APPENDIX F

HYDROLOGIC REPORTS

UPPER COTTONWOOD CREEK WATERSHED ASSESSMENT
SCOTT RIVER RANGER DISTRICT
KLAMATH NATIONAL FOREST
DECEMBER 2002

Introduction

Watershed analysis, as described in the *Federal Guide for Watershed Analysis* (USDA 1995) provides the ideal analytical framework for describing watershed processes and conditions at the watershed scale (5th or 6th field). The purpose of this assessment is to obtain a site-scale (7th field) characterization of the Upper Cottonwood Creek watershed.

The assessment at this level is intended to be incremental and will provide managers an overall perspective of watershed conditions while encouraging progressive analyses using the more detailed framework outlined in the Federal Guide.

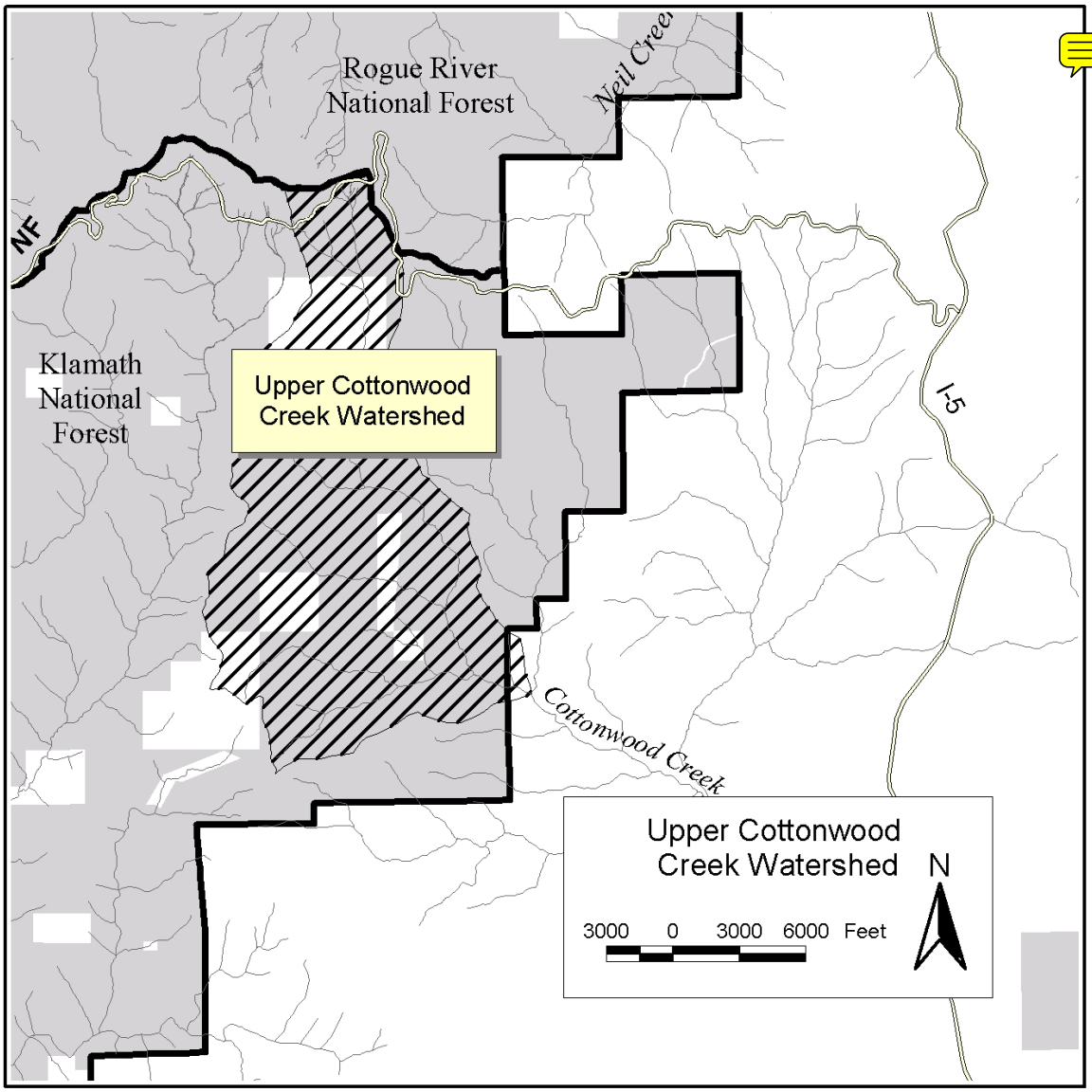
Background

The need for this assessment is based on activities proposed within the Special Use Permit Area for the Mt. Ashland Ski Area. Several restoration projects area proposed within the headwaters of Cottonwood Creek, related to ski area expansion. The *Klamath National Forest Land and Resource Management Plan (LRMP)* (1995) discusses the need to complete watershed analysis to support projects within Riparian Reserves and to support activities in watersheds of concern.

The Record Of Decision for the Klamath NF LRMP established Areas With Watershed Concerns (AWWCs). These are not Key Watersheds or land allocations, but places where there are concerns about cumulative effects and potential for impacts to water quality.

> "*Based on the potential effects at the watershed level as identified by a disaggregation model for sediment production, a cautious approach will be taken in areas with watershed concerns, particularly with regard to timber harvesting and road construction activities. Watershed analysis as part of ecosystem analysis will be required prior to implementing site-disturbing activities in the areas identified on the attached map to determine the kind and degree of concerns.*" ROD page 3.

The entire Cottonwood Creek Watershed drains an area of about 110 square miles (70,400 acres) and enters the Klamath River near the town of Hornbrook, California. The City of Hornbrook uses Rancheria Gulch, a tributary of Cottonwood Creek to the west of town, for municipal water supply, in addition to two wells. The majority of the flow is captured at the water plant west of Interstate 5. Ownership patterns in the headwaters of this fifth field watershed include both private and National Forest. The main stem is almost entirely within private ownership except for a small Forest Service parcel below the town of Hilt. Cottonwood Creek is **not** designated as a Key Watershed by the Northwest forest Plan. The Upper Cottonwood watershed contains the headwaters area of Cottonwood Creek from near the Summit of Mt. Ashland south to the confluence with Cottonwood Creek and Mill Creek, which is in proximity to the Klamath National Forest boundary. The Upper Cottonwood Creek watershed is located in a generally south facing basin that is 7.5 square miles in size (4,797 acres).



Analysis Process

This assessment will interpret and summarize known information by utilizing portions of the *Region 5 Watershed Condition Assessment Process* (USDA 2000). The purpose of this process is to obtain a reconnaissance-level characterization of all National Forest System 5th field watersheds in California. The assessment process involves three steps: (1) evaluate condition indicators; (2) determine preliminary watershed conditions by integrating the nine indicators; and (3) determine the final condition by interpreting results. This assessment will complete the first two steps of this process.

Step 1

The watershed condition assessment procedure incorporates a set of nine indicators. Three relate to potential adverse effects (risk, hazard, threat) and rely upon quantitative analysis. The remaining six relate to expressed adverse effects and are derived through professional judgment (Table 1). For the professional judgment indicators, categorically defined classes (high, medium, low) are used to minimize bias by the evaluators.

Table 1. List of Watershed Condition Indicators and Information Type

Watershed Condition Indicator	Information Type
(1) Road Hazard	Quantitative Assessment
(2) Surface Erosion	Quantitative Assessment
(3) Mass Wasting	Quantitative Assessment
(4) Floodplain Connectivity	Professional Judgment
(5) Water Quality	Professional Judgment
(6) Water Quantity/Flow Regime	Professional Judgment
(7) Stream Corridor Vegetation	Professional Judgment
(8) Stream Channel Condition	Professional Judgment
(9) Native Aquatic Faunal Integrity	Professional Judgment

Step 2

The nine diagnostic indicators are expected to yield a preliminary assessment of the condition of the watershed. In this step, the indicators are integrated through a consistent, repeatable, and understandable process. This approach stratifies the nine indicators into two groups: (1) indicators that reflect the hazard of impairment to the watershed condition; and (2) those that largely reflect the expression of watershed condition.

Step 3

This step is performed by interdisciplinary dialog between local specialists and interagency resource counterparts to validate the preliminary watershed condition rating. Because this assessment is preliminary, it does not complete this step.

Current Description of Watershed

The Upper Cottonwood Creek watershed contains approximately 17.16 miles of stream according to GIS analysis. The drainage density of this 4,797 acre watershed is 2.29 miles of stream per square mile. The Rosgen method outlines criteria for nine distinct Stream Types that are based on landscape morphology and stream reach characteristics (Rosgen 1996). Rosgen Type A streams are the most abundant stream type in the Upper Cottonwood Creek watershed (58 percent), 31 percent are Type Aa+ streams, and 11 percent are Type B streams. The road density in the Upper Cottonwood Creek watershed is 2.41 miles per square mile, which is considered a moderate watershed risk (USDA, USFS 1993). There are 21 road crossings of streams in the Upper Cottonwood Creek watershed. Approximately 67 percent of the road crossings are on Type Aa+ streams and the remaining 33 percent of crossings are on Type A streams. The analysis of land cover (vegetation) indicates that the Type Aa+ and A streams have 6 percent bank destabilizing cover along them and 94 percent as bank stabilizing cover. Bank destabilizing cover is defined here as non-vegetated areas such as grass, barren soil, or rocky areas. The potential for stream bank erosion and localized mass wasting is moderate in the Upper Cottonwood Creek watershed due to the moderate road density.

The Upper Cottonwood Creek watershed contains 9.2 acres of slope wetlands and no riverine wetlands at the site scale. Similar to the adjacent Grouse Creek watershed, slope wetlands are dominated by shrub and herbaceous vegetation and do not currently appear to be impacted by grazing. The slope wetlands in the Upper Cottonwood Creek watershed do not have any direct road impacts. Highly erodible granitic terrain combined with historical gully erosion from the Mt. Ashland Ski Area parking lot fill slopes, have previously contributed sediment to the slope wetland located approximately 500 feet downgradient of the existing parking lot adjacent to the Base Lodge.

Cooperative restoration efforts with the Mt. Ashland Ski Area, Klamath National Forest, and Rogue River National Forest have reduced gully erosion and sediment input into the wetland. Overall, the slope wetlands in the Upper Cottonwood Creek watershed have a Moderate level of function.

The North Coast Regional Water Quality Control Board (NCRWQB) has issued a Clean Water Act, Section 303 (d) List of Waterbodies in the North Coast Region with listed pollutants and estimated completion dates for the development of Total Maximum Daily Loads (TMDLs). The Klamath River from Iron Gate Dam to Scott River is a listed waterbody with nutrients and temperature as the targeted pollutants.

The NCRWQCB has advised that all tributaries to a listed waterbody are also considered impaired; this would include Cottonwood Creek as a tributary to the Klamath River. The estimated completion date for development of TMDLs in the Cottonwood Creek Watershed is the year 2004.

Tables 2, 3, and 4 summarize information gathered during the analysis of the proposed Mt. Ashland Ski Area Expansion.

Table 2. Summary of Stream Data by Rosgen Class

Watershed	Rosgen Stream Classification	Average Slope (percent)	Total Length (miles)
Cottonwood	Aa+ Stream Type	29	5.39
	A Stream Type	12	9.90
	B Stream Type	6	1.88
	Total:	17	17.16

Table 3. Watershed Summary

Parameter	Upper Cottonwood
Watershed Area (acres)	4,797
Total Stream Length (miles)	17.16
Drainage Density (mi/mi^2)	2.29
Road length (miles)	18.06
Road Area (acres)	45.86
Road Density (mi/mi^2)	2.41
Number of Stream Crossings by Roads	12

Table 4. Land Cover Characteristics Within Riparian Reserves

	Existing Land Cover Condition						
	Closed Canopy Forest	Open Canopy Forest	Sapling/ Shrub	Grass/ Forb	Barren, Non-Vegetated	Impervious	Total
Upper Cottonwood	353	83	68	30	4	4	542

Summary of Watershed Condition Indicators

(1) Road Hazard Potential

This indicator addresses the potential for an altered hydrologic regime and stream diversions associated with roads. Condition class is determined by examining the slope position, slope gradient, proximity to stream channels, number of stream crossings, and density of the road system. For Upper Cottonwood Creek, this indicator is rated as a **Moderate** hazard. The density and distribution of roads within the watershed indicate there is a moderate probability that the hydrologic regime is substantially altered.

(2) Surface Erosion

This indicator addresses the potential for an altered sediment regime associated with surface erosion accelerated by disturbances such as roads or timber harvest. Because overall disturbance within the watershed is variable and there is a moderate road density, this indicator is rated as **Moderate** hazard.

(3) Mass Wasting

This indicator addresses the potential for an altered sediment regime associated with mass wasting accelerated by disturbances such as roads and timber harvest. For Upper Cottonwood Creek, this rating is a **Moderate** hazard.

(4) Floodplain Connectivity

This indicator addresses the expressed alteration of floodplain connectivity. The condition class is determined by evaluating the extent to which the natural floodplain remains connected during high flows. Based on analysis completed for the Mt. Ashland Ski Area Expansion DEIS, there are no Rosgen C, D, E, or F channel types (no response channels); rated as **Properly Functioning.**

(5) Water Quality

This indicator addresses the expressed alteration of water quality. Condition class is determined by evaluating the geographic extent and length of time during which the water quality is impaired relative to beneficial uses. Specific water quality data for Upper Cottonwood Creek is not available, however, Cottonwood Creek has been annually observed to run turbid during intense or prolonged rainfall events. Heavy rains during late fall, winter, and spring months result in high turbidity for the duration of the storm and the follow-up runoff response period. It has also been observed that high temperatures (above State water quality standards) in the mainstem of Cottonwood Creek (below the Upper and West Forks of Cottonwood Creek, primarily located on private land) are due to the wide, shallow channel and open canopy cover along some downstream reaches (California State Department of Fish and Game (CDF&G), 1999 contact). For this reason, Upper Cottonwood receives a rating of **Low Water Quality**.

(6) Water Quantity/Flow Regime

This indicator addresses the expressed alteration of magnitude, duration, or timing of annual extreme flows. Condition class is determined by evaluating departure from the potential natural hydrograph. Upper Cottonwood Creek receives a rating of **Partially Altered**.

(7) Stream Corridor Vegetation

This indicator addresses the proper functioning condition of the riparian vegetation. Condition class is determined by the proportion of the stream corridor vegetation which is not in proper functioning condition. Based on a review of satellite imagery, Upper Cottonwood receives a rating of **Functioning At-risk**.

(8) Stream Channel Condition

This indicator addresses the stability of the stream channel system. Condition class is determined by assessing the proportion of the stream network which exhibits signs of instability. Upper Cottonwood is rated as **Functioning At-risk.**

(9) Native Aquatic Faunal Integrity

This indicator addresses the distribution, structure, and density of native and introduced aquatic fauna. Condition class is determined by assessing the geographic distribution, species mix, and numbers of native aquatic species. Upper Cottonwood is rated as **Low Integrity.**

Preliminary Determination of Condition Class

Based on the ratings above the Upper Cottonwood Creek watershed would be preliminarily classed as a Category II watershed according to the process outlined in the *Region 5 Watershed Condition Assessment Process* (USDA 2000). The following is a description of a Category II watershed:

> ***Category II****: Watersheds that are currently exhibiting moderate geomorphic, hydrologic, and biotic integrity relative to its natural potential condition and portions of these watersheds exhibit an unstable drainage network. Physical and biological conditions suggest that aquatic and riparian systems are at risk in being able to support dependent species and retain beneficial uses of water. The risks of management induced disturbance are variable and effects have partially been expressed or have resulted in localized alteration of geomorphic, hydrologic, and biotic processes.*

Summary

The next step in this process would be to validate and refine the information presented here. Because this watershed does not appear to be properly functioning, restoration projects that would repair past disturbances are needed and would be beneficial, particularly those that restore riparian conditions.

NOVEMBER 2002
STATUS REPORT

ON THE

1992 MT. ASHLAND SKI AREA RESTORATION ENVIRONMENTAL ASSESSMENT DOCUMENT

TEN YEARS LATER

Purpose of This Status Report:

The purpose of this report is to **(1)** identify and document specific areas at the Mt. Ashland Ski Area (MASA) that were identified in 1992 as needing ***restoration*** work and **(2)** briefly describe the 2002 condition and current needs of these areas.

Clarification is needed regarding the use and intent of the word "restoration". In 1992, prior to the Northwest Forest Plan, this term was used to describe the needed actions associated with dismantlement of the existing ski area and returning the site to a more natural and stable forested environment, similar to that which existed prior to 1963 (before the ski area was constructed). A more accurate term to describe this objective would have been **"reclamation"**. An analogy is the reclamation required on National Forests after a mining development is exhausted and the site of the operation is required to be returned to as near as possible, the previously existing condition. Under the 1994 Northwest forest Plan, "restoration" is typically a watershed goal where actions are identified to return watershed functions to previous and/or functional conditions. NWFP actions typically involve in-stream actions to restore conditions. This should not be confused with site "reclamation", as was the intent of the 1992 plan.

Since MASA was not dismantled and still functions as a developed ski area, many of the decisions made in 1992 are not applicable to the current situation. However, there may be opportunities for watershed restoration work that does not conflict with the currently authorized uses at MASA, and would help to attain the objectives of the Northwest Forest Plan. This report documents all findings.

Introduction:

In the winter and early spring of 1992, the Rogue River National Forest (RRNF) analyzed a proposal to dismantle the facilities located at the Mt. Ashland Ski Area. Harbor Properties, holder of the Special Use Permit for the ski area and owner of the improvements, had tried for about a year to sell the ski area without success. This led to their proposal to dismantle the ski area and terminate the permit. The Forest conducted an environmental analysis of this proposal that resulted in the *Mt. Ashland Ski Area Restoration Environmental Assessment* (EA) and the *Decision Notice and Finding of No Significant Impact* (DN) signed by Jim Gladen, Forest Supervisor, on April 28, 1992.

Gladen chose to implement Alternative C from the EA **if dismantlement would occur**.[1] He stated that "this alternative provides for resource restoration that would restore the ski area to a level that protects water quality,…stabilizes the site, reduces surface erosion rates and mass wasting, and increases the potential for revegetation success" (DN, p.1). Restoration activities included the following examples:

- Waterbars would be built on specified roads
- Parking lots would be ripped and planted
- Buildings and lift towers would be removed
- Most disturbed areas would be seeded, planted mulched and fertilized
-

The immediate goal was to stabilize the site in the absence of annual erosion control and maintenance performed by the permittee while the long term goal was for the area to return to a natural condition. Future developed uses of the area would require further environmental analysis.

Background:

The title of Appendix A in the 1992 EA was *Inventory of Existing Conditions and Necessary Watershed Work*. The appendix included a "Description of Work Needing Accomplished at the Individual Work Sites (as of April 1992)." It was described as a "brief summary of the existing conditions on the ski area that require attention during restoration." That summary is reproduced here in its entirety.

[1] The ski area was not dismantled. A successful fund-raising drive was initiated by southern Oregon community volunteers, which resulted in the purchase of the ski area from Harbor Properties by the City of Ashland in July 1992. The City currently holds the Special Use Permit and leases the operation of the ski area to the non-profit Mt. Ashland Association (MAA) at a cost of 1$/year.

SITE	WORK NEEDING DONE
A	These are areas with bare surface soil that need some combination of erosion matting, rock, seeding, vegetation planting, or mulching. Manzanita and conifer trees are two suggested species to plant.
B	These are areas with erosion gullies that need grade stabilization installed in the form of water bars made of logs or rocks and erosion matting. An example of one such gully is below the Comer Lift and is referred to as the T-Bar Trench.
C	These are roads that need better drainage to disperse water running down them. Build water bars with native materials like logs and rocks.
D	These are areas that need conifer trees, manzanita, or grass planted in order to stabilize either a gully or a fill slope.
E	These are areas where water runs down the road. Water bars or some form of water dispersal and drainage like rock or logs is needed. Grass seeding and vegetation planting with species like manzanita may be done also.
F	These are areas with rills or with two to four feet deep gullies that need stabilization. Consider using geotextiles, rip rap and rock. Seed if necessary.
G	This is an area of the road that has poor drainage with water collecting on the road. Rock surfacing is one consideration.
H	All area below the fill slope on the main parking lot lie in the Klamath National Forest. Work that may need to be done in this area would be accomplished by the Klamath National Forest.
I	Location of the sewage system. System currently conforms to existing regulations. Restoration of the system would conform to DEQ guidelines which may include 1) pumping all sewage from the tank, 2) breaking the bottom of the tank so as to not hold water, 3) filling tank with aggregate, and 4) covering tank with native soil and grade surface.
J	Location of fuel tanks. Three 1,000-gallon fuel tanks are located near the vehicle shop. Restoration will follow DEQ guidelines, which may include physically removing the tanks and soil testing for leakage. If leakage occurred, then DEQ would oversee removal of contaminated soil.

Each site letter corresponded to one or more geographic locations labeled on a topographic map that was also part of the appendix. For example, there were ten site “A’s” and one site “J”. A total of 35 sites were actually located on the map.

2002 Review of the 35 Sites listed in 1992 EA, Appendix A:

Each of the sites identified in the above summary was visited in October 2002. In order to facilitate an orderly review, each site was given an alphanumeric designator and a name. More than 90 percent of the sites were photographed (see photo attachment). Findings relative to each site are briefly described herein.

The "A" group work sites are primarily located on ski runs except for A8. Since designated runs need low-lying vegetation, it is not a common ski industry practice to plant trees in runs for restoration (revegetation) purposes at an existing ski area. Because of the distance from waterways, none of the sites contribute sediment to streams.

A1 Upper Dream

This area was recontoured in 1995-96 as part of a two year run widening and recontouring project at the ski area. Rocks were drilled, blasted, and moved to the west side of the widened run at this location. A tracked excavator and small bulldozer were used to complete the work. Waterbars were constructed and the area was mulched and seeded with native grass seed. Due to the nature of this site at this elevation, the extent of area of bare soil is comparable to other nearby undisturbed natural sites on dry ridge tops (for example, Upper Winburn Ridge in the west half of Section 17).

A2 Upper Caliban

This relatively flat portion of the run has some areas of bare soil that are being recolonized by mountain hemlock, green fescue, and green-leaf manzanita. This area was part of the 1993 Run Widening Project, which took place on selected ski runs for safety reasons and to improve the skier experience. Some trees were removed by helicopter while others were placed on the runs for slope stabilization, erosion control, and nutrient recycling.

A3 Lower Caliban I

Areas of bare soil exist at this location. This area (approx 30'x30') might benefit from seeding and mulching although it appears that no soil is moving off site. An adjacent area was recontoured in 1996 and was successfully revegetated with native grass.

A4 Lower Caliban II

The area is being naturally revegetated (recolonized) by forbs, green fescue, and green-leaf manzanita.

A5 Lower Dream I

This area has been naturally recolonized by green fescue and mountain hemlock. The hemlock is trimmed back every few years as part of normal ski run maintenance.

A6 Lower Dream II

Shasta red fir and green fescue are growing here.

A7 Upper Pistol

This area is heavily vegetated with green fescue, green-leaf manzanita, mountain hemlock, and Shasta red fir. Large woody material is also present as a result of placement from the 1993 Run Widening Project.

A8 Big T-Bar Top Terminal
This site was the location of the "Big T-Bar" top terminal. Installed in 1963, the terminal was crushed by snow creep ca. 1974 and was replaced by the Windsor chairlift in 1978. This excavated site has minimum vegetation and could benefit from vegetation planting including trees as it is now not a designated run.

A9 Upper Juliet
Native grass was planted here in the mid 1990s with a success rate of over 90%. Other native forbs and grasses are also colonizing the area. Spot planting in remaining bare areas may benefit the site.

A10 Ado
This area is naturally revegetating with trees and forbs but could use some grass seeding or planting of grass plugs.

The "B" group work sites are all located on existing ski runs.

B1 Middle Pistol
No erosion gully could be found anywhere in the area marked on the 1992 EA Appendix A map. The area is heavily vegetated with green-leaf manzanita.

B2 Upper Rodger's Way
No erosion gully could be found anywhere in the area marked on the 1992 EA Appendix A map. The area is heavily vegetated with green-leaf manzanita. An un-maintained trail is located on Rodger's Way that is occasionally used by ski area employees and the public. The trail has been in existence for at least 15 years and there are no apparent erosion problems associated with its use.

B3 Ariel Loading Area
Associated with Ariel construction, a large cut was made into the hillside adjacent and upslope from the loading area. As a result of this cut, a small wetland (< .1 acre) was artificially created here when the area was constructed. Within this wetland, a short channel (approx. 50 feet) formed. This rocky, ephemeral channel terminates before leaving the loading area where the water seeps back into the ground. The channel is stable and established vegetation is present on the site. Sediment is not being transported off the site.

B4 Ariel Lift Line
Water bars constructed by ski area personnel have stabilized this gully throughout most of its length (the site of an underground power cable). Vegetation, primarily green-leaf manzanita, covers much of the former gully area. However, a few problem spots remain where rock and/or coarse woody material needs to be placed in order to retain sediment during the spring melt or during thunderstorm activity. There is no evidence showing sediment transport to any stream or waterway.

B5 Upper Juliet South

The 1992 EA Appendix A map only marked two gullies in the Juliet area near the top of Comer (B5 and B6). There are actually four gullies in this area. Based on historical photos, at least two of these gullies were present prior to ski area construction. All four gullies have been stabilized with sediment check dams constructed of rock, treated posts, and geotextile fabric. Most of this work was completed in the mid 1990s. Revegetation is occurring in all the gullies via natural processes.

B6 Upper Juliet North

See B5 above.

B7 Ado

This gully was caused by the trenching associated with a waterline in this area. The gully incision has basically disappeared and is largely stable. Vegetation is lacking on some parts of the former gully so grass seeding or grass plug planting might be employed here to help reduce the visual effect of a straight line with little vegetation.

The "C" group work sites are primarily road related. All of the roads were constructed in 1963-64. The Lower Road from the switchback below the Base Lodge to Ariel was largely reconstructed in 1994. It is important to note that most of the restoration measures employed for roads cited in the 1992 EA are generally not applicable to a functioning ski area road system because most of the roads were to be restored in a fashion that would not permit vehicle use. All roads except the short driveway leading to the Base Lodge were to have waterbars installed, shrubs and trees planted (including mulch and fertilizer), and rock armor placed at selected locations. In some cases, portions of roads would be ripped to a depth of 12 inches and/or recontoured.

Currently, all roads are checked and maintained by MAA on a yearly basis. Waterbars are generally maintained by hand except in certain cases where a small John Deere® "crawler" tractor is used. Drain dip and waterbar outlets are rock-armored in most cases.

C1 Ariel Road

This road was developed in order to provide construction access to Ariel's top terminal area. It extends from the end of the 300 Road to the Ariel unloading area. The road has been blocked to vehicle access since at least the early 1980s. Access to the site is now via the National Weather Service road about 150 feet to the south. Two rare plants, Henderson's horkelia and Mt. Ashland lupine, grow on and near portions of the road. Water bars have not been constructed on this road as suggested in the 1992 EA. The road has largely stabilized except at one location where water has cut into the fill slope and formed a gully. This gully was filled with native rock from adjacent slopes in 2002. More work will be completed here to stabilize the gully in 2003 under the direction of the Forest Botanist.

C2 Upper Road (Falstaff at East Tempest)

This road extends from the west side of the Romeo run to the east edge of Dream. During the mid to late 1990s it was used as a route by tracked excavators and ATVs for performing work associated with run widening and slope grooming projects. It cannot be accessed with standard 4wd vehicles. Since the C2 location is checked and maintained on a yearly basis, no waterbars have been installed. Rock armor has been placed at one location where water drains off the road. The fill slope is moderately vegetated and there are no gullies in the road. The road is currently proposed for reconstruction as part of MAA's ski expansion proposal.

C3 Lower Road (Lower Rodger's Way)

The portion of this road from Tempest to Windsor has had gravel applied and waterbars installed. All water bars were constructed with geotextile fabric and all outlets to the fill slope are rock-armored. In October 2002, some of the waterbars needed some hand maintenance where gravel has partially filled the waterbar trench. Otherwise, all components of the road system here are functioning as intended.

C4 Comer Road

There are no apparent drainage problems with the road at the location mapped in the 1992 EA Appendix A. At the toe of steep section above the Rental Shop, water is running down the road forming a shallow gully on the north edge of the road. A waterbar needs to be constructed here to divert flow into the grass-covered Lower Juliet ski run. The outlet should be rock-armored.

The "D" group work sites are related to a fill slope on the Upper Road near Bottom and to a gully below the Windsor Chairlift.

D1 Upper Road Fill Slope (Falstaff at Bottom)

The cut and fill slopes are largely vegetated at this location. A gully remnant here appears stable. Also see C2 above.

D2 Middle Windsor

This erosion gully underneath the Windsor chair has received extensive attention by ski area personnel since 1992. Rock and log check dams have been installed and maintained throughout much the length of the gully. Due to natural erosion potential, it requires constant maintenance but has become much more stable through time. Native grass has been established in many sections of the gully through natural processes.

The "E" group work sites are predominantly related to roads. Also see the "C" group section above.

E1 Upper Avon

A ski area construction road existed at this site from 1963 to 1996. In 1993 the upper section of the Avon run was widened on its east side. In 1996, this area of Avon was recontoured, then seeded and mulched with native grass. The area is now stable with no erosion problems.

E2 Avon/Falstaff Junction

Water does not appear to be running down the road, but there is limited vegetation below the road. Mulching and seeding may benefit this area.

E3 Upper Road (Falstaff at Tempest)

The road appears stable and there is no evidence of water running down the road.

E4 Upper Road (Falstaff at Ariel)

This area of the Upper Road is located at a switchback on steep slopes. Waterbars with rock-armored outlets have been installed here and require annual maintenance. Portions of the area are lacking in vegetation and there is evidence of water flowing down the road just above the switchback. However, sediment is not being transported off site. MAA's March 2002 proposal calls for eliminating the switchback and the portion of the road above the Switchback and replacing it with a new road downslope that is less steep. The current road (from the Switchback to its end at Dream) would be returned to natural contours and revegetated. High-level maintenance of the waterbars in this area should continue to prevent sediment movement off site unless a decision is made to authorize change at this site. After a decision, revegetation efforts should take place at this site.

The "F" group work sites are predominantly related to parking lots except for F2 at the bottom terminal site of the former "Little T-Bar" (bottom of Dan's Run). Also see H1 below.

F1 Parking Lot Cut Slope

There is little evidence of "rills or…two to four feet deep gullies" at this location on the cut slope of the parking lot between the Rental Shop and Bottleneck as shown in the Appendix A map. Two very small rills (< less than 2 inches deep) extended part way down the slope at one location in October 2002. The cut slope is more of a visual concern to some than it is a threat to sediment transport to waterways. Options are currently being considered as to the best method to revegetate the site for visual purposes.

F2 Little T-Bar Bottom Terminal

This site was the location of the "LittleT-Bar" bottom terminal. Installed in 1963, the terminal was removed in 1987 and replaced by the Comer chairlift. The bottom terminal for Comer was placed at a different location adjacent to the Windsor chairlift. No constructed facility has existed at this site since that time. Due to efforts by MAA and through natural processes, the area has been revegetated and stabilized. However, a small ephemeral stream channel receives sediment from upland areas above the terminal site. This area is proposed for restoration in the forthcoming MASA DEIS. The uplands would be stabilized by planting vegetation and by placing coarse woody material (CWM) in a cross-slope orientation to retain sediment. In addition, CWM would be placed in the channel every 10 feet and jams every 50 feet.

F3 Back Lot East

There is no evidence of "rills or…two to four feet deep gullies" at this location on the fill slope of the back parking lot as shown in the Appendix A map. In the mid 1990s the parking lot was repaved and drainage patterns changed on both the front and back lot. Other work included placement of rip rap on a portion of the fill slope. The entire back lot appears stable with acceptable vegetation densities.

F4 Back Lot West

Same as for F3 above.

G1 Lower Road by Ariel

As mentioned previously, the Lower Road from the switchback below the Base Lodge to Ariel was largely reconstructed in 1994. Drainage problems in the Ariel area no longer exist. After intense rain associated with thunderstorms and during the peak snow melt period, water will sometimes puddle adjacent to the Ariel terminal. Runoff from the road is slowed and dissipated by vegetative cover and woody material or by rock-armored outlets. It is important to note that under dismantlement of the ski area, the Lower Road would have been "scarified (ripped to a depth of 12"), mulched, fertilized and seeded with appropriate species of grass and shrubs." In addition, trees would have been planted in the road near Ariel (1992 EA). The goals associated with dismantlement of a ski area are quite different than those associated with maintenance and improvement of a ski area where erosion control efforts are ongoing.

H1 Parking Lots Below Fill Slopes

The 1992 EA stated that all "work that may need to be done in this area would be accomplished by the Klamath National Forest." Specific restoration and erosion control was not identified in the EA. This area is proposed for restoration in the forthcoming MASA DEIS. Several large gullies formed on the south side of the main parking lot above the headwaters of Cottonwood Creek after the ski area was constructed in 1963. Previous restoration and erosion control efforts have improved the watershed condition but further efforts are needed. The head cutting of the gullies is due to lack of vegetative cover and over-steepened fill-slopes. This project would seed and mulch all bare soil areas proximate to the gullies. CWM and/or large rock would be placed in the gullies every 10 feet in an alternating fashion. In addition, an abandoned road (former

powerline route for ski area and other permittees on Mt. Ashland), which is the cause of some of the degradation, would be stabilized and planted to reduce the occurrence of erosion. The area would be seeded and mulched and CWM and/or large rock would be placed in exposed areas. Most of the gully and abandoned road work lies outside of the SUP, but the work would still be accomplished by ski area employees or contractors under the supervision of Forest Service personnel.

I1 Sewage System

Similar to many of the run and road projects associated with dismantlement, there is no need to deactivate the sewage system. In addition, the 1992 sewage system was replaced with a new and vastly improved wastewater system in 1999 that poses far less threat to water quality than the old system.

J1 Fuel Tanks

In 1994, the old underground fuel storage tanks were replaced with above-ground tanks that meet all regulations of the Oregon Department of Environmental Quality relative to operation and maintenance.

Prepared by: Steve Johnson, Snow Ranger, Ashland Ranger District

Signature — Date: 11/19/02

Reviewed by: Dan Sitton, Engineering Geologist, RRNF Supervisor's Office

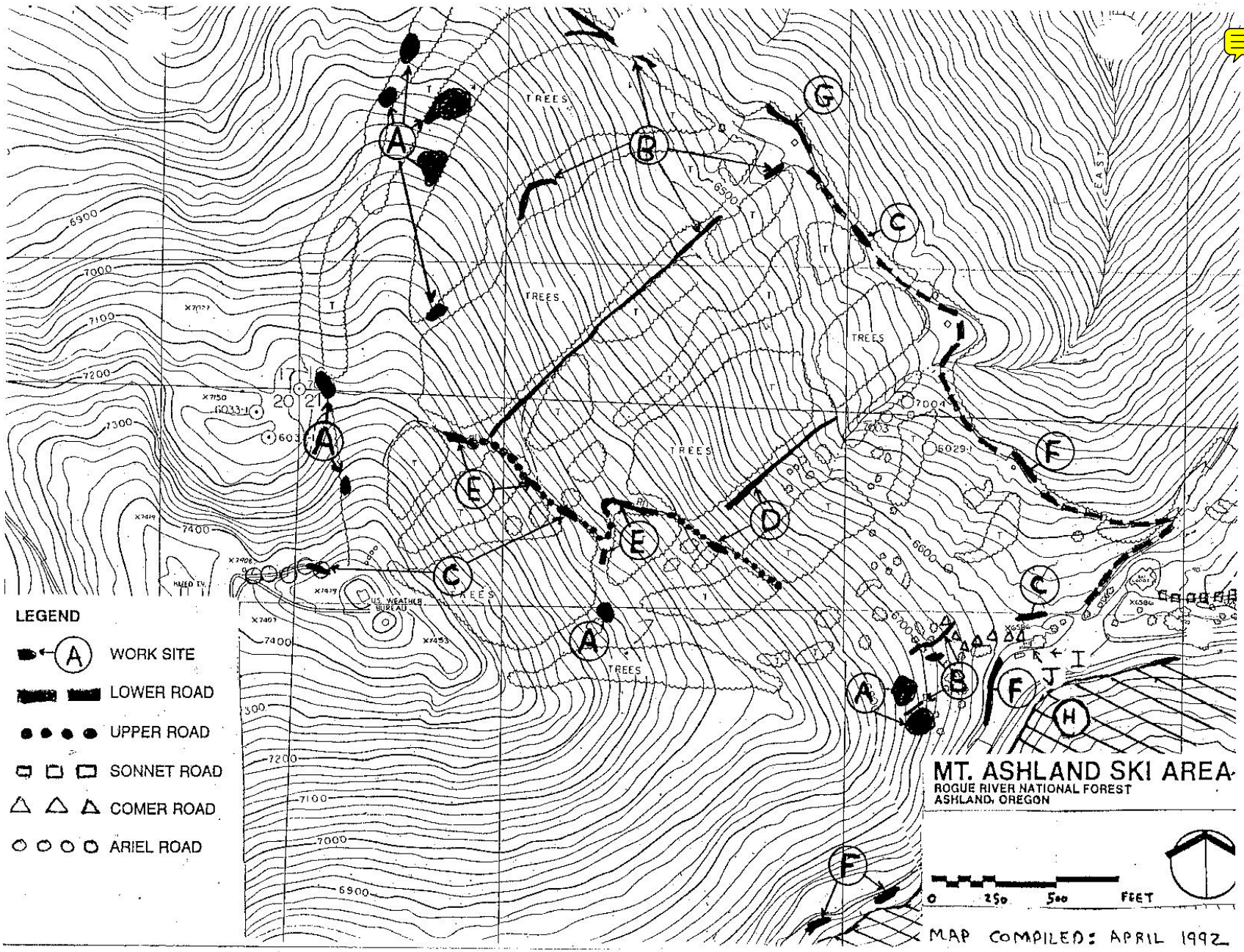
Dan R Sitton

Signature — Date: 11/19/02

Reviewed by: Peter Jones, Geotechnical Engineer

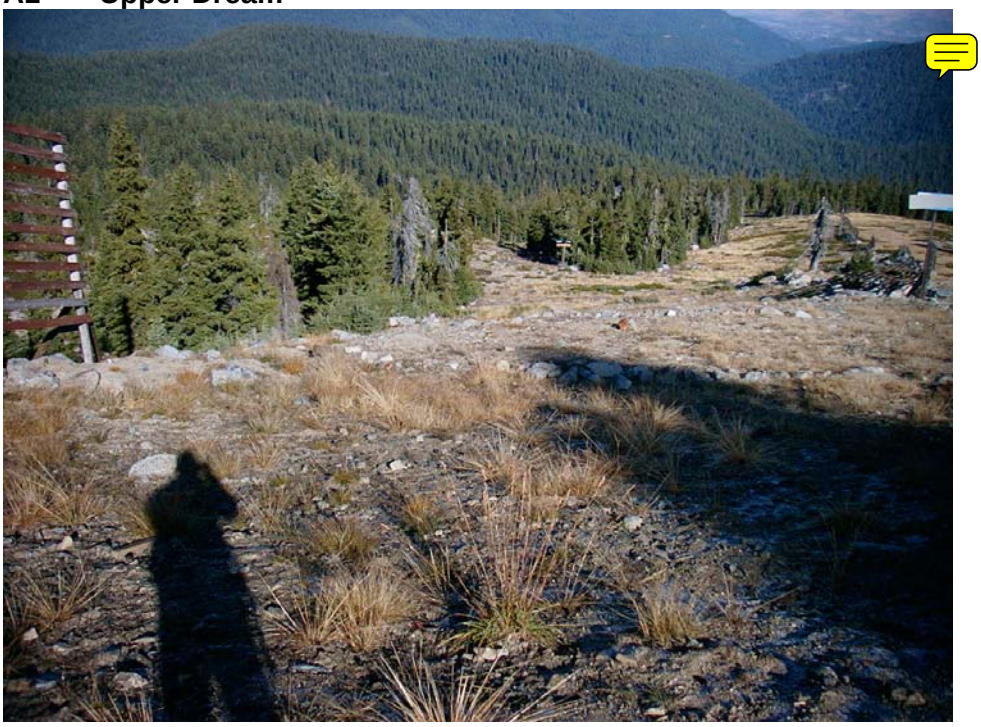
Signature — Date: 11/25/02

Photo Attachment (22 pages)


MT. ASHLAND SKI AREA
ROGUE RIVER NATIONAL FOREST
ASHLAND, OREGON
LEGEND
WORK SITE
LOWER ROAD
UPPER ROAD
SONNET ROAD
COMER ROAD
ARIEL ROAD
TREES
U.S. WEATHER BUREAU
0 250 500 FEET
MAP COMPILED: APRIL 1992

"A" Group Photo Attachment
to
2002 Report on Mt. Ashland Ski Area Restoration

A1 Upper Dream



A2 Upper Caliban

Downed woody debris is from 1993 Run Widening Project.

A3 Lower Caliban I

A4 Lower Caliban II

A5 Lower Dream I

A6 Lower Dream II

A7 Upper Pistol

Downed woody debris is from 1993 Run Widening Project.

A8 Big T-Bar Top Terminal

A9 Upper Juliet

Note gopher activity in lower right.

A10 Ado

“B” Group Photo Attachment
to
2002 Report on Mt. Ashland Ski Area Restoration

B1 Middle Pistol

B2 Upper Rodger’s Way

B3 Ariel Loading Area

B4 Ariel Lift Line (Photo 1)

Arrows points toward “gully.” The swale in the center of the photo is a natural feature.

B4 Ariel Lift Line (Photo 2)

Sample rock check dam.

B5 Juliet South

Left arrow points to where gully has been stabilized before entering the cut slope adjacent to the Comer unloading area. Right arrow points to nearby trail stabilized with rock steps and logs. Grass is now naturally reseeding in the rocks on the cut slope.

B6 Juliet North

A series of check dams below the Comer unloading area has helped to stabilize the gullies here. Native grass and forbs are recolonizing the gully areas.

B7 Ado

The former gully, caused by a water line trench, was located in a straight line between the two dogs.

“C” and “D” Groups Photo Attachment
to
2002 Report on Mt. Ashland Ski Area Restoration

C1 Ariel Road (Photo 1)

Gully formation center right.

C1 Ariel Road (Photo 2)

Rock placement in gully.

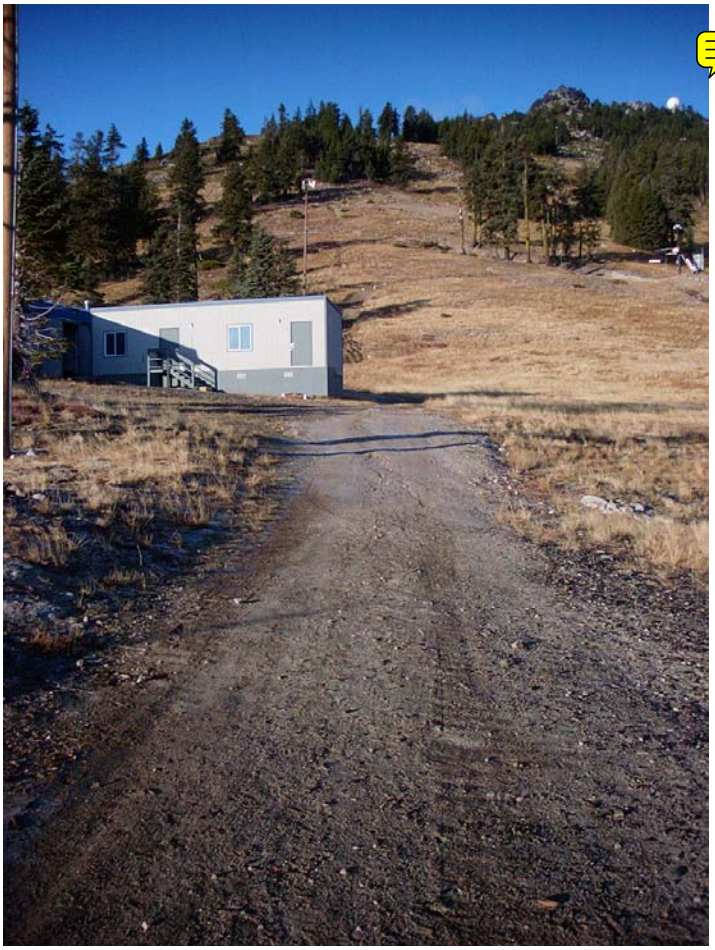
C2 Upper Road (Falstaff at East Tempest)

Note rock armor on fill slope.

C3 Lower Road (Lower Rodger's Way)

Sample waterbar with rock-armored outlet.

C4 Comer Road at location shown on 1992 EA Appendix A map (Photo 1)



C4 Comer Road between rental shop and Comer chairlift (Photo 2)

Waterbar at this location needs to be directed into the ski run.

D1 Upper Road Fill Slope (Falstaff at Bottom)

D2 Middle Windsor

Example of rock check dam.

"E" and "F" Groups Photo Attachment
to
2002 Report on Mt. Ashland Ski Area Restoration

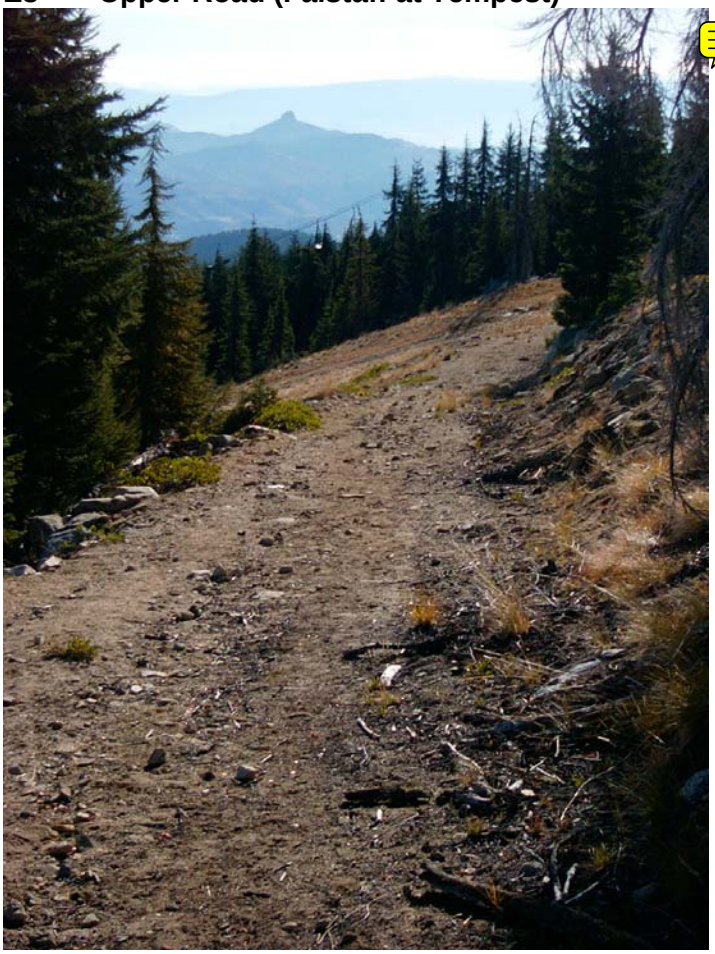
E1 Upper Avon

Widened in 1993. Recontoured and seeded in 1996.

E2 Avon/Falstaff Junction

Area in foreground is the upper road at the Avon/Falstaff jct.

E3 Upper Road (Falstaff at Tempest)



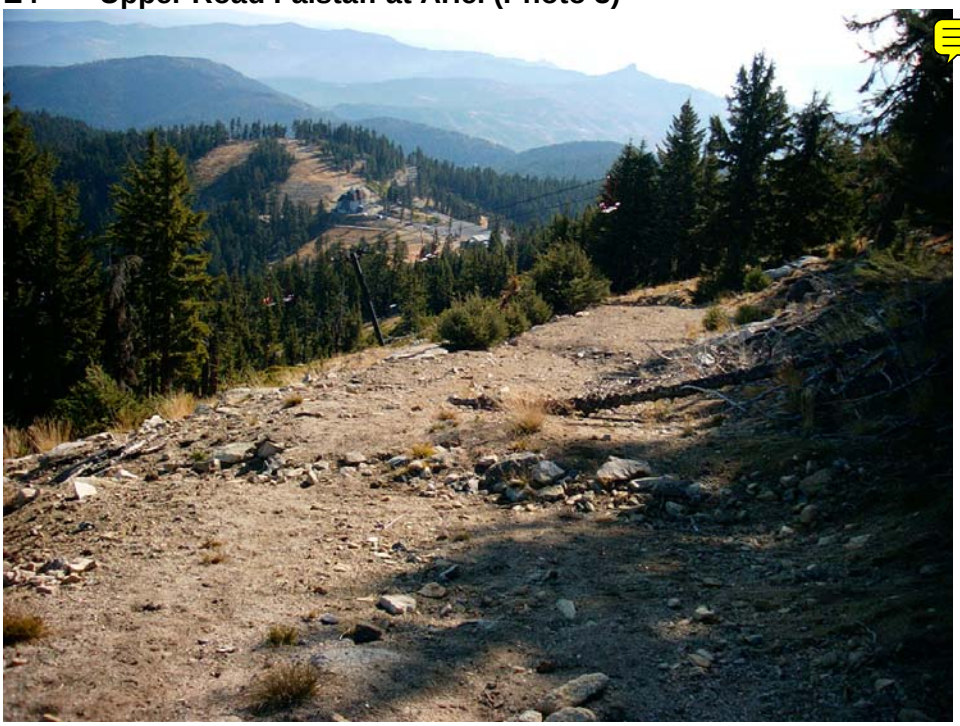
E4 Upper Road Falstaff at Ariel (Photo 1)

Middle and lower portion of switchback looking north.

E4 Upper Road Falstaff at Ariel (Photo 2)

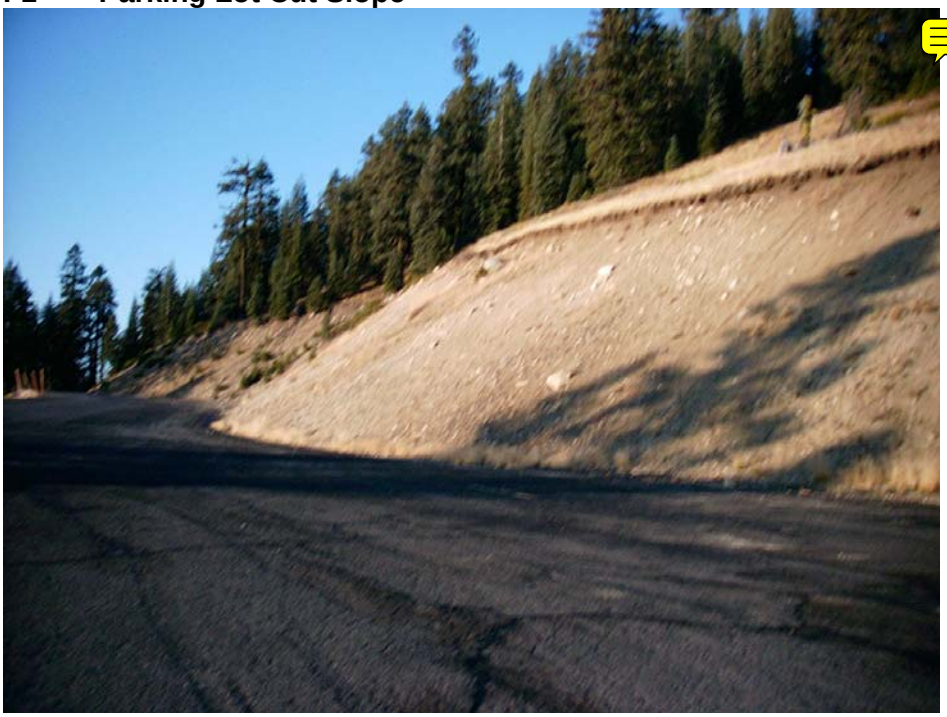
Upper portion of Switchback area looking west.

E4 Upper Road Falstaff at Ariel (Photo 3)



Upper portion of switchback area looking east.

F1 Parking Lot Cut Slope



F2 Little T-Bar Bottom Terminal (Photo 1)

Gully at former terminal location.

F2 Little T-Bar Bottom Terminal (Photo 2)

"Little T-Bar" was located on this slope now called Dan's run.

F3 Back Lot East

No photo available

F4 Back Lot West

No photo available

"G-J" Groups Photo Attachment
to
2002 Report on Mt. Ashland Ski Area Restoration

G1 Lower Road by Ariel (Photo 1)

G1 Lower Road by Ariel (Photo 2)

H1 Parking Lots Below Fill Slopes (Photo 1)

Gully below east end of main parking lot.

H1 Parking Lots Below Fill Slopes (Photo 2)

Arrows point to representative gully areas in "Cottonwood Meadows." H1

Parking Lots Below Fill Slopes (Photo 3)

Arrow points to abandoned road location.

I1 Sewage System

Old drainfield is located underneath parking lot in center of photo.

J1 Fuel Tanks

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