acreages for the ski trails and snowmaking by watershed reflective of the existing trail system and snowmaking applications. Mt. Rose does not have a long operational history with its snowmaking system. Phase I was installed in the summer of 2000 and Phase II was installed in the summer of 2002. The estimates for acreage and diversion amounts portrayed in the following table are based on usage data from those two seasons. Note that the presence of existing acreage under snowmaking in the Winters Creek watershed is based on approximate maps of current snowmaking coverage that show a small portion of the coverage west of the top of the Northwest Magnum 6 Chair within the uppermost region of the Winters Creek watershed.

Table III-14
Watershed Characteristics

Watershed	Watershed Area (acres)	Existing Snowmaking Acreage	Current Snowmaking Application (AF)[a]
Browns Creek	347.0	77.4	42.4
Chutes	313.2	0.0	0.0
Davis Creek	314.7	0.0	0.0
Ophir Creek	318.8	2.2	1.2
West Tavern Wash	148.7	0.0	0.0
Winters Creek	373.2	4.2	2.3
Total	**1815.6**	**83.8**	**45.9**

[a] Average estimated quantity of snowmaking water utilized per watershed in the 2000-2001seasons. The total diversions from the Big Springs well were apportioned amongst the watersheds according to the relative amount of snowmaking terrain existing within each. Although application rates vary with terrain and conditions, it was assumed that snow was applied at an equal rate on all terrain.

Source: Resource Engineering, Inc., 2002

Water yields are summarized in Table III-15, which outlines WRENNS model-estimated water yields for existing conditions:

Table III-15
Water Yields, Existing Conditions

	Existing Conditions		
Watershed	Peak Flow (CFS)	Yield (AF)	Yield per Unit Area (AF/Acre)
Browns Creek	8.8	1056.0	3.04
Chutes	6.1	854.8	2.73
Davis Creek	5.9	853.7	2.71
Ophir Creek	6.1	855.4	2.68
West Tavern Wash	2.8	368.2	2.48
Winters Creek	8.6	1076.4	2.88

Source: Resource Engineering, Inc., 2002

It is instructive to compare average yields as computed by the WRENNS model with basin-average behavior as indicated by longer-term USGS gaging records. For purposes of comparison, streamflow records from a USGS gage at Galena Creek State Park were obtained.[117]

[117] USGS Gage No. 10348850.

Galena Creek drains from its headwaters near the summit of the Mt. Rose Highway, east towards Steamboat Creek. This gage, located at an elevation of 6,320 feet, drains an area totaling 7.69 square miles, and offers continuous flow records extending from 1984-2000. Over this period of record, this gage exhibits an annual area-normalized yield of 1.72 AF of yield per acre of watershed area. By comparison, the average yield per unit watershed area as computed by the WRENNS model for the Mt. Rose watersheds from is 2.70 AF/acre (excluding the snowmaking-influenced Browns Creek yield estimate). This represents an additional 12 inches of water yield per unit watershed area above the estimate from the Galena Creek gage. However, this increased yield is reasonable since the Galena Creek Gage is approximately 2,000 vertical feet below the Mt. Rose base, and given the extreme variability of precipitation with elevation in this region, the yield differences are not unexpected.

Stream Channels

Davis Creek and Winters Creek originate on NFS lands within the East Bowl. The Chutes creek drains the steep, northeast aspect Chutes watershed on NFS lands within the proposed addition to the Mt. Rose SUP. Davis Creek and Winters Creek are both ephemeral streams, flowing primarily in the spring and early summer fed by snowmelt. The Chutes creek is perennial.

Overall, Davis and Winters Creeks exhibit little riparian vegetation. However, the reach of Winters Creek within the lower East Bowl near the water tank and day lodge flows through a substantial shrub-scrub wetlands zone, primarily willows. The perennial Chutes creek drainage supports a well-developed wetlands-riparian complex.

Stream channel and bank conditions were evaluated visually on a qualitative basis. The stream bank within the uppermost reach of Winters Creek is not well-protected by either well-developed vegetative cover, or armoring from cobbles or boulders. Immediately downstream on Winters Creek, near the existing water tank, the wetlands vegetation provides some level of anchoring for the stream bank. The extensive riparian vegetation within the Chutes creek drainage provides better anchoring for stream bank soils.

The headwaters of Winters Creek originate on the lower *Fremont*. In general however, evaluation of the existing trails within the East Bowl did not reveal any direct channelized drainage connections from the trails to the stream system.

Trails Vegetative Cover

The extent and types of vegetative cover on the trails within the East Bowl is somewhat variable. On trails such as *Bruce's, Bonanza,* and *Central Pacific*, existing cover is primarily comprised of isolated stands of shrub. However, on the more northerly trails such as *Silver Dollar,* a fairly substantial cover of shrubs such as manzanita is evident.

Water Quality

The streams within the Mt. Rose vicinity are classified by the State of Nevada Division of Environmental Protection (NDEP) as Class A waters. Class A Waters are defined by the NDEP as follows:

1. Class A waters include waters or portions of waters located in areas of little human habitation, no industrial development or intensive agriculture and where the watershed is relatively undisturbed by human activity.

2. The beneficial uses of Class A waters are municipal or domestic supply, or both, with treatment by disinfection only, aquatic life, propagation of wildlife, irrigation, watering of livestock, recreation including contact with the water and recreation not involving contact with the water.

The NDEP has established both narrative and numeric standards for water quality for the waters of the State of Nevada, pursuant to the mandates established by the Clean Water Act. These narrative and numeric standards as set forth in the Class A designation established by the State reflect the expectation that the streams in the study area, in their current state, reflect generally high water quality, characteristic of undeveloped, high altitude, alpine and sub-alpine snowmelt-fed watersheds, and are capable of supporting the defined beneficial uses.

Water quality results from sample analysis confirm the high-quality characteristics of the streams within the Mt. Rose vicinity.[118] Water quality samples were collected at two separate locations: Browns Creek near the Mt. Rose Lodge, and Chutes Creek which flows from the watershed draining the Chutes area. Samples were collected on two instances: June 4th and June 27th, 2002. The June 4th sample occurred during the late stages of spring snowmelt runoff, while the June 27th sample occurred after runoff, with streamflows approaching base flow. Water quality characteristics were very similar between the two sampling dates. Analytical results from these samples are summarized in Table III-16, below, as an average between the two sampling instances. Where applicable, water quality values are portrayed in concert with the relevant State standards.

[118] REI, 2002

Table III-16
Water Quality Summary

Parameter	Units[a]	Browns Creek	Chutes Creek	Standard
pH	N/A	6.4	6.3	6.5 - 8.5
Total Alkalinity (as CaCO3)	mg/l	21	31	
Hardness	mg/l	16	12	
Conductivity	µmhos/cm	50	35	
Total Dissolved Solids	mg/l	45	30	500
Total Suspended Solids	mg/l	<5	7	25 - 80
Turbidity	NTU	2.1	1.0	
Nitrate	mg/l	0.2	0.02	10
Total Phosphorus	mg/l	0.02	0.02	0.30
Calcium	mg/l	4.8	3.7	
Magnesium	mg/l	0.9	0.6	
Sodium	mg/l	3.2	2.5	
Potassium	mg/l	1.1	0.9	
Sulfate	mg/l	<10	<10	250
Chloride	mg/l	4	3	
Bicarbonate	mg/l	21	31	

Source: Resource Engineering, Inc., 2002
[a]1 mg/l = 0.001 g/l

Reviewing the water quality results, the analyses indicate good water quality. The pH reveals the water to be somewhat acidic. It should be noted that the results for pH are reported with the qualification that the laboratory maximum hold times were exceeded for this test. The alkalinity results indicate the water has low to moderate capacity for acid buffering. Analysis results indicate that the streams' suspended sediment at the time of sampling was undetectable for Browns Creek and barely above the threshold of detection for Chutes Creek. Water clarity is good as indicated by a low turbidity. Low electrical conductivity and low concentration of dissolved solids indicates that the water is low in dissolved minerals and mineral salts. Nutrient concentrations are also low, with nitrate concentrations of less than 0.5 mg/L, and phosphorus concentrations of less than 0.1 mg/L. It is should be recognized that water quality trends vary seasonally and with varying streamflow conditions, and detailed trends cannot be inferred from two samples conducted within a short time frame. However, the water quality analysis for Browns and Chutes creek samples generally confirms the high quality of waters expected in the chemistry of the sub-alpine to alpine watersheds.

Water quality analytical results are also available from the Big Springs Well, which serves as the source of snowmaking supply, but is being considered (although not as a part of the Proposed Action) as a potential additional source of domestic supply. The well was tested early in October 2002, for microscopic particulates for the purpose of determining its adequacy as a source of domestic supply for the Mt. Rose Lodge. The results of the particulate analysis indicated undetectable levels of particulates in all classes, with the exception of some level of detection for pine pollen, as well as a nominal level of inorganic precipitates in the form of silts and clays. The pH was 7.5, and the turbidity result was 1.2 NTU.

Management actions associated with ski resort operation can have water quality consequences, primarily in the form of sediment transport and delivery. Water quality is affected by sediment delivered to streams from surface soil erosion. Soil erosion can be accelerated due to natural or anthropogenic events that expose bare soil to the erosive energy of raindrops and diffuse or concentrated runoff. The magnitude of this effect is a function of, among other things:[119] 1) the soil itself (some soils are more susceptible than others to detachment and transport); 2) the steepness of the terrain; 3) the intensity of precipitation; and 4) the nature and effectiveness of erosion control measures such as vegetative barriers, interceptor ditches, etc. Assessments of water quality should include existing and potential sediment delivery to channels from surface (non-channel) sources.

The soils at Mt. Rose are known to be susceptible to erosion, as indicated by the Natural Resources Conservation Service (NRCS) soils survey data as described in the soils section. Sediment, in itself, is a concern as a water quality attribute. Beyond this, however, sediment is a concern because phosphorous and other potential contaminants tend to attach and adsorb to sediment particles.

Soils

Existing NRCS soils mapping and interpretive data provides source material for assessment of the soils resources of the project area. Soils field work and mapping was conducted in the Mt. Rose area in 1978 by the NRCS in cooperation with other agencies, including the Forest Service.

Two distinct soil mapping families were identified within the Mt. Rose area by the soils field survey. By far the predominant complex within the Mt. Rose area is the Graylock-Temo Rock outcrop complex, 30 to 70 percent slopes. The secondary soils complex found within the Mt. Rose vicinity, primarily within the Chutes watershed, is the Tallac bouldery sandy loam, four to 30 percent slopes. The characteristics of these complexes are described below, as quoted directly from the USDA/NRCS soils survey unit descriptions:

Graylock-Temo Complex

Located primarily on mountainous uplands, and comprised of: 50 percent Graylock bouldery loamy sand, 25 percent Temo boulder coarse sand, and 10 percent rock outcrop. Graylock soils dominate on side slopes of uplands, while the Temo soil dominates ridges. The component areas of the unit are intermingled such that the NRCS deemed it impractical to map them separately at the scale of the survey from which this information is derived.

Graylock Soil

The Graylock soil is deep and somewhat excessively drained. It is formed as residuum derived predominantly from granitic rock. Usually one to three percent of the surface is comprised of boulders. The surface is a bouldery loamy sand at least 10 inches in depth. The underlying material is a very gravelly loamy sand to a depth of 60 inches. Bedrock or parent rock is found at depths greater than 60 inches.

[119] Williams and Associates LLC, 2001, pp. 10-12

Temo Soil

The Temo soil is shallow and excessively drained. It is formed in residuum derived predominantly from granitic parent rock. The surface layer is a bouldery coarse sand approximately 10 inches deep. The underlying soil to a depth of about 16 inches is a pale brown gravelly loamy coard sand. Granitic gruss is at a depth of 16 inches, and depth to bedrock ranges from eight to 20 inches.

Tallac Very Bouldery Sandy Loam

The Tallac soil is a deep, well-drained soil manifested primarily as glacial moraines. It formed in glacial deposits from mixed parent rocks. Typically five to 15 percent of the surface is covered with boulders. The surface layer is brown very bouldery sandy loam to a depth of about 26 inches. The upper substratum to a depth of 45 inches is a very stony sandy loam. The lower part of the substratum is a somewhat silica-cemented very bouldery sandy loam. The depth to the silica layer ranges from 40 to 60 inches.

Additional soils properties are outlined following in Table III-17:

Table III-17
Soils Mapping Families

Family	Component Soils
Graylock	Witefels, Corbett, Toiyabe
Temo	Witefels, Corbett, Toiyabe
Tallac	Macareeno, Burnborough, Carioca

Source: NRCS, 1978

Table III-18
Characteristics of Predominant Soil Types

Soil	Drainage Class	Avail. Water Capacity	Eff. Rooting Depth (in.)
Graylock	Somewhat Excessively Drained	Low	40 - 60
Temo	Excessively Drained	Very Low	8 - 20
Tallac	Moderately Drained	Very Low	40 - 60

Source: NRCS, 1978

Table III-19
Additional Soil Characteristics

Soil	Surface Runoff	Permeability	Water Erosion Hazard
Graylock	Medium	Rapid	High
Temo	Medium	Rapid	High
Tallac	Slow	Moderately Rapid	Slight

Source: NRCS, 1978

DIRECT AND INDIRECT ENVIRONMENTAL EFFECTS

Alternative 1 – No Action

Water Resources

Water Rights

Under Alternative 1, Mt. Rose would remain in its current operational state and the proposed improvements to the East Bowl day lodge and the snowmaking system would not occur.

- Mountain Restaurants

Improvements to the East Bowl lodge would likely not occur; therefore water use at Mt. Rose's mountain facilities would not change. Both the Mt. Rose and East Bowl day use lodges would continue to receive water from their respective spring sources. Water uses would continue at existing levels, which have been recorded at approximately 5.4 AF and 0.8 AF for the Mt. Rose and East Bowl facilities, respectively.

- Snowmaking

Alternative 1 would not increase snowmaking coverage beyond existing and previously approved areas. Mt. Rose would continue snowmaking on 84 acres of terrain and may continue limited expansion on private-lands areas. However, the development of snowmaking capabilities would not occur within the East Bowl. Snowmaking water use could increase somewhat above the current 46 AF of annual diversions, but only to support potential additional coverage within the private-lands areas on the Mt. Rose side.

Water Yield

Snowmaking water use would continue to occur exclusively within the private-lands areas of Mt. Rose, primarily tributary to Browns Creek, with a very small fraction tributary to Ophir Creek. A slight increase in snowmaking applications and subsequent runoff water yield could occur should coverage be expanded within these private-lands areas.

Stream Channels

Stream channel conditions would not be anticipated to change under Alternative 1 relative to existing conditions. Snowmaking coverage would not be implemented within the East Bowl terrain, and stream flow conditions would continue at existing levels.

Trails Vegetative Cover

Under Alternative 1, grading, selective rock blasting, and stumping would not occur on trails within Forest Service lands in the East Bowl. Vegetative cover on these trails would not be disturbed.

Water Quality

It is unlikely that water quality would change under Alternative 1. The primary potential for changes in water quality would be as a result of additional sediment loading caused by new or changed management actions on private land, such as implementation of new roads or ski trails,

or re-grading or contouring of existing trails. Under Alternative 1, neither would occur within either the East Bowl or Chutes vicinities, and water quality effects would not be realized. There could be water quality consequences within Browns Creek or Ophir Creek associated with implementation of facilities improvements within the private-lands portion of Mt. Rose.

The East Bowl day lodge is not located on NFS lands and could be expanded or upgraded if not approved via decision on the Proposed Action. However, it is unlikely that such improvements would be implemented since its utilization would not be likely to increase without the accompanying up-mountain improvements. Therefore, it is unlikely that the proposed replacement of the antiquated septic system serving the East Bowl lodge would occur. Continuing water quality effects to the Winters Creek watershed would occur as they are associated with the less efficient treatment occurring within the current septic leach field.

Soils

Under Alternative 1, soils resources would likely be unchanged relative to existing conditions. No changes in productivity, cohesiveness, compaction or sediment production would occur on NFS lands within the East Bowl, because land treatment and management prescriptions would remain unchanged.

Alternative 2 – The Proposed Action

Water Resources

Water Rights

The Proposed Action incorporates two primary components that would affect Mt. Rose's water rights scenario: replacement of the East Bowl day lodge with a new and expanded restaurant, and expansion of overall snowmaking coverage by 65 acres on NFS lands and 8.5 acres on private land.

Mountain Restaurants

The existing East Bowl lodge would be replaced with a modern 300-seat restaurant facility (200 indoor and 100 outdoor). Water supplies would continue to be diverted from the three spring sources; however, some improvements to the water delivery system would be implemented, including installation of a new 250,000-gallon storage tank (located on the *Fremont* trail in the East Bowl) and replacement of the pipeline conveying water from the tank to the East Bowl lodge. In addition, the increased capacity would require that the septic system treating wastewater from the East Bowl lodge be replaced.

The quantity of water required to serve the new East Bowl lodge was calculated using historic water use records available from the main Mt. Rose Lodge. Over the period ranging from 1996 through 2001, the Mt. Rose lodge has diverted an average of 5.4 AF annually. This equates to an average water use of 16.0 gpd per indoor seat (540 indoor seats). Comparing this water use to the expected 200 indoor seats at the proposed East Bowl lodge suggests an annual water demand of approximately 2.0 AF. The current East Bowl lodge averages approximately 0.8 AF of use per year.

Peak day diversions necessary to support the Mt. Rose lodge have been calculated to be 11.6 gallons per minute (gpm), or 0.03cfs. Again, inferring diversions at the smaller proposed East Bowl lodge indicates that peak day demand would average 4.3 gpm (0.01 cfs). A summary of existing and potential water uses at the existing Mt. Rose lodge and the proposed East Bowl Lodge is shown in the following table:

Table III-20
Mt. Rose Lodge and Upgraded East Bowl Lodge
Water Demand

	Annual	gal/day/seat[a]		Total Use gal/day		Diversion (gpm)	
Restaurant	**Demand (AF)**	**Avg. Day**	**Peak Day**	**Avg. Day**	**Peak Day**	**Avg. Day**	**Peak Day**
Mt. Rose Lodge (Existing)	5.4	16.0	31.2	8,600	16,770	6.0	11.6
East Bowl (Proposed)	2.0	16.0	31.2	3,200	6,240	2.2	4.3

[a] Forecasted based on average use per indoor facility seat.

The estimated peak day demand of 0.01 cfs and 2.0 AF of annual water use indicates that the potential water demand at the East Bowl facility would fall well within the water yield and water rights associated with the lodge's three spring sources. Acquisition of additional water rights would not be required.

Snowmaking

The proposed implementation of 73.5 acres of snowmaking coverage on NFS lands would require additional diversions of water from the Big Springs Well. In general, optimal coverage depths can demand as much as 1.0 AF of water for each acre of terrain covered. In this instance, however, water rights at the Big Springs Well limit snowmaking diversions to a total of 100 AF per year for both existing and proposed terrain coverage. Furthermore, diversions from the well are limited to a total of 1.069 cfs.

Although diversions from the well would be limited to 1.069 cfs, applications to the ski trails would occur at higher rates. Water pumped from the well would be delivered to storage at either the existing 500,000 gallon storage tank located near the top of the North rim trail, or at a new storage pond proposed for construction immediately south of the *Zephyr Traverse* above the *Bonanza* trail. The pond's capacity would be approximately 5 to 7 AF (1.6 to 2.2 million gallons).

Water Yield

Implementation of the Proposed Action would allow snowmaking coverage on an additional 65 acres of trail on NFS lands. Of this new coverage, the majority, 59.9 acres, would occur within the Winters Creek watershed in the East Bowl. Approximately five acres of East Bowl snowmaking coverage would occur within the Davis Creek watershed. Another 8.5 acres of coverage on the private Mt. Rose side would be split almost evenly between the Browns Creek and Oprhir Creek watersheds, associated with the proposed *Lakeside Run* and the *Around the World Bypass*. The proposed snowmaking coverage would utilize an additional 54.1 AF of

snowmaking water diversions, which in combination with the estimated 45.9 AF of existing diversions would realize full utilization of Mt. Rose's existing allocation of 100 AF from the Big Springs Well. Assuming approximately 18 percent depletions in correspondence to the indicated results from the WRENNS water balance model, 9.7 AF of the additional 54.1 AF would be consumed, returning an additional total of approximately 44.4 AF to the stream system during the runoff season, amongst all the affected watersheds.

In addition to improved snowmaking coverage, implementation of the Proposed Action would permit trail construction involving clearing of overstory vegetation on approximately 10.2 acres amongst all the watersheds. Table III-21 outlines the acreage totals and snowmaking water use associated with the Proposed Action:

Table III-21
Vegetation Clearing and Snowmaking by Watershed

Watershed	Tree Clearing	Additional Snowmaking Acreage	Total Snowmaking Acreage	Snowmaking Diversions (AF)
Browns Creek	1.7	4.0	81.6	52.3
Chutes	6.7	0.0	0.0	0.0
Davis Creek	0.0	5.1	5.1	3.2
Ophir Creek	0.3	4.5	6.7	4.3
West Tavern Wash	1.5	0.0	0.0	0.0
Winters Creek	0.1	59.9	64.1	40.2
Total	*10.2*	*73.5*	*157.5*	*100.0*

Source: Resource Engineering, 2002

The proposed improvement activities would affect the watershed hydrology in the study area. The application of snowmaking alters the volume and timing of snowmelt runoff, while trail clearing can affect the water balance by decreasing the amount of water removed via evapotranspiration, thus increasing the quantity of water available for runoff. Interception and evaporation losses from the forest canopy are usually reduced as a result of vegetation clearing. Vegetation removal can affect the infiltration characteristics of watersheds, generally resulting in quicker runoff generation. Changes in vegetative cover also can affect the solar energy balance of the watershed, permitting increased solar radiation and therefore earlier and faster snowmelt. The Proposed Action calls for minimal vegetation clearing that would occur primarily in the form of selective tree removal and as a result the water yield related effects of vegetation thinning would likely be nearly negligible. Nonetheless, changes in the water balance due to snowmaking would cause water yield increases and changes in hydrograph timing.

The water balance model described earlier was used to provide estimates of expected changes in the volume and distribution of water due to the Proposed Action. The runoff derived from the water balance methodology was distributed over time utilizing the WRENNS nomographs. Summaries of the anticipated stream flow changes for average and wet water years are outlined in Table III-22.

Table III-22
Average Year Hydrograph Characteristics

Watershed	Existing Conditions		Proposed Conditions	
	Peak Flow (CFS)	Yield (AF)	Peak Flow (CFS)	Yield (AF)
Browns Creek	8.79	1,056.0	8.91	1,064.9
Chutes	6.08	847.1	6.06	851.6
Davis Creek	5.97	853.7	5.99	856.2
Ophir Creek	6.07	855.4	6.09	858.1
West Tavern Wash	2.82	368.2	2.82	369.1
Winters Creek	8.81	1,084.1	9.10	1,114.9

Source: Resource Engineering, Inc, 2002

Table III-23
Changes in Peak Flow and Water Yield

	Peak Flow Increase		Yield Increase	
Watershed	(CFS)	(%)	(AF)	(%)
Browns Creek	0.1	1.3	8.9	0.8
Chutes	0.0	0.0	4.5	0.5
Davis Creek	0.0	0.0	2.4	0.3
Ophir Creek	0.0	0.0	2.7	0.3
West Tavern Wash	0.0	0.0	0.9	0.3
Winters Creek	0.3	3.3	30.7	2.8

Source: Resource Engineering, Inc, 2002

The yield and streamflow increases in most watersheds are nearly negligible. For Winters Creek, the watershed in which the majority of additional snowmaking coverage is proposed, the 3.3 percent increase in peak flow and 2.8 percent increase in yield are small relative to existing annual yield and peak flow. These yield increases are relatively minor, and would be unlikely, in and of themselves, to affect sediment delivery or transport, stream bank erosion, or stream water quality.

Stream Channels

Stream channels typically arrive at a state of dynamic equilibrium under average flow conditions. An increase in average flow conditions such as would be caused by additional water input in the form of snowmaking, could cause stream channels and banks to adjust and arrive at a new equilibrium. Potential adjustments could include bank erosion or undercutting, lateral movement or widening of the channel, incisement, and bed-load transport.

The channel and bank conditions on Davis and Winters Creeks are not particularly resistant to the potential effects of such equilibrium adjustments. However, the anticipated increases in yield are small (less than three percent), and substantial changes in channel conditions are therefore unlikely to occur. The perennial Chutes creek supports a well-established corridor of wetlands and riparian vegetation, which generally provide some level of anchoring for channel banks. In addition, the Chutes drainage is not slated to receive snowmaking, and the anticipated yield effects due to the selective removal of trees for gladed terrain are less than one percent, and would not be expected to cause alterations in the stream channel system.

Trails Vegetative Cover

Under Alternative 2, grading, stumping and selective rock blasting would result in varying degrees of effect to existing vegetation on the trail system in the East Bowl. Grading would result in the removal of existing vegetation. Stumping and selective rock blasting would not result in complete removal of existing vegetative cover, although there would be some cover loss due to terrain effects from rock and stump removal. In general, the cover loss would be less on trails such as *Bruce's, Bonanza,* and *Central Pacific,* where existing cover is sporadic. Loss of vegetation would be greater on trails such as *Silver Dollar*, where there currently exists a fairly dense shrub cover.

Water Quality

Implementation of the Proposed Action would involve grading, selective rock blasting, stumping, and re-contouring activities on a total of approximately 72.4 acres of trails. An additional 17.9 acres of ground disturbance would occur as a result of skiway construction, pipelines, utilities, lift terminals and the proposed storage pond. Increases in sediment detachment, transport, and deposition, as well as accompanying nutrient loading are the primary potential effects to water quality associated with grading and re-contouring activities, as well as road construction. Potential phosphorus nutrient loading is directly associated with sediment transport because phosphorus adsorbs to soil particles and is transported with sediment. The risk for sediment transport is greatest for the steepest slopes, where higher shear stresses contribute to greater soil detachment potential. Under the Proposed Action, construction activities would affect a total of 15.1 acres in areas with slope greater than 40 percent. Estimates of sediment potential detachment associated with the proposed activities are described in detail in the soils section.

The potential risks would be greatest during construction activities when soils are disturbed and before re-vegetation and stabilization occurs. These effects can be partially mitigated via application of Best Management Practices (BMPs) during and after construction. Implementation of the Proposed Action would occur over the course of several years, reducing the amount of soil exposed at any one time. The multi-year implementation period would allow Mt. Rose and Forest Service staff to monitor and evaluate the effectiveness of erosion control and revegetation efforts and to revise strategies in response to information gained during implementation. Various drainage management, erosion control, and re-vegetation measures can help to minimize the potential for connection of disturbed areas (CDA) to the stream network, and are outlined as a part of the Surface Water Management Plan, which is included as Appendix C.

Soils

Grading and Re-Contouring

There are several primary effects to soils resources associated with terrain modifications. Grading and re-contouring utilizing heavy machinery causes soils compaction and loss of soil tilth. Loss of topsoil and a decrease in soils organic matter associated with disturbances to the rooting zone can reduce the soils productivity. Lastly, soils disturbances increase the risk of soil particle detachment and transport due to surface water erosion, increasing sediment yields.

In order to quantify the potential sediment yield associated with the proposed improvements, the USDA-ARS WEPP (Water Erosion Prediction Project) model was applied. The Forest Service has developed a set of forest simulation parameters for WEPP based on model calibration and validation to observed forested watershed behavior. These custom WEPP parameters are described in Water Erosion Prediction Project Forest Applications.[120] The WEPP model is a process-based, continuous computation, distributed parameter erosion prediction model implemented as a computer numerical simulation. The model is based on numerical representations of the physical processes influencing runoff and sediment yield. Thus, it permits a simulation of various actual watershed processes, including: rainfall/snowfall, infiltration, runoff, soil moisture accounting, snow accumulation/melt, evapotranspiration, plant growth and litter decomposition, and sediment detachment and deposition. The model parameters include rainfall amounts and intensity; soil textural properties; plant growth parameters; residue decomposition factors; slope shape, steepness, and orientation; and soil erodibility parameters. Soils may be represented in multiple layers with multiple parameters describing texture, rock content, moisture, permeability, organic content, and cation exchange capacity. The model uses a statistically generated synthetic climate dataset to drive its simulations. The synthetic dataset is derived by applying a probabilistic model using statistical parameters computed from observed climate trends. Very high resolution climate data (including temperature, windspeed and direction, relative humidity, and solar radiation) is derived via a sophisticated spatial algorithm. The PRISM climate data modeling process interpolates these variables based on both geographic position and elevation, from proximal NOAA, BLM RAWS, and NRCS-SNOTEL climate stations.

The Disturbed WEPP module was utilized to analyze the potential sediment production associated with disturbances to the forest from tree clearing and trail construction. The soil type chosen for simulation within WEPP was a "sandy loam" indicated by the WEPP technical manual as appropriate for coarse-grained sandy decomposed granite soils such as those predominant within the Mt. Rose vicinity. NRCS soils mapping within the Mt. Rose vicinity confirms that the soils in the Mt. Rose watersheds are coarse-grained sandy loams.

The WEPP model treats hillslope erosion and sediment detachment by modeling two overland flow elements (OFEs). The two OFEs allow the model to describe two different treatment prescriptions (e.g., an upper OFE modeling a disturbed area) delivering sediment into and through a lower OFE, which could model a vegetated buffer region.

The WEPP model was executed over a simulation period of 30 years. The model simulations were driven by climatic data derived from the PRISM model, corresponding to average-year conditions. The event-based model output includes rainfall events statistically generated by the USDA-ARS CLIGEN package to produce the synthetic climate dataset, and runoff events resulting from either rainfall or snowmelt. The sediment yield predictions from this simulation period offer an average and maximum value for soil detachment. It should be noted that the model is run over a 30-year period using the same treatment prescription to provide a dataset of sufficient length to compute averages and return periods. The results from a 30-year simulation should not be interpreted to be potential erosion rates for full 30-year time period following

[120] Elliot, William J and David E. Hall, 1997

construction. The model assumes that the full area of construction is disturbed at any one time during the simulation process. In practice, disturbances associated with terrain modification would be phased so as to minimize the overall extent of disturbance at any point in time.

Disturbed WEPP allows for the selection of a variety of treatment prescriptions. To facilitate a realistic analysis, the "Skid Trail" prescription was selected to model erosion produced from areas of terrain grading and re-contouring. Although at first glance the "Skid Trail" prescription may not seem to adequately describe terrain grading, according to the WEPP technical documentation,[121] the "Skid Trail" prescription describes a skid operation where the soil is assumed to be compacted due to multiple passes of skidding machinery. This treatment is used to describe any site mechanically disturbed and compacted. In addition, some of the parameters within the WEPP model permit additional adjustments to reflect the terrain prescriptions for the East Bowl proposals. The surface rock content of the soil may be adjusted. In the case of the terrain grading and rock blasting prescriptions, the surface rock content was reduced from 40 percent to 20 percent from existing to proposed conditions to reflect the removal of large cobbles and general sorting of finer materials to the surface that occurs with grading and turnover of the soils.

For purposes of modeling sediment production, only graded and re-contoured areas are considered via the WEPP modeling process. Regions of selective rock blasting and stump removal were assumed to create minimal soil disturbance, and therefore negligible risk for increased sediment yield. In order to assess the potential sediment detachment associated with the proposed terrain modifications, the WEPP model was executed for three different land cover prescriptions, alternatively modeling sediment production under the following scenarios through time:

1. *Existing Conditions*
   Selected Land Cover Prescription: Shrubs
   Cover Density: 15 percent
   Surface Rock Fraction: 40 percent

2. *Post-Implementation Conditions*
   Selected Land Cover Prescription: Skid Trail
   Cover Density: <10 percent
   Surface Rock Fraction: 20 percent
3. *Future Conditions (5-10 Years)*
   Selected Land Cover Prescription: Short Grass
   Cover Density: 60 percent
   Surface Rock Fraction: 20 percent

Each of these treatment prescriptions was modeled for a representative 500 foot hillslope upper OFE transitioning into a lower OFE buffer of short grass, which can be conceptualized as a vegetated buffer strip. Model runs for each of the above three prescriptions were performed for each of several slope gradients, as described below.

[121] Disturbed WEPP Technical Documentation, USFS Rocky Mountain Research Station, 2000

Because land slope is one of the primary determinants driving the potential for detachment of soil particles under the influence of water-driven erosional processes, the graded areas were further subdivided into zones by slope gradient as follows:

- Low: <20 percent slope gradient
- Intermediate: 20 – 30 percent slope gradient
- Steep: 30 – 40 percent slope gradient
- Very Steep: > 40 percent slope gradient

The three options for treatment prescription and four slope gradient classes correspond to a total of 12 different combinations of prescription and slope factor that were subsequently used as input to the WEPP model to produce predictions for potential sediment yield. The model results for these combinations are outlined in the following table:

Table III-24
WEPP Model Predicted Erosion Rate
by Slope Class (tons/acre)

Slope Gradient (%)	Existing Conditions	Post Implementation	After Re-Vegetation
> 40	0.16	3.24	0.23
30 - 40	0.02	0.54	0.18
20 - 30	0.00	0.12	0.11
< 20	0.00	0.06	0.05

Source: Resource Engineering, Inc, 2002

In implementation, WEPP models detailed hillslope erosional processes, and produces site-specific predictions for both sediment detachment and sediment deposition at each model increment along both the upper and lower OFE. Thus WEPP is capable of predicting the quantity of sediment that ultimately transports through a given vegetated buffer. In practice, modeling each individual hillslope component for every region of terrain modification in the Proposed Action was impractical. Sediment detachment per unit area (tons per acre) for each combination of prescription and slope gradient was selectively multiplied by the graded areas (acres) categorized by slope class as outlined in Table III-24, to yield predictions of sediment yield (tons) per graded area, Table III-25. These results are portrayed in the following table:

Table III-25
Proposed Action
Graded Areas Potential Erosion Quantities (tons)

Watershed	Existing Conditions[a]	Post Implementation	After Re-Vegetation
Browns Creek	0.00	0.21	0.19
Davis Creek	0.37	7.77	0.99
Winters Creek	2.23	47.39	5.65
Total	**2.60**	**55.37**	**6.83**

Source: Resource Engineering, Inc, 2002
[a] Represents existing sediment detachment only within zones slated for grading under the Proposed Action.

As portrayed in the above table, the bulk of the sediment-related impacts associated with the Proposed Action would be experienced by the Winters Creek watershed. The overall order-of-magnitude increase (from existing conditions of 2.6 tons to 55.4 tons) of predicted mass of sediment produced for post-implementation conditions highlights the high risk of water erosion for the decomposed granite soils units as outlined in the broad soils classifications identified in the NRCS soils survey. However, successful stabilization and re-vegetation reduces the overall predicted total sediment detachment to 6.8 tons, a factor of 2.6 greater than existing conditions. In interpreting the sediment yield predictions, it is important to note that the quantities refer to sediment detachment, and do not represent actual delivery of sediment to stream systems within the watersheds. Furthermore, the Forest Service WEPP documentation[122] cautions that "At best, any predicted runoff or erosion value, by any model, will be within only plus or minus 50 percent of the [actual] value. Erosion rates are highly variable, and most models can predict only a single value. Replicated research has shown that observed values vary widely for identical plots, or the same plot from year to year. Also, spatial variability… of soil properties add[s] to the complexity of erosion prediction."

The potential for an order-of-magnitude increase in sediment detachment immediately following implementation of terrain modifications highlights the importance of successful re-vegetation and stabilization measures. These measures are outlined as a part of the Surface Water Management Plan (Appendix C), but at a broad level would include the following components:

- Re-vegetation and Irrigation: Experience has shown that in this climate regime, with little summer precipitation, irrigation is necessary for some period of time to help establish vegetative cover in mulched and re-seeded areas. Currently, Mt. Rose delivers irrigation water to re-vegetated areas within portions of the private-lands areas of the resort via the snowmaking system. Graded areas associated with the terrain modifications in the Proposed Action would be irrigated via delivery of water through the newly installed snowmaking system in the East Bowl. Water utilized during the establishment re-vegetation would count against Mt. Rose's total 100 AF allotments from the Big Springs Well. Operationally, Mt. Rose would have to anticipate the need for summer irrigation use when allocating water for snowmaking. There would be enough water with the existing water right to accommodate both needs.

[122] Disturbed WEPP Technical Documentation, USFS Rocky Mountain Research Station, 2000

- Soils Stabilization: On regions where terrain modifications occur on steep slopes, soils would require additional stabilization utilizing the emplacement of jute-netting or other suitable geo-fabrics meshes to further reduce the risk of concentrated flows creating rilling.

- Drainage Routing: Operating experience reveals that although the decomposed granitic soils have the advantage of high infiltration rates, reducing the potential for concentrated surface runoff, during early spring snowmelt conditions, frozen soils can contribute to channelization and concentrated flows. Therefore, drainage controls such as water bars and detention depressions form an important component of reducing concentrated surface flows that contribute to erosion.

- Disconnection of Disturbed Areas: Especially for project components that would occur close to or within Riparian Conservation Areas (RCA) as identified in the 2001 Sierra Nevada Forest Plan amendment, implementation of management practices and controls to avoid soils compaction and disconnect disturbances from riparian zones would be important to reduce the risk of sediment delivery to the RCA.

Soils Effects—East Bowl/Chutes Ski-Way Road Construction

Sediment yield modeling for the new skiway from the East Bowl to the proposed Chutes Return Lift, transecting the lower Chutes area, was performed using the WEPP: road module, which specifically models sediment detachment and transport from road-type surfaces on forested lands. The skiway was modeled as a native surface, outsloped road, of average gradient 11 percent parallel to the skiway direction along the route of travel. The cut and fill slopes were conservatively modeled at a 30 percent slope to reflect the steeper zones intersected along the skiway routing through the lower Chutes.

The results of this modeling are outlined in Table III-26.

Table III-26
WEPP: ROAD
Skiway Sediment Yield Analysis Results

Watershed	SkiWay Corridor Disturbance Area	Road Prism Sediment Detachment	Sediment Leaving Downslope Buffer	Net Road Sediment Yield
Chutes	4.5 acres	11.1 tons/acre	0.11 tons/acre	0.50 ton

Source: Resource Engineering, Inc, 2002

The model indicates an increase in sediment detachment from the skiway on the order of 11.1 tons/acre. Due to the forested buffer below the out-sloped road, only a fraction of the sediment is transported through the buffer, with the result that the net increase in predicted sediment yield due to the skiway is 0.50 tons. Construction of the skiway within proximity to the lower terminal of the Chutes Return Lift, which is within the RCA of the Chutes drainage, would require site-specific erosion and sedimentation precautions to minimize the risk of sediment delivery or connection to the stream system.

Alternative 3

The direct and indirect effects associated with implementation of Alternative 3 would be identical in all respects to those for Alternative 2, with the exception of the grading and terrain modification prescriptions within the East Bowl. Alternative 3 was designed to minimize potential disturbance to Tahoe draba (a FS Regional Sensitive Species), and as a result, selective rock blasting and stump removal would be eliminated for *South Rim, Washoe Zephyr,* and most of *Gold Run* trails. In addition, grading prescriptions would be selective, with a test area of grading slated for the *Bonanza* trail and other zones of grading on *Central Pacific* and *Upper Bruce's* contingent upon successful Tahoe draba re-establishment within the grading test areas. The selective terrain prescriptions specified under Alternative 3 would result in less effect to existing vegetation on within the East Bowl trails.

Soils

Soils Effects—Grading and Re-Contouring

Implementation of Alternative 3 would exhibit several differences from the Proposed Action related to the different proposed terrain modification treatment prescriptions. The largest real differences in prescription are associated with removal of proposed zones of rock blasting and stump removal on *South Rim, Washoe Zephyr*, and the bulk of *Gold Run*. According to the modeling assumptions utilized for the WEPP model, these changes would have no effect on sediment yield, since it was assumed that the selective blasting and stump removal would not disturb the soil sufficiently to increase yields.

The following prediction is for net sediment detachment for the terrain modifications proposed for Alternative 3:

Table III-27
Alternative 3
Graded Areas Potential Erosion Quantities (tons)

Watershed	Existing Conditions	Post Implementation	After Re-Vegetation
Browns Creek			
Contingent	0.00	0.21	0.19
Davis Creek			
Planned	0.15	3.37	0.65
Contingent	0.22	4.42	0.34
Winters Creek			
Planned	1.10	23.77	3.53
Test	0.58	11.83	0.87
Contingent	0.40	8.43	0.83
Overall			
Planned	1.25	27.14	4.17
Test	0.58	11.83	0.87
Sub-Total, Planned + Test	**1.83**	**38.97**	**5.04**
Contingent	0.62	13.06	1.37
Total	**2.45**	**52.03**	**6.40**

Source: Resource Engineering, Inc, 2002

In comparing the results for Alternative 3 with those for Alternative 2, the sediment detachment after re-vegetation and stabilization is only slightly lower for Alternative 3, at 6.40 tons, as compared to Alternative 2, at 6.83 tons, a decrease of six percent. The primary reason for the similarity is the that there is only 1.1 fewer acres of grading in the "Very Steep" slope class for Alternative 3 than for Alternative 2. Because sediment production per acre is comparatively high for this slope class as related to the lower slope classes, small adjustments to acreage within this class have little effect on the overall sediment yield. However, if the contingent grading within Alternative 3 are not implemented, the predicted sediment detachment would be 5.04 tons, which would be 26 percent lower than the Alternative 2 production.

CUMULATIVE EFFECTS

The water resources effects that are most likely to be cumulative in nature are increased water yields due to snowmaking applications and increased sediment production caused by changes in land cover and usage. These effects are outlined below.

Alternative 1 – No Action

Water Resources - Water Yield

Under Alternative 1, Mt. Rose would continue in its current operational state, and there would not be further anticipated water-related cumulative effects above those exhibited under existing conditions, except for potential nominal increases in water yield within Brown's and Ophir creeks associated with possible additional snowmaking coverage within private-lands areas on the Mt. Rose side.

Soils - Sediment

Alternative 1 would not result in changes in land use or prescription, and would not implement any terrain modifications within the East Bowl. Therefore there would unlikely be any changes in soil compaction, productivity, sediment yields that would represent cumulative effects above existing conditions. There is the possibility of changes in land use within the private lands areas of Mt. Rose that would result in additional cumulative soils impacts.

Alternative 2 – The Proposed Action

Water Resources - Water Yield

Analysis of cumulative water yield related effects requires some inferences regarding the compound effects to water yield of vegetation clearing to create the existing complex of ski trails within the existing ski resort, to attempt to infer baseline water yields for the watersheds before the presence of ski resort related land use actions. Because historic effects are difficult to quantify, and pre-ski resort forested densities are difficult to assess, the following analysis should be regarded as an order-of-magnitude estimate for cumulative water-yield related impacts. Nonetheless, the WRENNs model permits an estimate of water yield for the Mt. Rose vicinity watersheds reflective of inferred forest conditions without the presence of a ski trail complex. This analysis is outlined in the following tables:

Table III-28
Cumulative Hydrograph Comparison

	Pre-Developed Conditions		Alternative 2 Conditions	
Watershed	**Peak Flow (CFS)**	**Yield (AF)**	**Peak Flow (CFS)**	**Yield (AF)**
Browns Creek	6.73	939.3	8.91	1064.9
Chutes	6.08	847.1	6.03	859.3
Davis Creek	6.00	840.3	5.99	856.2
Ophir Creek	6.08	847.9	6.09	858.1
West Tavern Wash	2.83	365.8	2.82	369.1
Winters Creek	7.12	998.7	8.83	1107.0

Source: Resource Engineering, Inc, 2002

Table III-29
Cumulative Yield Changes

	Peak Flow Increase		Yield Increase	
Watershed	**(CFS)**	**(%)**	**(AF)**	**(%)**
Browns Creek	2.2	32.3	125.6	13.4
Chutes	0.0	0.0	12.2	1.4
Davis Creek	0.0	0.0	15.9	1.9
Ophir Creek	0.0	0.1	10.2	1.2
West Tavern Wash	0.0	0.0	3.3	0.9
Winters Creek	1.7	24.0	108.4	10.9

Source: Resource Engineering, Inc, 2002

Thus, proposed conditions would reflect a cumulative effect of approximately 13.4 percent water yield increase in Brown's Creek, and a 10.9 percent increase for Winters Creek. These effects

are due both to the influence of vegetative clearing to construct the existing ski trails, and additional snowmaking water applications. The largest fraction is due to the clearing of vegetation for ski trail construction.

Soils—Sediment

Sediment-related cumulative effects are more difficult to quantify. Existing conditions reflect sediment yield and soils compaction and productivity changes that are reflective of distinct differences in land use, management, and cover between un-developed pristine wilderness and a modern ski resort, and are very difficult to quantify accurately. However, trail construction, tree clearing, and pipeline burial improvements outlined in the proposal would result in an incremental increase in sediment yields and effects to soils quality and productivities that could be permanent in nature, and therefore cumulative in effect beyond existing conditions. Although quantitative estimates of losses to soil productivity and/or increases in sediment yield are impractical, some estimate of the relative areas of active ski area management associated with the presence of developed ski trails and associated facilities within each sub-watershed provides some comparative information from which to infer the likelihood of cumulative soils effects within different watersheds at Mt. Rose.

Table III-30
Area of Developed Ski Terrain
by Watershed

Watershed	Area (acres)
Browns Creek	125.7
Chutes	157.0
Davis Creek	20.2
Ophir Creek	9.8
West Tavern Wash	3.6
Winters Creek	125.7
Total	**442.0**

Source: Resource Engineering, Inc., 2002

In the previous table, "developed" terrain is indicated by the clear presence of a ski trail where vegetation has been removed, or existing access roads or traverses. Zones of gladed skiing are not included. Permanent losses in soil resources have occurred at Mt. Rose as a result of the existing facilities and terrain development. Implementation of the Proposed Action would cause additional permanent soils-related effects, including but not necessarily limited to: soils compaction, loss of productivity and tilth, loss of organic matter, and additional sediment production and erosion.

Alternative 3

Soils

Alternative 3 would implement a nominally smaller terrain modification "footprint" than would Alternative 2, with the result that cumulative soils effects would be less. However, if full implementation of all contingent grading areas was to occur, the difference would likely be un-quantifiable. In any case, trail construction, tree clearing, and pipeline burial improvements

outlined in the proposal would result in an incremental increase in sediment yields and effects to soils quality and productivities that could be permanent in nature, and therefore cumulative in effect beyond existing conditions.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Water Resources

Water Yield

Water yield increases related to the proposal would not represent any irreversible or irretrievable resource commitments. The primary water yield related effects would be as a result of snowmaking, which is a management action that is reversible and whose reversal would result in yield conditions returning to pre-implementation conditions. It is unlikely that the small yield-related effects associated with the proposal would cause any irreversible changes in stream channel characteristics.

Water Quality

There could be irreversible water quality related effects associated with the proposal. Even with successful re-vegetation and stabilization measures, the proposal would result in a nominal increase in sediment detachment associated with the East Bowl grading and terrain modifications. This increased sediment loading would likely be manifest as a minor but permanent water quality effect as increased sediment transport within the Winters Creek and Davis Creek drainages.

Soils

Some losses of soils resources associated with terrain modifications would be permanent and would represent an irreversible commitment of soils resources. Although topsoil harvesting and preservation as a BMP in advance of project implementation can mitigate soils-related effects, the disturbance to the soil horizon that would occur associated with the turnover caused by grading and re-contouring would cause some losses in soil organic matter, tilth, and productivity that would be permanent in nature.

FOREST PLAN CONSISTENCY

The action alternatives would be consistent with Forest Plan direction. An erosion control plan would be developed prior to implementation of project elements. Additionally, state water quality standards are not adversely affected by any alternative.

L. WETLANDS AND RIPARIAN AREAS

INTRODUCTION

Wetlands in the project area are generally identified by the presence of willows, alder, and aspen, species which tend to require more mesic conditions than conifer forest and shrub lands. Within these wetland areas delimited by vegetation type are smaller areas that meet the specific conditions necessary to fall under the jurisdiction of the U.S. Army Corps of Engineers (COE). The COE Wetland Delineation Manual[123] (Manual) defines wetlands as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." Wetlands generally include swamps, marshes, bogs, and similar areas. Jurisdictional wetlands must meet specific requirements for the presence of hydrophytic vegetation, hydric soils, and wetland hydrology, as outlined in the COE Manual. Activities within and near these areas, including tree removal, culvert installation, grading, and changes in runoff regimes may affect the ecological functions of wetland resources. Section 404 of the Clean Water Act regulates dredge or fill activities in wetlands, and such activities require a permit from the COE. Additional direction regarding wetlands management is provided by Executive Order 11990. In this section the term "jurisdictional wetlands" will refer to areas under COE jurisdiction, while the term "wetlands" will refer to areas of willow, alder and aspen, which may or may not be under COE jurisdiction.

This section tiers to the Delineation of Wetlands and Waters of the U.S. Report for the Mt. Rose Chutes Expansion Area,[124] as well as a jurisdictional wetlands survey done for portions of the East Bowl in October 2002.[125] The delineation report is contained in the project file and includes a more detailed description of individual jurisdictional wetlands and streams identified through field investigations in accordance with the 1987 Manual. The text that follows summarizes the delineation report and includes a discussion of anticipated effects resulting from project implementation. Field delineations in the East Bowl were confined to areas of proposed disturbance under the Mt. Rose/Slide Mountain Facilities Improvements proposal.

Riparian areas are management zones that combine the ecological concerns of riparian ecosystems with the hydrologic concerns of floodplains and streamside slopes. Riparian areas include all aquatic ecosystems, riparian ecosystems, and associated floodplains. In the project area, riparian systems generally include willow, aspen, and alder shrubs and trees.

SCOPE OF THE ANALYSIS

The scope of this wetlands analysis (i.e., the project area) is limited to areas proposed for disturbance on NFS and Washoe County lands. Within the SUP area and the proposed SUP expansion areas, field inventories were conducted and riparian areas were identified. Jurisdictional wetland delineations were conducted by JBR Environmental Consultants only

[123] Environmental Laboratory, 1987
[124] JBR Environmental, Inc. 2000
[125] No written report was produced for this survey, however a map of potentially jurisdictional wetlands is contained in the project file.

within The Chutes expansion area and portions of the East Bowl where ground disturbance was proposed. The Chutes delineation was reviewed and approved by the COE on September 6, 2000, and is valid until September 6, 2005. The East Bowl delineation has not yet been submitted to the COE for verification. Assessments of direct and indirect effects are presented below.

FOREST PLAN DIRECTION

1986 Forest Plan[126]

Although there is no specific direction given in the Forest Plan pertaining to wetlands, the plan does state that all standards and guidelines listed for soil and water apply to riparian areas. Additionally, the Forest Plan requires the delineation and evaluation of riparian areas prior to project implementation.

Sierra Nevada Forest Plan Amendment

A primary purpose of the Sierra Nevada Forest Plan Amendment is to develop regional direction that will protect and restore aquatic, riparian, and meadow ecosystems and provide for the viability of native plant and animal species associated with these ecosystems. This regional direction is represented by an array of features that, in their entirety, constitute an Aquatic Management Strategy (AMS) for the Sierra Nevada. The fundamental principle of the AMS is to retain, restore, and protect the processes and landforms that provide habitat for aquatic and riparian-dependent organisms, and produce and deliver high-quality waters for which the national forests were established.[127]

Riparian Conservation Areas (RCAs) are land allocations that are managed to restore the structure and function of aquatic, riparian, and meadow ecosystems. Riparian Conservation Objectives (RCOs) provide a checklist for evaluating whether a proposed activity is consistent with the desired conditions described by the AMS goals. Wetlands fall into the "Special Aquatic Features" stream type when defining RCA widths, and receive buffers and protection measures determined through project-level analysis.[128]

CURRENT CONDITION

Wetlands

The dominant wetland type within the project area is palustrine scrub-shrub. Common woody species in these wetlands include willows, alder, and quaking aspen. Common forbs and grasses include monkeyflower, willowherb, sedges, larkspur, groundsel, rushes, and hydrophytic grass species. A total of 31 acres of willow/aspen/alder wetlands were identified on NFS lands in the project area. The majority of wetlands were found at the base of The Chutes and the base of the East Bowl. Isolated willow patches were found at higher elevations where the hydrology is typically supplied by localized seeps and snowmelt.

[126] USDA Forest Service, 1986
[127] USDA Forest Service, 2001a, Appendix A-5
[128] However, RCA widths may be adjusted at the project level if a landscape analysis has been completed and the site-specific RCO analysis demonstrates a need for different widths. USDA-FS, 2001a, Appendix A-8 and A-52

Potentially jurisdictional wetland areas that may be affected by lift and trail construction were identified by field delineations in The Chutes and portions of the East Bowl. Prior to the field delineations, maps and aerial photographs of the project site were reviewed for indications of ephemeral, intermittent, and perennial drainages. Soil surveys and National Wetlands Inventory maps were also reviewed. A total of 9.2 acres of jurisdictional wetlands were delineated on NFS lands in The Chutes. In the East Bowl, 2.1 acres of potentially jurisdictional wetlands were identified on NFS lands and an additional 5.9 acres were identified on Washoe County lands, for a total of 8.0 acres.

Riparian Areas

Riparian areas were identified during field wetland delineations and wildlife habitat mapping. The presence of willow/aspen/alder complexes was used to identify riparian areas within the project area. This habitat type is most prominent in the north and east, lower elevation portions of the survey area near the Mt. Rose Highway. These are wet areas fed by springs and/or creeks. Typical species found in these complexes include Booth's willow, Eastwood willow, Lemmon's willow, mountain alder, and quaking aspen.

Riparian areas within the project area are associated with wetlands and springs, as well as intermittent and permanent waterways. Riparian areas are located at the base of The Chutes and the base of the East Bowl, and are clearly defined by topography and the willow/aspen/alder community interface with upland vegetation. Because riparian areas were identified at the project level in the field, RCA boundaries vary across the project area. Approximately 30 acres of riparian areas were identified within the project area. The riparian area boundaries correspond very closely with the mapped areas of willow/aspen/alder.

DIRECT AND INDIRECT ENVIRONMENTAL EFFECTS

The following text describes potential wetland and riparian area effects for each of the alternatives. It is important to note that a substantial effort was made to avoid wetland and riparian area effects through initial project design and location, and through subsequent modification to the proposed project elements.

Alternative 1 – No Action

Selection of Alternative 1 would result in no direct or indirect effects to wetlands or riparian areas within the project area. Alternative 1 would continue existing management practices without changes, additions, or upgrades to the portion of the ski area operating on NFS lands.

Alternatives 2 and 3 – The Action Alternatives

Wetlands

Approximately 1.64 acres of willow/aspen/alder wetlands on NFS lands would be removed under Alternatives 2 and 3 for the construction of the lowest portion of the *East Bowl/Chutes Skiway* and the Chutes Return Lift. Aspen wetlands and, to a lesser extent, willow and alder dominated wetlands would be subject to removal by flush cutting, and would experience localized shifts in general plant composition (i.e., wetland type conversion). Shrub dominated wetlands would experience less of a community shift or type conversion (e.g., aspen or willow to

emergent). The proposed flush cutting would result in an increase in degree of dominance by the existing community type (e.g., 70 percent shrub cover to 90 percent shrub cover) with the removal of the aspen tree component. Increased amounts of solar radiation reaching the ground and increased available moisture (resulting from decreased evapotranspiration [ET] rates) would favor different wetland species in these areas. Scrub-shrub wetlands would likely dominate after removal of trees in these areas. Periodic corridor maintenance, to ensure minimum lift clearances, would cause these earlier successional stage plants to persist. However, should the lift corridor be abandoned in the future, there would be a high likelihood that, in the absence of periodic disturbance (hand removal of tree re-growth), an aspen dominated wetland community would return. Furthermore, because of the dispersed nature of wetland vegetation modifications within the project area, wetland functions are expected to be preserved. Wetland functions within the project area include: hydrologic flux and storage, biogeochemical cycling and storage, decomposition, and biological productivity. As isolated areas of wetland clearing occur, short-term temporary impacts to the above-referenced functions may occur in localized areas, but long-term functions of affected wetlands are expected to persist at present levels due to the dispersed nature of potential wetland clearing and the relative level of anticipated type conversion. In addition to the 1.64 acres of vegetation removal, seven lift towers and 0.2 acre of grading for construction of the *East Bowl/Chutes Skiway* and the Chutes Return Lift bottom terminal would occur in willow/aspen/alder communities under the two action alternatives.

Aspen tree removal in wetlands resulting in a decrease in ET rates would likely result in localized increases in surface and/or groundwater availability. The proposed areas of aspen wetland clearing would be minimal and dispersed to such a degree that any change in ET rates is expected to be incremental and inconsequential. Over time, (perhaps five to 10 years) as formerly aspen wetlands transition to willow and/or emergent dominated wetlands, ET rates approaching previous levels would return to the affected wetland systems.

Approximately 3.9 acres of willow/aspen/alder vegetation would be trimmed under Alternatives 2 and 3 for construction of the new Chutes runs. Aspen trees would be flush cut and tall willows would be trimmed if necessary to a height that would allow them to be skied over.

Alternatives 2 and 3 include proposed grading on *Bonanza* that would result in 0.04-acre of permanent impacts to a wetland. This isolated,[129] non-jurisdictional,[130] wetland is located within an existing ski trail. This isolated wetland represents approximately one tenth of one percent of the inventoried wetlands within Mt. Rose's SUP. The re-contouring of *Bonanza* would involve removing vegetation and filling the isolate with soils from higher-elevations on the trail. All other permanent impacts to wetlands within the SUP would be avoided. No discharge of dredged or fill material into jurisdictional wetlands or waters is proposed under Alternatives 2 and 3.

[129] Isolated wetlands are classified as non-navigable isolated intrastate waters and are not connected hydrologically (either tributary or adjacent to) navigable waters. They are no longer subject to regulation under the CWA.
[130] The status as isolated, non-jurisdictional is pending COE verification. Solid Waste Agency of Northern Cook County (SWANCC decision), 2001 Isolated wetlands are no longer regulated by the federal Clean Water Act administered by the US Army Corps of Engineers and would therefore not require Section 404 Clean Water Act permitting.

The Chutes Return Lift would traverse the large wetland near the base of The Chutes terrain. The bottom terminal and lift towers have been placed so that they are outside identified jurisdictional wetland areas.[131]

Riparian Areas

Because riparian areas in the project area are defined by the boundary of the willow/aspen/alder community, effects of vegetation removal would be similar to those described above under wetlands vegetation removal effects. In the context of a developed ski area, vegetation trimming and limited grading and placement of lift towers in riparian areas as disclosed above are considered to have minimal effects on the function and integrity of the riparian communities at the site.

CUMULATIVE EFFECTS

Two large wetland areas on Washoe County land in the East Bowl base area are connected by a culvert under the *Zephyr* trail. A small stream crosses *Zephyr* in the same vicinity by means of a small bridge. Additional grading proposed for *Zephyr* on NFS and county lands would not affect the culvert or bridge. None of the wetlands on County land would be impacted – directly, indirectly, or cumulatively, by the action alternatives.

Historic impacts to wetlands on private lands at the Mt. Rose side include a well installation, which disturbed an area of 0.15 acre of jurisdictional wetland, and installation of a water line. The water line project included a survey area of 10 acres, of which approximately 4.9 acres were jurisdictional wetlands. The water line installation temporarily affected an estimated 705 linear feet of jurisdictional wetland.

In February 2000, the COE issued permits to Mt. Rose for the well development project noted above. These permits include Nationwide 14 (Road Crossings) and Nationwide 26 (Headwaters and Isolated Water Discharges), allowing for the placement of dredged or fill material in wetlands for roadway and well construction. As part of the well development project, Mt. Rose constructed wetlands as mitigation for the placement of dredge or fill material in wetlands. Mt. Rose has also received a Nationwide Permit 12 (Utility Activities) for a proposed snowmaking water line, which was installed on private property.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Re-contouring *Bonanza* would necessitate filling a 0.04 acre isolated wetland at the East Bowl, constituting an irreversible and irretrievable commitment of this resource. Subsequent to grading the area, it is likely that the small wetland would reemerge within the ski trail.

As noted, aspen trees in wetlands that are proposed for flush cutting and, to a lesser extent, shrub dominated wetlands receiving trimming in The Chutes area would experience localized shifts in general plant composition (i.e., wetland type conversion). This would represent an irretrievable loss of current wetland function (increased amounts of solar radiation reaching the ground and increased available moisture resulting from decreased ET rates) by favoring different wetland

[131] Foundations for these towers would be constructed by hand, and towers would be placed by helicopter in order to eliminate mechanized, construction-related impacts to this wetlands complex.

species in these areas. Scrub-shrub wetlands would likely dominate after removal of aspen trees in these areas. Periodic corridor maintenance, to ensure minimum lift clearances, would cause these earlier successional stage plants to persist. However, this does not represent an irreversible change. Should the Chutes Return lift corridor be abandoned in the future, there would be a high likelihood that, in the absence of periodic disturbance (hand removal of tree re-growth), the aspen wetland community would return.

FOREST PLAN CONSISTENCY

The 1986 Forest Plan requires the delineation and evaluation of riparian areas prior to project implementation. Aside from the proposed direct effects described above, the action alternatives would not substantially degrade or retard wetland or riparian function/viability within the project area.

M. WILDLIFE AND FISHERIES

INTRODUCTION

Wildlife surveys in The Chutes area and snow tracking were performed in the winter of 2000/01 by JBR Environmental Consultants, Inc. Additional fieldwork specific to this analysis was conducted in 2002 to complement and expand the survey coverage of the previous work.[132] The following analysis represents the results of three wildlife surveys and associated reports, all of which are contained in the project file at the Carson Range District.

SCOPE OF THE ANALYSIS

The project area for this wildlife analysis is NFS land within the SUPs held by Mt. Rose, as well as NFS lands in The Chutes area.

FOREST PLAN DIRECTION

One goal of the 1986 Forest Plan is to ensure that threatened, endangered, and sensitive species are recognized through habitat management, and that habitat is in good-to-excellent condition.[133] Additionally, forest direction asserts that the agency should manage ecosystems containing threatened, endangered and sensitive species to maintain or increase these populations and achieve recovery.[134]

CURRENT CONDITION

Game Species

According to published records and conducted wildlife surveys,[135] game species found in the project area include mule deer (*Odocoileus hemionus*), mountain lions (*Felis concolor*), blue grouse (*Dendragapus obscurus*), and mountain quail (*Oreortyx pictus*). The greatest wildlife diversity is present during the spring and summer months, when neotropical migrant birds arrive to nest in the area.

Raptors

Raptors with potential to occur in the general area surrounding the project include golden eagles (*Aquila chrysaetos*), northern harriers (*Circus cyaneus*), red-tailed hawks (*Buteo jamaicensis*), American kestrels (*Falco sparverius*), Cooper's hawks (*Accipiter cooperii*), and sharp-shinned hawks (*Accipiter striatus*). Several species of owls, including great horned owl (*Bubo virginianus*), western screech owl (*Otus kennicottii*), northern pygmy-owl (*Glaucidium gnoma*), and short- and long-eared owls (*Asio flammeus* and *A. otus*, respectively) are likely to be found in the general area.

[132] JBR Environmental Consultants, Inc. 2002a, b, and c
[133] USDA Forest Service, 1986 IV-6
[134] USDA Forest Service, 1986 IV-49
[135] JBR Environmental Consultants, Inc. 2001 and 2002b

Non-Game Mammals

Non-game mammal species likely to be found, or known to be present, in the general area surrounding the project include bobcats (*Lynx rufus*), raccoons (*Procyon lotor*), skunks (*Mephitis mephitis*, *Spilogale putorius*), porcupines (*Erethizon dorsatum*), coyotes (*Canis latrans*), black bears (*Ursus americanus*), weasels (*Mustela* spp.), mountain beavers (*Aplodontia rufa*), American marten (*Martes americana*), snowshoe hares (*Lepus americanus*), and various bats and small rodents.

Birds

Much of the habitat in the project area is conifer forest. Bird species typical of this habitat include the northern flicker (*Colaptes auratus*), yellow-rumped warbler (*Dendroica coronata*), brown creeper (*Certhia americana*), western wood-pewee (*Contopus sordidulus*), olive-sided flycatcher (*Contopus cooperi*), Steller's jay (*Cyanocitta stelleri*), red crossbill (*Loxia curvirostra*), Townsend's solitaire (*Myadestes townsendi*), Clark's nutcracker (*Nucifraga columbiana*), lazuli bunting (*Passerina amoena*), downy woodpecker (*Picoides pubescens*), hairy woodpecker (*Picoides villosus*), pine grosbeak (*Pinicola enucleator*), western tanager (*Piranga ludociciana*), red-breasted nuthatch (*Sitta canadensis*), white-breasted nuthatch (*Sitta carolinensis*), hermit thrush (*Catharus guttatus*), mountain chickadee (*Poecile gambeli*), Cassin's finch (*Carpodacus cassinii*), and red-naped sapsucker (*Sphyrapicus nuchalis*). Brewer's blackbirds (*Euphagus cyanocephalus*), band-tailed pigeons (*Columba fasciata*), and killdeers (*Charadrius vociferous*) were observed near Hidden Lake, about ¼ mile from the project boundary.

Pacific chorus frogs (*Pseudacris regilla*) were observed at night, and many tadpoles and recently metamorphosed individuals have been observed at Hidden Lake.[136]

Listed and Sensitive Species

The specific species list provided by the USFWS for the project identified no listed species with the exception of the Lahontan cutthroat trout (*Oncorhynchus clarki henshawi*).[137] The species is not found in the project area and the closest population is approximately 20 miles downstream in the Truckee River in Reno.

The only Forest Service sensitive wildlife species known to be present in the project area is the mountain quail (*Oerortyx pictus*), which was observed at the base of The Chutes. Several other sensitive species could be present although their presence was not confirmed: Townsend's big-eared bat (*Corynorhinus townsendii pallescens*), spotted bat (*Euderma maculatum*), and white-headed woodpecker (*Picoides alborlarvatus*). The North American wolverine (*Gulo gulo luteus*), fisher (*Martes pennanti*), northern goshawk (*Accipter gentilis*), flammulated owl (*Otus flammeoulus*), great gray owl (*Strix nebulosa*), and California spotted owl (*Strix occidentalis occidentalis*) are very unlikely to be present, based on available habitat and negative results of wildlife surveys for these species.[138]

[136] JBR Environmental Consultants, Inc. 2001 and 2002b
[137] 2001
[138] JBR Environmental Consultants, Inc. 2001 and 2002b

Management Indicator Species

Management Indicator Species represent significant ecosystems on NFS lands, and fish and wildlife species that depend on those ecosystems. The following species were identified by the Forest Service as Management Indicator Species (MIS) for the project.[139]

Lahontan cutthroat trout

The Lahontan cutthroat trout is not found in the project area or in the near vicinity.

Paiute cutthroat trout

The Paiute cutthroat trout is not found in the project area or in the near vicinity.

Northern goshawk

The goshawk has potential to be found in the project area but none have been observed. A discussion of potential effects to this species was included in the Biological Assessment/Biological Evaluation (BA/BE) prepared for the project. The goshawk is a management indicator of the health of aspen and old growth habitat types. No old growth forest is found in the project area.

Mule deer

Mule deer are known to be present in the project area during the summer (JBR 2001), although their numbers do not appear to be high. Good deer habitat must provide water, cover, and food. Patches of interspersed vegetation communities appear to be more suitable for deer than extensive tracts of forest or meadow. Deer are generally found at the edges of habitats, such as forest openings or brushy borders of meadows.[140] Grasses and graminoids are not widely available in the project area but forbs can be found in wet areas at the bases of the Chutes and East Bowl. Cover is available in the dense willow patches and brush. Mule deer are management indicators of the health of aspen, old growth, pinyon-juniper, sagebrush, and riparian habitat types. The old growth and pinyon-juniper habitat types are not found in the project area.

Sage grouse

The sage grouse is not found in the project area or in the near vicinity.

Yellow warbler

Yellow warblers breed in wet areas dominated by deciduous thickets, especially willows. Patches of quaking aspens are used for foraging but nests are typically constructed in willows, alder, and dogwood. The species is the most widespread wood warbler in North America; the breeding range covers most of Canada and the United States except for the southernmost States.[141] Yellow warblers have not been observed in the project area but they are a potential resident and suitable habitat appears to be available in willow patches at the base of the Chutes and the base of the East Bowl. Yellow warblers are management indicators of the health of the riparian habitat type.

[139] Booth 2002.
[140] Dasmann 1981
[141] Terres 1982, Lowther et al. 1999

Yellow-bellied sapsucker

There has been much debate about the relationships among three of the sapsuckers found in the western United States: the yellow-bellied, red-breasted, and red-naped (Terres 1982). The American Ornithologist's Union (AOU) checklist of North American birds currently lists each as a separate species, although other authors consider the red-naped, or both red-breasted and red-naped, to be sub-species of the yellow-bellied sapsucker. These three sapsuckers are known to interbreed to some degree where their ranges overlap. Using the AOU checklist terminology, the project area is within the ranges of both the red-breasted and red-naped sapsuckers. The red-breasted sapsucker is found along the western coast of the United States and Canada, extending eastward to the Lake Tahoe region of California and Nevada. The red-naped sapsucker is found mostly in the Great Basin, as far west as the Nevada border. Thus, red-breasted and red-naped sapsuckers, as well as hybrids, could be found in the project area. A red-naped sapsucker was observed near the East Bowl road on the project area boundary.[142]

These sapsuckers drill holes in the trunks of a wide variety of conifer and deciduous trees to drink the sap that fills the holes. The diet is augmented with berries, fruit, ants, wasps, moths, beetles and other insects found on bark and trees. Sapsuckers in the project area would migrate to warmer areas in the winter.[143] This species is a management indicator of the health of the aspen habitat type.

Pine marten

The pine marten is known to be present in the project area.[144] This species is typically found in deep conifer forest and rocky areas, and is believed to be sensitive to human disturbance. It is considered nocturnal, although it is often seen in daylight, and is a specialist at climbing trees, where it frequently takes Douglas squirrels. Martens also prey on flying squirrels, mice and other rodents, and possibly snowshoe hares and pikas.[145] Dens are located in hollow trees, logs, or in rocky banks. Pine martens are management indicators for the health of riparian and old growth habitat types, although no old growth habitat is found in the project area.

Hairy woodpecker

Hairy woodpeckers are known to be present in the project area.[146] The species is found throughout the United States and much of Canada in a variety of habitat types, including conifer forest which is found in the project area. Hairy woodpeckers feed almost entirely on insects. Nest cavities are excavated in dead trees or dead branches of living trees. Adults are sedentary, tending to remain on a territory for life.[147] Hairy woodpeckers are management indicators for the health of riparian and old growth habitat types, although no old growth habitat is found in the project area.

Williamson's sapsucker

The project area is potential habitat for Williamson's sapsucker, although its presence has not

[142] JBR 2001
[143] Terres 1982
[144] JBR 2001, 2002b
[145] Ingles 1965
[146] JBR 2001
[147] Terres 1982

been confirmed. This species breeds in mid- to high-elevation conifer forest as well as mixed deciduous-conifer forest with quaking aspen, which appears to be the preferred nesting substrate. Williamson's sapsucker is omnivorous with seasonal changes in the diet. Cambium fibers and sap, which the birds drink from rows of small pits drilled in the bark of trees, is an important part of the diet during the nonbreeding season. Fruits, berries, and dormant insects and larvae are also eaten. In summer, the diet is largely composed of ants and wood boring insect larvae.[148] Williamson's sapsuckers is a management indicator for the health of the old growth habitat type; however, no old growth habitat is found in the project area.

Palmer's chipmunk

Palmer's chipmunk, an endemic species of the Spring Mountains of southern Nevada, is not found in the project area or in the near vicinity.

Yellow-rumped warbler

Yellow-rumped warblers are summer residents that have been observed in the project area (JBR 2001). They are found throughout the western United States and Canada and are associated with mature conifer and mixed conifer-deciduous forests. Food consists of ants, wasps, crane flies, gnats, scale insects, aphids, beetles, caterpillars, berries and seeds. Nests are typically constructed on a horizontal limb from three to 50 feet above ground.[149] Yellow-rumped warblers are management indicators for the health of the aspen habitat type

Macroinvertebrates

No survey of macroinvertebrates in the project area has been performed; however, the generally good condition of streams and wetlands in the project area suggests that a diverse macroinvertebrate community is present. Aquatic macroinvertebrates are susceptible to activities that degrade water quality by the introduction of sediments or contaminants. Macroinvertebrates are management indicators of the health of the aquatic habitat type.

Surveys

Based on the assumption that habitat is present within the project area, surveys for Northern goshawks (sensitive), willow flycatchers, pine marten, and yellow-legged frogs were conducted.

Northern Goshawks

JBR Environmental Consultants followed Forest Service protocol *Survey Methodology for Northern Goshawks in the Pacific Southwest Region*. In discussions with Forest Service biologists it was agreed that surveys in 2002 in The Chutes area would consist of one round of dawn acoustical surveys and one round of broadcast surveys. The 2002 surveys would complete the second consecutive year of surveys for goshawks in The Chutes, as required by the protocol. The dawn acoustical survey in The Chutes area was performed on March 22, 2002. No goshawk calls were heard. The broadcast survey in The Chutes was performed on July 3, 2002. JBR elicited no responses from goshawks to the broadcast calls. In addition, two calling locations were used at Hidden Lake and six were used along the Mount Rose Highway (200 meters apart). No responses were elicited. The protocol requires that a second year of goshawk surveys be

[148] Terres 1982, Dobbs et al. 1997
[149] Terres 1982, Hunt and Flaspohler 1998

completed in these tow areas, however, the habitat is somewhat marginal for goshawks and the Forest Service will decide whether another year of surveys is necessary.

Willow Flycatchers

JBR followed the protocol *A Willow Flycatcher Survey Protocol for California*. The survey was performed in the large willow-dominated areas at the base of The Chutes and the East Bowl, as well as in several smaller willow areas. At each survey point, an initial period of listening was followed by two rounds of playing willow flycatcher calls then listening and watching for responses. Willow flycatcher surveys were performed on June 18, 19, 27 and 28 as well as July 3, 2002. Each area was surveyed twice and no responses by willow flycatchers to the broadcast calls were seen or heard.

Furbearers

JBR's furbearer surveys consisted of searching for tracks in the snow and setting baited camera stations during the winter of 2001/02. On November 2, 2001 the southwest portion of the project area was searched for wildlife tracks and sign. The search area extended from the Mount Rose Highway on the west to the summit of Slide Mountain. The same area was searched on November 27, 2001, followed by a descent from the summit into the East Bowl side. During these surveys, tracks of weasels, snowshoe hares, Douglas squirrels, chipmunks, and coyotes were observed in the snow.

On February 15, 2002, two baited automatic camera stations were set near the summit of Slide Mountain – one on the east side of the summit and the other on the west. The east location was selected because marten tracks were seen there. On March 2, 2002, the film in the west camera was fully exposed, the bait had been scratched, and marten tracks were observed in the area. The developed film confirmed that a marten had visited the camera and several photos were taken.

On March 11, 2002, two baited automatic camera stations were set in The Chutes area, one on the east side and the other on the west side of the large wetland. No furbearers had been detected on either camera set in The Chutes.

JBR's winter furbearer surveys confirmed the presence of American martens in the project vicinity, as well as a variety of other small mammals such as long-tailed and short-tailed weasels, Douglas squirrels, flying squirrels, and snowshoe hares. Sensitive furbearer species such as the wolverine and fisher were not detected.

Yellow-legged Frogs

JBR followed the protocol A Standardized Protocol for Surveying Aquatic Amphibians. NDOW issued a permit to capture and release amphibians for the purpose of identification. The survey was performed in the large willow areas at the base of The Chutes and the East Bowl, as well as at Hidden Lake, and two small ponds and at a wet meadow on Mt. Rose's private property. Surveys were performed at Hidden Lake and the wet meadow on July 27, 2002. No yellow-legged frogs were observed; however, hundreds of Pacific treefrog (*Hyla regilla*) tadpoles were observed in Hidden Lake and adult treefrogs were observed in herbaceous vegetation east of the Lake. The remaining areas were surveyed on August 28, 2002 with no observations of mountain yellow-legged frogs.

DIRECT AND INDIRECT ENVIRONMENTAL EFFECTS

Alternative 1 –No Action

Selection of Alternative 1 would result in no direct or indirect effects to wildlife in the project area. Alternative 1 would continue existing management practices without changes, additions, or upgrades to the portion of the ski area operating on NFS lands.

Alternative 2 – The Proposed Action

Selection of Alternative 2 would directly affect wildlife in the project area during construction by causing them to disperse to more remote areas because of the relative increase in human activity. As specified in the mitigation measures contained in Table II-5, the effects to nesting migratory bird species would be minimized by trimming and cutting vegetation outside the avian breeding season, which is approximately from April 1 through August 31. Trimming and cutting of vegetation during the avian breeding season may be done if the work area is declared clear of nesting birds by a qualified biologist. During the operational phase of the ski area, some wildlife may be displaced from areas that previously had little or no recreational use.

Wildlife would be indirectly affected by a minor reduction or alteration of available habitat. Within the East Bowl, improvements to the lodge and parking areas would have little effect because the area is mostly unvegetated. A new trail segment of the *Zephyr Traverse* would require minimal vegetation removal and grading in an approximately 0.5-acre area. An additional 4.2 acres would be lightly gladed with removal of five-to-ten percent of the trees to construct Jim's Run. A snowmaking water impoundment, which would inundate approximately one acre, is proposed above the *Zephyr Traverse*.

In The Chutes area, approximately 0.7 acres of forest would be cleared by removing trees for installation of the Chutes Return Lift. Construction of the portion of the lift on NFS land would include four new towers and a loading area at the bottom terminal. Approximately 12 of the existing avalanche chutes would receive thinning and incidental trimming of vegetation for ski run construction. Vegetation removal would concentrate on smaller diameter trees, which have become established due to regular avalanche control. Vegetation thinning to construct trails would affect approximately 39 acres in total. Construction of the *East Bowl/Chutes Skiway,* which would allow access from the East Bowl parking lot to the base of the Chutes Return Lift, would require clearing approximately 4.5 acres of conifer forest.

The thinning of approximately 44 acres and clearing of approximately six acres of vegetation described above would affect a relatively small proportion of the almost 400 acres of conifer forest present on NFS lands in the project area. Large areas of conifer forest would also remain untouched on Mt. Rose property and on surrounding lands. Probably the most valuable wildlife habitat in the project area is the 31 acres of willow/aspen/alder. The Proposed Action would avoid all ground disturbances in this habitat type, although some incidental vegetation trimming (conducted by hand) is proposed for willow/aspen/alder habitat in The Chutes. Alternative 2 would result in the loss of 1.5 percent of the forested cover on NFS land, and thinning of an additional 11 percent. These effects would not measurably reduce wildlife numbers in the

project area and vicinity because of the large areas of adjacent forest available on Mt. Rose property and the HTNF.

Indirect effects of the project on wildlife would include a minor increase in wintertime traffic on the Mt. Rose Highway which would lead to a proportionate increased risk to animals crossing the Highway.

Threatened and Endangered Species

The effects of Alternative 2 on the threatened Lahontan cutthroat trout and Forest Service sensitive wildlife species found in the project area are analyzed in the Biological Assessment/Biological Evaluation prepared for the project.[150] The Lahontan cutthroat trout is not found in project area streams and is currently no closer than the Truckee River in Reno. The proposed projects would not directly or indirectly affect the species or preclude its reintroduction into Steamboat Creek or its tributaries at a future time; therefore, a "No effect" determination was made for the Lohontan cutthroat trout.

Sensitive Species

The mountain quail is known to be present in the project area and Townsend's big-eared bats, spotted bats, and white-headed woodpeckers could be present, although their presence has not been confirmed. These species, if they are present in the area, would be only minimally affected by the Proposed Action due to a relative increase in human activity and the minor reduction in habitat described above. The North American wolverine, fisher, northern goshawk,[151] flammulated owl, great gray owl, and California spotted owl are very unlikely to be present in the vicinity of the project area and would therefore not be affected by the Proposed Action. Table III-31 provides effects determinations for each of the sensitive species known or potentially present in the project area.

[150] JBR Environmental Consultants, Inc. 2002

[151] It is certainly possible that goshawks could occasionally hunt in the project area but they would probably be transients, not residents.

Table III-31
Effects to Sensitive Species

Species Name	Alternative			Rationale
	1	2	3	
Mammals				
Townsend's Big-eared Bat	NI	NI	NI	Could forage in project area but no suitable roosting habitat appears to be available. Minimal disturbance to potential foraging habitat proposed.
Spotted Bat	NI	NI	NI	Could forage in project area but no suitable roosting habitat appears to be available. Minimal disturbance to potential foraging habitat proposed.
North American Wolverine	NI	NI	NI	Not recorded and unlikely to be found in project area.
Fisher	NI	NI	NI	Not recorded and unlikely to be found in project area.
Birds				
Northern Goshawk	NI	NI	NI	Not recorded in project area. No suitable nesting habitat is available but goshawks could hunt in the area. Existing frequent human disturbance makes habitat less suitable for goshawks.
Mountain Quail	NI	MIIH	MIIH	Present in project area. Project will have minimal effect on amount of available habitat.
Flammulated Owl	NI	NI	NI	Not recorded and unlikely to be found in project area.
White-headed Woodpecker	NI	NI	NI	Could be present in project area. Project will have minimal effect on amount of available habitat.
Great Gray Owl	NI	NI	NI	Not recorded and unlikely to be found in project area.
California Spotted Owl	NI	NI	NI	Not recorded and unlikely to be found in project area.

Effects Codes:
NI = No Impact
MIIH = May Impact Individuals or Habitat, but will not likely contribute to a trend toward federal listing or loss of viability to the population or species

Management Indicator Species

Lahontan Cuttroat Trout
The Lahontan cutthroat trout is not found in the project area or in the near vicinity and would not be affected by any of the project alternatives. A discussion of potential effects to this species was included in the Biological Assessment/Biological Evaluation prepared for the project.

Paiute Cutthroat Trout
The Paiute cutthroat trout is not found in the project area or in the near vicinity and would not be affected by any of the project alternatives.

Goshawk
The goshawk is a management indicator of the health of aspen and old growth habitat types. No old growth forest is found in the project area and only minimal effects to aspen would result from construction of the Chutes return lift under alternatives 2 and 3. No reduction in the carrying capacity of the project area for goshawks should result from project implementation.

Mule Deer
Alternative 2 would have minimal effects to aspen habitat from construction of the Chutes Return lift. Ground disturbance to riparian areas would be avoided under all project alternatives. Sagebrush habitat is not widespread, and is generally found at lower elevations between willows and conifer forest. Permanent disturbance to sagebrush would be minimal under Alternatives 2 and 3. No reduction in the carrying capacity of the project area for mule deer should result.

Sage Grouse
The sage grouse is not found in the project area or in the near vicinity and would not be affected by any of the project alternatives.

Yellow Warbler
Alternative 2 could have temporary indirect effects during construction by causing the birds to disperse to more remote areas if disturbed by an increase in human activity. Trimming and cutting of vegetation during the avian breeding season would be done only if the work area is declared clear of nesting birds by a qualified biologist. Permanent project effects to willow nesting habitat would be minimal, mainly confined to trimming tall willows for new runs in The Chutes area. Ground disturbance in riparian areas would be avoided completely and aspen foraging habitat would also remain intact except for a minimal amount of clearing for the Chutes Return lift. These effects on willow and aspen habitat are unlikely to have a measurable effect on the carrying capacity of the project area for yellow warblers.

Yellow-bellied sapsucker
Alternative 2 could have temporary indirect effects on red-breasted or red-naped sapsuckers or their habitat during construction by causing the birds to disperse to more remote areas if disturbed by an increase in human activity. Effects on nesting activity would be minimized by trimming and cutting vegetation outside the avian breeding season, which is approximately from April 1 through August 31. Trimming and cutting of vegetation during the avian breeding season would be done only if the work area is declared clear of nesting birds by a qualified biologist. Permanent effects to conifer forest include thinning approximately 44 acres and clearing approximately six acres for construction of new ski runs and other facilities. These effects represent thinning of 11 percent of the conifer forest on NFS lands and clearing 1.5 percent. Additional conifer forest habitat would remain on Mt. Rose property and on NFS lands surrounding the project area. The project would also have minimal effects to aspen habitat from construction of the Chutes Return lift. The small reduction in aspen habitat resulting from the project is unlikely to have a measurable effect on the carrying capacity of the project area for red-breasted or red-naped sapsuckers.

Pine Marten
Alternative 2 would avoid ground disturbance in riparian areas but could affect martens indirectly by reducing the amount of conifer forest. Permanent effects to conifer forest include thinning approximately 44 acres and clearing approximately six acres for construction of new ski runs and other facilities. These effects represent thinning of 11 percent of the conifer forest on USFS lands and clearing 1.5 percent. Additional conifer forest habitat would remain on Mt. Rose property and on NFS lands surrounding the project area.

The increase in human activity, both during the construction period and after the start of operations at the expanded ski area, could affect martens. The project area is currently disturbed by skiing activity in the daylight winter hours. The road to the communications equipment site at the summit of Slide Mountain is another source of disturbance from year-round maintenance vehicle traffic. It is estimated that Alternatives 2 and 3 would increase ski area visitation by approximately two percent annually, the same as the expected regional population growth. This modest increase in skiing activity might cause martens to use the area less frequently than at present, or to use the area only at night, when most human activity ceases. There are large areas of conifer forest and rocky habitat on NFS lands surrounding the project area where martens could be more isolated from disturbance. Martens appear to have adjusted to the present level of human activity in the project area and the increase resulting from Alternatives 2 and 3 would probably not be great enough to make the area unsuitable for them. The prey base would remain and martens would likely continue to utilize it.

Post-implementation monitoring for pine marten would include using baited camera stations and snow tracking surveys. Forest Service biologists would be consulted with regarding specific survey areas and procedures.

Hairy Woodpecker

Alternative 2 could have temporary indirect effects during construction by causing the birds to disperse to more remote areas if disturbed by an increase in human activity. Effects on nesting activity would be minimized by trimming and cutting vegetation outside the avian breeding season, which is approximately from April 1 through August 31. Trimming and cutting of vegetation during the avian breeding season would be done only if the work area is declared clear of nesting birds by a qualified biologist. Alternatives 2 and 3 would avoid ground disturbance in riparian areas. Permanent effects to conifer forest include thinning approximately 44 acres and clearing approximately six acres for construction of new ski runs and other facilities. These effects represent thinning of 11 percent of the conifer forest on NFS lands and clearing 1.5 percent. Additional conifer forest habitat would remain on Mt. Rose property and on NFS lands surrounding the project area. The small reduction in conifer forest resulting from the project is unlikely to have a measurable effect on the species.

Williamson's Sapsucker

Alternative 2 could have temporary indirect effects on the species during construction by causing the birds to disperse to more remote areas if disturbed by an increase in human activity. Effects on nesting activity would be minimized by trimming and cutting vegetation outside the avian breeding season, which is approximately from April 1 through August 31. Trimming and cutting of vegetation during the avian breeding season would be done only if the work area is declared clear of nesting birds by a qualified biologist. Permanent effects to conifer forest include thinning approximately 44 acres and clearing approximately six acres for construction of new ski runs and other facilities. These effects represent thinning of 11 percent of the conifer forest on NFS lands and clearing 1.5 percent. Additional conifer forest habitat would remain on Mt. Rose property and on NFS lands surrounding the project area. The project would also have minimal effects to aspen habitat from construction of the Chutes Return lift. The small reduction in habitat resulting from the project is unlikely to have a measurable effect on any Williamson's sapsuckers in the vicinity.

Palmer's Chipmunk
Palmer's chipmunk, an endemic species of the Spring Mountains of southern Nevada, is not found in the project area or in the near vicinity and would not be affected by any of the project alternatives.

Yellow-rumped Warbler
Alternative 2 could have temporary indirect effects on the species during construction by causing the birds to disperse to more remote areas if disturbed by an increase in human activity. Effects on nesting activity would be minimized by trimming and cutting vegetation outside the avian breeding season, which is approximately from April 1 through August 31. Trimming and cutting of vegetation during the avian breeding season would be done only if the work area is declared clear of nesting birds by a qualified biologist. Only minimal effects to aspen habitat would result from construction of the Chutes Return lift. Permanent effects to conifer forest include thinning approximately 44 acres and clearing approximately six acres for construction of new ski runs and other facilities. These effects represent thinning of 11 percent of the conifer forest on NFS lands and clearing 1.5 percent. Additional conifer forest habitat would remain on Mt. Rose property and on NFS lands surrounding the project area. The small reduction in aspen and conifer habitat resulting from the project is unlikely to have a measurable effect on the yellow-rumped warbler.

Macroinvertebrates
Alternative 2 would avoid ground disturbance to streams and riparian areas. Disturbance to willow-dominated wetlands would consist only of trimming the taller shrubs to clear new ski runs in The Chutes area. These effects are not expected to result in any measurable degradation of water quality that would affect aquatic macroinvertebrates.

Alternative 3

Selection of Alternative 3 would have the same effects on wildlife, including MIS and sensitive species, as those detailed under the analysis of Alternative 2.

CUMULATIVE EFFECTS

No additionally proposed projects were identified that would contribute to cumulative effects to wildlife.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

There would be no irreversible or irretrievable commitment of wildlife resources as a result of this project. Construction-related effects would be temporary and minor.

FOREST PLAN CONSISTENCY

There are no inconsistencies associated with alternatives 2 or 3. No threatened, endangered, or sensitive species would be directly affected by implementation of either action alternative.