United States Department of Agriculture | Forest Service | Intermountain Region | 324 25th Street Ogden, UT 84401-2310

File Code: 2520-3 **Date:** August 7, 2001
Route To:

Subject: Y Mountain Fire Initial BAER Request

To: Forest Supervisor, Uinta National Forest

The enclosed Initial 2500-8 Burned Area Emergency Rehabilitation (BAER) request for the Y Mountain Fire has been approved with one exception. The native seed mixes that are being proposed include grasses, forbs and shrub seeds. The current BAER policy allows the use of all these for emergency treatments to protect life, property and ecosystem function. However, the native plant seeding must be considered as an emergency treatment and the current policy requires that the proposed treatment is expected to be successful at meeting the emergency objectives within two growing seasons (FSM 2503.03.3 Timeliness). If the purpose of any of the seed species is for long term ecosystem recovery or for purposes outside of the BAER policy and time lines, then the native species should be funded through other forest program funds.

You are authorized the control of the Dalmatian Toadflax only to the extent of the population that is increasing into the fire area. Also, you must have NEPA documentation in place and the type of herbicides approved in the NEPA document. If the proper NEPA documentation does not exist, you must fund the NEPA work with other program funds. BAER cannot pay for NEPA of projects for existing and increasing weed control.

You are authorized to spend only the amount shown for each treatment type. The total approved for all treatments, monitoring, and evaluations in this initial request is $112,715 minus any of the native seed that does not meet the intent of the BAER policy. The charges should be made to the BAER Fund Code H48096 0460. Please submit a final cost estimate of the seeding to the Regional BAER Coordinator no later than August 17.

If additional monitoring is needed beyond the first year, an interim request should be submitted at the appropriate time. If additional treatments, or changes to the existing treatments are needed, an interim request should be made as soon as possible after the change in emergency treatments is determined.

You must keep track of all funds by treatment, or project type, and by fiscal year. A final 2500-8 report must be submitted to the Regional Office when projects and treatments have been completed and reviewed.

Please contact Jeff Bruggink, Region 4 BAER Coordinator (801) 625-5357 if you have questions or concerns.

/s/ Jack G. Troyer
JACK A. BLACKWELL
Regional Forester

Enclosure

cc:
Uinta NF (Reese Pope, Bob Gecy)
Fishlake NF (Mike Smith)
RO (Jeff Bruggink, Bill Burbridge Michael Clonts)
WO (Max Copenhagen)

FS - 2500 - 8
(8/93)

Date of Report: July 31st, 2001

USDA - FOREST SERVICE / BURNED - AREA REPORT

(Reference FSH 2509.13)

PART 1 ... TYPE of REQUEST

A. Type of Report

(X) 1. Funding request for estimated WFSU - SULT funds

( ) 2. Accomplishment Report

( ) 3. No Treatment Recommendation

B. Type of Action

(X) 1. Initial Request
(Best estimate of funds needed to complete eligible rehabilitation measures)

( ) 2. Interim Report

( ) Updating the initial funding request based on more accurate site data and design analysis

( ) Status of accomplishments to date

( ) 3. Final Report - following completion of the emergency work

PART 2 ... BURNED - AREA DESCRIPTION and FIRE LOCATION

A. Fire Name: Y - Mountain

B. Fire Number: P48096 / UT-UIF-18071

C. State: Utah

D. County: Utah ... # 049

E. Region: R4 / Intermountain

F. Forest: Uinta ... # 0418

G. District: D2 / Pleasant Grove

H. Date Fire Started: 07-21-2001 @ 1830

I. Date Fire Contained: 07-24-2001

J. Time Fire Contained: 1800

K. Suppression Costs: $ 800,875 … as of 07-25-2001 according to Randy Miles, Budget & Finance

L. Fire Suppression Damages Repaired with EFFS – PF12 Funds:

- Fireline Waterbarred (miles) 1.5 miles of hand line … no dozer lines were constructed
- Fireline Re-seeded (miles) 1.5 miles of hand line … scheduled to be re-seeded during 10/01
- Other Damages … (identify) 3 helispots were rehabilitated

M. Watershed Number: 160202030306 … Utah Valley (6th Field HUC & Name)

N. NFS Acres Burned: 437 **Total Acres Burned:** 461 … according to a recent GPS flight taken on 07-25-2001

Other Land Ownerships … list as follows: (acres)

(X) Private (24) ( ) State of Utah ( ) USDI – BLM ( ) Other

O. Vegetation Types:	Much of the terrain on the upland foothills located due west of Y - Mountain consisted of Gambel oak with scattered shrubs and perennial grasses on steep to very steep hillside areas (60 %); the actual mountainsides observed within the burned-area supported a transitional zone with curlleaf mountain-mahogany, Stansbury cliffrose and Gambel oak along with a minor component of Rocky Mountain maple located in the swales (21 %); most of the north facing slopes within Slide Canyon and the ridgetop areas along Y - Mountain had previously supported both mixed conifers and spruce - fir type forests (15 %) and the remainder of the disturbance consisted of sparsely vegetated areas with rock outcrops and canyon cliffs (4 %).
P. Dominant Soils:	Most of the land resources occurring within the high elevation areas of the Y - Mountain Fire Incident were observed to have a cryic soil temperature regime; these specific locations were classified as being

	Typic Cryorthents on the mountain benches under spruce - fir forests and as Lithic Cryorthents along the ridgetop areas under scattered stands of mixed conifers with a component of curlleaf mountain mahogany and Stansbury cliffrose; most of the mid-elevation sites within the burn were mapped as Boralfic Argixerolls – especially on the north aspects … these particular soils previously supported scattered stands of mixed conifers with an understory of perennial grasses; a significant part of the fire incident, located along the west aspect of the Y - Mountain landscape, had miscellaneous land types in the form of rock outcrops, canyon cliffs and escarpments - most of these locations had less than 10 % vegetative cover; the mountain foothill landscapes consisted primarily of Typic Calcixerolls under Gambel oak and perennial grasses while the lower toeslopes of these foothill locations were mapped as Aridic Calcixerolls along the Forest boundary under upland shrubs with a mix of annual and perennial grasses. *(USFS, Pleasant Grove Soil Survey, June of 1981)*
Q. Geologic Types:	The majority of the burned-area has wildland soils formed in alluvium, colluvium and residuum derived from calcareous deposits of mixed sedimentary rocks such as limestone along with a secondary mineral named dolomite; a few small distinct areas, located along the toeslopes of the steep to very steep mountain foothills, have been influenced by quartzite … which is simply metamorphosed sandstone, while the entrance to Slide Canyon, especially in the area of the " Y " monument and access trail, displays an obvious accumulation of paleolandslide debris. *(Geologic Map of Utah, UGMS, 1980)*

R. Miles of Stream Channels by Order: (Strahler 1952 method, within the fire perimeter)

1st: -0- 2nd: 0.5 3rd: -0- 4th: -0-

S. Transportation Systems: (occurring within the fire perimeter)

Trails … 1.3 miles (ATV & foot path) Roads … 0 miles (426 acres designated as roadless by FS inside the burn)

PART 3 … WATERSHED CONDITION / NFS PROBLEM INVENTORY

A1. Mapping of the Fire Intensity Zones: (total acreage occurring within the perimeter of the Y - Mountain Fire

Incident)

72 High (15 %)	90 Moderate (20 %)	299 Low / Unburned (65 %)

A2. Mapping of the Fire Intensity Zones: (NFS lands … acres)

72 High (16 %)	81 Moderate (19 %)	284 Low / Unburned (65 %)

B. Estimation of Water-Repellent soils occurring within the different Fire Intensity Zones: (NFS lands … acres)

68 High (95 %)	57 Moderate (70 %)	28 Low / Unburned (10 %)

Overall Total = 153 acres

C. Rating Soils for Potential Erosion Hazards within the Fire Perimeter: (NFS lands … acres)

Very High	High	Moderate	Low
52 (12 %)	96 (22 %)	136 (31 %)	153 (35 %)

D1. Potential for Accelerated Erosion Losses without applying emergency rehabilitation treatments:

1st Year	2nd Year	3rd Year	4th Year
18.01 tons/acre/year	4.55 tons/acre/year	1.78 tons/acre/year	0 tons/acre/year

Overall Total = 7,586 tons

(additional erosion over a 48-month period)

(Source) – Disturbed WEPP model … http://www.forest.moscowfsl.wsu.edu/fswepp/

D2. Potential for <u>Accelerated Erosion Losses</u> without applying emergency rehabilitation treatments:

1st Year	2nd Year	3rd Year	4th Year
15.25 tons/acre/year	4.75 tons/acre/year	2.38 tons/acre/year	1.19 tons/acre/year

Overall Total = 7,285 tons

(additional erosion over a 48-month period)

(Source) - Uinta National Forest … Pleasant Grove Soil Survey, June 1981, Carlos F. Lopez

E1. Total Sediment Potential: 18,254 tons / mile ^{2} … according to the Disturbed WEPP Model

E2. Total Sediment Potential: 24,303 tons / mile ^{2} … according to the Pleasant Grove / LSI Project

(NOTE) - both sediment entries assume a 35 % delivery efficiency for a period of 4 years

PART 4 … HYDROLOGIC DESIGN FACTORS with CALCULATED RISK and CLIMATE EVALUATIONS

Slide Canyon Area

A. Estimated Vegetative Recovery Period: 5 to 7 years
B. Design Chance of Success: 80 percent
C. Equivalent Design Recurrence Interval: 25 year
D. Design Storm Duration: 1 hour
E. Design Storm Magnitude: 1.25 inches
F. Design Flow: 23.6 ft^3 / sec / mi^2
G. Estimated Reduction in Infiltration: 8 percent
H. Adjusted Design Flow: 66.7 ft^3 / sec / mi^2

PART 5 … SUMMARY OF SURVEY & ANALYSIS

A. Describe the Watershed Emergency:

- **THREATS TO HUMAN LIFE AND PROPERTY** … The photograph attachments to this document show the proximity of the steep to very steep burned slopes within the Y - Mountain Fire to private and commercial developments, which in part are located on ancient alluvial and debris fans. Nine percent of the 1.2 square mile Slide Canyon watershed is classified as a high intensity burn with a STRONG degree of hydrophobic soils and a HIGH class of water repellency. Average watershed slopes range from 51 to 80 percent. Slopes on the high polygons range from 65 to more than 80 percent. Six percent of Slide Canyon burned with MODERATE intensity and has a MEDIUM class of water repellency. Numerous developments are located below Slide Canyon, including condominiums, the 7 Peaks Water Resort, and the 2002 Olympic Ice Skating Rink. Small drainages to the north of Slide Creek also have some potential to produce fire related floods or debris flows that could cause damage to homes and the city storm water system. Additional field evaluations by the NRCS and the City of Provo will be necessary to better identify which properties and developments are at risk. In its current state, the Y - Mountain trail will intercept, concentrate and reroute water causing excessive erosion and perhaps unsightly scars on the highly visible hillside. This will add to the anticipated increases in peak flows and sediment yields resulting strictly from the fire. This could further endanger values-at-risk within and below the fire perimeter. Until the bare and hydrophobic soils revegetate and recover, there is appreciable risk that flood events generated by high intensity thunderstorms could threaten human life and property.

- **LOSS OF SOIL PRODUCTIVITY** … Virtually all of the contrasting soils observed within the HIGH fire intensity zones exhibited a moderate to strong degree of water-repellency at the sampling depths of about ½ to 2 inches below the ground surface. This temporary condition has greatly modified the existing site hydrologic function to the point that ... infiltration will be restricted or (in some cases) actually prevented at the soil surface -- resulting in dramatic examples of sheet, rill and gully erosion. Hydrophobic conditions may persist for a period of up to 3 years following the burn. All HIGH fire intensity sites are recognized as potential flood source areas. The severely burned areas of Y – Mountain have a maximum threshold for soil loss tolerance at about 1 to 3 tons/acre/year. Accelerated rates of erosion, resulting from either natural or human caused disturbances, that exceed this listed threshold, will definitely result in adverse impacts to long-term soil productivity -- which is not consistent with the R4 / Soil Quality Standards (FSH 2509.18) under the guidelines of 1) SEVERELY BURNED SITES and 2) INSUFFICIENT PROTECTION with respect to existing ground cover. Most of the soils (Lithic and Typic Cryorthents) occurring within the High Mountain ecological areas of this burn only had 1 to 4 inches of topsoil material … we need to get these fragile landscapes stabilized as-soon-as-possible.

B. Emergency Treatment Objectives:

The primary objective of the proposed emergency rehabilitation is to take prompt actions deemed reasonable and necessary to effectively protect, reduce or minimize significant threats to human health and safety; and prevent unacceptable resource degradation. The emergency

treatments being recommended by the Uinta NF / BAER Team are specifically designed to achieve the following results:

1) encourage public and political consideration of natural long-term flooding and debris flow hazards as they assess short-term risks related to the Y - Mountain Fire,

2) reduce the possibility that flood flows could threaten residential and commercial developments – including the 7 Peaks Water Resort and 2002 Olympic Ice Skating Rink located down slope from the fire,

3) prevent the Y - Mountain trail from concentrating and re-routing overland and channeled runoff; and from generating and delivering sediment,

4) stabilize severely burned soils to maintain long-term productivity and to meet Regional and Forest Plan standards

5) prevent the spread of existing noxious weed populations,

6) provide for public safety and promote fire recovery by communicating the potential flood hazards and the need to adhere to access restrictions on the Y - Mountain trail.

C. Expected Probability of Completing Treatments Prior to First Major Damage-Producing Storm:

Land … 80 % Channel … N/A Trails … 85 % Other … 85 %

D. Probability of Accomplishing Treatment Success:

< ---------- Years after Treatment ---------- >

	1	3	5
♦ **Land**	**75 %**	**80 %**	**85 %**
♦ **Channel**	**N/A**	**N/A**	**N/A**
♦ **Trails**	**80 %**	**75 %**	**70 %**
♦ **Other … Weeds**	**80 %**	**70 %**	**60 %**

E. Cost of Taking No-Action: (including loss) up to millions of dollars -- This number is especially difficult to quantify because of the current uncertainty about the exact path that water and sediment would travel if a flood event occurs. Regardless of the path taken, there are numerous residential and commercial developments - including condominiums, apartments and personal residences, along with the Provo City storm water systems, power lines, communication sites, the Upper Union Canal, 7 Peaks Water Resort and the 2002 Olympic Ice Skating Rink.

F. Cost of Selected Alternative: (including loss) $119,488 to $312,715 (assumes all treatments are implemented) -- This number is difficult to quantify for similar reasons the cost of No-Action is difficult to quantify. If potential hazards are identified and mitigated by the NRCS and the City of Provo, hopefully there will be no costs in excess of the planned treatments.

G. Skills Represented on Burned-Area Survey Team:

(X) Soils	**(X) Geology**	**( ) Timber**	**(X) TES … Plants**
(X) Hydrology (3)	**(X) Landscape Arch.**	**(X) Wildlife**	**(X) Fire Dispatch**
( ) Fire Ecology	**( ) Recreation**	**( ) Research**	**(X) Archeology**
(X) GIS Staff	**( ) USDI – BLM**	**(X) District Staff**	**( ) Engineering**
( ) Fisheries	**(X) USDA – NRCS**	**(X) Utah – DWR**	**(X) Other … BYU**

Team Leader: Michael D. Smith, Soil Scientist

Phone: (435) – 896 – 9233 / ext. # 1071 **E-Mail:** mdsmith01@fs.fed.us

RECOMMENDED TREATMENTS

National Forest System Lands

(the location of these emergency treatments has been identified on 2 GIS interpretive plots contained in this report)

- **Land Treatments** … conduct broadcast seeding (initial stabilization) on a total of 153 acres with a mix of Slender Wheatgrass and Pioneer Grass – includes all HIGH and MODERATE fire intensity sites; conduct broadcast seeding (native plant species in autumn) on a total of 134 acres – including all low elevation HIGH intensity sites and 3 low elevation MODERATE fire intensity sites (96 acres - Seed Mix # 1) as well as another 38 acres of upper elevation HIGH fire intensity sites (Seed Mix # 2); conduct slashing on 15 acres of high elevation spruce - fir sites (helicopter transportation of the crews to site will be necessary); conduct 12 hours of Gambel oak transplanting to stabilize fragile uplands located in close proximity to the " Y " Mountain Trail and Monument; conduct shrub plantings (bare-root stock) on approximately 10 acres along the " Y " Mountain Trail using student volunteers; support services for BAER implementation; once again … utilize student volunteers to conduct contour raking on lands contained within the " Y " Mountain Trail System in order to mix planted seed and promote water infiltration; install 14 explanatory signs along the " Y " Mountain Trail to restrict access into the treatment areas, promote public safety and share information; install 0.6 mile of discontinuous temporary fence to

control access into the treatment areas. ($ 60,384)

- **Channel Treatments** … None

- **Roads, Trails and Other Treatments** … re-condition 0.95 miles of the " Y " Mountain Trail by grading, shaping, building drain dips and removing the existing berm from the outside edge of the trail surface; and install water bars on abandoned trail along the south side of Slide Canyon. ($ 4,557)

- **Ecosystem Management** … in the spirit of protecting watersheds by implementing practices designed to improve existing ground conditions, spend approximately 2 weeks spraying known populations of noxious weeds (Dalmatian Toadflax) in order to control the spread of this plants following a fire disturbance in the area surrounding the " Y " monument. ($ 2,500)

SUGGESTED TREATMENTS

Private Lands … Brigham Young University (BYU)

- **Land Treatments** … conduct broadcast seeding (initial stabilization) on a total of 9 acres with a Slender Wheatgrass and Pioneer Grass mix; conduct broadcast seeding (native plant species in autumn) on a total of 9 acres; conduct 4 hours of Gambel oak transplanting to stabilize fragile uplands located in close proximity to the " Y " Mountain Trail; conduct shrub plantings on 2 acres along the " Y " Mountain Trail using native container stock and student volunteers; install 5 explanatory signs along the " Y " Mountain Trail to promote public safety and erosion control; install 0.1 miles of temporary fence to promote re-growth in burned areas, safety and erosion control. ($ 4,001)

- **Channel Treatments** … None

- **Roads, Trails and Other Treatments** … recondition 0.35 miles of the " Y " Mountain Trail by grading, shaping, and building drain dips and removing the existing berm from the outside edge of the trail surface; construct a drain dip on the " Y " Mountain Trail and armor the dip with 95 cubic yards of 6 " minus rock. ($ 2,772)

PART 6 … EMERGENCY REHABILITATION TREATMENTS & SOURCE OF FUNDS BY LAND OWNERSHIP(s)

A1. Primary Land Treatments

| < ---------- Recommended Treatments ---------- > | < -- Suggested Treatments -- > |

NFS Lands **Other Lands**

Line Items	Units	Unit Cost $	Number of Units	WFSU–SULT $	Other $	Number of Units	BYU $	EWP – Private $	Total $
Broadcast Seeding I (Initial Stabilization)									
Seed Mix (Slender Wheatgrass & Pioneer Grass)	Acre	$ 79	153	$ 12,087		9	$ 711		$ 12,798
Broadcast Seeding II (Native Plant Species)									
Seed Mix # 1 (Low Elevation)	Acre	$ 185	96	$ 17,760		9	$ 1,665		$ 19,425
Seed Mix # 2 (High Elevation)	Acre	$ 199	38	$ 7,562					$ 7,562
(all seeding includes the cost of using a Type III helicopter @ about $ 16 / acre)									
Slashing (Spruce - Fir Sites)	Acre	$ 275	15	$ 4,125					$ 4,125
Type III Helicopter (Transportation)	Hour	$ 530	2.5	$ 1,325					$ 1,325

Line Items	Units	Unit Cost $	Number of Units	WFSU–SULT $	Other $	Number of Units	BYU $	EWP – Private $	Total $
Shrub Planting (Stabilization of the fragile uplands located in close proximity to the " Y " Monument)	Hour	$ 100	12	$ 1,200		4	$ 400		$ 1,600
(Transplanting QUGA using a trackhoe on very steep terrain)	Project	$ 10,500	1	$ 10,500					$ 10,500
(Using bare-root stock & student volunteers) (Purchase equipment to enable volunteers to conduct planting during Eco-Day events sponsored by BYU)	Spades	$ 16	25	$ 400					$ 400
Contour Raking (Purchase equipment for student volunteers) (Mix seed and promote infiltration on fragile uplands near the " Y " Monument)	McLeod	$ 51	25	$ 1,275					$ 1,275

A2. Supplemental Land Treatments

Explanatory Signs (for public safety and control of entry into treatment areas) (will be made and installed by BYU)	Sign	$ 200	14	$ 2,800		5	$ 1,000		$ 3,800
Temporary Fence (installed)	Mile	$ 2,250	0.6	$ 1,350		0.1	$ 225		$ 1,575

Construct **Silt Fences** to trap sediment on private lands	100 feet	$ 100	-0-	-0-		(Example of the approximate costs for installing 100 Feet of Silt Fence by a Contractor)	-0-
Fill **Sand Bags** with Volunteer help to protect private lands	1,000 bags	$ 3,100	-0-	-0-		(Example of the approximate costs for filling 1,000 Sand Bags using local Volunteers)	-0-

B. Channel Treatments

N/A				-0-					-0-

C. Roads, Trails and Other Treatments

Re-Condition the Trail leading up to the " Y " Monument (Grade, shape, build drain dips and remove existing berm from outside edge of trail surface)	Mile	$ 3,850	0.95	$ 3,657		0.35	$ 1,347		$ 5,004
Purchase 6 " minus rock for armoring drain dips (3)	Cubic Yards	$ 15				95	$ 1,425		$ 1,425
Line Items	**Units**	**Unit Cost $**	**Number of Units**	**WFSU– SULT $**	**Other $**	**Number of Units**	**BYU $**	**EWP – Private $**	**Total $**
Install Water Bars on abandoned trail along the south side of Slide Canyon (Hand Crew … about 3 days)	Mile	$ 6,000	0.15	$ 900					$ 900

D. Structures or Ecosystem Management … Noxious Weeds

Eradicate existing populations of									

Dalmatian Toadflax to prevent a significant increase of this noxious weed following the recent burning disturbance	Job	$ 2,500	1	$ 2,500					$ 2,500

E. Initial and Interim BAER Evaluations / Monitoring / Administrative Support Services

FS … BAER Team (Survey & Initial Report)	Day	$ 340	60	$ 20,400					$ 20,400
FS … BAER Team (Travel - 3 People)	Day	$ 110	28	$ 3,080					$ 3,080
FS … BAER Team Helicopter Flights									
Bell 205 (Type II)	Hour	$ 824	3.5	$ 2,884					$ 2,884
A-Star (Type III)	Hour	$ 530	3.0	$ 1,590					$ 1,590
Technical Support Services for BAER Implementation	Day	$ 250	30	$ 7,500					$ 7,500
FS … BAER Supplies	Misc.	$ 875	1	$ 875					$ 875
FS … Implementation and Effectiveness Monitoring (3)									
1) Soil & Water	1st Year	$ 6,525	1	$ 6,525					$ 6,525
2) Erosion Control Seeding	1st Year	$ 2,000	1	$ 2,000					$ 2,000
3) Noxious Weeds	1st Year	$ 420	1	$ 420					$ 420
F. TOTALS				**$ 112,715**	**-0-**		**$ 6,773**	**$**	**$ 119,488**

Y - Mountain BAER fund code … H48096

(**NOTE**) – The quantities and locations of using either Silt Fences or Sand Bags would be determined by a survey conducted by the USDA – NRCS in cooperation with Provo City; the actual needs, if any, would be determined by their on-going survey effort. The entries displayed in the above financial table were simply intended to list " examples " as to how much these supplemental land treatments would be expected to cost on a per unit basis.

PART 7 … APPROVALS

1. **Forest Supervisor:** _____ **Date:** _____

2. **Regional Forester:** _____ **Date:** _____

NARRATIVES … SPECIALIST REPORTS

INTRODUCTION

The Y - Mountain Fire is believed to be a human caused event; the investigation of this burn remains pending at this time. It was reported on July 21st, 2001 at 1830 and consumed approximately 437 acres of the Uinta National Forest and 24 acres of private lands in the Slide Canyon area east of Provo, Utah. Dave Goodin was the Incident Commander for the Type 3 Overhead Team assigned to this fire. The point of origin was located South of the mouth of Slide Canyon on National Forest System lands from whence it only took a few hours to crest up to the top of the surrounding ridgetops.

While the residents of Provo watched the flames burn across the hillside and around the " Y " monument, the main goal of the firefighters was to protect the nearby structures and residents of the community. The " Y "marker, the established and recognized symbol for Brigham Young University, is located on Pleasant Grove Ranger District and authorized under a Special Use Permit.

Although the fire incident was declared " contained " on July 24th, 2001 at 1800, it is … and remains, officially uncontrolled as of 07-31-2001.

(Kathleen Twitchell, Realty Specialist)

FIRE INTENSITY ZONES

The Uinta NF / BAER Team worked as a cohesive unit to determine the contrasting fire intensity zones occurring within the perimeter of the Y - Mountain Fire Incident. We utilized aerial reconnaissance flights with both Type II (Bell 205) and Type III helicopters (A-Star) along with on-the-ground sampling to observe site indicators such as 1) depth and color of ashes; 2) size and amount of live fuels consumed; 3) organic litter consumption; 4) condition of plant root crowns; 5) soil crusting and 6) the degree and class of water repellency existing within the topsoil. Keep in mind, the accurate mapping of fire intensity is a critical step in the survey of the burned area because … it determines the overall potential for flooding along with the specific flood source sites occurring within the fire perimeter. The term FIRE INTENSITY refers to the fire's effect on the watershed -- not necessarily on its intensity as determined by overall flame height, canopy consumption or rate-of-spread. It's important to understand that the correct identification of fire intensity remains " the key measure " concerning the severity of a particular burn and strongly implies its related impacts upon the surrounding ecosystem.

Fire Intensity Zones according to Land Ownership

(Y - Mountain Fire Incident)

< ---------- (acres) ---------- >

	Unburned / Low	Moderate	High	Totals
♦ **FS**	**284**	**81**	**72**	**437**
♦ **BLM**	**- 0 -**	**- 0 -**	**- 0 -**	**- 0 -**
♦ **State of Utah**	**-0-**	**-0-**	**-0-**	**-0-**
♦ **Private**	**15**	**9**	**-0-**	**24**
♦ **Totals**	**299**	**90**	**72**	**461**

MAPPING FIRE INTENSITY ZONES ... Map fire intensity as high, moderate or low for each contrasting zone. An efficient strategy is to sample sites on-the-ground that were initially estimated during reconnaissance flights as being within the different classes. Fire intensity zones may cross watershed boundaries, vegetation types and topographic features.

1. LOW FIRE INTENSITY. A zone may be rated as a low intensity burn if the site factors indicate a moderate or low intensity on the entire area. Often, areas of low burn intensity do not contribute to an emergency watershed condition and they may act as buffer area to moderate flooding hazards that originate on more intensively burned sites. In addition, the information may be useful later in developing treatment strategies.

2. MODERATE FIRE INTENSITY. A zone may be rated as a moderate intensity burn area if the site factors indicating a high intensity burn are found on less than 40 percent of the total area. The rating of moderate fire intensity alerts the team to the possibility that the designated zone may be a potential flood source area. The zone should be further surveyed for water-repellent soil conditions or other indications that it may yield abnormally high overland runoff.

3. HIGH FIRE INTENSITY. A zone should be rated as a high intensity burned-area if the site factors indicating high intensity burn are found on 40 percent or more of the area. This would also designate the area as a potential flood source site for further investigation by the team.

WATER REPELLENT SOILS … Water-repellent soils can occur naturally. Burned-areas with high intensity fires of long residence times are candidates for intensified water-repellent conditions. In addition, soil texture, moisture content, plant communities and depth of litter also affect the development or degree of water-repellency as a result of the fire incident. Evaluate all areas with intensified water-repellent conditions resulting from the fire as potential flood source areas.

1. Degree of Water-Repellency. The degree of water-repellency is based on the amount of time required for the absorption of a drop of water on a dry soil surface:

    a. WEAK … Less than 10 seconds.

    b. MODERATE … Between 10 and 40 seconds.

    c. STRONG … Longer than 40 seconds.

2. Classes of Water-Repellency. Classes of water repellency are based on the following rating system:

    a. LOW … No strong repellency except at the immediate soil surface and no moderate repellency below ½ inch. Repellency is very spotty in occurrence.

    b. MEDIUM … Some moderate repellency below ½ inch, but no strong repellency below 1 inch.

    c. HIGH … Moderate repellency between 3 and 6 inches or strong repellency below 1 inch. The degree of repellency is uniform in extent.

(Michael D. Smith, Soil Scientist; Ken Burton, GIS Coordinator and Kathleen Twitchell, Reality Specialist)

GIS TECHNOLOGY

Y - Mountain Fire Incident / Interpretive Plots (19)

General Vicinity Map showing the Location of the recent Fire Incident
Detailed Vicinity Map with Topographic Coverage showing the recent Fire Incident
Digital Photograph showing the recent Fire Incident
Map of Land Ownership within the Fire Perimeter
Map of Fire Intensity Zones occurring within the Burned-Area
Vegetative Communities within the Fire Perimeter
Map of Geologic Formations within the Fire Perimeter
Soil Survey Map of the Fire Incident
Soil Suitability Ratings for Emergency Seeding Treatments within Disturbed Areas
6th - Field Subwatershed areas occurring within the Fire Perimeter
Hydrologic Groupings of the contrasting Soil Resources
Slope of the Upland Terrain occurring within the Fire Perimeter
Deer … Critical Winter Range Habitat
Mountain Goat … Habitat

Lynx … Habitat
Special-Use-Permits and Improvements occurring within the Fire Perimeter
Designated Roadless Areas occurring within the Fire Perimeter
Uinta NF / BAER Team - Recommendation for Initial Broadcast Seeding Treatment
Uinta NF / BAER Team – Recommendations and Suggestions for Emergency Treatments

(Ken Burton, GIS Coordinator and Michael D. Smith, Soil Scientist)

SOIL RESOURCES

All of the technical information and specific recommendations being presented in this brief specialist report have been linked with both the Soil Quality Standards and Guidelines for the Intermountain Region (R4 / SQS) along with both the existing and draft Land and Resource Management Plans (LRMP) for the Uinta National Forest. Keep in mind, the overall objective of Burned-Area Emergency Rehabilitation (BAER) is to initiate prompt action for the immediate rehabilitation of site disturbances following an incident of unwanted wildland fire. The specific purpose of this action is to 1) alleviate emergency conditions and thereby minimize threats to human life and property, 2) maintain long - term soil productivity on severely burned sites and 3) prevent permanent impairment of ecosystem structure and function by controlling water, sediment and debris movement – issues related to water quality. When prevention or mitigation type treatments are being recommended for a burned-area … the action needs to limit the potential effects of the site disturbance, to the extent practical, and remain in compliance with the local Forest / Land and Resource Management Plan.

- **USDA - FS / Intermountain Region … Soil Quality Standards and Guidelines**

The current direction contained in the R4 / SQS indicates that *" at least 85 % of the total acreage occurring within an activity area must have soil properties and site characteristics that remain in satisfactory condition; plans for projects where site disturbances that are expected to cause resource damage, which actually exceed the maximum allowable thresholds listed in the R4 / Soil Quality Standards, must include provisions for the timely mitigation of any ground disturbance. "* It should be noted, one of the site disturbances our R4 / SQS identifies is the impacts of SEVERE BURNING upon our fragile soil resources. In this particular instance, it really doesn't matter whether the source of ignition is natural, management-induced or a human caused event because …areas affected by severe burning (resulting in insufficient ground cover) would require emergency treatments to stabilize, rehabilitate and eventually restore the fire damaged landscapes.

- **Uinta National Forest … Management Direction / Goals and Objectives / Standards and Guidelines - Soil & Water Resources**

Forest Management Direction / Soils and Watershed … Develop plans for the protection and improvement of soil and water resources and the stabilization of deteriorated watershed land, giving emphasis to System and non-System roads. Include provisions for the restoration or

improvement of degraded wetlands, floodplains and riparian habitats. (LRMP, Uinta NF, p. 3-35, July, 1984)

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Forest Goal - Physical Environment / FW-Goal-1 … Soil, water and air resources provide for watershed health, public health and safety, ecosystem sustainability and meet applicable laws and regulations. (draft, LRMP, Uinta NF, p. 2-2, May 2001)

Forest Sub-Goal - Physical Environment / G-1-10 … The Forest coordinates and cooperates with other tribal, federal, state, county and city government agencies to mitigate, prepare for … and respond to all major natural disaster emergencies. (draft, Uinta NF, p. 2-3, May 2001)

Forest Objective - Physical Environment / O-1-6 … Maintain long - term soil productivity on 85 % of all activity areas. (draft, Uinta NF, p. 2-3, May 2001)

Soil and Water Resource Management / Guideline S&W-1 … Maintain or improve long - term soil productivity and hydrologic function by limiting activities that would cause a detrimental loss of ground cover, displacement, puddling and compaction on more than 15 % of the total activity area. (draft, LRMP, Uinta NF, p. 3-9, May 2001)

Soil and Water Resource Management / Guideline S&W-5 … Riprap or other erosion protection materials should be sufficient in size and placed in such a manner as to withstand peak flows comparable to a 100-year flood event. (draft, LRMP, Uinta NF, p. 3-9, May 2001)

Soil and Water Resource Management / Guideline S&W-10 … Avoid land use practices that reduce soil moisture effectiveness, increase erosion, cause invasion of exotic plants and reduce abundance and diversity of forbs in the long-run. (draft, LRMP, Uinta NF, p. 3-10, May 2001)

♦ **Site Characteristics … Slide Canyon Subwatershed**

Most of the contrasting land resources occurring within the perimeter of the Y – Mountain Fire Incident have evolved from a variety of mixed sedimentary and metamorphic rocks; specifically, these wildland soils were formed in alluvium, colluvium or residuum derived from limestone or quartzite and include a few distinct areas of soils with properties inherited from a secondary mineral named dolomite. According to the current Digital Elevation Models contained within the Uinta National Forest / Geographic Information System … landscape elevations are in the range from 5,240 to 8,528 feet within the burned-area. Digital files recently acquired from the Automated Geographic Reference Center / State Geographic Information Database and prepared by the Utah State University - Climatological Center indicate that mean annual precipitation is approximately 20 to 28 inches / year in the areas surrounding Y - Mountain and within Slide Canyon. The freeze-free season was determined to be about 70 to 110 days / year by the Natural Resources Conservation Service depending upon the aspect and landscape elevations. The dominant vegetative communities occurring prior to-the-burn consisted of spruce – fir, mixed conifer, curlleaf mountain mahogany, Gambel oak, Rocky Mountain Maple, mountain big

sagebrush, perennial grasses and a few annual grasses – in areas previously affected by incidents of unwanted wildland fires.

♦ **Soil Survey Mapping**

During the early 1980's, the Uinta National Forest prepared a Soil Survey Report for the staff of its Pleasant Grove Ranger District. In this technical manuscript, the Forest Service identified the following kinds of wildland soils as occurring within the Y - Mountain and lower Slide Canyon areas:

Aridic Calcixerolls	Typic Calcixerolls
Boralfic Argixerolls	Lithic Cryorthents
Typic Cryorthents	Pachic Calcixerolls
Calcic Argixerolls	Lithic Calcixerolls

(listed by a taxonomic classification which reflects the subgroup level of identification)

The mapping unit descriptions associated with this interim report indicated that most of the upland terrain occurring within the burned-area consisted of wildland soils that were considered to be renewable types of resources -- meaning sites that can be sustained or improved by applied resource management. The information displayed in this soil survey / land systems inventory report allowed the Uinta National Forest to prepare the following types of interpretive plots for this assessment using GIS technology:

USDA – FS / Soil Survey Map of the Fire Incident

Hydrologic Groupings of the contrasting Soil Resources occurring within the Burned-Area

Soil Suitability Ratings for conducting Emergency Seeding Treatments within Disturbed Sites

♦ **Fire Intensity Zones**

Keep in mind, the Y - Mountain / Fire Intensity Map identified several significant areas occurring within the burn that were affected by HIGH intensity fires; these sites were located within the Slide Canyon drainage and upon both the shoulderslopes and ridgetop areas of the Y - Mountain landscape. In addition, there were several areas disturbed by MODERATE intensity burns on steep to very steep terrain – potential flood source sites. Our BAER Team survey of the current conditions occurring on-the-ground within these specific areas strongly suggests … that site hydrologic function was affected by extreme fire temperatures. The infiltration and subsequent percolation of water will be restricted or prevented at these locations. In addition, there is insufficient protection at the ground surface in the form of surface litter and large woody debris to protect these sites from the dynamic splash associated with raindrop impact. The BAER Team is recommending that about 35 % of the total acreage occurring within the perimeter of the Y – Mountain Fire Incident -- meaning only its highly erodible landscapes, be re-seeded in order to maintain long-term site productivity. This action would reduce accelerated rates of erosion in the form of overland flows, rills and gullies from occurring on private and NFS lands. Specifically, our land treatment recommendations would amount to re-seeding about

153 acres of public lands administered by the Forest Service combined with treating another 9 acres of private lands managed by BYU in order to stabilize the surrounding hillsides. The Disturbed / WEPP Model suggests that soil erosion rates could approach 18.01 tons/acre/year in these areas during the next 12 months. It should be noted, all HIGH intensity burn sites are subject to potential flooding hazards. If these areas are left untreated … these disturbed sites will contribute additional erosion and sediment to other landscapes occurring within the burn-area – very possibly, resulting in continued threats to human life and property in Provo City, diminished water quality within Slide Creek and adverse impacts to long – term soil productivity.

♦ **Recommendations for Emergency Treatments**

The Uinta NF / BAER Team is strongly recommending that 2 applications of broadcast seeding be applied within the burned-area of the Y – Mountain Fire Incident. The initial seeding effort would consist of treating all MODERATE and HIGH fire intensity zones (162 acres) within the burn using both Slender Wheatgrass and Pioneer Grass. The specific purpose of this action would be to quickly re-vegetate all of the fire damaged hillsides occurring on moderately steep to very steep terrain. In this particular instance, the values-at-risk are such … that we want to stabilize as much of the burned-area as possible (right away) considering the close proximity of this disturbance to Provo City. FYI, both grass species are well adapted to getting established on upland landscapes disturbed by recent fire incidents. Once the initial phase of the seeding treatment is accomplished with these non-persistent and sterile type grasses, the Uinta Forest would then … broadcast another application of native seeds upon its highly erodible landscapes using mixes designed for both the low and high elevation areas (see GIS Treatment Map # 2). As the annual grasses established by the initial mix begin to dry-up on the hillside later in the fall, the slopes will have enough (temporary) vegetative cover on-site to actually anchor the native seeds in place in order to germinate the grasses the following spring season; in many ways, the debris left by the initial seeding treatment will behave much like a nurse crop for the establishment of the preferred native grass species. The intention of these seeding treatments is to get some protective vegetative ground cover and surface litter re-established on these fire damaged hillsides in order to minimize accelerated rates of erosion. In doing so … the treatments will minimize on-going threats to human life and property in Provo and sustain soil productivity on public lands.

(**NOTE**) – Contact the R4 / Fire, Aviation and Air Management Staff Group in Ogden, Utah to borrow one of their new seeding buckets when implementing these broadcast seeding treatments.

The purpose of the slashing treatment is to place some surface litter and large woody debris upon the steep to very steep fire-damaged ridgetop areas along the summit of Y - Mountain. Approximately 15 acres will be treated for erosion control in areas previously supporting non-commercial stands of spruce-fir trees. FYI, most of the terrain was considered too steep for either contour felling or the construction of log erosion barriers. The new accumulations of organic debris will provide some additional and necessary ground cover to these non-renewable type sites (Lithic Cryorthents) and serve to intercept summer rains – protecting the soils from the dynamic splash associated with raindrop impact. Overall … implementing this treatment will

limit accelerated soil erosion losses by limiting the detachment and transport of soil material within a HIGH fire intensity zone.

Most of the upland terrain located in close proximity to the " Y " monument has been impacted with constant recreational use by individual hikers, families, church groups and college students traveling up to the landmark for the past 91 years. According to Mr. Brian Eastman / Equipment Foreman at BYU … there are days when hundreds to thousands of people actually hike up to the " Y " monument to enjoy the surroundings and view of the valley. It should be noted, the university has been quite diligent in their attempts to stabilize, rehabilitate and restore the damaged watershed conditions occurring along the trail surface and upon the fragile lands surrounding the marker. **Simply stated … the recent fire incident is the type of site disturbance that will really aggravate the existing eroded conditions on the hillside**. Currently … much of the land surrounding the marker has been truncated by sheet, rill and gully type erosion. Past attempts to stabilize the soil resources upon the hillside have achieved marginal success; the area will continue to become severely eroded if emergency treatments are not implemented to address the loss of water control associated with the recent burning disturbance. The BAER Team is recommending the complete re-conditioning of the trail surface leading up to the monument; this action includes reshaping the trail surface, building or armoring drain dips, removing the existing berm – which currently concentrates water flows across the landscape along with installing enough temporary fence to control the movement of visitors traveling up to the well-known landmark. In addition, a series of explanatory signs would be placed along the trail surface and near the marker in order to educate visitors about the effects of wildfire and instructing them about BEING RESPONSIBLE as visitors to the Forest. Finally … this is an opportunity for the Forest Service and BYU to partner together in stabilizing our fire damaged landscapes. Every so often … BYU sponsor's what they call their Eco-Project Days. These outings enlist the services of local students as volunteers to assist in helping the university accomplish their outdoor projects having an environmental theme. Mr. Eastman suggested that the school would be very interested in having their students participate in working on erosion control projects related to protecting the soil resource near the " Y " monument. Some of the activities that could make use of the student volunteer's would include contour raking with McLeod's to mix seed into the topsoil and mix the horizons to minimize hydrophobic conditions along with the planting of shrubs to control erosion. Specifically … the students would assist with the transplanting of oakbrush to create a physical barrier which would discourage visitor's from leaving the established trail surface and walking cross-country up to the " Y " marker. In addition, it would include the planting of bare-root shrubs upon the landscape to control accelerated erosion losses associated with the burn. Basically … this is an excellent opportunity for the FS to work in cooperation with BYU to get some necessary land treatments accomplished in a timely manner.

Otherwise, the only remaining treatment being planned for the Y – Mountain Fire Incident would be to construct water bars along a 0.15 mile segment of abandoned trail located on the hillside just south of lower Slide Canyon. This task would probably take a crew of 3 individuals about 3 days to complete the necessary work. This action would assist in controlling the flow of water off the trail surface and prevent soil erosion from occurring upon the fire damaged hillside.

- **BAER Team … Survey and Initial Report**

The Uinta NF / BAER Team made a complete survey and corresponding assessment of the existing condition for all the lands occurring within the perimeter of the Y – Mountain Fire Incident. This report contains 1) recommended treatments on NFS lands and 2) suggested treatments for private landowners – meaning Brigham Young University in this particular instance. Our intention was simply to provide Federal, State and City government agencies, such as the NRCS, UDWR and Provo City with a detailed account of the fire incident along with an optional fire rehabilitation plan for them to review and perhaps implement if funding becomes available.

(Michael D. Smith, Soil Scientist)

GEOLOGIC HAZARDS - DEBRIS FLOWS

At your request I am providing my preliminary fire-related debris-flow and flooding hazard assessment for the Y - Mountain fire. I believe conditions exist for fire-related debris flows and flooding, and recommend implementing watershed protection measures. Based on my field reconnaissance with the Burned-Area Emergency Rehabilitation (BAER) team on July 26, 2001, and the geologic conditions in the burned areas, I conclude the following:

- Post-fire debris flows may be generated in the lower portion of Slide Canyon due to the loss of vegetation, hydrophobic soil conditions, erodible soils, and stored channel sediment.

- The abandoned Seven Peaks Golf Course and the stormwater runoff basin on the alluvial fan below Slide Canyon provide sufficient storage capacity to protect downstream development from debris-flow sediment deposition and floodwaters from Slide Canyon.

- The first switchback of the Y - Mountain trail and roads in lower Slide Canyon that cross the drainage may channel water causing erosion of the trail and/or roads.

- The small drainages on the west side of Y - Mountain north of Slide Canyon impacted by the fire have potential to produce fire-related debris flows and flooding that could impact houses and the Provo City stormwater system.

- In addition to the short-term debris-flow and flooding hazard from these small watersheds north of Slide Canyon associated with the Y - Mountain burn, a long-term debris-flow and flooding hazard from rapid snowmelt or intense rainfall exists.

Regarding the potential for fire-related debris flows and flooding from the Y - Mountain burned-area, I recommend the following:

- Measures should be taken to rehabilitate and establish vegetation in the burned drainages.

- For the homes and stormwater system below the smaller fire-impacted drainages on the

west side of Y - Mountain north of Slide Canyon, use the Natural Resource Conservation Service (NRCS) Emergency Watershed Protection (EWP) program to assess hazards, and, if necessary, provide funding and implement temporary measures to reduce transport of sediment into developed areas and route flows to minimize potential damages. The EWP program should also be used to address the potential trail and road erosion in lower Slide Canyon.

- The EWP measures are temporary and address only the short-term sediment and flooding behavior following a fire. Houses below these small watersheds remain exposed to long-term debris-flow and flooding hazards from surface-water runoff, and Provo City should consider how to permanently manage the long-term debris-flow and flood hazards from these drainages.

In summary, I believe the Seven Peaks Golf Course and the existing stormwater runoff basin likely provide protection from fire-related debris flows and flooding from Slide Canyon, but the fire-impacted smaller drainages on the west side of Y - Mountain north of Slide Canyon, have the potential to produce fire-related debris flows and flooding and cause damage to homes and the city stormwater system and should be addressed under the NRCS EWP. If you have any questions regarding this letter, please contact me (801-537-3351).

(Rich Giraud, Project Geologist)

RUNOFF AND STREAM SEDIMENTATION HAZARDS

6th Field Subwatershed Names & HUCs	Total Acreage occurring within the Subwatersheds	Amount of Subwatershed occurring within the burned-area	Amount of Subwatershed occurring within HIGH Intensity burn sites
Utah Valley (160202030306)	**35,555**	**0.9 %**	**0.2 %**

This report contains information on past, present and expected future hydrologic and watershed conditions for the catchments affected by the Y - Mountain Fire. The drainages impacted most significantly are Slide Canyon (a 2nd order drainage) and an unnamed tributary given the name Tributary 1 (a 1st order drainage) for this assessment. The map on the next page displays all of the watersheds analyzed. Most of the acreage within these catchments is located within the Uinta National Forest and the remainder is located on BYU and private property.

Sources of Information: Resource conditions resulting from the Y - Mountain Fire were reviewed in the field from July 25, 2001 through July 28, 2001. The BAER team made aerial reconnaissance flights and on-the-ground visits. From a hydrological standpoint, the main objectives for the field visits were to develop a fire intensity map, locate areas containing hydrophobic soils, inventory values-at-risk, review channel morphology and riparian conditions, inspect hill slope conditions, and determine needs for rehabilitation. Values-at-risk are items located within or downstream of the fire and subject to hazards caused by the burn. These hazards could include flooding, erosion, or sediment. Values-at-risk for the Y - Mountain Fire include:

- Residential and Commercial Developments (including 7 Peaks Water Resort),
- the Y - Mountain Trail,
- Power lines and Communications Towers,
- the Upper Union canals, and
- the 2002 Olympic Skating Rink.

Dale Deiter, Hydrologist, Fishlake National Forest and Chad Hermandorfer, Hydrologist, Uinta National Forest calculated important watershed parameters for the project using Geographic Information System (GIS), HYDRAIN (a flood frequency analysis program developed by the Federal Highway Administration), and Water Erosion Prediction Project (WEPP). Major parameters analyzed using GIS included landtypes, stream lengths, stream orders, watershed sizes, vegetative composition, land ownership, burn severity, soils and slope. An Excel spreadsheet was used to store, manipulate, and analyze the resulting water and sediment quantity data presented in this report. The spreadsheet also documents the data sources and assumptions used.

The HYDRAIN model (based on HEC-19) includes a rational method to estimate flood frequencies for intact to extremely disturbed or altered landscapes. Parameters in the model include watershed size; channel length and slope; hydrologic runoff group; acres and condition of the land (i.e. low, moderate, or high intensity burn); rainfall intensity and time of concentration; and slope length and gradient of the longest area in the watershed where overland flow will occur. HYDRAIN results are in the project file.

Potential accelerated erosion from the burned areas was estimated using Uinta National Forest erosion estimates contained in the Pleasant Grove Soil Survey, dated June 1981, and prepared by Carlos F. Lopez. The WEPP model http://www.forest.moscowfsl.wsu.edu/fswepp/ was also used for comparison. The WEPP model was developed by the Forest Service to generate erosion rates for disturbed forested areas. The model can be used to estimate the time necessary for a watershed to recover from a land disturbance such as fire. Parameters used in the WEPP model include precipitation, gradient, area, slope lengths, percent cover, and land conditions. Results from the modeling can be found within the Y - Mountain BAER report project file.

Water Features: All of the catchments affected by the Y - Mountain Fire are tributaries to the Great Basin. Water features within the fire are ephemeral and intermittent stream channels. No lakes or ponds are present, Upper Union canals are located on private lands below the fire. Slide Canyon is the only blue line stream delineated on USGS maps within the burned area. Approximately 0.5 miles of Slide Canyon was burned in the fire. Table 1 illustrates the miles of channel affected by each fire intensity class within the Y - Mountain Fire.

Table 1 - Miles of channel located within each fire intensity class.

Watershed Name	High	Moderate	Low	Unburned
	miles	Miles	miles	miles
Slide Canyon	0.0	0.1	0.4	2.1
Tributary 1	0.1	0.1	0.1	0.1
Tributary 2	0.05	0.0	0.05	0.2
Y Tributary	0.0	0.0	0.05	0.1
Tributary 3	0.0	0.03	0.0	0.3
Total	1.05	0.23	0.6	2.8

The following table displays the acres and percent burned within each of the analysis watersheds.

Table 2 – Acres and percent of each watershed burned by fire intensity class.

Watershed Name	High	High	Moderate	Moderate	Low	Low	Unburned	Unburned
	acres	%	Acres	%	acres	%	acres	%
Slide Canyon	70	9	50	6	69	9	596	76
Tributary 1	16	22	3	5	22	29	33	44
Tributary 2	1	1	8	9	43	45	43	45
Y Tributary	0	0	0.4	2	11	42	15	57
Tributary 3	0	0	7	9	0	0	72	91

Channel Morphology: The ephemeral channels within the fire perimeter are very steep, ranging from 49 to 67 percent slope. The unnamed tributaries are generally gullies or ancient debris flow paths that flow during isolated thunderstorms and quick snowmelt. These drainages typically carry fines and gravels with the potential to move and transport bigger material in larger events. These channels are checked at some locations by bedrock, but have fine sediment stored in-channel that could be bulked and excavated by a debris flow. These drainages terminate into alluvial fans. Much of the area and topography of the alluvial aprons have been affected by a variety of developments including roads, trails, and buildings. These developments make it extremely difficult to predict where floodwaters and sediment might travel. Further field evaluations of the most likely flow paths below Points A and B on the "Analysis Watershed"

map is warranted and recommended given the inherent risk, the new disturbance on the hillside, and the values-at-risk.

The Slide Canyon channel has an average slope of 29 percent. Within the fire perimeter the channel has frequent outcroppings of bedrock and very large boulders with negligible amounts of stored fine material that could be entrained in debris flows. However, the bottom 2 to 3 tenths of a mile of channel have material than could be mobilized by a debris flow. The abandoned 7 Peaks golf course is situated on a portion of the alluvial fan for Slide Canyon and "as is" can function as a detention structure for any water and sediment delivered during flood events. The 7 Peaks Water Resort and Olympic Skating Rink are located near the golf course. A partially plugged 18-inch culvert and the Upper Union irrigation canal are located at Point D on the "Analysis Watersheds" map. Based on the existing channel morphology and surrounding topography, there is a fairly high probability that any floods or sediment-laden water from Slide Canyon would flow to this point. This statement needs to be qualified by the fact that the Y - Mountain trail currently will intercept and redirect Slide Canyon flows upstream for at least one to two hundred feet at Point C on the "Analysis Watersheds" map. The highest road crossing of Slide Canyon (but below Point C) can also intercept flow. Point C and the crossing are recommended for reconditioning to prevent the trail and road from intercepting streamflow. At Point D there is also the possibility that the Upper Union canal would intercept either a portion or all of the flow from Slide Canyon. The capacity of the canal and down-canal values-at-risk should be assessed relative to the potential increases in peak flows. The canal flows to the south. The dikes may breach or be overtopped at any point after intercepting flood flows. This puts additional values below the canal at risk. If most or all of the water continues past Point D it will arrive at the golf course clubhouse (trailer) at Point E. At Point E the potential flow path could take a route into the "basin" of the main golf course or could flow behind the dike. Behind the dike, Point F could intercept water into a canal opening that emerges after being underground. The canal at Point F is likely connected with the canal at Point D at some point before crossing the Slide Canyon channel, but it appears to diverge after, so the capacity and down-channel values-at-risk for this canal should also be assessed. Given the inherent uncertainty of water flow and sediment deposition on any alluvial fan, and given the values-at-risk, further evaluation by the NRCS and the City of Provo is warranted and recommended.

Water Quantity: An analysis comparing pre-fire and post-fire water flow rates and volumes is shown in Table 3 and Table 4. The tables illustrate the predicted changes in flood magnitude that could potentially result from the altered hydrologic conditions created by the Y - Mountain Fire. The post-fire modeling results simulate site-conditions and intense thunderstorm flood potential for the first year following the fire, especially during calendar year 2001. Flood potential will decrease as soils re-vegetate, and as infiltration capacity and slope roughness are restored. Recovery of the strongly hydrophobic soils may take as long as 3 years. Each of the catchments shown on the "Analysis Watersheds" map was evaluated. Table 3 shows the pre-burn magnitudes and Table 4 shows the post-burn magnitudes for several flood return intervals. Point G on the "Analysis Watersheds" map is an example where water from cliffs and rock outcrops will quickly drain to the newly disturbed slopes below. The primary concerns with higher peak flows include increasing the natural potential for initiating debris flows (particularly in Tributary 1 and the lower portion of Slide Canyon), and increasing the potential for flooding buildings and improvements located down slope.

Table 3. – Flood Frequency for selected watersheds prior to the Y - Mountain Fire.

Watershed Name	Pre-fire 2 Year Return Interval Flood	Pre-fire 5 Year Return Interval Flood	Pre-fire 10 Year Return Interval Flood	Pre-fire 25 Year Return Interval Flood	Pre-Fire 50 Year Return Interval Flood	Pre-fire 100 Year Return Interval Flood
	cfs	cfs	cfs	cfs	cfs	cfs
Slide Canyon	16	21	26	29	33	39
Tributary 1	2	2	2	3	3	4
Tributary 2	2	3	3	4	4	5
Y Tributary	<1	<1	<1	<1	1	1
Tributary 3	2	2	3	3	3	4

Table 4. – Flood Frequency for selected watersheds after the Y - Mountain Fire.

Watershed Name	Post-fire 2 Year Return Interval Flood	Post-fire 5 Year Return Interval Flood	Post-fire 10 Year Return Interval Flood	Post-fire 25 Year Return Interval Flood	Post-Fire 50 Year Return Interval Flood	Post-fire 100 Year Return Interval Flood
	cfs	cfs	cfs	cfs	cfs	cfs
Slide Canyon	44	59	72	82	91	107
Tributary 1	10	13	16	18	20	24
Tributary 2	5	9	10	11	11	13
Y Tributary	<1	1	1	2	2	3
Tributary 3	3	4	4	5	5	6

Uinta National Forest Hydrologist Bob Gecy has developed two Maximum Flood Equations using as many as 48 gaged streams in Northern Utah. The equations are:

$$\text{Eq. 1: } Q_p = 170 * \text{Area}^{-0.388}$$

and

$$\text{Eq. 2: } Q_p = 205 * \text{Area}^{-0.355}$$

where, Q_p = cubic feet per second (cfs) per square mile
Area = square miles

These equations give estimates of the maximum probable flow you would expect based on data from the last 100-years. The equations are useful for estimating a "worse-case-scenario" based on historic conditions. However, it is important to realize that the data may or may not reflect all disturbances such as grazing, wildfire, fire suppression, road building, logging, and water

diversions. Table 5 shows the maximum probable floods for the selected watersheds within the Y - Mountain Fire.

Table 5. – Maximum probable floods for selected watersheds within the Y - Mountain Fire.

Watershed Name	Drainage Area	Maximum Flood Eq. 1	Maximum Flood Eq. 2
	square miles	cfs	cfs
Slide Canyon	1.23	193	234
Tributary 1	0.12	46	51
Tributary 2	0.15	53	60
Y Tributary	0.04	24	26
Tributary 3	0.12	47	53

Water Quality: There are no streams listed on the year 2000 State of Utah 303(d) Water Quality Limited list. There are no perennial streams within or downstream of the fire.

Erosion and Sedimentation: As mentioned previously, the Forest Service Land System Inventory (LSI) data and WEPP model were used to estimate accelerated erosion from the burned sites within the analysis watersheds affected by the Y - Mountain Fire. It is important to note that these are estimates primarily of surface erosion and do not include the erosion potential from mass failures such as debris avalanches or debris flows.

Based on both modeling efforts, it is estimated that soil erosion should return to pre-fire conditions in approximately 3 to 5 years. Tables 6 and 7 show the estimated erosion for the analysis watersheds within the Y - Mountain burn. The numbers in Tables 6 and 7 have two entries per year per watershed. The top numbers are based on erosion estimates contained in the Pleasant Grove Soil Survey (1981) and the bottom numbers are from WEPP.

Table 6. – Estimated erosion rates from the Y - Mountain Fire (LSI top, WEPP bottom).

Watershed Name	Year 1 Total Estimated Erosion	Year 2 Total Estimated Erosion	Year 3 Total Estimated Erosion	Year 4 Total Estimated Erosion
	tons/ac/yr	tons/ac/yr	tons/ac/yr	tons/ac/yr

Slide Canyon	10.19	3.14	1.57	0.78
	19.66	5.59	2.19	0.0
Tributary 1	26.99	10.93	5.46	2.73
	19.07	5.22	2.04	0.0
Tributary 2	18.57	2.99	1.50	0.75
	12.80	1.26	0.49	0.0
Y Tributary	10.13	0.14	0.07	0.03
	11.16	0.22	0.09	0.0
Tributary 3	34.45	17.22	8.61	4.31
	20.44	6.09	2.38	0.0
Total Area Weighted Average for Burned Sites	15.25	4.75	2.38	1.19
	18.01	4.55	1.78	0.0

Table 7. – Estimated erosion rates from the Y - Mountain Fire (LSI top, WEPP bottom).

Watershed Name	Year 1 Total Estimated Erosion	Year 2 Total Estimated Erosion	Year 3 Total Estimated Erosion	Year 4 Total Estimated Erosion
	tons	tons	tons	tons
Slide Canyon	1777	548	274	137
	3430	975	382	0
Tributary 1	1120	453	227	113
	791	217	85	0
Tributary 2	969	156	78	39
	668	66	26	0
Y Tributary	111	1	1	0
	123	2	1	0
Tributary 3	234	117	59	29
	139	41	16	0
Total Tons from Burned Sites	4211	1275	639	318
	5151	1301	510	0

The sediment modeling shows that the highest severity burns produce substantially more erosion than the less severe burns. This will be taken into consideration when addressing treatment needed for the Y - Mountain Fire. It is estimated that the Y - Mountain Fire will produce an estimated 7,285 to 7,586 tons of erosion over the next 4 years (including face drainages outside of the analysis watersheds). It is also assumed that 35 % of the erosion will be delivered to channels as sediment. The initial erosion of ash and surface soil during the first storm(s) will reduce slope roughness by filling in depressions above rocks, logs, and any remaining vegetation. The ability of the burned slopes to detain water and sediment will be reduced accordingly. This will add to the "flashy" runoff caused solely by hydrophobic soils and will increase the distance that eroded materials are transported. Point H on the "Analysis

Watersheds" map has naturally high amounts of dry-ravel and rock-fall. This slope is a likely source area for shallow seated debris avalanches that will reach Slide Canyon if they occur. The high elevation, high intensity polygons that were covered by conifers prior to the fire will have a substantial loss in rooting strength for the next 3 to 5 years. During this period, shallow or perhaps deeper seated mass failures will have a higher than normal likelihood of occurring. Fortunately, the prevalent bedrock and large boulders are inherently resistant to scour and provide significant amounts of channel roughness and storage that would substantially dissipate potential downstream effects. The most probable sediment concern for values-at-risk would be that of turbid, sediment-laden water being delivered with floodwaters. For the next year, the potential for debris flows is elevated (to at least a small degree) above natural probabilities. However, if debris flows were to occur, most of the energy and volume of sediment would be deposited upslope of Points A, B, and D due to the sudden decrease in slope near the valley bottom and due to the amount of slope distance before reaching the values-at-risk. Rock falls may also be slightly more frequent for a short period of time if any large rocks were partially or entirely held in place by organic matter that is now burned and gone.

Recommendations

The following recommendations are made to reduce or prevent immediate threats to human life and property, and soil and water resources within and below the Y - Mountain Fire:

- The NRCS and the City of Provo should evaluate the potential paths that water and sediment will take below Points A, B, and D on the "Analysis Watersheds" map if a flood event were to occur. This includes determining if and how the canals at Points D and F might intercept flows and put additional values at-risk. In the short-term, there may be locations below Points A, B, and D that could be protected by detainment structures such as temporary silt fences or sandbags. The potential for debris flows and floods are long-term concerns that currently have everyone's attention because these events may be more likely to occur for the next year or so until slope conditions within the Y - Mountain Fire begin to return to normal. The preferred solution is to determine the best way to mitigate for these potential hazards in the long term, not just in response to this fire.

- Given the values-at-risk, immediate seeding with a sterilized, non-persistent, hybrid species like "Pioneer" should be considered to initiate soil stabilization. The intent of this treatment is to hold the soil on-site in the short-term, and to function as a nurse crop for the native seeding that will occur in the fall. Immediate seeding is recommended for all high intensity polygons and within the moderate severity polygons on the west slopes facing Provo. The fall native plant seeding is recommended for all high intensity polygons, plus the moderate severity polygons in Slide Canyon, around the Y - Mountain trail, and in Tributary 2.

- The Y - Mountain trail currently intercepts, concentrates, and reroutes surface runoff causing down slope erosion once the water finds a path off of the trail (often at switchbacks). The slope surrounding the trail burned with moderate intensity so there is higher than normal potential for overland flow and accelerated erosion. In addition, the bottom switchback at Slide Canyon can directly intercept and redirect channel flow. Reconditioning this trail will primarily involve improving the cross drainage by outsloping the trail (with a 2 to 3 percent

outslope); adding excavated water bars every 50 feet; placing water and debris rolling dips on a 250 foot spacing; and reconfiguring the bottom switchback to allow passage and prevent diversion of channel flows in Slide Canyon. The intent of these treatments is to prevent concentration of water by the trail that could cause damaging and unsightly erosion. The outsloping will promote dispersion of water down slope and will remove the berm that keeps water flowing down the tread for much of the trail length. The berm material can be placed against the bottom of the cutslope as part of the outsloping process. Water bars and dips are needed because the trail gradient is much steeper than the planned 2 to 3 percent outslope. The water bars need to be skewed and excavated to a depth that allows water to be drained off the trail at the same gradient as where the water is intercepted. This allows the water bars to be self-maintaining. An alternative is to use conical shaped dips instead of water bars, which might be preferable for foot travel. The tip of the dip is placed near the base of the cutslope and constructed perpendicular or skewed relative to the trail tread. The larger rolling dips are intended to assure that water is drained off of the trail even if the water bars or other diversion structures become ineffective. A Forest Service hydrologist or hydrotech will assist with the design and placement of these structures. Effects of the diversion structures to foot travel and ATV travel must be factored into the project design. The switchback at Slide Canyon needs to be reconfigured by removing the fill from the channel, by outsloping and armoring the switchback, and by constructing an armored dip just below the switchback to prevent the trail from diverting channeled flow. The outlet of the armored dip must also be armored so that any intercepted flows can safely be routed back to the channel.

- Signing and temporary fences on the Y - Mountain trail are recommended for public safety regarding potential flood hazards. The signs will also educate the public about the importance of staying on the trail to protect soils and promote vegetative recovery following the fire. There are sites where the natural vegetation prevented people from leaving the trail prior to the fire. Temporary fencing will help discourage off trail use until the vegetation can become reestablished. Vegetative plantings may also be used to discourage off trail use.

- There are two channel crossings on BYU property near the bottom of Slide Canyon that need reshaping so they do not fail or redirect flows that could result from intense thunderstorms on the burned hillside. These 2 sites are displayed on the "Recommended Treatments" map for the Y - Mountain trail included in the BAER report. One site is a crossing of the main channel of Slide Canyon. Both sites need armored dips constructed. The design needs to eliminate the potential for these roads to divert channeled flow down the prism.

- There is an abandoned trail on the south side of Slide Canyon about 150 feet to the south of Point C on the "Analysis Watersheds" map. This trail concentrates surface runoff for about 1000 feet and is situated below 60 to 80 percent slopes that burned with high and moderate intensities. It is recommended that this trail be water barred on a maximum 50-foot spacing to prevent concentrated runoff and gully erosion, which could quickly and efficiently be delivered to the Slide Canyon channel. Due to the narrow width of the trail and difficult access, this work will need to be done by hand crews.

(Dale Deiter and Chad Hermandorfer, Hydrologists)

AERIAL SEEDING TREATMENTS

Aerial seeding is a useful tool which can help stabilize soil, control water movement, and restore ecosystem function. Seeding in the area of the Y - Mountain fire will aid in achieving these goals. The species included in the mix will provide both short and long term soil stability. They help to prevent permanent damage to the ecosystem from soil loss or invasion by weedy species such as cheatgrass and Dalmatian toadflax. The BAER team feels that seeding high intensity burned areas with Pioneer, a sterile hybrid, and slender wheatgrass may help to prevent debris and water flow into the basin. This mix will be followed by a native mix of grasses, forbs, and shrubs in the late fall which should become established the following spring. In areas where runoff occurs from the Y – Mountain trail bare root stalk will be planted to establish cover and prevent continuing erosion. Bare root stalk will be more effective than seed because it has a better survival rate, and it should help heal the gullies on the hill.

The Utah Division of Wildlife Resources was contacted as a potential source of seed. They were unable to provide any seed for this fire.

Native or Introduced	Grass & Forb Species	Seed Mix # 1 Low (16” – 20 ” precipitation)	Seed Mix # 2 Mid (20” – 24 ” precipitation)
		< ---------- Pounds / Acre (PLS) ---------- >	
N	Bluebunch wheatgrass	4	3
N	Slender wheatgrass	3	3
N	Blue wildrye	3	2.5
N	Muttongrass	.25	.5
N	Mountain brome		2
N	Western yarrow	.5	.5
N	Firecracker penstemon	.25	
N	Louisiana wormwood	.25	.25
N	Utah sweet vetch	.5	
N	Lewis flax	.5	
N	Silvery lupine		.25
N	Wasatch penstemon (STA)		.25
N	Showy goldeneye		.25
N	Mtn. Big sagebrush	.5	.25
N	Whitestem rabbitbrush	.5	.25
N	Cliffrose	.25	

N	Antelope bitterbrush	.25	
N	Curlleaf mtn. mahogany		.25
N	Snowberry		.5

Total Pounds / Acre	13.75	13.75
Total Seeds / Ft² *	68.1	63.6
Estimated Seed Cost / Acre	$169.15	$183.10
Estimated Cost Seed Mix / Pound	$12.30	$13.46

* Only a ¼ of the seeds / acre of species with more than 1,000,000 seeds per pound were included in the calculation of seeds per square foot as they are lighter and more likely to be distributed outside of the treatment areas when seeding with helicopters. They are an essential ingredient in the mix in order to provide stability.

(STA) is Subject to Availability. In the case that it is not available then a native species of equal or lesser price may be substituted with permission from the District Ranger.

	Seed Mix # 1	Seed Mix # 2
Estimated Cost / Acre (includes seed and helicopter)	$ 185	$ 199

(Tamara Heaton, Biological Technician)

VISUAL QUALITY

This report examines the effect of the Y - Mountain Fire to visual quality and recommends subsequent mitigation. This fire, which is believed to be human-caused, occurred on the eastern face of Y - Mountain, which is an important part of the Utah Valley viewshed. The total acreage altered or damaged is 461 acres, of which 72 acres burned at high intensity, 90 acres at moderate intensity and 299 acres at low intensity.

The Forest Service is concerned about present and future visual effects associated with this fire, particularly those which may adversely impact views from the 2002 Olympic Venue located at 7 Peaks, nearby homes, important travel corridors or other sensitive view points.

Accordingly, Kevin Draper/Forest Landscape Architect from the Uinta National Forest Supervisor's Office was assigned as a member of the initial BAER Team to address this issue.

RELEVANT FOREST PLAN DIRECTION

As inventoried during the 1984 Forest Planning process, the burn lies entirely within an area determined at that time to be in Retention. The Y Monument itself approximates the boundary

between the northern half of the burned area inventoried as Mg1A and the southern half inventoried as Fg1A. As with most of the Forest, Visual Quality Objectives (VQOs) were never formally adopted or assigned for this area. However, the 1984 Uinta Forest Plan (LMP) is presently under revision and the preferred alternatives (B and D) in the Draft Environmental Impact Statement (DEIS) both assign a VQO of Retention to foreground and middleground views along this portion of the Wasatch Front. This is consistent with the initial Visual Management System (VMS) inventory performed during the time of the existing Uinta National Forest's LMP.

Under the VQO of Retention, management activities may only repeat form, line, color and texture, which are frequently found in the characteristic landscape. Changes should not be evident to the casual forest visitor, and all retention activities to restore the area to a naturally appearing condition should be accomplished either during the operation or immediately after. **More simply; the VQO of Retention does not allow human-caused change that would be noticeable to the casual forest visitor.**

Typically, more stringent VQOs (such as retention) are incorporated to protect the most highly visible and most frequently seen areas that have the greatest amount of variety in vegetation and other features which occur naturally.

The term VQO refers to the degree of acceptable visual alteration of the landscape and is defined as follows: A desired level of scenic excellence based on physical and sociological characteristics of an area. These long-term VQOs or goals are based on a large-scale visual inventory and management process called the VMS, which has been used by National Forests for the past 25 years. Although inherently subjective, the VMS framework facilitates the attainment of subtle, yet very important aesthetic goals, while balancing other equally important resource needs.

Scenery is a very important natural resource and recreational element on the Forest, particularly along the Wasatch Front. It is primarily through their visual sense that most visitors perceive the Forest and its interrelated components. Part of the public appeal of the landscape found in this area stems from the viewing opportunities associated with Y - Mountain and its surroundings.

PRE-FIRE CONDITIONS

The primary character of the area within the limits of the burn is best described as oak-maple chaparral. There are some interspersed trees, i.e., conifers, Stansbury cliffrose, and Curlleaf mountain mahogany at higher elevations. The lower elevation slopes are largely covered with grass species. This mosaic of vegetation and the positive effect to scenery it adds are very important to nearby communities and the overall recreation experience. Rock escarpments or outcrops are a major component of the landscape. The steep mountain brush covered side slopes form a dramatic backdrop, particularly while in brilliant autumn color. One man-made feature known as the Y Monument dominates the landscape, and other evidence of human modification in the form of roads, trails, fences, gates and signs are apparent. Topsoils appear to be generally shallow and when eroded or otherwise removed expose a contrasting mineral layer of yellow-tan color.

In addition to viewing Y - Mountain itself, whether as a scenic backdrop or when the "Y" is sometimes lighted at night, other recreation--primarily in the form of hiking is common in this area.

POST-FIRE CONDITIONS

This human-caused burn greatly increased the visual evidence of the access road leading to the Y Monument. Due to the attributes of line, relative scale and contrasting color; this access road with its switchbacks and now more-exposed cuts and fills has approached dominance in foreground and middleground views. To a lesser extent, the same is true for other established trails now readily apparent on this mountain face. Of particular concern is the increased visual evidence of user developed "short-cut" trails that run more vertically down the mountain, which also serve as erosion channels.

It is anticipated that these contrasting lines and associated cut and fill slopes resulting from the benching for the access road will remain very evident and in some cases dominant, until successfully mitigated. It is anticipated that most linear elements except for the access road could be fully subordinate, and much less evident, after successful completion of obliteration and appropriate restoration/re-vegetation.

Trees that burned at high intensity can also have adverse visual effect by reducing scenic variety, and from silhouetting, particularly for those located at the skyline or set against a background of snow.

Most burns similar to this one have been found to impact scenic quality in the short-term. However, with appropriate mitigation, e.g., removal of certain trees in silhouette; scenic beauty can be enhanced. This coincides with the recovery of vegetation, even within the period of a few years (Rosenberger and Smith, 1998). While an understory of grasses, forbs and shrubs will begin to have positive effects within a year, conifers take a longer time to regenerate. Whether in shade or full sun, these trees only grow to four or five feet in about 20 years (Brunswick, 1998).

At certain times of the day the burn itself is presently evident in background views (especially terminal views) as seen from major travel corridors, vantage points, etc. In views where the burn is not screened by topography or in associated shadow, some areas are temporarily discernible due to relative scale, contrast and elevated location. However within a relatively short period of time it is anticipated that in background views, the burned area would not be very noticeable, even without mitigation. This is especially the case given the many rock outcrops and natural shadows found in this and other associated viewsheds.

It should also be noted that fires (including those which are human-caused) are most often perceived as natural phenomena, and while, to some, they may diminish scenic quality in the short term, their presence does not unduly affect recreation experiences (Love and Watson, 1992). Mass media coverage and government explanations of large, high-intensity unwanted wildland fires and ecosystem function have partially changed the general public's perception regarding the role of fire relative to forested ecosystems (Parfit, 1996). While studies show that people still prefer recreating in a vigorous vegetated landscape to one which has experienced a recent fire (Love and Watson, 1992), people also have gained an appreciation for natural processes.

In general, mitigating steps should be taken where practical to reduce or ameliorate aesthetic impacts associated with this man-caused burn, especially those that serve to assist other resource values or concerns. When considering such mitigation, visual variables that typically need to be addressed are: Distance from the viewer; angle of view; duration of the view; relative scale of the burn; whether or not burned trees will be in silhouette, and if so, is the background sky or vegetation, etc. An on-the-ground analysis, which considered these visual variables from a variety of viewpoints or travel corridors germane to the affected area was done to best provide for appropriate mitigation.

Recommendations to diminish contrasts of form, line, color, or texture are listed below:

- Stabilize unwanted trails by contour raking as deeply as possible, re-contouring where appropriate and seeding with approved native species consistent with surrounding vegetation. If topography does not provide an adequate screen for necessary trails, use vegetative cover to diminish visual effect, particularly on the lee or fill-slope side. In addition to proper species selection, care must be taken not to remove or overly establish vegetation so as to cause an unnatural contrast in texture (including under snow condition). Attention must also be given to color, particularly at different seasons of the year. It is best to provide a vegetative background that is effective during all year, which can be facilitated by using evergreen species native to this general area. Treatment to prevent disease and insect infestation should be employed as necessary to retain as many healthy trees as possible. Similar treatment should be prescribed for plants that assist in re-vegetating or screening undesirable trails.

  Recommended species to be used for this purpose are:

  Antelope bitterbrush
  Cliffrose

Curlleaf mountain mahogany
Gambel oak
Mountain big sagebrush
Rocky - Mountain maple
Squawbush.

- Unnecessary trails should be vegetated as soon as possible. Contrast from such scarring is typically evident at all distance zones. Shadow effect from larger shrubs, etc., assists in texture and darkens color. Visual impacts related to color are very apparent, particularly when in linear form or at a location where terrain meets blue sky, which normally allows for the strongest color-value contrast. Trail surfacing should match or blend as much as possible with adjacent soil color, rock formations, etc.

- Silhouetted trees (particularly dead ones) are highly visible, and from more viewpoints and at a greater distance. The apparent size and associated contrast of any vertical form on a horizon line is typically exaggerated, especially when set against a clear blue sky. Similar effect is true of blackened trees set against a background of snow.

  The removal of selected trees that stand out on the skyline on an exposed visual edge or rim would be beneficial. However, it is not reasonable to remove all dead trees. Of practical benefit would be the accelerated establishment of vegetation on the slopes underneath or behind the remaining burned trees. With distance, the natural color and texture tends to show through the frame of the trees and causes them to largely disappear. Of particular concern during the 2002 Olympics is blackened trees set against a background of snow, which may stand out in both foreground and middleground views unless removed.

- Where practical, trail obliteration or closure activities should use natural materials in lieu of steel gates, wire fences and other man-made structures. Broken sections of logs, rock, etc. could be scattered randomly on obliterated sections to break up the line of the trail and prevent perpetuation of linear feature in the landscape by primarily human or possibly some game animal trailing. If any boulders are used as barriers, they should be partially buried and arranged so as to appear natural.

- Trail width, curve widening, and associated cuts or fills should be the minimum needed for the proposed use—particularly at less vegetatively or topographically screened areas on steeper slopes. Any silhouetting of cuts, barriers or signage should be avoided. Silhouetted, more geometric development is highly visible and often appears exaggerated in size, especially against a clear blue sky. An unnatural feature set on a horizon line may be particularly apparent, and from more viewpoints and at a greater distance.

- Signage associated with the road should be kept to an appropriate minimum; in size, quantity, color, reflectivity and should fit within the context of the surrounding landscape.

- Surfaces of culverts, gates, fences, etc., should be of a color and finish so as not to reflect sunlight and to minimize visibility. Fifteen percent gray, painted surfaces are preferred; with a suitable alternative being acid etched galvanized coatings. Visual impacts related to color are very apparent. Particularly at a location where terrain meets the sky, which normally exhibits the strongest color-value contrast.

- Finally, it is important to provide for interpretation/explanation by using appropriate signage. This is a good opportunity for educating the public on the benefits of fire, which as discussed earlier, serves to ameliorate scenic impact in the public's eye.

SUMMARY

Regardless of the potential for obtrusive effect, the public's aesthetic expectations need to be taken into account. Linear features or soil scars by their very nature are characteristically in conflicting juxtaposition to the visual elements that define or ground one within a Forest landscape. If insensitively applied, some fire control measures and associated mitigation might conspicuously advertise human-caused change, resulting in a marked degradation of environmental grounding or sense of place. This is especially true of effects from unnatural line or silhouette in the landscape.

If properly applied, steps to restore a burned area should not only minimize visual impacts but additionally can enhance scenic, as well as other resource values.

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(Kevin Draper, Landscape Architect)

WILDLIFE HABITAT AND WINTER RANGE

Vegetation within the fire perimeter consists of Gambel oak, curlleaf mountain mahogany, Stansbury cliffrose, conifer, and a variety of shrubs, grasses and forbs. There is an existing trail through the burned area that leads to the Y Monument and continues up Slide Canyon. Trail users and game on the mountain have created many other trails. Three previous fires have burned in close proximity to the Y - Mountain Fire.

The Y - Mountain Fire burned areas of critical and high winter range for deer along the Wasatch Front. Rocky - Mountain goat and bighorn sheep winter habitat was also burned, though it is not considered critical or high value winter range for these species. Bighorn sheep were released in Rock Canyon 1 ½ miles north of the burn area. Migratory birds and resident bird species continue to use this area. New sprouts of Gambel oak and other shrub species would increase forage and cover within the burn for small mammals and birds. Tree snags would attract cavity nesters and may increase insects for foraging.

RELEVANT FOREST PLAN DIRECTION

Current Forest Service management objectives for the Uinta National Forest (1984 Uinta National Forest Land and Resource Management Plan. p 3-160) are to give emphasis to winter range, riparian zones, reproduction areas and aquatic systems. Intensive habitat management will be accomplished to maintain or improve habitat for all management indicator species, which includes deer and peregrine falcons (1984 Plan. p 4-3).

RECOMMENDATION

Initial seeding with Pioneer grass and Slender wheatgrass would improve soil stability allowing better retention of native species. Seeding with native grasses and shrubs would improve deer, bighorn sheep, and mountain goat winter range that burned at high and moderate intensities. Native plant seeding would help prevent the invasion of noxious weeds and promote the regrowth of browse species damaged by moderate intensity burns. Low elevation and high elevation seed mixes would be used for the different habitat types. Slashing would provide additional ground cover and denning sites for small mammals. Keeping trail users to the main trail up to the Y Monument and through Slide Canyon would help the area to recover.

(Antoinette Sitting Up, Wildlife Biologist)

TES / PLANTS AND ANIMALS

Threatened, Endangered, and Proposed Species

The threatened (T) and endangered (E) species list for Utah County includes the following animal and plant species: bald eagle (T) (*Haliaeetus leucocephalus*), Canada lynx (T) (*Lynx Canadensis*), June sucker (E) (*Chasmisted liorus*), Utah valvata snail (E) (*Valvata utahensis),*clay phacelia (E) (*Phacelia argillacea*), Ute ladies'-tresses (T) (*Spiranthes diluvialis*), and Deseret milkvetch (T) (*Astragalus deserticus*).

Bald eagle
There is no wintering or nesting habitat within Slide Canyon. Their winter habitat is usually by lakes, streams or rivers for feeding. There are 2-3 nesting pairs in the state, none of which occurs on the Uinta National Forest. The Y - Mountain Fire and rehabilitation should have no effect on the species.

Canada Lynx
The lynx require boreal forest habitat of both typical old-growth and an early successional structure, relying heavily on snowshoe hare as prey. Lynx Analysis Units (LAU) was identified with guidance from the Fish and Wildlife Service, on the north end of the Heber Ranger District. These areas are considered potential primary habitat; anything outside the units is potential secondary habitat. There is secondary habitat within the fire boundary, due to the vegetation type (spruce-fir). This area may be avoided by lynx, due to the close proximity to the city, high recreation use, and lack of snow pack. The LAUs are not within the Y - Mountain Fire boundary. The last verified records of lynx from Utah were in 1977 for physical remains and 1982 for tracks. The Y - Mountain Fire and rehabilitation should have no effects to the species.

June Sucker
This species is endemic to Utah Lake and uses streams flowing into the lake for spawning. It is believed to have become extirpated from the lake. The Y - Mountain Fire and rehabilitation should have no effects to the species.

Utah valvata snail
The only known populations of the Utah valvata snail were in Utah Lake. The snail is now thought to be extinct. The Y - Mountain Fire should have no effects to the species.

Clay Phacelia
Clay phacelia is found in pinyon-juniper and mountain brush communities on sparsely vegetated slopes of the Green River Shale Formation at about 6,600 feet elevation. It is endemic to upper Spanish Fork Canyon in Utah County and is known from less than a half-dozen sites, all of which are in the main Soldier Creek corridor, above the confluence with Sheep Creek. The Y - Mountain Fire and rehabilitation should have no effects to the species.

Ute Ladies'-tresses
Ute ladies' tresses occur along streams, bogs, and open seepage areas in the 4,000 to 6,800 feet elevations in cottonwood, tamarix, willow and pinyon-juniper communities. This species occurs

in the Diamond Fork Drainage approximately 12 miles southeast of the fire. The Y - Mountain Fire and rehabilitation should have no effects to the species.

Deseret milkvetch
The deseret milkvetch occurs in mixed sagebrush - mountain brush - juniper communities on red conglomerate and sandy areas between 5,000 to 6,000 feet elevation. The only known populations in Utah County occur along Highway 89 in road cuts. The Y - Mountain Fire and rehabilitation should have no effects to the species.

Forest Service Sensitive Species
The sensitive species list includes the Spotted bat (*Euderma maculatum*), Western big-eared bat (*Plecotus townsendii*), Fisher (*Martes pennanti*), Wolverine (*Gulo gulo*), Flammulated owl (*Otus flammeolus*), Boreal owl (*Aegolius funereus*), Great gray owl (*Strix nebulosa*), Peregrine falcon (*Falco peregrinus*), Northern goshawk (*Accipiter gentiles*), Northern three-toed woodpecker (*Picoides tridactytus*), Spotted frog (*Rana pretiosa*), Bonneville cutthroat trout (*Oncorhynchus clarki utah*), Colorado cutthroat trout (*Oncorhynchus clarki pleuriticus*), Barneby woody aster (*Aster kingii var. barnebyana*), Dainty moonwort (*Botrychium crenulatum*), Rockcress draba (*Draba densifolia apiculata*), Wasatch jamesia (*Jamesia americana macrocalyx*), and Garrett bladderpod (*Lesquerella garrettii*).

Spotted bat
Spotted bats were detected and observed in 1997 during mist netting in American Fork Canyon. This species utilizes rock crevices high up on steep cliff faces. Cracks in limestone and sandstone with 1-2 inch widths are important roosting sites. Potential habitat occurs within the burn area. Impacts to foraging habitat within the canyon could potentially affect the bat species that might occur there.

Western big-eared bat
The Western big-eared bat occurs in American Fork Canyon 21 miles north of the burn area, Diamond Fork Canyon 12 miles southeast of the burn area, and in Rock Canyon 1 ½ miles north of the burn area. Caves and adits are the primary habitat determinants for the species, none of which occurs in the burn area. There are rock crevices that could be used for roosting. Riparian areas are prime foraging places, which were not affected by the fire.

Fisher
There is no suitable habitat found within the fire area. Fishers occupy typical mature old-growth forest stands for forging and denning.

Wolverine
There is no suitable habitat found within the fire area. Wolverines occupy typical mature old-growth forest stands for forging and denning.

Flammulated owl
They prefer ponderosa pine but also occur in spruce-fir, Douglas fir, lodge pole pine, aspen and pinyon juniper, with some understory or mixture of oak. This habitat occurs within the fire area, but in fragmented segments, which the species may avoid.

Boreal owl
There is no suitable habitat within the fire area. The boreal owl inhabits old growth spruce fir forests. Nesting habitat consists of forests with a relatively high density of large trees (12 inch dbh) open understory, and multi-layered canopy.

Great gray owl
There is no suitable habitat within the fire area. The species utilize dense coniferous forest such as spruce-fir for roosting and nest sites. Their presence in Utah is considered to be occupied by winter vagrants, and is rare. They are only known to winter on the Heber Ranger District.

Northern goshawk
There is no suitable habitat within the fire area. This species is located throughout the forest. The species utilizes a variety of trees for nesting, using sticks as nest material. Goshawks forage in closed canopy areas, but prefer a more open understory for flight purposes.

Peregrine falcon
Peregrine falcons prefer cliffs for nesting habitat and they typically prey on smaller birds. There are no historical or recent nesting areas within Slide Canyon. There are three nest areas in close proximity to the burn area, Rock Canyon 1 ½ miles north, Slate Canyon 1 ½ miles south, and Little Rock Canyon 3 miles south of the burn area. The birds could use this area for foraging; there should be no negative effects to the species.

Northern three-toed woodpecker
The species resides in mixed forest and requires dead trees for cavity nesting. They are usually located near high insect populations mainly spruce bark beetles. The fire should slightly increase foraging habitat for the species, as they tend to prefer large stands of fire-killed trees.

Spotted frog
There is no suitable habitat within the fire area. The spotted frog is as aquatic species requiring perennial water sources such as ponds or riparian areas for habitat and is generally found below 10,000 feet elevation.

Colorado cutthroat trout
There is no suitable habitat within the fire area.

Bonneville cutthroat trout
There is no suitable habitat within the fire area.

Barneby Woody Aster
The Barneby woody aster is found on rock outcrops in mountain mahogany-oak communities between 7,300 to 7,600 elevation. The only known populations on the Uinta National Forest are

located in the Mt. Nebo unit. The burn had no effect on this species. It is closely related to King woody aster which may have been located in the burn, but King woody aster is not listed as sensitive.

Dainty Moonwart
Dainty moonwart has only been found in a wet meadow at about 9,500 feet on the Heber Ranger District. This is the only known location in the state. No habitat exists in the burn area, so there was no effect.

Rockcress Draba
Rockcress draba occurs in alpine tundra between 10,300 to 12,500 feet. The burn was lower in elevation and had no effect on this species.

Wasatch Jamesia
Wasatch jamesia occurs in mtn. brush and spruce-fir communities on cliffs and rocky places between 5,600 to 10,500 feet in elevation. Rock substrates include granite, limestone, and quartzite. Potential habitat for this species exists within the burn. However, by avoiding disturbance to rock outcrops and cliffs rehabilitation efforts should not disturb this plant.

Garrett's Bladderpod
Garrett's bladderpod is found on rock talus slopes between 9,000 and 12,010 feet in elevation. The burn did not damage habitat this high, and had no effect on this species.

Determinations and Requirements

The Y - Mountain Fire affected no threatened or endangered species. There was some damage to potential habitat for four sensitive species from the Y - Mountain Fire. The three wildlife species are the peregrine falcon, spotted bat, and Western big-eared bat. All species could use the area during the spring and summer months. These species use the rock cliffs and crevices for perching or roosting. High, moderate and low burns occurred around rock cliffs the species could use as foraging areas. There should be little effect to these species as adequate amounts of unburned forging areas occur in and around the fire perimeter.

Wasatch jamesia may or may not be located in the rock outcrops and cliffs within the fire boundary. The damage associated with the fire should not permanently damage the species or its survival as it only effected a small area, and no populations were known from that area.

(Antoinette Sitting Up, Wildlife Biologist; Tamara Heaton, Biological Technician)

NOXIOUS AND INVASIVE SPECIES

One of the primary objectives of BAER is " *to prevent permanent impairment of ecosystem structure and function.* " (FSM 2523.02, point # 2)

Dalmatian toadflax is a noxious weed species in the state of Utah. It is difficult to control and is quickly spreading into disturbed areas on the Uinta National Forest. By crowding out other plant species it will permanently impair ecosystem function in the area of the fire. The costs of treating it now, while the population is relatively small are much less than if it spreads into the burned area up Slide Canyon. Volunteers may be used to pull the species, however it is rhizomatous, so this may not be effective. Treatment with 2-4-D and Banvel have proven effective.

Leafy spurge is another noxious weed which is invading the area and preventing its recovery. Houndstongue, an invasive weed, is also present and actively spreading into the area.

(Tamara Heaton, Biological Technician)

ARCHEOLOGICAL SITES

No previous heritage site inventory work has been completed within the perimeter of the Y – Mountain Fire. However, there is a single site that has been reported for that area by local residents. Despite the steepness of most of the terrain, there is still a slim possibility that there are other archaeological or historical sites within the burn area.

There are several ways in which sites might be affected post-burn. These include loss of surface artifacts to illegal artifact collecting, loss of archaeological site deposits during soil erosion, and churning of archaeological site deposits during any emergency rehabilitation actions that cause soil disturbance (such as installing water bars, mechanical seeding, contour trenching, etc).

As a result, any rehabilitation efforts that involve ground-disturbing actions will require heritage inventory. This would be structured to balance both the specific potential effects of the proposed rehab technique, and each rehab area's potential to contain sites. Any emergency rehabilitation that reseeds the area without mechanical treatment stands to benefit potential archaeological sites without adversely affecting them. Consequently, this treatment type would not require any heritage inventory work.

Approximate heritage inventory costs are as follows:

Unit of Measure	Cost
1 acre of heritage inventory	$9.00

(INCLUDES GS-4 FIELD WORK AND REPORT WRITING,
GS-11 REPORT REVIEW, SHPO AND TRIBAL
CONSULTATION, AND FILM / DEVELOPING COSTS)

PLEASE CONTACT ME IF YOU HAVE ANY OTHER QUESTIONS (801-342-5119; CTHOMPSON01@FS.FED.US).

(CHARMAINE THOMPSON, HERITAGE SPECIALIST)

OTHER LANDS … PRIVATE OWNERSHIP – BRIGHAM YOUNG UNIVERSITY

Chad Hermandorfer and Dale Deiter met with Brian Eastman and Roy Peterman of BYU on July 27th, 2001 to discuss the recent fire incident and related rehabilitation issues. Most of our time was spent discussing the history of the trail along with identifying site-specific rehabilitation needs. In addition, we discussed how the emergency treatments would be coordinated and implemented. Similarly, Brian Eastman worked with Mike Smith to quantify costs and identify projects that BYU student volunteers could accomplish in a timely manner. Brian asked for several examples of sample wordings to be included on the planned signs. These are given below and have been shared with BYU officials. In addition, Brian will work with the Uinta National Forest / Public Affairs Officer - Loyal Clark to discuss additional wording for the explanatory signs.

BE RESPONSIBLE

The Uinta National Forest and BYU have worked in cooperation to implement burned-area emergency rehabilitation treatments within the perimeter of the Y - Mountain Fire Incident.

This action was taken in order to stabilize the fragile terrain affected by the recent burning disturbance; in addition, it was looked upon as an opportunity to rehabilitate both the trail surface and highly erodible lands surrounding the " Y " Monument.

Please enjoy your hike and remember to stay on the established trail.

CAUTION

These burned-areas are subject to **EXTREME FLOODING HAZARDS** during spring snowmelt conditions and summer thunderstorm events.

STAY ON THE TRAIL

In order to avoid the burned-area emergency rehabilitation treatments being implemented and monitored within these fire damaged watersheds.

Your cooperation will actually protect these charred landscapes by limiting detrimental compaction and minimizing soil erosion losses.

(Dale Deiter, Hydrologist and Michael D. Smith, Soil Scientist)

OTHER AGENCIES … USDA – NRCS / UDWR

On July 30th, 2001 Antoinette Sitting Up of the Forest Service contacted Doug Sakaguchi of the UDWR concerning a contribution of shrub seed to the rehabilitation mix for the burned-area. UDWR decided that the small number of deer using the Wasatch Front winter range was low priority and would not be contributing any shrub seed.

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The Uinta NF / BAER Team contacted Mr. Brain Miller, District Conservationist of the USDA - NRCS at their local office in Provo, Utah on July 25th, 2001 in an effort to provide him with a reconnaissance flight over the Y - Mountain Fire Incident using a Type III helicopter. Mr. Miller was unavailable for the flight … but did request a copy of our initial BAER report for this particular incident. Brian indicated that he would share our information with Mr. Bob Rasely, Geologist working at the NRCS / State Office in Salt Lake City, Utah. Later on July 27th, 2001 … Mike Smith contacted Mr. Gerald Jorgenson, Area Resource Specialist of the NRCS concerning their upcoming involvement on the Y – Mountain burn and their EWP program. At that time, I explained to Mr. Jorgenson that Provo City would be contacting the NRCS regarding the fire event. Gerald explained to me that Mr. Todd Neilsen, Area Conservationist would be the proper contact for the local NRCS office. Finally, on July 31st, 2001 … Mr. Bob Rasely of the NRCS / State Office met with the Uinta NF / BAER Team to discuss the Y- Mountain Fie Incident; after the brief meeting, Mr. Rasely was going to the field for his continued investigation of the burned-area; he will be mailing a report of his findings to the BAER Team during the next few days.

(Antoinette Sitting Up, Wildlife Biologist and Michael D. Smith, Soil Scientist)

MONITORING PLAN

Introduction: Why Monitor?

Monitoring is the periodic assessment of BAER treatments to evaluate their success and/or failure, recommend adjustments to treatments, and report on these findings to management. Forest Service Manual 2523.03 directs that the implementation and effectiveness of treatments, as well as the consequences of decisions not to treat certain areas, will be monitored. This plan will assess BAER measures taken to assist in rapid recovery of the burned sites and nearby lands and resources affected by the burned sites. Direction in this monitoring plan complies with the Uinta National Forest Land and Resource Management Plan. The Forest Service Handbook 2509.13, Section 61.1 requires that, as a minimum, the following conditions be monitored:

1. The effectiveness and proper functioning of rehabilitation measures, especially road drainage facilities and channel structures.
2. Need for re-treatment, maintenance and removal of temporary structures.
3. Quality and quantity of water leaving the burned area and the location and causes of problems.
4. Rate of recovery of vegetation.
5. Effects of resource utilization, restoration activities and emergency rehabilitation measures on each other.

District and Supervisors office personnel (with any requested assistance) will be assigned by the Leadership Team to conduct the implementation and the effectiveness monitoring (FSH 2509.13 Section 61.04).

Types of Monitoring Planned

Implementation Monitoring: Did the job get done correctly on-the-ground?

Determine if the following proposed treatments were implemented as outlined in the BAER report:

- Broadcast Seeding: Are the seed mixtures applied to the intended sites with the proper rates of application?
- Slashing: Are the felled trees placed in the proper location to meet the objectives set out in the BAER report?
- Shrub Planting: Are the planted shrubs in the locations, numbers and spacing recommended?

- Trail Reconditioning: Do the "as-built" treatments match the BAER plan prescriptions?

- Explanatory Signs: Are the signs installed at the designated locations with the intended message?

- Temporary Fence: Are the fences installed as described and in a timely manner?

- Monitoring: Are the vegetation transects and silt fences installed (following accepted protocols) ASAP so that effectiveness monitoring can be assessed prior to future thunderstorm events this and next year?

- Archeological Sites: Have the required surveys been conducted prior to conducting ground disturbing activities?

Effectiveness Monitoring: Did the expected response occur?

This monitoring is specifically designed to answer the question: Did the BAER treatments provide the planned protection and rehabilitation of the burned area? Said another way, have the objectives of the treatments been met and if not, why?

Are the emergency treatments successful in: ….. protecting long-term soil productivity,

….. preventing the deterioration of water quality,

….. reducing the threats to human life and property and
allowing for the management of ecosystems in their properly functioning condition?

Specific objectives of the treatments are described below:

Broadcast Seeding: Establish vegetative cover on the site quickly to:

- ✓ stabilize severely burned soils to maintain long-term productivity and meet Regional and Forest Plan standards,
- ✓ prevent production and delivery of off-site erosion to the stream channel network,
- ✓ reduce overland flow caused by rain-drop splash that seals the soil surface,
- ✓ act as a nurse crop for the native fall seeding,
- ✓ and prevent the spread of existing noxious weed populations.

Shrub Planting: Increase the root mass in unstable areas around the "Y" Mountain Trail to:

- ✓ provide improved strength to the soil and reduce the potential for rill and gully erosion.

Trail Reconditioning: Upgrade the "Y" Mountain Trail drainage frequency and out slope trail prism to:

- ✓ prevent the "Y" Mountain Trail from concentrating and rerouting overland runoff (caused by the current condition of the trail prism); and generating and delivering sediment via the trail ditch and prism,
- ✓ disconnect the trail from the channel network,

Explanatory Signs: Place signs at public land entry points and at the start of areas where hikers cut switchbacks to:

- ✓ provide for public safety and promote vegetative and fire recovery,
- ✓ promote natural and seeded vegetative recovery on the slopes around the "Y" Mountain Trail area .

Temporary Fence: Fence the areas along the "Y" Trail where resource damage has occurred by the lack of trail drainage and hikers to:

- ✓ promote natural and seeded vegetative recovery on the slopes.

- ✓ promote vegetative recovery of the burned area around the "Y" Mountain Trail.

General Data Collection Procedures

The information to be recorded and documented will include the dates and type of emergency treatments implemented along with the total number of acres and actual costs associated with these rehabilitation projects.

Photos will be taken before and after these treatments and locations will be plotted using a GPS. These photo points will be established above, within and below the various treatments. All photos will be collected using a digital camera in order to easily enter the images into interim and final monitoring reports.

Any monitoring item having a specific location will be mapped using GPS and loaded into the corporate GIS database (e.g., weed infestations).

The Implementation Team leader will ensure that all data being collected meets the established standards. Data collected for inclusion into the Forest GIS database will meet corporate standards.

For all monitoring projects, as a minimum, record:

- The dates of installation or accomplishment
- Name(s) of person(s) collecting data
- Types of equipment used
- Time for project completion (length of treatment)
- GPS location as well as a detailed map and narrative of directions to the site
- Short narrative explaining how the job was completed, any problems encountered and how they were solved
- Recommendations for continued use of the treatment on other fire rehabilitation projects considering both implementation and effectiveness concerns.

Specific Data To Be Collected

Soils and Hydrology:

- Establish photo points
- Monitoring time frames are before, during and immediately following large precipitation events
- Document evidence of mass wasting
- Describe and map the types of damage such as overland flow and the types of lands or resources damaged, such as trails, private property, and drainage structures (e.g., culverts)
- Describe the effectiveness of the trail treatments. Note if additional treatments or maintenance are needed.
- Install sediment fences and a tipping rain gage with a recorder, above and below 2 to 4 treatment areas so that effectiveness of 1.) aerial seeding and 2.) trail improvements can be assessed. Include measurements of sediment captured and the timing and severity of storm events.

Erosion Control Seeding:

- What were the soil moisture conditions at the time of seed application?
- What moisture events followed the seeding?
- Was seed spread uniformly over all intended treatment sites?
- Was prescribed protection achieved after the fire until full vegetation establishment (2 full years minimum) ?
- Is there between 50 and 80% soil cover to protect the soil three years post seeding?
- Which species did well?
- Which species did poorly?
- What is the location and species of any noxious or invasive weed present?
- Are there any more effective ways of doing business (e.g., erosion blankets) compared with the treatment recommendations presented with the Initial Request for EFFS - FW22 funds.
- Six vegetation transects (each 100’ long) will be installed to evaluate the amount of bare ground, seeding effectiveness and the spread of noxious weeds (see also discussion below under -Invasive Plants). The following table describes the sites that will be monitored:

Location	Burn Intensity	Treatment	Vegetation Type
North of the Y Monument	Low	Unseeded	Oak brush
South of Y Monument	Moderate	Aerial seeding	Oak brush
South of Y Monument	High	Aerial seeding	Oak brush
North facing slope	High	Aerial seeding	Oak brush
Unburned North of Y Monument	Unburned	Unseeded	Oak brush
North of Y Monument	High	Aerial seeding	Oak brush

Noxious Weeds and Invasive Species

As awareness of the problems associated with the introduction of invasive plant species increases [see Executive Order 13112 in appendix], it becomes important to immediately evaluate the magnitude of any invasion as quickly as possible and then take aggressive control action. Fire suppression activities associated with the Y - Mountain Fire may have caused the introduction or spread of some invasive species.

The District Ranger is directed (FSM 2523.04d) to *" monitor burned areas to ensure rehabilitation treatments and other measures are functioning as planned and are effective. Monitor for the post-fire presence of invasive species. Maintain treatments to keep them functioning as designed. Use monitoring results to plan follow-up actions, including the control of invasive species. "* The treatment of noxious weeds will prevent permanent impairment of ecosystem structure and function in compliance with FSM 2523.02.

Evaluate accepted treatment methods (mechanical and chemical) to determine the most appropriate course of action. Any action must be in full compliance with NEPA. Herbicide application will require applicable risk assessments, compliance with the label recommendations on the container and Agency policy and direction. Only personnel who are adequately trained in the proper use of herbicides shall implement pesticide-use projects (FHS 2109.14, Section 34). In addition, Forest Service personnel using, or supervising the use of, restricted-use pesticides must be certified and licensed (FSM 2154.2).

Invasive Plants:

- GPS inventory of <u>new</u> infestations annually from 2001 through 2005
- Assessment of the magnitude of the infestations annually to include:

  - ✓ Perimeter of infestations
  - ✓ Ocular estimates of plants per square foot
  - ✓ Appropriate pesticide-use approvals
  - ✓ Dates of treatment
  - ✓ Treatment methods and chemicals used
  - ✓ Include all treatment information in the annual pesticide-use report

- ✓ Evaluation of treatment success

Wildlife:

- No monitoring is planned. However, some of the erosion control seeding monitoring will occur within critical winter range for deer.

Archeology:

- Surveys will be conducted for any ground disturbing activities for areas that are not adequately inventoried.

Interim Evaluations

The Implementation Team Leader will conduct periodic evaluations (annually as a minimum) with the District and Forest implementation team to assess implementation progress, effectiveness monitoring and to determine if parameters measured and sampling frequency meet the planned objectives. **The BAER team understands that monitoring funds could be available for effectiveness monitoring in years 2 and 3 provided that the Uinta National Forest submits interim reports to request addition funding and provided that the Forest documents and shares their findings.**

Reports

- A DRAFT INTERIM REPORT will be prepared.
- The overall results will be presented in a detailed report during 2004. This report will be submitted to the Forest Supervisor, other unit District Rangers, the Regional Office and all cooperating agencies and other interested parties.

Annual Financial Requirements

The annual cost of monitoring is itemized in the following table. The total cost for year 1 is $8,945; $5,690 for Year 2; and $5,690 for Year 3. Costs for the first year are higher because of program initiation and establishing the monitoring sites.

(see attached financial worksheet on the following page)

Financial Worksheet	Year 1	Year 2	Year 3
Soil and Hydrology			
PHOTO POINTS—Establish, ½ day in Year 1; 1 day to gather/download data in Years 1, 2 and 3	$ 375	$ 375	$ 375
MONITORING--2 storms per year—Gather data 2 days; write-up 1 day, 3 days in Years 1, 2 and 3 (includes evaluation and documentation of trail treatment effectiveness)	$ 750	$ 750	$ 750
MONITORING--Silt Fences—3 days and two people to install, 1 day and two people to measure; 5 days inspection Year 1, 3 days inspection Years 2 & 3; 1 day and one person to summarize and write report—(total of 12 person days for Year 1 and 6 person days for Years 2 and 3)	$ 3,000	$ 1,500	$ 1,500
MONITORING—Slashing--- 1 day and two people to view; and one person to summarize and write report—(total of 3 person days for Year 1) work will be done the same day as the hydrophobic monitoring, hence—helicopter time for slashing and hydrophobic testing is documented in the hydrophobic soil testing row.	$ 600	--	--
MONITORING—Hydrophobic Soil Conditions--- 1 day and two people to view, 1 hour of helicopter time (A-Star); and one person to summarize and write report—(total of 3 person days for Year 1, 2, and 3)	$1,050	$925	$925
MONITORING—Y - Mountain Trail Reconditioning--- 1 days and two people to inspect each year; and one person to summarize and write report—(total of 3 person days for Years 1, 2, and 3)	$400	$400	$400
SUPPLIES—Including fabric, fence posts, rebar posts and tipping rain gage with recorder	$ 350	$ 100	$ 100
Soil and Hydrology Subtotals	$ 6,525	$ 4,050	$ 4,050
Erosion Control Seeding			
MONITORING—Measure soil moisture and monitor coverage—2 days observation; write-up 1/2 day in Year 1 only	$ 500	--	--
MONITORING--Vegetation Transects—4 days and two people to install and measure in Year 1; 3 days and two people to measure in Years 2 and 3; 2 days and one person to summarize and write report each year—(total of 10 person days for Year 1 and 8 person days for Years 2 and 3)	$ 1,400	$ 1,120	$ 1,120

Financial Worksheet	Year 1	Year 2	Year 3
SUPPLIES—Including 20 rebar posts	$ 100	$ 100	$ 100
Erosion Control Seeding Subtotals	$ 2,000	$ 1,220	$ 1,220
Noxious Weed			
MONITORING—Noxious Weed and Shrub Assessment—1 field day for 2 people and 1 write-up day for 1 person. (total of 3 people days for 3 years)	$420	$420	$420
Noxious Weed Subtotals	$420	$420	$420

(Michael D. Smith, Soil Scientist; Chad Hermandorfer & Dale Deiter, Hydrologists; Tamara Heaton, Biological Technician, Kevin Draper, Landscape Architect and Nettie Sitting Up, Wildlife Biologist)

TREATMENTS DISCUSSED BY THE BAER TEAM … BUT NOT CONSIDERED APPROPRIATE FOR THIS INCIDENT OF UNWANTED WILDLAND FIRE

The Uinta NF / BAER team considered a suite of potential treatments while putting together this emergency rehabilitation plan. The following is a list of some of the other treatments considered and the reasons they were not included in our final plan:

** Hillslope Treatments **

Mulching: This treatment is an effective, but costly means for providing soil cover until vegetation can become reestablish. It is best suited for small areas because it is labor intensive. Unfortunately, the high intensity polygons where this treatment is needed most are too steep and the footing too poor for the mulch to be applied safely and effectively.

Hydroseeding: This treatment is an effective, but costly means for reestablishing vegetation on sensitive sites. This treatment was considered for the slopes on both sides of the Y - Mountain trail. However, the trail does not provide adequate access. Instead aerial seeding and hand planting will be used for the area considered and substantial re-sprouting of Gambel oak is anticipated.

Contour Felling and Log Erosion Barriers: The high intensity sites where this treatment would be most beneficial are too steep and the footing too poor to accomplish the work safely.

Typically, this treatment is not applied on slopes greater than 45 percent because of crew safety and because the amount of material that can be stored and detained on steeper slopes quickly diminishes.

Straw Wattles: The high intensity sites where this treatment would be most beneficial are too steep and the footing too poor to accomplish the work safely, and is beyond the typical 50 percent slope limitations where this treatment is normally applied and considered effective.

Sand / Soil Bags: The high intensity sites where this treatment would be most beneficial are too steep and the footing too poor to accomplish the work safely. In addition, the sites are in some cases too rocky to excavate the trenches efficiently by hand.

Slashing: This treatment is being proposed on a limited number of acres on the final plan. This treatment would have been desirable on the remaining high intensity polygons, but the remaining sites are too steep and unsafe to have personnel felling trees.

Contour Trenching: The high intensity sites where this treatment would be most beneficial are too steep to accomplish by hand or with equipment. In addition, the high intensity sites are prone to soil creep, dry ravel, and in some cases debris avalanches that would quickly render this treatment ineffective. In fact, the trenching could create new risks by concentrating water, adding to amount of soil disturbance, and possibly creating mass failure concerns.

Tilling: Slopes on the high intensity polygons far exceed the maximum 15% to 20% gradient where this treatment can physically be accomplished on the contour.

Subsoiling / Ripping: Slopes on the high intensity polygons far exceed the maximum 15% to 20% gradient where this treatment can physically be accomplished on the contour.

Disking: Slopes on the high intensity polygons far exceed the maximum 15% to 20% gradient where this treatment can physically be accomplished on the contour. Also, the sites are too rocky for this implement.

Erosion Control Mats: This treatment was considered for the high intensity polygons, but the slopes are too steep and the footing too poor to accomplish the work safely, and is beyond the typical slope limitations where this treatment is normally applied and considered effective, especially for sites with high rates of soil creep and dry ravel. In addition, this treatment would be highly visible from Provo.

**** Channel Treatments ****

Grade Stabilizers, Rock Grade Stabilizers, Log Grade Stabilizers, Check Dams, Log Check Dams, Straw Bale Check Dams, Straw Wattle Check Dams, Straw Wattle Dams, Bank and Channel Armoring: Most of the channels within the fire perimeter have natural grade control provided by bedrock outcroppings and boulders in the channel bottom. The sites with no grade control and smaller sized material stored in the channel bed are prone (to varying degrees) to debris flows. None of these structures can successfully survive through or mitigate for a debris

flow event on the steep channels affected by the fire. Access for equipment to put in these structures is also severely limited.

Channel Clearing: Floatable debris is not an issue for this fire because there are no bridged or piped channel crossings downstream. In addition, there is not enough floatable debris in the channels to generate this concern.

Debris Basins: The topography is too steep to consider this option on National Forest. The golf course by 7 Peaks Water Resort currently serves this function for Slide Creek, and any potentially suitable areas for the northern drainages is already developed. In addition, there is substantial distance between the developments and the locations where sediment would start to deposit if a catastrophic failure were to occur. Silt fences, sandbags, or other detaining structures may be considered by the NRCS and the City of Provo.

**** Road Treatments ****

Upgrading Culverts, Trash Racks, Energy Dissipators, Storm Patrol: There are no relief culverts or crossings within or downstream of the fire perimeter. Therefore, these treatments are not applicable.

Road Rocking: There were no roads within the fire perimeter (excluding the Y - Mountain "trail" that will be receiving other more appropriate treatments). And there are no roads below the fire perimeter where this treatment can be justified as being needed to reduce threats to values-at-risk.

(Dale Deiter, Hydrologist)