

BLM LIBRARY



88073733

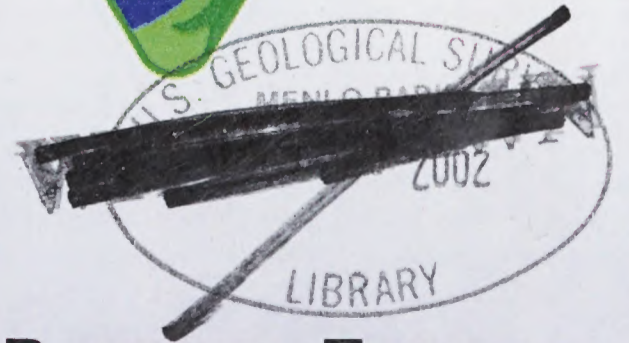
Coal Seam Fire

BURNED AREA EMERGENCY STABILIZATION AND REHABILITATION PLAN

June, 2002

White River National Forest

Bureau of Land Management, Glenwood Springs District



SD
421 .32
.C6
B87
2002

Prepared By:
Interagency Burned Area Emergency Response Team
June 28, 2002

BLM Library
Denver Federal Center
Bldg. 50, OC-521
P.O. Box 25047
Denver, CO 80225

#55497851

ID: 88073733

SD
421.32
.C6
B87
2002

**BURNED AREA EMERGENCY STABILIZATION AND REHABILITATION PLAN
COAL SEAM FIRE**

AGENCY/UNIT: U.S. FOREST SERVICE, WHITE RIVER NATIONAL FOREST
BUREAU OF LAND MANAGEMENT, GLENWOOD SPRINGS FIELD OFFICE

LOCATION: GLENWOOD SPRINGS, COLORADO

DATE: JUNE 27, 2002

PREPARED BY: INTERAGENCY BURNED AREA EMERGENCY RESPONSE TEAM



Submitted By:

Erv Gasser

Erv Gasser, USDI, National Park Service

Date:

June 28, 2002

EXECUTIVE SUMMARY

This plan addresses emergency stabilization and rehabilitation of fire suppression impacts and fire effects as a result of the Coal Seam 1 Fire. This plan has been prepared in accordance with the *Department of the Interior, Departmental Manual, Part 620: Wildland Fire Management, Chapter 3: Burned Area Emergency Stabilization and Rehabilitation* (January 19, 2001). This plan has been prepared according to the Interagency Burned Area Emergency Stabilization and Rehabilitation Handbook (June, 2001). This plan provides emergency stabilization and rehabilitation recommendations for all Bureau of Land Management – Glenwood Springs Resource Management Area; White River National Forest – Rifle Ranger District; and the private lands of Garfield County and the City of Glenwood Springs. The Coal Seam Fire occurred on federal and private lands in Garfield County, Colorado. The primary objectives of the Coal Seam Fire Burned Area Emergency Stabilization and Rehabilitation (ESR) Plan are:

To prescribe post-fire mitigation measures necessary to protect human life, property, and critical cultural and natural resources;

To promptly mitigate the unacceptable effects of the fire and suppression impacts on lands within and adjacent to the burned area in accordance with management policy guidelines and all relevant federal, state, and local laws and regulations and;

The Burned Area Emergency Response (BAER) Team has conducted an analysis of fire effects using aerial and ground reconnaissance methods throughout the lands impacted by the fire. The watershed group assessed and mapped the overall fire impacts on watershed conditions and developed a burn severity map. Archaeologists inventoried suppression impacts for potential damage to cultural sites as well as initiating consultation with the Colorado State Historic Preservation Office. The forester checked the occurrence of hazard trees. The vegetation specialist evaluated and assessed fire effects and suppression impacts to vegetative resources including noxious weed populations and identified values at risk associated with vegetative losses. The wildlife biologist conducted an assessment of fire effects to Threatened and Endangered (T&E) wildlife species and their associated habitat, suppression impacts to wildlife species, and initiated Section 7 Consultation with the US Fish and Wildlife Service. The GIS specialists gathered the data layers necessary for the plan, coordinated GPS activities, processed data calculations for other resource specialists, and produced maps for analysis, the ESR Plan and for presentations.

Resource assessments produced by these specialists can be found in Appendix I and treatments identified in the assessments can be located within Part F, Specifications. A summary of treatment costs is located within Part E. Part I is provided as a signature page for agency review and approval. Appendix II contains the National Environmental Policy Act (NEPA) compliance summary for all recommended treatments. Appendix III contains ESR Plan maps while Appendix IV contains photo documentation of fire effects. Appendix V contains supporting documentation.

FIRE LOCATION

The fire area is located in the Grand Hogback Range and the Flattop Mountains and within and adjacent to the community of Glenwood Springs, Garfield County, Colorado. The fire started in South Canyon near the landfill on the south side of Interstate 70.

Bureau of Land Management

BLM lands within the burn area are managed to protect critical watersheds. This particular area has been identified as a critical environmental concern because of the debris flow zone. The entire area is managed as a full fire suppression zone. The primary activity taking place on the lands is recreation.

WHITE RIVER NATIONAL FOREST

USFS lands within the burn area are managed to improve and protect watershed conditions and soil productivity necessary to support ecological functions. In addition, an objective of WRNF is to provide ecological conditions to sustain viable populations of native and desired nonnative species. Other land uses include recreation, scenery, heritage sites and grazing.

OTHER LANDS MANAGEMENT

Other lands within the fire perimeter are comprised of state, city/county, and private. The state lands are primarily the Colorado Division of Wildlife Glenwood Springs Fish Hatchery and property located along Interstate 70. The fish hatchery contains the critically important broodstock of Colorado River cutthroat trout. The hatchery also contains greenback cutthroat trout. Upstream from the hatchery, Mitchell Creek contains what is believed to be a genetically pure strain of native Colorado River cutthroat trout. Records indicate that this is a relict population of approximately 1,000 fish.

City/county and private lands within the fire perimeter are primarily an urban residential and commercial business district around Mitchell Creek and its mouth on the north side of the Colorado River and on the south side of the river are the Municipal Operations Center, Community Center, and landfill. Also located on the south side of the river are the mainline tracks of the Union Pacific Railroad. The tracks run through the entire width of the fire at the base of Red Mountain and South Canyon. Up Mitchell Creek are private residences in a wildland/urban interface setting.

Fire Background

The Coal Seam Fire started on June 8, 2002 when a coal seam fire, burning for several decades surfaced and ignited surrounding vegetation in South Canyon. The fire grew quickly, spreading in pinyon-juniper and oakbrush fuels. The fire exhibited extreme fire behavior with rapid rates of spread estimated at 80-160 chains per hour and long range spotting up to ½ mile due to high winds, steep slopes, and very dry fuels. Continuing into the next day, the fire ran up the Colorado River toward Glenwood Springs, spotting across I-70 and the Colorado River. Developing an intense terrain-driven run up Mitchell Creek to the northeast, and creating a fast-moving fire front in the dense oakbrush at the base of Red Mountain toward the city of Glenwood Springs, the fire spread to approximately 6,400 acres by the end of the 2nd day. Flame lengths exceeded 100 feet and fire whirls were observed.

At the height of the incident (June 11) there were 699 firefighters including 74 engines, 15 aircraft, and 7 dozers assigned to the incident. The Type I Rocky Mountain Incident Management Team (Hart) assumed management of the incident at 2000 on June 9. On June 20 at 0600 hours the fire was turned over to a Type II Fire Use Team (Cook). As of June 28 the fire is 90% contained. There is no estimate of containment or control.

The Coal Seam Fire is currently 12,229 acres in size and is not expected to expand. The fire area is located on BLM, USFS, and state, city/county, and private lands within and adjacent to the City of Glenwood Springs with a fire perimeter of 52.5 miles. Elevation within the fire area ranges from 5,800 to 10,500 feet.

Fire suppression actions included 9.4 miles of dozerline, 23 drop points and helispots, 1 helibase, 1 spike camp, 2 helispots, and an Incident Command Posts located at Two Rivers Park and the subsequent ICP at Colorado Mountain College. Suppression vehicles impacted 27.5 miles of the roads in the area, most of which were dirt roads.

The BLM and USFS requested the Interagency Burned Area Emergency Response (BAER) Team (Gasser) on June 14 and on June 17 conducted a briefing with the team to identify the resource issues.

Upon arrival at the Coal Seam Fire, the BAER Team was requested to prepare an Emergency Stabilization and Rehabilitation Plan to address potential effects of the fire and fire suppression impacts to all jurisdictions affected by the fire. Resource specialists from BLM, USFS and Natural Resource

Conservation Service (NRCS) augmented the team members from the national BAER Team. This incident provided an excellent opportunity to train the locally available disciplines on the aspects of burned area assessment and emergency stabilization and rehabilitation plan development.

Issues identified by the agencies included:

- Potential threats to human life and property downstream of the Coal Seam Fire from potential increases in storm flow runoff, flooding and debris flows.
- Threats to the Glenwood Springs State Fish Hatchery.
- Multiple jurisdictions: BLM, USFS, city/county, state, private.
- Ability of drainage structures to pass flood and debris flows.
- Potential loss of soil productivity and increased erosion.
- ESR cannot design treatments to protect against all scales of flood and debris flow events.
- Protection of threatened, endangered, and sensitive species.
- Invasion of noxious weeds and the spread of current populations.
- Recreational impacts – burnt bridge, trail closure.
- Cultural resources impacts.
- Fire suppression impacts.

The BLM and USFS presented the following objectives to the team for this incident:

1. Protect the lives and homes of the inhabitants of Glenwood Springs
2. Locate and stabilize severely burned slopes.
3. Protect the habitat of threatened, endangered species and sensitive species.
4. Recommend rehabilitation prescriptions, which prevent irreversible loss of natural and cultural resources.

The BAER Team, tasked with evaluation of short and long-term emergency stabilization and rehabilitation needs, developed this plan to address the following issues:

- Protection of life, public safety, property, and critical cultural and natural resources.
- Protection of cultural and natural resource values impacted by the fire or fire suppression actions.
- Rehabilitation of roads and other improvements impacted by the fire or the suppression of the fire.
- Assessment of Threatened and Endangered plant and animal species and their habitat.
- Rehabilitation requirements established by Federal law, policies, and relevant agency resource management mandates.
- Noxious weed and invasive species establishment and expansion within the fire area.
- Implementation of treatments in a timely manner, prior to the first damaging storms.

Resource Damages and Threats to Human Safety and Resources

Suppression impacts were minimal thanks to the Minimum Impact Suppression Techniques (MIST) used by the suppression forces. Most suppression impacts have been rehabilitated. In Mitchell Canyon, suppression forces dropped a number of tree hazards in the channel. These trees still need to be removed.

The Coal Seam Fire impacted a total of 12,229 acres on BLM, USFS, and private lands with a fire perimeter of 52.5 miles. The fire has been mapped by the BAER Team for burn severity. Low burn severity occurred on 3,195 acres (26%); moderate burn severity covered 3,223 acres (26%); and high burn severity was 2,195 acres (18%). Unburned acreage within the fire perimeter was 3,620 (30%)

Watershed Approximately 18% of the fire experienced high burn severity. Increased runoff and reduced ground cover is likely to cause hillslope erosion and potentially debris flows. Recovery of

grasses, forbs and shrubs is expected to occur in most areas within 3-5 years. Some high severity areas may not fully recover for ten or more years. Once the vegetation has recovered the watershed is expected to return to pre-fire conditions.

The primary watershed responses of the Coal Seam Fire are expected to include: 1) an initial flush of ash; 2) gully and rill erosion in drainages and on steep slopes within the burn area; 3) debris flows and sediment deposition where stream gradients flatten or at tributary mouths; and 4) increases in peak flows. Elevated erosion, runoff, and stream flows are expected to occur for several years after the fire until the vegetation has recovered. Streamflow is expected to increase as a result of events with a recurrence interval of 2 years and duration of 1 hour. Storms of high intensity and short duration are of most concern and may result in flow increases that range from 1 cfs to 222 cfs (unbulked) and 2 to 907 cfs (bulked). Rilling, gully erosion, and sheet erosion are expected to occur at increased rates due to the fire. Pre-fire, vegetation provided protective groundcover and duff layers played an important role in infiltration, both factors in reducing pre-fire overland flow. Due to the fire, soils are now bare and susceptible to accelerated erosion and increased runoff rates. Soils within the fire occurring on steep slopes of Red Mountain, in the SOB watershed, along Interstate 70, and above homes in Mitchell Creek have very high erosion hazards and debris flow potential exists in these areas during intense short-duration thunderstorms. Dry ravel was found in a few areas, but does not appear to be occurring at a rate that is a threat to overall soil productivity. It is most important to note the *relative* increase in erosion between pre and post-fire. Some of the areas of highest post-fire erosion show increases in rates of 100 to 1000%, especially where dense stands of vegetation once occurred that burned with high severity on steep slopes.

Vegetation Broad vegetation types that occur in the fire area include sagebrush shrublands, piñon-juniper woodlands, mountain shrublands, aspen forests, Douglas fir forests, and spruce fir forests. Much of the area south of the Colorado River in South Canyon is piñon-juniper while on the north end of the fire there is aspen and Douglas/spruce fir forests. Fire impacted plant communities of special note include the cottonwood gallery forests of Mitchell, South Canyon, and Paradise Creek. Even moderate fires will kill cottonwoods.

The primary impacts to vegetative resources were the combination of moderate to high vegetation mortality and moderate to high burn severity on the steeper slopes and on slopes upstream from houses and structures. Vegetative recovery will occur naturally on the majority of the fire. Sprouting has already been observed from Gambel oak, elderberry, lupine and other forbs and grasses. However, in the areas in lower Mitchell Canyon and the upper slopes of the alluvial above the Community Center, emergency revegetation actions need to be taken to reduce sheet and rill erosion.

Forestry Approximately 200 tree hazards were identified in Mitchell Canyon and South Canyon. These trees were flagged with either orange flagging or orange "Killer Tree" tape. Once felled these trees need to be removed from the channel to avoid being mobilized during a storm event and plugging the channel. Hazard trees felled above the flood plane can be dropped parallel to the slope with the branches limbed to form a contact with the ground. This log will act to slow surface water and trap sediment.

Wildlife Section 7 Consultation has been initiated and concluded under the Endangered Species Act for Federally listed threatened and endangered species. Threatened and Endangered species included: bald eagle, Canada lynx, Colorado pikeminnow, razorback sucker, humpback chub, and bonytail chub. In addition, Mitchell Creek contains a native population of Colorado River cutthroat trout. These fish are believed to be genetically pure. The Colorado Division of Wildlife operates the Glenwood Springs Fish Hatchery in Mitchell Canyon. The hatchery produces the broodstock and eggs for the Colorado River cutthroat trout. The hatchery itself is susceptible to the flooding potential within the canyon. Actions proposed in this plan and their potential effects on Federally listed species have been determined to be no effect.

The BAER Team cultural resources specialist has initiated necessary consultation with the Navajo Nation Historic Preservation Department regarding activities proposed within this plan. All activities proposed within this plan comply with applicable laws and executive orders.

Cultural

There are eight known or previously documented historic sites within the fire area, two on usfs land, one on state land, and five on city land. The fire did not impact the south canyon national register bridge. The wooden buildings at the cardnell ranch were consumed in the fire but some interpretive value remains. The south canyon coal camp had vegetation impacted by the fire. The state fish hatchery was also not impacted but this facility is at risk if mitchell creek floods. The hatchery buildings appear to have retained their original fabric and may be eligible for the national register. Consultation will need to occur with three ute indian tribes regarding sacred sites, results of cultural resource damage assessment, and other cultural issues specific to the fire.

Section 106, National Historic Preservation Act was initiated and completed for this plan.

Based on aerial and ground surveys the BAER Team identified the following treatments for implementation. These treatments meet policy, and the Interagency Burned Area Emergency Stabilization and Rehabilitation Handbook, June 2001.

Fire Suppression Stabilization:

- Rehabilitate suppression dozerline
- Remove tree hazards

Emergency Stabilization:

- Ditch breach evaluation & design
- Structure protection design
- Sediment basin (runway) maintenance
- Trash racks evaluation & design
- Soil netting with seed
- Remove floatable debris
- Early Warning System
- Diversion channel evaluation & design
- Culvert cleaning
- Bridge removal evaluation
- Contour straw wattles
- Culvert evaluation & design
- Hazard warning sign
- Straw mulching
- Noxious weed control
- Aerial seeding/mulching
- Implementation Leader & support
- ESR Plan preparation
- Hazard tree mitigation
- Native American consultation
- Rehabilitation:
- Noxious weed monitoring

The BAER Team conducted an agency close-out presentation to BLM, USFS, Natural Resource Conservation Service, Colorado Division of Wildlife, Garfield County, and City of Glenwood Springs on June 27, 2002, providing findings and identifying proposed emergency stabilization and rehabilitation treatments.

Implementing emergency watershed stabilization and erosion control treatments and mitigating non-native species invasion are critical tasks. These activities should be initiated as quickly as possible through the Implementation Leader. It will be important for the Implementation Leader to coordinate the recommended activities, track budgets, coordinate contracts, and prepare accomplishment reports.

This ESR Plan is the initial funding request for Emergency Stabilization and Rehabilitation (ESR) funds. This plan may also be used as a justification to seek funding from other sources for treatments proposed/recommended that are not covered by EFR funds. Additional supplemental requests may be made after this document has been reviewed and approved. It is recommended that supplemental requests be made on an as needed basis, if necessary.

The Emergency Stabilization and Rehabilitation funding for this plan extends over three years from the date of control of the fire. At the conclusion of the funding period, a final Accomplishment Report will be due to the approval authority. The Accomplishment Report will document the funding received (initial and supplemental funding), treatments installed, the effectiveness of the installed treatments, and the results of monitoring activities. A template for this report is provided with the transmittal memorandum to BLM and USFS.

This ESR Plan was submitted to BLM – Glenwood Springs Field Office and USFS – White River National Forest, in accordance with interagency Burned Area Emergency Stabilization and Rehabilitation guidelines for multiple jurisdictions within 10 days of fire control. The BAER Team was requested to evaluate all of the lands within the burn area regardless of jurisdiction. That was accomplished and copies of the ESR Plan have been submitted to NRCS for distribution to local agencies.

Because of various federal funding authorities/regulations, the BAER Team was not able to initiate emergency stabilization and rehabilitation treatments on private lands for the protection of homes, businesses, and infrastructure. This direction came from the Washington Offices of USFS and BLM. This area of the program needs to be assessed and remedied.

TABLE OF CONTENTS

FIRE

TABLE OF CONTENTS	IX
PART A FIRE LOCATION AND BACKGROUND INFORMATION.....	1
PART B NATURE OF PLAN.....	1
PART C REHABILITATION ASSESSMENT	3
PART D TEAM ORGANIZATION, TEAM MEMBERS, RESOURCE ADVISORS	5
PART D SUMMARY OF APPROVAL AUTHORITIES – U.S. FOREST SERVICE.....	7
PART D SUMMARY OF APPROVAL AUTHORITIES – BUREAU OF LAND MANAGEMENT	9
PART D SUMMARY OF APPROVAL AUTHORITIES – NRCS	11
PART E SUMMARY OF ACTIVITIES.....	13
PART E – SUMMARY OF ACTIVITIES – COST SUMMARY TABLE – U.S. FOREST SERVICE.....	17
PART E – SUMMARY OF ACTIVITIES – COST SUMMARY TABLE – B.L.M.	19
PART E – SUMMARY OF ACTIVITIES – COST SUMMARY TABLE – NRCS.....	21
TOTAL COST	21
DITCH BREACH DESIGN	23
STRUCTURE PROTECTION DESIGN.....	25
CLEAN HATCHERY DEBRIS BASIN (RUNWAYS)	29
DESIGN TRASH RACKS	33
SOIL NETTING.....	35
REMOVE FLOATABLE DEBRIS FROM CHANNELS AND FLOOD PLAIN.....	39
EARLY WARNING SYSTEM.....	43
DIVERSION CHANNEL DESIGN	47
CULVERT CLEANING	49
EVALUATE BRIDGES FOR REMOVAL	51
CONTOUR STRAW WATTLE – SLOPE TREATMENT.....	53
CULVERT EVALUATION & REPLACEMENT.....	57
FLOOD WARNING SIGNS	59
STRAW MULCHING.....	63
DOZERLINE REHABILITATION	67
NOXIOUS WEED MONITORING	71
NOXIOUS WEED CONTROL	75
AERIAL HYDROMULCHING.....	79
IMPLEMENTATION LEADER.....	83
PLAN PREPARATION	85
HAZARD TREE REMOVAL.....	89
TRIBAL CONSULTATION ACTIVITIES, COMPLIANCE AND REHABILITATION	93
PART G POST-REHABILITATION RECOMMENDATIONS	95
PART H CONSULTATIONS.....	97

PART I REVIEW AND APPROVAL – U.S. FOREST SERVICE 99

PART I REVIEW AND APPROVAL -- BUREAU OF LAND MANAGEMENT..... 101

IV. EMERGENCY STABILIZATION AND REHABILITATION APPROVAL..... 101

APPENDIX I. BAER TEAM RESOURCE ASSESSMENTS 103

SOIL AND WATERSHED RESOURCE ASSESSMENT 105

WILDLIFE RESOURCE ASSESSMENT..... 137

VEGETATION RESOURCE ASSESSMENT 151

CULTURAL RESOURCE ASSESSMENT..... 161

OPERATIONS ASSESSMENT..... 167

FOREST RESOURCE ASSESSMENT 177

APPENDIX II. ENVIRONMENTAL COMPLIANCE DOCUMENTATION 181

FEDERAL, STATE, AND PRIVATE ENVIRONMENTAL COMPLIANCE RESPONSIBILITIES 183

RELATED PLANS AND CUMULATIVE IMPACTS ANALYSIS..... 184

AGENCY AND PUBLIC SCOPING..... 184

APPLICABLE AND RELEVANT CATEGORICAL EXCLUSIONS..... 185

STATEMENT OF COMPLIANCE 186

ENVIRONMENTAL COMPLIANCE AND CONSULTATIONS 189

APPENDIX III. MAPS..... 191

APPENDIX IV. PHOTO DOCUMENTATION..... 193

APPENDIX V. SUPPORTING DOCUMENTS 195

**INTERAGENCY
BURNED AREA EMERGENCY STABILIZATION AND REHABILITATION PLAN**

PART A FIRE LOCATION AND BACKGROUND INFORMATION

Fire Name	Coal Seam		
Fire Number	CO-GJX-290	Affected Area	
Agency Unit	White River Nat. For. Glenwood Springs BLM	Jurisdiction	Acres
Region	Great Basin	U.S. Forest Service	3,755
State	Colorado	Glenwood Springs BLM	2,136
County(s)	Garfield	State of Colorado	58
Ignition Date/Manner	June 8, 2002, Natural	City of Glenwood	2,136
Date Contained		Private	1,824
Date Controlled		TOTAL ACRES	12,229 ac.

PART B NATURE OF PLAN

I. Type of Plan (check one box below)

	Short-term Rehabilitation (Complete Parts A, B, C, and H only)
	Long-term Rehabilitation (Complete all parts)
√	Both Long and Short-term Rehabilitation (Completed all Parts)

II. Type of Action (Check One box below)

√	Initial Submission
	Updating Or Revising The Initial Submission
	Supplying Information For Accomplishment To Date On Work Underway
	Different Phase Of Project Plan
	Final Report (To Comply With The Closure Of The EFR Account)

**INTERAGENCY
BURNED AREA EMERGENCY STABILIZATION AND REHABILITATION PLAN**

PART C REHABILITATION ASSESSMENT

I. Rehabilitation Objectives:

- Locate and stabilize severely burned slopes which pose a direct threat to human life, property or critically important cultural and natural resources.
- Recommend post-fire rehabilitation prescriptions which prevent irreversible loss of natural and cultural resources.
- As practical and necessary, restore natural conditions to areas disturbed by fire suppression actions.
- Conduct immediate post-burn reconnaissance for fire suppression related impacts to threatened and endangered (T&E) species, and cultural sites.
- Provide long-term monitoring recommendations intended to ensure the success of rehabilitation efforts.

**INTERAGENCY
BURNED AREA EMERGENCY STABILIZATION AND REHABILITATION PLAN**

PART D TEAM ORGANIZATION, TEAM MEMBERS, RESOURCE ADVISORS

I. BAER TEAM MEMBERS

POSITION	TEAM MEMBER / AGENCY
Team Leader	Erv Gasser, NPS T.J. Clifford, USFS (T)
Operations	Tom Gavin, Mescalero Apache Tribe John Perez, NPS (T)
Archaeologist	Chuck James, BIA
Wildlife	Karen Hayden, USFS
Soil & Watershed	Becca Smith, USFS Suzanne Loadholt, Contractor Michael Parenti, Contractor Andrea Holland-Sears, USFS Brian Rasmussen
Vegetation	Mike Dolan, BLM
Environmental Protection	Richard Hadley, FWS
GIS	Carl Hardzinski, BIA (lead) Rachel Endfield, White Mtn. Apache Tribe Jennifer McCollon, NPS
Computer / Documentation	Richard Inman, BIA
Engineer	John Andrews, NRCS

Miscellaneous Support Personnel

Linda Schuemaker	Consultant, Documentation
Annette Parker	W.R. NF, Documentation

III. **Resource Advisors:** (Note: Resource Advisors are individuals who assisted the BAER Team with the preparation of this plan. See Part H of this plan for a full list of agencies and individuals who were consulted or otherwise contributed to the development of this plan.)

NAME	AFFILIATION, SPECIALTY
Dan Sokal	BLM, Agency Liasion
Dennis Davidson	NRCS, Conservationist, Agency Liasion
Larry Sandoval	W.R. NF, Soil Scientist
Alice Gustafson	W.R. NF, Archaeologist
Merlin McDonald	BIA, Forester
Alan Czenkusch	CO. Div. Of Wildlife, Fish Biologist
Sonia Marzec	CO. Div. Of Wildlife, District Manager
Rodney Denardo	Archaeologist, USFS
Doug Kosik	Archaeologist, USFS
Chris Potvin	Archaeologist, USFS
Tim Rehusch	Archaeologist, USFS
Andele Worthington	Archaeologist, USFS

**INTERAGENCY
BURNED AREA EMERGENCY STABILIZATION AND REHABILITATION PLAN**

PART D SUMMARY OF APPROVAL AUTHORITIES – U.S. FOREST SERVICE

ACTIVITIES REQUIRING FOREST SUPERVISOR APPROVAL	STATUS CODE	COST
Fire Suppression Damages (charged to Fire Suppression)		
Dozerline Rehab		F
SUBTOTAL		

Status Code: C=Completed; O-Ongoing; P=Planned

ACTIVITIES REQUIRING FS REGIONAL OFFICE APPROVAL	STATUS CODE	COST
Long-term EFR Rehabilitation request (charged to EFR)		
Ditch Breach Evaluation & Design		0
Structure Protection Design		0
Sediment Basin (runway) Maintenance		0
Trash Racks Evaluation & Design		0
Soil Netting With Seed		0
Remove Floatable Debris		0
Early Warning System		\$22,900.00
Diversion Channel Evaluation & Design		0
Culvert Cleaning		0
Bridge Removal Evaluation		0
Contour Straw Wattles		0
Culvert Evaluation & Design		0
Hazard Warning Sign		0
Straw Mulching		0
Noxious Weed Monitoring		\$8,930.00
Noxious Weed Control		0
Aerial Mulching/Seeding		0
Implementation Leader & Support		0
Plan Preparation		\$122,655.00
Hazard Tree Mitigation		0
Native American Consultation		\$14,700.00
SUBTOTAL		\$169,185.00

Status Code: C=Completed; O-Ongoing; P=Planned

TOTAL REHABILITATION COST – U.S. FOREST SERVICE	\$169,185.00
--	---------------------

**INTERAGENCY
BURNED AREA EMERGENCY STABILIZATION AND REHABILITATION PLAN**

PART D SUMMARY OF APPROVAL AUTHORITIES – BUREAU OF LAND MANAGEMENT

ACTIVITIES REQUIRING GLENWOOD SPRINGS FIELD OFFICE APPROVAL	STATUS CODE	COST
Fire Suppression Damages (charged to Fire Suppression)		
Dozerline Rehab		F
SUBTOTAL		

Status Code: C=Completed; O-Ongoing; P=Planned

ACTIVITIES REQUIRING BLM WASHINGTON OFFICE APPROVAL	STATUS CODE	COST
Long-term EFR Rehabilitation request (charged to EFR)		
Ditch Breach Evaluation & Design		0
Structure Protection Design		0
Sediment Basin (runway) Maintenance		0
Trash Racks Evaluation & Design		0
Soil Netting With Seed		\$46,000.00
Remove Floatable Debris		0
Early Warning System		\$45,800.00
Diversion Channel Evaluation & Design		0
Culvert Cleaning		0
Bridge Removal Evaluation		0
Contour Straw Wattles		\$407,900.00
Culvert Evaluation & Design		0
Hazard Warning Sign		0
Straw Mulching		\$398,000.00
Noxious Weed Monitoring		\$8,930.00
Noxious Weed Control		\$2,245.00
Aerial Mulching/Seeding		\$2,557,100.00
Implementation Leader & Support		\$55,462.00
Plan Preparation		\$122,655.00
Hazard Tree Mitigation		0
Native American Consultation		0
SUBTOTAL		\$3,644,092.00

Status Code: C=Completed; O-Ongoing; P=Planned

TOTAL REHABILITATION COST – BUREAU OF LAND MANAGEMENT	\$3,644,092.00
--	-----------------------

UNITED STATES DEPARTMENT OF JUSTICE
 FEDERAL BUREAU OF INVESTIGATION
 WASHINGTON, D. C. 20535

UNITED STATES DEPARTMENT OF JUSTICE - FEDERAL BUREAU OF INVESTIGATION
 MEMPHIS, TENNESSEE - MAY 1968

1	...
2	...
3	...
4	...
5	...
6	...
7	...
8	...
9	...
10	...
11	...
12	...
13	...
14	...
15	...
16	...
17	...
18	...
19	...
20	...
21	...
22	...
23	...
24	...
25	...
26	...
27	...
28	...
29	...
30	...
31	...
32	...
33	...
34	...
35	...
36	...
37	...
38	...
39	...
40	...
41	...
42	...
43	...
44	...
45	...
46	...
47	...
48	...
49	...
50	...

1	...
2	...
3	...
4	...
5	...
6	...
7	...
8	...
9	...
10	...
11	...
12	...
13	...
14	...
15	...
16	...
17	...
18	...
19	...
20	...
21	...
22	...
23	...
24	...
25	...
26	...
27	...
28	...
29	...
30	...
31	...
32	...
33	...
34	...
35	...
36	...
37	...
38	...
39	...
40	...
41	...
42	...
43	...
44	...
45	...
46	...
47	...
48	...
49	...
50	...
51	...
52	...
53	...
54	...
55	...
56	...
57	...
58	...
59	...
60	...
61	...
62	...
63	...
64	...
65	...
66	...
67	...
68	...
69	...
70	...
71	...
72	...
73	...
74	...
75	...
76	...
77	...
78	...
79	...
80	...
81	...
82	...
83	...
84	...
85	...
86	...
87	...
88	...
89	...
90	...
91	...
92	...
93	...
94	...
95	...
96	...
97	...
98	...
99	...
100	...

UNITED STATES DEPARTMENT OF JUSTICE - FEDERAL BUREAU OF INVESTIGATION
 MEMPHIS, TENNESSEE - MAY 1968

**INTERAGENCY
BURNED AREA EMERGENCY STABILIZATION AND REHABILITATION PLAN**

PART D SUMMARY OF APPROVAL AUTHORITIES – NRCS

ACTIVITIES REQUIRING NRCS OFFICE APPROVAL	STATUS CODE	COST
Long-term EFR Rehabilitation request (charged to EFR)		
Ditch Breach Evaluation & Design		\$2,000.00
Structure Protection Design		\$7,000.00
Sediment Basin (runway) Maintenance		\$38,100.00
Trash Racks Evaluation & Design		\$10,000.00
Soil Netting With Seed		0
Remove Floatable Debris		\$160,110.00
Early Warning System		0
Diversion Channel Evaluation & Design		\$10,500.00
Culvert Cleaning		\$34,400.00
Bridge Removal Evaluation		\$5,000.00
Contour Straw Wattles		0
Culvert Evaluation & Design		\$14,500.00
Hazard Warning Sign		\$5,480.00
Straw Mulching		0
Noxious Weed Monitoring		\$24,930.00
Noxious Weed Control		\$23,645.00
Aerial Mulching/Seeding		\$1,559,830.00
Implementation Leader & Support		0
Plan Preparation		0
Hazard Tree Mitigation		\$24,200.00
Native American Consultation		0
SUBTOTAL		\$1,919,695.00

Status Code: C=Completed; O-Ongoing; P=Planned

TOTAL REHABILITATION COST – NRCS	\$1,919,695.00
---	-----------------------

INTERAGENCY
BURNED AREA EMERGENCY STABILIZATION AND REHABILITATION PLAN

PART E SUMMARY OF ACTIVITIES

The SUMMARY OF ACTIVITIES table identifies *trackable* rehabilitation costs charged or proposed for funding from fire suppression rehabilitation, emergency fire rehabilitation, emergency watershed protection, agency operations, and other. Only trackable expenditures are displayed in the total cost column. They are coded with the appropriate cost authority. The total cost of the rehabilitation effort to date, excluding the costs absorbed by the fire (fire crew, labor and associated overhead) is displayed as either Fire Suppression Rehabilitation (F), Emergency Fire Rehabilitation (EFR), Emergency Watershed Protection (EWP), or Agency Operations/Other (OP/O).

Coal Seam Fire

(FUNDING SUMMARY as of 6-28-02 - ESTIMATED TOTAL \$)



- Fire Suppression
- EFR Rehab

**PART E – SUMMARY OF ACTIVITIES – 2002
COAL SEAM FIRE**

PART E. COST SUMMARY TABLE

JURISDICTION	SPECIFICATION TOTALS			
	FIRE	EWPI/O	ESR	TOTALS
U.S. Forest Service	\$0	\$0	\$169,185	\$169,185
Bureau of Land Management	\$0	\$0	\$3,644,092	\$3,644,092
N.R.C.S.	\$24,000	\$287,000	\$1,608,405	\$1,919,695
TOTAL COST	\$24,000	\$287,090	\$5,421,682	\$5,732,972
COST: F=Suppression; EFR=Long-term Rehab.; Base Funding				

INTERAGENCY
BURNED AREA EMERGENCY STABILIZATION AND REHABILITATION PLAN

PART E – SUMMARY OF ACTIVITIES – COST SUMMARY TABLE – U.S. FOREST SERVICE
COAL SEAM FIRE –

TREATMENT SPECIFICATION	UNIT	UNIT COST	# OF UNITS	COST BY FUND SOURCE			IMPLEMENTATION METHOD	SPECIFICATION TOTAL
				F	EWP/O	ESR		
#1 Ditch Breach Evaluation & Design								
#2 Structure Protection Design								
#3 Sediment Basin (runway) Maintenance								
#4 Trash Racks Evaluation & Design								
#5 Soil Netting w/ seed								
#6 Remove Floatable Debris								
#7 Early Warning System	RAWS	\$22,900.00	1			\$22,900.00	C	\$22,900.00
#8 Diversion Channel Evaluation & Design								
#9 Culvert Cleaning								
#10 Bridge Removal Evaluation								
#11 Contour Straw Wattles								
#12 Culvert Evaluation & Design								
#13 Hazard Warning Sign								
#14 Straw Mulching								
#15 Dozerline Rehab.	Miles	F	3.53				C	F
#16 Noxious Weed Monitoring	Surveys	\$1,783.00	8			\$8,930.00	P	\$8,930.00
#17 Noxious Weed Control								
#18 Aerial Mulching/Seeding								
#19 Implementation Leader & Support								
#20 Plan Preparation	ESR Plan	\$245,310.00	0.5			\$122,655.00	PI/EFC	\$122,655.00
#21 Hazard Tree Mitigation								
#22 Native American Consultation	Person	\$350.00	42			\$14,700.00	C/MT	\$14,700.00
TOTAL COST						\$169,185.00		\$169,185.00

COST: F=Fire Suppression Account; EWP/O=Emergency Watershed Program/Other; ESR=Emergency Stabilization and Rehabilitation

Item	Unit	Quantity	Rate	Total	Remarks
1. Rice	kg	100	1000	100000	
2. Oil	liters	50	10000	500000	
3. Beans	kg	200	5000	1000000	
4. Eggs	dozen	10	100000	1000000	
5. Chicken	kg	10	100000	1000000	
6. Fish	kg	10	100000	1000000	
7. Pork	kg	10	100000	1000000	
8. Beef	kg	10	100000	1000000	
9. Lamb	kg	10	100000	1000000	
10. Mutton	kg	10	100000	1000000	
11. Goat	kg	10	100000	1000000	
12. Pig	kg	10	100000	1000000	
13. Duck	kg	10	100000	1000000	
14. Turkey	kg	10	100000	1000000	
15. Chicken	kg	10	100000	1000000	
16. Fish	kg	10	100000	1000000	
17. Pork	kg	10	100000	1000000	
18. Beef	kg	10	100000	1000000	
19. Lamb	kg	10	100000	1000000	
20. Mutton	kg	10	100000	1000000	
21. Goat	kg	10	100000	1000000	
22. Pig	kg	10	100000	1000000	
23. Duck	kg	10	100000	1000000	
24. Turkey	kg	10	100000	1000000	
25. Chicken	kg	10	100000	1000000	
26. Fish	kg	10	100000	1000000	
27. Pork	kg	10	100000	1000000	
28. Beef	kg	10	100000	1000000	
29. Lamb	kg	10	100000	1000000	
30. Mutton	kg	10	100000	1000000	
31. Goat	kg	10	100000	1000000	
32. Pig	kg	10	100000	1000000	
33. Duck	kg	10	100000	1000000	
34. Turkey	kg	10	100000	1000000	
35. Chicken	kg	10	100000	1000000	
36. Fish	kg	10	100000	1000000	
37. Pork	kg	10	100000	1000000	
38. Beef	kg	10	100000	1000000	
39. Lamb	kg	10	100000	1000000	
40. Mutton	kg	10	100000	1000000	
41. Goat	kg	10	100000	1000000	
42. Pig	kg	10	100000	1000000	
43. Duck	kg	10	100000	1000000	
44. Turkey	kg	10	100000	1000000	
45. Chicken	kg	10	100000	1000000	
46. Fish	kg	10	100000	1000000	
47. Pork	kg	10	100000	1000000	
48. Beef	kg	10	100000	1000000	
49. Lamb	kg	10	100000	1000000	
50. Mutton	kg	10	100000	1000000	
51. Goat	kg	10	100000	1000000	
52. Pig	kg	10	100000	1000000	
53. Duck	kg	10	100000	1000000	
54. Turkey	kg	10	100000	1000000	
55. Chicken	kg	10	100000	1000000	
56. Fish	kg	10	100000	1000000	
57. Pork	kg	10	100000	1000000	
58. Beef	kg	10	100000	1000000	
59. Lamb	kg	10	100000	1000000	
60. Mutton	kg	10	100000	1000000	
61. Goat	kg	10	100000	1000000	
62. Pig	kg	10	100000	1000000	
63. Duck	kg	10	100000	1000000	
64. Turkey	kg	10	100000	1000000	
65. Chicken	kg	10	100000	1000000	
66. Fish	kg	10	100000	1000000	
67. Pork	kg	10	100000	1000000	
68. Beef	kg	10	100000	1000000	
69. Lamb	kg	10	100000	1000000	
70. Mutton	kg	10	100000	1000000	
71. Goat	kg	10	100000	1000000	
72. Pig	kg	10	100000	1000000	
73. Duck	kg	10	100000	1000000	
74. Turkey	kg	10	100000	1000000	
75. Chicken	kg	10	100000	1000000	
76. Fish	kg	10	100000	1000000	
77. Pork	kg	10	100000	1000000	
78. Beef	kg	10	100000	1000000	
79. Lamb	kg	10	100000	1000000	
80. Mutton	kg	10	100000	1000000	
81. Goat	kg	10	100000	1000000	
82. Pig	kg	10	100000	1000000	
83. Duck	kg	10	100000	1000000	
84. Turkey	kg	10	100000	1000000	
85. Chicken	kg	10	100000	1000000	
86. Fish	kg	10	100000	1000000	
87. Pork	kg	10	100000	1000000	
88. Beef	kg	10	100000	1000000	
89. Lamb	kg	10	100000	1000000	
90. Mutton	kg	10	100000	1000000	
91. Goat	kg	10	100000	1000000	
92. Pig	kg	10	100000	1000000	
93. Duck	kg	10	100000	1000000	
94. Turkey	kg	10	100000	1000000	
95. Chicken	kg	10	100000	1000000	
96. Fish	kg	10	100000	1000000	
97. Pork	kg	10	100000	1000000	
98. Beef	kg	10	100000	1000000	
99. Lamb	kg	10	100000	1000000	
100. Mutton	kg	10	100000	1000000	

1. Rice
 2. Oil
 3. Beans
 4. Eggs
 5. Chicken
 6. Fish
 7. Pork
 8. Beef
 9. Lamb
 10. Mutton
 11. Goat
 12. Pig
 13. Duck
 14. Turkey
 15. Chicken
 16. Fish
 17. Pork
 18. Beef
 19. Lamb
 20. Mutton
 21. Goat
 22. Pig
 23. Duck
 24. Turkey
 25. Chicken
 26. Fish
 27. Pork
 28. Beef
 29. Lamb
 30. Mutton
 31. Goat
 32. Pig
 33. Duck
 34. Turkey
 35. Chicken
 36. Fish
 37. Pork
 38. Beef
 39. Lamb
 40. Mutton
 41. Goat
 42. Pig
 43. Duck
 44. Turkey
 45. Chicken
 46. Fish
 47. Pork
 48. Beef
 49. Lamb
 50. Mutton
 51. Goat
 52. Pig
 53. Duck
 54. Turkey
 55. Chicken
 56. Fish
 57. Pork
 58. Beef
 59. Lamb
 60. Mutton
 61. Goat
 62. Pig
 63. Duck
 64. Turkey
 65. Chicken
 66. Fish
 67. Pork
 68. Beef
 69. Lamb
 70. Mutton
 71. Goat
 72. Pig
 73. Duck
 74. Turkey
 75. Chicken
 76. Fish
 77. Pork
 78. Beef
 79. Lamb
 80. Mutton
 81. Goat
 82. Pig
 83. Duck
 84. Turkey
 85. Chicken
 86. Fish
 87. Pork
 88. Beef
 89. Lamb
 90. Mutton
 91. Goat
 92. Pig
 93. Duck
 94. Turkey
 95. Chicken
 96. Fish
 97. Pork
 98. Beef
 99. Lamb
 100. Mutton

INTERAGENCY
BURNED AREA EMERGENCY STABILIZATION AND REHABILITATION PLAN

PART E – SUMMARY OF ACTIVITIES – COST SUMMARY TABLE – B.L.M.
COAL SEAM FIRE

TREATMENT SPECIFICATION	UNIT	UNIT COST	# OF UNITS	COST BY FUND SOURCE			IMPLEMENTATION METHOD	SPECIFICATION TOTAL
				F	EWP/O	ESR		
#1 Ditch Breach Evaluation & Design								
#2 Structure Protection Design								
#3 Sediment Basin (runway) Maintenance								
#4 Trash Racks Evaluation & Design								
#5 Soil Netting w/ seed	Acres	\$9,200.00	5			\$46,000.00	C	\$46,000.00
#6 Remove Floatable Debris								
#7 Early Warning System	RAWS	\$22,900.00	2			\$45,800.00	C	\$45,800.00
#8 Diversion Channel Evaluation & Design								
#9 Culvert Cleaning								
#10 Bridge Removal Evaluation								
#11 Contour Straw Wattles	Acres	\$3,885.00	105			\$407,900.00	C	\$407,900.00
#12 Culvert Evaluation & Design								
#13 Hazard Warning Sign								
#14 Straw Mulching	Acres	\$995.00	400			\$398,000.00	P/C	\$398,000.00
#15 Dozerline Rehab.	Miles	0	3.11	0			C	0
#16 Noxious Weed Monitoring	Surveys	\$1,783.00	8			\$8,930.00	P	\$8,930.00
#17 Noxious Weed Control	Acres	\$123.00	10			\$2,245.00	P/C	\$2,245.00
#18 Aerial Mulching/Seeding	Acres	\$2,557.00	1000			\$2,557,100.00	C	\$2,557,100.00
#19 Implementation Leader & Support	Leader	\$55,462.00	1			\$55,462.00	P	\$55,462.00
#20 Plan Preparation	ESR Plan	\$245,310.00	0.5			\$122,655.00	P/EFC	\$122,655.00
#21 Hazard Tree Mitigation								
#22 Native American Consultation								
TOTAL COST						\$3,644,092.00		\$3,644,092.00

COST: F=Fire Suppression Account; EWP/O=Emergency Watershed Program/Other; ESR=Emergency Stabilization and Rehabilitation

INTERAGENCY
BURNED AREA EMERGENCY STABILIZATION AND REHABILITATION PLAN

PART E – SUMMARY OF ACTIVITIES – COST SUMMARY TABLE – NRCS
COAL SEAM FIRE

TREATMENT SPECIFICATION	UNIT	UNIT COST	# OF UNITS	COST BY FUND SOURCE			IMPLEMENTATION METHOD	SPECIFICATION TOTAL
				F	EW/P/O	ESR		
#1 Ditch Breach Evaluation & Design	Ditch Bill Design	\$2,000.00	1		\$2,000.00		C	\$2,000.00
#2 Structure Protection Design	Engineered Design	\$7,000.00	1		\$7,000.00		C	\$7,000.00
#3 Sediment Basin (runway) Maintenance	Cleaning	\$12,700.00	3		\$38,100.00		P/C	\$38,100.00
#4 Trash Racks Evaluation & Design	Debris Rack Design	\$2,000.00	5		\$10,000.00		C	\$10,000.00
#5 Soil Netting w/ seed								
#6 Remove Floatable Debris	Miles	\$51,648.00	3.1		\$160,110.00		P/C	\$160,110.00
#7 Early Warning System								
#8 Diversion Channel Evaluation & Design	Diversion Design	\$10,500.00	1		\$10,500.00		C	\$10,500.00
#9 Culvert Cleaning	Culverts	\$430.00	80		\$34,400.00		C	\$34,400.00
#10 Bridge Removal Evaluation	Bridge	\$714.00	7		\$5,000.00		C	\$5,000.00
#11 Contour Straw Wattles								
#12 Culvert Evaluation & Design	Culverts	\$659.00	22		\$14,500.00		C	\$14,500.00
#13 Hazard Warning Sign	Signs	\$274.00	20		\$5,480.00		C	\$5,480.00
#14 Straw Mulching								
#15 Dozerline Rehab.	Miles	0	2.8	0			C	0
#16 Noxious Weed Monitoring	Surveys	\$1,783.00	8			\$24,930.00	P	\$24,930.00
#17 Noxious Weed Control	Acres	\$123.00	200			\$23,645.00	P/C	\$23,645.00
#18 Aerial Mulching/Seeding	Acres	\$2,557.00	610			\$1,559,830.00	C	\$1,559,830.00
#19 Implementation Leader & Support								
#20 Plan Preparation								
#21 Hazard Tree Mitigation	Tree	\$110.00	220	\$24,200.00			C	\$24,200.00
#22 Native American Consultation								
TOTAL COST				\$24,200.00	\$287,090.00	\$1,608,405.00		\$1,919,695.00

COST: F=Fire Suppression Account; EWP/O=Emergency Watershed Program/Other; ESR=Emergency Stabilization and Rehabilitation

**INTERAGENCY
BURNED AREA EMERGENCY STABILIZATION & REHABILITATION PLAN**

PART F - SPECIFICATION

SPECIFICATION TITLE:	DITCH BREACH DESIGN	JURISDICTIONS:	PRIVATE - NRCS
PART E: LINE ITEM:	#1, Ditch Breach Evaluation & Design	FISCAL YEAR:	2002
ESR REFERENCE#	6.21.2 Watershed and Property Protection Strategy	SPECIFICATION TYPE:	ES

I. WORK TO BE DONE

Number and Describe Each Task:

A. General Description:

Evaluate locations for breaching an existing drainage ditch that threatens the roadway and two private structures in Mitchell Canyon.

B. Location (Suitable) Sites:

See Soil and Watershed Assessment, Appendix I and Treatment Map, Appendix III.

C. Design/Construction Specifications:

1. Obtain written permission from each landowner for treatments to be implemented on private property.
2. Evaluate locations for breaching an existing drainage ditch above the Mitchell Canyon Road.
3. Complete engineering design, including design specification, construction cost estimates, and any required construction drawings or diagrams, for the ditch breach. Provide designs to the Natural Resource Conservation Service.
4. Oversee construction of the ditch breach.

D. Purpose of Treatment Specifications:

A private road and drainage ditch crosses an alluvial fan on the west side of Mitchell Creek Road. The drainage ditch intercepts water flowing across the fan, routes the water along side the road to a culvert under the road, and discharges the water onto the adjoining pasture at the crest of a small ridge. The culvert and ditch are too small to pass expected flood and debris flows. The culvert outlet position would allow water and mud to flow down the private road and across Mitchell Creek Road threatening two residences. Breaching the drainage ditch would allow the water and mud to flow straight across the private road and discharge into the adjoining pasture and away from the residences.

E. Treatment Effectiveness Monitoring:

Visually inspect effectiveness of designed breach following flood event and make any necessary improvements

II. LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST/ITEM
TOTAL PERSONNEL SERVICE COST	\$0

EQUIPMENT PURCHASE, LEASE OR RENTAL (Item @ Cost/Hour or Cost/Day X # Hours or # Days X # Fiscal Years = Cost/Item): (Note: Purchase requires written justification that demonstrates cost/item benefits over lease or rental.)	COST/ITEM
TOTAL EQUIPMENT PURCHASE, LEASE, OR RENTAL COST	\$0

MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X # Fiscal Years = Cost/Item):	COST/ITEM
TOTAL MATERIALS AND SUPPLY COST	\$0

TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X # Fiscal Years = Cost/Item):	COST/ITEM
TOTAL TRAVEL COST	\$0

CONTRACT COST (Labor or Equipment @ Cost/Hour X # Hours X # Fiscal Years = Cost/Item):	COST/ITEM
Civil Engineer evaluation and design of ditch breach including specifications, cost estimates, and any engineering drawings or diagrams @ \$125 / hour X 8 hours	\$1,000
Civil Engineer oversight of ditch breach construction @ \$125 / hour X 8 hours	\$1,000
TOTAL CONTRACT COST	\$2,000

SPECIFICATION COST SUMMARY

FISCAL YEAR	UNIT	UNIT COST	# OF UNITS	COST	FUNDING SOURCE	METHOD
FY 1	Ditch Breach Design	\$2,000	1	\$2,000	EWP	C
FY 2						
FY 3						
TOTAL	Ditch Breach Design	\$2,000	1	\$2,000	EWP	C

Funding Sources:

F = Fire Suppression Account
 EFR=Emergency Fire Rehabilitation
 OP/O =Agency Operating Fund
 EWP = Emergency Watershed Program

Specification Type

ES = Emergency Stabilization
 R = Rehabilitation
 FS = Fire Suppression

Methods For Completion

P=Agency Personnel Services
 C=Contract
 EFC= Emergency Fire Contract
 FC=Crew Labor Assigned to Fire

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	C
3. Estimate supported by cost guides from independent sources or other federal agencies.	
4. Estimates based upon government wage rates and material cost.	
5. No cost estimate required – cost charged to Fire Suppression Account.	

P = Personnel Services M = Materials/Supplies T = Travel C = Contract F = Suppression

III. RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

List Relevant Documentation and Cross-References Within ESR Plan:
 See Soil and Watershed Assessment Appendix I, and Treatment Map, Appendix III.

IV. TOTAL COST BY JURISDICTION

JURISDICTION	UNITS TREATED	COST
Private (NRCS)	Ditch Breach Design	\$2,000
TOTAL COST	DITCH BREACH DESIGN	\$2,000

**INTERAGENCY
BURNED AREA EMERGENCY STABILIZATION & REHABILITATION PLAN**

PART F - SPECIFICATION

SPECIFICATION TITLE:	STRUCTURE PROTECTION DESIGN	JURISDICTIONS:	PRIVATE-STATE
PART E: LINE ITEM:	#2, Structure Protection Design	FISCAL YEAR:	2002
ESR REFERENCE#	6.21.2 Watershed and Property Protection Strategy	SPECIFICATION TYPE:	ES

I. WORK TO BE DONE

Number and Describe Each Task:

A. General Description:

Complete site specific designs for placement of K-rails (jersey barriers), sand bags or other treatments to protect structures on private lands and the State Fish Hatchery facilities in Mitchell Canyon.

B. Location (Suitable) Sites:

General location is Mitchell Creek Canyon from Interstate 70 to approximately 2.1 miles up stream. See Watershed Treatment Map in Appendix III.

C. Design/Construction Specifications:

1. Obtain written permission from each landowner for treatments to be completed on private lands.
2. Engineer should review BAER Team Soil and Watershed Assessment and recommendations for mitigation of impacts to structures on private lands.
3. Complete engineering design (include all specifications and design diagrams) to protect structures determined to be at risk to flood events and/or debris flows.
4. Design should be sufficient to protect historic fish hatchery buildings. Sand derived from stream channels will not be used in any treatments (sand bagging) from the fish hatchery upstream to prevent introduction of whirling disease in the hatchery and upper Mitchell Creek.
5. Provide detailed cost estimates for construction
6. Manage construction of designed protection measures.

D. Purpose of Treatment Specifications:

To protect residential structures and the State Fish Hatchery in Mitchell Creek Canyon from potential flood events and/or debris flows.

E. Treatment Effectiveness Monitoring:

Visually inspect protection measures for effectiveness and make improvements as required.

II. LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST/ITEM
TOTAL PERSONNEL SERVICE COST	\$0
EQUIPMENT PURCHASE, LEASE OR RENTAL (Item @ Cost/Hour or Cost/Day X # Hours or # Days X # Fiscal Years = Cost/Item): (Note: Purchase requires written justification that demonstrates cost/item benefits over lease or rental.)	COST/ITEM
TOTAL EQUIPMENT PURCHASE, LEASE, OR RENTAL COST	\$0

MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X # Fiscal Years = Cost/Item):	COST/ITEM
TOTAL MATERIALS AND SUPPLY COST	\$0
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X # Fiscal Years = Cost/Item):	COST/ITEM
TOTAL TRAVEL COST	\$0
CONTRACT COST (Labor or Equipment @ Cost/Hour X # Hours X # Fiscal Years = Cost/Item):	COST/ITEM
Civil Engineer to design protection measures for all structures at risk as identified in the Coal Seam Emergency Stabilization and Rehabilitation Plan @ \$125 / hr X 16 hours	\$2,000
Civil Engineer to manage construction of protection measures @ \$125 / hr. X 40 hours	\$5,000
TOTAL CONTRACT COST	\$7,000

SPECIFICATION COST SUMMARY

FISCAL YEAR	UNIT	UNIT COST	# OF UNITS	COST	FUNDING SOURCE	METHOD
FY 1	Engineered Design	\$7,000	1	\$7,000	EWP	C
FY 2						
FY 3						
TOTAL	Engineered Design	\$7,000	1	\$7,000	EWP	C

Funding Sources:
 F = Fire Suppression Account
 EFR=Emergency Fire Rehabilitation
 OPIO =Agency Operating Fund
 EWP = Emergency Watershed Program

Specification Type
 ES = Emergency Stabilization
 R = Rehabilitation
 FS = Fire Suppression

Methods For Completion
 P=Agency Personnel Services
 C=Contract
 EFC= Emergency Fire Contract
 FC=Crew Labor Assigned to Fire

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	C
3. Estimate supported by cost guides from independent sources or other federal agencies.	
4. Estimates based upon government wage rates and material cost.	
5. No cost estimate required – cost charged to Fire Suppression Account.	

P = Personnel Services M = Materials/Supplies T = Travel C = Contract F = Suppression

III. RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

List Relevant Documentation and Cross-References Within ESR Plan:
 See Watershed Assessment Appendix I, and Watershed Treatment Map, Appendix III.

IV. TOTAL COST BY JURISDICTION

JURISDICTION	UNITS TREATED	COST
Private (NRCS)		\$7,000
TOTAL COST	ENGINEERING DESIGN FOR UP TO 25 STRUCTURES	\$7,000

**INTERAGENCY
BURNED AREA EMERGENCY STABILIZATION & REHABILITATION PLAN**

PART F - SPECIFICATION

SPECIFICATION TITLE:	CLEAN HATCHERY DEBRIS BASIN (RUNWAYS)	JURISDICTIONS:	STATE - NRCS
PART E: LINE ITEM:	#3, Sediment Basin (runway) Maintenance	FISCAL YEAR:	2002, 2003
ESR REFERENCE#	6.21.2 Watershed & Property Protection Strategy	SPECIFICATION TYPE:	ES

I. WORK TO BE DONE

<p>Number and Describe Each Task:</p> <p>A. General Description:</p> <p>Remove debris and fill from State Fish Hatchery Runways to be used as debris basins during flood events in Mitchell Canyon.</p> <p>B. Location (Suitable) Sites:</p> <p>Glenwood Springs State Fish Hatchery, Mitchell Creek Road</p> <p>C. Design/Construction Specifications:</p> <ol style="list-style-type: none"> Utilize trash pump to drain debris basin after flood event. Use excavator or back-hoe and dump truck to remove mud and debris subsequent to draining water. Mud should be loaded into dump truck and deposited out-side the flood plain where it cannot re-enter stream channels. Use hand crews to complete removal of debris that cannot be removed by back-hoe. <p>D. Purpose of Treatment Specifications:</p> <p>To maximize debris basin capacity for subsequent flood events and eventual re-use as runways.</p> <p>E. Treatment Effectiveness Monitoring:</p> <p>Complete visual inspection following flood events to determine need.</p>
--

II. LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST/ITEM
Type 2 crew @ \$3,300 / day X 2 days per flood event X 3 flood events	\$19,800
Lodging/per diem @ \$1,400 / day X 3 days	\$4,200
TOTAL PERSONNEL SERVICE COST	\$24,000
EQUIPMENT PURCHASE, LEASE OR RENTAL (Item @ Cost/Hour or Cost/Day X # Hours or # Days X # Fiscal Years = Cost/Item): (Note: Purchase requires written justification that demonstrates cost/item benefits over lease or rental.)	COST/ITEM
TOTAL EQUIPMENT PURCHASE, LEASE, OR RENTAL COST	\$0
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X # Fiscal Years = Cost/Item):	COST/ITEM
TOTAL MATERIALS AND SUPPLY COST	\$0

TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X # Fiscal Years = Cost/Item):	COST/ITEM
TOTAL TRAVEL COST	\$0
CONTRACT COST (Labor or Equipment @ Cost/Hour X # Hours X # Fiscal Years = Cost/Item):	COST/ITEM
Operator and Trash pump @ \$150 / day X 2 days / flood event X 3 events	\$900
Operator and Excavator @ \$1,400 / day X 2 days / flood event X 3 events	\$8,400
Operator and Dump Truck @ \$400 / day X 2 trucks X 2 days / flood event X 3 events	\$4,800
TOTAL CONTRACT COST	\$14,100

SPECIFICATION COST SUMMARY

FISCAL YEAR	UNIT	UNIT COST	# OF UNITS	COST	FUNDING SOURCE	METHOD
FY 1	CLEANING	\$12,700	2	\$25,400	EWP	P/C
FY 2	CLEANING	\$12,700	1	\$12,700	EWP	P/C
FY 3						
TOTAL	CLEANING	\$12,700	3	\$38,100	EWP	P/C

Funding Sources:
 F = Fire Suppression Account
 EFR=Emergency Fire Rehabilitation
 OPIO =Agency Operating Fund
 EWP = Emergency Watershed Program

Specification Type
 ES = Emergency Stabilization
 R = Rehabilitation
 FS = Fire Suppression

Methods For Completion
 P=Agency Personnel Services
 C=Contract
 EFC= Emergency Fire Contract
 FC=Crew Labor Assigned to Fire

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	P/C
3. Estimate supported by cost guides from independent sources or other federal agencies.	
4. Estimates based upon government wage rates and material cost.	
5. No cost estimate required – cost charged to Fire Suppression Account.	

P = Personnel Services M = Materials/Supplies T = Travel C = Contract F = Suppression

III. RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

List Relevant Documentation and Cross-References Within ESR Plan:
 See Soil and Watershed Assessment, Appendix I for more detail.

IV. TOTAL COST BY JURISDICTION

JURISDICTION	UNITS TREATED	COST
State - NRCS	Debris Basin (runway)	\$38,100
TOTAL COST	DEBRIS BASIN	\$38,100

**INTERAGENCY
BURNED AREA EMERGENCY STABILIZATION & REHABILITATION PLAN**

PART F - SPECIFICATION

SPECIFICATION TITLE:	DESIGN TRASH RACKS	JURISDICTIONS:	PRIVATE - NRCS
PART E: LINE ITEM:	#4, Trash Racks Evaluation & Design	FISCAL YEAR:	2002
ESR REFERENCE#	6.21.2 Watershed & Property Protection Strategy	SPECIFICATION TYPE:	ES

I. WORK TO BE DONE

Number and Describe Each Task:

A. General Description:
Complete site specific designs for placement of up to 5 trash racks to protect culvert inlets and bridges at recommended locations.

B. Location (Suitable) Sites:
Mitchell Creek and South Canyon. See Soil and Watershed Assessment, Appendix I and Treatment Map, Appendix III.

C. Design/Construction Specifications:

1. Obtain written permission from each landowner for treatments to be implemented on private property.
2. Provide civil engineering services to evaluate recommended debris rack locations and complete construction designs including specifications, cost estimates, construction diagrams, and drawings.
3. Provide civil engineering services for oversight of debris rack construction

D. Purpose of Treatment Specifications:
To design trash racks that will reduce the possibility of debris to plug culverts and to oversee installation.

To prevent culverts and bridges from becoming blocked by debris conveyed by flood and/or debris flows. These blockages cause flood waters to leave the channel and go around or over the drainage structure, thereby increasing flooding.

E. Treatment Effectiveness Monitoring:
Visually inspect debris racks subsequent to flood events and make any necessary improvements.

II. LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST/ITEM
TOTAL PERSONNEL SERVICE COST	\$0
EQUIPMENT PURCHASE, LEASE OR RENTAL (Item @ Cost/Hour or Cost/Day X # Hours or # Days X # Fiscal Years = Cost/Item): (Note: Purchase requires written justification that demonstrates cost/item benefits over lease or rental.)	COST/ITEM
TOTAL EQUIPMENT PURCHASE, LEASE, OR RENTAL COST	\$0
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X # Fiscal Years = Cost/Item):	COST/ITEM
TOTAL MATERIALS AND SUPPLY COST	\$0

TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X # Fiscal Years = Cost/Item):	COST/ITEM
TOTAL TRAVEL COST	\$0
CONTRACT COST (Labor or Equipment @ Cost/Hour X # Hours X # Fiscal Years = Cost/Item):	COST/ITEM
Civil Engineer evaluation of recommended debris rack locations and completion of engineer design for trash racks @ \$125 / hour X 40 hours	\$5,000
Civil Engineer oversight of debris rack construction @ \$125 / hour X 40 hours	\$5,000
TOTAL CONTRACT COST	\$10,000

SPECIFICATION COST SUMMARY

FISCAL YEAR	UNIT	UNIT COST	# OF UNITS	COST	FUNDING SOURCE	METHOD
FY 1	Debris Rack Design	\$2,000	5	\$10,000	EWP	C
FY 2						
FY 3						
TOTAL	Debris Rack Design	\$2,000	5	\$10,000	EWP	C

Funding Sources:
 F = Fire Suppression Account
 EFR=Emergency Fire Rehabilitation
 OP/O =Agency Operating Fund
 EWP = Emergency Watershed Program

Specification Type
 ES = Emergency Stabilization
 R = Rehabilitation
 FS = Fire Suppression

Methods For Completion
 P=Agency Personnel Services
 C=Contract
 EFC= Emergency Fire Contract
 FC=Crew Labor Assigned to Fire

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	C
3. Estimate supported by cost guides from independent sources or other federal agencies.	
4. Estimates based upon government wage rates and material cost.	
5. No cost estimate required – cost charged to Fire Suppression Account.	

P = Personnel Services M = Materials/Supplies T = Travel C = Contract F = Suppression

III. RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

List Relevant Documentation and Cross-References Within ESR Plan:
 See Soil and Watershed Assessment, Appendix I and Treatment Map, Appendix III.

IV. TOTAL COST BY JURISDICTION

JURISDICTION	UNITS TREATED	COST
Private - NRCS	5 Debris Racks	\$10,000
TOTAL COST	5 DEBRIS RACKS	\$10,000

**INTERAGENCY
BURNED AREA EMERGENCY STABILIZATION & REHABILITATION PLAN**

PART F - SPECIFICATION

SPECIFICATION TITLE:	SOIL NETTING	JURISDICTIONS:	BLM
PART E: LINE ITEM:	#5, Soil Netting With Seed	FISCAL YEAR:	2002
ESR REFERENCE#	6.21.1 Surface Stabilization & Property Protection	SPECIFICATION TYPE:	ES

I. WORK TO BE DONE

Number and Describe Each Task:

A. General Description:

Install soil netting (erosion control blanket) with seed mix incorporated into blanket on approximately 5 acres of slope at risk to sheet and rill erosion.

B. Location (Suitable) Sites:

Slopes susceptible to sheet and rill erosion (see Watershed Treatment Map, Appendix III for slope locations proposed for treatment).

C. Design/Construction Specifications:

1. Seed mixture for the Coal Seam Fire was selected by the BAER Team Vegetation Specialist in consultation with local agency staff based on agency policies, regulations, and mandates. Seed should be tested for purity and germination areas. Before accepting delivery of seed the contractor must provide written evidence (seed label and letter) that the seed conforms to the purity and germination requirements in the specification. Test methods specified in Rules for Testing Seeds, Proceedings of the Association of Official Seed Analyst will be acceptable for determining the germination rate. Seed designated without a purity or germination rate shall be labeled to include the name, date (month and year) collected, and the name and address of the seed supplier. A sample of approximately 30g of seed will be taken from each seed container prior to incorporation into the netting. Seed mixture is as follows:

SPECIES	VARIETY	SEEDING RATE (LBS. / ACRE)
Great Basin Wildrye	Salina	2.0
Streambank Wheatgrass	Sodar	3.0
Bluebunch Wheatgrass	Secar	3.0
Western Wheatgrass	Arriba	3.0
Northern Sweetvetch	Monarch	2.0

2. Erosion control blanket shall consist of straw or wood excelsior mat secured in place with wire staples and shall conform to the following:
 - a. Excelsior blanket material shall consist of machine produced mats of curled wood excelsior blanket with 80 percent of the fiber 150 mm or longer. The erosion control blanket shall be of consistent thickness and the wood fiber shall be evenly distributed over the entire area of the blanket. The top surface of the blanket shall be covered with a photo-degradable extruded plastic mesh. The blanket shall be smolder resistant without the use of chemical additives and shall be non-toxic and non-injurious to plant and animal life. Erosion blanket shall be furnished in rolled strips, 4 ft. X 225 ft. with a normal weight of approximately 90 lbs..
 - b. On slopes, secure netting at top by laying at least 6" of material below grade (secure with the staples and cover with at least 6" of fill). Staples should be spaced every 18" to 24". The steeper the slope, the closer staples should be placed. Apply netting by unrolling it down the slope and terminate at level area. Fold 6" of netting under itself and secure with staples or live stakes. Overlap all seams at least 2" to 6".

D. Purpose of Treatment Specifications:

Soil netting is intended to capture and keep sediment on slopes. Soil netting is useful to temporarily stabilize slopes by reducing soil creep and sheet and rill erosion until permanent vegetation can get established. Organic matter and native seeds are trapped by netting, which provide a stable medium for germination. Soil netting traps fertile topsoil and retain moisture from rainfall, which aids in growth of tree seedlings.

E. Treatment Effectiveness Monitoring:

Visually inspect netting for failures and re-staple as necessary.

II. LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST/ITEM
Type II Crew @ \$3,300 / day X 2 days X 2 crews	\$13,200
TOTAL PERSONNEL SERVICE COST	\$13,200
EQUIPMENT PURCHASE, LEASE OR RENTAL (Item @ Cost/Hour or Cost/Day X # Hours or # Days X # Fiscal Years = Cost/Item): (Note: Purchase requires written justification that demonstrates cost/item benefits over lease or rental.)	COST/ITEM
TOTAL EQUIPMENT PURCHASE, LEASE, OR RENTAL COST	\$0
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X # Fiscal Years = Cost/Item):	COST/ITEM
Erosion netting with seed and staples @ \$70 / roll X 440 rolls	\$30,800
Staples, sledge hammers	\$2,000
TOTAL MATERIALS AND SUPPLY COST	\$30,800 \$32,800
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X # Fiscal Years = Cost/Item):	COST/ITEM
TOTAL TRAVEL COST	\$0
CONTRACT COST (Labor or Equipment @ Cost/Hour X # Hours X # Fiscal Years = Cost/Item):	COST/ITEM
2 sawyers plus 2 swampers for 2 days	\$4,000
TOTAL CONTRACT COST	\$4,000

SPECIFICATION COST SUMMARY

FISCAL YEAR	UNIT	UNIT COST	# OF UNITS	COST	FUNDING SOURCE	METHOD
FY 1	Acres	\$10,000	5	\$50,000	ES	C
FY 2						
FY 3						
TOTAL	Acres	\$10,000	5	\$50,000	ES	C

Funding Sources:
 F = Fire Suppression Account
 EFR=Emergency Fire Rehabilitation
 OP/O =Agency Operating Fund
 EWP = Emergency Watershed Program

Specification Type
 ES = Emergency Stabilization
 R = Rehabilitation
 FS = Fire Suppression

Methods For Completion
 P=Agency Personnel Services
 C=Contract
 EFC= Emergency Fire Contract
 FC=Crew Labor Assigned to Fire

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	M
3. Estimate supported by cost guides from independent sources or other federal agencies.	
4. Estimates based upon government wage rates and material cost.	P
5. No cost estimate required – cost charged to Fire Suppression Account.	

P = Personnel Services M = Materials/Supplies T = Travel C = Contract F = Suppression

III. RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

List Relevant Documentation and Cross-References Within ESR Plan:
See Appendix I, Watershed Assessment and Appendix III, Watershed Treatment Map.

IV. TOTAL COST BY JURISDICTION

JURISDICTION	UNITS TREATED	COST
BLM	5 Acres	\$50,000
TOTAL COST	5 ACRES	\$50,000

**INTERAGENCY
BURNED AREA EMERGENCY STABILIZATION & REHABILITATION PLAN**

PART F - SPECIFICATION

SPECIFICATION TITLE:	REMOVE FLOATABLE DEBRIS FROM CHANNELS AND FLOOD PLAIN	JURISDICTIONS:	PRIVATE-NRCS
PART E: LINE ITEM:	#6, Remove Floatable Debris	FISCAL YEAR:	2002
ESR REFERENCE#	6.21.2 Watershed & Property Protection Strategy	SPECIFICATION TYPE:	ES

I. WORK TO BE DONE

Number and Describe Each Task:

A. General Description:

Remove debris from approximately 3.1 miles of Mitchell Creek and South Canyon stream channels. Crews will be used to remove course debris to maximize channel capacity and eliminate obstructions that could block culverts or divert flows out of the channel. Debris includes hazard trees felled by suppression crews and debris from burned residential structures and vehicles. County equipment and personnel will handle removal and disposal of debris.

B. Location (Suitable) Sites:

Mitchell Creek and South Canyon (see Treatment Map, Appendix III).

C. Design/Construction Specifications:

1. Obtain written permission from each landowner for treatments to be implemented on private property.
2. Remove debris from channel and haul out of canyon for disposal outside of the flood plain. Wood debris will be made available to the public. Residential and vehicle debris will be recycled or appropriately disposed of by the County.

D. Purpose of Treatment Specifications:

To maximize flood channel capacity and eliminate obstructions that could block culverts or damage bridges, roads and other structures.

E. Treatment Effectiveness Monitoring:

Inspect stream channels after flood events to remove new floatable debris deposited in the channel.

II. LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST/ITEM
Type II Crew @ \$3,300 / day X 30 days	\$99,000
Hydrologist GS-11 @ \$237 / day X 30 days	\$7,110
TOTAL PERSONNEL SERVICE COST	\$ 106,110
EQUIPMENT PURCHASE, LEASE OR RENTAL (Item @ Cost/Hour or Cost/Day X # Hours or # Days X # Fiscal Years = Cost/Item): (Note: Purchase requires written justification that demonstrates cost/item benefits over lease or rental.)	COST/ITEM
Operator and Dump Truck @ \$400 / day X 30 days X 3 trucks	\$36,000
Operator and Front-end Loader @ \$600 / day X 30 days	\$18,000
TOTAL EQUIPMENT PURCHASE, LEASE, OR RENTAL COST	\$54,000

MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X # Fiscal Years = Cost/Item):	COST/ITEM
TOTAL MATERIALS AND SUPPLY COST	\$0
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X # Fiscal Years = Cost/Item):	COST/ITEM
TOTAL TRAVEL COST	\$0
CONTRACT COST (Labor or Equipment @ Cost/Hour X # Hours X # Fiscal Years = Cost/Item):	COST/ITEM
TOTAL CONTRACT COST	\$0

SPECIFICATION COST SUMMARY

FISCAL YEAR	UNIT	UNIT COST	# OF UNITS	COST	FUNDING SOURCE	METHOD
FY 1	MILE	\$51,648	3.1	\$160,110	EWP	P/C
FY 2						
FY 3						
TOTAL	MILE	\$51,648	3.1	\$160,110	EWP	P/C

Funding Sources:
 F = Fire Suppression Account
 EFR=Emergency Fire Rehabilitation
 OP/O =Agency Operating Fund
 EWP = Emergency Watershed Program

Specification Type
 ES = Emergency Stabilization
 R = Rehabilitation
 FS = Fire Suppression

Methods For Completion
 P=Agency Personnel Services
 C=Contract
 EFC= Emergency Fire Contract
 FC=Crew Labor Assigned to Fire

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	
3. Estimate supported by cost guides from independent sources or other federal agencies.	
4. Estimates based upon government wage rates and material cost.	P/C
5. No cost estimate required – cost charged to Fire Suppression Account.	

P = Personnel Services M = Materials/Supplies T = Travel C = Contract F = Suppression

III. RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

<p>List Relevant Documentation and Cross-References Within ESR Plan: See Soil and Watershed Assessment, Appendix I and Treatment Map, Appendix III.</p>
--

IV. TOTAL COST BY JURISDICTION

JURISDICTION	UNITS TREATED	COST
NRCS - PRIVATE LANDS	3.1 MILES	\$160,110
TOTAL COST	3.1 MILES	\$160,110

REMOVE FLOATABLE DEBRIS

**INTERAGENCY
BURNED AREA EMERGENCY STABILIZATION & REHABILITATION PLAN**

PART F - SPECIFICATION

SPECIFICATION TITLE:	EARLY WARNING SYSTEM	JURISDICTIONS:	BLM, FS,PRV
PART E: LINE ITEM:	#7, Early Warning System	FISCAL YEAR:	2002-2003- 2004
ESR REFERENCE#	6.8.4 Early Warning System	SPECIFICATION TYPE:	ES

I. WORK TO BE DONE

Number and Describe Each Task:

A. General Description:

Install automated rain gauges within the burn area that are connected with a remote automated warning system

B. Location (Suitable) Sites:

Three units will be installed, one on the north rim of Mitchell Creek (USFS land) called "Mitchell Canyon", one east of the Mitchell Creek Fish Hatchery (BLM Land) called "Fish Hatchery", and one near Red Mountain on the northeast rim of South Canyon called "South Canyon" (see Appendix III, Treatment Map for specific locations).

Sites were positioned with resource grade GPS (± 2 to 5 meters, NAD27) with the following coordinates:

- Mitchell Canyon: 107° 21' 30.7945" W 39° 36' 0.7159" N
- Fish Hatchery: 107° 22' 3.5474" W 39° 34' 47.5913" N
- South Canyon: 107° 21' 56.6365" W 39° 32' 31.3073" N

C. Design/Construction Specifications:

1. Install three Remote Automated Weather Stations (RAWS).
2. The weather stations will be programmed to relay "real-time" weather information to the National Weather Service.
3. The early warning system will be maintained by National Interagency Fire Center (NIFC) and connected to the dispatch center for the Garfield County Sheriff's Office via radio and/or phone lines. Mitchell Canyon RAWS should be tied into a siren to give immediate warning to residents in the canyon.
4. All stations will call on frequency Receiver 155.4750, and Transmitter 155.4750. Fish Hatchery station will also be linked digitally over a phone line and should be set to cell (970) 625-8095 which also will connect to Garfield County Dispatch. Testing of locations should be completed by calling Garfield County Dispatch. The repeater is located on Sunlight Peak. Bob Kibler is the Contact at Garfield County Dispatch (970) 625-8095. If Sunrise Peak repeater will not function due to line of sight, Bob Kibler will assist with portable repeater.
5. The Fish Hatchery station will have power and telephone extended to the installation site. To extend telephone line to site, call Gary Gibson or Mike Summers with Quest Communications at (970) 384-0255. Quest Business section will set up telephone number for this station, call 1-800-602-6000. The address for this telephone is Pedestal #1415 on County Road #132, West Glenwood, CO.
6. Extend 2000 feet of telephone line to the site. The phone line should be buried a minimum of 6 to 18 inches deep beside county road #132 and centered on private land (Rudy Steele's property). The line will cross Mitchell Creek attached to the bridge or span above to prevent flood damage to line at discretion of implementation team. Possible Vendors include: McDaniels Contracting at (930) 250-4419 or (970) 285-1270.
7. Installation of the South Canyon will require a helicopter to place crew and equipment.
8. The Glenwood Springs Mud and Flood Task Force will design and implement a contact and evacuation plan based on flood zones delineated by the BAER Team.
Issue new release when system is on line informing the public of its activation. Provide a web-site where people can access weather station data and how emergency messages will be broadcast through Sheriff's Department.

D. Purpose of Treatment Specifications:

The RAWs stations are to provide an early warning system in response to anticipated flood events resulting from the burned area above the community of Glenwood Springs, Colorado. ESR treatments cannot protect life and property from all size floods. The early warning system allows people to evacuate the area when flood hazards are imminent.

E. Treatment Effectiveness Monitoring:

Monitor systems ability to provide adequate warnings in relation to flood and/or debris flows. Station monitoring will be conducted by NIFC.

II. LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST/ITEM
TOTAL PERSONNEL SERVICE COST	\$0

EQUIPMENT PURCHASE, LEASE OR RENTAL (Item @ Cost/Hour or Cost/Day X # Hours or # Days X # Fiscal Years = Cost/Item): (Note: Purchase requires written justification that demonstrates cost/item benefits over lease or rental.)	COST/ITEM
TOTAL EQUIPMENT PURCHASE, LEASE, OR RENTAL COST	\$0

MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X # Fiscal Years = Cost/Item):	COST/ITEM
- Purchase supplies, construct, and install 3 RAWs units equipped for use as early warning systems (see details Appendix V, Supporting Documentation)	\$41,900
- Maintain 3 RAWs stations with full service maintenance plan for 3 years	\$18,700
TOTAL MATERIALS AND SUPPLY COST	\$60,600

TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X # Fiscal Years = Cost/Item):	COST/ITEM
TOTAL TRAVEL COST	\$0

CONTRACT COST (Labor or Equipment @ Cost/Hour X # Hours X # Fiscal Years = Cost/Item):	COST/ITEM
- Install telephone line from Fish Hatchery site. 2000 ft @ \$0.95/foot = \$1,900	
- Install power line to Fish Hatchery site. 150' @ \$20/foot = \$3000	\$8,100
- Helicopter Flight to install South Canyon Site. 4 hours @ \$800/hour = \$3,200	
TOTAL CONTRACT COST	\$8,100

SPECIFICATION COST SUMMARY

FISCAL YEAR	UNIT	UNIT COST	# OF UNITS	COST	FUNDING SOURCE	METHOD
FY 1	RAWS	\$19,367	3	\$58,100	EFR	EFC
FY 2	Maintenance	\$1,767	3	\$5,300	EFR	EFC
FY 3	Maintenance	\$1,767	3	\$5,300	EFR	EFC
TOTAL	RAWS	\$22,901	3	\$68,700	EFR	EFC

Funding Sources:

F = Fire Suppression Account
 EFR=Emergency Fire Rehabilitation
 OP/O =Agency Operating Fund
 EWP = Emergency Watershed Program

Specification Type

ES = Emergency Stabilization
 R = Rehabilitation
 FS = Fire Suppression

Methods For Completion

P=Agency Personnel Services
 C=Contract
 EFC= Emergency Fire Contract
 FC=Crew Labor Assigned to Fire

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	C
3. Estimate supported by cost guides from independent sources or other federal agencies.	
4. Estimates based upon government wage rates and material cost.	
5. No cost estimate required – cost charged to Fire Suppression Account.	

P = Personnel Services M = Materials/Supplies T = Travel C = Contract F = Suppression

III. RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

List Relevant Documentation and Cross-References Within ESR Plan:

See Soil and Watershed Assessment, Appendix I, Treatment Map, Appendix III, and Supporting Documentation, Appendix V.

IV. TOTAL COST BY JURISDICTION

JURISDICTION	UNITS TREATED	COST
BLM	2 RAWS	\$45,800
FS	1 RAWS	\$22,900
TOTAL COST	3 RAWS	\$68,700

**INTERAGENCY
BURNED AREA EMERGENCY STABILIZATION & REHABILIZATION PLAN**

PART F - SPECIFICATION

SPECIFICATION TITLE:	DIVERSION CHANNEL DESIGN	JURISDICTIONS:	PRIVATE - NRCS
PART E: LINE ITEM:	#8, Diversion Channel Evaluation & Design	FISCAL YEAR:	2002
ESR REFERENCE#	6.21.2 Watershed & Property Protection Strategy	SPECIFICATION TYPE:	ES

I. WORK TO BE DONE

Number and Describe Each Task:

A. General Description:

Evaluate and complete site specific designs for diversion channel to protect residence on private in Mitchell Creek Canyon.

B. Location (Suitable) Sites:

See Soil and Watershed Assessment, Appendix I and Watershed Treatment Map, Appendix III.

C. Design/Construction Specifications:

1. Obtain written permission from landowners for treatments to be implemented on private property.
2. Evaluate location for construction of a water diversion channel around residence.
3. Complete construction design including specifications, cost estimates, diagrams and engineering drawing. Provide designs to the Natural Resource Conservation Service for implementation.
4. Provide engineering oversight of project construction.

D. Purpose of Treatment Specifications:

A residence on the west side of Mitchell Creek Road is positioned directly in the flow path of a small tributary watershed. This watershed is at high risk of debris flows. In the present configuration, a debris flow would flow directly at the house. A diversion channel is needed to divert the debris flow around the residence.

E. Treatment Effectiveness Monitoring:

Visually inspect channel following flood events to determine effectiveness and make necessary improvements.

II. LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST/ITEM
TOTAL PERSONNEL SERVICE COST	\$0
EQUIPMENT PURCHASE, LEASE OR RENTAL (Item @ Cost/Hour or Cost/Day X # Hours or # Days X # Fiscal Years = Cost/Item): (Note: Purchase requires written justification that demonstrates cost/item benefits over lease or rental.)	COST/ITEM
TOTAL EQUIPMENT PURCHASE, LEASE, OR RENTAL COST	\$0
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X # Fiscal Years = Cost/Item):	COST/ITEM
TOTAL MATERIALS AND SUPPLY COST	\$0

TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X # Fiscal Years = Cost/Item):	COST/ITEM
TOTAL TRAVEL COST	\$0
CONTRACT COST (Labor or Equipment @ Cost/Hour X # Hours X # Fiscal Years = Cost/Item):	COST/ITEM
Civil Engineer evaluation of diversion channel location and completion of engineering design of diversion channel @ \$125 / hour X 60 hours	\$7,500
Civil Engineer oversight of diversion channel construction @ \$125 / hour X 24 hours	\$3,000
TOTAL CONTRACT COST	\$10,500

SPECIFICATION COST SUMMARY

FISCAL YEAR	UNIT	UNIT COST	# OF UNITS	COST	FUNDING SOURCE	METHOD
FY 1	Diversion Design	\$10,500	1	\$10,500	EWP	C
FY 2						
FY 3						
TOTAL	Diversion Design	\$10,500	1	\$10,500	EWP	C

Funding Sources:
 F = Fire Suppression Account
 EFR=Emergency Fire Rehabilitation
 OP/O =Agency Operating Fund
 EWP = Emergency Watershed Program

Specification Type
 ES = Emergency Stabilization
 R = Rehabilitation
 FS = Fire Suppression

Methods For Completion
 P=Agency Personnel Services
 C=Contract
 EFC= Emergency Fire Contract
 FC=Crew Labor Assigned to Fire

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	C
3. Estimate supported by cost guides from independent sources or other federal agencies.	
4. Estimates based upon government wage rates and material cost.	
5. No cost estimate required – cost charged to Fire Suppression Account.	

P = Personnel Services M = Materials/Supplies T = Travel C = Contract F = Suppression

III. RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

List Relevant Documentation and Cross-References Within ESR Plan:
 See Soil and Watershed Assessment, Appendix I and Treatment Map, Appendix III.

IV. TOTAL COST BY JURISDICTION

JURISDICTION	UNITS TREATED	COST
Private Land - NRCS	Diversion Channel Design	\$10,500
TOTAL COST	DIVERSION CHANNEL DESIGN	\$10,500

**INTERAGENCY
BURNED AREA EMERGENCY STABILIZATION & REHABILITATION PLAN**

PART F - SPECIFICATION

SPECIFICATION TITLE:	CULVERT CLEANING	JURISDICTIONS:	PRIVATE - NRCS
PART E: LINE ITEM:	#9, Culvert Cleaning	FISCAL YEAR:	2002 -2003
ESR REFERENCE#	6.21.2 Watershed & Property Protection Strategy	SPECIFICATION TYPE:	ES

I. WORK TO BE DONE

Number and Describe Each Task:

A. General Description:

Culverts that are in areas at risk to flooding and/or debris flows should be cleaned to ensure maximum flow capacity. Subsequent to flood events culverts should be inspected and if necessary re-cleaned

B. Location (Suitable) Sites:

See Culvert Inventory, Supporting Documentation, Appendix V for specific locations and photo-documentation

C. Design/Construction Specifications:

1. Shovel and flush debris from culverts and place outside of channel where it cannot re-enter stream channels.
2. Use backhoe and dump truck to remove debris and fill from channel and around culvert. Use water tender and/or fire engine to flush debris out of culverts.

D. Purpose of Treatment Specifications:

To maximize culvert and channel capacity to handle flood flows and protect road beds.

E. Treatment Effectiveness Monitoring:

Visually inspect each culvert in flood prone areas subsequent to rain events and clean those blocked.

II. LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST/ITEM
TOTAL PERSONNEL SERVICE COST	\$0
EQUIPMENT PURCHASE, LEASE OR RENTAL (Item @ Cost/Hour or Cost/Day X # Hours or # Days X # Fiscal Years = Cost/Item): (Note: Purchase requires written justification that demonstrates cost/item benefits over lease or rental.)	COST/ITEM
TOTAL EQUIPMENT PURCHASE, LEASE, OR RENTAL COST	\$0
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X # Fiscal Years = Cost/Item):	COST/ITEM
TOTAL MATERIALS AND SUPPLY COST	\$0
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X # Fiscal Years = Cost/Item):	COST/ITEM
TOTAL TRAVEL COST	\$0

CONTRACT COST (Labor or Equipment @ Cost/Hour X # Hours X # Fiscal Years = Cost/Item):	COST/ITEM
Operator and Backhoe @ \$65 / hour X 40 hours / flood event X 4 flood events	\$10,400
Operator and Dump Truck @ \$65 / hour X 40 / hours / flood event X 4 flood events	\$10,400
Operator and Water Tender @ \$85 / hour X 40 / hours / flood event X 4 flood events	\$13,600
TOTAL CONTRACT COST	\$34,400

SPECIFICATION COST SUMMARY

FISCAL YEAR	UNIT	UNIT COST	# OF UNITS	COST	FUNDING SOURCE	METHOD
FY 1	CULVERTS	\$430	40	\$17,200	EWP	C
FY 2	CULVERTS	\$430	40	\$17,200	EWP	C
FY 3						
TOTAL	CULVERTS	\$430	80	\$34,400	EWP	C

Funding Sources:

F = Fire Suppression Account
 EFR=Emergency Fire Rehabilitation
 OP/O =Agency Operating Fund
 EWP = Emergency Watershed Program

Specification Type

ES = Emergency Stabilization
 R = Rehabilitation
 FS = Fire Suppression

Methods For Completion

P=Agency Personnel Services
 C=Contract
 EFC= Emergency Fire Contract
 FC=Crew Labor Assigned to Fire

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	C
3. Estimate supported by cost guides from independent sources or other federal agencies.	
4. Estimates based upon government wage rates and material cost.	
5. No cost estimate required – cost charged to Fire Suppression Account.	

P = Personnel Services M = Materials/Supplies T = Travel C = Contract F = Suppression

III. RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

List Relevant Documentation and Cross-References Within ESR Plan:

See Soil and Watershed Assessment, Appendix I, Treatment Map, Appendix III, and Culvert Inventory, Supporting Documentation, Appendix V.

IV. TOTAL COST BY JURISDICTION

JURISDICTION	UNITS TREATED	COST
Private - NRCS	80 Culverts	\$34,400
TOTAL COST	80 CULVERTS	\$34,400

**INTERAGENCY
BURNED AREA EMERGENCY STABILIZATION & REHABILITATION PLAN**

PART F - SPECIFICATION

SPECIFICATION TITLE:	EVALUATE BRIDGES FOR REMOVAL	JURISDICTIONS:	PRIVATE - NRCS
PART E: LINE ITEM:	#10, Bridge Removal Evaluation	FISCAL YEAR:	2002
ESR REFERENCE#	6.21.2 Watershed & Property Protection Strategy	SPECIFICATION TYPE:	ES

I. WORK TO BE DONE

<p>Number and Describe Each Task:</p> <p>A. General Description: Several bridge crossings on private land may be at risk of failure during flood events. This specification provides funds to hire a civil engineer to evaluate whether these bridges should be removed.</p> <p>B. Location (Suitable) Sites: Mitchell Creek Canyon. See Soil and Watershed Assessment, Appendix I, and Treatment Map, Appendix III.</p> <p>C. Design/Construction Specifications:</p> <ol style="list-style-type: none"> 1. Engineer should review BAER Team Soil and Watershed Assessment and predicted flood and debris flows. 2. Obtain written permission from landowners for treatments to be implemented on private property. 3. Complete civil engineering evaluation of bridge locations that may be at risk to failure and provide written recommendation to the Natural Resource Conservation Service for treatment of each. 4. Provide detailed cost estimates for treatments. 5. Provide oversight of construction treatments. 6. Bridges should not be removed until debris from burned residential structures accessed by the bridge has been cleaned up (see Floatable Debris specification). <p>D. Purpose of Treatment Specifications: Numerous bridges cross Mitchell Creek, many of which access only one house. Some of these bridges may no longer be needed in the short-term. Unneeded bridges that would cause channel construction or potential debris jams should be considered for removal.</p> <p>E. Treatment Effectiveness Monitoring: NRCS will provide scope of work and monitoring contract</p>

II. LABOR, MATERIALS AND OTHER COST:

<p>PERSONNEL SERVICES (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).</p>	COST/ITEM
TOTAL PERSONNEL SERVICE COST	\$0
<p>EQUIPMENT PURCHASE, LEASE OR RENTAL (Item @ Cost/Hour or Cost/Day X # Hours or # Days X # Fiscal Years = Cost/Item): (Note: Purchase requires written justification that demonstrates cost/item benefits over lease or rental.)</p>	COST/ITEM
TOTAL EQUIPMENT PURCHASE, LEASE, OR RENTAL COST	\$0
<p>MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X # Fiscal Years = Cost/Item):</p>	COST/ITEM
TOTAL MATERIALS AND SUPPLY COST	\$0

TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X # Fiscal Years = Cost/Item):	COST/ITEM
TOTAL TRAVEL COST	\$0
CONTRACT COST (Labor or Equipment @ Cost/Hour X # Hours X # Fiscal Years = Cost/Item):	COST/ITEM
Civil engineering evaluation of up to 7 bridges @ \$125 / hour X 40 hours	\$5,000
TOTAL CONTRACT COST	\$5,000

SPECIFICATION COST SUMMARY

FISCAL YEAR	UNIT	UNIT COST	# OF UNITS	COST	FUNDING SOURCE	METHOD
FY 1	BRIDGE	\$714	7	\$5,000	EWP	C
FY 2						
FY 3						
TOTAL	BRIDGE	\$714	7	\$5,000	EWP	C

Funding Sources:
 F = Fire Suppression Account
 EFR=Emergency Fire Rehabilitation
 OP/O =Agency Operating Fund
 EWP = Emergency Watershed Program

Specification Type
 ES = Emergency Stabilization
 R = Rehabilitation
 FS = Fire Suppression

Methods For Completion
 P=Agency Personnel Services
 C=Contract
 EFC= Emergency Fire Contract
 FC=Crew Labor Assigned to Fire

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	C
3. Estimate supported by cost guides from independent sources or other federal agencies.	
4. Estimates based upon government wage rates and material cost.	
5. No cost estimate required – cost charged to Fire Suppression Account.	

P = Personnel Services M = Materials/Supplies T = Travel C = Contract F = Suppression

III. RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

List Relevant Documentation and Cross-References Within ESR Plan:
 See Watershed Assessment Appendix I, and Watershed Treatment Map, Appendix III.

IV. TOTAL COST BY JURISDICTION

JURISDICTION	UNITS TREATED	COST
PRIVATE - NRCS	7 BRIDGES	\$5,000
TOTAL COST	7 BRIDGES	\$5,000

**INTERAGENCY
BURNED AREA EMERGENCY STABILIZATION & REHABILITATION PLAN**

PART F - SPECIFICATION

SPECIFICATION TITLE:	CONTOUR STRAW WATTLE – SLOPE TREATMENT	JURISDICTIONS:	BLM
PART E: LINE ITEM:	#11, Contour Straw Wattles	FISCAL YEAR:	2002
ESR REFERENCE#	6.21.1 Surface Stabilization	SPECIFICATION TYPE:	ES

I. WORK TO BE DONE

Number and Describe Each Task:

A. General Description:

Straw wattles can be used on slopes to act as terraces to prevent slope erosion and facilitate revegetation. Straw wattles should not be placed in channels or gullies.

B. Location (Suitable) Sites:

Slopes susceptible to sheet and rill erosion, slopes producing dry ravel, slopes susceptible to freeze/thaw activity, or slopes difficult to vegetate because of soil movement. (see Watershed Treatment Map, Appendix III for slopes proposed for treatment).

C. Design/Construction Specifications:

1. **Wattles** should be installed on contour with slight downward angle at the end of the row to prevent ponding at mid-section of the wattle. No overall slope preparation is needed prior to installation, however straw wattles should always be installed in shallow trenches according to the guidelines below. Wattles should be pinned securely to the ground.
2. **Spacing Down-slope:** Vertical spacing for slope installations should be determined by site conditions: slope gradient and soil types are the main factors. Between 20 – 30 wattles should be placed per acre.
3. **Trenching:** Use a hand tool such as a Pulaski or pick to score the ground. Dig the trench to the needed depth. Soil from excavation can be placed on the uphill side.
4. **Installation:** Lay the first straw wattle snugly in the trench. No daylight should be seen under the wattle. Pack soil from trenching against the wattle on the uphill side. It's preferable to install wattles from the top of the slope and work downslope.
5. **Stake the wattles** at each end and four foot on center. For example: 20 foot wattle uses 5 stakes.

D. Purpose of Treatment Specifications:

Straw wattles are intended to capture and keep sediment on slopes. Straw wattles are useful to temporarily stabilize slopes by reducing soil creep and sheet and rill erosion until permanent vegetation can get established. Installed, straw wattles shorten and interrupt the development of raveling and rilling processes. Organic matter and native seeds are trapped behind wattles, which provide a stable medium for germination. Wattles trap fertile topsoil and retain moisture from rainfall, which aids in growth of vegetation.

E. Treatment Effectiveness Monitoring:

Inspect wattles after significant weather events for failures and make necessary repairs.

II. LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST/ITEM
Type II Crew @ \$3,300 / day X 17 days (production rate is estimated to be 6 acres / day for 20 person crew)	\$56,100
Lodge & per diem @ \$1,400 X day X 17 days	\$23,800
TOTAL PERSONNEL SERVICE COST	\$79,900

EQUIPMENT PURCHASE, LEASE OR RENTAL (Item @ Cost/Hour or Cost/Day X # Hours or # Days X # Fiscal Years = Cost/Item): (Note: Purchase requires written justification that demonstrates cost/item benefits over lease or rental.)	COST/ITEM
TOTAL EQUIPMENT PURCHASE, LEASE, OR RENTAL COST	\$0
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X # Fiscal Years = Cost/Item):	COST/ITEM
8 inch diameter X 20 foot long straw wattle wrapped in biodegradable plastic netting with wooden stakes @ \$60 / roll X 30 rolls / acre X 105 acres (delivered FOB to Glenwood Springs, Colorado Michelle Canyon Road)	\$189,000
Misc. supplies and tools	\$3,000
TOTAL MATERIALS AND SUPPLY COST	\$192,000
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X # Fiscal Years = Cost/Item):	COST/ITEM
TOTAL TRAVEL COST	\$0
CONTRACT COST (Labor or Equipment @ Cost/Hour X # Hours X # Fiscal Years = Cost/Item):	COST/ITEM
Contracted helicopter @ \$1,000 per hour X 8 hrs. / day X 17 days	\$136,000
TOTAL CONTRACT COST	\$136,000

SPECIFICATION COST SUMMARY

FISCAL YEAR	UNIT	UNIT COST	# OF UNITS	COST	FUNDING SOURCE	METHOD
FY 1	Acres	\$3,885	105	\$407,900	ES	C
FY 2						
FY 3						
TOTAL	Acres	\$3,885	105	\$407,900	ES	C

Funding Sources:

F = Fire Suppression Account
 EFR=Emergency Fire Rehabilitation
 OP/O =Agency Operating Fund
 EWP = Emergency Watershed Program

Specification Type

ES = Emergency Stabilization
 R = Rehabilitation
 FS = Fire Suppression

Methods For Completion

P=Agency Personnel Services
 C=Contract
 EFC= Emergency Fire Contract
 FC=Crew Labor Assigned to Fire

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	M
3. Estimate supported by cost guides from independent sources or other federal agencies.	
4. Estimates based upon government wage rates and material cost.	P
5. No cost estimate required – cost charged to Fire Suppression Account.	

P = Personnel Services M = Materials/Supplies T = Travel C = Contract F = Suppression

III. RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

List Relevant Documentation and Cross-References Within ESR Plan:

See Appendix I, Soil and Watershed Assessment and Appendix III, Watershed Treatment Map.

IV. TOTAL COST BY JURISDICTION

JURISDICTION	UNITS TREATED	COST
BLM	105 Acres	\$407,900
TOTAL COST	105 ACRES	\$407,900

**INTERAGENCY
BURNED AREA EMERGENCY STABILIZATION & REHABILITATION PLAN**

PART F - SPECIFICATION

SPECIFICATION TITLE:	CULVERT EVALUATION & REPLACEMENT	JURISDICTIONS:	PRIVATE - NRCS
PART E: LINE ITEM:	#12, Culvert Evaluation & Design	FISCAL YEAR:	2002
ESR REFERENCE#	6.21.2 Watershed & Property Protection Strategy	SPECIFICATION TYPE:	ES

I. WORK TO BE DONE

<p>Number and Describe Each Task:</p> <p>A. General Description: Evaluate 3 culverts for replacement and 19 culverts for inlet protection. Produce engineering design for replacement and/or inlet protection including cost estimates, diagrams and drawings.</p> <p>B. Location (Suitable) Sites: See Soil and Watershed Assessment, Appendix I, Treatment Map, Appendix III, and Culvert Inventory Appendix V.</p> <p>C. Design/Construction Specifications:</p> <ol style="list-style-type: none"> Obtain written permission from landowners for treatments to be implemented on private property. Civil Engineer evaluation of 3 culverts for replacement and 19 culvert inlets for protection as identified in the Culvert Inventory in Appendix V. Complete engineering design, including design specifications, construction cost estimates, and any required construction drawings or diagrams for the 3 culvert replacements and 19 culvert protection locations. Civil engineer oversight of construction of replacement culverts and culvert protection measures <p>D. Purpose of Treatment Specifications: To ensure that culverts are correctly sized for flows and adequately protected during flood and/or debris flows.</p> <p>E. Treatment Effectiveness Monitoring: Visually inspect culverts subsequent to flood events for function and make any necessary improvements.</p>

II. LABOR, MATERIALS AND OTHER COST:

<p>PERSONNEL SERVICES (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).</p>	COST/ITEM
TOTAL PERSONNEL SERVICE COST	\$0
<p>EQUIPMENT PURCHASE, LEASE OR RENTAL (Item @ Cost/Hour or Cost/Day X # Hours or # Days X # Fiscal Years = Cost/Item): (Note: Purchase requires written justification that demonstrates cost/item benefits over lease or rental.)</p>	COST/ITEM
TOTAL EQUIPMENT PURCHASE, LEASE, OR RENTAL COST	\$0
<p>MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X # Fiscal Years = Cost/Item):</p>	COST/ITEM
TOTAL MATERIALS AND SUPPLY COST	\$0

TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X # Fiscal Years = Cost/Item):	COST/ITEM
TOTAL TRAVEL COST	\$0
CONTRACT COST (Labor or Equipment @ Cost/Hour X # Hours X # Fiscal Years = Cost/Item):	COST/ITEM
Civil Engineer to evaluate and design 3 culvert replacements and 19 culvert protection designs @ \$125 / hour X 40 hours	\$5,000
Civil Engineer to manage construction of 3 culvert replacements and installation of protection at 19 culverts @ \$125 / hour X 60 hours	\$7,500
TOTAL CONTRACT COST	\$12,500

SPECIFICATION COST SUMMARY

FISCAL YEAR	UNIT	UNIT COST	# OF UNITS	COST	FUNDING SOURCE	METHOD
FY 1	Culvert	22	\$568	\$12,500	EWP	C
FY 2						
FY 3						
TOTAL	Culvert	22	\$568	\$12,500	EWP	C

Funding Sources:
 F = Fire Suppression Account
 EFR=Emergency Fire Rehabilitation
 OP/O =Agency Operating Fund
 EWP = Emergency Watershed Program

Specification Type
 ES = Emergency Stabilization
 R = Rehabilitation
 FS = Fire Suppression

Methods For Completion
 P=Agency Personnel Services
 C=Contract
 EFC= Emergency Fire Contract
 FC=Crew Labor Assigned to Fire

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	C
3. Estimate supported by cost guides from independent sources or other federal agencies.	
4. Estimates based upon government wage rates and material cost.	
5. No cost estimate required – cost charged to Fire Suppression Account.	

P = Personnel Services M = Materials/Supplies T = Travel C = Contract F = Suppression

III. RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

List Relevant Documentation and Cross-References Within ESR Plan:
 See Watershed Assessment Appendix I, Watershed Treatment Map, Appendix III, and Culvert Inventory, Appendix V.

IV. TOTAL COST BY JURISDICTION

JURISDICTION	UNITS TREATED	COST
Private – NRCS	22 Culverts (3 replaced and 19 protected)	\$12,500
TOTAL COST	22 CULVERTS (3 REPLACED AND 19 PROTECTED)	\$12,500

**INTERAGENCY
BURNED AREA EMERGENCY STABILIZATION & REHABILIZATION PLAN**

PART F - SPECIFICATION

SPECIFICATION TITLE:	FLOOD WARNING SIGNS	JURISDICTIONS:	PRIVATE - NRCS
PART E: LINE ITEM:	#13, Hazard Warning Sign	FISCAL YEAR:	2002
ESR REFERENCE#	6.10 Public Health & Safety	SPECIFICATION TYPE:	ES

I. WORK TO BE DONE

Number and Describe Each Task:
<p>A. General Description: The attached public safety signs were developed for immediate installation on roads and housing areas that are likely to sustain damage from flooding and mudflows generated from the Coal Seam Fire.</p> <p>B. Location (Suitable) Sites: Flash flood warning signs will be placed along roads in flood and debris flow prone areas. See Watershed Treatment Map for specific locations.</p> <p>C. Design/Construction Specifications: See attached sign lay-out and sign dimensions below.</p> <p>D. Purpose of Treatment Specifications: To provide warning to residents and the general public about potential flash flood and mudflow conditions on roads down-slope and downstream of the burned area during and immediately after rain events.</p> <p>E. Treatment Effectiveness Monitoring: Following flood events determine if signs work effectively in keeping public out of areas at risk.</p>

II. LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST/ITEM
TOTAL PERSONNEL SERVICE COST	\$0
EQUIPMENT PURCHASE, LEASE OR RENTAL (Item @ Cost/Hour or Cost/Day X # Hours or # Days X # Fiscal Years = Cost/Item): (Note: Purchase requires written justification that demonstrates cost/item benefits over lease or rental.)	COST/ITEM
TOTAL EQUIPMENT PURCHASE, LEASE, OR RENTAL COST	\$0
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X # Fiscal Years = Cost/Item):	COST/ITEM
6" carriage bolts, with washers and nuts @ \$1.00 each X 80 bolts	\$80
4" X 6" X 8' pressure treated posts @ \$10 each X 40 posts	\$400
TOTAL MATERIALS AND SUPPLY COST	\$480
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X # Fiscal Years = Cost/Item):	COST/ITEM
TOTAL TRAVEL COST	\$0

CONTRACT COST (Labor or Equipment @ Cost/Hour X # Hours X # Fiscal Years = Cost/Item):	COST/ITEM
4' X 6' sign on reflective background white background with reflective red letters @ \$250 / sign X 20 signs	\$5,000
TOTAL CONTRACT COST	\$5,000

SPECIFICATION COST SUMMARY

FISCAL YEAR	UNIT	UNIT COST	# OF UNITS	COST	FUNDING SOURCE	METHOD
FY 1	SIGNS	\$274	20	\$5,480	EWP	C
FY 2						
FY 3						
TOTAL	SIGNS	\$274	20	\$5,480	EWP	C

Funding Sources:

F = Fire Suppression Account
 EFR=Emergency Fire Rehabilitation
 OP/O =Agency Operating Fund
 EWP = Emergency Watershed Program

Specification Type

ES = Emergency Stabilization
 R = Rehabilitation
 FS = Fire Suppression

Methods For Completion

P=Agency Personnel Services
 C=Contract
 EFC= Emergency Fire Contract
 FC=Crew Labor Assigned to Fire

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	C
3. Estimate supported by cost guides from independent sources or other federal agencies.	
4. Estimates based upon government wage rates and material cost.	
5. No cost estimate required – cost charged to Fire Suppression Account.	

P = Personnel Services M = Materials/Supplies T = Travel C = Contract F = Suppression

III. RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

List Relevant Documentation and Cross-References Within ESR Plan:

See Watershed Assessment, Appendix I and Watershed Treatment Map, Appendix III.

IV. TOTAL COST BY JURISDICTION

JURISDICTION	UNITS TREATED	COST
PRIVATE - NRCS	20 SIGNS	\$5,480
TOTAL COST	20 SIGNS	\$5,480

**WARNING
SEVERE FLOODING POSSIBLE**

**THE 12,000 ACRE COAL SEAM FIRE HAS CREATED
SEVERE
flash flood conditions in this area**

**Avoid this area during rainfall and 2 hours
after Rain Stops**

**INTERAGENCY
BURNED AREA EMERGENCY STABILIZATION & REHABILITATION PLAN**

PART F - SPECIFICATION

SPECIFICATION TITLE:	STRAW MULCHING	JURISDICTIONS:	BLM
PART E: LINE ITEM:	#14, Straw Mulching	FISCAL YEAR:	2002-2003
ESR REFERENCE#	6.21.1 Surface Stabilization & Prevention	SPECIFICATION TYPE:	ES

I. WORK TO BE DONE

Number and Describe Each Task:

A. General Description:

Straw mulch is applied where the pre-burn ground cover was consumed by the fire and the expected overland runoff would threaten high values at risk. First year effectiveness includes, stabilizing ashes onsite, preventing loss of topsoil, improving infiltration rate and replacing organic litter consumed by the fire. All of these are usually associated with flood source areas, and therefore mulching has a secondary benefit of controlling flood peaks to an acceptable level. Each mulching area designated on a map. Mulching is implemented only on those slopes that are designated by watershed teams or operations staff.

B. Location (Suitable) Sites:

Slopes in the SOB watershed up to and not over 60% gradient. Refer to Watershed Treatment map.

C. Design/Construction Specifications:

1. Site Selection: Suitable sites are designated on the BAER Watershed Treatment Map and in the field by either watershed or operations staff. Treat 400 acres by hand.
2. Type of Straw: Straw must be from a field that is certified free of noxious plants listed in the Garfield County Noxious Weed Management Plan, 5101. Suitable straw includes barley, rice, and bean grasses. Size of straw bales must be such that employees do not suffer injury from handling the bales, usually 80 pounds or less.
3. Application: The rate of application is determined by qualified individuals who have been trained in the principles of BAER Treatments. The rate of application is 2,000 pounds per acre. This is about 25 bales per acre, spread 2 inches deep, if evenly distributed.

D. Purpose of Treatment Specifications:

The basic purpose of straw mulch is to replace only the natural ground cover density (GCD) that was consumed by the fire. If there was little natural GCD before the fire, then mulch probably will not improve the site conditions after the fire. Straw can effectively control overland runoff due to bare soil. By controlling the overland runoff, the top soil is also protected. Especially important is to stabilize the ashes onsite, because they represent the nutrient capital into the Colorado River. Straw mulch can also: 1) Break the impact of raindrops and prevent soil compaction; 2) Maintain a favorable moisture regime for sprouting seeds that are either stored in the soil; 3) Insulate the topsoil from solar isolation, and provide a more favorable temperature range for new plants; 5) Provide a growing medium for soil biological activity including soil flora, fauna, and fungal complex; and 6) Effectively control sediment loss from a burned area. By treating the source of floodwaters after a burn, the immediate downslope area can also be effectively protected. Rills and gullies that originate on extremely hot burns can migrate downslope from the place of origin and scour the slope for several hundred feet. Therefore mulching can protect much larger, downslope areas from the cumulative effect of hillslope runoff.

E. Treatment Effectiveness Monitoring:

Visually inspect effectiveness of treatments and repair as needed.

II. LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST/ITEM
Type II crew (20 people) @ \$3,300 / day x 15 days x 4 crews	\$198,000
TOTAL PERSONNEL SERVICE COST	\$198,000

EQUIPMENT PURCHASE, LEASE OR RENTAL (Item @ Cost/Hour or Cost/Day X # Hours or # Days X # Fiscal Years = Cost/Item): (Note: Purchase requires written justification that demonstrates cost/item benefits over lease or rental.)	COST/ITEM
Helicopter staged bales 12 bales/trip x 10 min/trip @ \$8,000/day (using a medium sized ship)	\$160,000
TOTAL EQUIPMENT PURCHASE, LEASE, OR RENTAL COST	\$160,000
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X # Fiscal Years = Cost/Item):	COST/ITEM
Straw bales @ \$4.00 each (FOB) X 25 bales / acre X 400 acres = 15,000 bales	\$40,000
TOTAL MATERIALS AND SUPPLY COST	\$40,000
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X # Fiscal Years = Cost/Item):	COST/ITEM
TOTAL TRAVEL COST	\$0
CONTRACT COST (Labor or Equipment @ Cost/Hour X # Hours X # Fiscal Years = Cost/Item):	COST/ITEM
TOTAL CONTRACT COST	\$0

SPECIFICATION COST SUMMARY

FISCAL YEAR	UNIT	UNIT COST	# OF UNITS	COST	FUNDING SOURCE	METHOD
FY 1	Acres	\$995	400	\$398,000	ES	P, C
FY 2						
FY 3						
TOTAL	Acres	\$995	400	\$398,000	ES	P, C

Funding Sources:

F = Fire Suppression Account
EFR=Emergency Fire Rehabilitation
OP/O =Agency Operating Fund
EWP = Emergency Watershed Program

Specification Type

ES = Emergency Stabilization
R = Rehabilitation
FS = Fire Suppression

Methods For Completion

P=Agency Personnel Services
C=Contract
EFC= Emergency Fire Contract
FC=Crew Labor Assigned to Fire

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	M
3. Estimate supported by cost guides from independent sources or other federal agencies.	
4. Estimates based upon government wage rates and material cost.	P
5. No cost estimate required – cost charged to Fire Suppression Account.	

P = Personnel Services M = Materials/Supplies T = Travel C = Contract F = Suppression

III. RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

List Relevant Documentation and Cross-References Within ESR Plan:

See Appendix I, Soil and Watershed Assessment. See Appendix III, Watershed Treatment Map.

IV. TOTAL COST BY JURISDICTION

JURISDICTION	UNITS TREATED	COST
BLM	400	\$398,000
TOTAL COST	400	\$398,000

**INTERAGENCY
BURNED AREA EMERGENCY STABILIZATION & REHABILITATION PLAN**

PART F - SPECIFICATION

SPECIFICATION TITLE:	DOZERLINE REHABILITATION	JURISDICTIONS:	BLM FS-WRF
PART E: LINE ITEM:	#15, Dozerline Rehab.	FISCAL YEAR:	2002
ESR REFERENCE#	6.23 Wildland Fire Suppression	SPECIFICATION TYPE:	F

I. WORK TO BE DONE

Number and Describe Each Task:

A. General Description:

Rehabilitation of suppression constructed "dozerline" is necessary to avoid excessive soil erosion and restore natural landscape surface water flows. Rehabilitation will also serve to restrict undesired access by 4 wheeled drive and "all terrain vehicles (ATV), provide for re-establishment of pre-incident road closures where affected by suppression access needs.

B. Location (Suitable) Sites:

See Appendix III, Fire Suppression Impact map for location of known dozerline. Additional lines should be rehabilitated as they are discovered in the field. All newly discovered lines should be mapped.

C. Design/Construction Specifications:

1. Return Soil Side Cast Berms, and recover "fill" materials and replace in "cut" banks along dozerline blending excavator disturbed areas to fit the natural contours. Accomplishment of this specification is best achieved with use of an excavator with a 2 to 3 cubic yard bucket with an opposable thumb, with capabilities of working on steep sloped (50 to 60%) and capable of having a 30 to 35ft. reach.
2. Compacted soils associated with suppression staging areas, helipads, and intensively used areas from suppression equipment should be ripped to a depth 12 to 18 inches or less in the presence of underlying rock or sandstone formulation.
3. Waterbar spacing should be installed according to the following standards depending upon slope and soil susceptibility to erosion with waterbar spacing decreasing on steeper slopes. Generally....
 - a. Waterbars are to be built on slopes greater than 5%.
 - b. Waterbars should be skewed horizontally from the fall line of the slope (not the dozer) approximately 15 to 20 degrees from horizontal and drained away from the fire burned area if possible.
 - c. Utilize natural rolls and dips whenever possible
 - d. Scatter branches, wood, rock, sod, or other materials to naturalize the fire line and further retard mineral soil movement (best done with an excavator or heavy duty backhoe not hand crew) Scattered materials should be randomly placed along the dozerline. In grassy areas, replace soil and sod, waterbar as necessary and scatter rocks or limbs to naturalize the dozerline location.
 - e. Hand crews may be used to augment scattering of wood debris/slash to naturalize the dozer and further retard soil erosion, striving to achieve a minimum of 65% surface cover.
 - f. Hand crews may be used to construct waterbars on slopes greater than 50% (with little to no rock) or in areas too hazardous for safe excavator use.
 - g. Remove all trash and equipment associated with dozer equipment maintenance.
 - h. Fill materials will be cleaned or removed from established drainages and live water courses (best done with an excavator)

D. Purpose of Treatment Specifications:

Prevent surface and gully erosion on lands disturbed by dozerline. Waterbars are intended to channel water off dozerline and prevent gully erosion.

E. Treatment Effectiveness Monitoring:

Visually inspect line after rain events and correct any erosion problems.

II. LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST/ITEM
TOTAL PERSONNEL SERVICE COST	\$0
EQUIPMENT PURCHASE, LEASE OR RENTAL (Item @ Cost/Hour or Cost/Day X # Hours or # Days X # Fiscal Years = Cost/Item): (Note: Purchase requires written justification that demonstrates cost/item benefits over lease or rental.)	COST/ITEM
TOTAL EQUIPMENT PURCHASE, LEASE, OR RENTAL COST	\$0
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X # Fiscal Years = Cost/Item):	COST/ITEM
TOTAL MATERIALS AND SUPPLY COST	\$0
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X # Fiscal Years = Cost/Item):	COST/ITEM
TOTAL TRAVEL COST	\$0
CONTRACT COST (Labor or Equipment @ Cost/Hour X # Hours X # Fiscal Years = Cost/Item):	COST/ITEM
Cost charged to fire suppression account – not tracked in this plan.	F
TOTAL CONTRACT COST	F

SPECIFICATION COST SUMMARY

FISCAL YEAR	UNIT	UNIT COST	# OF UNITS	COST	FUNDING SOURCE	METHOD
FY 1	Miles	F	9.44	F	F	C
FY 2						
FY 3						
TOTAL	Miles	F	9.44	F	F	C

Funding Sources:

F = Fire Suppression Account
 EFR=Emergency Fire Rehabilitation
 OP/O =Agency Operating Fund
 EWP = Emergency Watershed Program

Specification Type

ES = Emergency Stabilization
 R = Rehabilitation
 FS = Fire Suppression

Methods For Completion

P=Agency Personnel Services
 C=Contract
 EFC= Emergency Fire Contract
 FC=Crew Labor Assigned to Fire

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	
3. Estimate supported by cost guides from independent sources or other federal agencies.	
4. Estimates based upon government wage rates and material cost.	
5. No cost estimate required – cost charged to Fire Suppression Account.	C

P = Personnel Services M = Materials/Supplies T = Travel C = Contract F = Suppression

III. RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

List Relevant Documentation and Cross-References Within ESR Plan:
 See Rehabilitation Operations Assessment, Appendix I and Operations (fire suppression impacts) Map

IV. TOTAL COST BY JURISDICTION

JURISDICTION	UNITS TREATED	COST
BLM	3.11 miles	F
FS	3.53 miles	F
Private	2.8 miles	F
TOTAL COST	9.44 MILES	F

**INTERAGENCY
BURNED AREA EMERGENCY STABILIZATION & REHABILITATION PLAN**

PART F - SPECIFICATION

SPECIFICATION TITLE:	NOXIOUS WEED MONITORING	JURISDICTIONS:	PRIVATE BLM
PART E: LINE ITEM:	#16, Noxious Weed Monitoring	FISCAL YEAR:	2003, 2004
ESR REFERENCE#	Bill Monitoring	SPECIFICATION TYPE:	ES

I. WORK TO BE DONE

Number and Describe Each Task:

A. General Description:

Monitor for new populations of Scotch thistle, musk thistle, Canada thistle, houndstongue, and tamarisk on travel routes, dozerlines, handlines, other areas disturbed by suppression activities, and on un-infested areas (such as drainages and areas with moderate to high vegetation mortality), adjacent to known populations of noxious weeds. Also monitor for Russian knapweed and yellow toadflax which are suspected to be within the fire perimeter.

B. Location (Suitable) Sites:

Refer to Appendix III-Suppression Treatment map, Noxious Weed map, and Vegetaion Mortality map. Conduct primary surveys on all Forest Service, BLM, and private roads used in suppression efforts, along dozerlines, safety zones, helispots, helibase, and burned areas adjacent to known weed populations.

C. Design/Construction Specifications:

1. Conduct short-term monitoring (2 years), on all travel routes and disturbed areas and on known noxious weed populations within burned area to determine spread of noxious and invasive plant species. monitoring protocols will be established by each jurisdiction and will be implemented in accordance with current management plans. See noxious weed survey form, appendix V.
2. Document using photography and Global Positioning System (GPS) technology, new weed occurrences within burned area.
3. Initiate Agency approved control measures on new weed occurences where monitoring demonstrates the establishment or expansion of known weed populations that threaten the natural regeneration of native vegetation oor establishment of effective ground cover.
4. Complete supplemental funding request for ESR funding (or cost-share programs on private through the Garfield County Weed Management Area), for noxious weed control of new weed populations.

D. Purpose of Treatment Specifications:

To detect new noxious weed populations into disturbed and burned areas within the fire area and to monitor known noxious weed populations to determine if suppression or rehabilitation actions have spread noxious weeds that may potentially threaten the long-term health of native plant associations or impact short-term recovery of revegetaion efforts.

E. Treatment Effectiveness Monitoring:

As described in this specification.

II. LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST/ITEM
USFS - GS-11 Weed Coordinator/Resource Specialist x \$25/Hour x 40 Hours x 4 visits x 2 years	\$8,000
BLM - GS-11 Weed Coordinator/Resource Specialist x \$25/Hour x 40 Hours x 4 visits x 2 years	\$8,000
County - Vegetation Specialist x \$75/Hour x 40 Hours x 4 visits x 2 years (not included in total ESR request)	\$24,000
TOTAL PERSONNEL SERVICE COST	\$40,000

EQUIPMENT PURCHASE, LEASE OR RENTAL (Item @ Cost/Hour or Cost/Day X # Hours or # Days X # Fiscal Years = Cost/Item): (Note: Purchase requires written justification that demonstrates cost/item benefits over lease or rental.)	COST/ITEM
TOTAL EQUIPMENT PURCHASE, LEASE, OR RENTAL COST	\$0
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X # Fiscal Years = Cost/Item):	COST/ITEM
USFS – Photographic film and processing – 10 rolls x \$20	\$200
BLM - Photographic film and processing – 10 rolls x \$20	\$200
County - Photographic film and processing – 10 rolls x \$20 (not included in total ESR request)	\$200
TOTAL MATERIALS AND SUPPLY COST	\$600
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X # Fiscal Years = Cost/Item):	COST/ITEM
USFS – 50 miles/Day x \$0.365/Mile x 5 days x 4 visits x 2 years	\$730
BLM – 50 miles/day x \$0.365/Mile x 5 days x 4 visits x 2 years	\$730
County – 50 miles/day x \$0.365/Mile x 5 days x 4 visits x 2 years (not included in total ESR request)	\$730
TOTAL TRAVEL COST	\$2,190
CONTRACT COST (Labor or Equipment @ Cost/Hour X # Hours X # Fiscal Years = Cost/Item):	COST/ITEM
TOTAL CONTRACT COST	\$0

SPECIFICATION COST SUMMARY

FISCAL YEAR	UNIT	UNIT COST	# OF UNITS	COST	FUNDING SOURCE	METHOD
FY 1	Surveys	\$1,783	12	\$21,395	ESR	P
FY 2	Surveys	\$1,783	12	\$21,395	ESR	P
FY 3						
TOTAL		\$1,783	24	\$42,790	ESR	P

Funding Sources:

F = Fire Suppression Account
EFR=Emergency Fire Rehabilitation
OP/O =Agency Operating Fund
EWP = Emergency Watershed Program

Specification Type

ES = Emergency Stabilization
R = Rehabilitation
FS = Fire Suppression

Methods For Completion

P=Agency Personnel Services
C=Contract
EFC= Emergency Fire Contract
FC=Crew Labor Assigned to Fire

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	
3. Estimate supported by cost guides from independent sources or other federal agencies.	P, M, T
4. Estimates based upon government wage rates and material cost.	
5. No cost estimate required – cost charged to Fire Suppression Account.	

P = Personnel Services M = Materials/Supplies T = Travel C = Contract F = Suppression

III. RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

List Relevant Documentation and Cross-References Within ESR Plan:

APPENDIX I - VEGETATION ASSESSMENT, APPENDIX III - NOXIOUS WEED MAP, VEGETATION MORTALITY MAP.

IV. TOTAL COST BY JURISDICTION

JURISDICTION	UNITS TREATED	COST
USFS	8 Surveys	\$8,930
BLM	8 Surveys	\$8,930
County	8 Surveys	\$24,930
TOTAL COST		\$42,790

1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

11		12		13	
14		15		16	
17		18		19	
20		21		22	
23		24		25	
26		27		28	
29		30		31	
32		33		34	
35		36		37	
38		39		40	
41		42		43	
44		45		46	
47		48		49	
50		51		52	

DATE	DESCRIPTION	AMOUNT	CHECK NO.	BANK	BALANCE
1/1/19	Opening Balance	1000.00			1000.00
1/15/19	Deposit	500.00	1001	ABC Bank	1500.00
1/20/19	Withdrawal	200.00	1002	ABC Bank	1300.00
1/25/19	Deposit	300.00	1003	ABC Bank	1600.00
1/31/19	Closing Balance				1600.00

Preparing this statement is the responsibility of the account holder. The bank is not responsible for the accuracy of the information provided.

**INTERAGENCY
BURNED AREA EMERGENCY STABILIZATION & REHABILITATION PLAN**

PART F - SPECIFICATION

SPECIFICATION TITLE:	NOXIOUS WEED CONTROL	JURISDICTIONS:	PRIVATE BLM
PART E: LINE ITEM:	#17, Noxious Weed Control	FISCAL YEAR:	2003, 2004
ESR REFERENCE#	6.4.1 Non-Native Invasive Plant Control	SPECIFICATION TYPE:	ES

I. WORK TO BE DONE

Number and Describe Each Task:

A. General Description:

Utilize integrated pest management practices (herbicides, biological, mechanical, and cultural control methods), as appropriate to prevent the spread and establishment of noxious weeds known to exist within the fire perimeter and as defined by monitoring within the Coal Seam Fire area.

B. Location (Suitable) Sites:

Control all known weed populations within the fire area as identified on the vegetation map (Appendix III), and from monitoring efforts. Control sites include South Canyon drainage, Paradise Creek area, and the Coal Seam Helibase. Approximate acreage of BLM administered lands is 5 acres.

C. Design/Construction Specifications:

1. Control noxious/non-native weeds identified during Garfield County and Bureau of Land Management (BLM), monitoring surveys prior to seed set and with repeat applications in the fall on regrowth and missed plants. Contracts will be with the Garfield County Vegetation Management Department. All spraying on BLM lands will be in accordance with guidelines contained within BLM management plans and approved Environmental Assessments using approved herbicides. Two applications may be necessary to achieve control objectives (spring and fall applications); this would double Contract spraying on BLM lands.
2. Follow-up control in subsequent years on all new infestation sites as identified through noxious weed monitoring surveys.

D. Purpose of Treatment Specifications:

Control or contain existing noxious weed populations to prevent further spread onto un-infested sites in the South Canyon part of the Coal Seam Fire and into riparian areas of the Colorado River. Protect the ecological integrity and site productivity of plant communities on private and BLM lands in accordance with the Garfield County Weed Management Plan and BLM management plan guidelines.

E. Treatment Effectiveness Monitoring:

Spot checking of noxious weed sites to ensure control methods are meeting management objectives. Garfield County and/or BLM Weed Specialists will visit sites controlled every other week for two to three times, beginning two weeks after initial treatment; this is especially important for weed populations that are sprayed to ensure effectiveness of herbicide application. If both spring and fall applications are used then visits will occur during both these times.

II. LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST/ITEM
BLM – GS-11 Weed Coordinator x \$25/Hour x 4 hours x 6 visits x 2 years	\$1,200
County – Vegetation Manager x \$75/Hour x 4 hours x 6 visits x 2 years	\$3,600
TOTAL PERSONNEL SERVICE COST	\$4,800

EQUIPMENT PURCHASE, LEASE OR RENTAL (Item @ Cost/Hour or Cost/Day X # Hours or # Days X # Fiscal Years = Cost/Item): (Note: Purchase requires written justification that demonstrates cost/item benefits over lease or rental.)	COST/ITEM
TOTAL EQUIPMENT PURCHASE, LEASE, OR RENTAL COST	\$0
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X # Fiscal Years = Cost/Item):	COST/ITEM
BLM – Photographic film and processing—3 rolls x \$15	\$45
County – Photographic film and processing—3 rolls x \$15	\$45
TOTAL MATERIALS AND SUPPLY COST	\$90
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X # Fiscal Years = Cost/Item):	COST/ITEM
TOTAL TRAVEL COST	\$0
CONTRACT COST (Labor or Equipment @ Cost/Hour X # Hours X # Fiscal Years = Cost/Item):	COST/ITEM
BLM – Contract Weed control on 5 acres @ \$100/Acre x 2 years	\$1000
County – Weed Control on 100 acres @ 100/Acre x 2 years	\$20,000
TOTAL CONTRACT COST	\$21,000

SPECIFICATION COST SUMMARY

FISCAL YEAR	UNIT	UNIT COST	# OF UNITS	COST	FUNDING SOURCE	METHOD
FY 1	Acres	\$123	105	\$12,945	EFR	P, C
FY 2	Acres	\$123	105	\$12,945	EFR	P, C
FY 3						
TOTAL		\$123	210	\$25,890	EFR	P, C

Funding Sources:

F = Fire Suppression Account
EFR=Emergency Fire Rehabilitation
OP/O =Agency Operating Fund
EWP = Emergency Watershed Program

Specification Type

ES = Emergency Stabilization
R = Rehabilitation
FS = Fire Suppression

Methods For Completion

P=Agency Personnel Services
C=Contract
EFC= Emergency Fire Contract
FC=Crew Labor Assigned to Fire

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	
3. Estimate supported by cost guides from independent sources or other federal agencies.	C
4. Estimates based upon government wage rates and material cost.	P, M
5. No cost estimate required – cost charged to Fire Suppression Account.	

P = Personnel Services M = Materials/Supplies T = Travel C = Contract F = Suppression

III. RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

List Relevant Documentation and Cross-References Within ESR Plan:

APPENDIX I, VEGETATION ASSESSMENT, APPENDIX III, NOXIOUS WEED MAP.

IV. TOTAL COST BY JURISDICTION

JURISDICTION	UNITS TREATED	COST
BLM	10 Acres	\$2,245
County	200 Acres	\$23,645
TOTAL COST		\$25,890

**INTERAGENCY
BURNED AREA EMERGENCY STABILIZATION & REHABILITATION PLAN**

PART F - SPECIFICATION

SPECIFICATION TITLE:	AERIAL HYDROMULCHING	JURISDICTIONS:	PRIVATE BLM
PART E: LINE ITEM:	#18, Aerial Mulching/Seeding	FISCAL YEAR:	2002-2003
ESR REFERENCE#	6.21.1 Surface Stabilization	SPECIFICATION TYPE:	ES

I. WORK TO BE DONE

Number and Describe Each Task:

A. General Description:

Hydromulch is applied where the pre-burn ground cover was consumed by the fire and the expected overland runoff would threaten high values at risk. First year effectiveness includes, stabilizing ashes onsite, preventing loss of topsoil, improving infiltration rate and replacing organic litter consumed by the fire. All of these are usually associated with flood source areas, and therefore mulching has a secondary benefit of controlling flood peaks to an acceptable level. Each mulching area is designated on a map. Mulching is implemented only on those slopes that are designated by watershed teams or operations staff.

B. Location (Suitable) Sites:

Slopes in lower Mitchell Canyon and Red Mountain (slopes behind the Community Center and Municipal Operations Center) with moderate and high burn severity not over 80% gradient, see Appendix III, Hillslope Treatment Map.

C. Design/Construction Specifications:

1. Site Selection: Suitable sites are designated on the Hillslope Treatment Map and in the field by either watershed or operations staff.
2. Hydromulching with seed should be completed before the monsoon season (typically beginning in mid-July). It is imperative to get effective groundcover down prior to the first damaging summer thunderstorm.
3. Use an application rate of 10 lbs PLS/acre native seed mix.
4. Mulch and Tackifier Requirement: Contractor will utilize mulch and tackifier appropriate for up to 80% slopes.
5. Obtain permission of private landowners before hydromulching and seeding.
6. Seed Mixture: All seed used by contractor shall have no less than 80% germination and 90% purity. Inert matter must not exceed 10%. Contractor will provide written certification that seed has been tested for noxious weed content and inert matter within the past 120 days or bags will be randomly tested upon delivery. All seeds will be certified noxious weed free. No substitute species will be accepted. If certain species in the mix are not available due to seed availability, then the species in the mix will be increased to maintain the desired seeding rate. Non-native species will not be used.
7. Coal Seam Fire Hydro-Mulch Seed Mix:

8. Species (Variety)	% of Mix	Lbs. PLS / Acre
9. Western Wheatgrass (Arriba)	50%	5.0
10. Streambank Wheatgrass (Sodar)	50%	5.0

11. Mulch Rate: Mulch rate should not exceed 2,000 lbs. Per acre
12. Equipment and Transportation: Contractor is responsible for supplying all materials, supplies, equipment, personnel, loading and transportation.
13. Completion Date: Work must be completed before the beginning of the monsoon season, or by July 14, 2002.

D. Purpose of Treatment Specifications:

The basic purpose of hydromulch is to replace only the natural ground cover density (GCD) that was consumed by the fire. Hydromulch can effectively control overland runoff due to bare soil. By controlling the overland runoff, the top soil is also protected. Hydromulch can also: 1) Break the impact of raindrops and prevent soil compaction; 2) Maintain a favorable moisture regime for sprouting seeds that are stored in the soil; 3) Insulate the topsoil from solar isolation, and provide a more favorable temperature range for new plants; 5) Provide a growing medium for soil biological activity including soil flora, fauna, and fungal complex; and 6) Effectively control sediment loss from a burned area. By treating the source of floodwaters after a burn, the immediate downslope area can also be effectively protected. Rills and gullies that originate on extremely hot burns can migrate downslope from the place of origin and scour the slope for

several hundred feet. Therefore mulching can protect much larger, downslope areas from the cumulative effect of hillslope runoff.

E. Treatment Effectiveness Monitoring:

Visually inspect effectiveness of treatments and repair as needed.

II. LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST/ITEM
TOTAL PERSONNEL SERVICE COST	
EQUIPMENT PURCHASE, LEASE OR RENTAL (Item @ Cost/Hour or Cost/Day X # Hours or # Days X # Fiscal Years = Cost/Item): (Note: Purchase requires written justification that demonstrates cost/item benefits over lease or rental.)	COST/ITEM
TOTAL EQUIPMENT PURCHASE, LEASE, OR RENTAL COST	
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X # Fiscal Years = Cost/Item):	COST/ITEM
(Western wheatgrass @ \$1.83/lb + Streambank wheatgrass @ \$3.88/lb) @ 10 lbs/acre x 805 acres x 2 years	\$91,930
TOTAL MATERIALS AND SUPPLY COST	\$91,930
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X # Fiscal Years = Cost/Item):	COST/ITEM
TOTAL TRAVEL COST	\$0
CONTRACT COST (Labor or Equipment @ Cost/Hour X # Hours X # Fiscal Years = Cost/Item):	COST/ITEM
Contracted aerial hydromulching including all materials, supplies, equipment, personnel, loading and transportation @ \$2,500 / acre X 805 acres x 2 years	\$4,025,000
TOTAL CONTRACT COST	\$4,025,000

SPECIFICATION COST SUMMARY

FISCAL YEAR	UNIT	UNIT COST	# OF UNITS	COST	FUNDING SOURCE	METHOD
FY 1	Acres	\$2,557	805	\$2,058,465	ES	C
FY 2	Acres	\$2,557	805	\$2,058,465	ES	C
FY 3						
TOTAL	Acres	\$2,557	1610	\$4,116,930	ES	C

Funding Sources:
 F = Fire Suppression Account
 EFR=Emergency Fire Rehabilitation
 OP/O =Agency Operating Fund
 EWP = Emergency Watershed Program

Specification Type
 ES = Emergency Stabilization
 R = Rehabilitation
 FS = Fire Suppression

Methods For Completion
 P=Agency Personnel Services
 C=Contract
 EFC= Emergency Fire Contract
 FC=Crew Labor Assigned to Fire

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	C
3. Estimate supported by cost guides from independent sources or other federal agencies.	
4. Estimates based upon government wage rates and material cost.	
5. No cost estimate required – cost charged to Fire Suppression Account.	

P = Personnel Services M = Materials/Supplies T = Travel C = Contract F = Suppression

III. RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

List Relevant Documentation and Cross-References Within ESR Plan:
 SEE APPENDIX I, SOIL AND WATERSHED ASSESSMENT. SEE APPENDIX III, HILLSLOPE TREATMENT MAP.

IV. TOTAL COST BY JURISDICTION

JURISDICTION	UNITS TREATED	COST
BLM – 500 acres treated twice	1000	\$2,557,100
Private – 305 acres treated twice	610	\$1,559,830
TOTAL COST	805	\$4,116,930

**INTERAGENCY
BURNED AREA EMERGENCY STABILIZATION & REHABILITATION PLAN**

PART F - SPECIFICATION

SPECIFICATION TITLE:	IMPLEMENTATION LEADER	JURISDICTIONS:	BLM
PART E: LINE ITEM:	#19, Implementation Leader & Support	FISCAL YEAR:	2002-2003
ESR REFERENCE#	8.5 Project Management	SPECIFICATION TYPE:	ES

I. WORK TO BE DONE

Number and Describe Each Task:	
A. General Description:	Provide funding for basic salary, overtime, lease, utilities, materials, and supplies in support of rehabilitation plan objectives and implementation.
B. Location (Suitable) Sites:	Rehabilitation site office located at Bureau of Land Management, Glenwood Springs, Colorado
C. Design/Construction Specifications:	<ol style="list-style-type: none"> Implementation Leader will coordinate all aspects of rehabilitation including administering contracts, documentation of treatments installed, maintaining financial tracking of cost, providing at least annual reports of rehabilitation progress, submitting supplemental requests for funding, ensuring the completion of all approved treatments, and coordinating treatments with other agencies and private landowners. Implementation Leader will coordinate on-the-ground implementation of treatments including site orientation of contractors, developing daily/weekly work plans for contractors/crews, and supervising work. At completion of the funding period the implementation leader will prepare a final accomplishment report.
D. Purpose of Treatment Specifications:	Full-time project Implementation Leader, the intent of this specification is to provide the agencies with fiscal support for proper administration of the short and long-term rehabilitation program.
E. Treatment Effectiveness Monitoring:	Review of projects, financial accountability, and oversight will be conducted by Colorado State ESR Coordination.

II. LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST/ITEM
Implementation Leader GS-11 @ \$29.63 / hour X 80 hours / pay period X 13 pay periods	\$30,815
Administrative Support GS-9 @ \$17.93 / hour X 80 hours / pay period X 13 pay periods	\$18,647
TOTAL PERSONNEL SERVICE COST	\$49,462
EQUIPMENT PURCHASE, LEASE OR RENTAL (Item @ Cost/Hour or Cost/Day X # Hours or # Days X # Fiscal Years = Cost/Item): (Note: Purchase requires written justification that demonstrates cost/item benefits over lease or rental.)	COST/ITEM
Misc. equipment rental \$3,000	\$3,000
TOTAL EQUIPMENT PURCHASE, LEASE, OR RENTAL COST	\$3,000
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X # Fiscal Years = Cost/Item):	COST/ITEM
Misc. materials and supplies	\$3,000
TOTAL MATERIALS AND SUPPLY COST	\$3,000

TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X # Fiscal Years = Cost/Item):	COST/ITEM
TOTAL TRAVEL COST	\$0
CONTRACT COST (Labor or Equipment @ Cost/Hour X # Hours X # Fiscal Years = Cost/Item):	COST/ITEM
TOTAL CONTRACT COST	\$0

SPECIFICATION COST SUMMARY

FISCAL YEAR	UNIT	UNIT COST	# OF UNITS	COST	FUNDING SOURCE	METHOD
FY 1	LEADER	\$27,731	1	\$27,731	ES	P
FY 2	LEADER	\$27,731	1	\$27,731	ES	P
FY 3						
TOTAL	LEADER	\$55,462	1	\$55,462	ES	P

Funding Sources:
 F = Fire Suppression Account
 EFR=Emergency Fire Rehabilitation
 OP/O =Agency Operating Fund
 EWP = Emergency Watershed Program

Specification Type
 ES = Emergency Stabilization
 R = Rehabilitation
 FS = Fire Suppression

Methods For Completion
 P=Agency Personnel Services
 C=Contract
 EFC= Emergency Fire Contract
 FC=Crew Labor Assigned to Fire

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	
3. Estimate supported by cost guides from independent sources or other federal agencies.	
4. Estimates based upon government wage rates and material cost.	P/M
5. No cost estimate required – cost charged to Fire Suppression Account.	

P = Personnel Services M = Materials/Supplies T = Travel C = Contract F = Suppression

III. RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

List Relevant Documentation and Cross-References Within ESR Plan:
 See Appendix I Assessments for further description of projects and Treatment Maps, Appendix III.

IV. TOTAL COST BY JURISDICTION

JURISDICTION	UNITS TREATED	COST
BLM	Implementation Leader	\$55,462
TOTAL COST	IMPLEMENTATION LEADER	\$55,462

**INTERAGENCY
BURNED AREA EMERGENCY STABILIZATION & REHABILITATION PLAN**

PART F - SPECIFICATION

SPECIFICATION TITLE:	PLAN PREPARATION	JURISDICTIONS:	FS/BLM/PVT
PART E: LINE ITEM:	#20 PLAN PREPARATION	FISCAL YEAR:	2002
ESR REFERENCE#	5.4.2 ESR Plan	SPECIFICATION TYPE:	ES

I. WORK TO BE DONE

Number and Describe Each Task:	
A. General Description:	To prepare the Emergency Stabilization and Rehabilitation (ESR) plan for the Coal Seam Fire.
B. Location (Suitable) Sites:	The plan will include all treatment specifications, which are distributed throughout the fire, regardless of ownership.
C. Design/Construction Specifications:	<ol style="list-style-type: none"> 1. Conduct a detailed assessment of the burn severity and determine fire impacts.. <ol style="list-style-type: none"> 1. Write specifications based on assessment recommendations. 2. Submit the plan for approval and secure funding from appropriate sources. 3. Per policy, complete annual reports with monitoring narratives and cost details.
D. Purpose of Treatment Specifications:	To prepare a comprehensive ESR plan to manage or mitigate the fire impacts in order to protect life and property and conserve trust resources.
E. Treatment Effectiveness Monitoring:	Per policy, an annual and final accomplishment report will be prepared with detailed costs and monitoring narratives.

II. LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).			COST/ITEM
Resource Group	Total Cost	Total Hours	\$116,000
Archeology	\$23150.50	1,103.5 hrs	
Compliance	\$7434.00	144 hrs	
Dispatch	\$2880.00	96 hrs	
Engineering	\$2040.00	52 hrs	
Geology	\$6120.00	144 hrs	
GIS	\$16554.00	392 hrs	
Leader	\$19515.13	426.5 hrs	
Operations	\$13934.00	346 hrs	
Trainee Lead	\$6800.00	160 hrs	
Vegetation	\$9520.00	256 hrs	
Wildlife	\$7434.00	144 hrs	
TOTAL PERSONNEL SERVICE COST				$116,000
EQUIPMENT PURCHASE, LEASE OR RENTAL (Item @ Cost/Hour or Cost/Day X # Hours or # Days X # Fiscal Years = Cost/Item): (Note: Purchase requires written justification that demonstrates cost/item benefits over lease or rental.)			COST/ITEM
TOTAL EQUIPMENT PURCHASE, LEASE, OR RENTAL COST			\$0

MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X # Fiscal Years = Cost/Item):			COST/ITEM
Resource Group	Total Cost	Total Hours	\$15,310
Supplies	\$10.00		
Documentation	\$15,300.00	198 hrs	
TOTAL MATERIALS AND SUPPLY COST			\$15,310
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X # Fiscal Years = Cost/Item):			COST/ITEM
Resource Group	Total Cost	Total Hours	\$67,000
Transportation	\$67,192.50	2,050 hrs	
TOTAL TRAVEL COST			\$67,000
CONTRACT COST (Labor or Equipment @ Cost/Hour X # Hours X # Fiscal Years = Cost/Item):			COST/ITEM
Resource Group	Total Cost	Total Hours	\$47,000
Hydrology	\$27,000.00	240 hrs	
Soils Scientist	\$20,000.00	160 hrs	
TOTAL CONTRACT COST			\$47,000

SPECIFICATION COST SUMMARY

FISCAL YEAR	UNIT	UNIT COST	# OF UNITS	COST	FUNDING SOURCE	METHOD
FY 1	ESR Plan	\$245,310	1	\$245,310	EFR	P/EFC
FY 2						
FY 3						
TOTAL		\$245,310		\$245,310		

Funding Sources:
 F = Fire Suppression Account
 EFR=Emergency Fire Rehabilitation
 OP/O =Agency Operating Fund
 EWP = Emergency Watershed Program

Specification type
 ES = Emergency Stabilization
 R = Rehabilitation
 FS = Fire Suppression

Methods For Completion
 P=Agency Personnel Services
 C=Contract
 EFC= Emergency Fire Contract
 FC=Crew Labor Assigned to Fire

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	P/M/T
3. Estimate supported by cost guides from independent sources or other federal agencies.	
4. Estimates based upon government wage rates and material cost.	
5. No cost estimate required – cost charged to Fire Suppression Account.	

P = Personnel Services M = Materials/Supplies T = Travel C = Contract F = Suppression

III. RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

List Relevant Documentation and Cross-References Within ESR Plan:
 See Executive Summary.

IV. TOTAL COST BY JURISDICTION

JURISDICTION	UNITS TREATED	COST
BLM	.5	\$122,655
FS	.5	\$122,655
TOTAL COST	805	\$245,310

**INTERAGENCY
BURNED AREA EMERGENCY STABILIZATION & REHABILITATION PLAN**

PART F - SPECIFICATION

SPECIFICATION TITLE:	HAZARD TREE REMOVAL	JURISDICTIONS:	PRIVATE
PART E: LINE ITEM:	#21, Hazard Tree Mitigation	FISCAL YEAR:	2002
ESR REFERENCE#	6.10 Health and Safety	SPECIFICATION TYPE:	ES

I. WORK TO BE DONE

Number and Describe Each Task:

A. General Description:

Locate and identify for removal, hazard trees killed or weakened by fire that pose a threat to public safety and infrastructure.

B. Location (Suitable) Sites:

Mitchell Creek road, branch streets and associated structures, and South Canyon. (See Treatment Map for general locations)

C. Design/Construction Specifications:

1. Fall hazard trees that have been identified with Orange Flagging or Orange "KILLER TREE" plastic ribbon
2. On slopes of 10% - 30%, fall trees on the contour wherever possible, otherwise away from the target. Contour felled trees are to be left as traps for sediment and to slow water.
3. Leave trees unbucked, remove limbs flush from the bole and scatter slash. Trees and slash should be removed if it poses a debris hazard in the channel.
4. Stump heights to be as low as practical.
5. Trees that must be felled in the stream channel or flood plane will need to be removed daily, including branches.

D. Purpose of Treatment Specifications:

To protect the safety of the public, maintain open access along roads and prevent further damage to structures and other man made features and to clear channels of potential hazards.

E. Treatment Effectiveness Monitoring:

Follow-up review to insure that all hazards have been removed.

II. LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST/ITEM
TOTAL PERSONNEL SERVICE COST	\$0
EQUIPMENT PURCHASE, LEASE OR RENTAL (Item @ Cost/Hour or Cost/Day X # Hours or # Days X # Fiscal Years = Cost/Item): (Note: Purchase requires written justification that demonstrates cost/item benefits over lease or rental.)	COST/ITEM
TOTAL EQUIPMENT PURCHASE, LEASE, OR RENTAL COST	\$0

MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X # Fiscal Years = Cost/Item):	COST/ITEM
TOTAL MATERIALS AND SUPPLY COST	\$0
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X # Fiscal Years = Cost/Item):	COST/ITEM
TOTAL TRAVEL COST	\$0
CONTRACT COST (Labor or Equipment @ Cost/Hour X # Hours X # Fiscal Years = Cost/Item):	COST/ITEM
Equipment and Labor @ \$1,210.00 per day X 20 days	\$24,200
TOTAL CONTRACT COST	\$24,200

SPECIFICATION COST SUMMARY

FISCAL YEAR	UNIT	UNIT COST	# OF UNITS	COST	FUNDING SOURCE	METHOD
FY 1	Tree	\$110	220	\$24,200	O	C
FY 2						
FY 3						
TOTAL		\$110	220	\$24,200	O	C

Funding Sources:

F = Fire Suppression Account
 EFR=Emergency Fire Rehabilitation
 OPIO =Agency Operating Fund
 EWP = Emergency Watershed Program

Specification Type

ES = Emergency Stabilization
 R = Rehabilitation
 FS = Fire Suppression

Methods For Completion

P=Agency Personnel Services
 C=Contract
 EFC= Emergency Fire Contract
 FC=Crew Labor Assigned to Fire

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	C
2. Documented cost figures from similar project work obtained from local agency sources.	
3. Estimate supported by cost guides from independent sources or other federal agencies.	
4. Estimates based upon government wage rates and material cost.	
5. No cost estimate required – cost charged to Fire Suppression Account.	

P = PERSONNEL SERVICES M = MATERIALS/SUPPLIES T = TRAVEL C = CONTRACT F = SUPPRESSION

III. RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

List Relevant Documentation and Cross-References Within ESR Plan:

REFER TO THE TREATMENT MAP FOR LOCATIONS. THE RECOMMENDATIONS IN THIS SPECIFICATION ARE SUGGESTED TREATMENTS FOR HAZARDOUS TREE REMOVAL AND WILL NOT BE IMPLEMENTED THROUGH THIS ESR PLAN.

**INTERAGENCY
BURNED AREA EMERGENCY STABILIZATION & REHABILITATION PLAN**

PART F - SPECIFICATION

SPECIFICATION TITLE:	TRIBAL CONSULTATION ACTIVITIES, COMPLIANCE AND REHABILITATION	JURISDICTIONS:	FS-WRF
PART E: LINE ITEM:	#22, Native American Consultation	FISCAL YEAR:	2002/03
ESR REFERENCE#	6.3 Cultural Resources	SPECIFICATION TYPE:	ES

I. WORK TO BE DONE

Number and Describe Each Task:

A. General Description:

Consultation with the Southern Ute Indian Reservation, Unita-Ouray Ute Reservation, and the Ute Mountain Ute tribal representatives regarding sacred sites within the Coal Seam Fire, results of the cultural resource damage assessment and other cultural issues specific to the fire assessment.

B. Location (Suitable) Sites:

One consultation meeting will be conducted in the field at the Coal Seam Fire and two followup meetings will be conducted at the White River National Forest Supervisor's Office or a suitable location at Glenwood Springs, Colorado.

C. Design/Construction Specifications:

One field and two office consultation meetings will be conducted (three meetings total) with an estimated 2 representatives from each of the three tribes. The consultation should occur prior to the first rains (FY2002), spring, 2003, and following the first flood event or in summer, 2003.

D. Purpose of Treatment Specifications:

To meet consultation requirements of the National Historic Preservation Act, the Archaeological Resources Protection Act, the American Indian Religious Freedom Act, the Native American Graves and Repatriation Act, and associated Federal legislation.

E. Treatment Effectiveness Monitoring:

Included within consultation.

II. LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST/ITEM
TOTAL PERSONNEL SERVICE COST	\$0
EQUIPMENT PURCHASE, LEASE OR RENTAL (Item @ Cost/Hour or Cost/Day X # Hours or # Days X # Fiscal Years = Cost/Item): (Note: Purchase requires written justification that demonstrates cost/item benefits over lease or rental.)	COST/ITEM
TOTAL EQUIPMENT PURCHASE, LEASE, OR RENTAL COST	\$0
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X # Fiscal Years = Cost/Item):	COST/ITEM
TOTAL MATERIALS AND SUPPLY COST	\$0

TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X # Fiscal Years = Cost/Item):	COST/ITEM
6 Tribal Representatives @ \$350 ea. X 7 days	\$14,700
TOTAL TRAVEL COST	\$14,700
CONTRACT COST (Labor or Equipment @ Cost/Hour X # Hours X # Fiscal Years = Cost/Item):	COST/ITEM
TOTAL CONTRACT COST	\$0

SPECIFICATION COST SUMMARY

FISCAL YEAR	UNIT	UNIT COST	# OF UNITS	COST	FUNDING SOURCE	METHOD
FY 1	Person	\$350	18	\$6,300	EFR	C
FY 2	Person	\$350	24	\$8,400	EFR	C
FY 3						
TOTAL		\$700	42	\$14,700		

Funding Sources:

F = Fire Suppression Account
 EFR=Emergency Fire Rehabilitation
 OP/O =Agency Operating Fund
 EWP = Emergency Watershed Program

Specification Type

ES = Emergency Stabilization
 R = Rehabilitation
 FS = Fire Suppression

Methods For Completion

P=Agency Personnel Services
 C=Contract
 EFC= Emergency Fire Contract
 FC=Crew Labor Assigned to Fire

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	C/MT
3. Estimate supported by cost guides from independent sources or other federal agencies.	
4. Estimates based upon government wage rates and material cost.	
5. No cost estimate required – cost charged to Fire Suppression Account.	

P = Personnel Services M = Materials/Supplies T = Travel C = Contract F = Suppression

III. RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

List Relevant Documentation and Cross-References Within ESR Plan:

SEE APPENDIX , CULTURAL RESOURCE ASSESSMENT

IV. TOTAL COST BY JURISDICTION

JURISDICTION	UNITS TREATED	COST
USFS	42	\$14,700
TOTAL COST	3	\$14,700

**INTERAGENCY
BURNED AREA EMERGENCY STABILIZATION AND REHABILITATION PLAN**

PART G POST-REHABILITATION RECOMMENDATIONS

I. Long-Term Monitoring:

- Monitor Seeding Effectiveness
- Monitor Water Quality
- Monitor Vegetative Recovery
- Monitor Threatened and Endangered Species
- Monitor Cultural Sites Treatments
- Maintain Installed Treatments

1	...
2	...
3	...
4	...
5	...
6	...
7	...
8	...
9	...
10	...

11	...	...	...
12	...	...	...
13	...	...	...
14	...	...	...

1. ...
 2. ...
 3. ...
 4. ...

15	...	...	...
16	...	...	...
17	...	...	...
18	...	...	...
19	...	...	...
20	...	...	...

21. ...
 22. ...

23. ...

24	...	...	...
25	...	...	...
26	...	...	...

INTERAGENCY
BURNED AREA EMERGENCY STABILIZATION & REHABILITATION PLAN

COAL SEAM FIRE

PART H CONSULTATIONS

COLORADO DIVISION OF WILDLIFE

Rich Kolecki, Fish Hatchery Manager, Colorado Division of Wildlife	970-947-2924
Alan Alan Czenkusch, Aquatic Biologist, Colorado Division of Wildlife	970-947-2924
Sonia Marzec, District Wildlife Manager, Colorado Division of Wildlife	970-947-2934
Sherman Hebein, Senior Aquatic Biologist, Colorado Division of Wildlife	970-252-6022
Bill Andree, Acting Area Wildlife Manager, Colorado Division of Wildlife	970-328-9699

US FISH AND WILDLIFE SERVICE

Lee Carlson, Wildlife Biologist, US Fish and Wildlife Service, Denver Office	303-275-2343
Kurt Broderdorp, Wildlife Biologist, US Fish and Wildlife Service, Grand Junction Field Office	970-245-3920
Bob Leachman, Wildlife Biologist, US Fish and Wildlife Service, Grand Junction Office	970-245-3920

BUREAU OF LAND MANAGEMENT

Cheryl Harrison, Archaeologist and Native American Liaison, Bureau of Land Management, Glenwood Springs Field Office	925-947-2820
Brian Hopkins, Bureau of Land Management, Glenwood Springs Field Office	970-947-2840
Tom Fresques, Wildlife Biologist, Bureau of Land Management, Glenwood Springs Field Office	970-947-2814
Steve Bennett, Acting Field Manager; Bureau of Land Management, Glenwood Springs Field Office	970-947-2800
Daniel Sokal, Planning and Environmental Coordinator, Bureau of Land Management, Glenwood Springs Field Office	970-947-2800
Michael Kinser, Rangeland Management Specialist, Bureau of Land Management, Glenwood Springs Field Office	970-947-2800
Michael McGuire, Rangeland Management Specialist, Bureau of Land Management, Glenwood Springs Field Office	970-947-2800

U.S. FOREST SERVICE

Christine Hirsch, Forest Fisheries Biologist, White River National Forest, Supervisor's Office	970-945-3243
Alice Gustafson, Archaeologist, White River National Forest, Supervisor's Office	925-948-3247
Andele Worthington, Native American Coordinator, White River National Forest, Supervisor's Office	925-948-3247
Andrea Brogan, Fire Archaeologist, White River National Forest, Supervisor's Office	925-948-7534
Phil Nyland, Wildlife Biologist, White River National Forest, Rifle Ranger District	970-625-2371
Keith Gienzentanner, Forest Wildlife Biologist, White River National Forest, Supervisor's Office	970-945-3244
David Silveus, District Ranger, White River National Forest, Rifle Ranger District	970-625-2371

NRCS

Jim Green, Staff, Colorado State Historic Preservation Office, Denver, CO	303-866-4674
Steve Anthony, Vegetation Manager, Garfield County	970-625-3969
Dennis Davidson, District Conservationist, NRCS	970-945-5494
Robin Millyard, Community Planner, City of Glenwood Springs	925-928-6009
Rich and Laura Kolecki, Hatchery Management,	970-945-9887

UTE INDIAN REPRESENTATIVES

Betsy Champoos, Cultural Rights and Protection Director, Ute Indian (Unita-Ouray Ute) Tribe, Ft. Duchesne, UT -	435-722-4992
Jim Jefferson, Cultural Protection Director, Southern Ute Indian Tribe, Ignacio, CO	970-563-0396
Terry Knight, NAGPRA Coordinator, Ute Mountain Ute Tribe, Towaoc, CO	970-565-9473

HOMEOWNERS AND LOCAL BUSINESSES

Myles Rovig, Homeowner, (0125 Donegan Road)	970-945-7963
Linda Gabossi, Homeowner, (0717 Rd. 132)	970-928-0668
Stanley Rachesky, Homeowner, (1686 Mitchell Creek)	970-945-4002
Ralph Besler, Homeowner, (1962 Rd. 132)	970-948-9650
Kenny Cline, Homeowner, (Rd. 132 above Hatchery)	970-945-6019
Lee Bowles, Homeowner, (0688 Rd. 132)	970-945-2539
Hector Bulow, Homeowner, (1246 Rd. 132)	970-945-2556
Larry Martin, Homeowner, (0964 Rd. 132)	970-945-7390
Mr. Kenny Cline, Homeowner, Craig Westley, Manager, Sky King Ranch	970-928-0904
Willa Soncarty, Curator, Frontier Historic Society, Glenwood Springs CO	925-945-4445
Mr. Ken McKay, Tree Removal Service,	970-434-7586
Mr. Scott Danials, High Rise Tree Care,	970-984-0202
Mr. Tom Ziola, Forestry Consultant/Arborist,	970-216-8514
Michael Metcalf, Owner, Metcalf Archaeological Consultants Inc, Eagle, CO	970-328-6244

**INTERAGENCY
BURNED AREA EMERGENCY STABILIZATION AND REHABILITATION PLAN**

PART I REVIEW AND APPROVAL – U.S. FOREST SERVICE

I. SUPPRESSION RELATED REHABILITATION CONCURRENCE

- Approved**
- Approved with Revision**
- Disapproved**

Explanation for Revision or Disapproval:

Martha Kettle, Forest Supervisor, White River National Forest

Date

II. EMERGENCY STABILIZATION AND REHABILITATION CONCURRENCE

- Approved**
- Approved with Revision**
- Disapproved**

Explanation for Revision or Disapproval:

Martha Kettle, Forest Supervisor, White River National Forest

Date

III. EMERGENCY STABILIZATION AND REHABILITATION APPROVAL

- Approved**
- Approved with Revision**
- Disapproved**

Explanation for Revision or Disapproval:

Tim Sullivan, Regional BAER Coordinator, Rocky Mtn. Region, USFS

Date

IV. OPERATIONAL BASE FUNDING APPROVAL

- Approved**
- Approved with Revision**
- Disapproved**

Explanation for Revision or Disapproval:

Martha Kettle, Forest Supervisor, White River National Forest

Date

INTERIM REPORT
 ENVIRONMENTAL STABILIZATION AND REHABILITATION PLAN
 EAST 11th Street and Commercial - 1st Street
 City of Seattle, Washington
 Environmental Services Department

I. PURPOSE AND SCOPE OF ENVIRONMENTAL STABILIZATION
 The purpose of this plan is to stabilize and rehabilitate the environment in the area bounded by East 11th Street to the north, Commercial Street to the south, 1st Street to the east, and 2nd Street to the west. The plan includes the following components:
 A. Site Assessment
 B. Remediation
 C. Monitoring
 D. Reporting

II. ENVIRONMENTAL ASSESSMENT AND REHABILITATION
 A. Site Assessment
 The site was assessed for environmental conditions. The assessment included a visual inspection, soil sampling, and groundwater monitoring. The results of the assessment are as follows:
 1. Visual Inspection: The site is in poor condition, with significant erosion and debris.
 2. Soil Sampling: The soil is contaminated with lead, copper, and zinc.
 3. Groundwater Monitoring: The groundwater is contaminated with lead, copper, and zinc.
 B. Remediation
 The remediation plan includes the following actions:
 1. Erosion Control: Install silt fences and erosion control blankets.
 2. Soil Remediation: Excavate and remove contaminated soil.
 3. Groundwater Remediation: Install groundwater monitoring wells and pump-and-treat system.
 C. Monitoring
 The monitoring plan includes the following actions:
 1. Visual Monitoring: Conduct regular visual inspections of the site.
 2. Soil Monitoring: Conduct regular soil sampling and analysis.
 3. Groundwater Monitoring: Conduct regular groundwater monitoring and analysis.
 D. Reporting
 The reporting plan includes the following actions:
 1. Progress Reports: Submit progress reports to the City of Seattle.
 2. Final Report: Submit a final report to the City of Seattle.

III. ENVIRONMENTAL STABILIZATION AND REHABILITATION
 A. Erosion Control
 The erosion control plan includes the following actions:
 1. Silt Fences: Install silt fences around the perimeter of the site.
 2. Erosion Control Blankets: Install erosion control blankets on exposed soil.
 B. Soil Remediation
 The soil remediation plan includes the following actions:
 1. Excavation: Excavate and remove contaminated soil.
 2. Landfill: Landfill the excavated soil at an approved landfill.
 C. Groundwater Remediation
 The groundwater remediation plan includes the following actions:
 1. Monitoring Wells: Install groundwater monitoring wells.
 2. Pump-and-Treat System: Install a pump-and-treat system to remove contaminants from the groundwater.

IV. ENVIRONMENTAL STABILIZATION AND REHABILITATION
 A. Erosion Control
 The erosion control plan includes the following actions:
 1. Silt Fences: Install silt fences around the perimeter of the site.
 2. Erosion Control Blankets: Install erosion control blankets on exposed soil.
 B. Soil Remediation
 The soil remediation plan includes the following actions:
 1. Excavation: Excavate and remove contaminated soil.
 2. Landfill: Landfill the excavated soil at an approved landfill.
 C. Groundwater Remediation
 The groundwater remediation plan includes the following actions:
 1. Monitoring Wells: Install groundwater monitoring wells.
 2. Pump-and-Treat System: Install a pump-and-treat system to remove contaminants from the groundwater.

V. ENVIRONMENTAL STABILIZATION AND REHABILITATION
 A. Erosion Control
 The erosion control plan includes the following actions:
 1. Silt Fences: Install silt fences around the perimeter of the site.
 2. Erosion Control Blankets: Install erosion control blankets on exposed soil.
 B. Soil Remediation
 The soil remediation plan includes the following actions:
 1. Excavation: Excavate and remove contaminated soil.
 2. Landfill: Landfill the excavated soil at an approved landfill.
 C. Groundwater Remediation
 The groundwater remediation plan includes the following actions:
 1. Monitoring Wells: Install groundwater monitoring wells.
 2. Pump-and-Treat System: Install a pump-and-treat system to remove contaminants from the groundwater.

**INTERAGENCY
BURNED AREA EMERGENCY STABILIZATION AND REHABILITATION PLAN**

PART I REVIEW AND APPROVAL -- BUREAU OF LAND MANAGEMENT

I. SUPPRESSION RELATED REHABILITATION APPROVAL

- Approved**
- Approved with Revision**
- Disapproved**

Explanation for Revision or Disapproval:

Steve Bennett, Acting Field Manager, Glenwood Springs Field Office, BLM Date

II. EMERGENCY STABILIZATION AND REHABILITATION CONCURRENCE

- Approved**
- Approved with Revision**
- Disapproved**

Explanation for Revision or Disapproval:

Steve Bennett, Acting Field Manager, Glenwood Springs Field Office, BLM Date

III. EMERGENCY STABILIZATION AND REHABILITATION CONCURRENCE

- Approved**
- Approved with Revision**
- Disapproved**

Explanation for Revision or Disapproval:

Scott Davis, State of Colorado ESR Coordinator, BLM Date

IV. EMERGENCY STABILIZATION AND REHABILITATION APPROVAL

- Approved**
- Approved with Revision**
- Disapproved**

Explanation for Revision or Disapproval:

Bob Bolton, Washington Office, BLM Date

V. OPERATIONAL BASE FUNDING APPROVAL

- Approved**
- Approved with Revision**
- Disapproved**

Explanation for Revision or Disapproval:

Steve Bennett, Acting Field Manager, Glenwood Springs Field Office, BLM Date

INTERAGENCY
 GUNNERS AREA EMERGENCY STATION AND REHABILITATION PLAN

PART I - GUNNERS AREA - BUILDING OF 1300 REHABILITATION

I. SUPPLEMENTAL REHABILITATION APPROVAL

Exposure to Hazardous Materials

- Disapproved
- Approved with Revision
- Approved

State Council, Acting Fire Manager, Gunner's Area, 1300, 1310, 1320

II. EMERGENCY STATION AND REHABILITATION CONFORMANCE

Exposure to Hazardous Materials

- Disapproved
- Approved with Revision
- Approved

State Council, Acting Fire Manager, Gunner's Area, 1300, 1310, 1320

III. EMERGENCY STATION AND REHABILITATION CONFORMANCE

Exposure to Hazardous Materials

- Disapproved
- Approved with Revision
- Approved

State Council, Acting Fire Manager, Gunner's Area, 1300, 1310, 1320

IV. EMERGENCY STATION AND REHABILITATION APPROVAL

Exposure to Hazardous Materials

- Disapproved
- Approved with Revision
- Approved

State Council, Acting Fire Manager, Gunner's Area, 1300, 1310, 1320

V. OPERATIONAL BASE FUNDING APPROVAL

Exposure to Hazardous Materials

- Disapproved
- Approved with Revision
- Approved

State Council, Acting Fire Manager, Gunner's Area, 1300, 1310, 1320

**INTERAGENCY
BURNED AREA EMERGENCY STABILIZATION AND REHABILITATION PLAN**

APPENDIX I. BAER TEAM RESOURCE ASSESSMENTS

- **SOIL AND WATERSHED RESOURCE ASSESSMENT**
- **WILDLIFE RESOURCE ASSESSMENT**
- **VEGETATION RESOURCE ASSESSMENT**
- **CULTURAL RESOURCE ASSESSMENT**
- **OPERATIONS ASSESSMENT**
- **FOREST RESOURCE ASSESSMENT**



**INTERAGENCY
BURNED AREA EMERGENCY STABILIZATION & REHABILITATION PLAN
COAL SEAM FIRE**

SOIL AND WATERSHED RESOURCE ASSESSMENT

I. OBJECTIVES

- Assess overall watershed changes caused by the fire, particularly those that pose substantial threats to human life, property, and critical natural and cultural resources. This includes evaluating changes to soil conditions, hydrologic function, and watershed response to precipitation events.
- Identify the most critical soil and watershed areas and issues related to the Coal Seam Fire based on increased flood and debris flow potential and loss of soil resources and prescribe treatments, if necessary, to mitigate impacts and risks.
- Develop maps of burn severity, flood zones, debris flow source areas and treatments.
- Identify future monitoring needs.

II. ISSUES

- Potential threats to human life and property downstream of the Coal Seam Fire from potential increases in storm flow runoff, flooding and debris flows.
- Threats to the Glenwood Springs State Fish Hatchery.
- Ability of drainage structures to pass flood and debris flows.
- Potential loss of soil productivity and increased erosion.
- ESR cannot design treatments to protect against all scales of flood and debris flow events.

III. OBSERVATIONS

A. Background

1. Geology/Physiography:

The Coal Seam Fire is located immediately west of Glenwood Springs, Colorado along both sides of the Colorado River. Most of the burned area is characterized by high relief and very steep slopes with narrow canyon bottoms. The northern portion of the burned area, known as the Flat Tops, is a high elevation, relatively flat plateau. Slopes range from nearly flat in the northern portion of the fire to greater than 80% along Mitchell Creek and south of the Colorado River. The burned area ranges from approximately 5,720 feet along the Colorado River to 10,400 feet in the Flat Tops.

Bedrock geology of the Coal Seam Fire and surrounding areas consists of eleven units of Paleozoic, Mesozoic, and Cenozoic eras ranging from Ordovician to Tertiary in age. Surficial deposits include Quaternary and Holocene alluvial, colluvial, debris-flow, and glacial units (Table 1). Major structural components include the Grand Hogback Monocline, folding, uplift, tilting, and faulting. Geomorphic processes include alluvial, colluvial, debris-flow, and glacial deposition.

Table 1 Geological units found within the Coal Seam Fire burned zone and surrounding area.

Name	Type	Period/Epoch;
Surficial Deposits	Alluvial, colluvial, debris-flow, & glacial	Quaternary
Volcanics	Basalt	Tertiary
Mesaverde	Sandstone	Cretaceous
Mancos	Shale	Cretaceous
Frontier	Sandstone	Cretaceous
Morrison	Sandstone	Jurassic
Chinle	Sandstone	Triassic
Maroon	Sandstone	Permian
Eagle Valley	Limestone	Pennsylvanian
Eagle Creek	Evaporites	Pennsylvanian
Belden	Limestone	Pennsylvanian
Leadville	Limestone	Mississippian
Peerless	Quartzite	Ordovician
Swatch	Dolomite and Sandstone	Cambrian

Debris Flow History and Potential

In September of 1994, following the South Canyon Fire of July, heavy downpours on Storm King Mountain produced large debris flows which exited the steep canyons and deposited sediments over Interstate 70 into the Colorado River near Glenwood Springs, Colorado. The combination of intense rainfall, highly erosive bedrock, steep slopes, and fire related hydrophobic soils generated these flows. Research of these events by the US Geological Survey and Colorado Geological Survey (Canon & Kirkham, 2000) demonstrated that these flows were primarily runoff-dominated failure from sheetwash, rill, and rainsplash erosion, instead of soil-slip process. Further investigation showed that the majority of the debris flows originated from the Maroon formation, Pleistocene colluvium, and sheet wash deposits from these formations. Also demonstrated was the runoff-contributing area that extends upslope from the point of the debris-flow initiation to the drainage divide and its gradient is a critical characteristic in debris-flow initiation. Slope-area thresholds for fire-related debris-flow initiation from the Maroon formation on Storm King Mountain are defined by the function $A_{cr}(\tan \theta)^3 = S$, where A_{cr} is the critical area upslope from the initiation location to the drainage divide, and $\tan \theta$ is the gradient. It is also important to note that these thresholds vary with different materials.

Of the entire Coal Seam Fire burn unit (12,229 acres) 16.3% of the bedrock exposure is the highly erosive Maroon Formation. Exposures occur within the lower southwestern portion of the Mitchell Creek watershed and above the Glenwood Springs Community Center and extend from Red Mountain west past the South Canyon Road. Although maps of Quaternary Surficial deposits showing Pleistocene debris-flow deposits in this area are not available, it is thought that these deposits are prevalent within most of the steep canyons in the burn area. Areas of high burn severity within these units have much greater potential for slope failure as demonstrated by the September, 1994 debris-flows from Storm King Mountain (Kirkham, 2000). Other moderately erosive units, such as the Mancos shale and Mesaverde sandstone, present a lesser debris flow potential compared to the Maroon Formation, but are a hazard none the less.

2. Soils

The information on soils is derived from the Soil Survey of Rifle Area, Garfield and Mesa Counties, CO and the Flat Tops Soil Survey, White River National Forest, CO. Four general soil map units occur within the burn perimeter, including 33 more detailed soil mapping units.

The first two general soils units, the Flat Tops and White River Plateau, occur on the White River National Forest in the northern part of the fire. In the Flat Tops, elevation ranges between 9,000 and 11,000 feet above sea level; and it is an exceptionally flat area supported largely by basalt flows. The area has been modified by subsequent glaciation in the higher regions. Where dissection has cut through the basalt cap rock, erosion in the softer sedimentary rocks below has progressed at a more rapid rate, yielding areas of high relief in the form of narrow canyons. Soil types are largely decomposed basaltic soils and where glacial deposits have been laid down, the soils are predominately silts, sands, rock and boulders of various morainal deposits. The White River Plateau is generally south and west of the Flat Tops. The parent materials range from quartzites through limestones and dolomites in upper to mid Mitchell Creek watershed, to siltstones and shales in the lower portions of Mitchell Creek. The soils vary considerably because of the variety of underlying units. Some soils are corrosive, such as those which contain salts derived from the Eagle Valley Evaporite; others have high swelling potential, especially those of the Mancos Shale along the fringes of the White River Uplift.

The remaining two general soil map units, designated by the Soil Survey of Rifle Area, CO as units 4 and 9, occur over the rest of the fire. Unit 4 (Torriorthents-Rock outcrop-Camborthids) is dominated by shallow to deep, well drained, steep to extremely steep soils, and rock outcrop on mountains, fans and ridges. The soils formed in sandstone and shale. Soils in unit 9 (Jerry-Lamphier-Cochetopa) are deep, well drained, moderately sloping to steep soils on mountains and fans. The soils formed in mixed alluvial and colluvial material derived from sandstone, shale and basalt.

Erosion hazards are naturally high in some areas within the fire such as Red Mountain and the steep slopes along the Interstate 70 corridor. These soils are formed in highly erosive sandstones and shales and are susceptible to rill and gully erosion and are prone to debris flows (Cannon et. al, 2000) during high intensity, short duration thunderstorms. Of the 12,2209 acres of soils within the fire, approximately 15 % have a naturally erosion rating of severe or very severe, and approximately 50% have an erosion hazard of moderate.

3. Climate:

Within the White River National Forest and Glenwood Springs area elevations range from 5,700 feet in the valley bottom to over 11,000 feet on the nearby mountain. Glenwood Springs has a semi-arid climate with low humidity throughout the year. Average high temperatures in the valley bottoms range from 30° to 40° F in winter, to 80° to 90° F with cooler temperatures at elevation. Average annual precipitation in the valley is 15 to 17 inches and up to 38 inches at elevation. Precipitation usually occurs at two times of year, winter storms and summer monsoons. Winter storms occur with cold fronts moving in from the west to northwest, and summer monsoons are generated from the south to southwest. Localized intense thundercells associated with the monsoons can produce much greater rain than surrounding areas within one storm event.

4. Hydrology

The Colorado River cuts through the center of the burned area with all streams draining to the Colorado River. Deep, narrow canyons with steep side slopes are the dominant hydrologic features of the lower portions of Mitchell and Oasis Creek watersheds, which lie in the northern portion of the burned area. The upper portions of these watersheds are more gently sloped. Elevations range approximately between 5,600 and 10,000 feet.

The hillslopes and stream channels of the major watersheds south of the Colorado River (South Canyon and Paradise Creeks) are not as steep. Their elevations range approximately between 5,600 and 9,100 feet.

Numerous ephemeral channels draining directly into the Colorado River occur on oversteepened, highly dissected hillslopes. The portion of Red Mountain that drains towards the Glenwood Springs Community Center and Municipal Operations Center is an example of such channels.

The area's riparian and wetland areas are primarily associated with streams and springs. The flow regime of the analysis area is characterized by snowmelt peak flows in spring and peak flows in response to short duration, high intensity thunderstorms associated with the monsoon season.

B. Reconnaissance Methodology and Results

The purpose of a burned area assessment is to determine if the fire caused emergency watershed conditions and if there are values at risk from these conditions. If an emergency is not identified, the assessment stops. If emergency watershed conditions are found, and values at risk are identified, then the magnitude and scope of the emergency is mapped and described, values at risk and resources to be protected are analyzed, and treatment prescriptions are developed to protect values at risk. Emergency watershed conditions include both hydrologic and soil factors; typically potential for flash floods and debris flows and deterioration of soil condition, particularly loss of soil cover, leading to a decline in soil productivity. Table 2 describes terms commonly used in assessing soils and watersheds that have been burned.

Table 2. Definitions of terms commonly used in soil and watershed burned area assessments.

Term	Definition
Fire Intensity	Based on temperature, flame length, rate of spread, heat of combustion and total amount and size of fuel consumed. Accounts for convective heat rising into the atmosphere and fire effects to the overstory.
Fire Severity	Based on temperature, moisture content of duff and fuels lying on the ground, heat of combustion of conductive and radiant heat that goes down in to the soil, affecting soil characteristics.
Burn Severity	A relative measure of the degree of change in a watershed that relates to the severity of the effects of the fire on soil hydrologic function. Burn severity is delineated on topographic maps as polygons. Classes of burn severity are high, moderate, low and unburned.
Watershed Response	A qualitative degree and/or modeled measure of how a watershed will respond to precipitation. Parameters include pre-existing soil moisture; amount of soil cover; amount and distribution of impermeable surfaces (rock outcrop, hydrophobic soils) amount and duration of rainfall; lag time between initiation of storm and peak flow runoff; and peak flow discharge and sediment delivery. Changes in the characteristics of a watershed caused by a fire will increase the efficiency with which a watershed yields runoff.

Burned area evaluations included, but were not limited to:

- Fire-caused changes in soil properties and hydrologic function;
- Aerial extent and strength of hydrophobic soil conditions;
- Mapping burn severity;
- Conditions of sediment source areas;
- Current channel and culvert capabilities;
- Elevations of commercial and residential facilities relative to anticipated or modeled post-fire flows; and
- Threats to human life and property from storm or mudflow and debris.

1. Burn Severity

Burn severity is not the same concept as fire intensity and fire severity as recognized by fire behavior specialists. Fire intensity and fire severity relate to fire behavior and fire effects on overstory and understory vegetation, respectively, while burn severity relates specifically to effects of the fire on soil conditions and hydrologic function (e.g., amount of surface litter and duff, erodibility, soil structure, infiltration rate, runoff response). Although burn severity is not primarily a reflection of fire effects on vegetation, vegetative conditions and pre-fire vegetation density are among indicators used to assess burn severity.

Site indicators used to evaluate and map burn severity include soil hydrophobicity (water repellency), ash depth and color (fire severity), size of residual fuels (fire intensity), soil texture and structure, and post-fire effective ground cover. These criteria provide clues about fire residence time, depth of litter layer consumed, radiant heat throughout the litter layer and ease of detachability of the surface soil. Using these indicators, burned areas are mapped into three relative burn severity categories - high, moderate, and low. A category of "unburned" may be mapped separately if there are large unburned islands inside the burn perimeter. Alternatively, mosaics of low and unburned areas may be lumped together for mapping and assessment purposes.

In some cases there may be complete consumption of vegetation by fire, with little effect on soil and watershed function. In general, the denser the pre-fire vegetation and the longer the residence time, the more severe the effects of the fire are on soil hydrologic function. For example, deep ash after a fire usually indicates a deeper litter layer prior to the fire, which generally supports longer residence times. Increased residence time promotes the formation of water repellent layers at or near the soil surface, and loss of soil structural stability. The results are increased runoff and soil particle detachment by water and transport off-site (erosion).

A classified satellite image using different spectral wavelength bands to delineate areas of low, moderate, and high burn severity at 30 meter resolution was produced by the Forest Service Remote Sensing Application Center using a Landsat7 image. The burn severity satellite image was verified by field visits, direct soil observations, and helicopter reconnaissance to produce the final burn severity map. The burn severity map becomes a basis to predict the hydrologic response of the watersheds, rates of erosion and the rate of natural revegetation of the site following the fire.

2. Soil Condition

Fire effects were evaluated in terms of soil condition parameters. These parameters included changes in litter and duff (vegetative ground cover), loss of soil structure, destruction of fine and very fine roots in the surface horizon, susceptibility to erosion, and development of hydrophobic (water repellent) soil surfaces. Changes in vegetative ground cover as affected by the fire were noted and compared to pre-fire conditions. Stability and strength of surface soil structural aggregates was examined. Surface soils were examined for the presence of fine and very fine roots. Water repellency was evaluated by observing the depth and thickness of a water repellent horizon in surface soils where it exists, and the length of time a water drop remained beaded on the surface.

Erosion potential was calculated using the Revised Universal Soil Loss Equation (modified for use on National Forests) in tons/acre in a spatially-based Arcview model. Input data was taken from the Soil Surveys and the White River National Forest and NRCS soils and vegetation GIS layers.

The RUSLE equation:

$$A \text{ (tons/acre)} = R * K * LS * C$$

Where *A* is the on-site soil loss expected in tons/acre, *R* is the rainfall factor, *K* is the soil erodibility value taken from the soil surveys, *LS* is the slope factor accounting for slope length and step effect, and *C* is the cover factor. A spatial model (30 meter grid cell size) to predict erosion in tons/acre was run to develop a sense of where the highest erosion potential occurs within the fire and identify candidate areas for hillslope treatments. The model runs a user-specified

precipitation event to predict erosion – for the Coal Seam fire, the storm event of concern as a threat to loss of control of water and erosion was a short-duration localized thunderstorm event. The other USLE inputs are incorporated spatially using a Digital Elevation Model (DEM) for the LS factor and by calculating C factors for each different vegetation type in conjunction with burn severity (i.e., a polygon of gamble oak in moderate burn severity is attributed with a lower cover factor than a polygon of gamble oak in high burn severity).

3. Watershed Response

On-the-ground field observations and aerial reconnaissance within and downstream of the burn areas were conducted to determine watershed response. Channel morphology related to transport and deposition processes were noted, along with channel crossings and stream outlets. Observations included condition of riparian vegetation and the volume of sediment stored in channels and on slopes that could be mobilized. Burn severity and changes in soil infiltration were also considered. Cross sections were measured at key locations (Appendix V, Cross Sections).

Pre-fire and post-fire flows were modeled for 41 watersheds within and downstream of the Coal Seam Fire (Appendix III, Potential Peak Flow and Sediment Delivery Map). Potential debris flow source areas and flood zones were also identified (Appendix III, Potential Debris/Flood Flow Areas Map).

Pre and Post-Fire Flow Modeling

Pre and post-fire flows were modeled using a GIS Rational Method. The model uses a Runoff Curve Number (CN) to calculate time of concentration. The pre-fire and post-fire CN were selected from a CN table based on vegetation types within the Coal Seam Fire Area (Appendix V, Curve Numbers).

Runoff coefficients used in the model were determined from research conducted at experimental plots in the Bitterroot National Forest (Robichaud, 2000). Hydraulic conductivity rates in mm/hr were measured from simulated rainfall events applied several days after a prescribed burn. The simulator rained at a rate of 94 mm/hr on randomly located one meter square plots on natural (unburned), low severity, high severity, and high severity plus strongly hydrophobic soil plots, with three replications. Hydraulic conductivity rates (K) were reported as a range of values but the lowest number in each range for varying burn severity type was used to calculate the runoff coefficient. K values were subtracted from the total simulated rainfall to determine the amount of runoff and then divided by the rainfall rate to calculate percent runoff. Moderately burned areas were extrapolated from the low and high severity values. The post-fire flow factor is a ratio of each severity type runoff rate (mm/hr) to the runoff rate of the unburned condition. Table 3 describes unburned runoff coefficients.

Table 3 Unburned Runoff Coefficients

Type	Coefficient
Urban	0.80
Barren	0.50
Grass	0.20
Pinyon juniper	0.20
Sagebrush	0.18
Gambel oak	0.12
Spruce, mixed conifer/aspen, aspen w/conifer, aspen/mesic mountain shrub	0.10
Aspen	0.08
Riparian	0.02

Table 4 Runoff Coefficients

Plot	K (mm/hr)	Runoff rate (mm/hr)	Post-fire Flow Factor	% Runoff / Runoff coefficient
Natural (unburned)	85	9	1	10/0.10
Low severity	60	34	3.78	36/0.36
Moderate severity	43	52	5.78	55/0.55
High severity with strong hydrophobicity	25	69	7.67	73/0.73

Post-fire modeled flows were bulked to account for potential sediment and debris in the flow volume using the following bulking equation:

Pre-fire discharge + (Pre-fire discharge x % high severity burn in watershed x 0.7) + (Pre-fire discharge x % moderate burn severity in watershed x 0.5) + (Pre-fire discharge x % low severity burn in watershed x 0.2) (Table 7 - Burn Severity by Watershed)

Debris Flow Modeling

Stream Network

1. A stream network was created from a 30 meter Digital Elevation Model (DEM) using the ArcView extension basin1.avx. The minimum accumulation area was set to 60 cells (1800 m²). The resulting network was ordered using the Strahler method (ArcView extension strahler.avx).
2. Stream gradients (maximum, minimum, and average) were calculated for all stream segments in degrees and percent using the ArcView extension surftools.avx.
3. All Order 1 streams within the fire perimeter with a slope of greater than 27° were selected as potential debris flow source areas (Cannon et al., 2000).
4. Order 1 stream lengths were calculated using a map wheel and Plate 1 of 1 in Kirkham et al. (2000). The volume of deposit at the basin mouth was divided by the Order 1 stream length resulting in the potential debris yield per foot of stream.
5. Streams selected under Step 3 were intersected with the analysis watershed boundaries and the total length was calculated for each watershed.

6. The total length of stream segments in each watershed was multiplied times the average debris yield in Table X Potential Sediment Yield.

Table 5 Potential Sediment Yield

Basin	m ³	yd ³	Order 1 Channels (ft)	Sediment Yield (yd ³ /ft)
G	1,064	4,174	1,681	2.48
F	4,256	16,698	6,303	2.65
E	1,368	5,367	3,571	1.50
B	20,824	81,699	5,042	16.20
C+D	39,064	153,261	15,966	9.60
		261,200	32,563	
Average				8.02

Precipitation values for flow modeling were determined using the methodology described in Appendix V, Precipitation Analysis.

C. Findings

1. Burn Severity and Soil Condition:

Table 6 (below) displays a summary of burn severity acres and percentages by severity class for the Coal Seam Fire. A burn severity map is included in Appendix III.

Table 6. Acres and percent of burn severity.

Burn Severity	Acres	Percent
High	2,195	18
Moderate	3,223	26
Low	3,195	26
Unburned	3,616	30
TOTAL	12,229	100

The post-fire soil conditions were reviewed by the BAER soil scientist, geologist, and hydrologists. While the percentages of burn severity classes are approximately evenly distributed between unburned, low, moderate and high (Table 6), the portion of the fire south of I-70 including Red Mountain, Paradise and South Canyon Creeks, experienced the majority of high burn severity. The northern portion of the fire including the Flat Tops area and the upper watershed of Mitchell Creek burned in a desirable mosaic pattern of high, moderate, and low burn severities. In the steep canyon area of Mitchell Creek, densely vegetated drainages on both sides of the creek burned with high severity producing "fingers" of exposed and highly hydrophobic soils where Douglas Fir once grew. Polygons of high burn severity also occurred on the steep slopes of Red Mountain, behind homes on the west side of Mitchell Creek, over the entire SOB watershed, and in areas of the Paradise and South Canyon Creeks. In these areas, the litter and duff were entirely consumed and little to no protective groundcover exists. The only soils exhibiting strong water repellency in high burn severity areas were located on the steep canyon slopes of Mitchell Creek – in all other units of high severity examined in the field, soils most commonly exhibited weak repellency. Increased stream flows due to strongly hydrophobic conditions in areas of Mitchell Creek are reflected in the hydrologists' peak flow analysis. An increase in overland flow due to the hydrophobic conditions is expected and is coupled with increased rates of erosion. Hydrophobic layers typically take six months to two years to break down. Plant root development and soil microbial activity contribute to the degradation of

hydrophobic conditions. The high burn severity fingers in Mitchell Canyon revealed that temperatures were hot enough to fuse and destroy the structure of surface soils.

Polygons of moderate burn severity exist throughout the entire fire across all vegetation types. In these areas, some leaves or needles remain and will drop to provide protective ground cover that will help reduce runoff velocities, promote infiltration, and mitigate post-fire erosion potential. The litter and duff in these areas was consumed in discontinuous patches. Hydrophobicity is predominately classified as weak with inclusions of moderate and no repellency at the surface in areas of moderate burn severity.

The majority of low severity and unburned polygons occurred along the southern perimeter of the fire in the upper Paradise Creek and South Canyon Creek Watersheds, and in large patches across the northern area of the fire in the Flat Tops. Areas of forest litter and grass may look black immediately post-fire, but in the low burn severity areas the litter and duff was charred but not entirely consumed. This remaining duff provides good ground cover to protect the soil from erosion and runoff. Areas of low severity were tested for water repellency but it was rarely exhibited, and was weak if present. The soil structure was strong, and intact fine and very fine roots were present. Trees in low severity areas are generally mostly green and are expected to survive. Vegetation communities are expected to recover rapidly, and post-fire erosion will not be significantly higher than pre-fire erosion.

Table 7 shows the percentages of burn severity in each watershed. Please refer to the Watershed Analysis Map in Appendix III for watershed locations.

Appendix IV contains photos showing examples of low and high burn severity areas.

Table 7 Burn Severity by Watershed

Watershed	Acres	High Severity	Moderate Severity	Low Severity	Burned	Unburned
Mitchell Creek at Highway 70	7,225	6%	11%	8%	25%	75%
Donegan Bridge	7,181	6%	11%	8%	25%	75%
Barn/Diversion Structure	7,159	6%	11%	8%	25%	75%
Structure 2	132	44%	6%	39%	88%	12%
Maroon Basin	35	2%	47%	50%	99%	1%
Structure 1	6,871	6%	11%	7%	23%	77%
Bridge below hatcher	4,119	9%	15%	7%	31%	69%
Hatchery	4,107	9%	15%	7%	31%	69%
Hatchery spring hous	4,082	9%	14%	7%	31%	69%
Mitchell Road low point	4,071	9%	14%	7%	30%	70%
Bridge at Unburned House	3,889	9%	14%	5%	28%	72%
Bridge at Upper House	3,792	9%	13%	4%	26%	74%
South Basin I	120	25%	14%	61%	100%	0%
Community Cntr A	56	28%	5%	67%	100%	0%
Community Cntr B	35	43%	0%	57%	100%	0%
South Basin H	509	73%	1%	26%	100%	0%
South Basin K	2,599	25%	10%	21%	56%	44%
South Canyon	5,744	7%	16%	11%	35%	65%
North Basin D	28	18%	26%	56%	100%	0%
North Basin A	30	18%	18%	64%	100%	0%
North Basin B	512	0%	46%	2%	48%	52%
North Basin C	429	0%	9%	1%	10%	90%
Oasis Creek	129	1%	57%	27%	85%	15%
North Basin G	483	1%	44%	27%	72%	28%
Lower Native Cutthroat	3,743	9%	13%	4%	26%	74%
Upper Native Cutthroat	1,514	2%	12%	2%	16%	84%
Landfill fill slope	792	3%	48%	20%	71%	29%
Landfill trib	185	7%	27%	26%	61%	39%
Gregory Park Bridge	7,220	6%	11%	8%	25%	75%
South Basin A	55	2%	40%	40%	81%	19%
South Basin B	79	1%	23%	71%	94%	6%
Operation Cntr A	51	1%	39%	60%	100%	0%
Operation Cntr B	40	1%	18%	81%	100%	0%
South Basin C	22	49%	0%	50%	100%	0%
South Basin D	350	19%	2%	34%	55%	45%
South Basin E	27	5%	5%	90%	100%	0%
South Basin F	42	33%	13%	55%	100%	0%
South Basin G	21	28%	0%	72%	100%	0%
Structure 3	14	14%	10%	76%	100%	0%
North Basin E	26	3%	26%	70%	99%	1%
North Basin F	83	0%	69%	1%	70%	30%

2. Erosion Potential

Rilling, gully erosion, and sheet erosion are expected to occur at increased rates due to the fire. Pre-fire, vegetation provided protective groundcover and duff layers played an important role in infiltration, both factors in reducing pre-fire overland flow. Due to the fire, soils are now bare and susceptible to accelerated erosion and increased runoff rates. Soils within the fire occurring on steep slopes of Red Mountain, in the SOB watershed, along Interstate 70, and above homes in Mitchell Creek have very high erosion hazards and debris flow potential exists in these areas during intense short-duration thunderstorms. Dry ravel was found in a few areas, but does not appear to be occurring at a rate that is a threat to overall soil productivity. Average annual rates of erosion potential (tons/acre) were calculated for 41 watersheds and are shown in Table 8.

The results of the RUSLE model in Arcview, run for a short-duration thunderstorm (1.05 inches in one hour) are presented in Appendix III, Pre and Post-Fire Erosion Potential Map. The maps indicate where the highest rates of erosion are likely to occur and helped identify areas to target hillslope treatments. It is most important to note the *relative* increase in erosion between pre and post-fire, shown on the Potential Erosion Due to the Fire Map (Appendix III) because of the error associated with the model (due to human inputs such as soil survey information, the burn severity map, and calculations of post-fire cover factors). Some of the areas of highest post-fire erosion show increases in rates of 100 to 1000%, especially where dense stands of vegetation once occurred that burned with high severity on steep slopes.



Table 8. Erosion Potential* Due to the Fire (TONS/ACRE)

Watershed	Acres	Sum	Max	Mean
Mitchell Creek at Highway 70	7225	226188	195	7
Donegan Bridge	7181	226081	195	7
Barn/Diversion Structure	7159	226598	195	7
Structure 2	132	28713	153	48
Maroon Basin	35	2935	45	18
Structure 1	6871	188586	195	6
Bridge below hatcher	4119	158695	195	9
Hatchery	4107	158359	195	9
Hatchery spring hous	4082	158709	195	9
Mitchell Road low point	4071	158510	195	9
Bridge at Unburned House	3889	145888	195	8
Bridge at Upper House	3792	134706	195	8
South Basin I	120	18934	154	35
Community Cntr A	56	9686	100	39
Community Cntr B	35	6326	79	40
South Basin H	509	120300	180	51
South Basin K	2599	147806	176	13
South Canyon	5744	210352	232	8
North Basin D	28	2003	41	16
North Basin A	30	2085	41	15
North Basin B	512	7076	52	3
North Basin C	429	1346	29	1
Oasis Creek	129	4865	55	8
North Basin G	483	20126	72	9
Lower Native Cutthroat	3743	130345	195	8
Upper Native Cutthroat	1514	16773	148	2
Landfill fill slope	792	44603	232	13
Landfill trib	185	15289	185	18
Gregory Park Bridge	7220	226188	195	7
South Basin A	55	3228	69	11
South Basin B	79	4965	94	14
Operation Cntr A	51	1741	83	7
Operation Cntr B	40	3850	127	21
South Basin C	22	4743	115	47
South Basin D	350	37472	159	24
South Basin E	27	4460	99	37
South Basin F	42	10559	178	55
South Basin G	21	5126	141	55
Structure 3	14	1668	69	25
North Basin E	26	1321	61	11
North Basin F	83	811	21	2

TOTAL (TONS) 2878017.9

*Modeled using a 10yr/1hr storm event (1.05"/hr)

3. Watershed Response:

The primary watershed responses of the Coal Seam Fire are expected to include: 1) an initial flush of ash; 2) gully and rill erosion in drainages and on steep slopes within the burn area; 3) debris flows and sediment deposition where stream gradients flatten or at tributary mouths; and 4) increases in peak flows. Elevated erosion, runoff, and stream flows are expected to occur for several years after the fire until the vegetation has recovered.

Approximately 18% of the fire experienced high burn severity. After a high severity fire, most of the vegetation and duff has been consumed. The result is that little interception of rainfall occurs and infiltration rates are reduced resulting in increased surface runoff and erosion. In the areas where high burn severity occurs, increased runoff and reduced ground cover is likely to cause hillslope erosion and potentially debris flows. Recovery of grasses, forbs and shrubs is expected to occur in most areas within 3 to 5 years. Some high severity areas may not fully recover for ten or more years. Once the vegetation has recovered the watershed is expected to return to pre-fire conditions.

Post-fire time of concentration decreases range from 0.03 hours to 0.47 (Table 9, Watershed Parameters). Post-fire average curve number increases range from 1 to 34 (Table 9, Watershed Parameters). Post-fire average runoff coefficient increases range from 0.02 to 0.53 (Table 9, Watershed Parameters). Post-fire 2 yr-1 hr flows and bulked flow increases range from 1 cfs to 222 cfs (unbulk) and 2 to 907 cfs (bulk) (Table 10a, Discharge Analysis).

In order to determine a threshold or trigger value for early warning system design and emergency response and preparedness, a 10 minute storm with a precipitation value of 0.1 inches was modeled (Table 10b, Discharge Analysis).

Form 1041-1 (2001) **Individual Income Tax Return**

Part I **Adjusted Gross Income**

1. Wages, salaries, tips, etc. **2.** Dividends and capital gains

3. Interest on U.S. government bonds

4. Interest on state and local government bonds

5. Interest on other bonds

6. Interest on savings and loan association deposits

7. Interest on other deposits

8. Interest on credit cards

9. Interest on other loans

10. Interest on other debt

11. Other interest

12. Tax-exempt interest

13. Other income

14. Other income

15. Other income

16. Other income

17. Other income

18. Other income

19. Other income

20. Other income

21. Other income

22. Other income

23. Other income

24. Other income

25. Other income

26. Other income

27. Other income

28. Other income

29. Other income

30. Other income

31. Other income

32. Other income

33. Other income

34. Other income

35. Other income

36. Other income

37. Other income

38. Other income

39. Other income

40. Other income

41. Other income

42. Other income

43. Other income

44. Other income

45. Other income

46. Other income

47. Other income

48. Other income

49. Other income

50. Other income

51. Other income

52. Other income

53. Other income

54. Other income

55. Other income

56. Other income

57. Other income

58. Other income

59. Other income

60. Other income

61. Other income

62. Other income

63. Other income

64. Other income

65. Other income

66. Other income

67. Other income

68. Other income

69. Other income

70. Other income

71. Other income

72. Other income

73. Other income

74. Other income

75. Other income

76. Other income

77. Other income

78. Other income

79. Other income

80. Other income

81. Other income

82. Other income

83. Other income

84. Other income

85. Other income

86. Other income

87. Other income

88. Other income

89. Other income

90. Other income

91. Other income

92. Other income

93. Other income

94. Other income

95. Other income

96. Other income

97. Other income

98. Other income

99. Other income

100. Other income

Line	Amount	Amount	Amount
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			
31			
32			
33			
34			
35			
36			
37			
38			
39			
40			
41			
42			
43			
44			
45			
46			
47			
48			
49			
50			
51			
52			
53			
54			
55			
56			
57			
58			
59			
60			
61			
62			
63			
64			
65			
66			
67			
68			
69			
70			
71			
72			
73			
74			
75			
76			
77			
78			
79			
80			
81			
82			
83			
84			
85			
86			
87			
88			
89			
90			
91			
92			
93			
94			
95			
96			
97			
98			
99			
100			
TOTAL			

Do not write in these spaces.

FORM 1041-1 (2001) U.S. GOVERNMENT PRINTING OFFICE: 2001

Table 9 Watershed Parameters

Watershed	Acres	Pre-Fire Time of Concentration (hrs)	Post-Fire Time of Concentration (hrs)	Average Slope %	Pre-Fire Average Curve Number	Post-Fire Average Curve Number	Pre-Fire Average Runoff Coefficient	Post-Fire Average Runoff Coefficient
Watershed								
Mitchell Creek at 70	7,225	2.5	2.3	38	61	65	0.14	0.23
Donegan Bridge	7,181	2.5	2.2	38	61	65	0.14	0.22
Barn/Diverston Struc	7,159	2.4	2.1	38	61	65	0.14	0.22
Structure 2	132	0.5	0.3	50	68	88	0.15	0.57
Maroon Basin	35	0.3	0.1	53	60	83	0.20	0.47
Structure 1	6,871	2.3	2.1	38	61	64	0.13	0.21
Bridge below hatcher	4,119	2.1	1.9	37	62	67	0.13	0.24
Hatchery	4,107	2.1	1.8	37	62	67	0.13	0.24
Hatchery spring hous	4,082	2.1	1.8	37	62	67	0.13	0.24
Mitchell Road low po	4,071	2.0	1.8	37	62	67	0.13	0.24
Bridge at Unburned H	3,889	2.0	1.8	38	61	66	0.13	0.23
Bridge at Upper Hous	3,792	2.0	1.8	38	61	66	0.13	0.23
South Basin I	120	0.3	0.2	57	66	88	0.19	0.57
Community Cntr A	56	0.3	0.1	60	53	87	0.20	0.59
Community Cntr B	35	0.3	0.1	54	55	86	0.18	0.62
South Basin H	509	0.7	0.3	47	70	91	0.15	0.68
South Basin K	2,599	1.7	1.2	33	66	78	0.14	0.39
South Canyon	5,744	2.0	1.7	39	66	73	0.16	0.27
North Basin D	28	0.3	0.1	47	67	90	0.20	0.54
North Basin A	30	0.3	0.1	43	68	91	0.22	0.56
North Basin B	512	0.7	0.6	46	69	75	0.18	0.25
North Basin C	429	1.1	1.1	39	62	63	0.16	0.18
Oasis Creek	129	0.5	0.4	40	63	77	0.18	0.38
North Basin G	483	1.0	0.8	41	62	74	0.16	0.36
Lower Native Cutthro	3,743	1.9	1.7	36	61	65	0.13	0.22
Upper Native Cutthro	1,514	1.5	1.4	34	63	64	0.12	0.17
Landfill fill slope	792	0.7	0.5	48	62	75	0.19	0.35
Landfill trib	185	0.6	0.4	46	61	74	0.16	0.36
Gregory Park Bridge	7,220	2.5	2.2	38	61	65	0.14	0.23
South Basin A	55	0.3	0.2	67	70	81	0.29	0.40
South Basin B	79	0.4	0.3	51	63	79	0.21	0.48
Operation Cntr A	51	0.1	0.1	73	81	89	0.37	0.49
Operation Cntr B	40	0.2	0.1	56	71	88	0.22	0.52
South Basin C	22	0.2	0.1	61	64	92	0.19	0.64
South Basin D	350	0.4	0.3	48	63	79	0.15	0.38
South Basin E	27	0.1	0.1	77	64	89	0.23	0.55
South Basin F	42	0.2	0.1	75	63	90	0.19	0.57
South Basin G	21	0.2	0.1	76	62	91	0.20	0.60
Structure 3	14	0.3	0.2	39	61	77	0.16	0.56
North Basin E	26	0.2	0.1	57	76	92	0.31	0.51
North Basin F	83	0.3	0.3	41	73	81	0.25	0.31

Table 10.a Discharge Analysis

Watershed	Acres	Pre-Fire 2yr1hr Discharge (cfs)	Post-Fire 2yr1hr Discharge (cfs)	2yr1hr Bulk Flow (cfs)	Pre-Fire 5yr1hr Discharge (cfs)	Post-Fire 5yr1hr Discharge (cfs)	5yr1hr Bulk Flow (cfs)	Pre-Fire 10yr1hr Discharge (cfs)	Post-Fire 10yr1hr Discharge (cfs)	10yr1hr Bulk Flow (cfs)
Mitchell Creek at Highway 70	7,225	1,501	1,692	1,885	2,408	2,700	3,009	3,243	3,616	4,030
Donegan Bridge	7,181	1,488	1,678	1,870	2,387	2,679	2,985	3,216	3,589	3,998
Barn/Diversion Struc	7,159	1,481	1,671	1,862	2,377	2,668	2,972	3,203	3,574	3,981
Structure 2	132	32	46	65	50	72	102	68	95	135
Maroon Basin	35	9	11	15	15	18	24	19	24	32
Structure 1	6,871	1,409	1,575	1,742	2,262	2,516	2,782	3,049	3,373	3,730
Bridge below hatchery	4,119	836	976	1,122	1,343	1,557	1,791	1,811	2,084	2,397
Hatchery	4,107	834	973	1,119	1,339	1,552	1,785	1,806	2,078	2,389
Hatchery spring house	4,082	828	966	1,110	1,330	1,541	1,771	1,794	2,063	2,371
Mitchell Road low point	4,071	825	961	1,104	1,325	1,534	1,762	1,787	2,053	2,358
Bridge at Unburned House	3,889	782	905	1,034	1,256	1,445	1,650	1,695	1,936	2,211
Bridge at Upper Hous	3,792	754	869	988	1,213	1,389	1,578	1,637	1,862	2,115
South Basin I	120	32	43	59	51	67	92	68	89	121
Community Cntr A	56	15	20	27	24	32	43	32	42	57
Community Cntr B	35	9	13	18	14	20	28	19	26	37
South Basin H	509	118	191	300	189	300	471	253	395	620
South Basin K	2,599	500	716	909	805	1,136	1,443	1,089	1,510	1,919
South Canyon	5,744	1,233	1,422	1,644	1,976	2,265	2,619	2,658	3,026	3,499
North Basin D	28	7	9	13	11	15	20	15	20	27
North Basin A	30	7	10	14	12	16	22	16	21	29
North Basin B	512	123	133	164	196	211	260	262	281	347
North Basin C	429	93	96	100	149	153	160	200	205	215
Oasis Creek	129	29	37	49	46	58	78	62	77	104
North Basin G	483	108	135	173	173	215	275	232	285	366
Lower Native Cutthroat	3,743	739	851	964	1,188	1,359	1,541	1,605	1,823	2,067
Upper Native Cutthroat	1,514	289	312	336	465	500	539	629	674	727
Landfill fill slope	792	195	230	299	311	364	474	415	483	629
Landfill trib	185	43	54	67	69	85	105	93	113	140
Gregory Park Bridge	7,220	1,499	1,690	1,883	2,405	2,698	3,006	3,240	3,613	4,027
South Basin A	55	17	18	24	27	29	37	36	38	49
South Basin B	79	20	26	33	32	41	51	43	54	68
Operation Cntr A	51	17	18	24	27	28	37	35	37	49
Operation Cntr B	40	11	14	17	17	22	27	23	29	36
South Basin C	22	6	8	12	10	13	19	13	17	25
South Basin D	350	83	104	125	132	164	198	176	218	263
South Basin E	27	8	10	12	13	15	19	18	20	25
South Basin F	42	13	15	22	20	24	34	27	32	45
South Basin G	21	6	8	10	10	12	16	13	16	22
Structure 3	14	3	5	6	5	8	10	7	10	13
North Basin E	26	8	9	11	12	14	18	16	18	23
North Basin F	83	20	22	29	33	35	47	43	46	62

Table 10.b Discharge Analysis

Watershed	Acres	Pre-Fire 10 min Discharge (cfs)	Post-Fire 10 min Discharge (cfs)	10 min Bulk Flow (cfs)
Mitchell Creek at Highway 70	7,225	1,740	2,085	2,324
Donegan Bridge	7,181	1,724	2,069	2,305
Barn/Diversion Struc	7,159	1,717	2,061	2,295
Structure 2	132	37	56	80
Maroon Basin	35	11	14	19
Structure 1	6,871	1,633	1,942	2,148
Bridge below hatchery	4,119	969	1,203	1,384
Hatchery	4,107	967	1,199	1,379
Hatchery spring house	4,082	960	1,191	1,368
Mitchell Road low point	4,071	957	1,185	1,361
Bridge at Unburned House	3,889	907	1,116	1,274
Bridge at Upper Hous	3,792	875	1,072	1,218
South Basin I	120	37	53	72
Community Cntr A	56	18	25	33
Community Cntr B	35	10	16	22
South Basin H	509	137	234	368
South Basin K	2,599	580	881	1,119
South Canyon	5,744	1,429	1,752	2,026
North Basin D	28	8	12	16
North Basin A	30	8	13	17
North Basin B	512	142	163	202
North Basin C	429	108	118	123
Oasis Creek	129	33	45	61
North Basin G	483	125	166	213
Lower Native Cutthroat	3,743	857	1,049	1,189
Upper Native Cutthroat	1,514	335	385	415
Landfill fill slope	792	226	283	368
Landfill trib	185	50	66	82
Gregory Park Bridge	7,220	1,738	2,083	2,322
South Basin A	55	20	22	29
South Basin B	79	24	32	40
Operation Cntr A	51	19	22	29
Operation Cntr B	40	13	17	21
South Basin C	22	7	10	15
South Basin D	350	96	128	154
South Basin E	27	10	12	15
South Basin F	42	15	19	27
South Basin G	21	7	10	13
Structure 3	14	4	6	8
North Basin E	26	9	11	14
North Basin F	83	24	27	36

Table 11 Sediment Delivery

Watershed	Debris Flow Source Area (ft)	Potential Sediment Delivery From Debris Flow Source Areas yd ³
Mitchell Creek at Highway 70	15,151	121,535
Donegan Bridge	15,151	121,535
Barn/Diversion Structure	15,151	121,535
Structure 2	2,778	22,283
Maroon Basin	707	5,675
Structure 1	11,665	93,571
Bridge below hatcher	9,865	79,134
Hatchery	9,865	79,134
Hatchery spring hous	9,865	79,134
Mitchell Road low point	9,865	79,134
Bridge at Unburned House	9,865	79,134
Bridge at Upper House	8,593	68,931
South Basin I	1,754	14,072
Community Cntr A	1,641	13,162
South Basin H	735	5,893
South Basin K	185	1,485
South Canyon	13,202	105,896
North Basin D	795	6,375
North Basin A	994	7,975
North Basin B	2,024	16,231
Oasis Creek	1,430	11,474
North Basin G	4,269	34,246
Lower Native Cutthroat	8,592	68,922
Upper Native Cutthroat	3,587	28,776
Landfill fill slope	4,291	34,421
Landfill trib	676	5,421
Gregory Park Bridge	15,151	121,535
South Basin A	3,288	26,372
South Basin B	2,886	23,152
Operation Cntr A	2,007	16,098
Operation Cntr B	307	2,464
South Basin C	832	6,672
South Basin D	644	5,169
South Basin E	907	7,278
South Basin F	655	5,250
South Basin G	537	4,308
North Basin E	538	4,315

Sediment delivery was modeled using the methodology described on page 7 – Debris Flow Modeling.

Values at Risk:

Table 12 Values at Risk

MAP # (Appendix III Channel and Structure Treatments Map)	VALUE AT RISK	POTENTIAL FLOOD/DEBRIS FLOWRISK	RISK PROCESS
B1	Last residence up canyon	High	Flood flows can contact debris at site and transport it downstream.
B2	Second residence from the end of road	High	Flood flows can contact debris at site and transport it downstream
B3	Rayder residence 1688 Mitchell Creek Road	Low	
B4	Bed & Breakfast 1686 Mitchell Creek Road (includes a guest house and residence)	Low	
B5	Residence across road from horse farm	Low	
B6	Last home before the junction with Donegan Rd, CR 130	Low	
U1	Only remaining residence above the hatchery, upstream of Bed & Breakfast	High	Flood flows and debris can damage bridge and contact house. See channel cross section in Appendix V.
U2	Hatchery spring house	High	Flood flows and debris can damage spring house. Spring house is a domestic water supply and supplies water for hatchery operations.
U3	Residence immediately upstream of hatchery, including garage 1416 Mitchell Creek Rd	High	Flood flows and debris can contact house and create damage.
U4	Hatchery Manager's residence. Sign with #1 attached to fence.	High	Flood flows and debris can contact hatchery facilities creating damage to facilities and fish. See channel cross sections Appendix V.
U5	Historic block hatchery building. Sign with #5 on building.	High	Flood flows and debris can contact hatchery facilities creating damage to facilities and fish. . See channel cross sections Appendix V.

MAP # (Appendix III Channel and Structure Treatments Map)	VALUE AT RISK	POTENTIAL FLOOD/DEBRIS FLOWRISK	RISK PROCESS
U6	Hatchery residence. Sign with #3 on fence.	High	Flood flows and debris can contact hatchery facilities creating damage to facilities and fish. See channel cross sections Appendix V.
U7	Cutthroat trout laboratory	High	Flood flows and debris can contact hatchery facilities creating damage to facilities and fish. See channel cross sections Appendix V.
U8	Residence immediately downstream of hatchery, 1246 Mitchell Creek Road	Moderate	
U9	Residence very close to creek across from Storm King Ranch	High	Flood flow and debris can contact residence. Arch culvert above house could be obstructed by debris causing flood flows and debris to contact propane tank.
U10	Log residence on west side of road, 0717 Mitchell Creek Road	High	Structure constructed in flood flow and debris flow path.
U11	Log residence on east side of road, 0688 Mitchell Creek Road	High	Structure constructed in flood flow and debris flow path.
U12	Residence on west side of road, 0531 Mitchell Creek Road	High	Structure constructed in flood flow and debris flow path.
U13	Horse farm residence on east side of road, 0398 Mitchell Creek Road	Low	
U14	White barn, 0398 Mitchell Creek Road	High	Flood flow and debris could contact facility. See channel cross section Appendix V.
U15	Old red barn, 0398 Mitchell Creek Road	High	Flood flow and debris could contact facility. See channel cross section Appendix V.
U16	First residence on north side of Donegan Road, just east of the creek, 0125 Donegan Road	High	Flood flow from Mitchell Creek could be diverted into irrigation channel above residence. Irrigation channel will not convey flood flow resulting in flooding of residence.
U17	Adjacent to U16 east of creek, 0141	High	Flood flow from Mitchell

MAP # (Appendix III Channel and Structure Treatments Map)	VALUE AT RISK	POTENTIAL FLOOD/DEBRIS FLOWRISK	RISK PROCESS
	Donegan Road		Creek could be diverted into irrigation channel above residence. Irrigation channel will not convey flood flow resulting in flooding of residence.
Lower Mitchell Flood Zone	Intersection of Mitchell Creek Road and Donegan Road east to Storm King Road, Storm King Road south to Highway 6 and 24, Highway 6 and 24 west to Mitchell Creek Road.	High	Flood and debris flows can access residential and commercial buildings downstream of Donegan Road bridge.
City of Glenwood Community Center and Operations Center	Community Cntr A and B and Operations Center A and B Watersheds	High	Debris flows can access diversion berms above Community Center and debris basin above Operations Center.
Culverts and Bridges	Roads and railroad line throughout and downstream of fire area.	High	Culverts and bridges do not have sufficient capacity to convey post-fire flows (Appendix V-NRCS Trip Report Coal Seam Fire).

IV. RECOMMENDATIONS

A. Fire Suppression Rehabilitation

1. See Operations Assessment

B. Emergency Stabilization

1. Management

a. Early Warning System:

Situation: Mitchell Canyon contains numerous residences and the Glenwood Springs State Fish Hatchery. The canyon is very narrow in the upper end with very steep side slopes. Predicted flood and debris flows as a result of the Coal Seam Fire are likely to flood portions of the valley. In addition, the railroad, road and structures south of the Colorado River are at risk from flooding and debris flows coming off the steep slopes behind them. ESR treatments cannot protect human life or property from all magnitudes of floods and debris flows. Therefore, residents, employees, and visitors to flood prone areas need timely warning in order to evacuate the hazard area.

Recommendation: Install three Remote Automated Weather Stations (RAWS): two in Mitchell Canyon and one on Red Mountain (Appendix III – Channel and Structure Treatments). These weather stations should be programmed to relay “real-time” weather information to the National Weather Service. The system would be connected to the

Garfield County Sheriff's Office. There should also be a siren at the station in the middle of the Mitchell Creek watershed which would immediately warn anyone in the canyon of the impending flood risk.

See Part F; Specification # 7, Early Warning System

b. Hazard Warning Signs:

Situation: Mitchell Canyon and the steep slopes south of the Colorado River are at high risk of flash flooding and debris flows. Residents, employees, and visitors need to be aware of this potential hazard on roads.

Recommendation: Install flood warning signs on roads at locations designated on the Treatment Maps.

See Part F; Specification # 13, Flood Warning Signs

c. Remove Floatable Debris from Channels and Floodplain:

Situation: Hazard trees felled by suppression crews and debris from burned residential structures and vehicles are present in and adjacent to Mitchell Creek and South Canyon. This debris will become entrained in flood flows, reducing channel capacity and may create debris jams in the channel or plug culverts or bridges. These jams will divert the flow out of the channel increasing flooding.

Recommendation: Remove debris from channels and floodplains and haul out of the canyons for appropriate disposal outside of the floodplain. Provide wood debris to the public. Written permission must be obtained from landowners before implementing treatments on private property.

See Part F; Specification # 6, Remove Floatable Debris from Channels and Floodplains

d. Structure Protection Design:

Situation: Many residences and a state fish hatchery lie within flood and debris flow prone areas within and downstream of the burned area. These areas are predicted to be flooded even in relatively frequent rainfall events (e.g. the 2-year storm). Although ESR treatments cannot prevent flooding of or damage to structures during all magnitudes of storms, treatments can be effective in reducing flooding and damage. A preliminary design for the Glenwood Springs Fish Hatchery is included in Appendix V (Glenwood Springs Fish Hatchery Structure Protection).

Recommendation: Hire an engineer to complete site-specific designs for placement of K-rails (jersey barriers), sand bags or other treatments to divert flood waters around structures determined to be at risk in order to reduce the amount of water that may get inside the structures (Appendix III – Channel and Structure Treatments). Written permission must be obtained from landowners before implementing treatments on private property.

See Part F; Specification # 2, Structure Protection Design

e. Diversion Channel Design:

Situation: A residence on the west side of Mitchell Creek Road is positioned directly in the flow path of a small tributary watershed. This watershed is at high risk of debris flows. In the present configuration, a debris flow would flow directly at the house.

Recommendation: Hire an engineer to complete a site-specific design for construction of a flood diversion channel around the residence (Appendix III – Channel and Structure Treatments). Written permission must be obtained from landowners before implementing treatments on private property.

See Part F; Specification # 8, Diversion Channel Design

f. Ditch Breach Design:

Situation: A private road and drainage ditch crosses an alluvial fan on the west side of Mitchell Creek Road. The drainage ditch intercepts water flowing across the fan, routes

the water alongside the road to a culvert under the road, and discharges the water onto the adjoining pasture at the crest of a small ridge. The culvert and ditch are too small to pass expected flood and debris flows. The culvert outlet position would allow water and mud to flow down the private road and across Mitchell Creek Road, threatening two residences.

Recommendation: Hire an engineer to complete a site-specific design for breaching the ditch in order to allow water and mud to flow straight across the private road and discharge in the adjoining pasture and away from the residences (Appendix III – Channel and Structure Treatments). Written permission must be obtained from landowners before implementing treatments on private property.

See Part F; Specification # 1, Ditch Breach Design

g. Culvert Cleaning:

Situation: Some culverts in areas at risk of flooding and/or debris flows are partially plugged with sediment and debris, thus reducing the amount of water that can pass through the culvert (Appendix V – NRCS Trip Report Coal Seam Fire).

Recommendation: Culverts in areas at risk of flooding and/or debris flows should be cleaned to ensure maximum flow capacity.

See Part F; Specification # 9, Culvert Cleaning

h. Evaluate Bridges for Removal:

Situation: Numerous bridges cross Mitchell Creek, many of which access only one house (Appendix V – NRCS Trip Report Coal Seam Fire). Some of these bridges may no longer be needed in the short term. Unneeded bridges that would cause channel constriction or potential debris jams should be considered for removal.

Recommendation: Hire an engineer to evaluate bridge locations and provide written recommendations to the Natural Resource Conservation Service for removal or treatment of each bridge. Written permission must be obtained from landowners before implementing treatments on private property. Bridges should not be removed until debris from burned residential structures accessed by the bridge has been cleaned up.

See Part F; Specification # 10, Evaluate Bridges for Removal

i. Culvert Evaluation and Replacement:

Situation: Some culverts in areas at risk of flooding and/or debris flows are undersized for the predicted flows (Appendix V – NRCS Trip Report Coal Seam Fire). Other culverts have culvert inlets at high risk of being plugged with sediment. Undersized or plugged pipes have reduced capacity to carry flood flows.

Recommendation: Hire an engineer to evaluate 3 culverts for replacement and 19 culverts for inlet protection. Complete site-specific designs for these treatments to ensure maximum flow capacity through the culverts. See Appendix V, NRCS Trip Report, June 23, 2002 for site specific information and initial evaluation of culverts and bridges.

See Part F; Specification # 12, Culvert Evaluation and Replacement

j. Design Trash Racks:

Situation: Wood and other debris in the channels has the potential to be carried downstream during floods. This debris can create debris jams or plug culverts or bridges, causing the flow to leave the channel, thereby increasing flooding. Even if loose debris is removed from the channel and floodplain as recommended in another specification, live trees and other material in the channel can still be entrained in the flood flow.

Recommendation: Hire an engineer to complete site-specific designs for location and construction of trash racks to trap woody debris. Written permission must be obtained from landowners before implementing treatments on private property.

See Part F; Specification # 4, Design Trash Racks

k. Clean Hatchery Debris Basin (Raceways):

Situation: Some of the raceways at the Glenwood Springs Fish Hatchery are positioned in the channel of Mitchell Creek. Flood and debris flows will pass directly through these raceways and thus will serve as debris catchment basins.

Recommendation: Remove mud and debris from raceways following each flood event. This will maximize debris basin capacity for subsequent flood events.

See Part F; Specification # 3, Clean Hatchery Debris Basin (Raceways)

l. Contour Straw Wattle – Slope Treatment:

Situation: Several slopes of high and moderate burn severity will have higher erosion following the fire. Hillslope treatments slow overland flow, capture sediment, retain soil moisture, and trap seeds, thus encouraging revegetation. These processes keep soil on the hillslope and reduce the amount of sediment that travels to streams.

Recommendation: Install straw wattles to temporarily stabilize slopes until vegetation is reestablished.

See Part F; Specification # 11, Contour Straw Wattle – Slope Treatment

m. Soil Netting:

Situation: Several slopes of high and moderate burn severity will have higher erosion following the fire. Hillslope treatments slow overland flow, capture sediment, retain soil moisture, and trap seeds, thus encouraging revegetation. These processes keep soil on the hillslope and reduce the amount of sediment that travels to streams.

Recommendation: Install soil netting to temporarily stabilize slopes until vegetation is reestablished.

See Part F; Specification # 5, Soil Netting

n. Straw Mulching:

Situation: Several slopes of high and moderate burn severity will have higher erosion following the fire. Hillslope treatments slow overland flow, capture sediment, retain soil moisture, and trap seeds, thus encouraging revegetation. These processes keep soil on the hillslope and reduce the amount of sediment that travels to streams.

Recommendation: Apply straw mulch 2" deep with hand crews to temporarily stabilize slopes.

See Part F; Specification # 14, Straw Mulching

o. Aerial Mulching/Seeding:

Situation: Several slopes of high and moderate burn severity will have higher erosion following the fire. Hillslope treatments slow overland flow, capture sediment, retain soil moisture, and trap seeds, thus encouraging revegetation. These processes keep soil on the hillslope and reduce the amount of sediment that travels to streams.

Recommendation: Aerially apply hydromulch including a native seed mix to inaccessible slopes burned at moderate and high severity to reduce the amount of surface erosion in the first two years after the fire.

See Part F; Specification # 18, Aerial mulching/seeding

2. Monitoring

NONE

C. Rehabilitation

1. Management

NONE

2. Monitoring

NONE

D. Management Recommendations (Non-Spec)

1. Extend Trigger Fence along Railroad:

Situation: The railroad has a fence that runs between the tracks and a portion of the steep slopes between south of the Colorado River. When something hits the fence (like rocks, debris, sediment) the fence sets a trigger that stops the trains before they approach the fenced section. This serves as an effective safety measure. However, the fence does not extend all the way through the flood and debris flow prone areas. Therefore, a flood or debris flow could cross the tracks in these areas and fail to be detected in time to stop trains from entering the area.

Recommendation: Extend trigger fence along railroad tracks to cover the entire length of track from the Roaring Fork through the South Canyon crossing. Repair existing sections of fence if needed.

2. Prepare a Flood and Debris Flow Emergency Preparedness Alert Plan

Situation: Several areas within and downstream of the burned area are at high risk of flooding and debris flows. When the RAWs stations receive enough rainfall to trigger flooding, a warning can be sent to the Sheriff's department. A siren will also sound in Mitchell Canyon. People within the flood prone areas will need to evacuate.

Recommendation: Prepare a plan detailing what conditions will trigger alerts, who will be notified by the alerts, and what actions will occur at each stage of alert. Based on the results of the analysis of post-fire flows generated by 0.1 inches of rainfall in a 10 minute period (Table 10.b – Discharge Analysis) the initial threshold precipitation value for the recording rainfall devices should be set at 0.1 inches in a 10 minute period. A conceptual plan is included in Appendix V (Conceptual Flood and Debris Flow Emergency Preparedness Alert Plan Glenwood Springs, CA). Plan evacuation routes and notify residents and employees of actions they need to take when an alert is triggered. Entities notified when an alert is triggered may include: Sheriff's department, highway patrol, fire department, railroad, residents, businesses, fish hatchery, and community center.

V. CONSULTATIONS

Name, title, and agency	Telephone
Rich Kolecki, Fish Hatchery Manager, Colorado Division of Wildlife	(970) 947-2924
Alan Czenkusch, Aquatic Biologist, Colorado Division of Wildlife	(970) 947-2924

VI. REFERENCES

Cannon, S.H., R.M. Kirkham, and M. Parise, 2001. Wildfire-related debris-flow initiation processes, Storm King Mountain, Colorado. *Geomorphology* 39, pp. 171-188.

Kirkham, R.M., M. Parise, and S.H. Cannon, 2000. Geology of the 1994 South Canyon Fire Area, and a Geomorphic Analysis of the September 1, 1994 Debris Flows, South Flank of Storm King Mountain, Glenwood Springs, Colorado. *Special Publication* 46.

Miller, J.F., R.H. Frederick and R.J. Tracey, 1973. *Precipitation-Frequency Atlas of the Western United States: Volume III – Colorado*, NOAA Atlas 2. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service, Silver Spring, MD.

U.S.D.A. Soil Conservation Service, 1977. *Soil Survey of Rifle Area, Colorado, Parts of Garfield and Mesa Counties*.

U.S.D.A. White River National Forest, 2002. *Final Environmental Impact Statement to accompany the Land and Resource Management Plan – 2002 Revision*.

Robichaud, P.R. and R.D. Hungerford, 2000. Water repellency by laboratory burning of four northern Rocky Mountain Forest soils. *Journal of Hydrology*. 231-232:207-209.

Michael Parenti, Hydrologist, M. Parenti & Associates, Alameda, CA	(510) 864-7580
Suzanne Loadholt, Soil Scientist, URS Corporation, Oakland, CA	(510) 874-3211
Becca Smith, Hydrologist, San Juan National Forest	(970) 264-1521
Andrea Holland-Sears, Hydrologist, White River National Forest	(970) 945-3256
Brian Rasmussen, Geologist, Whiskeytown National Recreation Area	(530) 242-3444
John Andrews, P.E., Colorado State Conservation Engineer, NRCS	(720) 544-2834
Mark Weinhold, Hydrologist, White River National Forest	(970) 945-3306
Larry Sandoval, Soil Scientist, White River National Forest	(970) 945-3301

**INTERAGENCY
BURNED AREA EMERGENCY STABILIZATION AND REHABILITATION PLAN**

COAL SEAM FIRE

WILDLIFE RESOURCE ASSESSMENT

I. OBJECTIVES

- Assess effects of fire and suppression action to Federally listed Threatened, Endangered, Proposed and other significant or locally rare species and their habitats.
- Conduct Section 7 Emergency Consultation with the Fish and Wildlife Service.
- Determine effects of fire and suppression action to habitat improvements.
- Prescribe emergency rehabilitation measures and/or monitoring.
- Assess effects of proposed rehabilitation actions to listed species and habitats.

II. ISSUES

- Six Federally listed Threatened and Endangered species occur within or downstream from the fire area.
- One locally rare species occurs within the fire area.
- Potential impacts to these species from the fire, suppression actions, and emergency rehabilitation proposals
- State fish hatchery is at risk of post fireflood damage; houses one Federally listed and one locally rare species.

III. OBSERVATIONS

The purpose of this Burn Area Emergency Rehabilitation (BAER) Wildlife Assessment is to document the effects of the fire, suppression activities, proposed rehabilitation work, potential post fire flooding and sediment delivery, to all Federally listed Threatened, Endangered, Proposed, and significant or locally rare birds, mammals, amphibians, reptiles, fish, invertebrates, and their habitat, that may occur within or downstream from the fire area. This assessment includes effects to species that occur on lands under the jurisdiction of the White River National Forest Rifle Ranger District (WRNF), Bureau of Land Management Glenwood Springs Field Office (BLM), and Colorado Division of Wildlife (CDOW).

This assessment also discusses information that is included in documentation of the Emergency Section 7 Consultation for this incident. Emergency Consultation was initiated, as required by the Endangered Species Act, with U. S. Fish and Wildlife Service (FWS). The detailed consultation documentation is on file at the WRNF Supervisor's Office and the BLM Glenwood Springs Field Office.

Wildlife and fish addressed for this fire include all federally listed species from the current FWS lists, and significant or locally rare species as identified by WRNF, BLM and CDOW Biologists. Species occurrence information discussed in this assessment is based on formal surveys for these species, habitat inventories conducted prior to the Coal Seam Fire, and post fire reconnaissance. Documents, inventory data, sighting records, vegetation maps and other species specific information referenced in this report are on file at the offices mentioned above.

A. Background

The Coal Seam Fire burned approximately 12,229 acres between June 8 and 24, 2002. The fire originated at a coal seam that had been burning below ground for about 90 years. The Coal Seam Fire occurred on WRNF (3,754 acres), BLM (4,457), CDOW (58), city (2,135) and private (1,825) lands. There is currently no estimate of containment or control, however, as of June 24, the fire is not growing as only small flare-ups occur within the fire perimeter. The small flare-ups that are still occurring are located well within the existing fire line. This was essentially a wind-driven crown fire, except in Mitchell Creek where terrain was the major factor. Contributing factors include low live fuel moistures, persistent winds ≥ 20 miles per hour, and single digit relative humidity during the day with poor humidity recovery at night. The majority of the acres burned between June 8 and June 11. More detailed information on the Coal Seam Fire weather, fuels and fire behavior can be found in the Coal Seam Fire Final Narrative provided by the Rocky Mountain Incident Management Team. The fire was declared 90 percent contained on June 25, with no estimate for a control date.

Fire suppression actions that occurred on the Coal Seam Fire included construction of 9.42 miles of dozer line and use of 23.5 miles of roads. Very little vegetation was disturbed during construction of a small amount of hand line, several safety zones, and 23 helispots and drop points. Numerous lakes, ponds, city water, and the Colorado River were used as water sources.

Soils were impacted to varying degrees as burn intensity varied across the landscape. Approximately 2,195 acres (18%) were impacted by very intense fire resulting in high burn severity (defines effects to soils and hydrologic function), 3,223 acres (26%) experienced moderate burn severity, 3,195 acres (26%) experienced low burn severity, and 3,616 acres (30%) remained unburned (see Soil and Watershed Assessment, Appendix IV and Map). The low severity fire resulted in removal of all or part of the duff layer, and little effect to the shrubs and trees. Much of the low to moderate burn severity areas still have 1000 hour fuels remaining on the ground, and live tree or shrub canopies. In other moderate burn severity areas, the fire completely burned patches of vegetation where all of the plant species were affected but effects to soils and hydrologic function remain moderate.

Vegetation resources were impacted to varying degrees and fire intensity varied across the landscape (effects above the soils). Summary of vegetation mortality (trees, shrubs and other ground vegetation):

VEGETATION SPECIES	HIGH 61%-100% MORTALITY	MODERATE 31 – 60% MORTALITY	LOW 0 – 30% MORTALITY	TOTAL ACRES OF EACH VEG TYPE
Aspen	8	65	1,085	1,158
Aspen w/ conifer	0	23	210	233
Aspen/mesic mountain shrub	20	4	39	63
Mixed conifer/aspen	45	121	851	1,017
Gambel oak	644	1,584	634	2,862
Grass	0	58	322	380
Pinyon juniper	824	2,672	520	4,016
Riparian	108	123	111	342
Sage	157	406	515	1,078
Spruce	89	175	278	542
Urban	8	31	33	72
Barren	43	371	31	445
TOTALS BY MORTALITY CLASS	1,946	5,633	4,629	12,208*

*excludes 21 acres of water within fire perimeter

The Coal Seam Fire occurred in the Flattop Mountains. This area includes part of the headwaters of the Colorado River. The fire area includes foothill, montane and subalpine life zones. Vegetative communities include Mountain Shrublands (Gambel oak, mountain mahogany, mountain sagebrush), Aspen forests, and Spruce-Fir forests (Englemann spruce, subalpine fir, Douglas fir). The mosaic of spruce and fir stands are divided by subalpine meadows. Subalpine grasslands and meadows are diverse and many include Thurber and Idaho fescue, Wheeler bluegrass, Porter ligusticum, American

vetch and aspen peavine. Lower elevation shrublands include Gambel's oak, serviceberry, pinon pine, juniper and sagebrush. Elevations within the fire area range from approximately 5,800 to 10,500 feet. Precipitation ranges from 20 inches in the valleys to nearly 50 inches annually at the higher elevations, falling mostly in the form of snow. Drainages that flow from the fire area include Mitchell Creek, Cascade Creek, Paradise Creek and South Canyon Creek.

The vegetative resource provides forage and cover for a variety of wildlife and fish species. Many species of reptiles, amphibians, birds, mammals, and fish are known or expected to occur within or adjacent to the fire area either seasonally or year around. Terrestrial species include bighorn sheep, elk, mule deer, black bear, and wild turkey. Diversity of wildlife habitats is primarily due to elevation changes, a variety of vegetation ecotones, and natural geological features.

B. Reconnaissance Methodology and Results

Information used in this assessment is based on a review of relevant literature, WRNF, BLM and CDOW species sighting and habitat inventory data, consultation with FWS, personal communication with agency biologists, and field reconnaissance of the Coal Seam Fire area. Reconnaissance included ground review of the fire area on June 19, 20, 21, 25, and a helicopter flight on June 19. Sonia Marzec, Colorado Division of Wildlife, District Wildlife Manager; Alan Czenkusch, Colorado Division of Wildlife Aquatic Biologist; Tom Fresques, Bureau of Land Management Wildlife Biologist; and Phil Nyland, White River National Forest District Biologist, also participated in the fire reconnaissance. Field notes were recorded in Unit logs (Form ICS 214) and included in the BAER file provided to the WRNF, BLM and CDOW. Burn severity and vegetation mortality were mapped by the BAER watershed and vegetation specialists to determine effects to soils and vegetative resources. Habitat for the various species in the Coal Seam Fire area was mapped using data collected during fire reconnaissance and pre-fire habitat maps.

To better understand the species habitat information briefly discussed in this wildlife assessment, it is important to review the Coal Seam Fire BAER Vegetation and Watershed Resource Assessments. These reports contain more detailed descriptions of pre-fire vegetation, post-fire vegetative recovery estimates, and the effects of this incident on the watersheds. Effects to the vegetation in terms of wildlife habitat are the primary focus of this wildlife assessment.

The purpose of this assessment is to discuss the potential effects of the fire, suppression actions and proposed emergency rehabilitation activities to Federally listed, significant, and locally rare species that occur within, adjacent to, or downstream from, the Coal Seam Fire area. Effects to other wildlife species are not discussed. This assessment is not intended to definitively answer the many questions of effects to specific species that may be raised during an incident such as the Coal Seam Fire. The focus of this assessment is only to determine the potential for immediate, emergency actions that may be necessary to prevent further effects to listed species. Because the species discussed in this assessment have ranges or territories that extend beyond the fire area, it may be important to include information at a larger scale, across land ownership boundaries, for species that appear to be potentially significantly affected.

C. Findings

Biological Assessment for Federally Listed Species

Direct effects as described in this report refer to mortality or disturbance that results in flushing, displacement or harassment of the animal. Indirect effects refer to modification of habitat and/or effects to prey species.

The information on lynx was provided by Keith Giezentanner, White River National Forest Wildlife Biologist.

BALD EAGLE: No nest or roost sites have been documented on the White River National Forest. Wintering habitat found adjacent to the Coal Seam fire area is found primarily in Douglas fir stands along the Colorado River corridor. Large cottonwoods along the river are used for hunting perches. No winter roosting habitat has been documented within the fire area. The nearest bald eagle nest site is located about 5 miles south of the fire area.

DIRECT EFFECTS: No bald eagles were present during the fire. Therefore, there are no effects to this species from the fire, suppression actions or proposed emergency rehabilitation measures.

INDIRECT EFFECTS: No known bald eagle nesting or winter roost habitat were affected by the fire. A few cottonwood trees that may be used by bald eagles as hunting perches during the winter months may have been killed by the fire. Any dead trees will remain suitable for use as perches until they fall over. It is thought that the small number of perch trees affected by the fire is negligible and discountable. Therefore the determination is that there was no effect to bald eagle habitat as a result of the fire, suppression actions or the proposed emergency rehabilitation actions.

POST-FIRE OBSERVATIONS: No bald eagles were observed during post fire reconnaissance.

CANADA LYNX: Lynx habitat in the Southern Rocky Mountains consists of early successional and late successional conifer stands, generally above 9,000 feet in elevation. Dense early successional stands provide suitable habitat for snowshoe hare, the dominant prey for lynx. Late successional stands also provide habitat for hares, but generally at lower, more stable population levels than early successional stands. Late successional stands also provide dead and down material that provides cover for denning and for young kittens. Intermediate successional stages of conifer and deciduous forest stands adjacent to conifer stands provide connectivity between foraging and denning habitats.

The White River National Forest has mapped denning, winter foraging, and other suitable lynx habitat throughout the Forest. Lynx Analysis Units (LAU) have been delineated and are used as the primary analysis unit for assessing impacts to lynx habitat conditions. A more complete description of the life history and habitat requirements of lynx can be found in the Biological Evaluation (Appendix N) of the White River National Forest Revised Land and Resource Management Plan (3/2002).

Pre-fire stand conditions in the area of the Coal Seam Fire provided some areas of suitable lynx habitat on National Forest System portions of the fire. No suitable habitat has been identified on Bureau of Land Management or private lands within the boundary of the Coal Seam Fire.

No lynx have been historically documented to occur within the boundary of the fire. However, several of the radio-telemetry relocations from the 1999-2000 transplant of lynx to Colorado have been recorded within approximately 10 miles of the fire. These lynx apparently were dispersing after the initial transplants, and none were documented to remain in the area for any length of time.

The fire is included entirely within the Quartzite LAU. This LAU covers approximately 97,000 acres of National Forest System (NFS) and Bureau of Land Management (BLM) land. The only BLM acreage within the LAU that includes potential lynx habitat is located outside of the fire perimeter. Approximately 3,755 acres of NFS lands, within the LAU, are included within the fire boundary. The table below displays the amount of lynx habitat included within the LAU, the acreage of habitat within the fire perimeter, and the acreage included within the areas that experienced fire resulting in high, moderate, and low vegetation mortality.

QUARTZITE LAU. Lynx denning, winter foraging, and other habitat associated with the Coal Seam Fire

Habitat Type	LAU total acreage	Acreage within the fire perimeter	Acreage within High veg Mortality 61-100%	Acreage within Moderate veg mortality 31-60%	Acreage within Low veg mortality 0-30%
Denning	13,824	531	25	109	397
Winter Foraging	8,529	917	13	93	811
Other	13,567	159	2	25	132
Unsuitable	16	0	0	0	0
Non-habitat	60,456	2,148	110	199	1839
Non-FS land (BLM & private)	728	0			
Total	97,120	3755	150	426	3179

FIRE DIRECT EFFECTS: There are no anticipated direct effects to individual lynx as a result of the Coal Seam Fire. It is highly doubtful if any lynx were present within the area of the fire at the time it burned. Although the area includes suitable lynx habitat, lynx have never been documented to use the area.

FIRE INDIRECT EFFECTS: Some suitable habitat for lynx was affected by the fire. Approximately 134 acres of Denning, 106 acres of Winter Foraging, and 27 of Other habitat have been burned with either high or moderate intensity, which would change the affected stands from late successional to early seral stages. This change would reduce the value of these stands as snowshoe hare habitat until they regenerate. The approximate 267 total acres of affected late successional conifer forest represents approximately one percent of the suitable habitat within the LAU. This represents a reduction of about four percent in the acres of suitable habitat within the LAU. This is far below the 15% per decade standard for change discussed in the Lynx Conservation Assessment and Strategy (LCAS, page 7-5, Project Planning Standard #1) allowed for federal agency management actions. Natural fires are considered to be desirable for long-term maintenance of lynx habitat conditions.

Short Term: The determination for the short term effects of the fire is MAY EFFECT, NOT LIKELY TO ADVERSELY AFFECT lynx or lynx habitat, due to the limited amount of habitat affected by the fire.

Long-term: The areas burned by the fire are expected to regenerate into aspen and spruce/fir forests. When these areas become regenerated, they are expected to provide improved habitat conditions for snowshoe hare. Therefore, the long-term determination for the effects of the fire is MAY EFFECT, NOT LIKELY TO ADVERSELY AFFECT due to the overall, long-term beneficial effect of the fire.

Depending upon the site characteristics and the availability of nearby seed sources, spruce regeneration is expected to take up to 40 years to reestablish. With the preponderance of aspen in the area, most of the burned areas are expected to regenerate to aspen with 5 years. When these areas are adjacent to the unburned conifer stands, they should provide summer habitat for snowshoe hare for approximately 10-15 years as they mature.

FIRE SUPPRESSION DIRECT EFFECTS: There are no anticipated direct effects to individual lynx as a result of the Coal Seam Fire suppression efforts. It is highly doubtful if any lynx were present within the area of the fire at the time it burned. Although the area includes suitable lynx habitat, lynx have never been documented to use the area.

FIRE SUPPRESSION INDIRECT EFFECTS: There are no expected impacts to lynx habitat from the fire suppression efforts. There has been limited dozer activity on this section of the fire and the majority of that activity has occurred in the grasslands and other openings adjacent to the forested stands, rather than through the stands themselves. All dozer line occurred outside of denning and

winter foraging habitat types. The construction of fire lines by hand crews is not expected to affect habitat conditions for snowshoe hare or lynx. The overall effect of suppression efforts on the lynx habitat within the Coal Seam Fire is felt to be insignificant and discountable. The determination for the fire suppression efforts is NO EFFECT, due to the fact that only limited dozer activity and hand line creation were used and that the fire lines were constructed outside of the forested stands that constitute lynx habitat.

EMERGENCY REHABILITATION DIRECT EFFECTS: there are no anticipated direct effects to individual lynx as a result of the coal seam fire rehabilitation. It is highly doubtful that any lynx were present within the area of the fire at the time it burned or immediately afterwards, or will be during implementation of emergency treatments. Although the area includes suitable lynx habitat, lynx have never been documented to use the area. The determination for the emergency rehabilitation measures is no effect.

EMERGENCY REHABILITATION INDIRECT EFFECTS: Emergency rehabilitation measures recommended in this plan should minimize soil loss. There is no emergency rehabilitation proposed within suitable lynx habitat. Therefore, the determination is NO EFFECT.

POST FIRE OBSERVATIONS: No lynx or sign of lynx were observed during post-fire reconnaissance.

COLORADO PIKEMINNOW, RAZORBACK SUCKER, HUMPBACK CHUB, BONYTAIL CHUB

The Colorado Pikeminnow is currently found only in the Upper Basin above Glen Canyon Dam.

The razorback sucker is found primarily in Lake Mohave and other locations in the lower Colorado River. Individuals are occasionally noted in the Colorado River from Rifle to Grand Junction and at Black Rocks on the Colorado, Utah border.

Humpback chub is found in the Grand Canyon portion of the Colorado River.

Bonytail chub are extremely rare although occasionally collected from the upper and lower basins of the San Juan River.

The Colorado River and its 100 year flood plain, from the town of Rifle downstream, is designated critical habitat for the razorback sucker and Colorado pikeminnow.

The FWS has determined that any Federal action that will deplete water in the basin will prompt a "May affect" Jeopardy determination under Section 7 of the Endangered Species Act. Therefore, the use of water during the suppression actions taken for the Coal Seam Fire is considered as negative effect on these down stream species. According to the Coal Seam Incident Aircraft Summary dated 6/21/02, approximately 894,501 gallons (2.75 acre feet) of water were taken from the Colorado River and ponds within and adjacent to the fire area. It is thought that although not all of the water was taken from the Colorado River, all of it is part of the same water system and should be considered in the calculation of water taken from that system. Additional water used in suppression actions after June 20 are expected to be minimal. However, the amount that may be used was estimated and added to the known amount, bringing the total amount of water used to approximately 3 acre feet. This water use figure will be reported to FWS as part of the yearly sum submitted to FWS. Fire suppression activities are covered by the amendment to the programmatic biological opinion (3/2/00) that addresses minor water depletions within the Colorado River basin in western Colorado. All other minimization measures were met during suppression actions:

- Minimize losses of vegetation within the Colorado River drainage and associated tributaries to minimize the potential for erosion of sediments into the Colorado River.
- In conjunction with the reclamation of fire lines, provide for drainage with water bars on constructed hand/dozer lines and impacted areas in critical watershed areas.

- Fire line placement within the Colorado River corridor and its major tributaries should be coordinated with the resource advisor and as needed with Bureau hydrologists to minimize erosion concerns.
- Avoid aerial application of retardant or foam within 300 feet of any body of water including lakes, rivers, streams and ponds whether or not they contain aquatic life.
- The amount of water used for fire abatement will be added yearly to the water depletion log to account for these water depletions.

The implementation of the fire suppression actions, with the mitigation measures noted above, should reduce impacts to insignificant, discountable levels. Because all of the minimization measures were met, with the exception of water depletion, it is determined that the suppression actions may result in short-term adverse modification of critical habitat designated for these fishes.

SIGNIFICANT OR LOCALLY RARE SPECIES

Colorado River cutthroat trout natural population: Mitchell Creek contains a native population of Colorado River Cutthroat trout. These fish are believed to be genetically pure. Colorado Division of Wildlife (CDOW) stocking records and anecdotal information strongly suggest that this is a relict population. Fin-clip samples have been taken from this population and are awaiting nuclear DNA analysis. The range of this population extends from an 11 foot cascade at about 6,800 feet elevation, upstream about 2.5 miles to the upper limit of live water (currently at about 9,000 feet). A rough estimate of that population is about 1,000 fish.

Based on initial impressions of burn severity in the Mitchell Creek watershed, it seemed that collecting as many live fish as possible and moving them, either to a hatchery unit or to another water, was indicated because of the concern of post fire flooding and debris flows. Subsequent helicopter flights, remote imagery, and field reconnaissance, indicate that much less of the watershed experienced severe burn conditions than was originally thought to be the case. Also, the logistics problems and degree of risk involved in such a rescue effort are significant. Helicopter operations are dangerous in the bottom of a narrow canyon, the re-burn hazard is currently high, and there are many hazard trees that would have to be dropped before crews could work safely along the creek. Those trees would then become floatable debris, compounding debris flow problems downstream.

Post fire reconnaissance findings indicated that riparian vegetation along the main branch of Mitchell Creek experienced about 20 percent mortality north of the WRNF/BLM boundary, approximately 80 percent mortality from the BLM boundary south about 1.5 miles, and approximately 20 percent between there and the fish hatchery. It is thought that the remaining riparian vegetation will act as a filter for some of the debris that may move off the slopes, decreasing the effects of siltation on the aquatic habitat. Riparian vegetation is already resprouting where the burn severity was low and moderate. Riparian vegetation that experienced high burn severity will take longer to recover, depending on rainfall, soil recovery, status of seeds in the soil and effects of the fire to root crowns of those species that regenerate vegetatively.

If the decision were made to remove fish from Mitchell Creek, as many fish as possible would be needed to conserve genetic heterozygosity. A conservation population should contain a minimum of 500 individuals. To access the fish for collection, more vegetation would need to be removed, again adding to the floatable debris hazards downstream. Another concern with removing the fish from their native habitat is associated with where the fish would be taken and how long they would have to remain there. Fish health regulations and associated hatchery section protocols constrain the range of possible locations. The 1994 Storm King fire caused debris flows that closed I-70 as late as 2001. This suggests that the Mitchell Creek cutthroat would have to stay in the selected new location for several years.

HATCHERY FACILITY CONCERNS

It was determined early in the incident that the potential for post-fire flooding is high in the Mitchell Creek drainage. The Colorado Division of Wildlife Glenwood Fish Hatchery facilities are at risk. In anticipation

of flooding and debris flows from the affected watershed, the following actions have been taken. These actions were developed with the watershed data collected by the BAER Team and in coordination with Rich Kolecki, Hatchery Manager. It is important to mitigate potential impacts to the facility because of the high value and critical importance of the broodstocks present, primarily Colorado cutthroat trout, but also including greenback cutthroat trout (will be removed from hatchery in early July).

Actions taken include: Production fish, three inches and larger, were stocked out to allow movement of broodstock to those runs. On June 25, approximately 1,200 Colorado River rainbow broodstock were transported to the Poudre hatchery to serve as back up in the event that the fish are negatively affected. Colorado River cutthroat broodstock were moved to the west side raceways. Approximately 700,000 one inch fish in the hatchery building will be stocked out this summer. The 600,000 Colorado cutthroat trout eggs currently incubating at the hatchery will be shipped to the Rifle Falls hatchery isolation facility over the next three weeks.

The main raceways and the County road will be used as debris flow channels to pass water and mud through the unit. All items that hinder flows or that could become mobile have been removed from the raceways, including screens, drop boards, and spawning shelters. It is anticipated that the creek will become unusable for fish when it rains because of debris and/or increased water pH levels. Re-circulating pumps have been set up on the west side raceways to maintain adequate flows.

Priorities for saving different groups of fish will come into play if any of the three spring flows are lost. Two of the three springs are in jeopardy of being affected by debris flow.

Priorities for saving the fish on the unit area:

- 1) Colorado river cutthroat broodstock,
- 2) Colorado River rainbow broodstock,
- 3) Colorado River cutthroat eggs, and
- 4) Remaining production fish.

All equipment not necessary to handle debris flows is being removed from the hatchery facility grounds. Plywood sheets have been installed on the east side of the hatchery building to protect the windows and the inside of the building.

Jersey barriers need to be installed to direct the water and debris flows. These barriers are also essential for protection of the various buildings and structures on the unit. CDOW is unable to obtain and install these barriers. Therefore it is critical that the federal agencies assist with facilitating this part of the hatchery protection plan. Immediate installation is critical due to anticipated thunderstorm activity within the next few weeks.

Hatchery employees and other CDOW staff are involved with the current protection efforts. Hatchery equipment used to implement the protection plan includes a small tractor (with backhoe and front loader bucket) and a 350 dozer with a front bucket. A series of floodlights have been set up with generators to power them in the event that electrical power is lost during a flood occurrence. If a major thunderstorm is located over the Mitchell Creek drainage, resulting in over twenty-five cubic feet per second of water flowing through the channel, the facility personnel will be evacuated for safety reasons.

Colorado River cutthroat trout hatchery population and one other species located at the hatchery for the next 3 weeks, Greenback cutthroat trout

WILDLIFE HABITAT IMPROVEMENTS WITHIN THE FIRE AREA: There are no wildlife habitat improvements within the fire area. The Glenwood Fish Hatchery is discussed above.

COAL SEAM FIRE SPECIES LIST

Species lists were obtained on June 19, 2002 from Keith Giezentanner, White River National Forest Wildlife Biologist (WRNF), and Tom Fresques, Bureau of Land Management Wildlife Biologist (BLM). The WRNF list originated from the U. S. Fish and Wildlife Service (FWS) Grand Junction Field Office on June 13, 2001, and was confirmed to be current and accurate by Lee Carlson, Colorado State Field Office Supervisor, on June 20, 2002. The BLM list originated from the FWS Grand Junction Field Office on

August 23, 2000 and was confirmed to be current and accurate by Bob Leachman, FWS Grand Junction Field Office, on June 20, 2002. The lists were discussed with Sonia Marzec, Colorado Division of Wildlife, District Wildlife Manager; Alan Czenkusch, Colorado Division of Wildlife Aquatic Biologist; Tom Fresques, Bureau of Land Management Wildlife Biologist; and Phil Nyland, White River National Forest District Biologist, and Keith Gienzentanner, White River National Forest Wildlife Biologist. The following federally listed species occur, or have habitat within or CDOWN stream of the fire area:

SPECIES	SCIENTIFIC NAME	LISTING STATUS
Bald eagle	<i>Haliaeetus leucocephalus</i>	Threatened
Canada lynx	<i>Felis lynx canadensis</i>	Threatened
Colorado pikeminnow	<i>Ptychocheilus lucius</i>	Endangered
Razorback sucker	<i>Xyrauchen texanus</i>	Endangered
Humpback chub	<i>Gila cypha</i>	Endangered
Bonytail chub	<i>Gila elegans</i>	Endangered

Additional species identified by all three agencies as significant and locally rare include:

SPECIES	SCIENTIFIC NAME	LISTING STATUS
Colorado River cutthroat trout natural population, Grade A genetic purity.	<i>Oncorhynchus clarki pleuriticus</i>	BLM and FS Sensitive - Conservation Agreement with FWS. Petitioned for listing 12/19/99
Colorado River cutthroat trout hatchery population	<i>Oncorhynchus clarki pleuriticus</i>	Same

The following species were identified by the FWS as potentially existing within, adjacent to, or downstream from the fire area. Through post fire reconnaissance and consultation with local experts, it was determined that these species were not affected by the fire (no habitat within or adjacent to the fire area and/or inventories prior to the fire determined absence), or expected to be affected by potential post-fire flooding:

SPECIES	SCIENTIFIC NAME	LISTING STATUS	REASON FOR NOT ADDRESSING IN THIS DOCUMENT
Black-footed ferret	<i>Mustela Nigripes</i>	E	No habitat within fire area
Uncompahgre fritillary butterfly	<i>Boloria acrocneuma</i>	T	No habitat within fire area
Mexican spotted owl	<i>Strix occidentalis lucida</i>	T	No habitat within fire area
Southwestern willow flycatcher	<i>Empidonax trailii extimus</i>	E	No habitat within fire area

IV. RECOMMENDATIONS

- A. **Emergency Stabilization:** No treatments recommended. Recommendations for the Glenwood Springs Fish Hatchery are addressed in the Watershed Resource Assessment and associated treatment specifications.
- B. **Rehabilitation**
1. **Management:** No treatments recommended.
 2. **Monitoring:** No treatments recommended.
- C. **Management (non- specification related)**
1. FOR WRNF: Section 7 Emergency Consultation for the fire, suppression actions and proposed emergency rehabilitation actions has been completed on the lynx.
 2. FOR WRNF and BLM: Section 7 Emergency Consultation for the fire, suppression actions and proposed emergency rehabilitation actions should be completed with transmittal of the volume of water used during suppression actions. This notification will occur at the end of the fiscal year, 2002. This notification will fulfill the requirements of the Programmatic Biological Assessment and Opinion for the four Colorado River listed fish species.
 3. The determinations documented in this assessment should be reassessed, and Section 7 Consultation reinitiated, if additional rehabilitation measures or vegetation management activities are proposed after June 25, 2002. If non emergency vegetation management activities are proposed for long term rehabilitation and restoration of the fire area, another Biological Assessment should be prepared.
 4. CDOW should continue to inventory and monitor Colorado cutthroat trout native population in Mitchell Creek.

DETERMINATIONS OF EFFECT TO THREATENED AND ENDANGERED SPECIES

BALD EAGLE

FIRE EFFECTS: No known winter roosting or nesting habitat was lost due to the fire. Some trees used as winter hunting perch trees may have been killed, however, they will remain standing for some time. Because perch trees are not considered a limiting factor for the species in this area and because many potential perch trees remain, the determination for both WRNF and BLM is **no effect**.

SUPPRESSION ACTION EFFECTS: Bald eagles were not present during the fire and no habitat was affected by fire suppression actions. Therefore, the determination of suppression effects to bald eagles across the fire area is **no effect**.

PROPOSED EMERGENCY REHABILITATION ACTION EFFECTS: Bald eagles will not be present during implementation of the proposed emergency rehabilitation actions, and no habitat will be affected. Therefore, the determination of emergency rehabilitation action effects to bald eagle across the fire area is **no effect**.

CANADA LYNX

BLM: There is no potentially suitable habitat on BLM lands within the fire area.

FIRE EFFECTS: On WRNF, It was determined that only a small amount of available habitat was modified by the fire, less than 5 percent of the suitable habitat within the LAU. Therefore, the determination of fire effects to Canada lynx is **may affect, not likely to adversely affect**.

SUPPRESSION ACTION EFFECTS: On WRNF, it is thought that no lynx were present in the fire area. No dozer line was constructed in lynx habitat. Only limited hand line was constructed. Therefore, the determination is **no effect**.

PROPOSED EMERGENCY REHABILITATION ACTION EFFECTS: On WRNF, the emergency rehabilitation efforts will stabilize soils and provide for improved recovery of the vegetation on the dozer lines. Therefore the determination is **no effect**.

COLORADO PIKEMINNOW, RAZORBACK SUCKER, HUMPBACK CHUB, BONYTAIL CHUB

FIRE EFFECTS: The distance of the burn area to habitat used by these species is approximately 25 miles. Therefore, the determination is **no effect**.

SUPPRESSION ACTION EFFECTS: The implementation of the fire suppression actions with the mitigation measures noted above, should reduce impacts to insignificant, discountable levels. Because all of the minimization measures were met, with the exception of water depletion, it is determined that the suppression actions may result in short-term adverse modification of critical habitat designated for these fishes. Suppression forces used approximately 3 acre feet of water. Some water was taken from the river, but most of this water was taken from ponds and lakes within and adjacent to the fire area, and within the Colorado River watershed. Therefore the determination is **may affect, likely to adversely affect**.

PROPOSED EMERGENCY REHABILITATION ACTION EFFECTS: None of the proposed emergency rehabilitation measures will have a negative effect on these four species. Therefore the determination across the fire area is **no effect**.

PROPOSED EMERGENCY REHABILITATION ACTIONS:

- Ditch breach evaluation and design
- Structure protection evaluation and design
- Sediment basin maintenance
- Trash racks evaluation and design
- Soil netting with seed
- Remove floatable debris
- Early warning system
- Diversion channel evaluation and design
- Culvert cleaning
- Bridge removal evaluation
- Straw wattles
- Culvert evaluation and design
- Hazard warning sign
- Straw mulching
- Dozerline rehab
- Noxious weed monitoring
- Noxious weed treatment
- Aerial mulching/seeding
- Tree hazard mitigation

V. CONSULTATIONS

The following people participated in post fire reconnaissance, data collection and analysis, and developing the information included in this assessment:

NAME	AGENCY	TITLE	PHONE NUMBER
Sonia Marzec	Colorado Division of Wildlife	District Wildlife Manager	970-947-2934
Alan Czenkusch	Colorado Division of Wildlife	Aquatic Biologist	970-947-2924
Tom Fresques	Bureau of Land Management, Glenwood Springs Field Office	Wildlife Biologist	970-947-2814
Phil Nyland	White River National Forest, Rifle Ranger District	District Wildlife Biologist	970-625-2371
Keith Gienzentanner	White River National Forest, Supervisor's Office	Forest Wildlife Biologist	970-945-3244
David Silveus	White River National Forest, Rifle Ranger District	District Ranger	970-625-2371
Lee Carlson	US Fish and Wildlife Service, Denver Office	Wildlife Biologist	303-275-2343
Kurt Broderdorp	US Fish and Wildlife Service, Grand Junction Field Office	Wildlife Biologist	970-245-3920
Bob Leachman	US Fish and Wildlife Service, Grand Junction Office	Wildlife Biologist	970-245-3920
Sherman Hebein	Colorado Division of Wildlife	Senior Aquatic Biologist	970-252-6022
Bill Andree	Colorado Division of Wildlife	Acting Area Wildlife Manager	970-328-9699
Christine Hirsch	White River National Forest, Supervisor's Office	Forest Fisheries Biologist	970-945-3243
Rich Kolecki	Colorado Division of Wildlife	Hatchery Manager	

VI. REFERENCES

Colorado Division of Wildlife. 1999. Wildlife Resource Information System.

Colorado Natural Heritage Program. 2001. Survey of Critical Biological Resources Garfield County, Colorado, Volume 1.

CRTC Task Force. 1999. Conservation Agreement and Strategy for Colorado River Cutthroat Trout (*Oncorhynchus clarki pleuriticus*) in the States of Colorado, Utah and Wyoming. Colorado Division of Wildlife, Fort Collins.

CRTC Task Force. 2001. Conservation Agreement and Strategy for Colorado River Cutthroat Trout (*Oncorhynchus clarki pleuriticus*) in the States of Colorado, Utah and Wyoming. Colorado Division of Wildlife, Fort Collins.

Garfield County. 2002. Garfield County Comprehensive Plan Revision.

USDA FS. 2002. White River National Forest Environmental Impact Statement.

USDA FS. 2002. Coal Seam Fire Final Narrative. Rocky Mountain Incident Management Team.

USDI BLM. 2002. Biological Assessment for the Glenwood Springs Field Office Fire Management Plan.

USDI FWS. 2000. Lynx Conservation Strategy.

MAPS LOCATED IN THIS BAER REPORT UNDER APPENDIX III:

Fisheries Distribution
Lynx habitat

SUPPORTING DOCUMENTATION LOCATED IN THIS BAER REPORT UNDER APPENDIX IV:

U. S. Fish and Wildlife Service Species lists

Other supporting documentation not included in this BAER report is filed in the Coal Seam Fire file, including:

ICS 214 Unit logs
Documentation on Emergency Consultation with FWS
Documentation provided by Agency personnel during Fire reconnaissance
Summary of Air Operations from Type 1 Incident Command Team report on Coal Seam Fire
Species map

Karen L. Hayden, Wildlife BAER Technical Specialist, USDA Forest Service, 530-994-3401

1901-1902 - [Faint text, possibly a title or header]

[Faint header text]	[Faint header text]	[Faint header text]	[Faint header text]
[Faint text]	[Faint text]	[Faint text]	[Faint text]
[Faint text]	[Faint text]	[Faint text]	[Faint text]
[Faint text]	[Faint text]	[Faint text]	[Faint text]
[Faint text]	[Faint text]	[Faint text]	[Faint text]
[Faint text]	[Faint text]	[Faint text]	[Faint text]
[Faint text]	[Faint text]	[Faint text]	[Faint text]
[Faint text]	[Faint text]	[Faint text]	[Faint text]
[Faint text]	[Faint text]	[Faint text]	[Faint text]
[Faint text]	[Faint text]	[Faint text]	[Faint text]
[Faint text]	[Faint text]	[Faint text]	[Faint text]
[Faint text]	[Faint text]	[Faint text]	[Faint text]

[Faint text block containing several lines of illegible text, possibly a list or notes]

**INTERAGENCY
BURNED AREA EMERGENCY STABILIZATION AND REHABILITATION PLAN
COAL SEAM FIRE**

VEGETATION RESOURCE ASSESSMENT

I. OBJECTIVES

- Evaluate and assess fire and suppression impacts to vegetative resources and identify values at risk associated with vegetative losses.
- Determine rehabilitation needs supported by specifications to aid in vegetative recovery and soil stabilization efforts.
- Evaluate potentials for invasive plant species encroachment into native plant communities within the fire area.
- Evaluate and assess fire and suppression impacts to rangeland improvements and forage production on grazing allotments within the fire area.
- Provide management recommendations to assist in vegetative recovery and species habitat protection and rehabilitation.

II. ISSUES

- Short and long-term impacts to plant communities and vegetative resources on private (including city), National Forest, and Bureau of Land Management lands within the Coal Seam Fire.
- Protection and enhancement of other resource values including site productivity, wildlife habitat, and watershed stability.
- Management strategies which provide for the natural recovery and revegetation of heavily impacted areas.
- Identification, early detection, and potential of noxious weed spread into the burned area.

III. OBSERVATIONS

This report identifies and addresses known and potential impacts to vegetative resources within the Coal Seam Fire on private (including City of Glenwood Springs) lands, national forest lands within the White River National Forest (WRNF), Rifle Ranger District, and public lands administered by the Bureau of Land Management (BLM), Glenwood Springs Field Office.

Findings and recommendations contained within this assessment are based upon information obtained from personal interviews with BLM staff, WRNF staff, Natural Resources Conservation Service (NRCS) staff, and Garfield County staff, literature reviews, and field reconnaissance of the fire area.

Reconnaissance of impacted areas was conducted utilizing aerial and ground survey methods. This assessment will attempt to capture the concerns and issues expressed by the general public, Garfield County, BLM, and WRNF staff for the future management of the lands in and near the fire area. It will detail the known damage to the vegetative resource and will outline expected post-fire response of the vegetation; will discuss revegetation needs and noxious weed encroachment; and outline management considerations for recovery of the vegetative resources.

- A. **Background** – The Coal Seam Fire started from a coal seam vent on June 8, 2002. High temperatures, low relative humidities, high winds, and very low live fuel moistures resulted in a fast moving fire with rapid rate of spread through the oakbrush and piñon-juniper communities. The fire continued through these plant communities for nearly a week until it moved to the higher elevations and into the mixed aspen and conifer plant associations. The Type I Incident Management Team (IC Hart) took control of the fire on June 9 and released control on June 20, 2002. A total of 12,229 acres were impacted by the fire of which 3,756 acres of WRNF lands were impacted, 4,457 acres of BLM lands were impacted, 1,825 acres of private lands burned, 2,135 acres of Municipal (Glenwood Springs) lands had burned and 59 acres of state lands burned. Approximately 2,195 acres or 18% was of high (H) burn severity, 3,223 acres or 26% was moderate (M), 3,195 acres or 26% was low (L), and 3,616 acres were unburned.

Resource concerns expressed by local agencies for vegetative resources include vegetative loss and short and long-term impacts to site productivity, loss of sensitive wildlife habitat, and potential for accelerated erosion and debris flows into creeks that drain towards the city of Glenwood Springs and the Colorado River. Additional resource management direction was obtained from the White River National Forest Land and Resource Management Plan (2002), BLM Glenwood Springs Resource Area Resource Management Plan (1983), and the Garfield County Noxious Weed Management Plan (2000).

Broad vegetation types that occur in the fire area include sagebrush shrublands, piñon-juniper woodlands, mountain shrublands, aspen forests, Douglas fir forests, and spruce-fir forests. The sagebrush communities formed only a minor portion within the fire area. On BLM and private lands the mountain shrublands were dominant with piñon-juniper woodlands co-dominant. The mountain shrublands were dominated by Gambel oak. A mix of aspen, Douglas fir and spruce/fir forests dominates the National Forest lands, but these vegetation types do occur at the lower elevations on private and BLM. The data set for the vegetation came from three different sources and the layers had to be merged. Much of the area in the South Canyon part of the fire was mapped as P-J. Field observations revealed that the majority of the P-J (visually estimated at 60-75%) was a mix of Gambel oak and juniper and juniper being the dominant tree.

Numerous plant associations are described for each of the vegetation types. The common ones present within the fire area were: mountain big sagebrush-bluebunch wheatgrass (*Artemisia tridentata* ssp. *vaseyana*/*Psuedoroegneria spicata*), Wyoming big sagebrush-western wheatgrass (*A. tridentata* ssp. *wyomingensis*/*Pascopyron smithii*), piñon-juniper (P-J) forest (*Pinus edulis*-*Juniperus osteosperma* – juniper was dominant here), Gambel oak-mountain mahogany (*Quercus gambelii*-*Cercocarpus montanus*), Douglas fir-mountain lover (*Pseudotsuga menziesii*/*Paxistima myrsinites*), aspen-meadow rue (*Populus tremuloides*/*Thalictrum fendleri*), and alpine fir-Engelmann spruce (*Abies lasiocarpa*-*Picea engelmannii*). The Gambel oak associations intergraded into each other and into the juniper communities. Other shrubs in the Gambel oak associations included snowberry (*Symphoricarpos oreophilus*) and serviceberry (*Amelanchier utahensis*). The aspen association also had snowberry, serviceberry, and chokecherry (*Prunus virginiana*). The major riparian areas (in defined creek drainages) were dominated by cottonwood (*Populus angustifolia*); species of willow (*Salix* spp.) are to be found along riparian areas on the WRNF.

Noteworthy forbs present were bluebells (*Mertensia ciliata*), mule's ears (*Wyethia amplexicaulis*), Oregon-grape, which is sometimes considered a sub-shrub by some (*Mahonia repens*), silvery lupine (*Lupinus argenteus* ssp.), groundsels (*Senecio* spp. and *Packera* spp.), buckwheat (*Eriogonum microthecum* and *E. umbellatum*), and fleabanes (*Erigeron* spp. Grasses include in addition to those listed above, mutton bluegrass (*Poa fendleriana*), Indian ricegrass (*Achnatherum hymenoides*), Letterman's needlegrass (*A. lettermanii*), mountain brome (*Bromus carinatus*), and cheatgrass (*B. tectorum*).

Fire impacted plant communities of special note include the cottonwood gallery forests of Mitchell, South canyon, and Paradise Creeks and the juniper woodlands where juniper was the dominant species. Fire effects varied across the landscape, with areas burning in mosaics, but the key critical areas were the juniper-oak ecotones on the steeper slopes.

B. Reconnaissance Methodology and Results – When the BAER team arrived meetings were held to assist in directing where resource assessment would be conducted and values at risk. Information on vegetation, grazing allotments, noxious weeds, possible seeding strategies, and other resources was obtained from the WRNF Wildlife Biologist and Hydrologist, numerous BLM staff specialists including those serving as Resource Advisors on the fire, the NRCS District Conservationist, and the Garfield County Vegetation Manager. On June 18-22 aerial and ground surveys were conducted to map and document vegetation losses/survival, determine fire effects to vegetative species and ground truth aerial reconnaissance data. Ground reconnaissance included traversing affected areas, hiking to remote areas, and recording observations on plant community types, species composition, burn severity on vegetation (including microbiotic crusts), topographic features, noxious weed species, range improvements, and suppression damage.

Ground survey observations were compared with data obtained from the watershed group on burn severity to correlate vegetation mortality. Areas with high vegetation mortality and moderate to high burn severity, and correlated with slopes and down slope values at risk, were selected for seeding and/or hydromulching.

In order to better address resource issues and concerns, each major issue will be discussed separately. Management recommendations follow these issues to better define treatment actions and prescriptions.

1. Vegetation

Vegetation mortality is a function of how much of the vegetation burned to the ground and how it affects wildlife habitat and short-term recovery. Observations were taken of how much of the trees and shrubs had leaves removed by fire, if any branches were left and if only stubs were remaining. For forbs and grasses, observations were taken on the amount of above ground vegetative material removed and how much of the root crown remained. Only about 16% of the vegetation had high mortality. Considering both moderate and high vegetative mortality, about 62% of the vegetative ground and foliar cover was removed to some extent. This will create some loss of wildlife habitat for 3 to 20 years, depending on the plant association present.

Mortality for the entire burn area is summarized here in Table 1:

VEGETATION MORTALITY			
RATING	Low (0-30%)	Moderate (31-60%)	High (61-100%)
ACRES	4,651	5,634	1,944
PERCENT	38	46	16

Vegetation mortality on the Coal Seam Fire by ownership is presented here in Table 2:

Mortality Rating	VEGETATION MORTALITY BY OWNERSHIP				
	BLM	WRNF	CITY	PRIVATE	STATE
High - Acres	956	150	359	480	0
High - %	8	1	3	4	0
Moderate - Acres	2,826	426	1,329	1,011	40
Moderate - %	23	3	11	8	trace
Low - Acres	674	3,179	447	333	19
Low - %	6	26	4	3	trace

Vegetation resources impacted by suppression activities was not significant. To date many of the dozer lines, including the contingency lines have been rehabilitated. Many of the drop points were in naturally cleared areas. Some helispots, a spike camp and vehicle turn-arounds were either cleared by crews or natural openings were enlarged. Removal of aerial fuels and hazard trees, backfiring and retardant and water bucket drops are all impacts, but not significant.

Wildlife habitat on WRNF lands was not significantly impacted; there is potential lynx habitat within the burn on WRNF lands (See Wildlife Assessment). The Douglas fir stands on BLM had stand replacement fires go through them. The fir-spruce associations on WRNF lands were not significantly impacted; only 150 acres received high vegetation mortality and 162 acres of the aspen, mixed aspen, Douglas fir, and fir-spruce associations received high vegetation mortality. Most of the aspen did not burn. Non-fire impacts to aspen stands are encroachment of fir.

SPECIES	VEGETATION MORTALITY BY ACRES FOR EACH VEGETATION TYPE			
	HIGH	MODERATE	LOW	GRAND TOTAL
Aspen	8	65	1,000	1,073
Aspen w/conifer	0	23	190	213
Aspen/mesic mountain shrub	20	4	36	60
Barren	43	361	30	434
Gambel oak (mixed shrub)	643	1,534	618	2,795
Grass	0	58	315	373
Mixed conifer/aspen	45	120	811	976
PJ	824	2,600	508	3932
Riparian	108	120	101	329
Sagebrush	157	400	483	1,040
Spruce/Douglas Fir	89	175	278	542
Urban	8	170	262	440
Water	0	2	20	22
Grand Total	1945	5,632	4,652	12,229

The majority of fire impacts to vegetation occurred on private and BLM lands, and this primarily south of I-70. Moderate to high mortality occurred in the Gambel oak and P-J associations. Impacts are significant based on burn severity and vegetation mortality. Within the moderate to high vegetation mortality areas, most of the vegetation should recover. The USDA, Fire Effects Information System (FEIS) and input from local agency specialists indicates that the following species should recover in 2-5 years: Gambel oak, western wheatgrass and bluebunch wheatgrass; Gambel oak is a vigorous sprouter and it was observed sprouting within the burn in all mortality classes. Recovery within 15 to 20 years occurs in serviceberry and snowberry. Recovery of serviceberry has been reported from 3 to 25 years and for snowberry from 4 to 15 years. There are mixed reports of recovery in mountain mahogany; *Cercocarpus montanus* is not in the FEIS database but it is listed as a synonym to birch-leaf mountain mahogany (*C. betuloides*). Birch-leaf mountain-mahogany is a vigorous sprouter and recovers within 6 to 8 years. Local BLM specialists feel it does sprout after fire (depending on burning intensity); it was seen sprouting after the South Canyon fire.

Microbiotic crusts were observed within the fire area, mostly in the form of tall mosses and lichens. Under the P-J—oak mix they appeared to be fully combusted by the fire. The FEIS did state that the mosses do recover within 4 month to 4 years after a fire; spores readily colonize burnt areas by wind-dispersed, off-site spores. Lichens do not recover well after fire.

Based on the moderate to high vegetation mortality in the Paradise Creek drainage area, recovery should take slower than other areas of the burn. The fire killed approximately 40 to 60% of the perennial grass and forb root crowns. This area, however, had gentle slopes in the areas of high mortality and the burn severity was moderate.

In order to promote vegetation recovery, reduce unacceptable erosion and maintain ecological integrity of plant communities in the high severity burn areas, seeding and hydromulching recommendations have been developed. In consultation with the BAER Team Soil and Watershed Specialists, aerial mulching/seeding on critical slopes with moderate and high burn severity in lower Mitchell Canyon and on the slopes above the alluvial fan of Red Mountain (behind the Community Center and the Municipal Operations Center) have been recommended. Application of soil netting with seed has been recommended on approximately 5 acres of slope in Mitchell Canyon to help prevent sheet and rill erosion. Mulching is also recommended in SOB Canyon to help prevent sheet and rill erosion and debris flows into the Colorado River.

Seeding will be accomplished using native grass species adapted to the sites selected for treatment. This was done in consultation with staff from the BLM and NRCS and with coordination with Garfield County. These recommendations are consistent with existing management guidelines of the BLM. In some areas, additional mulching work may be required with seeding to ensure stabilization success. Supplemental funding requests may be filed should existing specifications inadequately provide treatment requirements following closer field review of the impacted areas.

2. Noxious Weeds

A search of the BLM weed database and consultation with agency staff revealed that noxious weed populations existed within the burn area, primarily in the South Canyon area. The BLM staff said weeds could be expected throughout the area. While awaiting an aerial reconnaissance flight at the Coal Seam Helibase, approximately 5 to 8 acres of Russian knapweed (*Acroptilon repens*) was located in the parking area and near where the helicopters were taking off. Mapped noxious weeds included Scotch thistle (*Onopordum acanthium*), Houndstongue (*Cynoglossum officinale*) and salt cedar (*Tamarix ramosissima*). These species are very competitive invaders into disturbed areas and roadsides and are found along travel routes, heavily disturbed sites and pastures. Salt cedar is found primarily along waterways and has the ability to totally choke out all vegetation in riparian areas.

During field surveys of the burn area more noxious weeds were located in the South Canyon area as well as new locations of the above listed weeds. Weeds located were Canada thistle (*Cirsium arvense*) and musk thistle (*Carduus nutans*). These species prefer wet areas but will invade upland sites. The new locations of salt cedar and Canada thistle were at a beaver pond adjacent to South Canyon Creek.

It is possible that weed seeds and weed plant parts were transported into the fire area. It has been observed by the Vegetation Specialist that Scotch thistle will increase into uninfested areas after a fire, See Appendix III, Vegetation Treatment Map. ESR funds requested in this document will be utilized to complete weed inventories and control of existing weed population inside the burn area to prevent further spread onto uninfested sites.

3. Range Management

Consultation with staff from the WRNF and BLM revealed historic grazing allotments are in the burn area. The WRNF grazing allotments are vacant. One of these allotments has not been used since 1981; this is the Dolan Gulch allotment, a sheep allotment with the following permit: 350 sheep from 7/6 to 9/5 for 700 animal unit months (AUMs). The WRNF range improvement database showed no allotment fences or other improvements in the burn area.

The BLM also has vacant allotments; these are not permitted for livestock use. There are three allotments in the burn area, all in the South Canyon area. The allotments are: Vulcan AMP, South Canyon and Paradise Creek. That portion of the Vulcan allotment inside the burn area is

unsuitable to grazing because of steep slopes. The area of the South Canyon allotment that burned is not grazed by the permittee. The Paradise Creek is active but has been in non-use for two years; BLM will request the permittee take 2 more years of authorized non-use. Paradise Creek is permitted as follows: 1000 sheep from 5/16 to 6/15 for 102 AUMs, and 1000 sheep from 10/01 to 10/31 for 102 AUMs. No fences were on the BLM range improvement database; the Rangeland Management Specialist administering the allotment said there were no known fences impacted by the burn. Field surveys did not locate any fences on BLM.

C. Findings – Vegetative resources were impacted to varying degrees throughout the fire area. The primary impacts were the combination of moderate to high vegetation mortality and moderate to high burn severity on the steeper slopes and on slopes upstream from houses and structures. Vegetative recovery will occur naturally on the majority of the fire. Sprouting was seen on Gambel oak, a species of elderberry, lupine, other forbs and perennial grasses throughout the fire area. Sprouting was minimal on the areas identified for aerial mulching and seeding. General findings are outlined below:

1. Only 16% of the fire area had 60% or greater vegetation loss, so natural recovery is anticipated to occur in the low and most of the moderate burn severity areas. Natural regeneration is expected to revegetate the majority of the fire area adequately to protect soil productivity and prevent unacceptable erosion and site degradation. However, in the areas described in lower Mitchell Canyon and the upper slopes of the alluvial above the Community Center, emergency revegetation actions should be taken to reduce sheet and rill erosion.
2. Reseeding within the identified high burn severity areas should be accomplished with other planned treatments but prior to the first damaging storms. Aerial mulching/seeding should be accomplished within a month.
3. There is a high potential for noxious weed invasion onto uninfested sites within the burn area. Surveys should be conducted for the next 2 years to locate any new weed occurrences.

Area	Vegetation Mortality	Burn Severity	Recovery Status

IV. RECOMMENDATIONS

C. Emergency Stabilization

1. **#5, Soil Netting With Seed** - Install soil netting (erosion control blanket with seed mix incorporated into blanket on approximately 5 acres of slope in Mitchell Canyon.
2. **#18, Aerial Mulching/Seeding** - Hydromulch with selected native grass seed where expected overland runoff would threaten high values at risk.
3. **#17, Noxious Weed Control** - Implement Integrated Weed Management practices to control existing weed populations within the fire area to prevent further spread of weeds onto uninfested sites.

D. Rehabilitation

1. **#16, Noxious Weed Monitoring** - Monitor for new populations of Scotch thistle, musk thistle, Canada thistle, houndstongue and saltcedar on travel routes, dozerlines, handlines, other areas disturbed by suppression activities, and on uninfested areas adjacent to known populations of noxious weeds. Also monitor for Russian knapweed and yellow toadflax which are suspected to be fire area.

V. CONSULTATIONS

Name, title, and agency	Telephone
Steve Anthony, Vegetation Manager, Garfield County	970-625-3969
Dennis Davidson, District Conservationist, NRCS	970-9455494
Steve Bennett, Acting Field Manager, BLM, Glenwood Springs FO	970-947-2800
Daniel Sokal, Planning and Environmental Coordinator, BLM	970-947-2800
Brian Hopkins, Community Liaison, BLM	970-947-2800
Michael Kinser, Rangeland Management Specialist, BLM	970-947-2800
Michael McGuire, Rangeland Management Specialist, BLM	970-947-2800
Keith Giezentanner, Wildlife Biologist/Ecologist, WRNF, SO	970-945-2521

VI. REFERENCES

- Colorado Weed Management Association. 2000. Troublesome Weeds of the Rocky Mountain West.
- FEIS, Fire Effects Information System. 2002. <http://www.fs.fed.us/database/feis/>
- Garfield County Weed Advisory Board. 2001. Garfield County Noxious Weed Management Plan.
- Lindauer, Ivo E., et.al., 1982. Terrestrial Ecosystems of Northwest Colorado, An Annotated Bibliography and Vegetation Classification.
- Lyon, Peggy, John Sovell, and Joe Rocchio. 2001. Survey of Critical Biological Resources, Garfield County, Colorado. Colorado Natural Heritage Program.
- USDA, Forest Service. 2002. Final Environmental Impact Statement (FEIS) White River National Forest Land and Resource Management Plan.
- USDI, BLM. 1983. FEIS, Glenwood Springs Resource Management Plan.
- USDI, BLM. 1991. FEIS, Colorado Oil & Gas Leasing & Development.
- USDI, BLM. 1999. Glenwood Springs Resource Area, Final Oil and Gas SEIS.
- Weber, William A. and Ronald C. Wittmann. 1996. Colorado Flora: Western Slope.
- Whitson, Tom D. (Ed). 1996. Weeds of the West.

Michael P. Dolan, Rangeland Management Specialist/Botanist, BLM, (530) 233-4666

Chen, W. (1998). *China's Economic Reforms: A Review of the Literature*. *Journal of Economic Surveys*, 12(1), 1-48.

Chen, W. (2000). *China's Economic Reforms: A Review of the Literature*. *Journal of Economic Surveys*, 14(1), 1-48.

Chen, W. (2002). *China's Economic Reforms: A Review of the Literature*. *Journal of Economic Surveys*, 16(1), 1-48.

Chen, W. (2004). *China's Economic Reforms: A Review of the Literature*. *Journal of Economic Surveys*, 18(1), 1-48.

Chen, W. (2006). *China's Economic Reforms: A Review of the Literature*. *Journal of Economic Surveys*, 20(1), 1-48.

Chen, W. (2008). *China's Economic Reforms: A Review of the Literature*. *Journal of Economic Surveys*, 22(1), 1-48.

Chen, W. (2010). *China's Economic Reforms: A Review of the Literature*. *Journal of Economic Surveys*, 24(1), 1-48.

Chen, W. (2012). *China's Economic Reforms: A Review of the Literature*. *Journal of Economic Surveys*, 26(1), 1-48.

Chen, W. (2014). *China's Economic Reforms: A Review of the Literature*. *Journal of Economic Surveys*, 28(1), 1-48.

Chen, W. (2016). *China's Economic Reforms: A Review of the Literature*. *Journal of Economic Surveys*, 30(1), 1-48.

Chen, W. (2018). *China's Economic Reforms: A Review of the Literature*. *Journal of Economic Surveys*, 32(1), 1-48.

Chen, W. (2020). *China's Economic Reforms: A Review of the Literature*. *Journal of Economic Surveys*, 34(1), 1-48.

Author	Title	Year
Chen, W.	China's Economic Reforms: A Review of the Literature	1998
Chen, W.	China's Economic Reforms: A Review of the Literature	2000
Chen, W.	China's Economic Reforms: A Review of the Literature	2002
Chen, W.	China's Economic Reforms: A Review of the Literature	2004
Chen, W.	China's Economic Reforms: A Review of the Literature	2006
Chen, W.	China's Economic Reforms: A Review of the Literature	2008
Chen, W.	China's Economic Reforms: A Review of the Literature	2010
Chen, W.	China's Economic Reforms: A Review of the Literature	2012
Chen, W.	China's Economic Reforms: A Review of the Literature	2014
Chen, W.	China's Economic Reforms: A Review of the Literature	2016
Chen, W.	China's Economic Reforms: A Review of the Literature	2018
Chen, W.	China's Economic Reforms: A Review of the Literature	2020

**INTERAGENCY
BURNED AREA EMERGENCY STABILIZATION AND REHABILITATION PLAN
COAL SEAM FIRE**

CULTURAL RESOURCE ASSESSMENT

I. OBJECTIVES

- Assess potential damage to cultural resources for the purpose of recommending treatments to stabilize and rehabilitate archaeological sites, traditional cultural properties, and historic structures from adverse effects following wildland fire, suppression activities and rehabilitation projects.
- Conduct assessments as necessary to meet federal legal requirements.
- Consult with appropriate Native American Tribes as necessary to meet federal legal requirements and Agency policy and agreements.

II. ISSUES

- Investigation of any known or previously documented cultural resources potentially affected by the Coal Seam Fire, by suppression activities, or by proposed rehabilitation.
- Investigation of any undocumented cultural resources potentially affected by the Coal Seam Fire, by fire suppression activities, or by proposed rehabilitation activities.
- Consultation with the Southern Ute Indian Tribe, the Ute Indian (Unita-Ouray Ute) Tribe, and the Ute Mountain Ute Tribe specific to sacred sites and traditional cultural properties.

III. OBSERVATIONS

INTRODUCTION – This report documents the results of an assessment of the impacts to cultural resources arising from the 12,229 acre Coal Seam Fire. This fire's origin was attributed to the exposure of a long-burning coal seam. The resultant fire soon spread to both sides of Interstate 70 and the Colorado River in and adjacent to the City of Glenwood Springs, Colorado. In all, the fire covered 12,229 acres of USFS, BLM, State, Municipal and private lands.

Cultural History - The physical and natural environment of the fire is described in preceding and following assessments. This discussion of this area's prehistoric cultural history comes from Reed and Metcalf (1999), and the White River 2002 Land and Management Plan 2002 Revision (2002).

The general area around the Coal Seam Fire may have been occupied for as long as 13,500 years, although this occupation may not have been extensively or intensively occupied during all time periods. Within this temporal framework, the earliest peoples hypothesized as entering this region are placed into the Paleoindian era, which lasted from 11,500 to 6400 B.C. This era saw exploitation of megafauna in the upland and lowland areas although only limited material from this time is known for this region. Sites dating to this era have not been found with architectural remains.

The Paleoindian era gives way to the Archaic era, which is from 6400 to 400 B.C. Architectural elements begin to appear during this era. Hunting now focuses on deer, elk and smaller animals such as rabbit while evidence of plant exploitation is more apparent. Rock art appears during this time.

In the Formative era (400 B.C. to A.D. 1300), different cultural influences are seen in the archaeological record of Colorado. While corn first appears during this era, this area does not adopt agriculture. Various styles of pottery now appear in sites dating to this time and rock art styles reflect different cultural influences.

In this area, the Protohistoric period, from A.D. 1300-1881, is specific to the Ute, although their presence is thought to have begun in the Formative era, sometime between 500 and 3000 years ago. The Ute, however, do not have migration accounts in their mythology and their origin stories say they were always here. The Ute occupation was noted as being a loose confederation of seven bands, of which the Grand River Band and the Yampa Band are from this area. They have been described as nomadic hunters/gathers, whose primary focus was the harvest of bison and elk. In this area, their sacred sites occur on upland ridges and at favorable vantage points. The Ute Trail crosses just outside the northern fire boundary on the Flat Tops and a number of lateral trails may extend off of it and had provided access to the Colorado River. Several of these Ute trails have been converted to roads and the possibility exists that Ute campsites may be located near them. In 1849 the Ute entered into the first of a number of treaties with the United States. In 1863 they entered into a second treaty, ceding the eastern slopes of the Rockies. In 1868 another treaty ceded more territory although they retained possession of the western third of the State. Prompted by an uprising over plowing Indian pasturage, a final treaty in 1880 removed the Ute from all remaining desirable lands in Western Colorado.

The following historic synopsis of this report relies on work by Conner and Davenport (1996), the White River 2002 EIS (2002), and Jim Nelson (1999). In the Historic period, the first direct contact between the Ute and Euroamericans was with fur trappers. The fur trappers were in this area of the Colorado River by the 1830's, but their contact with the tribes was generally non-confrontational and did not result in long-term changes in tribal territory. Then came a series of US Army and government sponsored expeditions looking for railroad routes through the Rockies. Again, these expeditions were brief and left little evidence of their passing. Their observations, however, led to public awareness of settlement opportunities. In 1859, mining discoveries led to an influx of people into the mining areas and by 1861 the Euroamerican population was large enough for Colorado to become a territory. In 1876, the territory's population was large enough for Statehood.

In 1873, the area around Glenwood Springs was surveyed by the federally sponsored Hayden Expedition and the areas minerals and settlement potential noted. This dovetailed with a silver mining boom that began in the 1870's and lasted until 1893, when the US withdrew its silver support. During this period of time it was noted that the removal of the Ute from their land was the result of continuing encroachment by Euroamerican settlers as well the previously mentioned uprising.

Glenwood Springs, however, began more as a resort area and supply center, capitalizing on the reputed healing powers of its hot springs. In 1885 a toll road was built through Glenwood Springs and by the late 1880's, two competing railroads reached the town in the same year. The railroads ushered in the recreational era when they began advertising the town and its' hot springs as a recreation destination. The town soon grew to accommodate this type of enterprise with construction of hotels and other accommodations.

In 1887, the Grand Hogback coal seam, first noted in the Hayden report, was mined to fuel the Leadville coke ovens and several coal mines were developed near Glenwood Springs. The South Canyon coal deposit was developed around this time, primarily to satisfy the coal needs of the Glenwood Springs community. These miners lived at the South Canyon Coal Camp near the mine. In 1915, a steel truss bridge was constructed across the Colorado River at the mouth of South Canyon and facilitated coal movement from the mines to the town.

In the 1890's, farmers and ranchers came into the area. Soon, irrigation ditches were dug to move water to the fields. While the ranchers used the area along the Colorado, they also used the uplands as pasturage for cattle and sheep.

In 1904, the State of Colorado bought land for a fish hatchery in Mitchell Creek. Originally of wood, the hatchery was expanded, with new buildings constructed of rustic concrete blocks made on site between 1927-30.

Beginning in 1887, the hills north of Glenwood Springs were used for a gravity fed community water system. This system has been modified as the town's needs expanded, leaving some historic parts of it abandoned as they were replaced or upgraded to meet the needs of a growing community.

While the city focused on tourism, other recreational opportunities were explored. The first ski run was developed on the north side of Red Mountain in the 1930's and small ski slopes, some with poma lifts, appeared between the 40-60's. These local operations gave way as the larger resorts developed.

- A. Background** – The Coal Seam Fire started on June 8, 2002, and involved a mixture of private, municipal (City of Glenwood Springs), Colorado State, and Federal (Bureau of Reclamation (BLM) and United States Forest Service (USFS) lands. The Southern Ute Indian Tribe, Unita-Ouray Ute, and Ute Mountain Ute also have cultural ties to this area through land usage extending back well into prehistoric times.

The fire's origin was from a long-burning coal seam. On June 10, 2002, the White River National Forest Heritage Resources Program (Forest HRP) began compiling site records and informing fire of the location of cultural resources threatened by the fire. On Sunday, June 16, 2002 the North Zone Burned Area Emergency Response Team (BAER) began arriving at the Coal Seam Fire. The Forest HRP assisted in beginning field surveys in areas of suppression impacts. On June 20, 2002, BAER Archaeologist Chuck James arrived at the fire and was provided location maps of known sites and source information on the area by BLM and Forest HRP archaeologists. Tribal contacts had been made by the Forest Native American Coordinator by this time. Contact with the State Historic Preservation Office (SHPO) was then initiated soon after arrival. Following briefings, aerial helicopter reconnaissance of the fire was made in the company of other BAER archaeologists on June 21. During that flight areas of higher cultural sensitivity along ridges were viewed as well as determining where bulldozer lines were placed.

On the north side of the Colorado River, at 5,700 ft. elevation, the fire burned up Mitchell Creek and several smaller drainages, onto the Flat Tops, and was stopped at around the 10,000 feet elevation contour. On the south side of the river the fire burned from the Colorado River through parts of the South Canyon drainage and was stopped near the 8,000 feet elevation contour. The fire burned through the riparian zones along the Colorado River and the drainages, through the oak, mid-slope pine and fir, and into the upland fir stands, meadows, and aspen groves. Fire intensity ranged from high severity stand-replacing burns, especially on the lower slopes, to low severity under-burns in moister areas. In the uplands, fir stands were subject to low and moderate burning while little fire entered the moist aspen groves.

Suppression impacts included aircraft operations and helicopter landing spots, fire engine suppression activities, bulldozed fire lines, staging areas, spike camps, safety zones, drop points, and mop up operations. Where possible the fire was tied into existing roads or natural barriers including aspen groves. Full control of the Coal Seam Fire had not been established by the date of this plan.

- B. Reconnaissance Methodology and Results** – Due to the high elevation, steep slopes in much of the fire area, and the limited fishery away from waterways, most of the fire area was ascribed a low probability for detecting prehistoric sites. Exceptions to this were where prehistoric and historic Ute trails crossed the area, along ridge lines, near springs, and in riparian areas by the Colorado River and along streams (Andele Worthington, Personal Communication 2002). Historically, homesteading, cattle and sheep ranching, coal mining, transportation corridors (railroads, roads, bridges and trails), early recreational facilities, and municipal infrastructure were known for this area. Again, most of this development was focused in the drainages, along the river, adjacent to travel corridors, and between resource or recreation points of interest (Alice Gustafson and Cheryl Harrison, Personal Communication, 2002).

Based on the above areas of sensitivity, cultural resources anticipated in the Coal Seam Fire include prehistoric and historic tribally used trails, temporary campsites, wickiups, tools and weapons associated with animal and plant procurement and processing, tool repair sites, cairns, stacked rocks and spiritual areas. Historic sites would include administration buildings, coal exploration and mining support facilities, transportation features, animal husbandry features and homesteads. The fire appeared to burn from an area of high sensitivity near the Colorado River

and live streams, into lower sensitivity slope areas, and in the north, stopped short of a high sensitivity zone that extends across the Flat Tops.

Survey strategy involved archaeologists walking dozer lines and adjacent buffers, as well as helicopter landing sites, drop points and other suppression related impact areas with spacing approximately five meters or less apart. Other low sensitivity areas where reported sites were looked for had transect spacing up to 20 meters apart. All suppression impacts (9.44 miles of dozer line and bladed roads, 32 drop points, 1 spike camp, 7 helicopter landing zones and several water take-out points) were covered. Following this, all known and documented sites were assessed for fire damage. The archaeological resource advisors spent a total of seven days surveying suppression impacts and assessing sites.

- C. Findings** – During this inventory, no archaeological or historic sites were discovered within land impacted by suppression related activities. One previously unrecorded homestead, adjacent to a bladed section of Dolan Road, was noted but the site was not impacted by that activity. In addition, a prehistoric component was noted at three historic sites. The Forest HRP took GPS coordinates at each of these sites. Of the six known or previously documented historic sites within the fire area, one (the Transfer Springs R.S.) had been previously dismantled and could not be relocated. The South Canyon National Register Bridge was not impacted by the fire but the foundations of a nearby saloon and cabin appear to have been removed by bulldozer activity at some unknown time in the past. The wooden buildings at the Cardnell Ranch were consumed in the fire but some interpretive values remain. The Municipal water facilities were not impacted by the fire and were not assessed as to their eligibility. An abandoned recreational poma lift exists near these facilities and should be recorded. The South Canyon Coal Camp had vegetation impacted by the fire. More of the camp has been exposed as was an area of vandalism. The two foundation areas were not impacted by the fire. The State Fish Hatchery was also not impacted but this compound is at risk if Mitchell Creek floods. The hatchery buildings appear to have retained their original fabric and may be eligible for the National Register.

IV. RECOMMENDATIONS

Based on the results of the above observations, in accordance with the Interagency Burned Area Emergency Stabilization and Rehabilitation Handbook, the National Historic Preservation Act, other applicable Federal law, and the USFS Regional Cultural Resource Wildland Fire Programmatic Agreement, the following recommendations are advanced:

A. Emergency Stabilization

1. Management – Native American Consultation

Description: Consultation with three Ute Indian Tribes regarding sacred sites, results of cultural resource damage assessment, and other cultural issues specific to this fire assessment.

2. Monitoring – No specifications

B. Management Recommendations (non-specification related)

As a result of archaeological assessment of known or documented sites, the following non-specification management recommendations are advanced.

1. On both USFS and BLM lands, an opportunity exists to survey those mid-slope ridges for sacred sites and early trails. Any land disturbing rehabilitation project or Agency project activity, such as salvage logging, will need to have an archaeological survey done in accordance with Section 106 of the National Historic Preservation Act. These surveys can be done with qualified agency personnel or contracted out as circumstances dictate. Law enforcement should be aware that

earlier episodes of looting are found in the area and there is the potential for this activity to increase until returning vegetation masks the surface component of these sites.

2. State of Colorado lands. It is recommended that the State sheath the upstream and drainage side of the fish hatchery building prior to the expected flooding projected for Mitchell Creek to protect both the buildings unique concrete block exterior and original windows. It is also recommended that the building be nominated for inclusion onto the National Register of Historic Places. This location is among the earliest State Hatcheries and played a role in Colorado's recreational development. Further, building exteriors in this compound retain their historic character and later infill does not appear to have severely compromised the site's setting. Since there are around four State Hatcheries of this architectural style and construction, a thematic approach to National Register eligibility may be cost effective.
3. City of Glenwood Springs' lands.
 - a. While the water facilities were not affected by the fire, an abandoned poma lift is located near the water tank. This earlier recreational facility should be recorded.
 - b. The fire did consume the wooden structures at the Cardnell Ranch. A basement adjacent to the cabin chimney should be filled in. The city may consider placing burned historic material they do not want for museum display in the basement prior to filling so that it retains its context to the site. A standing concrete archway is also located here and is being undermined on one corner by non-fire related erosion. It is recommended that this corner be stabilized.
 - c. The South Canyon Coal Camp has been exposed by this fire. Evidence of looting is present in one area and should be filled in as it constitutes a safety hazard. Law enforcement should also be aware of potential looters, both here and at other sites on city property, since removal of the vegetation that previously obscured the sites leaves them vulnerable until the vegetation cover returns. A long masonry wall is also jeopardized by a fire killed cottonwood on one side and two live cottonwoods growing out against the wall on the other side. These three trees should be removed.
 - d. The 1915 pin-connected steel through truss South Canyon Bridge is listed on the National Register. On the south side of the bridge was an 1880's saloon and residence owned at one time by W.J. Grandstaff, who was an early Black resident of the area. Both of these locations offer interpretive values to the city.

V. CONSULTATIONS

Name, title, and agency	Telephone
Jim Green, Staff, Colorado State Historic Preservation Office, Denver, CO	(303) 866-4674
Cheryl Harrison, Archaeologist and Native American Liaison, Bureau of Land Management, Glenwood Springs Field Office, Glenwood Springs, CO	(925) 947-2820
Alice Gustafson, Archaeologist, USFS, White River Supervisor's Office, Glenwood Springs, CO	(925) 948-3247
Andele Worthington, Native American Coordinator, USFS, White River Supervisor's Office, Glenwood Springs, CO	(925) 948-3247
Andrea Brogan, Fire Archaeologist, USFS, White River Supervisor's Office, Glenwood springs, CO	(925) 948-7534
Michael Metcalf, owner, Metcalf Archaeological Consultants, Inc., Eagle, CO	(970) 328-6244
Robin Millard, Community Planner, City of Glenwood Springs, Glenwood Springs, CO	(925) 928-6009
Willa Soncarty, Curator, Frontier Historic Society, Glenwood Springs, CO	(925) 945-4445
Betsy Chappoose, Cultural Rights and Protection Director, Ute Indian (Unita-Ouray Ute) Tribe, Ft. Duchesne, UT	(435) 722-4992
Jim Jefferson, Cultural Protection Director, Southern Ute Indian Tribe, Ignacio, CO	(970) 563-0396
Terry Knight, NAGPRA Coordinator, Ute Mountain Ute Tribe, Towaoc, CO	(970) 565-9473

VI. REFERENCES

Conner, Carl E., and Barbara J. Davenport 1996. Report of the Cultural Resources Investigation for the proposed 3D Seismic Area in Garfield County, Colorado for the Department of Energy. Advanced Resources International, Inc. Golden.

Nelson, Jim 1999. *Glenwood Springs: The History of a Rocky Mountain Resort*. Western Reflections, Ouray.

Reed, Alan D., and Michael D. Metcalf 1999. *Colorado Prehistory: A Context for the Northern Colorado River Basin*. Colorado Council of Professional Archaeologists, Denver.

White Mountain National Forest 2002 Final Environmental Impact Statement White River National Forest Land and Resource Management Plan, 2002 Revision, Vol. 3, Appendix D., Historic Range of Variability, Human Use. MS on file, White River N.F. Supervisor's Office, Glenwood Springs.

Charles James, Bureau of Indian Affairs, Northwest Regional Office, Portland, OR (503)231-6229
 Alice Gustafson, White River National Forest, Glenwood Springs, CO (970)945-3305

INTERAGENCY
BURNED AREA EMERGENCY STABILIZATION AND REHABILITATION PLAN
COAL SEAM FIRE

OPERATIONS ASSESSMENT

I. OBJECTIVES

- Identify, inventory and map fire suppression impacts including areas adjacent to the fire line that were adversely affected by fire suppression activities
- Ensure compliance of suppression rehabilitation with standards developed by the BAER team and/or host agencies
- Prescribe and implement short term flood mitigation measures to protect structures and human life
- Provide oversight for the implementation of all short term treatment measures prescribed by the BAER team

II. ISSUES

- Camps, roads and staging areas used by suppression forces requiring additional rehabilitation
- Implementation of hand and dozerline rehabilitation standards
- Oversight of short term treatment implementation as prescribed by the team
- Communications and coordination with Incident Management Team, other agencies and private land owners

III. OBSERVATIONS

- A. **Background** - The BAER OPS section assigned to the Coal Seam Fire consisted of two individuals, an Operations Specialist and a single trainee. The section was ordered to the fire on June 16 and arrived at the incident the next day. Quickly thereafter, the section established effective lines of communications and coordination with the Type 1 Incident Management Team (IMT) assigned to the fire at that time (Hart). In order to maintain these lines of communications, the OPS section attended all IMT briefings and planning meetings. In addition, they coordinated the aerial reconnaissance and ground travel for BAER team members. Individual specialists were kept informed of significant developments related to fire growth, weather and other important safety matters through daily briefings provided by the OPS specialist or trainee.
- B. **Reconnaissance Methodology and Results** - The OPS section for the team was able to quickly access the operational needs related to the implementation of short-term mitigation treatments. This was done through the use of aerial reconnaissance flights and ground surveys conducted in conjunction with other BAER team disciplines. Three days were devoted to the development of individual site protection plans for structures that are currently threatened by the potential for flooding and/or mud flows. Unfortunately, before this project was completed, the BAER team concluded (during Team deliberations at its 1900 hours meeting on June 21, 2002) that these planning activities on private lands should be discontinued for the following reasons:
1. Concerns voiced by the BLM representative to the Team that it could not meet with BAER team members who were working on private lands.

2. Warnings by the NRCS representative to the Team that the individual site plans would probably need to be completely redone if Emergency Watershed Protection (EWP) funds were to be used for implementing these treatments.
3. Statements by USFS representatives to the team indicated that there had been consultation with other supervisory offices and based on these discussions, it had been determined that the work being proposed on private land would be of no direct benefit to the Agency (re: Wyden Amendment), and therefore, could not be funded from the emergency fire rehabilitation appropriation despite the fact that flood waters or mud flows would most likely originate from public lands. While this position was not universally understood by the team, National policy guidance on this matter, found in Chapter 6, page 1 of the Interagency Burned Area Emergency Stabilization and Rehabilitation Handbook, clearly supports this position stating "Emergency Fire Rehabilitation funding can only be used for treatments on agency lands within the perimeter of the fire or impact area downstream from the burned area."

Immediately following this determination, all individual site plans and signed consent forms gathered by the Operations Specialist, up to that date, were turned over to the NRCS representative to the Team. Other plans to return to Mitchell Canyon the following day, to complete the work related to the development of site protection plans were cancelled.

In addition to the operational needs assessment conducted in Mitchell Canyon, the OPS section also hiked over much of the rugged Federal terrain above Mitchell Canyon in an attempt to flag potential treatment areas. Forest Road 910 and the spike camps and staging areas located along this road were surveyed for additional rehabilitation. Based on specific direction received from USFS and BLM representatives to the team, no other road surveys were conducted by the OPS section of the team, even though several offers were made to conduct a systematic roads survey of all travel routes used by fire suppression forces.

With respect to the fire perimeter, the entire length of fire perimeter in DIVS C, E, F, and G were surveyed by foot for additional rehabilitation needs. In addition, archeologists assigned to the Team surveyed all known or suspected locations of dozer line. Dozer line rehabilitation conducted by the Incident Management Team, before it was demobilized, was also reviewed for compliance with standards provided to the IMT by the BAER function.

C. Findings. Based on the field surveys discussed previously, the following findings have been documented by the OPS Section of the BAER Team:

1. It is obvious, even from an unscientific point of view, that many of the unburned homes in Mitchell Canyon, and the Glenwood Springs Fish Hatchery, administered by the State, are at an imminent threat from floodwaters and/or debris flows off Federal lands. While surveying the many drainages immediately above Mitchell Creek, that run off BLM lands into the primary creek channel, OPS section personnel, at times, walked through knee deep deposits of ash and burned debris, all of which is waiting to be transported into the primary drainage by a rainfall event.
2. The OPS section completed individual site protection plans for seven of the home sites before this work was terminated. A total of 17 unburned homes/barns/outbuildings are threatened by flood potential above Donegan Road. The site protection plan for the Hatchery was to be completed and discussed in detail by the Watershed Section. Treatment measures identified within these plans include short-term mitigation measures such as sand bagging, the placement of jersey barriers and diversion channels and debris clearing. A Structural Flood Protection Map has been prepared by the OPS section and is shown in Appendix III. This map shows all structures at threat on County Route 1, above Donegan Road and immediately adjacent to the creek. It also shows two houses on Donegan Road, 0125 and 0141 Donegan and 0095 Creek side that are at risk from flooding. A detailed list of treatments required to protect these structures from imminent flooding is attached to this assessment. Detailed site plans for the Hatchery and Donegan Road have been included in Appendix V. All other site plans are on file in the NRCS Glenwood Springs District Office.

3. At least 2.5 acres of soil netting (on 58% slope, immediately above residences within Mitchell Canyon) and 103 acres of straw wattle treatment were identified (and flagged with blue and orange flagging) by the OPS section within Mitchell Creek. The soil netting was prescribed in areas too steep for wattles and was intended to cover as much slope that could possibly be negotiated by hand crews during installation. These treatments are to be considered emergency treatments that should be installed immediately on Federal land to reduce the potential threats to life and property off federal lands in Mitchell Canyon. Orders for these materials were placed through the BAER team leader in the very infancy of the BAER assignment. As per the direction from the BAER team leader, slightly more materials were ordered than actually required by the OPS assessment. The justification and location for the placement of these materials is discussed in detail in the Watershed Assessment and associated specifications.
4. Only a small portion of the roads used for fire suppression reasons were inventoried for damage. Only one of these roads, a 4 X 4 road that originates below the Hatchery on BLM land indicated the need for significant regrading and stabilization. This road should be left open until after all midslope rehabilitation treatments have been installed by BLM above the Hatchery, and then closed. At the present time, the road surface has turned to powder. Based on the advice of the BLM Team representative, no rehabilitation specification for this road has been included in the plan.
5. There is a great deal of Dozer line that was not rehabilitated by the either IMT to date. In fact, a large majority of the dozer line mapped by the IMT is inaccurate in its location. These lines have been mapped, and then discussed in detail in the Archeological assessment. With respect to the dozer line rehabilitation work that was completed by the IMT, the OPS section determined that this work was completed to the standard specified. The quality of this work was exceptional.
6. A huge amount of floatable debris will cause a considerable amount of damage to structures within Mitchell Canyon during the first few flood events. This debris, which is concentrated over a three mile distance within Mitchell Creek consists of both natural vegetation and logs felled by suppression crews during the course of the incident, as well as burned manmade debris that is strewn around home sites within the drainage (primary metal, plastic and wood products including burned cars, heavy yard/landscaping and construction equipment, washing machines etc.). Without question, potentially toxic materials seen during OPS survey activities, including car batteries, partially consumed chemical containers, etc. have the potential to contaminate Mitchell Creek and the habitats downstream if not removed from the drainage before the first damaging rainfall event.
7. Domestic water supplies within Mitchell Canyon will be threatened by overland flows. A design floodwall has been prepared to protect the Hatchery spring box and provided to the NRCS representative to the Team. Also, the OPS section has documented at least two other sources of sole source domestic water supply that lie on private land that will be eventually contaminated by flood waters if not protected.

IV. RECOMMENDATIONS

A. Management Recommendations (non-specification related)

1. Management must find a way to take advantage of rehabilitation opportunities, and to move quickly to treat landscapes that are prone to movement/flooding post fire. The Interagency Burned Area Emergency Stabilization and Rehabilitation Handbook states (Chapter 5, page 3) "Emergency stabilization actions need to be completed before the next damaging storms and/or Spring runoff (to prevent the loss of life, property or cultural resources).

On Day 2 of the BAER Team's deployment to the incident, an order was placed through the Team Leader for 4 Type 2 crews and supporting equipment to install the straw wattles, straw bale check dams, and soil netting on BLM lands above Mitchell Creek. The track record of

the National BAER teams since 1994, on most assignments of this size and complexity, is to have all such treatments completed prior to the departure of the team (or the OPS section). It is the responsibility of the OPS section on the Team to provide the oversight and direction required to implement such treatments quickly and effectively.

Due to the unprecedented fire activity throughout the county, it was obvious that Federal fire crews were not going to be made available to complete this work. However, other non-fire contract crews could be contacted in such instances. Furthermore, as this final report was being prepared, in preparation for Team demobilization from the incident on the 9th day of the assignment, the OPS Specialist still had not received any form of verification that materials had been ordered. It was for this reason that the OPS section, having completed all of its assigned work, was sent to another fire rather than wait on these materials to arrive at the incident.

2. An underlying tone of the BAER Team mission on the Coal Seam Fire, as expressed by some agency representatives to the team and ;perhaps, their supervisors, seemed to discourage intensive fieldwork on private lands and/or interaction with private landowners. Such attitudes should, in retrospect, be tempered somewhat in light of the new policy citations taken from the Interagency Burned Area Emergency Stabilization and Rehabilitation Handbook:
 - a. Chapter 6, page 15: "Interested members of the public must be given reasonable opportunity for input and comment on all rehabilitation and restoration plans. Consultation with resource users, other agencies, scientists and private and public interests are recommended to a degree appropriate with complexity...During the course of coordination and consultation, excellent opportunities exist to make or improve partnerships...Joint planning and implementation with other land management agencies are encouraged. "
 - b. Chapter7, page 3: After the preliminary information has been reviewed and assembled, the ESR Team will conduct one or more field inspections of the burned area to assess damages caused by the fire...The burned area must be evaluated to determine if life or *private property* will be threatened if rehabilitation practices are not implemented.
 - c. Chapter 7, page 2: During the course of the assessment, all rehabilitation needs should be identified regardless of funding status in order to avoid having to reassess the area at a later date. At a minimum, it should provide sufficient information to provide an inventory of facilities, structures and utilities damaged by the fire and fire suppression actions and to provide emergency stabilization and rehabilitation recommendations."
3. Opportunities for building partnerships with local agencies and landowners, as discussed previously in this text and emphasized by National policy, were not fully exploited during this BAER effort due to the fact that some community leaders, municipal/county department heads (utilities and street departments) and other critical decision makers were not readily accessible to the team and were not present during critical BAER briefings/planning meetings. Community leaders from all jurisdictions affected by large wildfires should be made aware of the fact that their day-to-day involvement in such an effort, is critical, especially as it relates to the speed at which treatment implementation occurs.
4. A stockpile of sand bags and sand should be purchased and made available to the public at will. The Colorado Division of Wildlife has raised concerns relative to the use of sand above the Hatchery, due to the possibility that Whirling Disease could be introduced into the creek. Accordingly, if a native source of sand cannot be located, supply of pea gravel should be provided to homeowners in lieu of sand for filling sand bags.
5. NRCS should hire an engineer to design a floodwall to protect the springhouse at the Glenwood Fish Hatchery. The OPS section and one of the watershed specialists developed a tentative design for the structure. A sketch of this design was left with the NRCS representative to the Team.

In closing, the OPS section would like to thank the Steve Hart Type 1 Team for their outstanding interest and support of our mission during the assignment. The Colorado Division of Wildlife and the Glenwood Fish Hatchery should also be acknowledged for their outstanding participation in BAER field assessments, briefings and other meetings hosted by the Team. It was indeed a delight to work with so many fine professional people.

V. CONSULTATIONS

Name, title, and agency	Telephone
Myles Rovig, Homeowner (0125 Donegan Road)	970-945-7963
Craig Westley, Manager Sky King Ranch	970-928-0904
Brian Hopkins, BLM Glenwood District	970-947-2840
Mike Kinser, Range Specialist, BLM Glenwood	970-947-2820
Linda Gabossi, Homeowner (0717 Rd. 132)	970-928-0668
Stanley Rachesky, Homeowner (1686 Mitchell Creek)	970-945-4002
Ralph Besler, Homeowner (1962 Rd. 132)	970-948-9650
Kenny Cline, Homeowner (Rd. 132 above Hatchery)	970-945-6019
Lee Bowles, Homeowner (0688 Rd. 132)	970-945-2539
Hector Bulow, Homeowner (1246 Rd. 132)	970-945-2556
Larry Martin, Homeowner (0964 Rd. 132)	970-945-7390
Rich and Laura Kolecki, Hatchery Management	970-945-9887

VI. REFERENCES

Thomas M. Gavin, Fire Chief, Mescalero Apache Fire/Rescue	505-464-4711
John Perez, Biologist, New River Gorge National River	304-465-6537

In the event of a change of ownership, the City of...
 shall be deemed to have accepted the...
 and shall be responsible for the...
 of the...
 V. CONCLUSION

1	...
2	...
3	...
4	...
5	...
6	...
7	...
8	...
9	...
10	...
11	...
12	...
13	...
14	...
15	...
16	...
17	...
18	...
19	...
20	...

IV. ALL RIGHTS...
 The City of...
 shall be deemed to have accepted the...
 and shall be responsible for the...
 of the...
 The City of...
 shall be deemed to have accepted the...
 and shall be responsible for the...
 of the...

MAP #	GENERAL LOCATION OF RESIDENCES & STRUCTURES - COUNTY ROAD 132, MITCHELL CREEK DRAINAGE	POTENTIAL FLOOD/DEBRIS FLOWRISK	RECOMMENDED MITIGATION TREATMENT	COMMENTS
B1	Last residence up canyon	High	Remove debris, both manmade and natural. Hazard trees are identified, cut & removed off site. Design diagram given to NRCS.	Flood flows can contact debris at site and transport it downstream.
B2	Second residence from the end of road	High	Remove logging debris off site. Design diagram given to NRCS.	Flood flows can contact debris at site and transport it downstream
B3	Rayder residence 1688 Mitchell Creek Road	Low	No treatments	
B4	Bed & Breakfast 1686 Mitchell Creek Road (includes a guest house and residence)	Low	Remove debris, both manmade and natural. Hazard trees are identified, cut & removed off site. Design diagram given to NRCS.	
B5	Residence across road from horse farm	Low	No treatments	
B6	Last home before the junction with Donegan Rd, CR 130	Low	No treatments	
U1	Only remaining residence above the hatchery, upstream of Bed & Breakfast	High	Place Jersey barriers and sandbags between residence and creek. Design and diagram given to NRCS.	Flood flows and debris can damage bridge and contact house. See channel cross section in Appendix V.
U2	Hatchery spring house	High	Construct crib wall or concrete wall on upstream side to divert water and mud around structure. Design and diagram given to NRCS.	Flood flows and debris can damage spring house. Spring house is a domestic water supply and supplies water for hatchery operations.

MAP #	GENERAL LOCATION OF RESIDENCES & STRUCTURES – COUNTY ROAD 132, MITCHELL CREEK DRAINAGE	POTENTIAL FLOOD/DEBRIS FLOWRISK	RECOMMENDED MITIGATION TREATMENT	COMMENTS
U3	Residence immediately upstream of hatchery, including garage 1416 Mitchell Creek Rd	High	Place Jersey barriers in a V shape upstream of garage to divert flow around structures into the creek and roadway. Barriers also placed between creek and porch. Remove portion of porch hanging over creek. Design diagram given to NRCS.	Flood flows and debris can contact house and create damage.
U4	Hatchery Manager's residence. Sign with #1 attached to fence.	High	See Glenwood Springs Fish Hatchery Structure Protection – Appendix V	Flood flows and debris can contact hatchery facilities creating damage to facilities and fish. See channel cross sections Appendix V.
U5	Historic block hatchery building. Sign with #5 on building.	High	See Glenwood Springs Fish Hatchery Structure Protection – Appendix V	Flood flows and debris can contact hatchery facilities creating damage to facilities and fish. See channel cross sections Appendix V.
U6	Hatchery residence. Sign with #3 on fence.	High	See Glenwood Springs Fish Hatchery Structure Protection – Appendix V	Flood flows and debris can contact hatchery facilities creating damage to facilities and fish. See channel cross sections Appendix V.
U7	Cutthroat trout laboratory	High	See Glenwood Springs Fish Hatchery Structure Protection – Appendix V	Flood flows and debris can contact hatchery facilities creating damage to facilities and fish. See channel cross sections Appendix V.
U8	Residence immediately downstream of hatchery, 1246 Mitchell Creek Road	Moderate	No treatments	

MAP #	GENERAL LOCATION OF RESIDENCES & STRUCTURES - COUNTY ROAD 132, MITCHELL CREEK DRAINAGE	POTENTIAL FLOOD/DEBRIS FLOWRISK	RECOMMENDED MITIGATION TREATMENT	COMMENTS
U9	Residence very close to creek across from Storm King Ranch	High	Place Jersey barriers and sandbags between residence and the creek. Design diagram given to NRCS.	Flood flow and debris can contact residence. Arch culvert above house could be obstructed by debris causing flood flows and debris to contact propane tank.
U10	Log residence on west side of road, 0717 Mitchell Creek Road	High	Straighten channel behind residence. Place Jersey barriers along west side of driveway to intersect with Mitchell Creek Road. Design diagram given to NRCS.	Structure constructed in flood flow and debris flow path.
U11	Log residence on east side of road, 0688 Mitchell Creek Road	High	Place Jersey barriers along Mitchell Creek Road to divert overland flow of mud away from residence. Barriers would be placed on State right-of-way.	Structure constructed in flood flow and debris flow path
U12	Residence on west side of road, 0531 Mitchell Creek Road	High	Construct diversion channel on northwest side of residence into Storm King Ranch pasture. Use riprap to fortify channel. Compact banks of channel with heavy equipment. Design diagram given to NRCS.	Structure constructed in flood flow and debris flow path
U13	Horse farm residence on east side of road, 0398 Mitchell Creek Road	Low	No treatments	
U14	White barn, 0398 Mitchell Creek Road	High	Place Jersey barriers on north end of barn diverting flow coming overland from Storm King Ranch, back into Mitchell Creek. Design diagram given to NRCS.	Flood flow and debris could contact facility. See channel cross section Appendix V.
U15	Old red barn, 0398 Mitchell Creek Road	High	Place Jersey barriers on east side between barn and Mitchell Creek. Design diagram given to NRCS.	Flood flow and debris could contact facility. See channel cross section Appendix V.

MAP #	GENERAL LOCATION OF RESIDENCES & STRUCTURES - COUNTY ROAD 132, MITCHELL CREEK DRAINAGE	POTENTIAL FLOOD/DEBRIS FLOWRISK	RECOMMENDED MITIGATION TREATMENT	COMMENTS
U16	First residence on north side of Donegan Road, just east of the creek, 0125 Donegan Road	High	Place Jersey barriers and sandbags on north & west sides of residence, running parallel to dry creek bed and irrigation ditch.	Flood flow from Mitchell Creek could be diverted into irrigation channel above residence. Irrigation channel will not convey flood flow resulting in flooding of residence.
U17	Adjacent to U16 east of creek, 0141 Donegan Road	High	Place Jersey barriers in rear and along north side of residence to keep water from overflowing irrigation ditch.	Flood flow from Mitchell Creek could be diverted into irrigation channel above residence. Irrigation channel will not convey flood flow resulting in flooding of residence.
Lower Mitchell Flood Zone	Intersection of Mitchell Creek Road and Donegan Road east to Storm King Road, Storm King Road south to Highway 6 and 24, Highway 6 and 24 west to Mitchell Creek Road.	High	Place two jersey barriers in Mitchell Creek Road above intersection with Donegan Road to divert flood flow and debris into pasture south of Mitchell Creek Road (Locations triple yellow flagged). Place Jersey barriers (See Appendix V) starting at crown of intersection of Mitchell Creek Road and Donegan Road east on Donegan Road to vacant field (Location triple yellow flagged). Place Rhino barriers in each access point and fill/move into place when Stage 3 alert is activated. Place sand bags 3 high on east and west banks of Mitchell Creek form Donegan Road bridge downstream to Highway 6 and 24 culvert.	Flood and debris flow can access residential and commercial buildings downstream of Donegan Road bridge.

**INTERAGENCY
BURNED AREA EMERGENCY STABILIZATION AND REHABILITATION PLAN
COAL SEAM FIRE
FOREST RESOURCE ASSESSMENT**

I. OBJECTIVES

- Provide information to the reader pertaining to the hazards presented to public safety and infrastructure as a result of fire killed or damaged trees.
- Make recommendations for the treatment of the tree hazards.

II. ISSUES

- Fire killed or damaged trees that pose a threat to the general public and infrastructure.
- Long-term tree health.

III. OBSERVATIONS

- A. Background** – The Coal Seam fire burned through several jurisdictions including BLM, USFS, Colorado State, Private and the City of Glenwood Springs. The fire heavily impacted areas of public use and habitation such as Mitchell Creek Road.

Vegetation: South of the Colorado River the majority of the areas burned consisted of Gambel Oak (*Quercus gambelli*) and Pinion-Juniper (*Pinus edulis*), (*Juniperus spp.*), with stringers of riparian areas, dominated by Cottonwood. Aspen (*Populus tremuloides*) and Douglas-fir (*Pseudotsuga menziesii*) were found on moist sites and north facing slopes.

North of the Colorado River, the burn area contains lesser amounts of Oak and PJ tending more toward Aspen, Mixed Conifer composed of Douglas-fir and Spruce (*Picea engelmannii*). Riparian areas are again found in drainage bottoms. High elevation grass meadows occur in a mosaic with the mixed conifer stands.

Tree Damage: Three factors were considered when determining tree mortality and susceptibility to falling.

Crown Scorch: In species with slender twigs and small terminal buds, such as Douglas-fir, the minimum post fire survival criterion is 40% to 50% of the pre-fire foliage. If the foliage is discolored, or there is less than 40% of pre-fire green needle retention for Douglas-fir, the tree will probably die within one year.

Cottonwoods are easily top killed by even moderate fire.

Cambium Damage: For Douglas-fir, if more than 50% of the cambium has been killed the tree is not expected to survive.

For Cottonwood only a small amount of cambium damage is required to cause mortality either as a direct result of fire damage or as an avenue for rot and other pathogens to weaken the tree. Even low-severity surface fires can cause mortality.

Root Damage: Tree roots that have been killed by long duration burning as occurs near the base of trees with deep duff layers interact with root rot to cause mortality. Also roots exposed by severe undercutting and trees with more than 20 degree lean are susceptible to falling.

Mortality in the Douglas-fir was mainly a result of crown scorch, while cambium damage and crown scorch caused the majority of the cottonwood trees.

Oak and Pinion-Juniper mortality was mainly a result of crown loss during the running crown fire in these types. Bole damage was also a causal affect to the mortality of these species.

- B. Reconnaissance Methodology and Results** – Geographic Information System (GIS) was used to determine areas of mortality by vegetation type.

Ground reconnaissance by the BAER Team Forester, Merlin McDonald, was conducted to locate and flag for removal Tree Hazards in Mitchell Creek and South Canyon. All of this survey took place on private and city property. Consultation with the USFS indicated that hazard trees on forest roads and trails would be determined by survey as part of other project activities. The majority of the BLM property involved in the fire was in the Oak and Pinion Juniper types that do not present the same hazards as tall timber. Trees that were deemed to be a hazard were flagged with Orange and Orange "KILLER TREE" plastic flagging.

- C. Findings** – A total of 200 trees were located and flagged along the Mitchell Creek road and in Mitchell Creek above Donegan Rd. The safest and most efficient method of mitigating long-term tree hazards is to fall all fire killed trees that will potentially fall on roads, structures, trails and infrastructure such as utility lines. The treatment map, developed, as part of this plan show's the general locations of some of the groups of hazard trees. Others can be seen along Mitchell Creek road and were not mapped. An estimate of 20 trees in South Canyon should be removed to protect the culvert under the road at the turn off to the landfill.

The majority of the trees can be safely felled as long as the road in the vicinity of the falling operation is closed and the public is notified when trees are felled near occupied structures. A few trees above the state Fish Hatchery, west of the road may require topping to prevent them falling on structures.

It will be the responsibility of the property owners to bear the burden of removing these trees as funding for this type of activity on private property is not authorized for the use of Emergency Fire Rehabilitation or Emergency Stabilization project funds.

- D. Post Fire Recovery** – Oak will begin sprouting from the root crowns of fire killed trees almost immediately and will provide some limited protection against soil movement.

Pinion and Juniper will need to grow from remnant seeds or brought in by birds and rodents.

Cottonwoods should also show some sprouting from roots and the boles of trees if the bole was not killed at the ground level. Riparian areas have the potential to be invaded by saltcedar, therefore monitoring of these areas should be conducted to insure that saltcedar's are not allowed to gain a foothold in the area.

Douglas-fir trees that appear to have initially survived the fire may succumb to post fire insect damage from Douglas-fir beetles and wood borers. Drought and fire stress will weaken the trees and make them more susceptible to insect infestation.

INTERAGENCY
EMERGENCY STABILIZATION AND REPAIR PLAN

RECOMMENDATION

A. Management Recommendations (non-specification related)

1. Fall all the identified hazard trees along Mitchell Creek Rd. and along Mitchell Creek. Those trees on slopes outside the flood plane should be felled on the contour and left tree length to provide slope stability. Trees in the flood plane should be felled and removed to prevent slash accumulations from building up in the drainage and creating a floating debris problem during runoff events.
2. Property owners should consider postponing cutting of hazard trees until after the rainy season, thereby not contributing to the floatable debris problem that may occur during rainfall events. Once the rainy season has passed, removal of the hazard trees can take place at the convenience of the property owner and the tree removal services.
3. Tree falling in South Canyon should take place under the supervision of a hydrologist to determine which trees are posing a threat to the culvert and road and to locate trees to be felled that can be used to create a debris jam to catch and hold material floating downstream.

IV. CONSULTATIONS

Name, title, and agency	Telephone
Mr. Kenny Cline, Homeowner	----
Mr. Tom Ziola, Forestry Consultant/Arborist	(970) 216-8514
Mr. Ken McKay, Tree Removal Service	(970) 434-7586
Mr. Scott Danials, High Rise Tree Care	(970) 984-0202

VI. REFERENCES

Fire Effects Information System (FEIS)

Merlin McDonald, Sorester, BIA, Oklahoma Fire Center, 405-522-5951

RECOMMENDATION

A

...

IV. CONCLUSION

...

V. RECOMMENDATIONS

...

...

...

INTERAGENCY
BURNED AREA EMERGENCY STABILIZATION AND REHABILITATION PLAN

APPENDIX II. ENVIRONMENTAL COMPLIANCE DOCUMENTATION

- NATIONAL ENVIRONMENTAL POLICY ACT, COMPLIANCE DOCUMENTATION
- CATEGORICAL EXCLUSION CHECKLIST



BURNED AREA EMERGENCY STABILIZATION AND REHABILITATION PLAN

COAL SEAM FIRE

ENVIRONMENTAL COMPLIANCE CONSIDERATIONS AND DOCUMENTATION

FEDERAL, STATE, AND PRIVATE ENVIRONMENTAL COMPLIANCE RESPONSIBILITIES

All projects proposed in the Coal Seam Fire Burned Area Emergency Stabilization and Rehabilitation (ESR) Plan that are prescribed, funded, or implemented by Federal agencies on Federal, State, or private lands are subject to compliance with the *National Environmental Policy Act* (NEPA) in accordance with the guidelines provided by the *Council on Environmental Quality (CEQ) Regulations* (40 CFR 1500-1508). This Appendix documents the Interagency Burned Area Emergency Response (BAER) Team considerations of NEPA compliance requirements for prescribed rehabilitation and monitoring actions described in this plan for all jurisdictions affected by the Coal Seam Fire burned area emergency.

While this plan recommends engineering evaluation and design of treatments on private lands, this plan does not authorize or analyze the implementation of those treatments. The U.S. Forest Service and Bureau of Land Management have determined that authorization of recommended treatments on private lands is outside the funding authorities provided in the U.S. Department of the Interior and Department of Agriculture, Burned Area Emergency Stabilization and Rehabilitation (ESR) Policy. Because this ESR plan simply recommends treatments for private lands and does not authorize implementation of recommended treatments, the environmental consequences of implementing the treatments are not analyzed in this Environmental Compliance Consideration and Documentation.

This plan has been developed by an Interagency BAER Planning Team comprised of representatives from the: U.S. Department of the Interior (DOI), Bureau of Indian Affairs (BIA), U.S. Fish and Wildlife Service, Bureau of Land Management (BLM), and National Park Service (NPS); and U.S. Department of Agriculture (DOA), Forest Service (USFS) and Natural Resource Conservation Service (NRCS). The ESR Plan has been developed in close coordination with the State of Colorado Division of Wildlife, Garfield County, and City of Glenwood Springs, Colorado.

Agency Specific Guidance: This NEPA documentation has been developed in accordance with the following agency specific guidelines.

U.S. Forest Service: Emergency rehabilitation actions proposed on U.S. Forest Service lands within the White River National Forest, must comply with NEPA compliance guidelines contained in *Forest Service Handbook 1909.15, (Chapter 30 and 31 and 36 CFR 219)*.

Bureau of Land Management: Emergency rehabilitation actions proposed on Bureau of Land Management lands, involving the agencies permitting, funding, or implementation, must comply with regulations set forth in the *Department of the Interior Manual Part 516 (DM 6, Appendix 5)*.

Natural Resource Conservation Service: Emergency rehabilitation actions recommended for further evaluation and design prior to potential implementation or funding by the U.S. Department of Agriculture, Natural Resource Conservation Service (NRCS) on city, county, private lands, or state must comply with *Natural Resource Conservation Service, NEPA Guidelines (7CFR, Part 650)*. Emergency watershed treatments recommended for further engineering evaluation and design for potential implementation by the NRCS on private lands will require further environmental analysis upon determination of treatment feasibility and development of site specific designs.

RELATED PLANS AND CUMULATIVE IMPACTS ANALYSIS

White River National Forest, Resource Management Plan: The BAER Team Environmental Protection Specialist reviewed the *White River National Forest Resource Management Plan and Environmental Impact Statement (2002)* and in consultation with the U.S. Forest Service, has determined that actions proposed in the Coal Seam Fire ESR Plan within the boundary of the White River National Forest are consistent with the management objectives established in the Resource Management Plan and U.S. Forest Service best management practices for emergency watershed protection and rehabilitation.

Glenwood Springs Resource Area Management Plan: The BAER Team Environmental Protection Specialist reviewed the Bureau of Land Management's *Glenwood Springs Resource Area Management Plan (1989)* as amended in 1999 (*Environmental Impact Statement*) and in consultation with the BLM has determined that actions proposed in the Coal Seam Fire ESR Plan are consistent with the management objectives established in the Area Resource Management Plan.

AGENCY AND PUBLIC SCOPING

Multi-Agency Scoping: Upon arrival at the Coal Seam Fire the Interagency BAER Team learned of the establishment of a County and City "Mud and Flood Task Force" intended to address issues related to the Coal Seam Fire. The BAER Team consulted with the Mud and Flood Task Force regarding recommendations and specifications included in the plan.

Technical Scoping: Upon arriving at the Coal Seam Fire incident BAER Team Technical Specialists immediately consulted with local agency Technical Specialists to scope issues of concern and develop an approach to the assessment of resource damages, analysis of findings, and development of recommendations. All specifications and resource assessments were developed and approved after extensive consultation with and review by local technical specialists for all affected agencies.

Public Scoping: Public scoping and review was further facilitated through establishment of a Coal Seam Fire BAER Team telephone line, news releases, individual contacts with interested members of the public, and a public meeting held in Glenwood Springs, Colorado. BAER Team members participated in the June 27, 2002 public meeting held at the Glenwood Springs High School. Issues of concern to the public were recorded and addressed through the plan development. BAER Team representatives were available to answer questions during and after this meeting.

Agency representatives from the White River National Forest, the Bureau of Land Management, Glenwood Springs Resource Area, Natural Resource Conservation Service, and Colorado Division of Wildlife played an integral part to the assessment and planning process. The BAER Team also hosted an agency close-out briefing on the findings and recommendations provided in this plan on June 27, 2002.

APPLICABLE AND RELEVANT CATEGORICAL EXCLUSIONS

Bureau of Land Management: The individual actions proposed in this plan for Bureau of Land Management lands are Categorically Excluded from further environmental analysis as provided for in the Department of the Interior Manual Part 516 and Bureau of Land Management, NEPA Guidelines, Part 516. All applicable and relevant Department and Agency Categorical Exclusions are listed below. Department exceptions (516) DM 2.3 do not apply to any of the individual actions proposed. Categorical Exclusion decisions were made with consideration given to the results of required emergency consultations completed by the Interagency BAER Team.

Categorical Exclusions:

516 DM 6 App. 5.4C(3) Seeding or reforestation of timber sales or burn areas where no chaining is done, no pesticides are used and there is no conversion of timber type or conversion of non-forest to forest land.

516 DM 6 App.5.4.G(2) Installation of routine signs, markers, culverts, ditches, waterbars, gates, or cattleguard on/or adjacent to existing roads.

516 DM 6 App.5.4.G(3) Temporary closure of roads.

516 DM 6 App.5.4.H(3) Conducting preliminary hazardous materials assessments and site investigations, site characterization studies and environmental monitoring. Included is siting, construction, installation and/or operation of small monitoring devices such as wells, particulate dust counters, and automatic air or water samplers.

516 DM 6 App. 5.4.H(8) Installation of minor devices to protect human life.

516 DM 6 App.5.4.H(10) Removal of structures and materials of non-historical value, such as abandoned automobiles, fences, and buildings, including those built in trespass, and reclamation of the site when little or no surface disturbance is involved.

U.S. Forest Service: The individual actions proposed in this plan for White River National Forest lands are Categorically Excluded from further environmental analysis as provided for in the Department of Agriculture, Forest Service Handbook 1909.15, Chapter 30 and 31. All applicable and relevant Department and Agency Categorical Exclusions are listed below. Categorical Exclusion decisions were made with consideration given to the results of required emergency consultations completed by the BAER Team and documented in Section E below.

FSH 1909.15, 31.1a(3)	Inventory, research activities, and studies such as resource inventories and routine data collection when such actions are clearly limited in context and intensity.
FSH 1901.15, 31.1a(6)	Activities which are advisory and consultative to other agencies and public and private entities, such as legal counseling and representation.
FSH 1909.15, 31.1b(1)	Orders issued pursuant to 36 CFR Part 261 - Prohibitions to provide short-term resource protection or to protect public health and safety.
FSH 1909.15, 31.1b(4)	Repair and maintenance of roads, trails, and land line boundaries.
FSH 1909.15, 31.2(1)	Construction, reconstruction, closure or obliteration of trails.

Regeneration of an area to native tree species, including sites preparation which does not involve the use of herbicides or result in vegetation type conversion.

STATEMENT OF COMPLIANCE

This section documents considerations given in development of the Coal Seam Fire ESR Plan to the requirements of specific environmental laws. Specific consultations initiated or completed during development and implementation of this plan are also documented. The following executive orders and legislative acts have been reviewed as they apply to the Coal Seam Fire ESR Plan.

Executive Order 11593. Protection and Enhancement of Cultural Environment and National Historic Preservation Act (NHPA). The BAER Team archeologists have initiated necessary consultation with the Colorado State Historic Preservation Office (SHPO) and affiliated tribes regarding treatments proposed in the Coal Seam Interagency ESR Plan. In some instances, treatments have been implemented as emergency measures subsequent to SHPO and Tribal consultations and prior to completion of this plan. Should the ESR plan be modified to adapt to post-flood emergencies individual agencies will be responsible for continued SHPO consultations.

Executive Order 11988. Floodplain Management. Some treatments proposed within the Coal Seam Interagency ESR Plan occur within the 100-year floodplain. After the consultation with U.S. Army Corps of Engineers, Section 404 Permitting Office, Grand Junction, Colorado, the BAER Team Environmental Protection Specialist has determined that the treatments prescribed in this plan do not constitute structures, fills, or changes in land use as defined under this order. Consultation with the Corps should be re-initiated should NRCS determine that in-stream treatments recommended in this plan are feasible and warrant implementation.

Executive Order 11990. Protection of Wetlands. After consultation with U.S. Army Corps of Engineers, Section 404 Permitting Office, Grand Junction, Colorado, the BAER Team Environmental Protection Specialist has determined that the treatments prescribed in this plan do occur within a jurisdictional wetland.

Executive Order 12372. Intergovernmental Review. Coordination and consultation is ongoing with affected Tribes, Federal, State, and local agencies. A copy of the ESR Plan will be disseminated to all affected agencies. The Interagency BAER Team has specifically consulted with the U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, Colorado SHPO, Colorado Division of Wildlife, Colorado Office of Emergency Management, Federal Emergency Management Agency, Natural Resource Conservation Service, Ute Mountain Tribe, Southern Ute Tribe, and Ute Mountain Ute Tribe, Garfield County and the City of Glenwood Springs.

Executive Order 12892. Federal Actions to Address Environmental Justice in Minority and Low-Income Populations. All Federal actions must address and identify, as appropriate, disproportional high and adverse human health on low-income populations, and Indian Tribes in the United States. The actions proposed in this plan have been designed to protect cultural resources of concern to the Ute Mountain Tribe, Southern Ute Tribe, and Ute Mountain Ute Tribe and have been developed in consultation with Tribal representatives and representatives of other affected communities including the City of Glenwood Springs, Colorado. The ESR Team Environmental Protection Specialist has determined that the actions proposed in this plan will result in no adverse human health or environmental effects for minority or low-income populations and Indian Tribes.

Endangered Species Act. The Interagency BAER Team Wildlife Biologists have consulted with the U.S. Fish and Wildlife Service and Colorado Division of Wildlife regarding actions proposed in this plan and potential effects on federally and State listed species and has determined that there is no affect. Individual agencies are responsible for continued consultations during plan implementation.

Secretarial Order 3127. Contaminants and Hazardous Waste. No known contaminated sites occur within the Coal Seam Fire burn area. The Glenwood Springs municipal landfill occurs within the burn area. The city is responsible for any management of the landfill and potential contamination or hazardous waste that might be associated with the landfill. Homes that burned in the Coal Seam Fire within the city limits of Glenwood Springs, Colorado may contain hazardous materials. Assessment of potential hazardous waste for these home sites is the responsibility of individual landowners and/or the City of Glenwood Springs in accordance with applicable and relevant Federal and State laws. There are no known contaminated sites on other jurisdictions affected by the Coal Seam Fire.

Clean Water Act. Any alteration to streams or waters of the United States requires compliance with Section 404 of the Clean Water Act. The Interagency BAER Team has recommended minor alterations to the drainages within and adjoining the Coal Seam Fire burned area including: installation of diversion channels, debris racks, replacement of culverts, cleaning of debris basins, and construction of deflector berms to protect infrastructure. However, this plan does not propose implementation of these treatments until completion of further specified engineering evaluation by the NRCS. Should NRCS choose to implement these treatments consultation should be re-initiated with the U.S. Army Corps of Engineers, Grand Junction, Colorado, Section 404 Permitting Office prior to their implementation. Any additional treatments prescribed subsequent to transfer of responsibilities for ESR Plan implementation to local jurisdictions, may require additional consultation under the requirements of the Clean Water Act.

Clean Air Act. Federal Ambient Air Quality Primary and Secondary Standards are provided by the National Ambient Air Quality Standards (NAAQS), as established by the U.S. Environmental Protection Agency (EPA) (Clean Air Act, 42 U.S.C. 7470, et seq., as amended). The BAER Team Environmental Protection Specialist has determined that treatments prescribed in the Coal Seam burned area will have short-term minor impacts to air quality that would not differ significantly from routine land use practices for the area. Long-term, treatments proposed in this plan would be expected to have a beneficial impact to air quality through stabilization of ash and soils within the Coal Seam Fire burned area.

CONSULTATIONS

Natural Resource Conservation Service

Dennis Davidson, Natural Resource Conservation Service, Glenwood Springs, Colorado
John Andrews, Natural Resource Conservation Service, Denver, Colorado
Greg Sunstrom, Natural Resource Conservation Service, Glenwood Springs, Colorado

U.S. Army Corps of Engineers

Susan Nall, Section 404 Permitting Office, Grand Junction, Colorado
Randy Snyder, Section 404 Permitting Office, Grand Junction, Colorado

U.S. Forest Service

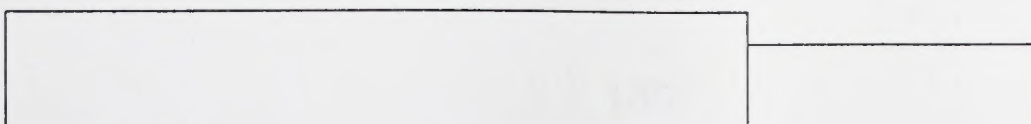
Alice Gustafson, Archeologist, White River National Forest
Andrea Holland Sears, Hydrologist, White River National Forest
Phil Nigland, Wildlife Biologist, White River National Forest
Keith Grezentenner, Ecologist, White River National Forest

Colorado Division of Wildlife

Rich Kolicki, Hatchery Manager, Glenwood Springs State Fish Hatchery
Alan Czenkusch, Fish Biologist, Glenwood Springs, Colorado
Sonia Marzec, District Wildlife Manager, Glenwood Springs, Colorado

Bureau of Land Management

Dan Sokal, BLM BAER Team Liaison, Glenwood Springs Resource Area
Tom Fresques, Wildlife Biologist, Glenwood Springs Resource Area



Steve Bennett, Associate Field Manager, Glenwood Springs Resource Area

City of Glenwood Springs
Robin Millyard, Director of Public Works

Garfield County
Dale Hancock, Director of Operations
Ron Vanmeter, Public Relations
James H. Sears, Undersheriff

BURNED AREA EMERGENCY STABILIZATION AND REHABILITATION PLAN

ENVIRONMENTAL COMPLIANCE AND CONSULTATIONS

DOCUMENTATION AND DECISION
COAL SEAM FIRE

NEPA CHECKLIST: If any of the following exception applies, the project cannot be Categorically Excluded and an Environmental Assessment (EA) is required.

- | (Yes) | (No) | |
|-------------------------------------|-------------------------------------|---|
| | <input checked="" type="checkbox"/> | Adversely affect Public Health and Safety |
| <input checked="" type="checkbox"/> | | Adversely affect historic or cultural resources, wilderness, wild and scenic rivers, aquifers, prime farmlands, wetlands, floodplains, ecologically critical areas, or Natural Landmarks. |
| | <input checked="" type="checkbox"/> | Have highly controversial environmental effects. |
| | <input checked="" type="checkbox"/> | Have highly uncertain environmental effects or involve unique or unknown environmental risks. |
| | <input checked="" type="checkbox"/> | Establish a precedent resulting in significant environmental effects. |
| | <input checked="" type="checkbox"/> | Relates to other actions with individually insignificant but cumulatively significant environmental effects. |
| | <input checked="" type="checkbox"/> | Adversely effects properties listed or eligible for listing in the National Register of Historic Places. |
| | <input checked="" type="checkbox"/> | Affect a species listed or proposed to be listed as Threatened or Endangered. |
| | <input checked="" type="checkbox"/> | Threaten to violate any laws or requirements imposed for the protection of the environment such as Executive Order 1198 (Floodplains Management) or Executive Order 11990 (Protection of Wetlands). |

NATIONAL HISTORIC PRESERVATION ACT

Ground Disturbance:

None

- Ground disturbance did occur and an archeologist survey, required under section 110 of the NHPA has been or will be performed. A report has been prepared by the prepared by the BAER Team archeologist. Clearance documentation is attached.

A NHPA Clearance Form:

Is required because the project affects a site that is eligible or on the national register. The clearance form is attached. SHPO has been consulted under Section 106 (see Cultural Resource Assessment, Appendix I).

- Is not required because the project has no potential to affect cultural resources (initial of cultural resource specialist).

OTHER REQUIREMENTS

- | (Yes) | (No) | |
|-------------------------------------|-------------------------------------|--|
| | <input checked="" type="checkbox"/> | Does the project have potential to affect any Native American uses? If so, consultation with affiliated tribes is needed. Consultation has been completed with both the Santa Clara and San Ildefonso Tribes (see Cultural Resource Assessment, Appendix I). |
| <input checked="" type="checkbox"/> | | Are any toxic chemicals, including pesticides or treated wood, proposed for use? If so, local agency integrated pest management specialists must be consulted. |

I have reviewed the proposals in the Coal Seam Fire Burned Area Emergency Stabilization and Rehabilitation Plan in accordance with the criteria above and have determined that the proposed actions would not involve any significant environmental effect. Therefore it is categorically excluded from further environmental (NEPA) review and documentation. BAER Team technical specialists have completed necessary coordination and consultation to insure compliance with the National Historic Preservation Act, Endangered Species Act, Clean Water Act and other Federal, State and local environmental review requirements.

Richard Hadley, BAER Team, Environmental Protection Specialist
Date

- I concur and it is my decision to approve the plan.
 I do not concur because.

Area Manager, Glenwood Springs Resource Area, Bureau of Land Management
Date

- I concur and it is my decision to approve the plan.
 I do not concur because.

Forest Supervisor, White River National Forest, U.S. Forest Service
Date

- I concur and it is my decision to approve the plan.
 I do not concur because.

District Conservationist, Natural Resource Conservation Service
Date

- I concur and it is my decision to approve the plan.
 I do not concur because.

**INTERAGENCY
BURNED AREA EMERGENCY STABILIZATION AND REHABILITATION PLAN**

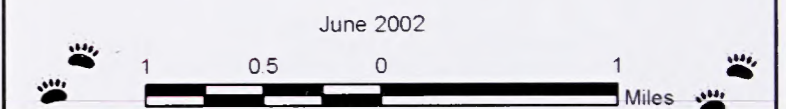
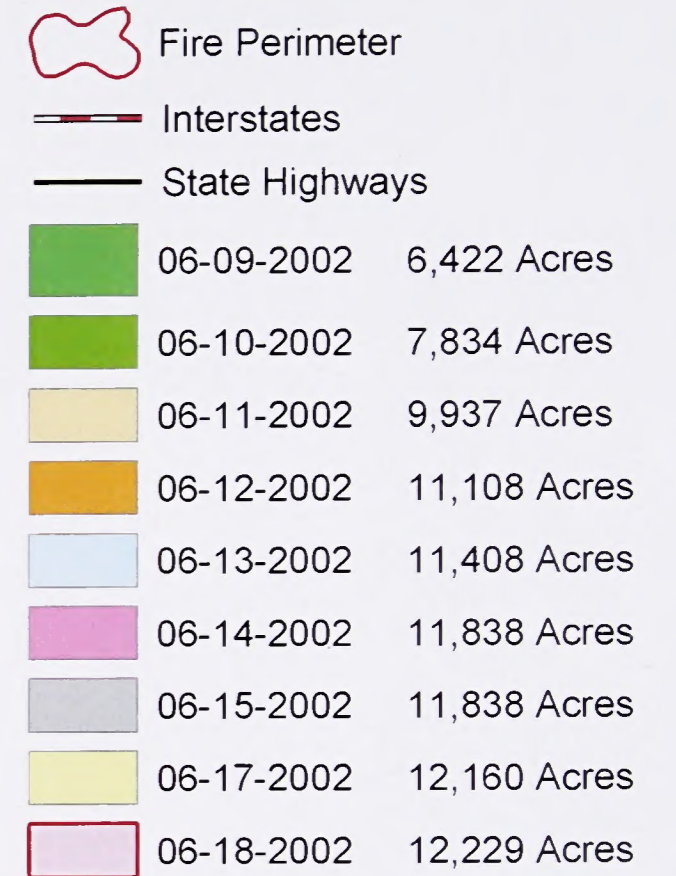
APPENDIX III. MAPS

- FIRE PROGRESSION
- SUPPRESSION IMPACTS
- OWNERSHIP
- BURN SEVERITY AND OWNERSHIP
- PRE- AND POST-FIRE EROSION
- CHANGE IN EROSION POTENTIAL DUE TO FIRE
- POTENTIAL PEAK FLOW AND SEDIMENT DELIVERY
- POTENTIAL DEBRIS/FLOOD FLOW AREAS, WITH FISH HABITAT
- FLOOD DANGER ZONES
- CHANNEL AND STRUCTURE TREATMENTS
- HILLSLOPE TREATMENTS
- VEGETATION MORTALITY
- VEGETATION TREATMENTS
- LYNX HABITAT



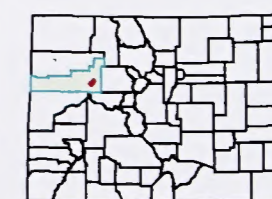
Coal Seam Fire

Fire Progression



The data represented in this map were gathered from multiple sources which may vary in accuracy, scale and date. This map is for display purposes only.

Locator Maps



Colorado



Garfield County

Point of Origin
 June 8, 2002
 1230


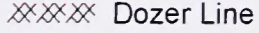










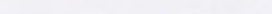
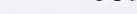
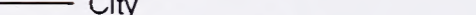
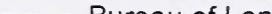
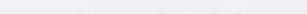
Storm King Mountain



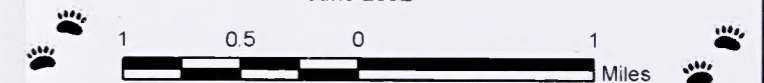


Coal Seam Fire

Suppression Impacts

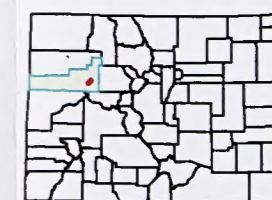
-  Fire Perimeter
-  Dozer Line
-  CAMP
-  Drop Points
-  Heli Base
-  Heli Spots
-  Incident Command Post
-  Dip Tank
-  Spot Fire
-  Staging Area
-  Interstates
-  State Highways
-  County Roads
-  City
-  Bureau of Land Management
-  Forest Service
-  Privately Owned

June 2002



The data represented in this map were gathered from multiple sources which may vary in accuracy, scale and date. This map is for display purposes only.

Locator Maps



Colorado




Garfield County



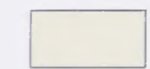


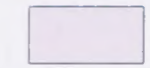



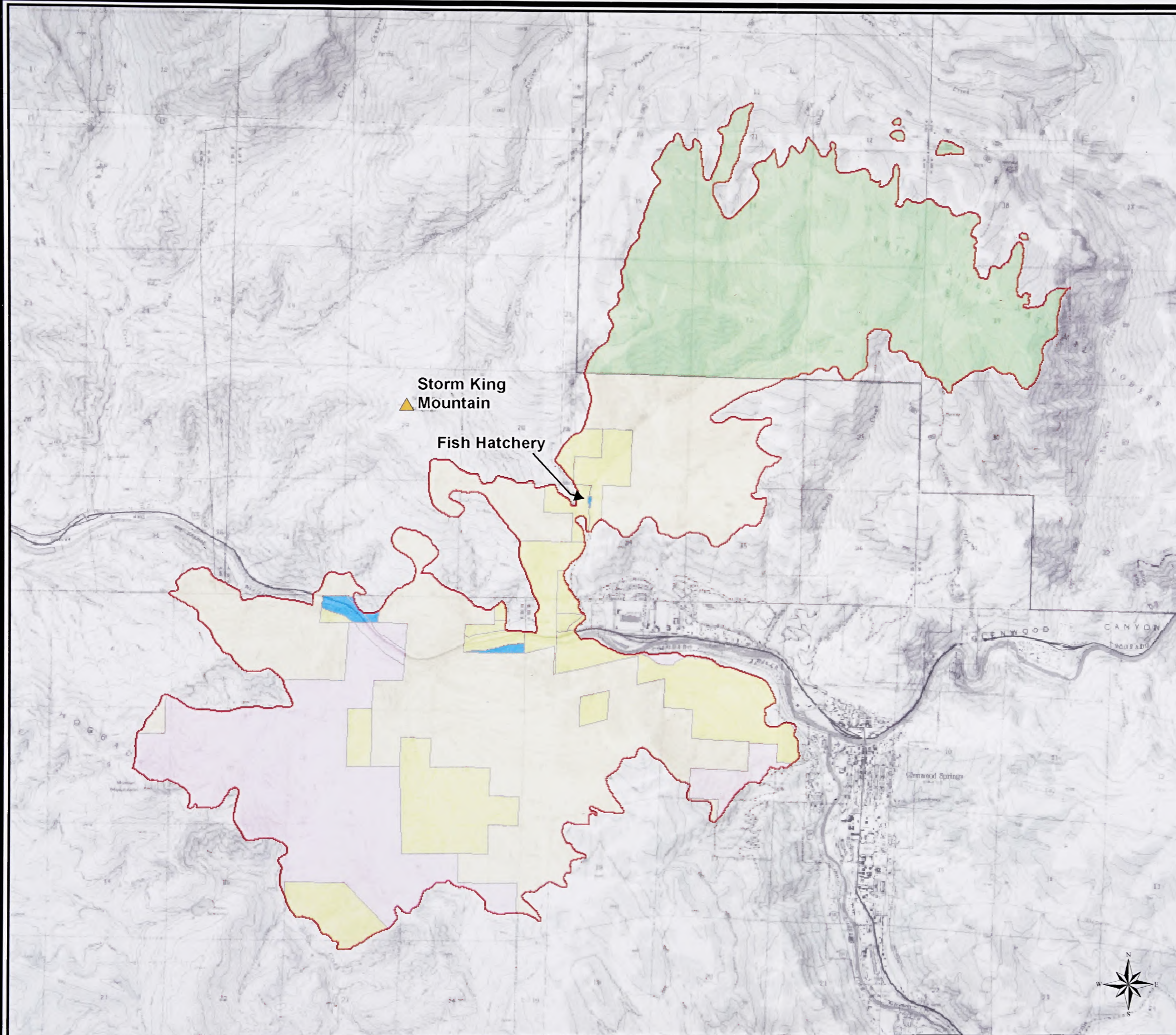
Coal Seam Fire

Ownership

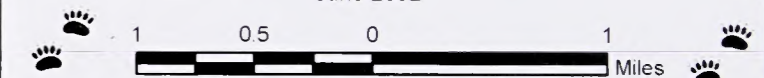
 Fire Perimeter

Ownership Class

	BLM	4457 Acres
	USFS	3754 Acres
	STATE	58 Acres
	CITY	2135 Acres
	PRIVATE	1825 Acres

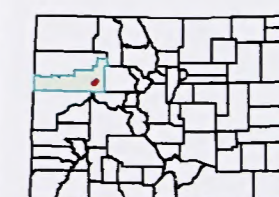


June 2002



The data represented in this map were gathered from multiple sources which may vary in accuracy, scale and date. This map is for display purposes only.

Locator Maps



Colorado

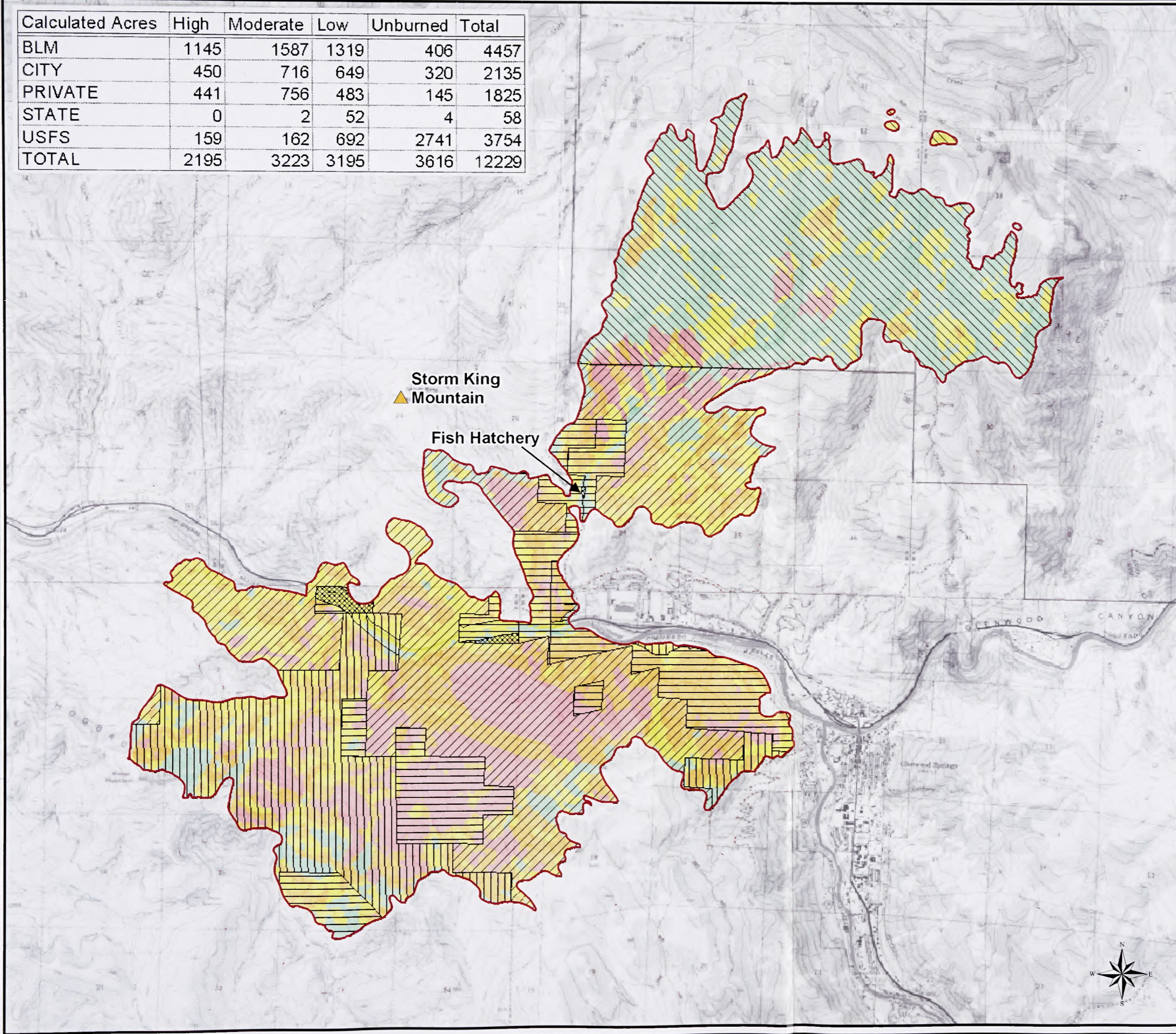


Garfield County





Calculated Acres	High	Moderate	Low	Unburned	Total
BLM	1145	1587	1319	406	4457
CITY	450	716	649	320	2135
PRIVATE	441	756	483	145	1825
STATE	0	2	52	4	58
USFS	159	162	692	2741	3754
TOTAL	2195	3223	3195	3616	12229



Coal Seam Fire

Burn Severity and Ownership

Fire Perimeter

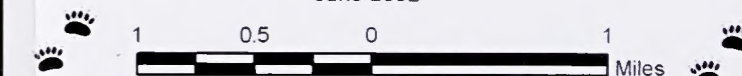
Burn Severity by Ownership

High 2195 Acres
 Moderate 3223 Acres
 Low 3195 Acres
 Unburned 3616 Acres

Ownership Classes

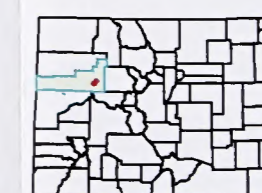
BLM 4457 Acres
 USFS 3754 Acres
 STATE 58 Acres
 CITY 2135 Acres
 PRIVATE 1825 Acres

June 2002



The data represented in this map were gathered from multiple sources which may vary in accuracy, scale and date. This map is for display purposes only.

Locator Maps

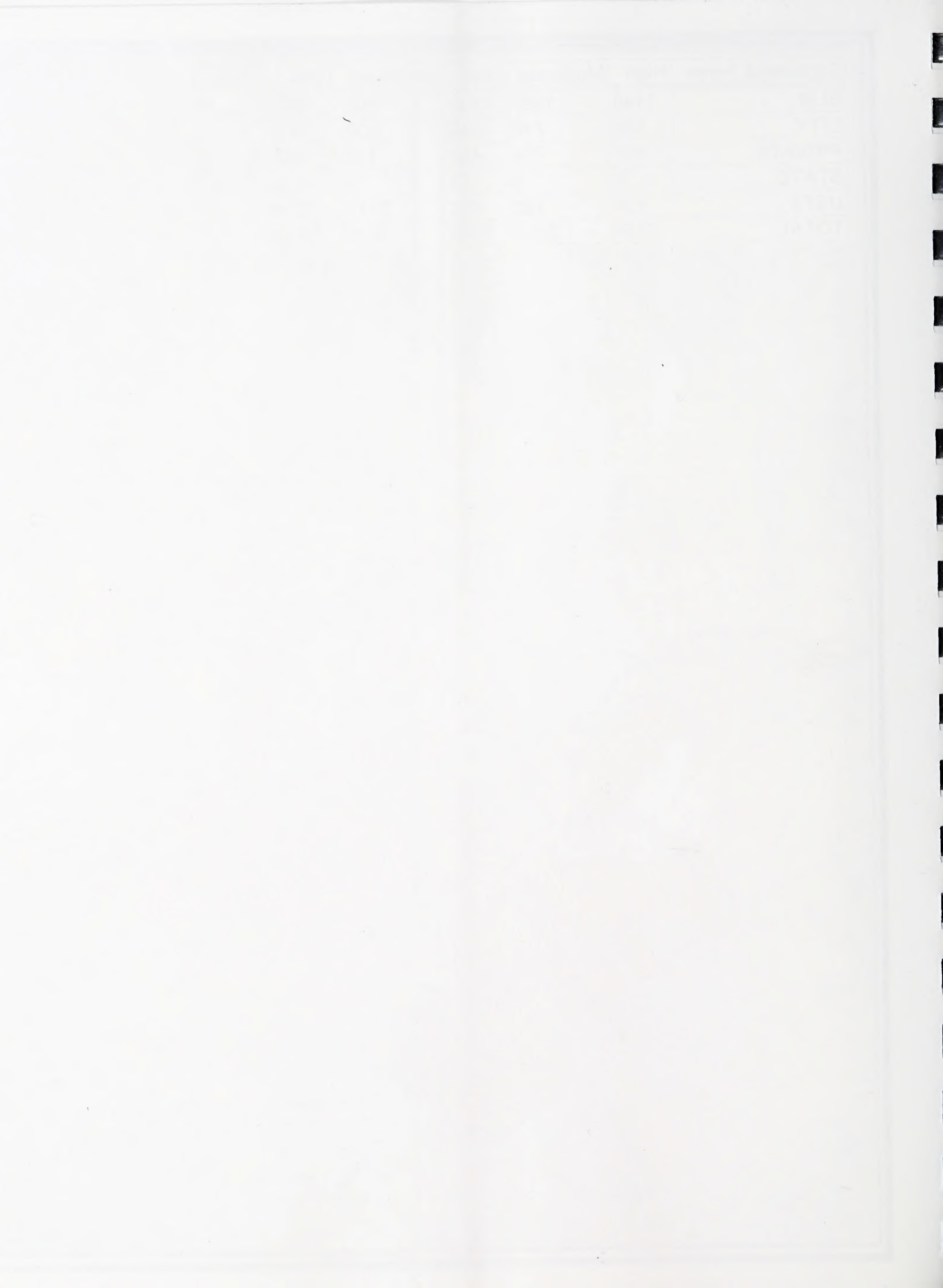


Colorado

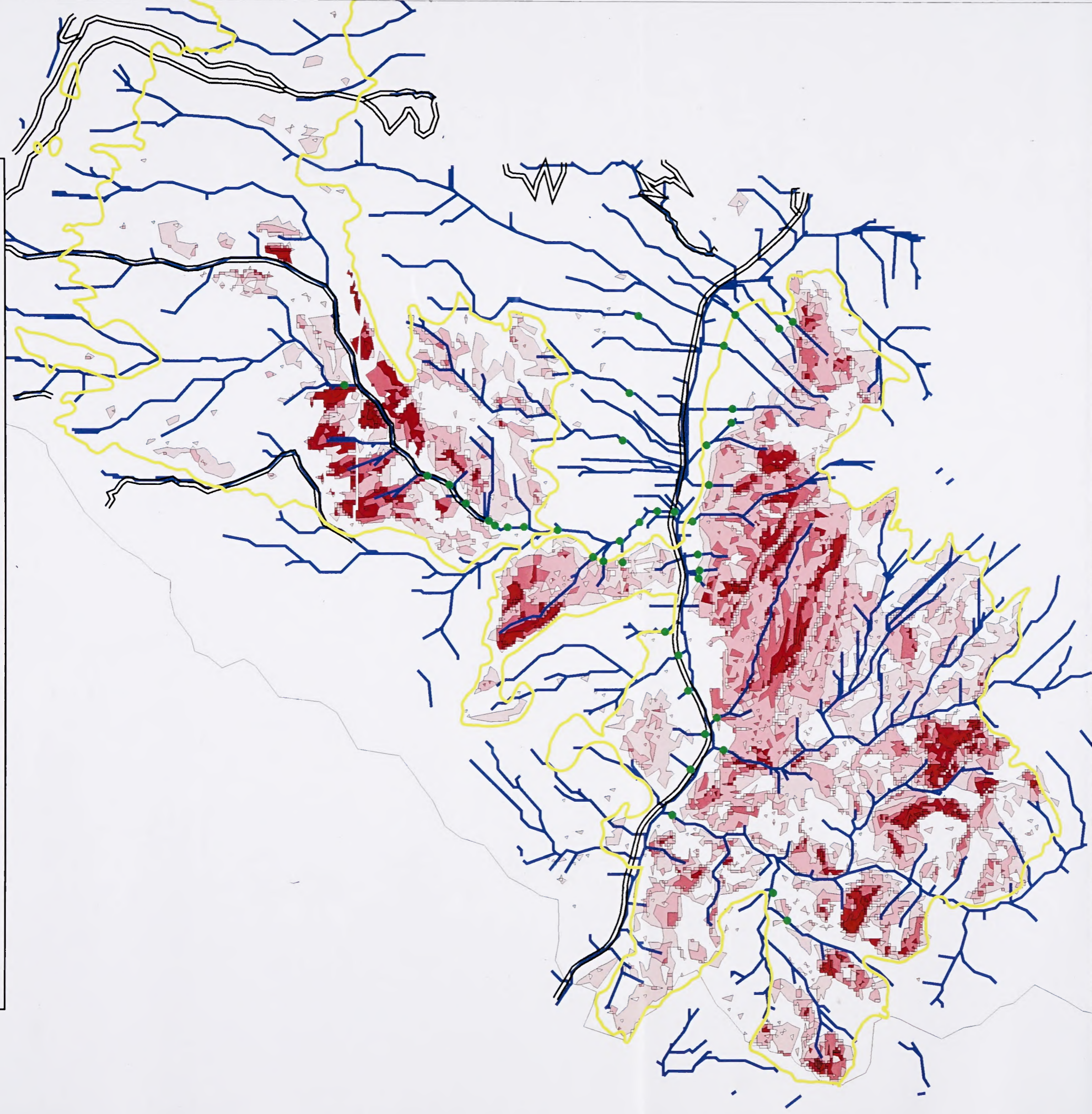


Garfield County





Erosion Potential Map Pre and Post Fire Change in Erosion* Coal Seam Fire White River NF, June 2002

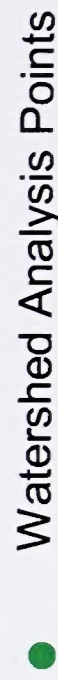
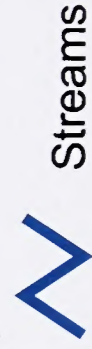
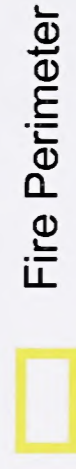


Change in Erosion Potential

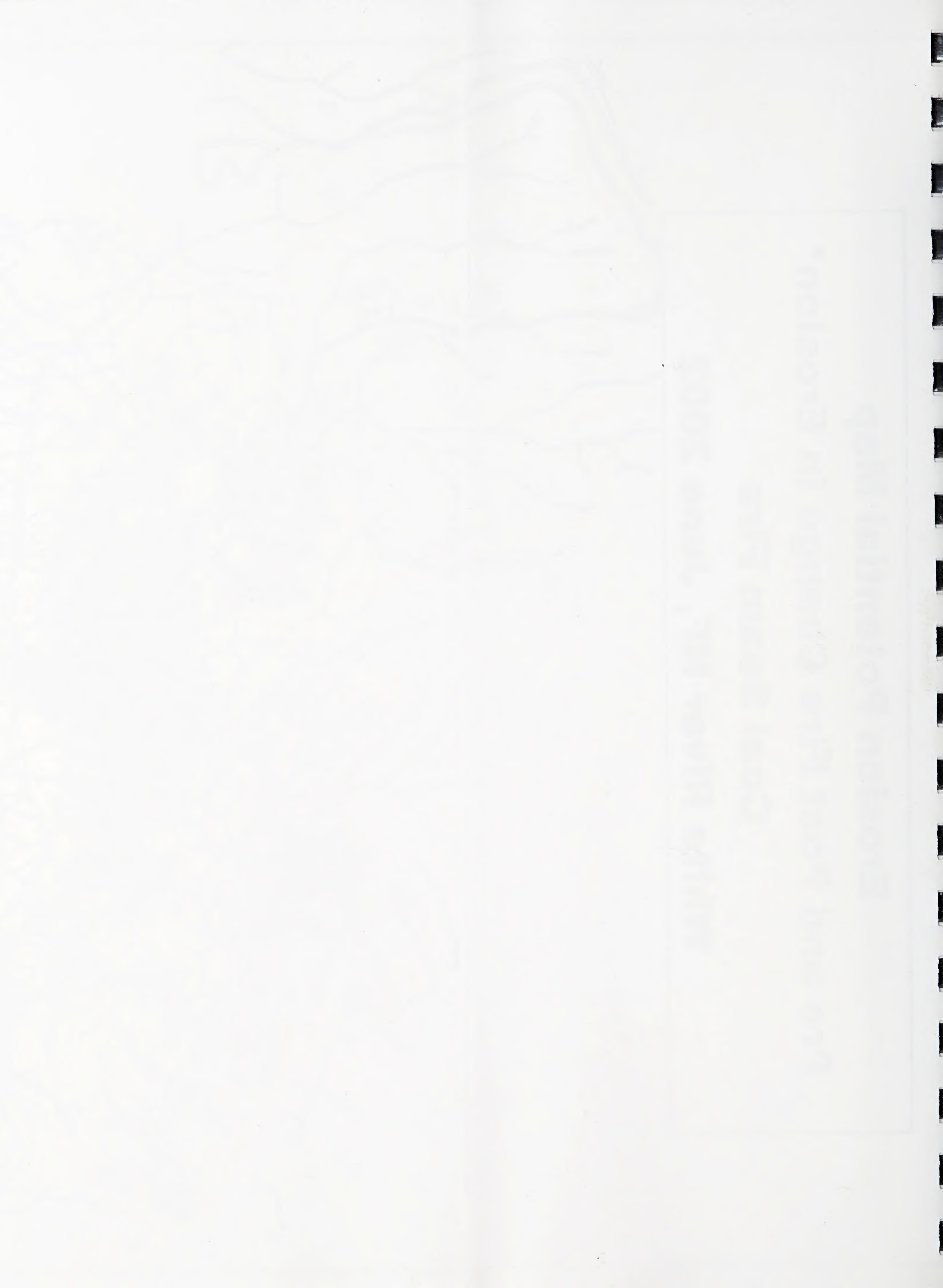
(tons/acre)



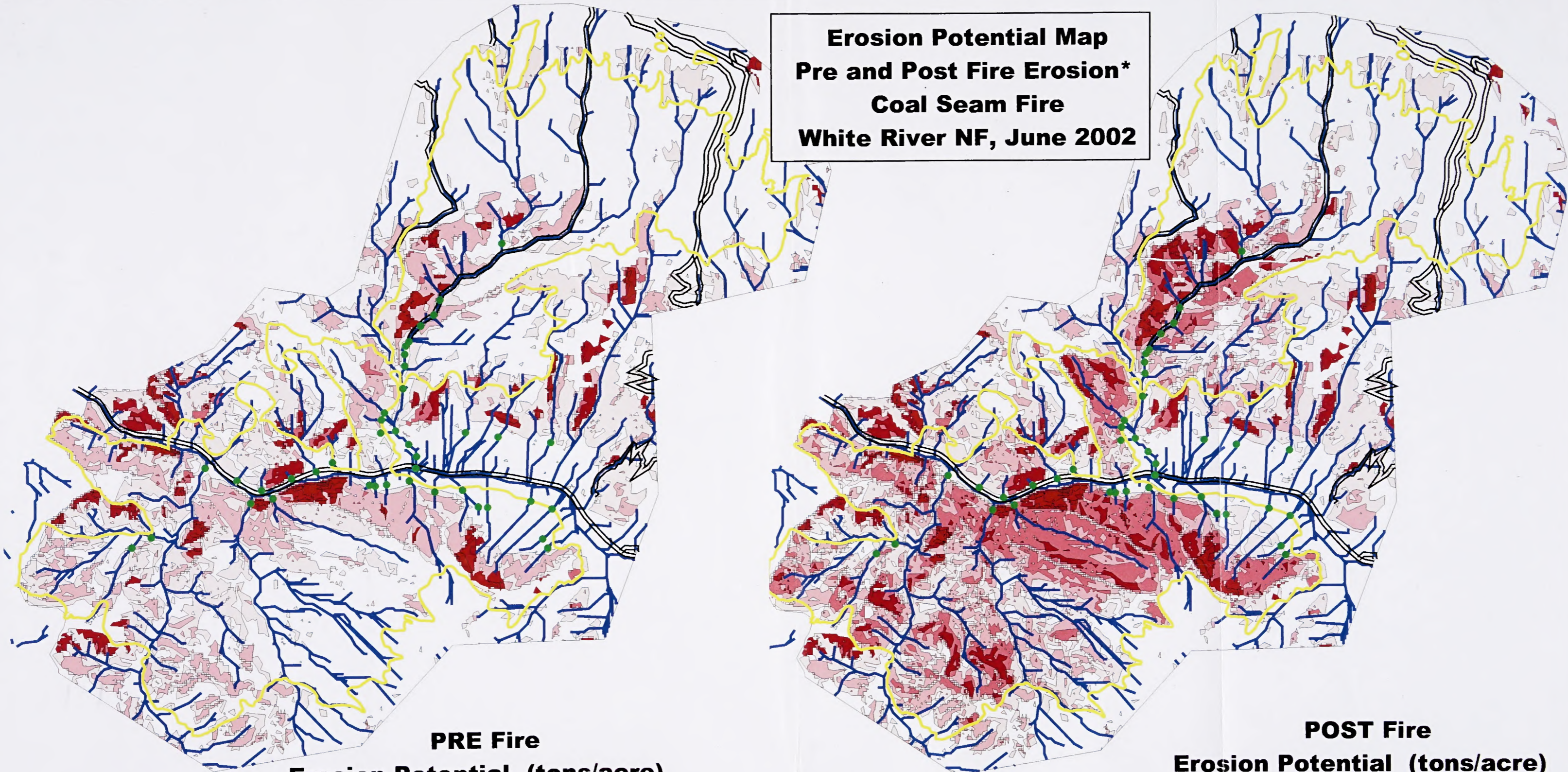
Scale 1:48,000



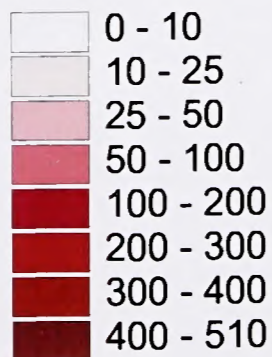
*Modeled for a 10 yr/1 hr storm (1.05"/hr)



**Erosion Potential Map
Pre and Post Fire Erosion*
Coal Seam Fire
White River NF, June 2002**



**PRE Fire
Erosion Potential (tons/acre)**



Scale 1:65,000

0 1 2 Miles

Fire Perimeter

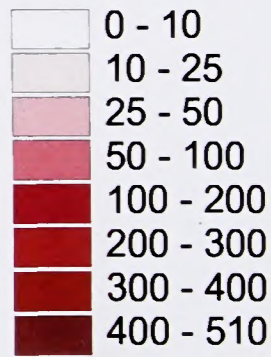
Streams

Roads

Watershed Analysis Points

*Modeled for a 10 yr/1 hr storm (1.05"/hr)

**POST Fire
Erosion Potential (tons/acre)**

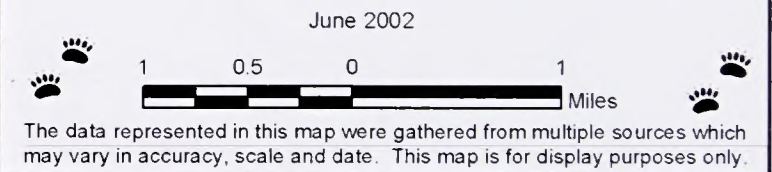


Coal Seam Fire

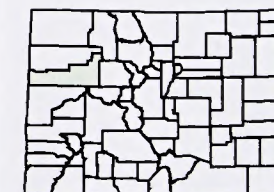
Potential Peak Flow and Sediment Delivery

-  Fire Perimeter
-  Watershed Boundary
-  Watershed Area
-  Analysis Streams
-  Interstates
-  State Highways
-  Water

Watershed identification numbers correspond to attached table with flow and sediment statistics.



Locator Maps



Colorado



Garfield County









Potential Peak Flow and Sediment Delivery by Watershed – Refer to attached map

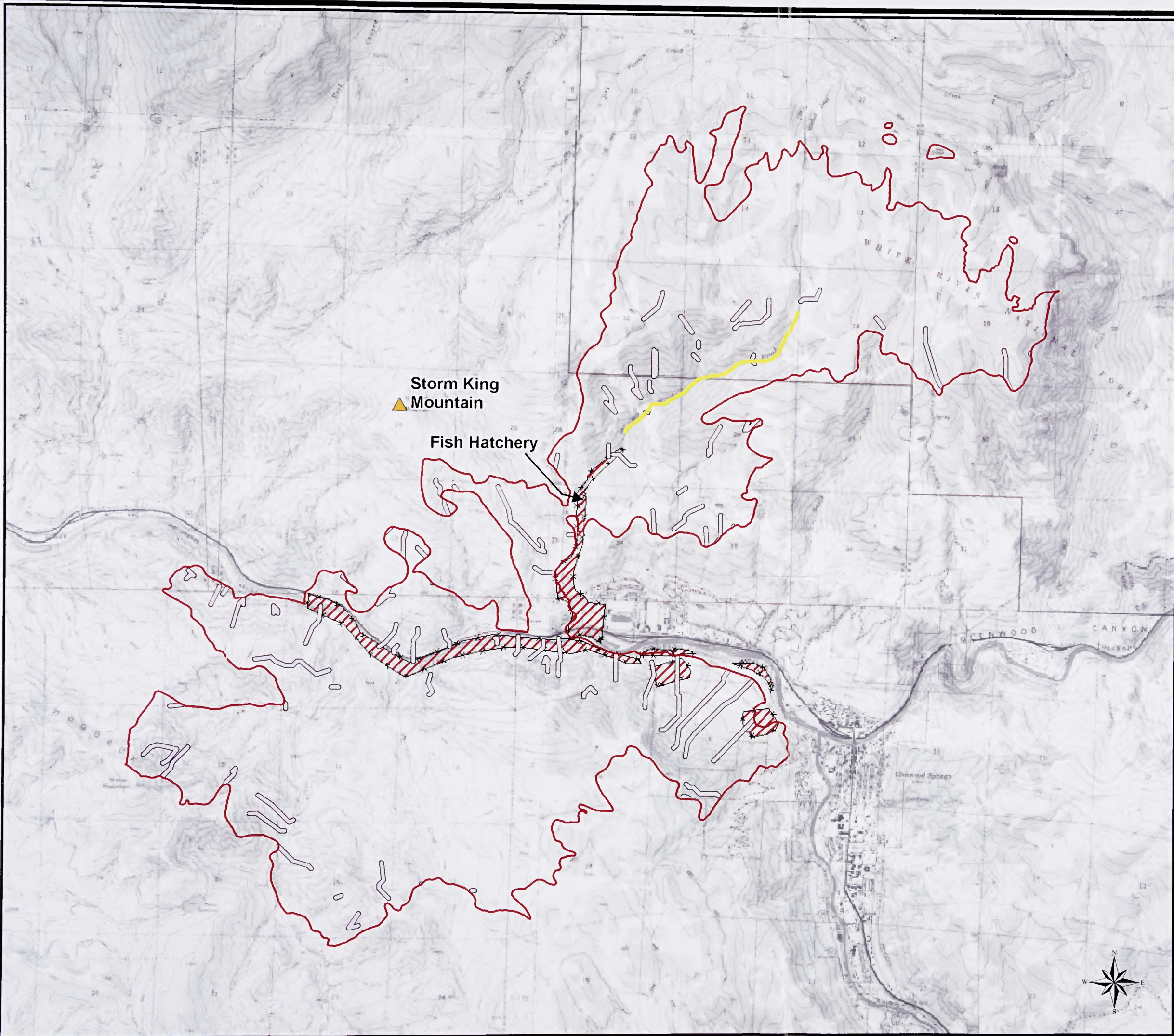
ID	Point_name	Acres	High Severity	Moderate Severity	Low Severity	Burned	Unburned	Pre-Fire 2yr1hr Discharge (cfs)	Post-Fire 2yr1hr Discharge (cfs)	2yr1hr Bulk Flow (cfs)	Potential Sediment Delivery Form Debris Flow Source Areas yd ³
1	Mitchell Creek at Highway 70	7225	6%	11%	8%	25%	75%	1,501	1,692	1,885	121,535
2	Donegan Bridge	7181	6%	11%	8%	25%	75%	1,488	1,678	1,870	121,535
3	Barn/Diversion Structure	7159	6%	11%	8%	25%	75%	1,481	1,671	1,862	121,535
4	Structure 2	132	44%	6%	39%	88%	12%	32	46	65	22,283
5	Maroon Basin	35	2%	47%	50%	99%	1%	9	11	15	5,675
6	Structure 1	6871	6%	11%	7%	23%	77%	1,409	1,575	1,742	93,571
7	Bridge Below Hatchery	4119	9%	15%	7%	31%	69%	836	976	1,122	79,134
8	Hatchery	4107	9%	15%	7%	31%	69%	834	973	1,119	79,134
9	Hatchery Spring House	4082	9%	14%	7%	31%	69%	828	966	1,110	79,134
10	Mitchell Road Low Point	4071	9%	14%	7%	30%	70%	825	961	1,104	79,134
11	Bridge at Unburned House	3889	9%	14%	5%	28%	72%	782	905	1,034	79,134
12	Bridge at Upper House	3792	9%	13%	4%	26%	74%	754	869	988	68,931
13	South Basin I	120	25%	14%	61%	100%	0%	32	43	59	14,072
14	Community Cntr A	56	28%	5%	67%	100%	0%	15	20	27	8
15	Community Cntr B	35	43%	0%	57%	100%	0%	9	13	18	
16	South Basin H	509	73%	1%	26%	100%	0%	118	191	300	5,893
17	South Basin K	2599	25%	10%	21%	56%	44%	500	716	909	1,485
18	South Canyon	5744	7%	16%	11%	35%	65%	1,233	1,422	1,644	105,896
19	North Basin D	28	18%	26%	56%	100%	0%	7	9	13	6,375
20	North Basin A	30	18%	18%	64%	100%	0%	7	10	14	7,975
21	North Basin B	512	0%	46%	2%	48%	52%	123	133	164	16,231
22	North Basin C	429	0%	9%	1%	10%	90%	93	96	100	
23	Oasis Creek	129	1%	57%	27%	85%	15%	29	37	49	11,474
24	North Basin G	483	1%	44%	27%	72%	28%	108	135	173	34,246
25	Lower Native Cutthroat	3743	9%	13%	4%	26%	74%	739	851	964	68,922
26	Upper Native Cutthroat	1514	2%	12%	2%	16%	84%	289	312	336	28,776
27	Landfill Fil Slope	792	3%	48%	20%	71%	29%	195	230	299	34,421
28	Landfill Tributary	185	7%	27%	26%	61%	39%	43	54	67	5,421
29	Gregory Park Bridge	7220	6%	11%	8%	25%	75%	1,499	1,690	1,883	121,535
30	South Basin A	55	2%	40%	40%	81%	19%	17	18	24	26,372
31	South Basin B	79	1%	23%	71%	94%	6%	20	26	33	23,152
32	Operation Cntr A	51	1%	39%	60%	100%	0%	17	18	24	16,098
33	Operation Cntr B	40	1%	18%	81%	100%	0%	11	14	17	2,464
34	South Basin C	22	49%	0%	50%	100%	0%	6	8	12	6,672
35	South Basin D	350	19%	2%	34%	55%	45%	83	104	125	5,169
36	South Basin E	27	5%	5%	90%	100%	0%	8	10	12	7,278
37	South Basin F	42	33%	13%	55%	100%	0%	13	15	22	5,250
38	South Basin G	21	28%	0%	72%	100%	0%	6	8	10	4,308
39	Structure 3	14	14%	10%	76%	100%	0%	3	5	6	
40	North Basin E	26	3%	26%	70%	99%	1%	8	9	11	4,315
41	North Basin F	83	0%	69%	1%	70%	30%	20	22	29	



Coal Seam Fire

Potential Debris/Flood Flow Areas with Fish Habitat

-  Fire Perimeter
-  Native Cutthroat Trout Habitat
-  Potential Debris Flow Source Area
-  Flood Zones

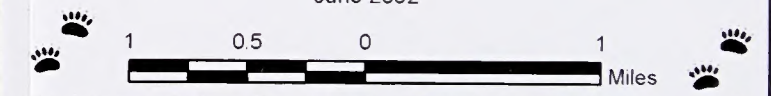


Storm King Mountain

Fish Hatchery

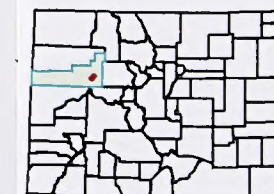
GREENWOOD CANYON

June 2002



The data represented in this map were gathered from multiple sources which may vary in accuracy, scale and date. This map is for display purposes only.

Locator Maps



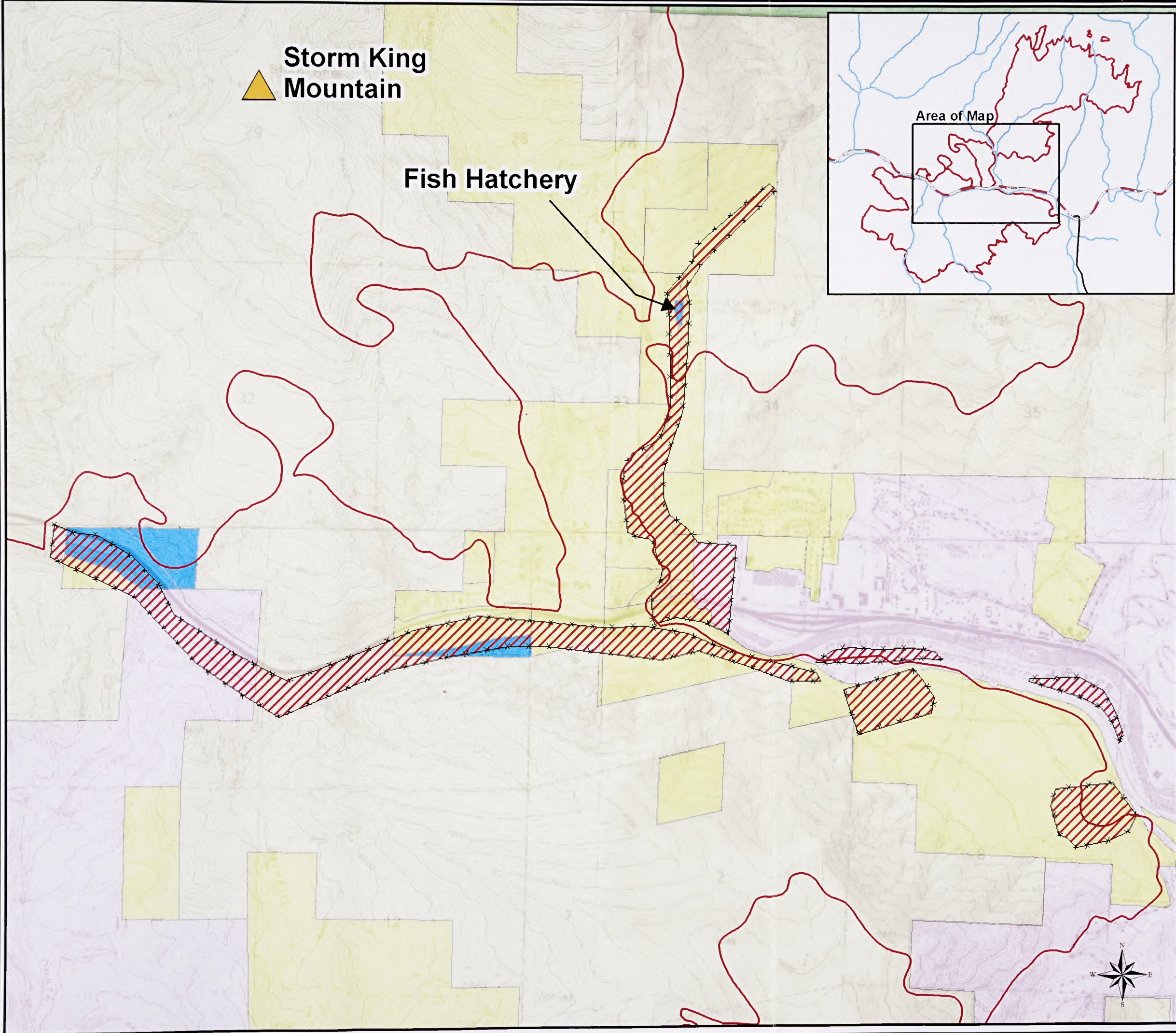
Colorado



Garfield County



Coal Seam Fire



Flood Danger Zones

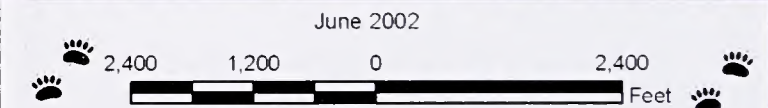
- Fire Perimeter
- Flood Zone

Ownership Class

- BLM
- USFS
- STATE
- CITY
- PRIVATE

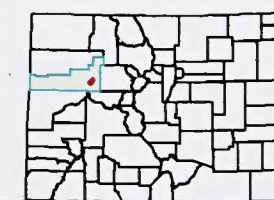
Flood Zone Acreage by Owner

BLM	35
City	89
Private	267
State	32



The data represented in this map were gathered from multiple sources which may vary in accuracy, scale and date. This map is for display purposes only.

Locator Maps



Colorado








Garfield County








Coal Seam Fire









Channel & Structure Treatments

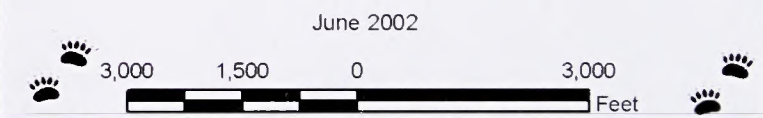
-  Fire Perimeter
-  Remote Automated Weather (R.A.W.) Stations
-  Hazard Trees (with number in stand)
-  Flood Warning Sign
-  Hazard Trees along road

Structures at Risk

-  High
-  Moderate
-  Low

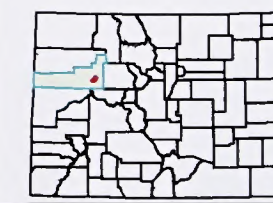
Treatments

-  Breach ditch
-  Channel clearing
-  Clean debris
-  Diversion channel
-  Jersey barrier
-  Sandbags
-  Concrete wall
-  Jersey barrier and sandbags



The data represented in this map were gathered from multiple sources which may vary in accuracy, scale and date. This map is for display purposes only.

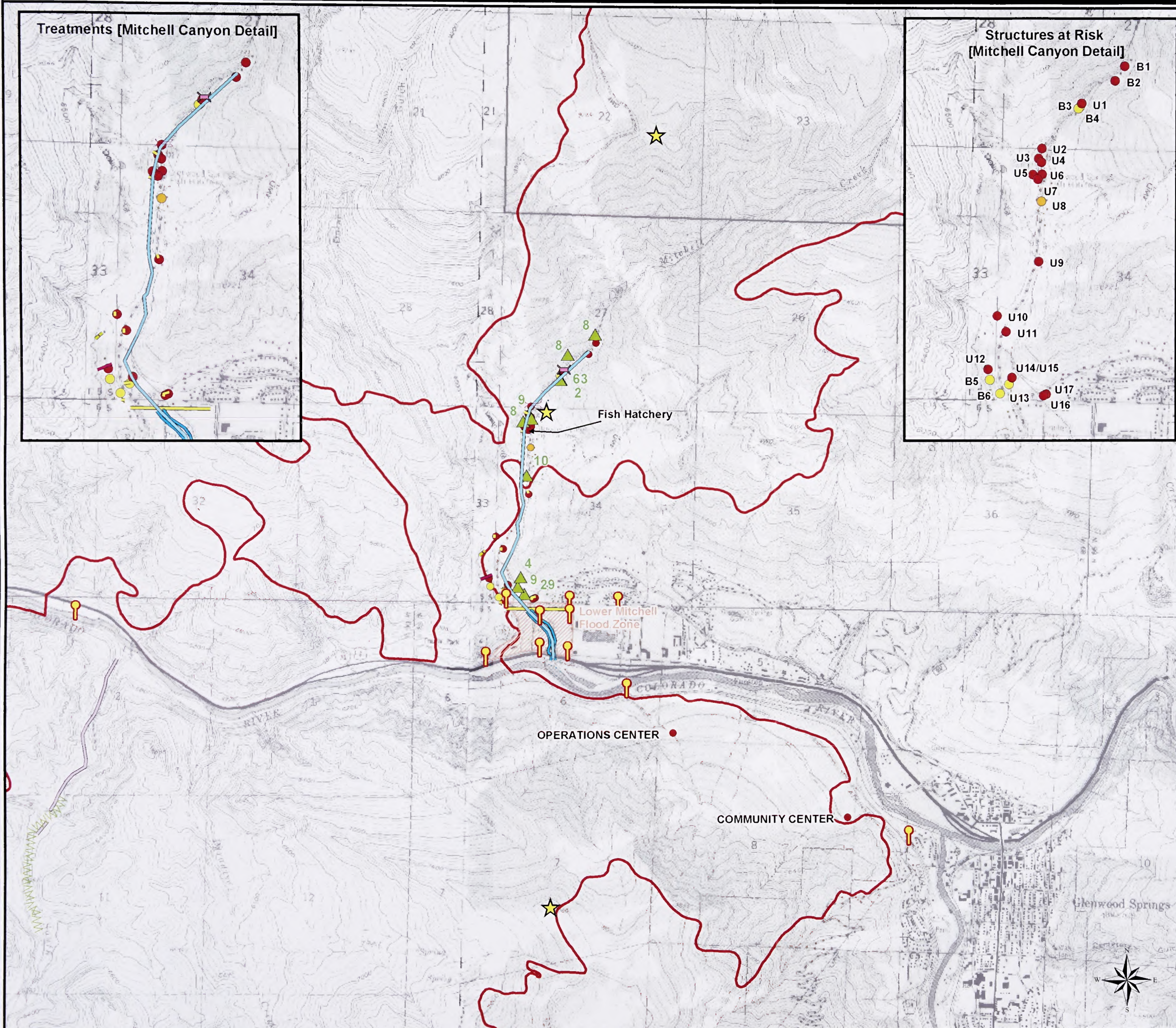
Locator Maps



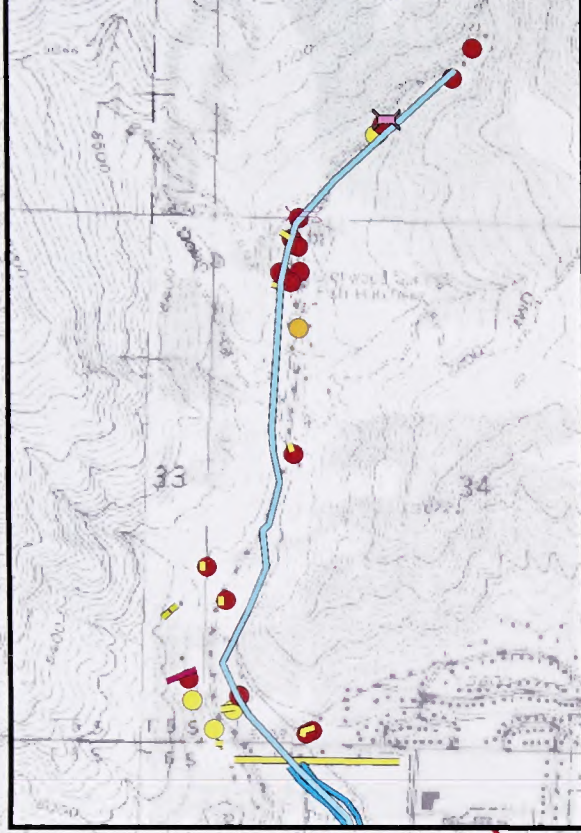
Colorado



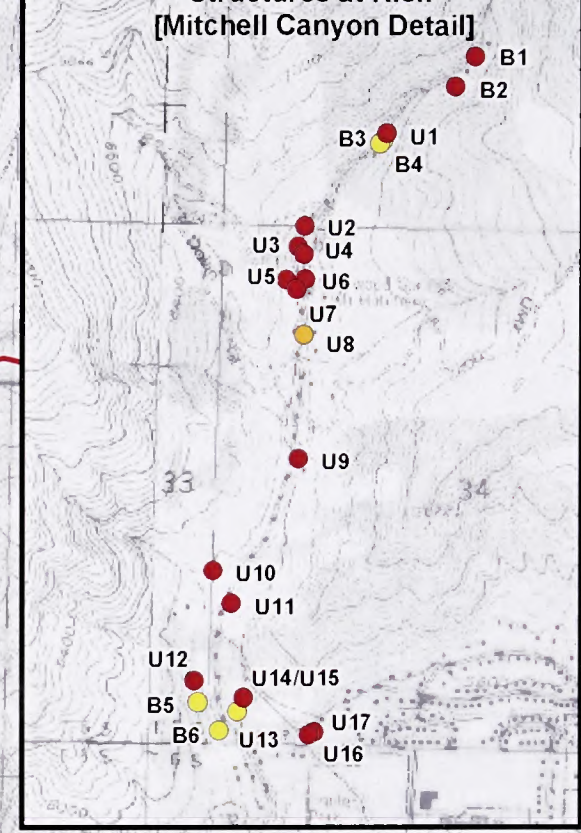
Garfield County



Treatments [Mitchell Canyon Detail]










Structures at Risk [Mitchell Canyon Detail]

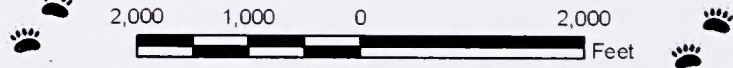


Coal Seam Fire

Hillslope Treatments

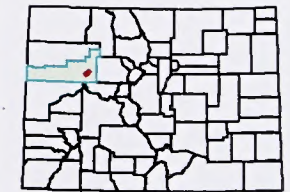

-  Fire Perimeter
- Treatment**
-  Hydromulch w/seed mix
-  Straw mulch by hand crew
-  Soil Netting
-  Straw Waddles
-  Major Streams
-  Interstates

June 2002

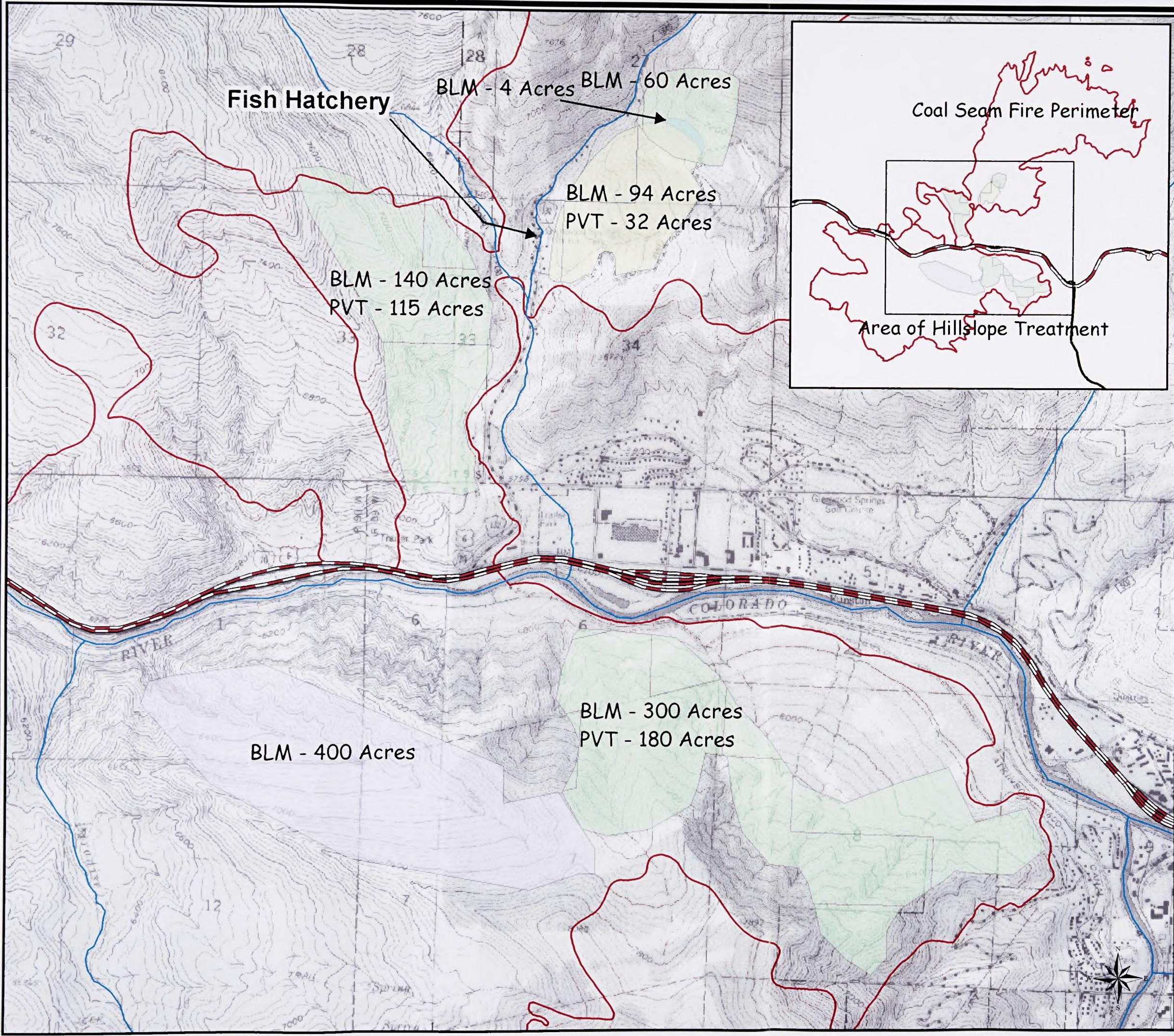


The data represented in this map were gathered from multiple sources which may vary in accuracy, scale and date. This map is for display purposes only.

Locator Maps

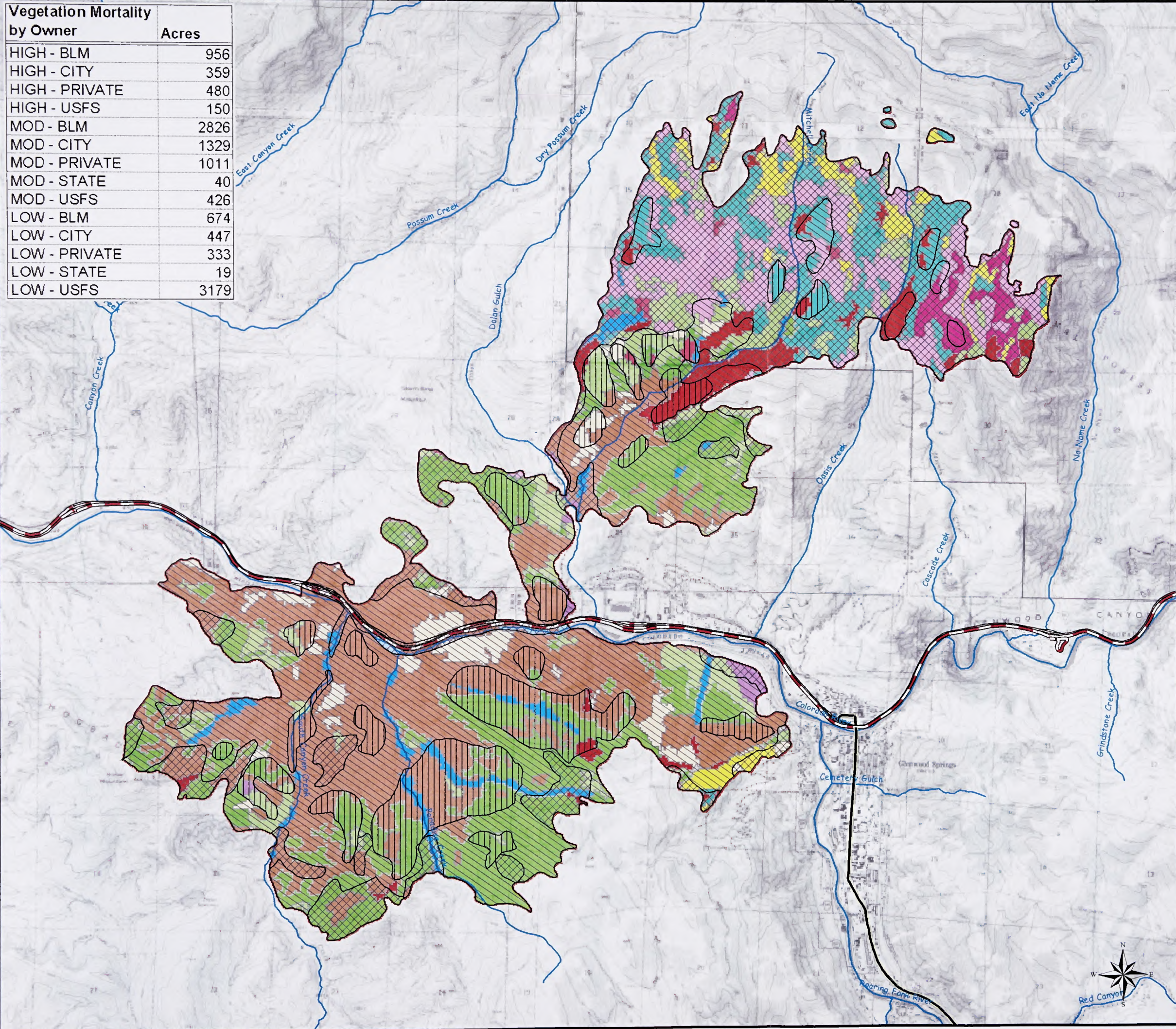



Colorado Garfield County

Coal Seam Fire

Vegetation Mortality by Owner	Acres
HIGH - BLM	956
HIGH - CITY	359
HIGH - PRIVATE	480
HIGH - USFS	150
MOD - BLM	2826
MOD - CITY	1329
MOD - PRIVATE	1011
MOD - STATE	40
MOD - USFS	426
LOW - BLM	674
LOW - CITY	447
LOW - PRIVATE	333
LOW - STATE	19
LOW - USFS	3179



Vegetation Mortality

- Fire Perimeter
- Interstates
- State Highways
- Major Streams

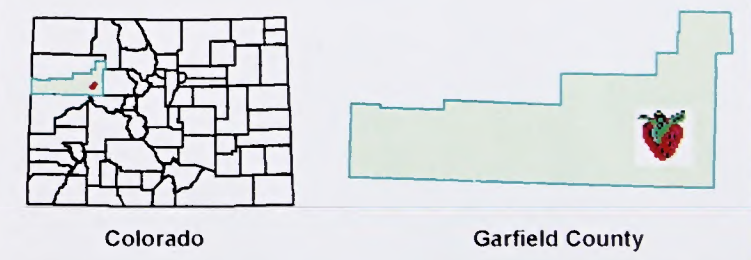
Vegetation Mortality		
	High	61 - 100% 1,945 Acres
	Moderate	31 - 60% 5,632 Acres
	Low	0 - 30% 4,652 Acres

- ### Vegetation Types
- Aspen
 - Aspen w/Conifer
 - Aspen/Mesic Mountain Shrub
 - Barren
 - Gambel Oak
 - Grass
 - Mixed Con/Aspen
 - Pinyon Juniper
 - Riparian
 - Sage
 - Spruce
 - Urban
 - Water

June 2002

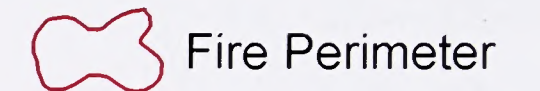
The data represented in this map were gathered from multiple sources which may vary in accuracy, scale and date. This map is for display purposes only.

Locator Maps



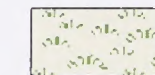
Coal Seam Fire

Vegetation Treatments



Fire Perimeter

Noxious Weeds



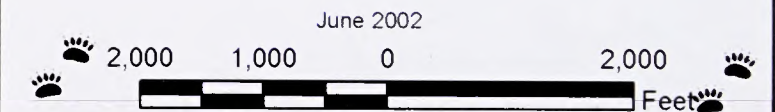
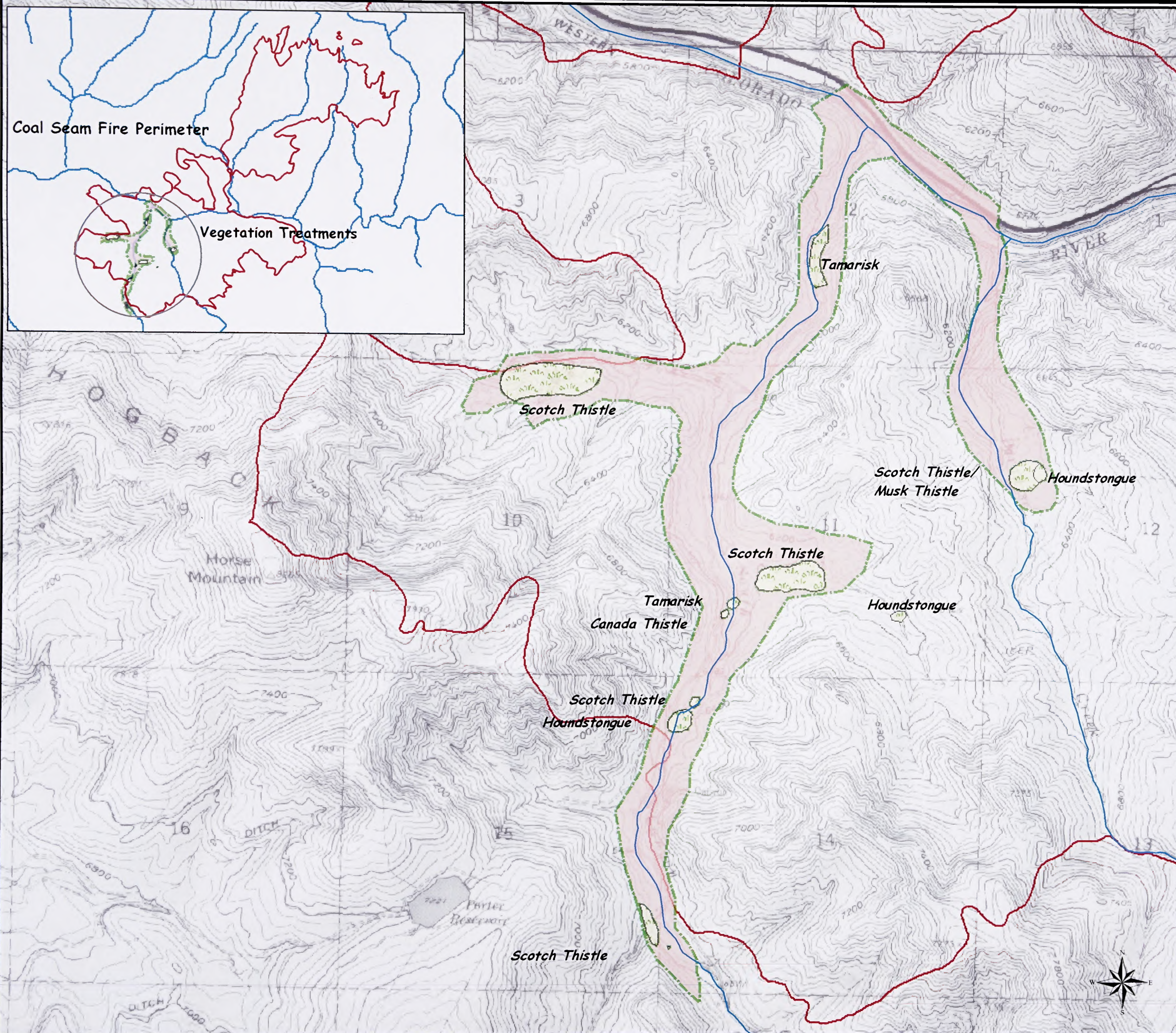
Existing



Potential

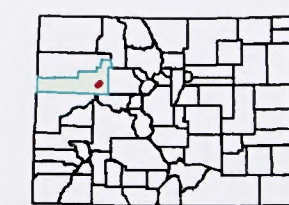


Streams

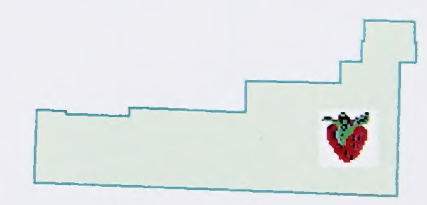


The data represented in this map were gathered from multiple sources which may vary in accuracy, scale and date. This map is for display purposes only.

Locator Maps



Colorado

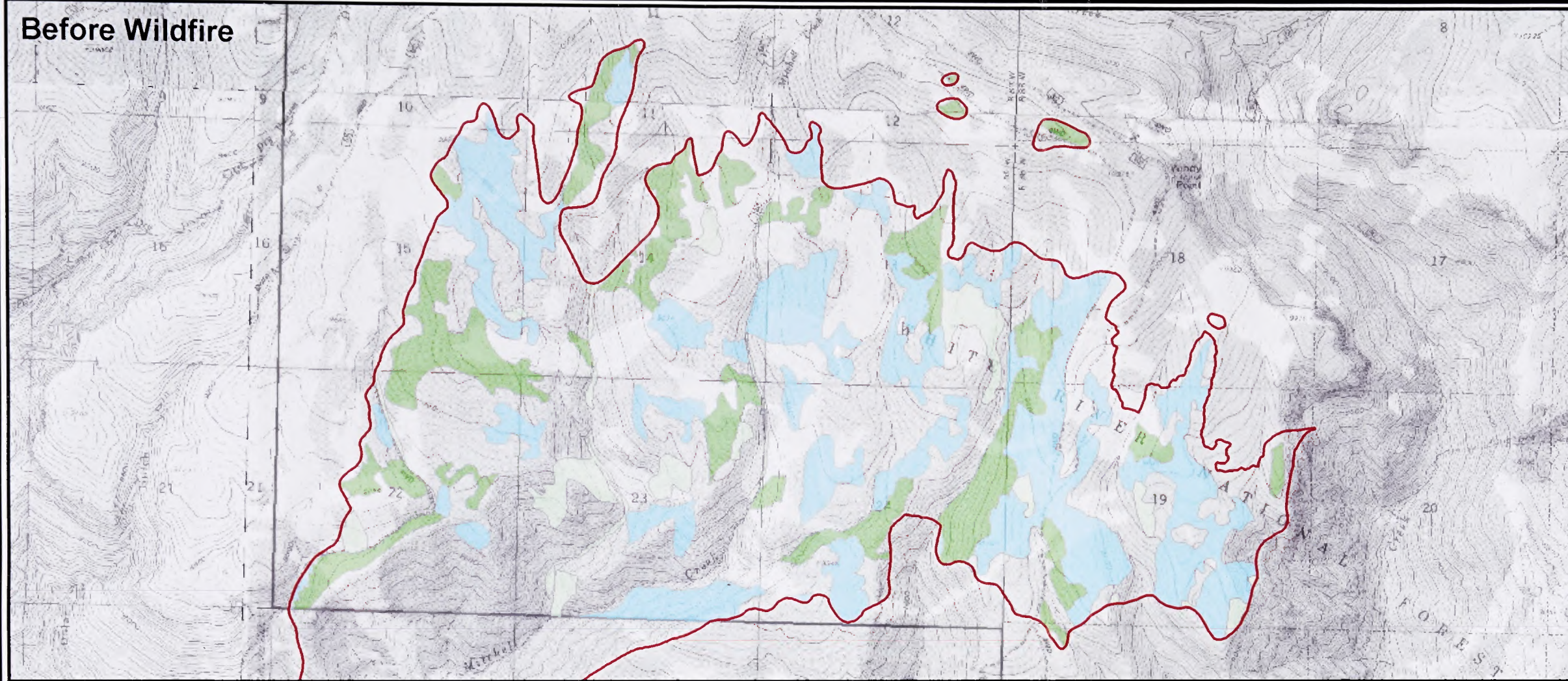


Garfield County

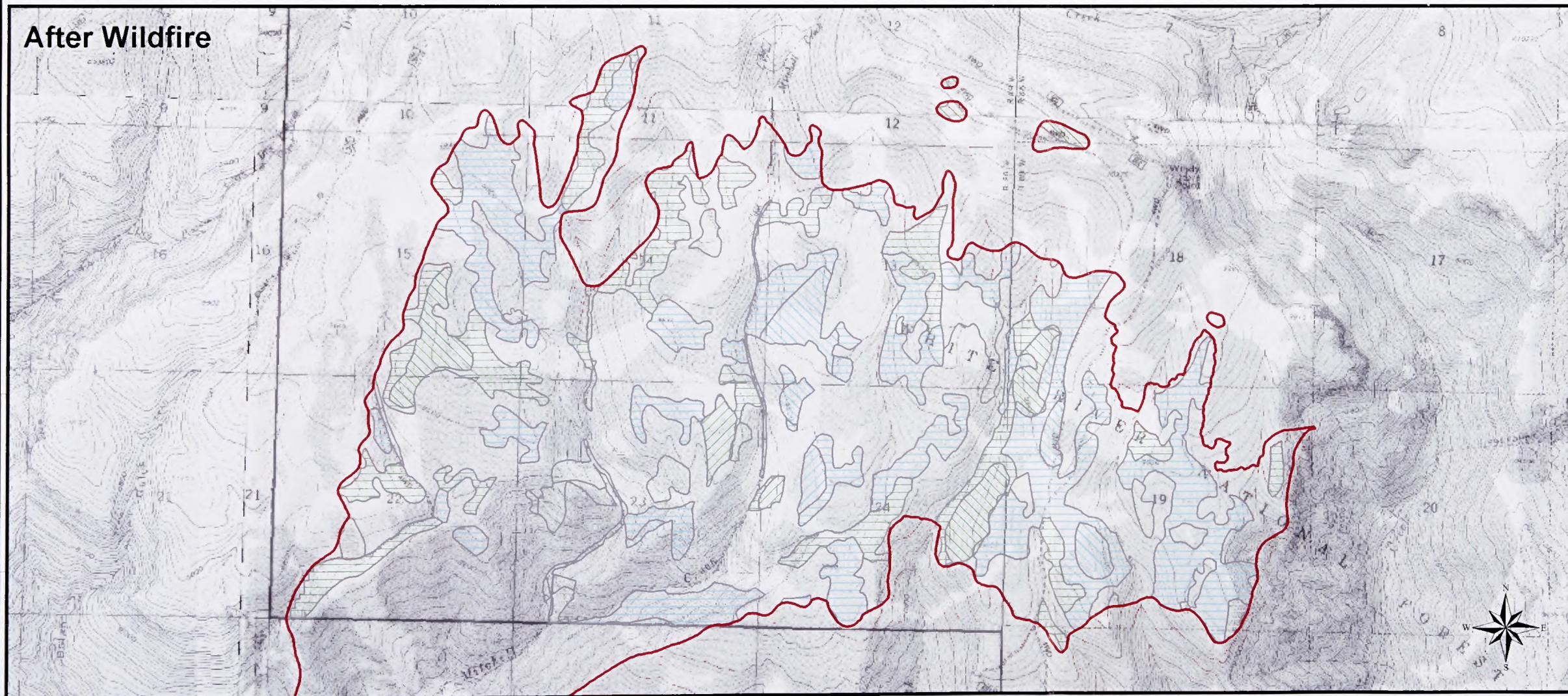




Before Wildfire



After Wildfire



Coal Seam Fire

Lynx Habitat Change

Fire Perimeter

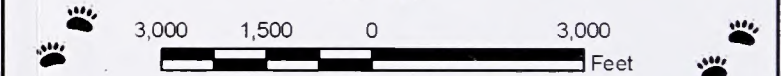
Habitat

	Denning	531 Acres
	Winter	917 Acres
	Other	159 Acres
	NonHabitat	2148 Acres

Habitat by Vegetation Mortality

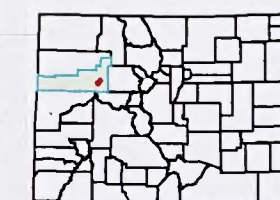
	HIGH	61 - 100%
	MOD	31 - 60%
	LOW	0 - 30%
	Denning - HIGH	25 Acres
	Denning - MOD	109 Acres
	Denning - LOW	397 Acres
	Winter - HIGH	13 Acres
	Winter - MOD	93 Acres
	Winter - LOW	811 Acres
	Other - HIGH	2 Acres
	Other - MOD	25 Acres
	Other - LOW	132 Acres

June 2002



The data represented in this map were gathered from multiple sources which may vary in accuracy, scale and date. This map is for display purposes only.

Locator Maps



Colorado



Garfield County





PHOTO DOCUMENTATION



BURNING COAL SEAM



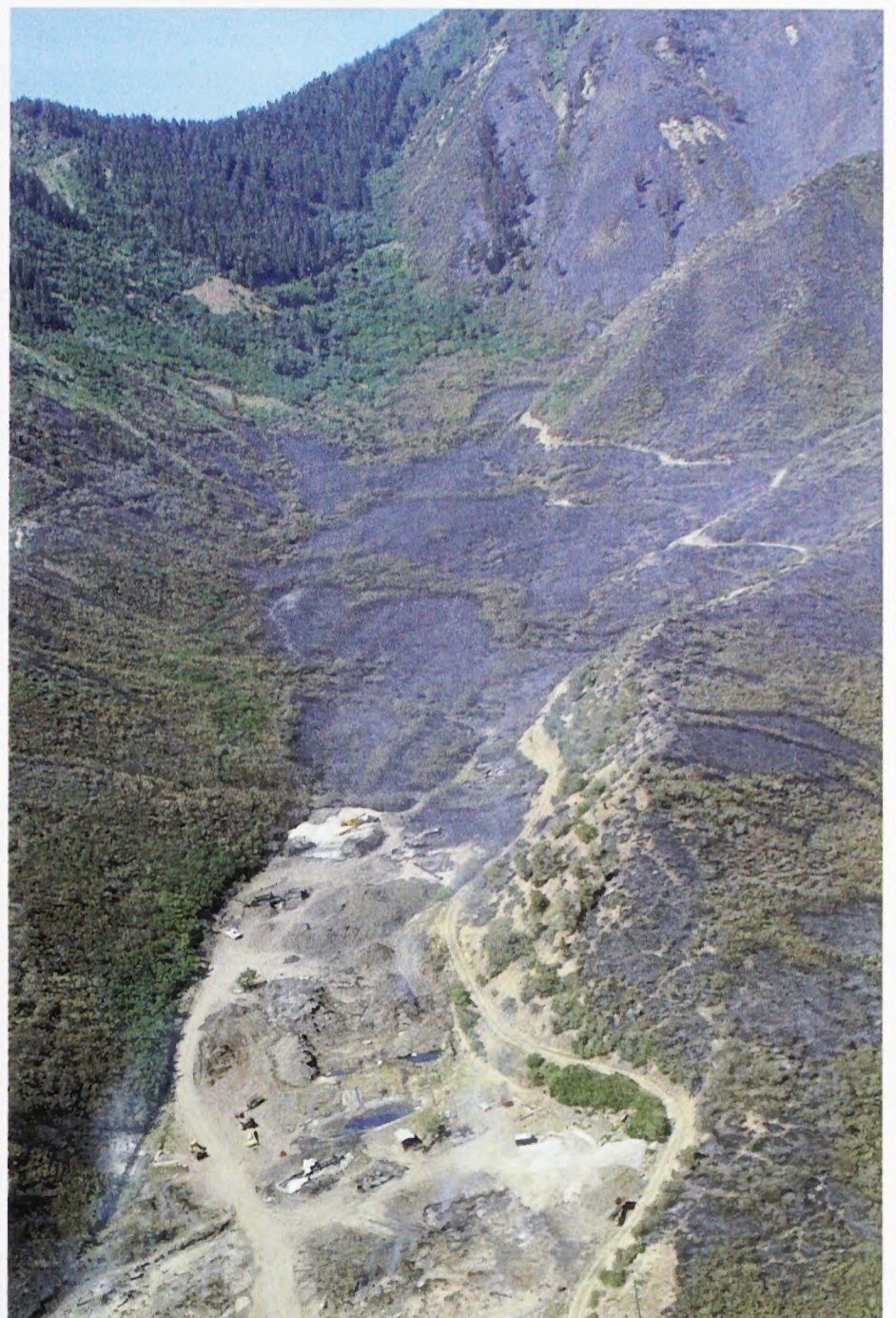
FIRE ORIGIN COAL SEAM



DUMP PONDS AND FILLS



GLENWOOD LANDFILL

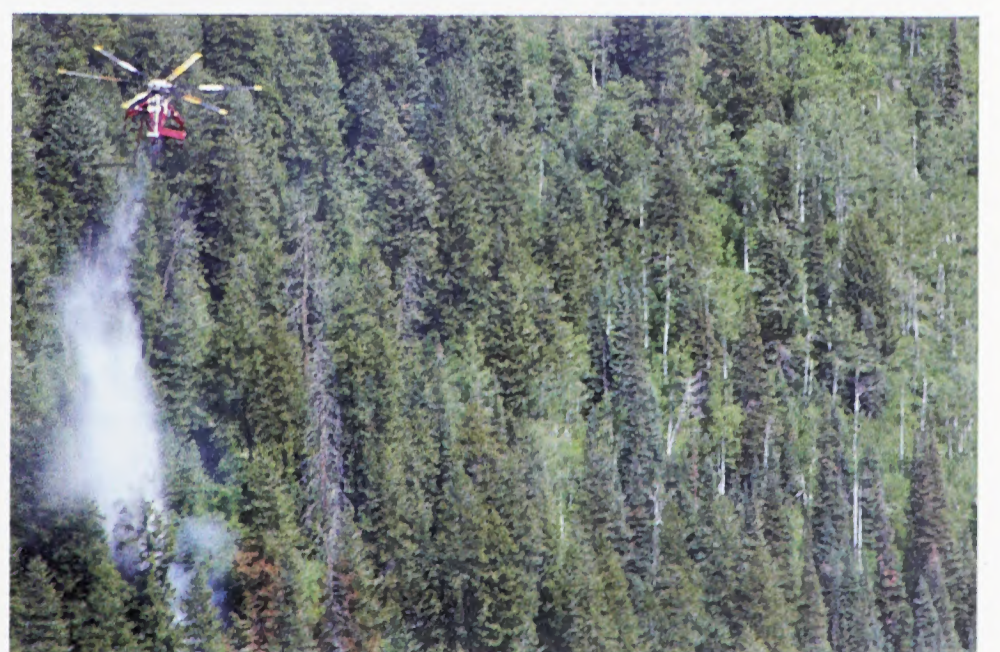


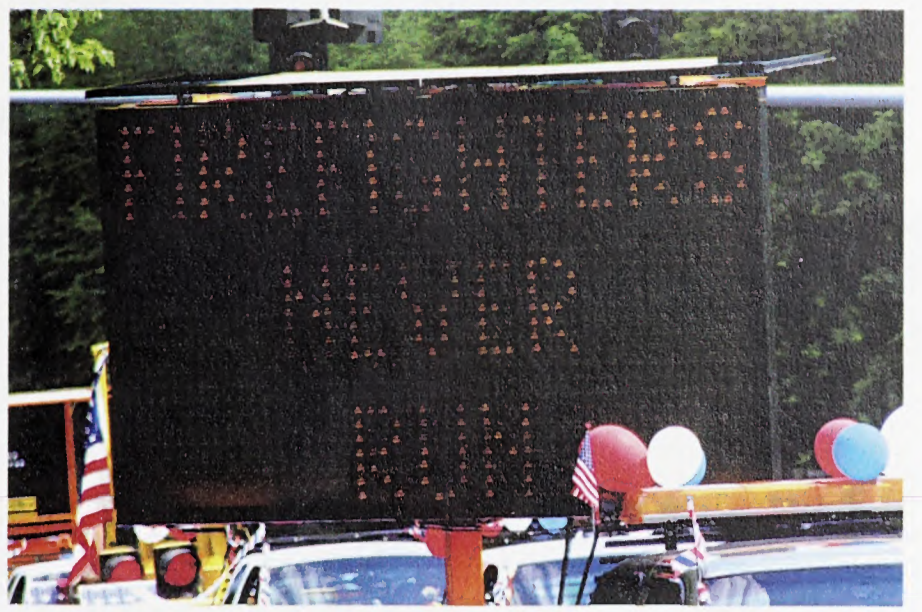
DUMP PONDS / DRAINAGE

PHOTO DOCUMENTATION

FIRE MOSAIC







REHABILITATION EFFORTS



DOZER LINE REHABILITATION



COMPLETED DOZER REHABILITATION

POWER LINE RECONSTRUCTION



FOREST ROAD MAINTENANCE

RAILROAD BED RECONSTRUCTION

SOIL & WATERSHED



PARADISE CREEK RIPARIAN AREA



MITCHELL CREEK



TRIBUTARY TO MITCHELL CREEK



BLM SLOPE ON EAST SIDE OF LOWER MITCHELL CR.



SOB WATERSHED



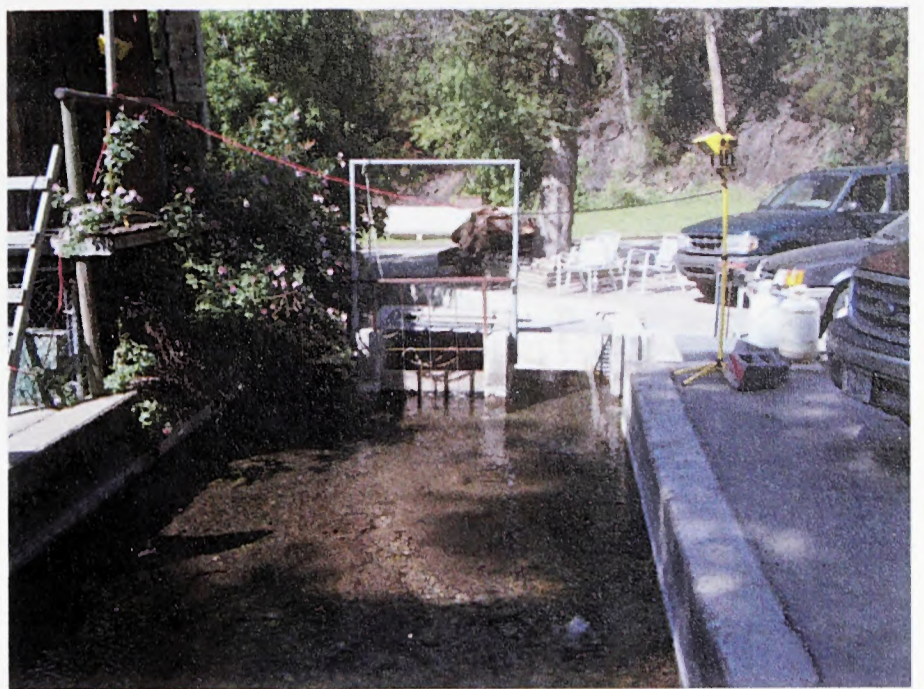
RED MOUNTAIN DEBRIS FLOW POTENTIAL AREAS



SOIL & WATERSHED



HATCHERY RESIDENCE ON MITCHELL CREEK



HATCHERY WEIR AND 30,000 GPM INTAKE



MITCHELL CREEK ROAD ABOVE HATCHERY – FLOOD FLOWS WILL BE CONVEYED DOWN THIS ROAD TO HATCHERY FACILITIES



RESIDENCE ON WEST SIDE OF MITCHELL CREEK ROAD – DEBRIS FLOWS COULD DAMAGE THIS HOUSE.



HATCHERY SPRING HOUSE



MITCHELL CREEK ROAD LOW POINT



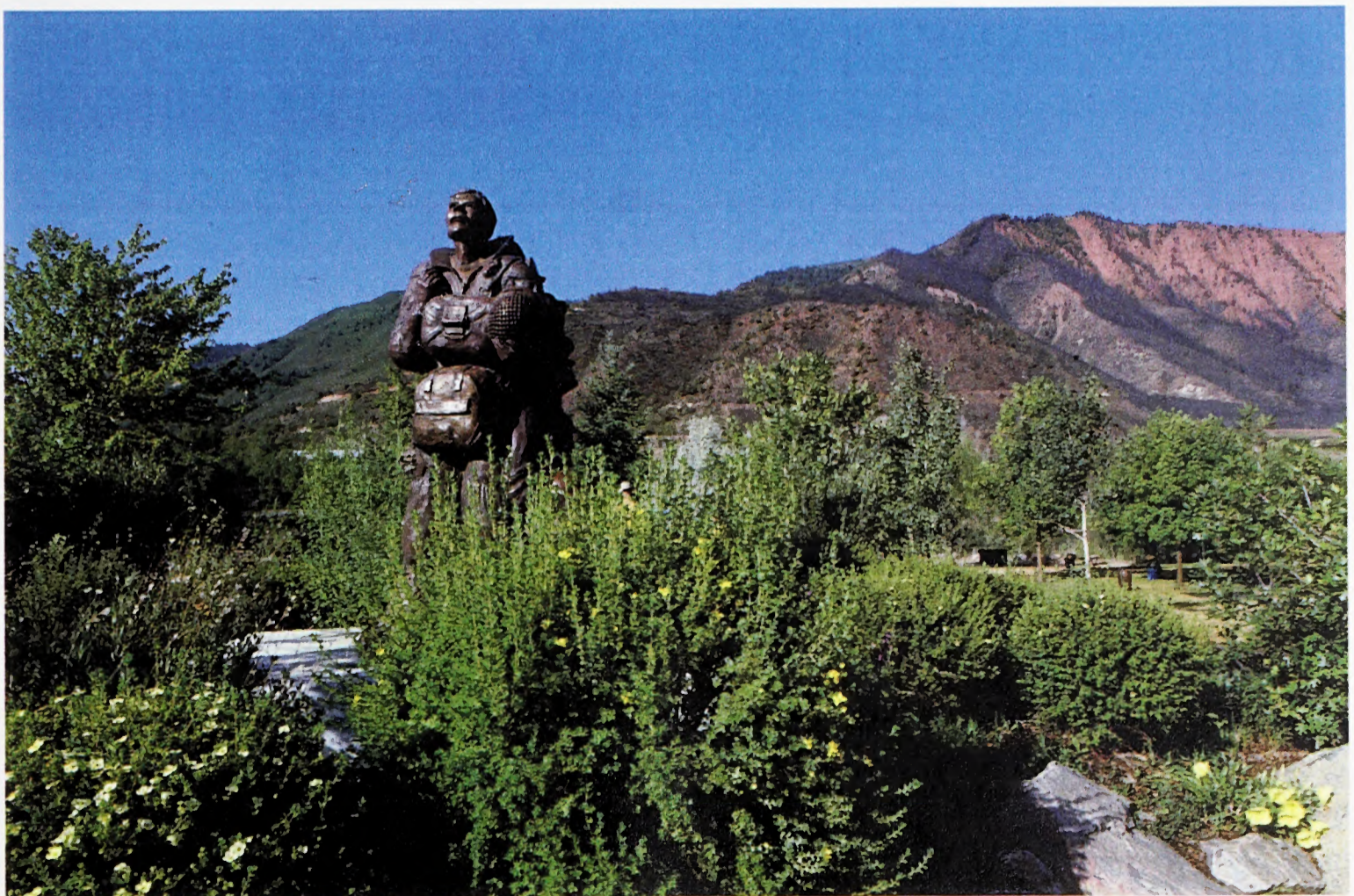
SOIL & WATERSHED



DONEGAN ROAD BRIDGE LOOKING WEST



FIELD WHERE DONEGAN ROAD FLOW WILL BE DIVERTED

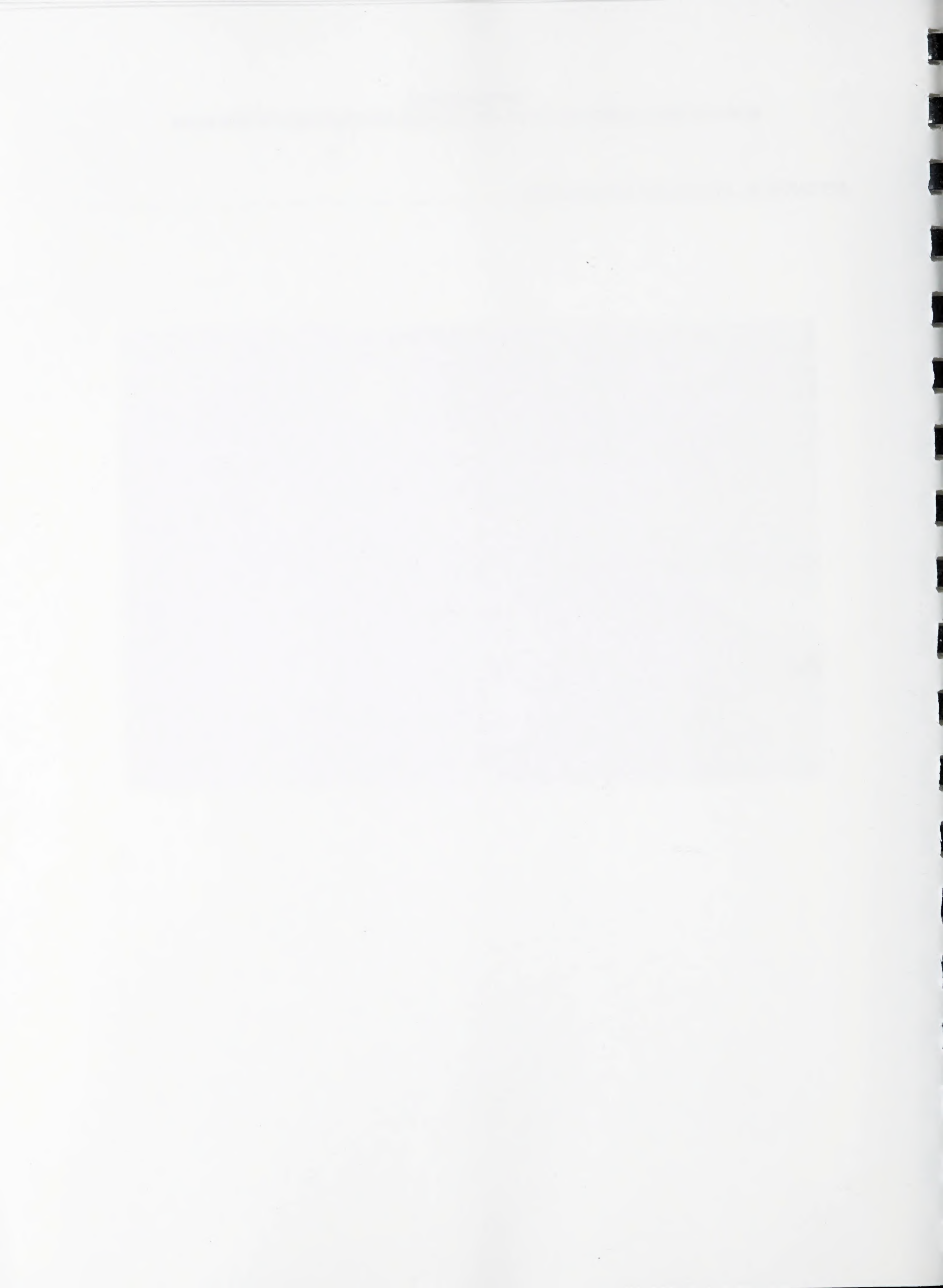




INTERAGENCY
BURNED AREA EMERGENCY STABILIZATION AND REHABILITATION PLAN

APPENDIX IV. PHOTO DOCUMENTATION





**INTERAGENCY
BURNED AREA EMERGENCY STABILIZATION AND REHABILITATION PLAN**

APPENDIX V. SUPPORTING DOCUMENTS

- **Cost Risk Analysis (Vegetation, Cultural, Watershed)**
- **FSH 2509.13 Burned Area Report.**
- **Coal Seam Fire Issues**
- **Noxious Weed survey form**
- **Exotic plant list**
- **Federally listed species list**
- **Emergency consultation memo**
- **BLM species list**
- **Emergency site inspection record**
- **RAWs price quotation**
- **Request for assistance to FEMA**
- **Request for funding to BLM**
- **Request for funding to USFS**
- **Funding memo from BLM**
- **Funding approval letter from BLM**
- **NRCS Trip report**
- **Rhino fact sheet**
- **CDOW memo on hatchery protection**
- **Memo to BLM and cost on RAWs station**
- **Memo requesting attendance at team closeout meeting**
- **Closeout meeting agenda**
- **Mud/flood task force agency 6/27 meeting**
- **Mud/flood task group attendance list**
- **CDOW hatchery report**
- **Press release 6/18/02**
- **Flash Flood alert flyer**
- **Press release on Federal disaster declaration**
- **MISC press clippings**
- **Watershed documents:**
 - **Glenwood springs fish hatchery structure protection**
 - **Curve numbers**
 - **Precipitation analysis**
 - **Cross sections**
 - **Conceptual emergency preparedness alert plan**





Cost/Risk Analysis - Vegetation

Part 1. Treatment Cost

Treatments	Cost
Noxious Weed Monitoring	\$42,790.00
Noxious Weed Control	\$25,890.00
Hazard Tree Mitigation	\$24,200.00
Total	\$92,880.00

Part 2. Probability of Rehabilitation Treatments Successfully Meeting ESR Objectives

Treatments	Units	%
Noxious Weed Monitoring	acres	80
Noxious Weed Control	acres	80
Hazard Tree Mitigation	Trees	100

Risk of Resource Value Loss or Damage

No Action-Treatment Not Implemented (check one)

Resource Value	None	Low	Mid	High
Lives			x	
Residential & Commercial Property				x
Recreation				
Wildlife Habitat			x	

Proposed Action C Treatments Successfully Implemented (check one)

Resource Value	None	Low	Mid	High
Lives	x			
Residential & Commercial Property	x			
Recreation		x		

Wildlife Habitat		x		
------------------	--	---	--	--

PART 3. SUMMARY

1. Are the risks to natural resources and private property **acceptable** as a result of the fire if the following actions are taken?

Proposed Action Yes No Rational for answer: **Noxious Weed Monitoring.** Noxious weed monitoring will allow for identification of potential wildlife habitat loss.

No Action Yes No Rational for answer: **Noxious Weed Monitoring,** Noxious weed monitoring and mitigation is required by DO 12.x

Alternative(s) Yes No Rationale for answer: **None**

2. Is the probability of success of the proposed action, alternatives or no action acceptable given their costs?

Proposed Action Yes No Rational for answer: **Noxious Weed Monitoring.** Noxious weed monitoring will minimize the spread of invasive exotic species.

No Action Yes No Rational for answer: **Noxious Weed Monitoring.** No action will allow invasive exotic species to spread into burned areas.

Alternative(s) Yes No Rationale for answer: **None**

3. Which approach will most cost-effectively and successfully attain the ESR objectives and therefore is recommended for implementation from a Cost/Risk Analysis standpoint?

Proposed Action Yes No Rational for answer: **Noxious Weed Monitoring**

Comments:

1. Are the risks to natural resources and private property **acceptable** as a result of the fire if the following actions are taken?

Proposed Action Yes No Rational for answer: **Noxious Weed Control.** Mitigation

of noxious weeds will reduce the threat of invasive exotic species from spreading onto burned areas.

No Action Yes [] No [x] Rational for answer: **Noxious Weed Control.** Mitigation of noxious weeds is required by DO 12 for federal lands.

Alternative(s) Yes [] No [] Rationale for answer: **None**

2. Is the probability of success of the proposed action, alternatives or no action acceptable given their costs?

Proposed Action Yes [] No [] Rational for answer **Noxious Weed Control**. Control of noxious weeds will reduce the spread onto the burned areas.

No Action Yes [] No [] Rational for answer: Unacceptable loss of native habitat.

Alternative(s) Yes [] No [] Rationale for answer: **None**

3. Which approach will most cost-effectively and successfully attain the ESR objectives and therefore is recommended for implementation from a Cost/Risk Analysis standpoint?

Proposed Action Yes [] No [] Rational for answer: **Noxious Weed Control**
Comments:

1. Are the risks to natural resources and private property **acceptable** as a result of the fire if the following actions are taken?

Proposed Action Yes [] No [] Rational for answer: **Hazard Tree Mitigation**. Mitigation of identified tree hazards will reduce threat to public safety.

No Action Yes [] No [] Rational for answer: **Hazard Tree Mitigation**. Landowner has legal obligation to mitigate known safety hazards.

Alternative(s) Yes [] No [] Rationale for answer: **None**

2. Is the probability of success of the proposed action, alternatives or no action acceptable given their costs?

Proposed Action Yes [] No [] Rational for answer: **Hazard Tree Mitigation**. Removal of identified hazards will lessen probability of accidental failure at minimal cost.

No Action Yes [] No [] Rational for answer:

Alternative(s) Yes [] No [] Rationale for answer: **None**

3. Which approach will most cost-effectively and successfully attain the ESR objectives and therefore is recommended for implementation from a Cost/Risk Analysis standpoint?

Proposed Action Yes [x] No [] Rationale for answer:

Comments:

TABLE SUMMARY

The following summary is a result of the...

TABLE SUMMARY

The following summary is a result of the...

Cost/Risk Analysis - Cultural

Part 1. Treatment Cost

Treatments	Cost
Native American Consultation	\$14,700
Total	\$14,700

Part 2. Probability of Rehabilitation Treatments Successfully Meeting ESR Objectives

Treatments	Units	%
Native American Consultation	Consultation	100

Risk of Resource Value Loss or Damage

No Action-Treatment Not Implemented (check one)

Resource Value	None	Low	Mid	High
Loss of Native American Cultural Resources				x
Recreation			x	
Loss of Tribal Cooperation				x

Proposed Action C Treatments Successfully Implemented (check one)

Resource Value	None	Low	Mid	High
Loss of Native American Cultural Resources		x		
Recreation		x		
Loss of Tribal Cooperation		x		

PART 3. SUMMARY

- Are the risks to natural resources and private property **acceptable** as a result of the fire if the following actions are taken?

Proposed Action Yes [x] No [] Rational for answer: **Native American Consultation.**
 Native American consultation will reduce the loss of cultural resources.

No Action Yes []

No [x] Rational for answer: Landowner has legal responsibility to preserve cultural resources, as directed by the State Historic Preservation Office.

Alternative(s) Yes []

No [] Rationale for answer: None

2. Is the probability of success of the proposed action, alternatives or no action acceptable given their costs?

Proposed Action Yes [x]

No [] Rational for answer: **Native American Consultation.** Native American Consultation will minimize potential loss of cultural resources.

No Action Yes []

No [] Rational for answer:

Alternative(s) Yes []

No [] Rationale for answer: None

3. Which approach will most cost-effectively and successfully attain the ESR objectives and therefore is recommended for implementation from a Cost/Risk Analysis standpoint?

Proposed Action Yes [x] No [] Rational for answer:

Comments: Compliance with federal law.

Cost/Risk Analysis - Watershed

Part 1. Treatment Cost

Treatments	Cost
Ditch Breach Evaluation & Design	\$2,000.00
Structure Protection Design	\$7,000.00
Sediment Basin (runway) Maintenance	\$38,100.00
Trash Racks Evaluation & Design	\$10,000.00
Soil Netting w/ seed	\$46,000.00
Remove Floatable Debris	\$160,110.00
Early Warning System	\$74,301.00
Diversion Channel Evaluation & Design	\$10,500.00
Culvert Cleaning	\$34,400.00
Bridge Removal Evaluation	\$5,000.00
Contour Straw Wattles	\$407,900.00
Culvert Evaluation & Design	\$14,500.00
Hazard Warning Sign	\$5,480.00
Straw Mulching	\$398,000.00
Aerial Mulching/Seeding	\$4,116,930.00
Total	\$5,330,221.00

Part 2. Probability of Rehabilitation Treatments Successfully Meeting ESR Objectives

Treatments	Units	%
Ditch Breach Evaluation & Design	Design	80
Structure Protection Design	Design	50

Sediment Basin (runway) Maintenance	Feet ²	100
Trash Racks Evaluation & Design	Design	30
Soil Netting w/ seed	Feet ²	80
Remove Floatable Debris	tons	60
Early Warning System	units	70
Diversion Channel Evaluation & Design	Design	80
Culvert Cleaning	Feet ³	100
Bridge Removal Evaluation	Evaluation	80
Contour Straw Wattles	feet	70
Culvert Evaluation & Design	Design	90
Hazard Warning Sign	sign	50
Straw Mulching	acres	90
Aerial Mulching/Seeding	acres	70

Risk of Resource Value Loss or Damage

No Action-Treatment Not Implemented (check one)

Resource Value	None	Low	Mid	High
Residential & Commercial Structures				x
Transportation Infrastructure				x
Lives			x	
Erosion				x
Timber Resources		x		
View Shed			x	
Property Value				x
Soil Productivity				x
Wildlife Habitat				x
Economic Development			x	

Aquatic Habitat				X
Recreation			X	

Proposed Action C Treatments Successfully Implemented (check one)

Resource Value	None	Low	Mid	High
Residential & Commercial Structures			X	
Transportation Infrastructure			X	
Lives		X		
Erosion			X	
Timber Resources		X		
View Shed		X		
Property Value			X	
Soil Productivity		X		
Wildlife Habitat		X		
Economic Development		X		
Aquatic Habitat			X	
Recreation		X		
Recreation		X		

PART 3. SUMMARY

1. Are the risks to natural resources and private property **acceptable** as a result of the fire if the following actions are taken?

Proposed Action Yes [] No [] Rational for answer:

No Action Yes [] No [] Rational for answer: The public would not allow a no action alternative. There are many lives, property, and safety at risk.

Alternative(s) Yes [] No [] Rationale for answer: **None**

2. Is the probability of success of the proposed action, alternatives or no action acceptable given their costs?

Proposed Action Yes No Rational for answer: Everything feasible should be done to protect lives. As a result of the proposed action, lives, property, and safety will be protected as best as possible.

No Action Yes No Rational for answer: Not an option.

Alternative(s) Yes No Rationale for answer: None

3. Which approach will most cost-effectively and successfully attain the ESR objectives and therefore is recommended for implementation from a Cost/Risk Analysis standpoint?

Proposed Action Yes No Rational for answer:

Comments: Proposed action meets ESR objectives of protection of life, property, and safety.

Date of Report:

BURNED-AREA REPORT
(Reference FSH 2509.13)

PART I - TYPE OF REQUEST

A. Type of Report

- 1. Funding request for estimated WFSU-SULT funds
- 2. Accomplishment Report
- 3. No Treatment Recommendation

B. Type of Action

- 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 or design analysis
 - Status of accomplishments to date
- 3. Final Report (Following completion of work)

PART II - BURNED-AREA DESCRIPTION

- A. Fire Name: Coal Seam
- B. Fire Number: CO-GJX-276
- C. State: Colorado
- D. County: Garfield
- E. Region: Rocky Mountain
- F. Forest: White River
- G. District: Rifle
- H. Date Fire Started: June 8, 2002
- I. Date Fire Contained: 90% on 06/27
- J. Suppression Cost: ~7 million
- K. Fire Suppression Damages Repaired with Suppression Funds
 - 1. Fireline waterbarred (miles): 9.44
 - 2. Fireline seeded (miles): None as of June 27, 2002
 - 3. Other (identify):
- L. Watershed Number: 14010005061301
- M. Total Acres Burned: 12,229 acres
NFS Acres(3,754) Other Federal (4,457) State (58) Private (1,825)
- N. Vegetation Types: Gambel oak, Mixed conifer, Aspen, Sage/Grass
See the attached post-fire assessment and treatment specification sheets developed by the Interagency BAER Team for the Coal Seam Fire near Glenwood Springs, Colorado.

O. Dominant Soils: Torriorthents-Rock outcrop-Camborthids, Jerry-Lamphier-Cochetopa
See the attached post-fire assessment and treatment specification sheets developed by the Interagency BAER Team for the Coal Seam Fire near Glenwood Springs, Colorado.

P. Geologic Types: Sandstone, Limestone, Quartzite, Alluvial & Glacial Deposits
See the attached post-fire assessment and treatment specification sheets developed by the Interagency BAER Team for the Coal Seam Fire near Glenwood Springs, Colorado.

Q. Miles of Stream Channels by Order or Class:

Order	1st	2nd	3rd	4th	5th	6th
Miles	48.4	23.1	11.8	6.2	0.1	2.7

R. Transportation System

Trails: miles Roads: 27.5 miles

PART III - WATERSHED CONDITION

A. Burn Severity (acres): 3,195 (low) 3,223 (moderate) 2,195 (high)

B. Water-Repellent Soil (acres): 500

C. Soil Erosion Hazard Rating (acres):
7,949 (low) 6,115 (moderate) 1,834 (high)

This is reported by watershed in the attached post-fire assessment and treatment specification sheets developed by the Interagency BAER Team for the Coal Seam Fire near Glenwood Springs, Colorado.

D. Erosion Potential: Average of 60 tons/acre
Refer to Table 8 – Watershed Assessment – Coal Seam BAER Assessment. This is reported by watershed in the attached post-fire assessment and treatment specification sheets developed by the Interagency BAER Team for the Coal Seam Fire near Glenwood Springs, Colorado.

E. Sediment Potential:
Refer to Table 11 – Watershed Assessment – Coal Seam BAER Assessment. This is reported by watershed in the attached post-fire assessment and treatment specification sheets developed by the Interagency BAER Team for the Coal Seam Fire near Glenwood Springs, Colorado.

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years): 2-3

B. Design Chance of Success, (percent): 50

C. Equivalent Design Recurrence Interval, (years): 2

D. Design Storm Duration, (hours): 1

E. Design Storm Magnitude, (inches): 0.51

F. Design Flow, (cubic feet / second/ square mile):

Refer to Table 10a – Watershed Assessment – Coal Seam BAER Assessment. This is reported by watershed in the attached post-fire assessment and treatment specification sheets developed by the Interagency BAER Team for the Coal Seam Fire near Glenwood Springs, Colorado.

G. Estimated Reduction in Infiltration, (percent): 32%

H. Adjusted Design Flow, (cfs per square mile):
Refer to Table 10a – Watershed Assessment – Coal Seam BAER Assessment. This is reported by watershed in the attached post-fire assessment and treatment specification sheets developed by the Interagency BAER Team for the Coal Seam Fire near Glenwood Springs, Colorado.

PART V - SUMMARY OF ANALYSIS

A. Describe Watershed Emergency:

See the attached post-fire assessment and treatment specification sheets developed by the Interagency BAER Team for the Coal Seam Fire near Glenwood Springs, Colorado.

Issues

- Potential threats to human life and property downstream of the Coal Seam Fire from potential increases in storm flow runoff, flooding and debris flows.
- Threats to the Glenwood Springs State Fish Hatchery.
- Ability of drainage structures to pass flood and debris flows.
- Potential loss of soil productivity and increased erosion.
- ESR cannot design treatments to protect against all scales of flood and debris flow events.

Rilling, gully erosion, and sheet erosion are expected to occur at increased rates due to the fire. Pre-fire, vegetation provided protective groundcover and duff layers played an important role in infiltration, both factors in reducing pre-fire overland flow. Due to the fire, soils are now bare and susceptible to accelerated erosion and increased runoff rates. Soils within the fire occurring on steep slopes of Red Mountain, in the SOB watershed, along Interstate 70, and above homes in Mitchell Creek have very high erosion hazards and debris flow potential exists in these areas during intense short-duration thunderstorms. Dry ravel was found in a few areas, but does not appear to be occurring at a rate that is a threat to overall soil productivity. It is most important to note the *relative* increase in erosion between pre and post-fire. Some of the areas of highest post-fire erosion show increases in rates of 100 to 1000%, especially where dense stands of vegetation once occurred that burned with high severity on steep slopes.

The primary watershed responses of the Coal Seam Fire are expected to include: 1) an initial flush of ash; 2) gully and rill erosion in drainages and on steep slopes within the burn area; 3) debris flows and sediment deposition where stream gradients flatten or at tributary mouths; and 4) increases in peak flows. Elevated erosion, runoff, and stream flows are expected to occur for several years after the fire until the vegetation has recovered. Streamflow response to common rainfall events (with a recurrence interval of 2 years and duration of 1 hour) is expected to increase as a result of fire impacts. Storms of high intensity and short duration are of most concern and may result in flow increases that range from 1 cfs to 222 cfs (unbulked) and 2 to 907 cfs (bulked).

Noxious weeds were found to occur extensively within and near the burned area, which will create a high potential for further invasion, by these species. These invasive plant species readily out compete native species following a burn; therefore, it will also be necessary work to prevent this from occurring.

B. Emergency Treatment Objectives:

See the attached post-fire assessment and treatment specification sheets developed by the Interagency BAER Team for the Coal Seam Fire near Glenwood Springs, Colorado.

- Protect the lives and property of the inhabitants of Glenwood Springs.
- Locate and stabilize, where feasible, severely burned slopes that pose a direct threat to human life, property, or critically important cultural and natural resources.
- Recommend post-fire rehabilitation prescriptions that prevent irreversible loss of natural and cultural resources.
- As practical and necessary, identify natural conditions disturbed by fire suppression actions.
- Conduct immediate post-burn reconnaissance for fire suppression related impacts to threatened and endangered (T&E) species and related habitat, and cultural sites.
- Provide long-term monitoring recommendations intended to ensure the success of rehabilitation efforts.

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

Land __ % Channel __ % Roads __ % Other 50 %

D. Probability of Treatment Success

	Years after Treatment		
	1	3	5
Land			
Channel			
Roads			
Other			

E. Cost of No-Action (Including Loss): \$47,500,000

See the attached post-fire assessment and treatment specification sheets developed by the Interagency BAER Team for the Coal Seam Fire near Glenwood Springs, Colorado. Included in this estimate is 160 homes at a cost of \$250,000, the fish hatchery at a cost of \$7 million, and fish stock/eggs at a cost of \$500,000.

F. Cost of Selected Alternative (Including Loss): \$36,000,000

See the attached post-fire assessment and treatment specification sheets developed by the Interagency BAER Team for the Coal Seam Fire near Glenwood Springs, Colorado. Included in this estimate is 160 homes at a cost of \$250,000, the fish hatchery at a cost of \$7 million, and fish stock/eggs at a cost of \$500,000. In addition, treatments applied to all ownership, which is an estimate intended to illustrate prevention of complete damage to values at risk.

G. Skills Represented on Burned-Area Survey Team:

- | | | | | |
|---|--|---|---|--------------------------|
| <input checked="" type="checkbox"/> Hydrology | <input checked="" type="checkbox"/> Soils | <input checked="" type="checkbox"/> Geology | <input checked="" type="checkbox"/> Range | <input type="checkbox"/> |
| <input checked="" type="checkbox"/> Forestry | <input checked="" type="checkbox"/> Wildlife | <input type="checkbox"/> Fire Mgmt. | <input checked="" type="checkbox"/> Engineering | <input type="checkbox"/> |
| <input type="checkbox"/> Contracting | <input type="checkbox"/> Ecology | <input type="checkbox"/> Botany | <input checked="" type="checkbox"/> Archaeology | <input type="checkbox"/> |
| <input checked="" type="checkbox"/> Fisheries | <input type="checkbox"/> Research | <input type="checkbox"/> Landscape Arch | <input checked="" type="checkbox"/> GIS | |

Team Leader: T.J. Clifford, Boise National Forest & Erv Gasser, National Park Service

Email: tjclifford@fs.fed.us
4111

Phone: (208)373-4311

FAX: (208)373-

H. Treatment Narrative:

(Describe the emergency treatments, where and how they will be applied, and what they are intended to do. This information helps to determine qualifying treatments for the appropriate funding authorities. For seeding treatments, include species, application rates and species selection rationale.)

Land Treatments:

**INTERAGENCY
BURNED AREA EMERGENCY STABLIZATION & REHABILIZATION PLAN**

PART F - SPECIFICATION

SPECIFICATION TITLE:	EARLY WARNING SYSTEM	JURISDICTIONS:	BLM, FS,PRV
PART E: LINE ITEM:	#7, Early Warning System	FISCAL YEAR:	2002-2003- 2004
ESR REFERENCE#	6.8.4 Early Warning System	SPECIFICATION TYPE:	ES

I. WORK TO BE DONE

Number and Describe Each Task:

A. General Description:
Install automated rain gauges within the burn area that are connected with a remote automated warning system

B. Location (Suitable) Sites:

Three units will be installed, one on the north rim of Mitchell Creek (USFS land) called "Mitchell Canyon", one east of the Mitchell Creek Fish Hatchery (BLM Land) called "Fish Hatchery", and one near Red Mountain on the northeast rim of South Canyon called "South Canyon" (see Appendix III, Treatment Map for specific locations).

Sites were positioned with resource grade GPS (± 2 to 5 meters, NAD27) with the following coordinates:

Mitchell Canyon: 107° 21' 30.7945" W 39° 36' 0.7159" N
 Fish Hatchery: 107° 22' 3.5474" W 39° 34' 47.5913" N
 South Canyon: 107° 21' 56.6365" W 39° 32' 31.3073" N

C. Design/Construction Specifications:

1. Install three Remote Automated Weather Stations (RAWS).
2. The weather stations will be programmed to relay "real-time" weather information to the National Weather Service.

3. The early warning system will be maintained by National Interagency Fire Center (NIFC) and connected to the dispatch center for the Garfield County Sheriff's Office via radio and/or phone lines. Mitchell Canyon RAWS should be tied into a siren to give immediate warning to residents in the canyon.
4. All stations will call on frequency Receiver 155.4750, and Transmitter 155.4750. Fish Hatchery station will also be linked digitally over a phone line and should be set to cell (970) 625-8095 which also will connect to Garfield County Dispatch. Testing of locations should be completed by calling Garfield County Dispatch. The repeater is located on Sunlight Peak. Bob Kibler is the Contact at Garfield County Dispatch (970) 625-8095. If Sunrise Peak repeater will not function due to line of sight, Bob Kibler will assist with portable repeater.
5. The Fish Hatchery station will have power and telephone extended to the installation site. To extend telephone line to site, call Gary Gibson or Mike Summers with Quest Communications at (970) 384-0255. Quest Business section will set -up telephone number for this station, call 1-800-602-6000. The address for this telephone is Pedestal #1415 on County Road #132, West Glenwood, CO.
6. Extend 2000 feet of telephone line to the site. The phone line should be buried a minimum of 6 to 18 inches deep beside county road #132 and centered on private land (Rudy Steele's property). The line will cross Mitchell Creek attached to the bridge or span above to prevent flood damage to line at discretion of implementation team. Possible Vendors include: McDaniels Contracting at (930) 250-4419 or (970) 285-1270.
7. Installation of the South Canyon will require a helicopter to place crew and equipment.
8. The Glenwood Springs Mud and Flood Task Force will design and implement a contact and evacuation plan based on flood zones delineated by the BAER Team.
9. Issue new release when system is on line informing the public of its activation. Provide a web-site where people can access weather station data and how emergency messages will be broadcast through Sheriff's Department.

D. Purpose of Treatment Specifications:

The RAWS stations are to provide an early warning system in response to anticipated flood events resulting from the burned area above the community of Glenwood Springs, Colorado. ESR treatments cannot protect life and property from all size floods. The early warning system allows people to evacuate the area when flood hazards are imminent.

E. Treatment Effectiveness Monitoring:

Monitor systems ability to provide adequate warnings in relation to flood and/or debris flows. Station monitoring will be conducted by NIFC.

II. LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST/ITEM
TOTAL PERSONNEL SERVICE COST	\$0

EQUIPMENT PURCHASE, LEASE OR RENTAL (Item @ Cost/Hour or Cost/Day X # Hours or # Days X # Fiscal Years = Cost/Item): (Note: Purchase requires written justification that demonstrates cost/item benefits over lease or rental.)	COST/ITEM
TOTAL EQUIPMENT PURCHASE, LEASE, OR RENTAL COST	\$0

MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X # Fiscal Years = Cost/Item):	COST/ITEM
- Purchase supplies, construct, and install 3 RAWs units equipped for use as early warning systems (see details Appendix V, Supporting Documentation)	\$41,900
- Maintain 3 RAWs stations with full service maintenance plan for 3 years	\$18,700
TOTAL MATERIALS AND SUPPLY COST	\$60,600

TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X # Fiscal Years = Cost/Item):	COST/ITEM
TOTAL TRAVEL COST	\$0

CONTRACT COST (Labor or Equipment @ Cost/Hour X # Hours X # Fiscal Years = Cost/Item):	COST/ITEM
- Install telephone line from Fish Hatchery site. 2000 ft @ \$0.95/foot = \$1,900 - Install power line to Fish Hatchery site. 150' @ \$20/foot = \$3000 - Helicopter Flight to install South Canyon Site. 4 hours @ \$800/hour = \$3,200	\$8,100
TOTAL CONTRACT COST	\$8,100

SPECIFICATION COST SUMMARY

FISCAL YEAR	UNIT	UNIT COST	# OF UNITS	COST	FUNDING SOURCE	METHOD
FY 1	RAWs	\$19,367	3	\$58,100	EFR	EFC
FY 2	Maintenance	\$1,767	3	\$5,300	EFR	EFC
FY 3	Maintenance	\$1,767	3	\$5,300	EFR	EFC
TOTAL	RAWs	\$22,901	3	\$68,700	EFR	EFC

FUNDING SOURCES:

F = Fire Suppression Account
EFR=Emergency Fire Rehabilitation
OP/O =Agency Operating Fund
EWP = Emergency Watershed Program

SPECIFICATION TYPE

ES = Emergency Stabilization
R = Rehabilitation
FS = Fire Suppression

METHODS FOR COMPLETION

P=Agency Personnel Services
C=Contract
EFC= Emergency Fire Contract
FC=Crew Labor Assigned to Fire

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	C
3. Estimate supported by cost guides from independent sources or other federal agencies.	
4. Estimates based upon government wage rates and material cost.	
5. No cost estimate required – cost charged to Fire Suppression Account.	

P = Personnel Services M = Materials/Supplies T = Travel C = Contract F = Suppression

III. RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

List Relevant Documentation and Cross-References Within ESR Plan:
 See Soil and Watershed Assessment, Appendix I, Treatment Map, Appendix III, and Supporting Documentation, Appendix V.

IV. TOTAL COST BY JURISDICTION

JURISDICTION	UNITS TREATED	COST
BLM	2 RAWS	\$45,800
FS	1 RAWS	\$22,900
TOTAL COST	3 RAWS	\$68,700

I. Monitoring Narrative:

(Describe the monitoring needs, what treatments will be monitored, how they will be monitored, and when monitoring will occur. A detailed monitoring plan must be submitted as a separate document to the Regional BAER coordinator.)

**INTERAGENCY
 BURNED AREA EMERGENCY STABLIZATION & REHABILIZATION PLAN**

PART F - SPECIFICATION

SPECIFICATION TITLE:	NOXIOUS WEED MONITORING	JURISDICTIONS:	PRIVATE, BLM
PART E: LINE ITEM:	#16, Noxious Weed Monitoring	FISCAL YEAR:	2003, 2004
ESR REFERENCE#	Bill Monitoring	SPECIFICATION TYPE:	ES

I. WORK TO BE DONE

- A. General Description:** Monitor for new populations of Scotch thistle, musk thistle, Canada thistle, houndstongue, and tamarisk on travel routes, dozerlines, handlines, other areas disturbed by suppression activities, and on un-infested areas (such as drainages and areas with moderate to high vegetation mortality), adjacent to known populations of noxious weeds. Also monitor for Russian knapweed and yellow toadflax which are suspected to be within the fire perimeter.
- B. Location (Suitable) Sites:** Refer to Appendix III-Suppression Treatment map, Noxious Weed map, and Vegetaion Mortality map. Conduct primary surveys on all Forest Service, BLM, and private roads used in suppression efforts, along dozerlines, safety zones, helispots, helibase, and burned areas adjacent to known weed populations.
- C. Design/Construction Specifications:**
1. Conduct short-term monitoring (2 years), on all travel routes and disturbed areas and on known noxious weed populations within burned area to determine spread of noxious and invasive plant species. monitoring protocols will be established by each jurisdiction and will be implemented in accordance with current management plans. See noxious weed survey form, appendix V.
 2. Document using photography and Global Positioning System (GPS) technology, new weed occurrences within burned area.
 3. Initiate Agency approved control measures on new weed occurences where monitoring demonstrates the establishment or expansion of known weed populations that threaten the natural regeneration of native vegetation oor establishment of effective ground cover.
 4. Complete supplemental funding request for ESR funding (or cost-share programs on private through the Garfield County Weed Management Area), for noxious weed control of new weed populations.
- D. Purpose of Treatment Specifications:** To detect new noxious weed populations into disturbed and burned areas within the fire area and to monitor known noxious weed populations to determine if suppression or rehabilitation actions have spread noxious weeds that may potentially threaten the long-term health of native plant associations or impact short-term recovery of revegetaion efforts.
- E. Treatment Effectiveness Monitoring:** As described in this specification.

II. LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST/ITEM
USFS - GS-11 Weed Coordinator/Resource Specialist x \$25/Hour x 40 Hours x 4 visits x 2 years	\$8,000
BLM - GS-11 Weed Coordinator/Resource Specialist x \$25/Hour x 40 Hours x 4 visits x 2 years	\$8,000
County - Vegetation Specialist x \$75/Hour x 40 Hours x 4 visits x 2 years (not included in total ESR request)	\$24,000
TOTAL PERSONNEL SERVICE COST	\$40,000
EQUIPMENT PURCHASE, LEASE OR RENTAL (Item @ Cost/Hour or Cost/Day X # Hours or # Days X # Fiscal Years = Cost/Item): (Note: Purchase requires written justification that demonstrates cost/item benefits over lease or rental.)	COST/ITEM
TOTAL EQUIPMENT PURCHASE, LEASE, OR RENTAL COST	\$0
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X # Fiscal Years = Cost/Item):	COST/ITEM
USFS - Photographic film and processing - 10 rolls x \$20	\$200
BLM - Photographic film and processing - 10 rolls x \$20	\$200
County - Photographic film and processing - 10 rolls x \$20 (not included in total ESR request)	\$200
TOTAL MATERIALS AND SUPPLY COST	\$600
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X # Fiscal Years = Cost/Item):	COST/ITEM
USFS - 50 miles/Day x \$0.365/Mile x 5 days x 4 visits x 2 years	\$730
BLM - 50 miles/day x \$0.365/Mile x 5 days x 4 visits x 2 years	\$730
County - 50 miles/day x \$0.365/Mile x 5 days x 4 visits x 2 years (not included in total ESR request)	\$730
TOTAL TRAVEL COST	\$2,190
CONTRACT COST (Labor or Equipment @ Cost/Hour X # Hours X # Fiscal Years = Cost/Item):	COST/ITEM
TOTAL CONTRACT COST	\$0

SPECIFICATION COST SUMMARY

FISCAL YEAR	UNIT	UNIT COST	# OF UNITS	COST	FUNDING SOURCE	METHOD
FY 1	Surveys	\$1,783	12	\$21,395	ESR	P
FY 2	Surveys	\$1,783	12	\$21,395	ESR	P
FY 3						
TOTAL		\$1,783	24	\$42,790	ESR	P

FUNDING SOURCES:

F = Fire Suppression Account
 EFR=Emergency Fire Rehabilitation
 OP/O =Agency Operating Fund
 EWP = Emergency Watershed Program

SPECIFICATION TYPE

ES = Emergency Stabilization
 R = Rehabilitation
 FS = Fire Suppression

METHODS FOR COMPLETION

P=Agency Personnel Services
 C=Contract
 EFC= Emergency Fire Contract
 FC=Crew Labor Assigned to Fire

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	
3. Estimate supported by cost guides from independent sources or other federal agencies.	P, M, T
4. Estimates based upon government wage rates and material cost.	
5. No cost estimate required – cost charged to Fire Suppression Account.	

P = Personnel Services M = Materials/Supplies T = Travel C = Contract F = Suppression

III. RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

List Relevant Documentation and Cross-References Within ESR Plan:

APPENDIX I - VEGETATION ASSESSMENT, APPENDIX III - NOXIOUS WEED MAP, VEGETATION MORTALITY MAP.

IV. TOTAL COST BY JURISDICTION

JURISDICTION	UNITS TREATED	COST
USFS	8 Surveys	\$8,930
BLM	8 Surveys	\$8,930
County	8 Surveys	\$24,930
TOTAL COST		\$42,790

Part VI – Emergency Rehabilitation Treatments and Source of Funds by Land Ownership

Line Items	Units	Unit Cost	NFS Lands		Other	# of units	Other Lands		All Total
			# of Units	WFSU SULT \$			Fed \$	# of Units		Non Fed $
A. Land Treatments									
Early Warning System				\$23			\$46	\$0	\$
Contour Straw Wattles				\$0			\$408		
Straw Mulching				\$0			\$398	\$0	\$3
Aerial Mulching/Seeding				\$0			\$2,557	\$1,560	\$4,1
Noxious Weed Control				\$0			\$24	\$2	\$
				\$0			\$2,559	\$0	\$2,5
<i>Subtotal Land Treatments</i>				\$23			\$3,432	\$1,560	\$4,5
B. Channel Treatments									
Ditch Breach Evaluation & Design				\$0			\$0	\$2	
Structure Protection Design				\$0			\$0	\$7	
Sediment Basin Maintenance				\$0			\$0	\$38	\$
Trash Racks				\$0			\$0	\$10	\$
Soil Netting				\$0			\$0	\$0	\$
Remove Floatable Debris				\$0			\$0	\$160	\$1
Diversion channel Evaluation				\$0			\$0	\$11	\$
Culvert Cleaning				\$0			\$0	\$34	\$
Bridge Removal Evaluation				\$0			\$0	\$5	
Hazard Warning Sign				\$0			\$0	\$5	
				\$0			\$0	\$0	
<i>Subtotal Channel Treat.</i>				\$0			\$0	\$273	\$3
C. Road and Trails									
				\$0			\$0	\$0	
<i>Subtotal Road & Trails</i>				\$0			\$0	\$0	
D. Structures									
Hazard Tree Mitigation				\$0			\$0	\$24	\$
native american Consultation				\$15			\$0	\$0	\$
				\$0			\$0	\$0	
<i>Subtotal Structures</i>				\$15			\$0	\$24	\$
E. BAER Evaluation									
Coal Seam Plan				\$123			\$123	\$0	\$
Implementation Leader				\$0			\$55	\$0	\$
F. Monitoring									
Invasive Plant Species				\$9			\$9	\$25	\$
G. Totals				\$169			\$3,620	\$1,882	\$5,

PART VII - APPROVALS

1. _____
Forest Supervisor (signature)

Date

2. _____
Regional Forester (signature)

Date

3. Independent Verified by _____
Entered in AWP file by _____
Map digitized by _____
Date(s) checked _____

Approved _____
Date _____

COAL SEAM FIRE ISSUES - 6-18-02

OWNERSHIP

- Forest Service (3371 Acres)
- Bureau of Land Management (4456 Acres)
- Colorado Department of Wildlife (fish hatchery)
- Private and Local Agencies (4012 Acres)

IDENTIFIED ISSUES:

Watershed Group

- Review Interagency Task Force Early Warning System/Evacuation Plan & Provide Comments
- Determine Status of Contact with Natl. Weather Service
- Determine Status of Existing RAWS Unit(s)
- Structural protection at State Fish hatchery
- Potential debris flow damage to railroad track
- Protection or removal of landfill in drainage
- Private structure protection
- Condition and adequacy of culverts

Wildlife

- Protection of sensitive cutthroat stock in hatchery (1 of 3 captive populations)
- Protection of sensitive wild cutthroat population (1 of 2 wild populations)
- Potential impacts to Lynx

Vegetation and Range

- Invasive noxious weed control
- Potential Seeding for Erosion Control
- Fence Repair ?

Recreational Issues

- Replace Burnt BLM Bridge)

Fire Suppression Impacts

- Handline rehabilitation
- Dozerline rehabilitation
- Helispot/Drop Point Rehab.
- Safety Zone

Cultural Resources

- Cultural resource
- Regrade dirt roads
- Implementation leader

UNITED STATES DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT
GRAND JUNCTION DISTRICT

B. Surveyed By: _____
Date: _____

Resource Area _____

A. Report/Infestation No. _____ NOXIOUS WEED SURVEY

C. Weed or Weeds present: _____ Est. Acres: _____ County: _____

D. Legal Description: T. _____ R. _____ S. _____

Sub. _____ Prin. Mer. _____
Allotment: _____

E. Attach Map of infestation. (7 1/2 minute Topo Map)

F. Narrative: (Describe infestation, include an ocular est. of crown cover density. The following canopy covers classes.

S = Sparse, < 1 %
L = Low, 1-10 %

M = Moderate, 11-25%
H = Heavy, > 25%

G. Infestation Verified by: _____ Date: _____

Entered in data base by: _____ Date: _____

Map digitized by: _____ Date: _____

Date(s) treated: _____

Attach a copy of Pesticide or biological Application Record

Evaluation: (Narrative as to effectiveness of control, date and name of evaluator).

If not treated, estimate current acres and update map.

Acres _____ Acres _____ Acres _____ Acres _____

Date _____ Date _____ Date _____ Date _____

8. Directions for filling in the form:

A. Report or Infestation No. - This is a number assigned by the Area Coordinator and can begin with number 1. You do have to use a Resource Area designator when it is computerized, i.e. CO-078-1. Each infestation report must have a unique number.

B. Surveyed by - Indicates the name of the person completing the form.

C. Weeds Present - Weeds can be identified from the yellow Weed Hand Book, Series 1-30. The District coordinator has copies and will make them available to field personnel. A copy is attached. It pictures the weed and has botanical information on the back of each picture. Write in the number in the handbook, this form, or use the common name. For example, halogeton is #29. Infestations less than 10 acres will be shown as a point. Map all infestations over 10 acres. See part E for mapping requirements.

D. Complete the legal description to the quarter-quarter section, which is 40 acres. For example: T. 8 S., R. 91 W., S. 14, Sub. NW4SE4. Sixth Principal Meridian.

E. Map requirements:

- Use 7 1/2 topo quads
- , use this symbol to indicate infestation < 1 ac.
- , use this symbol to indicate infestation of 1 to 10 ac.
- For infestations > 10 ac. outline area on the map and indicate est. acres.
- Indicate the code number of the weed spp., from the handbook, within the symbol.
- Indicate the canopy cover class within the symbol.

Example 1H = 1 to 10 acres of leafy spurge with greater than 25% canopy cover.

F. Narrative - The narrative should be as descriptive as possible in order to make some decisions about the importance or severity of the infestation. Our purpose is to map location and size of an infestation with an indication of canopy cover. We will not be taking direct objective measurements so the description becomes very important. If it's along a right-of-way indicate width and length and kind of r/w. Road, pipeline etc. It may be helpful to give it as a percentage of a known pasture area, or timber sale area or project area. Use the following symbols to indicate canopy cover. S= scattered or sparse, L= Low (1-10%), M= Medium (11-25%), H = Heavy (> 25%). Although we've said that direct measurements are not required, if you have other measured data that would apply or help with estimates then attach the data as appropriate.

G. The bottom half of the form is not completed in the field when the infestation is inventoried. It is to be used as a historical record for tracking and evaluation purposes. There is a place for verification either by a range con or the weed coordinator and is meant to be a spot check for quality control or to help permittees or volunteers by confirming or completing their reports. A treatment date along with the application record and evaluation will tell us about the success of our treatments and serve as data for pesticide use reports and provide a guide for future management decisions. A copy of the application record or reference to a project file must be attached to the inventory form when applicable. The acreage and date at the bottom of the page allows for monitoring the spread of untreated infestations and for up-dating the acreage of the inventory.

Predominant Weed Species

CODE/WEED SPECIES	CODE/WEED SPECIES	Code/Weed Species
1 Leafy Spurge	11 Common Burdock	_____
2 Musk thistle	15 Houndstongue	_____
4 Russian knapweed	16 Dyer's woad	_____
5 Canada Thistle	31 Salt Cedar	_____
7 Spotted knapweed	32 Copper weed	_____
8 Diffuse Knapweed	33 Plat thistle	_____
9 Yellow toadflax	34 Whitetop	_____

Exotic plants

Exotic plant invasion is an increasingly serious problem in Colorado. Colorado now contains about 70 noxious weed species that infest at least 1.5 – 2.0 million acres. Weeds tend to take advantage of any disturbance of the soil. Wind, water, animals, people and vehicles can disperse their seeds. In some cases, we have planted them intentionally. Once established, they often lack the native competitors, predators, and pathogens that would keep them under control in their native habitat. The current thinking in weed management is to aim for “early detection and early treatment....if you have one acre of spotted knapweed in a county, it makes more sense to devote resources to that and try to contain the spread before it’s too late” (Anthony 2001). The following plants have been listed as noxious weeds by Garfield County. The names in bold type are the exotic plant species that we encountered most frequently during this survey.

GARFIELD COUNTY NOXIOUS WEED LIST

Canada thistle	<i>Cirsium arvense</i>
Chicory	<i>Cichorium intybus</i>
Common burdock	<i>Arctium minus</i>
Dalmatian toadflax	<i>Linaria dalmatica</i>
Diffuse knapweed	<i>Centaurea diffusa</i>
Hoary cress	<i>Cardaria draba</i>
Houndstongue	<i>Cynoglossum officinale</i>
Jointed Goatgrass	<i>Aegilops cylindrica</i>
Leafy spurge	<i>Euphorbia esula</i>
Musk thistle	<i>Carduus nutans</i>
Oxeye Daisy	<i>Chrysanthemum Leucanthemum</i>
Plumeless thistle	<i>Carduus acanthoides</i>
Purple loosestrife	<i>Lythrum salicaria</i>
Russian knapweed	<i>Acrotilon repens</i>
Russian olive	<i>Elaeagnus angustifolia</i>
Saltcedar	<i>Tamarix parviflora</i>
Saltcedar	<i>Tamarix ramosissima</i>
Scotch thistle	<i>Onopordum acanthium</i>
Spotted knapweed	<i>Centaurea maculosa</i>
Yellow starthistle	<i>Centaurea solstitialis</i>
Yellow toadflax	<i>Linaria vulgaris</i>



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
764 Horizon Drive, Building B
Grand Junction, Colorado 81506-3946

200 JUN 14 11 09 23

IN REPLY REFER TO:

ES/CO:FS/WRNF
MS 65412 GJ

June 13, 2001

Martha J. Ketelle, Forest Supervisor
White River National Forest
P.O. Box 948
Glenwood Springs, Colorado 81602-0948

Dear Ms. Ketelle:

The U.S. Fish and Wildlife Service has received your May 17, 2001, correspondence requesting a species list for updating your land and resource management plan for the White River National Forest. We are sending you a list of federally listed endangered, threatened, proposed and candidate species for your consideration as you prepare the forest plan. Species lists are valid for 90 days and should be updated by telephone or in writing when they have expired.

FEDERALLY LISTED SPECIES

Bald eagle	<i>Haliaeetus leucocephalus</i>
Canada lynx	<i>Felis lynx canadensis</i>
Black-footed ferret	<i>Mustela nigripes</i>
Bonytail	<i>Gila elegans</i>
Razorback sucker	<i>Xyrauchen texanus</i>
Colorado pikeminnow ¹	<i>Ptychocheilus lucius</i>
Humpback chub	<i>Physaria obcordata</i>
Uncompahgre fritillary butterfly	<i>Boloria acrocynema</i>
Mexican spotted owl	<i>Strix occidentalis lucida</i>
Southwestern willow flycatcher	<i>Empidonax traillii extimus</i>
<i>Sclerocactus glaucus</i>	Uinta Basin hookless cactus
<i>Physaria obcordata</i>	Piceance twinpod
<i>Lesquerella congesta</i>	Dudley Bluffs bladderpod
<i>Eutrema penlandii</i>	Penland alpine fen mustard

¹formerly squawfish

We would like to bring to your attention species which are candidates for official listing as threatened or endangered species [64 FR, Vol. 64, No. 205 (October 25, 1999)]. While these species presently have no legal protection under the Endangered Species Act, it is within the spirit of the Act to consider project impacts to potentially sensitive candidate species. Additionally, we wish to make you aware of the presence of Federal candidates should any be proposed or listed prior to the time that all Federal actions related to the project are completed.

FEDERAL CANDIDATE SPECIES

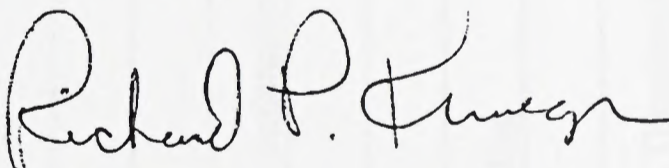
Boreal toad	<i>Bufo boreas boreas</i>
Gunnison sage-grouse	<i>Centrocercus minimus</i>
<i>Phacelia submutica</i>	De Beque phacelia
<i>Penstemon debilis</i>	Parachute penstemon
<i>Penstemon grahamii</i>	Graham beardtongue
<i>Penstemon scariosus</i> var. <i>albifluvis</i>	White River penstemon

PROPOSED FOR LISTING

Mountain plover	<i>Charadrius montanus</i>
-----------------	----------------------------

If the Service can be of further assistance, please contact Kurt Broderdorp at the letterhead address or phone (970) 243-2778.

Sincerely,


Acting for Allan R. Pfister
Assistant Colorado Field Supervisor

cc: FWS/ES, Lakewood
CDOW, Grand Junction

Species List WIRNF 3 of 3

06-20-02 13:30

Phone Call to Lee Carlson, State Field Office Supervisor,
US. Fish and Wildlife Service,
Lakewood, CO.

REF: Emergency Consultation on the Coal Seam Fire

I talked to Lee Carlson, Colorado State Field Office Supervisor, today, in lieu of Kurt Broderdorp, who is in Montana at a lynx meeting.

→ Lee agreed that the species list used for the recently completed Revised Forest Plan was accurate and includes the species of concern for the Coal Seam fire.

He also agreed that referencing the Biological Evaluation completed for the Plan should be adequate to cover the life history and habitat information for the species involved.

Lee felt that the water depletion issue should be covered under the Upper Colorado Basin agreement with the FWS so our finding concerning water depletion use would be "May Affect; Likely to Adversely Affect"

/s/

Keith Giezentanner

U. S. Fish and Wildlife Service
 Ecological Services
 Colorado Field Office

(Effective August 23, 2000)

FEDERALLY LISTED AND CANDIDATE SPECIES & THEIR STATUS IN COLORADO

Species List BLM 1063

COUNTIES --	D O L O R E S	D O U G L A S	E A G L E	E L B E R T	E L P A S O	F R E M O N T	G A R F I E L D	G I L P I N	G R A N D	G U N N I S O N	H I N S D A L E	H U E R F A N O	J A C K S O N	J E F F E R S O N	K I O W A	K I T C A R S O N
Bald eagle, <i>Haliaeetus leucocephalus</i> , Listed Threatened	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓
Eskimo curlew, <i>Numenius borealis</i> , Listed Endangered			✓	✓			✓								✓	✓
Gunnison sage-grouse, <i>Centrocercus minimus</i> , Candidate for Listing	✓		✓				✓			✓						
Least tern (interior population), <i>Sterna antillarum</i> , Listed Endangered															✓	✓
Lesser prairie chicken, <i>Tympanuchus pallidicinctus</i> , Candidate for Listing															✓	✓
Mexican spotted owl, <i>Strix occidentalis lucida</i> , Listed Threatened	✓	✓			✓	✓	✓	✓				✓			✓	✓
Mountain plover, <i>Charadrius montanus</i> , Proposed Threatened				✓	✓										✓	✓
Piping plover, <i>Charadrius melodus</i> , Listed Threatened															✓	✓
Southwestern willow flycatcher, <i>Empidonax traillii eximius</i> , Listed Endangered	✓						✓			✓						
Whooping crane, <i>Grus americana</i> , Listed Endangered				✓								✓				
Black-footed ferret, <i>Mustela nigripes</i> , Listed Endangered	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Black-tailed prairie dog, <i>Cynomys ludovicianus</i> , Candidate for Listing		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Canada lynx, <i>Lynx canadensis</i> , Threatened	✓		✓				✓									
Preble's meadow jumping mouse, <i>Zapus hudsonius preblei</i> , Listed Threatened		✓		✓	✓									✓		
Swift fox, <i>Vulpes velox</i> , Candidate for Listing		✓		✓	✓	✓										
Arkansas darter, <i>Etheostoma cragini</i> , Candidate for Listing	*		*				✓		*	*						
Bonytail, <i>Gila elegans</i> , (presumed-historical) Listed Endangered	*		*				©		*	*						
Colorado pikeminnow, <i>Ptychocheilus lucius</i> , Listed Endangered																
Greenback cutthroat trout, <i>Oncorhynchus clarki stomias</i> , Listed Threatened		✓			✓							✓				
Humpback Chub, <i>Gila cypha</i> , Listed Endangered	*		*				✓		*	*						

Species List BLM 3 of 3

I talked to Bob Leachman, Biologist for the USFWS in Grand Junction, on June 20, 2002 at 0910 hours. We discussed the Threatened and Endangered species list for our Field Office and he verbally confirmed that the species list we have is current and acceptable for use regarding Emergency Consultation on the Coal Seam Fire.

Per our species list, we are considering the following species regarding the Coal Seam Fire:

Bald eagle	Threatened
Big River Fishes	
razorback sucker	Endangered
bonytail chub	Endangered
humpback chub	Endangered
Colorado pikeminnow	Endangered
Mexican spotted owl	Threatened
Colorado River cutthroat trout	BLM & USFS Sensitive Species with Conservation Agreement signed by the USFWS. Petitioned for listing December 19, 1999

**COAL SEAM FIRE
EMERGENCY POST-FIRE SITE INSPECTION RECORD**

SITE: No: _____ Temp or other No: _____ Date of Inspection _____
Inspector(s) initials) _____ Crew Chief _____

SITE DESCRIPTION

Site Type: Prehistoric _____ Historic _____ Multi component _____ Other _____
UTM (GPS) _____ E _____ N Elev: _____ USGS Quad: _____
Features Present: _____

List wood/organics (if known to be present): _____
Were they burned Y__ N__

VANDALISM PRESENT: YES__ NO__ If yes: Recent YES__ NO__ UNKNOWN__

SITE BURN SEVERITY

___ Low (duff partially consumed, none to little ladder fuels burned, no canopy burned)
___ Moderate (duff consumed, ladder fuel burned, isolated crown burn or torching)
___ Severe (duff, ladder and crown completely consumed)

Note: Map, photograph and describe affected areas of site

FIRE EFFECTS AT SITE

	YES	NO
Cracking/spalling.....	___	___
Smoke/soot damage.....	___	___
Stump/root holes.....	___	___
Loss of architectural wood/features.....	___	___
Tree(s) on walls or rubble.....	___	___
Other _____		

SUPPRESSION IMPACTS TO SITE: YES__ NO__ Handline__ Drop point/safety zone__
Dozer line__ Retardant drop impact/staining__ Mopup__ Tree falling__ Spike Camp__ Safety
Zone__ Vegetation removal__ Vehicle ruts__
Other _____

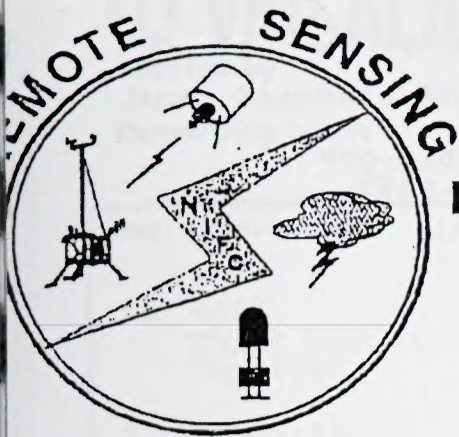
EROSIONAL THREATS TO SITE : YES__ NO__

On site slope ___% Aspect ___o
Site Watershed (to 20 m. out) Slope ___% Aspect ___o
Erosion threat: Active gully/rilling/scouring (depth and extent) _____ Stumphole/burned log erosion _____
Pedestaling__ Duff absent _____
Other _____

RECOMMENDED PRESERVATION TREATMENT

___ No Treatment Recommended
___ Monitor
___ Treatment Recommended: if so, describe:(e.g. Directional falling, Straw bale, straw scatter, Excelsior matting, sandbag, etc.):

Additional comments on back Yes__ No__



**Bureau of Land Management
Office of Fire and Aviation**

3833 S. Development Avenue
Boise, Idaho 83705-5354
208-387-5726
FAX 208-387-5397



TELEFAX TRANSMITTAL SHEET

Date: 6/20/02
To: IRV CASSEK
From: MARK

Number of Pages to Follow:

Subject: QUITE

Comments: THANKS

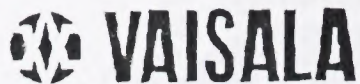
Mark Barbo
2509

BAER RAWS

How used
Why necessary
Where
How many
How much - Quote
Pract

Equipment cost quote
Main \$2700/per station

Contract for maintenance -> both ya



Handled by
Janet Yokobata-Ando / rer
Forwarding agent

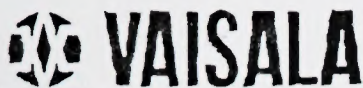
QUOTATION

Date 06/19/02 10077
Seller's reference 10077
Buyer's reference
MARK BARBO mark_barbo@nifc.blm.gov
PH 208-387-5854/FAX 208-387-5397

Consignee	214324	Invoicing address(if not consignee)
BUREAU OF LAND MANAGEMENT USDI/NIFC 3833 SOUTH DEVELOPMENT AVE ATTN MARK BARBO BOISE ID 83705-5354 USA		
Delivery address/notify	214324	Last date of validity
BUREAU OF LAND MANAGEMENT USDI/NIFC 3833 SOUTH DEVELOPMENT AVE ATTN MARK BARBO BOISE ID 83705-5354 USA		08.18.02
		Country of origin
		Country of destination
		USA
Carriage by/via	From/via	Terms and time of delivery
BEST WAY		DESTINATION/PREPAY
Place of discharge	Final destination	Terms of payment
		30 days net

Pos	Description	Quantity	UM	Unit price	delivery time	Total Price USD
SHIP DATE: 7 TO 10 DAYS ARO FOB:DESTINATION						
1	555B Data Collection Platform MS Connec	3.00	EA	1971.00		5913.00
2	555-7007 Panel, Met Mega Config S/S, BLM	3.00	EA	1183.50		3550.50
3	555-7018 Goes Radio, 555B/SB	3.00	EA	1791.00		5373.00
4	540-7037 Solar Panel, 20 Watt	3.00	EA	436.50		1309.50
5	530-3612 Cable, Solar Panel 12 ft	3.00	EA	142.20		426.60
6	443A Antenna, X Yagi 10Db Gain	3.00	EA	384.30		1152.90
7	530-3507 Cable, Antenna 7 ft.	3.00	EA	154.80		464.40
8	430A Sensor, Wind Speed	3.00	EA	408.60		1225.80
9	431A Sensor, Wind Direction	3.00	EA	563.40		1690.20
10	540-3428 Cable, WS/WD 28 ft Xarm	3.00	EA	503.10		1509.30
11	HMP45AH Sensor, RH/AT HMP45AH	3.00	EA	621.90		1865.70
./..						

MAILING ADDRESS	TELEPHONE +1-408-734-9640	REMIT TO ADDRESS	BANKERS	BANK ACCOUNT #
vaisala Inc.	TELEFAX +1-408-734-0655	Vaisala Inc.	Merita Bank PLC	5002-4013743-001-001
1288 Reamwood Ave.		P.O. Box 8500-53423	ABA #	Fed ID#
Sunnyvale, CA 94089-2233		Philadelphia, PA	026010786	04-2731916
USA		19178-3423	NDEAUS3N	



Handled by
Janet Yokobata-Ando / rer
forwarding agent

QUOTATION

Date 06/19/02 10077
Seller's reference 10077
Buyer's reference
MARK BARBO mark_barbo@nifc.blm.gov
PH 208-387-5854/FAX 208-387-5397

Pos	Description	Quantity	UM	Unit price	delivery time	Total Price USD
12	442C Solar Radiation Shield for 435C	3.00	EA	189.00		567.00
13	530-3310 Cable, RH/AT 10 Ft.	3.00	EA	202.50		607.50
14	439C Sensor, Fuel Moisture	3.00	EA	472.50		1417.50
15	530-3307 Cable, RH/AT 7 Ft.	3.00	EA	187.20		561.60
16	444A Sensor, Tipping Bucket 0.01 inch	3.00	EA	699.30		2097.90
17	530-3711 Cable, Precip 11 ft.	3.00	EA	122.40		367.20
18	441A Sensor, Solar Rad with Level	3.00	EA	448.20		1344.60
19	403A Tower, 20 ft. Free Standin	3.00	EA	2134.80		6404.40
20	555-3036 Cable, 555B/540 Program I/F DB9	3.00	EA	178.20		534.60
21	555-9071 Manuals, Products (CD) INCLUDES PROGRAM SOFTWARE	3.00	EA			
22	555-7107 GPS Receiver, 555B/ES NON GSA ITEM	3.00	EA	440.00		1320.00
23	555-7111 Tx/Rx Inverter 555B/ES NON GSA ITEM	3.00	EA	152.00		456.00
24	555-7045 Voice Radio, 555B	3.00	EA	523.80		1571.40
Total						41,730.60
GRAND TOTAL:						USD 41,730.60

GSA CONTRACT NAME: VAISALA INC. - SUNNYVALE OPERATIONS
GSA CONTRACT NUMBER: GS-25F6053D
GSA CONTRACT PERIOD: 12/1/95 THROUGH 11/30/05

MAILING ADDRESS
Vaisala Inc.
1288 Reamwood Ave.
Sunnyvale, CA 94089-2233
USA

TELEPHONE +1-408-734-9640
TELEFAX +1-408-734-0655

REMIT TO ADDRESS
Vaisala Inc.
P.O. Box 8500-53423
Philadelphia, PA
19178-3423

BANKERS
Merita Bank PLC
ABA #
026010786
NDEAUS3N

BANK ACCOUNT #
5002-4013743-001-001
Fed ID#
04-2731916

June 22, 2002

To: Michael Hillenburg, Mitigation Branch, Federal Emergency Management Agency
From: Team Leader, Burned Area Emergency Response (BAER) Team
Subject: Request for Urgent Assistance, Coal Seam Fire, Glenwood Springs, Colorado

Initial findings of the BAER Team have identified a significant risk to life and property as a result of the Coal Seam Fire. We are notifying FEMA of this risk and request your assistance in working with private and state land owners within the Mitchell Creek drainage. Due to the modeled storm-of-concern being a short duration, high intensity event normally received during summer monsoon-type thunderstorms, our assessment indicates that mitigating treatments should be constructed immediately. Most of the treatments that can be safely and feasibly implemented lie on private or state land. The funding authority of both the Bureau of Land Management and US Forest Service does not allow the use of agency funds to conduct work on private lands. Therefore, we are requesting your assistance to help with the emergency watershed treatments identified specifically for private and state lands. The BAER Team has identified potential treatments for these lands to include: debris removal from Mitchell Creek, tree hazards dropped and removed, debris removal from burned homes, site protection structures (Jersey barriers, straw bales, sand bags, etc.) and fish removal or relocation.

The Coal Seam Fire ignited on June 8, 2002 and burned a total of 12,229 acres as a result of exposure of a long-burning coal seam, which surfaced in South Canyon. The fire is located in the Grand Hogback range adjacent to the community of Glenwood Springs, Colorado.

Several watersheds above the community of Glenwood Springs were burned intensively. The soils of these watersheds exhibit high burn severity and there is a complete loss of vegetation on the steep slopes. There is an immediate concern that future runoff events, particularly high-intensity summer storm cells, will result in significant flooding and/or debris flow events.

Our assessment has found that the property (greater than 29 homes/structures) including the fish hatchery in Mitchell Creek are at an extremely high risk to damaging debris flows due to their location in the drainage. The fish hatchery is the highest independent value at risk due to facilities and equipment. Besides the dollar value of the hatchery, this facility controls a large majority of the brood stock and fry of the Colorado River Cutthroat trout. The only other stock in existence in the world is located in Durango, Colorado at a smaller facility. The Colorado Division of Wildlife (CDW) raised the issue in terms of an irretrievable loss of this particular species. The CDW and hatchery manager has already begun relocating their entire stock to raceways that they feel are better protected should a debris flow event occur. However, CDW does not have the staff expertise, resources or the funding to implement treatments that would provide fully successful protection of these alternative raceways.

The BAER Team is almost finished with field assessments and the Emergency Stabilization and Rehabilitation Plan will be completed by June 30. The BAER Team has also purchased three Early Warning Alert Systems to alert Sheriff and Highway Patrol dispatch offices of precipitation events. If you have any questions regarding this request please contact me at 970-945-3282.

Erv Gasser & T.J. Clifford
BAER Team Leaders, Coal Seam Fire

Copy: US Forest Service, White River National Forest
Bureau of Land Management, Glenwood Springs Resource Area
Natural Resources Conservation Service

June 18, 2002

Memorandum

To: Burned Area Emergency Rehabilitation Coordinator, Colorado State Office

From: Area Manager, Glenwood Springs Resource Area, Glenwood Springs, Colorado

Subject: Request for Emergency Fire Stabilization & Rehabilitation (ESR) Funding, Coal Seam Fire, Glenwood Springs Resource Area

The Coal Seam Fire, ignited on June 8, 2002 as a result of a burning coal seam in Storm King Canyon. The fire has resulted in a severe watershed disturbance above the community of Glenwood Springs, Colorado. There currently exists a high flood/mud flow potential in the Mitchell Creek drainage. For this reason, the implementation of flood prevention and early warning treatments has become an exigent circumstance. Accordingly, we are requesting emergency spending authority NTE \$71,000 to begin immediate implementation of the following treatments:

1.	200 Barricades (structure protection)	\$43,000
2.	Equipment to place barricades	\$5,000
3.	Straw bales (certified weed seed free) and installation materials	\$15,000
4.	Sand bags and sand	\$2,500
5.	Hazard warning signs	\$1,500
6.	Miscellaneous emergency ESR needs	<u>\$5,000</u>
	TOTAL:	\$71,000

The above figures do not represent final costs for each of the project categories. Nor do they represent the totality of the treatments that may be proposed by the team. They do, however, represent what we have determined to be the most urgent treatment measures needed to protect human life and property in the potential flood areas.

Implementation of these treatments will be on private lands. The slopes above this drainage are owned by Bureau of Land Management and US Forest Service. Erosion potential will initiate from federal lands, however, due to the steepness of the slopes it is not practical or safe to place approved treatments on the upper watershed lands at this time. There is a potential to seed these slopes in the fall. Our concern at present is the monsoon season, which is imminent. The costs identified are half of the total initial request, which approximates the distribution of ownership.

Final plan specifications for each of these activities will be submitted to your office for review and final approval by approximately June 30, 2002. Thank you for your prompt attention to this most urgent request.

Steve Bennett

June 18, 2002

Memorandum

To: Regional Burned Area Emergency Rehabilitation Coordinator, Rocky Mountain Region

From: Deputy Forest Supervisor, White River National Forest, Glenwood Springs, Colorado

Subject: Request for Emergency Fire Stabilization & Rehabilitation (ESR) Funding, Coal Seam Fire, White River National Forest

The Coal Seam Fire, ignited on June 8, 2002 as a result of a burning coal seam in Storm King Canyon. The fire has resulted in a severe watershed disturbance above the community of Glenwood Springs, Colorado. There currently exists a high flood/mud flow potential in the Mitchell Creek drainage. For this reason, the implementation of flood prevention and early warning treatments has become an exigent circumstance. Accordingly, we are requesting emergency spending authority NTE \$71,000 to begin immediate implementation of the following treatments:

1.	200 Barricades (structure protection)	\$43,000
2.	Equipment to place barricades	\$5,000
3.	Straw bales (certified weed seed free) and installation materials	\$15,000
4.	Sand bags and sand	\$2,500
5.	Hazard warning signs	\$1,500
6.	Miscellaneous emergency ESR needs	<u>\$5,000</u>
	TOTAL:	\$71,000

The above figures do not represent final costs for each of the project categories. Nor do they represent the totality of the treatments that may be proposed by the team. They do, however, represent what we have determined to be the most urgent treatment measures needed to protect human life and property in the potential flood areas.

Implementation of these treatments will be on private lands. The slopes above this drainage are owned by Bureau of Land Management and US Forest Service. Erosion potential will initiate from federal lands, however, due to the steepness of the slopes it is not practical or safe to place approved treatments on the upper watershed lands at this time. There is a potential to seed these slopes in the fall. Our concern at present is the monsoon season, which is imminent. The costs identified are half of the total initial request, which approximates the distribution of ownership.

Final plan specifications for each of these activities will be submitted to your office for review and final approval by approximately June 30, 2002. Thank you for your prompt attention to this most urgent request.

Steve Sherwood

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
COLORADO STATE OFFICE
2850 YOUNGFIELD STREET
LAKEWOOD, COLORADO 80215-7093

In Reply To:
CO-932
1742

Memorandum

To: Director (880), MIB, Room 5060

From: Deputy State Director, Resource Services

Subject: Emergency Fire Stabilization/Rehabilitation (ESR-EFR) Funding for Fire No. E-838, Coal Seam Fire, Glenwood Springs Field Office, Colorado - **Monday, June 24, 2002, additional emergency stabilization request for \$245,100 - part 2 in bold below--**

Part 1: We have approved \$71,000 of immediate funding for the emergency stabilization of BLM lands next to portions of the community of Glenwood Springs. Selected areas in the Mitchell Creek drainage require immediate attention for the protection of life and property because of the high likelihood of flooding and mud flows. Watershed stabilization treatments will begin right now, before the final ESR plan is completed. The following contains the preliminary information for your records. **This \$71,000 has been re-directed toward straw wattle, soil netting, mulching & seeding and printing of the ESR plan since BLM does not have the authority to place treatments of private lands.**

Part 2: We are requesting an immediate need of an additional \$245,100 to place 3,150 rolls of straw wattles on 105 acres of BLM lands on steep slopes Mitchell Creek to protect approximately 29 homes of a housing development along Mitchell Canyon Road. A fish hatchery, containing a large amount of the brood stock and fry of the Colorado River Cutthroat trout. Is also at a very high risk. The Colorado Division of Wildlife will be able to relocate some, but not all, of the stock to raceways they feel are better protected from debris flows. The area has been determined to be extremely vulnerable to flash flooding and mudflows following the total loss of vegetation and severe burn intensity of the fire.

The USFS will be implementing other erosion control work on their lands above the BLM as a secondary priority.

For BLM, each of the rolls of straw wattles are to be 8' in diameter and 20' in length and

will be anchored on the contour by wooden stakes. The total materials cost is estimated to be \$189,000 (at a cost of \$60 per roll, 30 rolls per acre, for 105 acres). A type II crew will be required at \$3,300 per day for 17 days to complete the task, for a total labor cost of \$56,100. A Contract Inspector will be needed on an interim basis to facilitate completion of the required labor (Americorp or Dept. of Corrections Crew can be used)

Michael Hillenburg, Mitigation Branch, Federal Emergency Management Agency has been contacted for assistance that may become available for helping protect the houses and hatchery. The Natural resources Conservation Service has been involved in the project and could provide assistance through their Emergency Watershed Assistance Program (EWP). Both these avenues would facilitate any treatments that would be done on private lands as neither BLM nor the USFS have authority to do stabilization treatments on private lands.

It is requisite that this segment of the stabilization project get completed as soon as possible prior to the arrival of monsoon rains and high intensity summer storm cells in early July. We appreciate your quick response to this need. A supplemental report will be done after the control of the fire and upon the final gathering of stabilization needs by the DOI Emergency Stabilization Team.

Approximately \$5,000 will be needed to print the Burned Area Emergency Rehabilitation Stabilization Plan which is expected to be done by the end of the week of June 23rd.

EFR Project Summary

	Data	Estimated Cost
Fire name	Coal Seam	
Fire Number	E-838	
Fire Dates	June 8-present, 2002	
Acres burned	approximately 4,000 acres BLM approximately 4,000 acres USFS approximately 4,000 acres private	
BLM acres of Rehab	to be determined	
Estimated Start of Rehab	immediately	
Estimated Funding FY02	preliminary immediate needs	
	200 barricades (structure protection)	\$ 43,000
	Equipment to place barriers	\$ 5,000
	Straw bails (certified weed free) & installation materials	\$ 15,000
	Sand bags & sand	\$ 2,500
	Hazard warning signs	\$ 1,500
	Misc. emergency ESR needs	\$ 5,000

Total immediate needs \$ 71,000

The above \$71,000 has been re-directed to BLM lands, to include straw wattles, soil netting, mulching & seeding.

Part 2: immediate needs

Contour straw wattles \$ 189,000
(3150 20-ft. rolls @ \$60)

Labor \$ 56,100
(\$3,300 /day for 17 days-
6 ac. / day for 20 person crew)

Total immediate stabilization
Needs for erosion protection \$ 245,100

Total BLM Cost of Rehabilitation To be determined

The final cost will be submitted to WO-220 & 880 upon completion of the ESR plan (June 30, 20002). These immediate needs represent the most urgent treatment measures to protect life and property from imminent floods and mud flows. The implementation will be on private land directly downslope from USFS & BLM lands will have to be done by the Natural Resources Conservation Service will provide funds through the Emergency Watershed Protection program and or Federal Emergency Management Agency funds. The steep, bared, charred slopes on BLM will most likely be mobilized when the monsoon rains begin in the near future. An objective is to reduce further resource damage from runoff and erosion. An interagency Emergency Stabilization and Rehabilitation team will complete their assessment of treatments needs from the suppression impacts and fire effects to both cultural and natural resources and infrastructure. By June 30, 2002, the Emergency Stabilization & Rehabilitation Plan will be prepared, outlining other stabilization treatments (i.e seeding) that may be done later in the year.

For additional information please contact Scott Davis, Emergency Stabilization/Fire Rehabilitation Coordinator, scott_davis@blm.gov or 303-239-3721

cc: Peter Teensma WO-220
Lisa Dehn, NBC-Bldg 50; BC-610
Bob Bolton, WO-880



United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Washington, D.C. 20240
<http://www.blm.gov>

In Reply Refer To:
1680, 1742

MEMORANDUM

To: State Director, Colorado
From: Budget Officer *Rosanne E. Ben*
Subject: Funding Approval for Coal Seam (E-838) Emergency Fire Stabilization and Rehabilitation Plan.

Your request for emergency stabilization and rehabilitation funding for the Coal Seam Emergency Stabilization and Rehabilitation (ESR) Plan is approved as shown in the table below.

Incident	FY 2002	Total
Coal Seam	\$245,100	\$245,100

We understand this is an initial request for the immediate need of protecting life and property and that the complete and final ESR plan will be submitted later this week or next week. Your submission of the letter from Deputy State Director sent via e-mail to our office on June 25, 2002, along with the Interagency Burned Area Emergency Stabilization and Rehabilitation Plan Specification for the treatment, will be considered as an interim ESR plan. You are authorized to spend up to the approved funding level in Fiscal Year (FY) 2002.

Spending in future years, up to the approved funding level is contingent upon fund availability in that FY. Spending of emergency fire rehabilitation (EFR) funds in excess of the approved amount or timeframe is not permitted without a separate request from the State Director explaining the need for additional funding or an extension of time to complete the rehabilitation project. Please note that in accordance with Interagency Emergency Stabilization and Rehabilitation Handbook and policies, the window for expenditures of EFR funds for treatment is limited to three years after fire control.

The results of EFR monitoring/program related questions should be coordinated with Peter Teensma, WO-220, Interim ESR Coordinator. Questions on this memorandum can be addressed to Bob Bolton, WO-880 Program Analyst, at 202-452-7792.

cc: Peter Teensma, WO-220

United States Department of Agriculture



Natural Resources Conservation Service
655 Parfet Street - RM. E200C
Lakewood, CO 80215

720-544-2810 - OFFICE
720-544-2965 - FAX
www.co.nrcs.usda.gov

SUBJECT: Trip Report - Coal Seam Fire
Garfield County, Colorado

DATE: June 23, 2002

TO: Erv Gasser, BAER Team Leader
Dennis Davidson, District Conservationist,
NRCS, Glenwood Springs

A field investigation within the boundaries of the Coal Seam Fire, Garfield County, Colorado, was conducted June 19-22, 2002. The purpose of the investigation was to assess potential negative effects on roads, bridges, culverts and other hydraulic structures attributable to the post fire condition of the watersheds. This report will provide a general summary of the issues, findings and recommendations resulting from the investigation. Detailed information for each site investigated will be included in the attachments.

Issues

Watersheds will show the effects of the fire via increased yield, runoff rates, erosion, sediment and debris transport. This creates a concern for roads, culverts, bridges, channels and related hydraulic structures located in or along drainageways of burned watersheds in that they may be plugged, overtopped or washed away more frequently than experienced when the watershed was in its pre-fire condition. This report identifies the structures that may be affected, assess their current condition and vulnerability, and in some cases recommends treatments to minimize damage from post-fire runoff events.

Findings & Recommendations

Mitchell Creek Area.

The private road along Mitchell Creek above the hatchery is roughly graded and lacks adequate drainage for storm runoff, especially from the point above where the gravel surface ends. As a result runoff from adjacent slopes will cause increased erosion, turning ruts into gullies. If Mitchell Creek flows out of bank the road may be washed away altogether as a result of headcuts forming at locations where the flow returns abruptly to the channel. It is recommended that the road be outsloped at a uniform grade towards Mitchell Creek.

Mitchell Creek Road below the hatchery, and other affected streets within West Glenwood are paved, have good drainage and should not experience much increased maintenance. There are several locations where the road is adjacent to the creek. If extreme flows in this reach occur, they could widen the channel and undermine the road. It is recommended that the road be inspected immediately after unusually high or intense rains to identify any unsafe conditions. Bank revetments using structural or biotechnical methods should be considered as an alternative to increased maintenance.

Mitchell Creek passes under Mitchell Creek Road in large culverts at two locations below the hatchery. Culverts size should be reevaluated to assure they meet the capacity requirements dictated by the applicable highway authority in light of expected increases in runoff rates.

Overflows will create nuisance flooding but should not do serious damage to the road except for extreme runoff events. Each culvert is large enough to trap and pass a human should they fall into the creek during a flood. Since more frequent flood flows are expected, it is recommended that a fence be built to restrict access above each inlet, and warning signs be hung noting the danger. The box culvert at Center street appears undersized in comparison to structures upstream from it. Overtopping at this site could cause flooding of businesses below. It is recommended that temporary flood barriers (e.g. sandbags) be stored near the site and placed along the south side of Center Street in the event of rising water. This will direct flows down the street on both sides of the crossing, reducing potential damage to deposition of debris on the roadway.

A diversion for the West Glenwood Irrigation Ditch is located on Mitchell Creek just above Donnegan Road. Concrete and steel components of the check dam, headworks and measuring devices should survive a flood. The wooden division box will not. Recommend replacing the tall frame and gate stem at the inlet with a short one that extends just above the top of the gate structure in order to reduce the risk of catching debris. The owners should also evaluate the opportunity to install some sort of temporary sediment trap above the point where the ditch enters an underground pipe. Sediment entering the pipe could easily plug it, a condition which could not easily be remedied short of excavation and replacement of the plugged section.

In general unimproved roads in the Mitchell Creek drainage (east side of road) have been treated by dozer grading and hand dug waterbars. No further treatment is needed in the near term. Forest road 635 (west side) appeared to be in good condition. The gravel surfaced reach above Storm King Ranch headquarters to the small reservoir would benefit from a light grading to remove ruts that could turn into gullies after an intense storm event.

Chutes and culverts carrying runoff under I-70 and the railroad generally appear to be in good condition. Culvert capacity requirements for the 72 inch culvert draining Mitchell Creek under Highway 6 and I-70 should be evaluated in light of expected increases in runoff rates. Overtopping here could deposit debris and sediment on both Highway 6 and the westbound lanes of I-70. The inlet structure would benefit by addition of a trash rack to catch debris from the riparian zone between it and Center Street, and to restrict access by humans, especially during flood events. Additionally a joint about 80 feet downstream from the inlet has separated. Should this culvert be pressurized by high flows soil may be sucked through this gap leaving a sink hole near the westbound lane of I-70.

Midland Avenue Area.

Slope drainage above the new county building complex at the west end of Midland Avenue is controlled by a large debris basin. Hydraulic evaluation of this basin will be performed by others, however it appears the drawdown pipe inlet has not been completed. Sediment can enter the pipe and will plug it if not treated soon. It is recommended to install a screened inlet structure to protect against this condition as a permanent measure and perhaps a straw bale barrier immediately until the final structure can be completed. Similarly slope drainage above the new recreation center is controlled on the east portion by two small abandoned irrigation ditches and a new rock wall about a third the way upslope, and to the west by a new large diversion channel that outlets to existing pasture above Midland Avenue. It is recommended that the irrigation channels be cleaned to restore their capacity for use as debris catchments and small diversions. The upper ditch should be extended to outlet into the new large diversion to fill a gap in the current slope protection scheme. The small irrigation diversions lack capacity to divert flow from significant rainfall events. Consideration should be given for installing a flood

barrier/diversion along the south edge of the road behind the ice rink as an additional flood prevention measure.

Road culverts along Midland Avenue are in good condition and well maintained. Some form of inlet protection should be considered where they handle drainage from steep and heavily burned slopes to the south. Use of a screened inlet box on all culverts is recommended, similar to several already in place there. Culverts size should be reevaluated to assure they meet the capacity requirements dictated by the applicable highway authority in light of expected increases in runoff rates. Consideration for installing additional culverts rather than replacement of existing ones should be made if increased capacity is required.

Culverts draining the area between Midland Avenue and the Union Pacific Railroad are generally in good condition, with three needing sediment removed from their inlets. If the structures lack adequate capacity for increased runoff rates, it appears there is considerable flood storage available between Midland Road and the railroad that would be filled before the railroad overtops. Fencing to restrict human access to the culvert inlets is recommended, especially if the area above them will be subjected to ponding from increased runoff. Culvert capacity and available storage should be evaluated to determine the extent of protection under current conditions. Although unexpected, an overtopping event could seriously damage the track embankments. In addition the drainage between the railroad and the steep mountain slope may be vulnerable to debris flows that would plug the drainage system from the I-70 - West Glenwood interchange on west past South Canyon Creek. There is no room for structural improvements in this area. Suggested treatments for this concern include completion of a more detailed study to evaluate the risk under current conditions, possible extension of the existing rockfall protection fence and warning system to fill gaps through the vulnerable areas, and assuring sediment is removed from culvert entrances after sediment producing storm events.

South Canyon Creek Area.

South Canyon Creek Road appears well maintained with good drainage and should not experience much increased maintenance as a result of the fire, except attention to the culverts as described below. Forest road surfaces consist mostly of powder dry soil and will experience heavy erosion if intense rains occur. Waterbars are in place but may only have a small affect under the current condition. Its recommended that these roads be graded to remove ruts and maintenance after storms is increased.

South Canyon Creek outlets under the railroad through a large box culvert. Plugging of this culvert by woody debris is not a concern due to its size and the mild slope immediately upstream.

Drainage ditches along South Canyon Creek Road outlet through culverts to the Canyon Creek riparian area. Adjacent slopes appear intensely burned and will produce more runoff borne sediment and debris that could plug these culverts. If plugged, overtopping will damage the road but should not breach the road embankment. These culvert inlets should be cleaned and some form of simple inlet protection should be considered, such as excavating a small sediment reservoir or installing a low straw bale barrier above each inlet.

South Canyon Creek Road crosses the creek twice and a perennial tributary drainage once in culverts in the study area. Culverts size should be reevaluated to assure they meet the capacity requirements dictated by the applicable highway authority in light of expected increases in runoff rates. Overtopping at these sites may result in breaching the road fill and loss of access for emergency services to residents up canyon. Consideration should be given for installing a trash

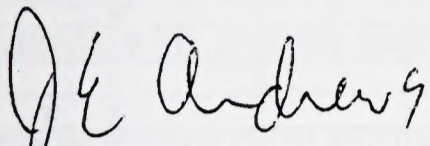
rack at or above the inlets to catch woody debris, as it is not feasible to remove it from the riparian areas above these sites.

Summary

A summary of proposed treatments for each site investigated is shown in Table 1.

Please contact me by telephone at (720) 544-2834 or by E-mail at john.andrews@co.usda.gov if the information in this report needs any explanation or if you have any additional concerns that I may be able to address.

Sincerely,



JOHN E. ANDREWS, P.E.
State Conservation Engineer

Attachments: Coal Seam Fire Road Crossing Assessment
Photographs (on CD-ROM)
GPS Site Summary Data

TABLE 1. Summary of Recommended Treatments

Site # ¹	photo file	Type of Structure	Inlet Cleaning	Evaluation & Design	Inlet Protection	Debris Racks	Other ²	None
1	100-0545.jpg	pvt. bridge	x					
2	100-0547.jpg	pvt. culvert	x	x			x	
3	100-0550.jpg	pvt. bridge					x	
4	100-0551.jpg	pvt. bridge					x	
5	100-0552.jpg	pvt. bridge						x
10	100-0557.jpg	pvt. bridge						x
11	100-0558.jpg	pub. culvert	x	x			x	
12	100-0559.jpg	pub. culvert	x	x			x	
13	100-0560.jpg	pvt. culvert		x				
14	100-0561.jpg	pvt. bridge						x
15	100-0562.jpg	pub. bridge	x			x		
16	100-0563.jpg	pvt. bridge						x
18	100-0565.jpg	pub. bridge	x	x			x	
19	100-0566.jpg	pub. culvert	x	x		x	x	
22	100-0572.jpg	pub. culvert	x		x	x		
23	100-0573.jpg	pub. culvert		x	x			
24	100-0575.jpg	pub. culvert						x
25	100-0578.jpg	pub. culvert	x	x		x		
26	100-0579.jpg	trmt. plant rd.					x	
27	100-0579.jpg	pvt. irr. ditch					x	
27	100-0580.jpg	pub. diversion					x	
28	100-0582.jpg	pub. culvert	x	x	x			
29	100-0583.jpg	pvt. culvert					x	
30	100-0584.jpg	pub. culvert	x	x	x			
31	100-0585.jpg	RR culvert		x			x	
32	100-0586.jpg	pub. culvert	x	x	x			
33	100-0587.jpg	pub. culvert	x	x	x			
34	100-0588.jpg	RR culvert		x			x	
35	100-0589.jpg	pub. culvert	x	x	x			
36	100-0590.jpg	pub. culvert	x	x				
37	100-0591.jpg	RR culvert	x	x			x	
38A	100-0592.jpg	debris basin	x		x			
38B	100-0593.jpg	pub. culvert		x				
39	none	RR Culvert	x	x			x	
40	100-0595.jpg	debris basin	x	x		x		
42	100-0597.jpg	pub. culvert	x	x				
43	100-0597.jpg	RR culvert	x	x			x	
44	100-0600.jpg	RR culvert	x	x			x	
45	100-0601.jpg	pub. bridge	x					
46	100-0602.jpg	RR culvert	x	x				
47	100-0603.jpg	RR culvert	x	x		x		
48	100-0604.jpg	RR culvert	x	x		x		
49	100-0605.jpg	RR culvert	x	x		x		
50	100-0606.jpg	pub. culvert	x		x			
51	100-0607.jpg	pub. culvert	x		x			
52	100-0608.jpg	pub. culvert	x		x			
53	100-0609.jpg	pub. culvert	x	x		x		
54	100-0610.jpg	pub. culvert	x		x			
55	100-0611.jpg	pub. culvert	x		x			
56	100-0612.jpg	pub. culvert	x		x			
57	100-0613.jpg	pub. culvert	x		x			
58	none	pub. culvert	x		x			
59	100-0614.jpg	pub. culvert	x	x		x		
60	100-0615.jpg	pub. culvert	x	x		x		
61	100-0616.jpg	pub. culvert	x	x		x	x	
62	100-0617.jpg	pub. ford						
63	100-0618.jpg	irr. diversion	x				x	
63	100-0619.jpg	" "						
63	100-0620.jpg	" "						
63	100-0621.jpg	" "						
64	100-0623.jpg	irr. pipe					x	

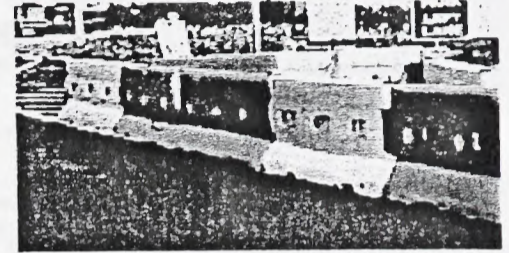
1. See map & assesment document for detailed description.

2. See assesment document for description of non standard recommendations.

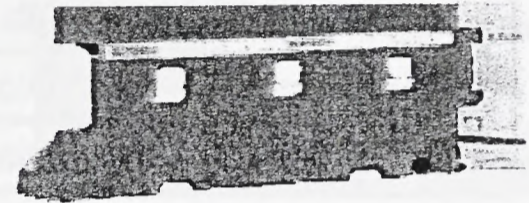

[Home](#)
[Products](#)
[Specs](#)
[Contact Us](#)

There isn't any barrier better than Rhino™ Safety Barriers

As a supplier of safety barriers, **American Barrier Systems, Inc.**, offers excellent product to suit your needs. We supply highway barriers as well as delineator barriers. Our Rhino Barriers will provide you with the excellence you deserve. These tough molded polyethylene barriers combine very high standards with unique safety specifications.

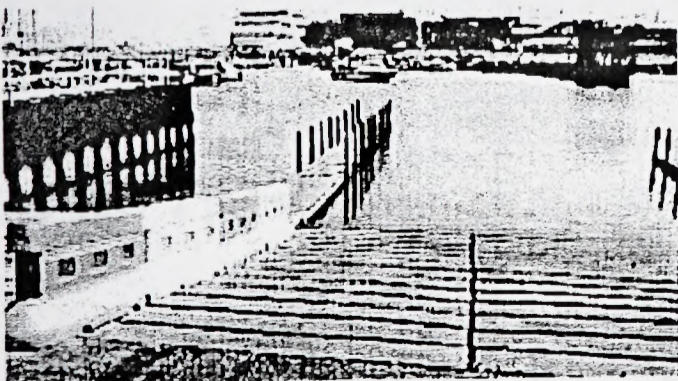


Rhino Barriers offer many uses for highway safety, pedestrian control, as well as complete temporary traffic control services to contractors, utilities, state and local governments. Barriers are also of great use for the Department of Transportation and railroads throughout the country. When you see the benefits of **Rhino Barriers**, we are confident you will use them for all of your safety road barrier needs.



Some of the outstanding features of Rhino Barriers include:

- Superior strength.
- Lightweight and easy to handle.
- Available in highly visible colors in chevron design.
- One man can easily move empty barriers.
- Offer added weight and stability when filled with water.
- Easy stacking for storage and transportation.
- Optional reflectors and lights for added safety features.
- Just passed DOT regulation NRCHP350 level 2 test for highway safety.
- 100 % financing available through Rhino finance.



At American Barrier Systems, Inc., we are number one in our service is number one. We are dedicated to providing you the finest traffic-control safety barriers in the industry.

If you should have any questions or would like to place an order, please call me.

Thank you,

Daniel Ginsberg



Home

Products

Specs

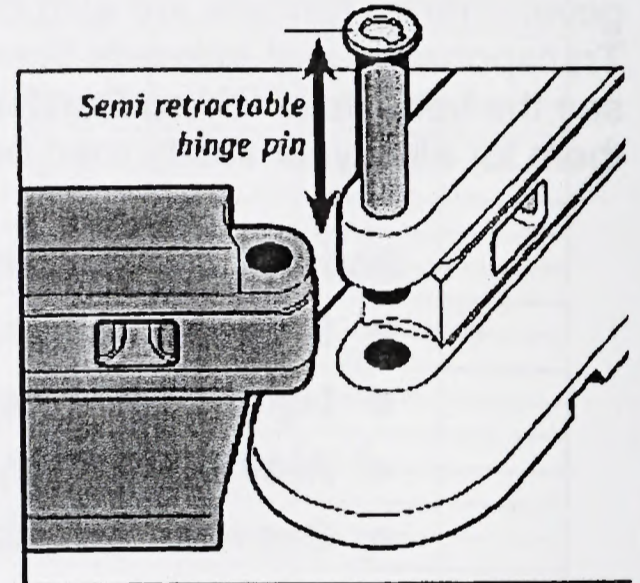
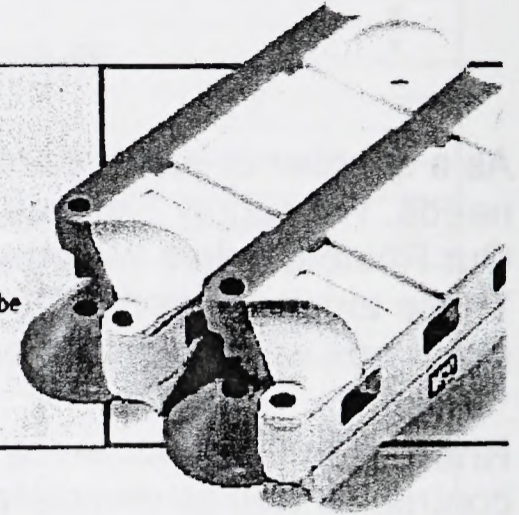
Contact Us

BARRIER SPECIFICATION

	Imperial	Metric
Overall length	90"	2.285m
Overall height	35"	0.885m
Overall base	25.5"	0.65m
Weight, empty	132/150lb.	60/70kg
Water filling	770lb.	350kg
Water entry	3" Dia.	75mm Dia.
Water exit	2" Dia.	50mm Dia.

EASY STACKING

Rhino Protection Barriers have a unique design allowing them to be efficiently stacked for storage or transportation.

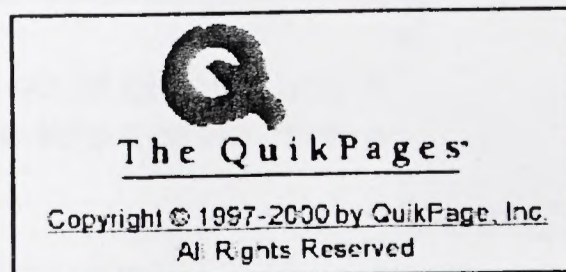


American Barrier Systems, Inc.
3989 Market Street
Ventura, CA 93003

Toll Free
877-774-4664

Toll-Free: (877)
Phone: (805) 648-2128
Fax: (805) 648-1543

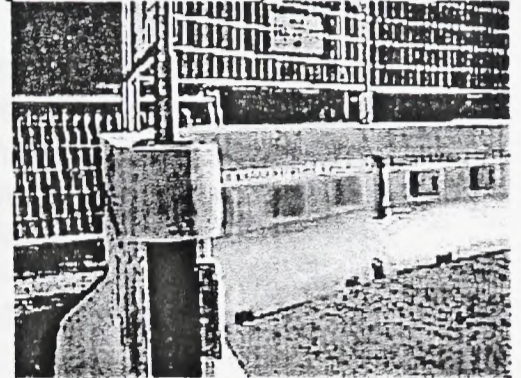
RHINO BARRIERS



Phone
805-648-2128
Fax
805-648-1543

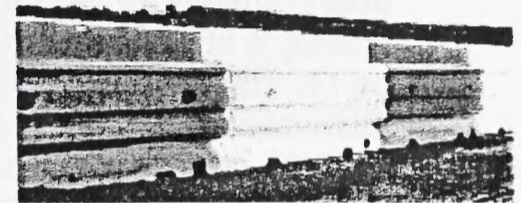

[Home](#)
[Products](#)
[Specs](#)
[Contact Us](#)

Rhino Barriers are manufactured from tough molded polyethylene. They are easy to carry, transport, stack, store, and put together. One person can easily move an empty barrier into position, and a simple pin system allows the barriers to be tightly interlocked for extra strength. Rhino Barriers can be filled with water for added weight and stability. Rhino Barriers are a means of delineation for both traffic and pedestrians in a number of situations. They can be used at road works, construction sites, ports or terminals, airports, concerts, and all manner of special events.



APPLICATIONS

- Road construction sites
- Road closures/works
- Building/work site pedestrian
- Sporting events
- Shows/galas
- Car parking lots/garages
- Any emergency



American Barrier Systems, Inc.
3989 Market Street
Ventura, CA 93003

Toll-Free: (877) 447-2273

Phone: (805) 641-1111
Fax: (805) 641-1112

RHINO BARRIERS



The QuikPages

Copyright © 1997-2000 by QuikPage, Inc.
All Rights Reserved

Czenkusch, Alan

From: Hebein, Sherman
Sent: Thursday, June 27, 2002 3:12 PM
To: Knox, Robin
Cc: Graul, Walt; Wood, Don; Senior Staff; Velarde, Ron; Yamashita, Steve; Kolecki, Rich; Czenkusch, Alan
Subject: Glenwood Hatchery Protection-Coal Seam Fire

Robin,

We have located the materials required to provide minimal mud and flood protection to the Glenwood Springs Fish Hatchery as suggested by the BAER team. The materials consist of concrete highway barriers (jersey barriers) and concrete blocks. These materials will be placed in strategic locations to direct and divert the flow of mud, debris and water away from unit residences and buildings. The jersey barriers weigh approximately 4,000 lbs each and are linked top and bottom through integral rings joined by a steel rod. The concrete blocks are 2' x 2' x 6' and are used to insure that the barriers do not move laterally.

BAER team recommendations require a combined minimum barrier length of 750 linear feet or approximately 75 units that are 10' long. I have made preliminary arrangements with Mays Concrete of Grand Junction to begin transporting "up to 80" of the units to the Glenwood Hatchery on Monday, July 1. The units have been previously used and are in good condition. Mays Concrete has agreed to sell them to us for \$150.00 each, or \$30.00 less than their new price of \$180.00 each.

Grand Junction Pipe and Supply does not have any of the barriers in stock and would require 3-4 days to assemble the materials needed to begin work on them. Their price is \$21.00 per lineal foot FOB their sales yard in Glenwood Springs, and they can make 8 -10 per day. Their scheduled production has already been dedicated to other customers and we would have to wait several weeks for our turn.

Concrete blocks are available through Bavarick Brothers, a Glenwood Springs concrete company. They cost \$22.50 each plus delivery based on an hourly rate for their crane truck (\$90.00/hr) and dump truck (\$60.00/hr).

Given the above, I would like to request approval to obtain a Purchase Order to Mays Concrete for "up to" 80 of the jersey barriers at \$150.00 each for a maximum cost of \$12,000.00. Our Game Damage trucks are ready to begin transportation of the barriers to the Glenwood Springs Fish Hatchery on Monday, July 1.

The concrete blocks will cost \$900.00 plus the transportation. I would also like to request the authority to purchase the blocks plus a maximum of 10 hours of transportation time for each unit involved for a total cost of \$2,400.00. I present this request for documentation purposes as well as your approval.

Rich Kolecki, Alan Czenkusch and I are in agreement that the procurement and placement of these barriers is an absolutely critical step towards the protection of the Glenwood Springs Fish Hatchery from mud and flood damage associated with the Coal Seam Fire. We appreciate your prompt attention to this situation.

Thanks,
Sherm



United States
Department of
Agriculture

Forest
Service

White River
National
Forest

Supervisor's Office
900 Grand Avenue
PO Box 948
Glenwood Spgs CO 81602
(970) 945-2521
TTY (970) 945-3255
FAX (970) 945-3266

File Code: 2520

Date: June 21, 2002

Mark Barbo
Bureau of Land Management
Office of Fire and Aviation
3833 S. Development Avenue
Boise, ID 83705-5354

Dear Mr. Barbo,

The Coal Seam Fire ignited on June 8, 2002 as a result of a burning coal seam in South Canyon and has burned about 12,000 acres to date. Several watershed areas above the community of Glenwood Springs were burned intensively, resulting in the loss of vegetation and altered hydrology. There is a real concern that future runoff events, particularly high intensity summer storm cells, will result in significant flooding and/or debris flows. Because homes and commercial businesses lie within the path of stream courses of these watersheds, we are requesting three BAER RAWS stations.

The purpose of these RAWS stations is to provide an early warning system in response to anticipated flood events resulting from the burned area above the community. We would like to order three BAER RAWS stations and have received a quote for \$41,730.60. The annual cost to operate and maintain these instruments was quoted to us at \$2,650 for each instrument. This year's total costs, including operation and maintenance, will be about \$49,681.

Two units will be placed in Mitchell Creek and one unit placed in South Canyon. The early warning system will be maintained by NIFC and connected to the dispatch center for the Garfield County Sheriff's office via radio and/or phone lines. It will also relay "real-time" weather information to the National Weather Service. The Glenwood Springs Mud and Flood Task Force will design and implement a contact and evacuation plan based on flood zones delineated by the BAER Team. This plan will be implemented by the Sheriff's office and/or Highway Patrol.

Please contact T.J. Clifford, Forest Service BAER Team Leader with any questions at tjclifford@fs.fed.us or (208) 866-3204.

T.J. CLIFFORD
BAER Team Leader – Coal Seam Fire



PROCUREMENT REQUEST

INSTRUCTIONS: Agencies must provide entries in unshaded areas. See reverse.

TO: (Procurement Office)

1. REQUESTING OFFICE

2 RECEIVING OFFICE NO.	3 CONTRACT NUMBER	4 ORDER DATE	5	6 UNIT CODE	7 FUND CODE	8 PURCHASE/DELIVERY ORDER NUMBER	9 SUB.	1A. PROCUREMENT REQUEST NO.
		06/21/02						1B. DATE

CHECK ONE

Purchase Order

Delivery

10. TO: (Seller)

11. SHIP TO: (Consignee and Destination)

INSIDE DELIVERY REQUESTED

12 LINE ITEM	13 ACT. CODE	14 DESCRIPTION	15 BUDGET OBJECT	16 ACC. LINE	17 QUANTITY	18 UNIT ISSUE	19 UNIT PRICE	20 AMOUNT
		<p>Early Warning System</p> <ul style="list-style-type: none"> • BAER RAWs station see attached for supplies • Maintenance Contract Full - provided by NIFC (BLM) RAWs office <p>Will be delivered and installed to sites identified by BAER Team on negotiated delivery date. Prior to installation construction and testing of units will be completed.</p> <p>For additional information, Please contact:</p> <p>TECHNICAL CONTACT _____ TELEPHONE NO. _____</p>			3			
					3		\$2,650	\$7,950

21 FOB POINT	22 DISCOUNT TERMS	25
		Sub-Total ▶


23 REQUIRED DELIVERY (Do not use ASAP)	23A NEGOTIATED DELIVERY	24 SHIP VIA	26 ESTIMATED FREIGHT	27
	July 5, 2002			TOTAL ▶

28 ACC. LINE	29 ACCOUNTING CLASSIFICATION				30 DISTRIBUTION	31 AMOUNT
5	A	B	C	D	E	
	5	10	3	4	1 4 1 2	

RECOMMENDED SOURCE(S) (If necessary, use attachment)

I certify that the above items are necessary for use in the public service.

TITLE
FS BAER Team Leader

SIGNATURE OF AUTHORIZED REPRESENTATIVE




**Interagency Burned Area Emergency Response Team
c/o White River National Forest
1512 Grand Ave, Suite 212
Glenwood Springs, Colorado**

June 24, 2002

Memorandum

To: Area Manager, Glenwood Springs Resource Area, Bureau of Land Management
Forest Supervisor, White River National Forest, U.S. Forest Service
District Conservationist, Natural Resource Conservation Service
District Wildlife Manager, Colorado Division of Wildlife

From: Burned Area Emergency Response (BAER) Team

Subject: Coal Seam Fire, BAER Team Closeout Briefing
**June 27, 2002, 10:00 a.m., County Courthouse, 8th Street, Room 301,
Glenwood Springs, Colorado**

The Interagency Burned Area Emergency Response (BAER) Team was requested to assess the fire suppression and fire effects impacts to cultural and natural resources and to the community of Glenwood Springs, Colorado as a result of the Coal Seam Fire. The Coal Seam Fire affected private lands, the City of Glenwood Springs, and lands administered by the Bureau of Land Management and U.S. Forest Service. You and any of your staff are invited to attend a presentation by the BAER Team discussing our assessment of the issues, observations, findings, and recommendations pertaining to the Coal Seam Fire incident. The presentation will be held on Thursday, June 27, 2002, at 10:00 a.m., at the County Courthouse, 8th Street, Room 301, Glenwood Springs, Colorado.

BAER Team members will discuss emergency stabilization and rehabilitation treatments in the areas of watershed/soils, cultural resources, wildlife, vegetation, forestry, infrastructure, compliance, suppression impacts, and rehabilitation completed. Following the presentation, BAER Team members will be available for individual questions.

Should you have any questions regarding this invitation please give me a call at 970-945-3288.

Erv Gasser

Coal Seam Fire

~ Glenwood Springs, Colorado ~

Bureau of Land Management – Glenwood Springs Field Office
US Forest Service – White River National Forest
City of Glenwood Springs
Garfield County

Interagency Burned Area Emergency Response Team
Close-Out Briefing
June 27, 2002 at 10:00 am
County Courthouse, Room 301

Agenda

Welcome

Introduction

Gasser

Resource Assessments:

**Cultural
Vegetation
Forestry
Wildlife
Soils/Watershed**

**James
Dolan
Gasser
Hayden
Parenti
Loadholt**

Questions

Clifford

Plan Status, Approval, Action Items

Gasser

Closing Remarks

Bennett

**INTERAGENCY
BURNED AREA EMERGENCY STABILIZATION AND REHABILITATION
PLAN**

PART E – SUMMARY OF ACTIVITIES – COST SUMMARY TABLE

TREATMENT SPECIFICATION	USFS	NRCS/O	BLM
#1 Ditch Breach Evaluation & Design		\$2,000.00	
#2 Structure Protection Design		\$7,000.00	
#3 Sediment Basin (runway) Maintenance		\$38,100.00	
#4 Trash Racks Evaluation & Design		\$10,000.00	
#5 Soil Netting w/ seed			\$46,000.00
#6 Remove Floatable Debris		\$160,110.00	
#7 Early Warning System	\$24,767.00		\$49,534.00
#8 Diversion Channel Evaluation & Design		\$10,500.00	
#9 Culvert Cleaning		\$34,400.00	
#10 Bridge Removal Evaluation		\$5,000.00	
#11 Contour Straw Wattles			\$407,900.00
#12 Culvert Evaluation & Design		\$14,500.00	
#13 Hazard Warning Sign		\$5,480.00	
#14 Straw Mulching			\$398,000.00
#15 Dozerline Rehab.	F	F	F
#16 Noxious Weed Monitoring	\$8,930.00	\$24,930.00	\$8,930.00
#17 Noxious Weed Control		\$23,645.00	\$2,245.00
#18 Aerial Mulching/Seeding		\$1,559,830.00	\$2,557,100.00
#19 Implementation Leader & Support			\$55,462.00
#20 Plan Preparation	\$122,655.00		\$122,655.00
#21 Hazard Tree Mitigation		\$24,200.00	
#22 Native American Consultation	\$14,700.00		
TOTAL COST PER AGENCY	\$171,052.00	\$1,919,695.00	\$3,647,826.00
TOTAL COST	\$5,738,573.00		

Coal Seam Fire

Fire Incident Abstract

Fire History:

June 8 Coal Seam Fire Surfaces and Ignites Vegetation
 June 9 Type I Incident Management Team Arrives
 June 16 BAER Team Arrives
 June 25 Fire: 90% contained

Fire Areas & Perimeters: The Coal Seam Fire burned 12,229 acres with a perimeter of 52.5 miles.

Suppression Impacts:

Agency	BLM	USFS	State	City	Private
Dozerline (Miles)	3.11	3.53	0	1.76	1.04
Helispots/Drop Points	7	6	0	4	6
Roads	12.0	7.78	0	0.86	6.88
Tree Hazards	Two Hundred Hazard Trees on BLM, State, and Private Land				

Burn Severity by Jurisdiction:

Agency	High	Moderate	Low	Unburned
BLM	1145	1587	1319	406
USFS	159	162	692	2745
State	0	2	52	4
City	450	716	649	320
Private	441	756	483	145
Total	2195	3223	3195	3620

Acres by Jurisdiction:

BLM 4457
 USFS 3754
 City 2135
 State 58
 Private 1825

TOTAL: 12,229

Resource Impacts:

Vegetation Mortality: Pinon-Juniper communities impacted, other communities will recover quickly. High potential for noxious weed spread, especially in South Canyon area. Tree hazards in Mitchell Creek Canyon and South Canyon have been identified.

Threatened & Endangered Species: Bald Eagle, Lynx, and four Colorado River Fish Species.

Sensitive Species: Colorado River Cutthroat.

Cultural Sites: Eight sites within or adjacent to the fire area, two on USFS land, one on State land, and five on city land.

Watersheds: Forty-one watersheds with various degrees of debris-flow, flooding, property damage, and transportation delay potentials.

**Coal Seam Fire
Mud/Flood Management
Primary Task Assignments
June 27, 2002**

- **Emergency Watershed Protection Program agreement between the National Resources Conservation Service and Garfield County**
 - Garfield County
 - NRCS
- **Obtain jersey barriers and sandbags**
 - Garfield County—order materials *CDOT*
 - NRCS—reimburse county
- **Prepare final design specifications for flood/debris flow overflow channel** *NRCS*
- **Close Donagan Road from CR132 to Strom King Road to all but local traffic?**
 - Garfield County Road and Bridge
 - Garfield County Sheriff's Office
- **Close Center Drive at Mitchell Creek bridge**
 - Glenwood Springs Police Department
- **Post event, clean-up debris on private property used as overflow control channel**
 - ~~Garfield County Road and Bridge~~ *video current conditions*
 - ~~Glenwood Springs Public Works~~
- **Utility protection**
 - ~~Glenwood Springs Public Works~~
 - Various utility companies
- **Irrigation Ditch diversion structure closure/protection**
 - NRCS
 - Various ditch companies
- **Mitchell Creek channel pre-event debris removal**
 - NRCS
 - Army Corps of Engineers—404 permit
- **U.S. 6&24 protection/closure and post event debris removal**
 - C-DOT
 - CSP
- **Obtain easements for work on private property**
 - NRCS

NAME	AGENCY	PHONE	email
Ron Van Meter	GARCO S.O.		Rvanmeter@garfield 945-0453
MICHAEL MATSON	FEMA		county.com 202-431-7089
Tomás Löwe	FEMA		202-431-7739
Steve Bennett	BLM-Glenwood		stave_bennett@co.blm.gov 970-947-2813
DALE HANCOCK	GARFIELD CO		dhancock@garfield-county.com 970-384-5001
ED GREEN	GARCO		970-384-5000 egreen@garfield-county.com
Ron Biggers Glenwood			
Ron Biggers	Glenwood Fire Dept	928-6033	RBiggers@ci.glenwood-springs.co.us
MIKE PIPER	GLENWOOD SPRINGS FIRE DEPT.		928-6030 379-3303
Susan Hakanson			hakanson@sopris.net 948-1894 (C)
BILL KIGHT	USFS/White River NF (agency rep)		bkight@fs.fed.us
T. Clifford	USFS / BAER Team Lead		202-431-2200 t.clifford@fs.fed.us 206-617-0350
ERV GASSER	NATIONAL PARK SERVICE/BAER TEAM LEAD		erv_gasser@nps.gov 970-3256
Andrea Holland-Sear	White River NF (Hydrologist)		ahollandsear@fs.fed.us
George Mead	Garfield SAR Vice president		970-285-7908 gmead@glenwood.
LANNY GRANT	GARFIELD SAR PRESIDENT		876-5514 H 379-5355 C
Dennis Davidson	NRCS. Glenwood		945-5494
KEVIN LAUMINGER	UNION PACIFIC RR.		970-577-3606
Dee Lehman	BLM-Glenwood		dee-lehman@co.blm.gov 970-947-2830
Jim Dale	Information-Cool Steam Fire Team		970-945-3233
Mike Alsdorf	AMERICAN Red Cross		970-947-0400 guterma@red.net
Phillip Anderle	CDOT		970-947-9361 phillip.anderle@dot.state.co
John Martin	Garfield County Commissioner		J.MARTIN@Garfield-County.com 945-5004 EX 1010
Guy Meyer	GARCO EM		945-9789
BOB KIBLER	GARCO EMER. COMMUNICATIONS		625-8280
Carl Stephens	Garco Emergency Comm		625-8095
marion Stephens	Garco Road & Bridge		625 8601.
Steve Denney	Colo. OEM	stevedenney@state.co.us	970-248-7308
Tim Sarmo	Colo. DEPT. LOCAL AFFAIRS		248-7333
Dick Vauk	COLO OFFICE of EMERGENCY MGT		303 273-1774
Marilyn Gally	CO OEM	marilyn.gally@state.co.us	303 273 1775
Bill Middleton	Gar Co Sheriff's Dept.		970-945-0453

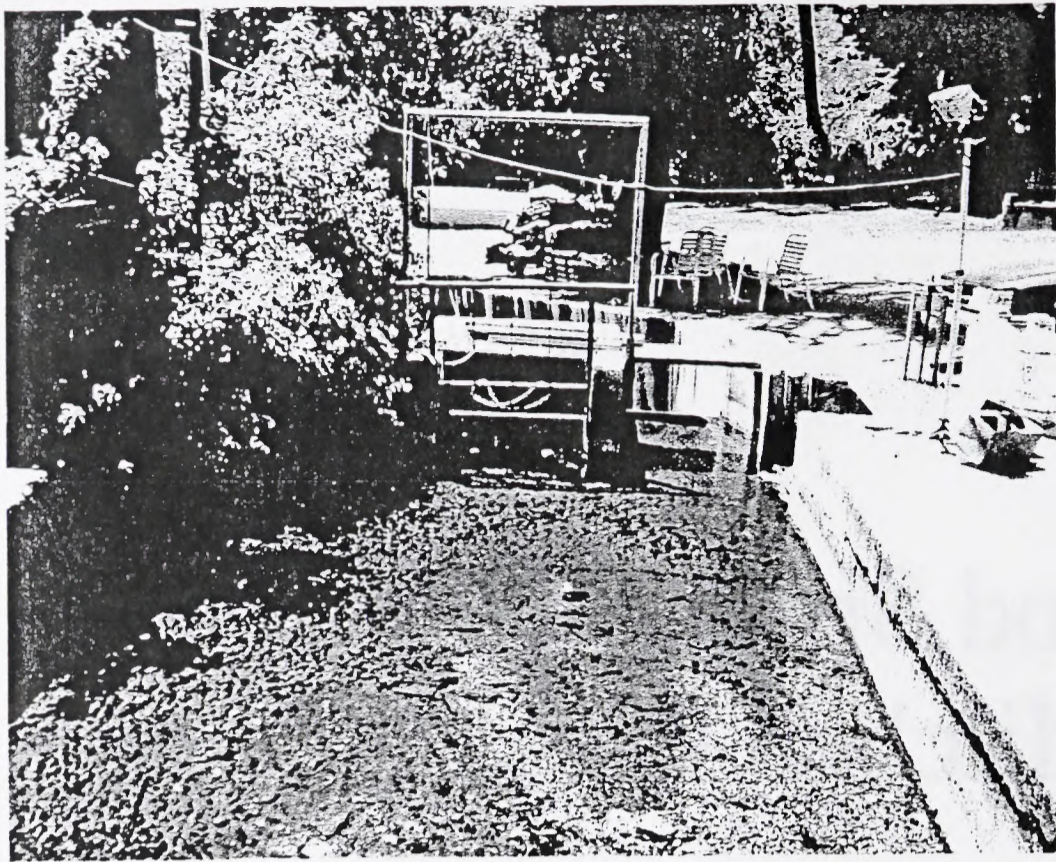
Glenwood Springs Hatchery Mitchell Creek

Colorado Division of Wildlife

June 18, 2002

*Digital photos by Glenwood Spgs Resource
Area — files % Kay Hopkins —*

LOOKING SW

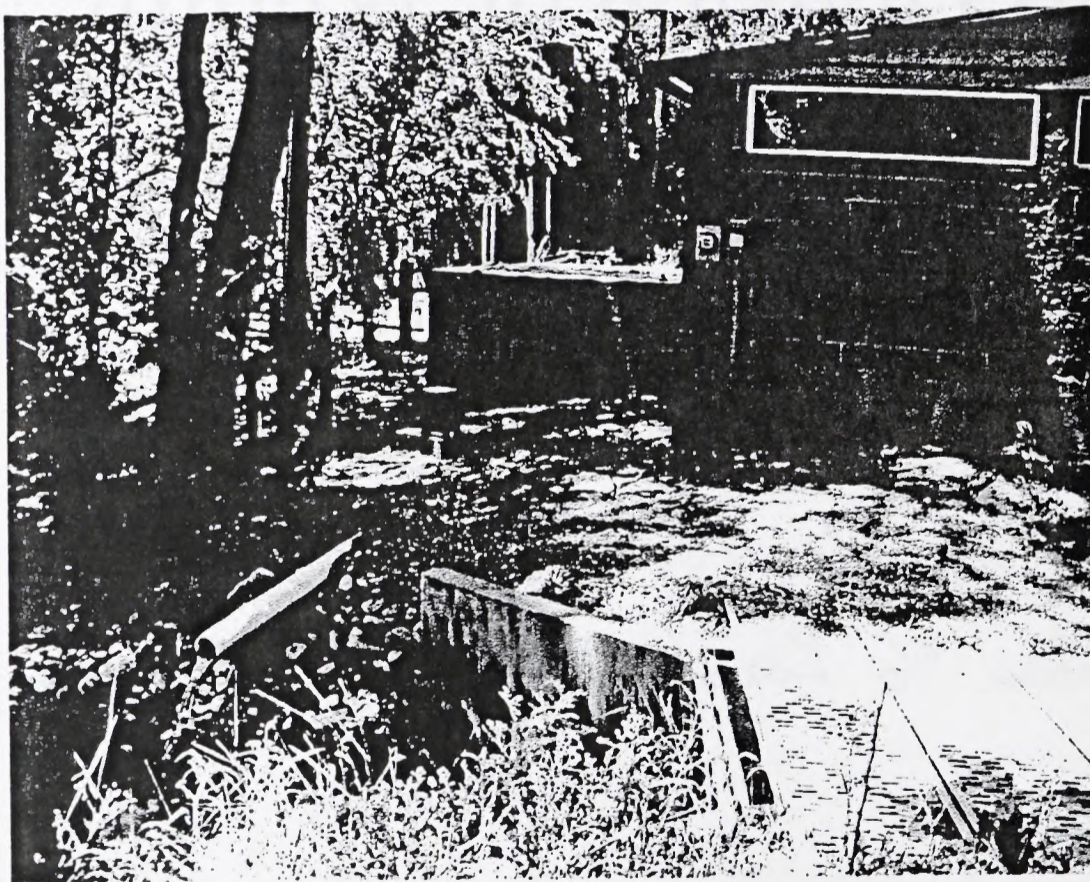


Note limited freeboard
bulkhead on @ ~ 2' high

1. Diversion Structure

This headgate allows for the diversion of Mitchell Creek water to bypass the raceways

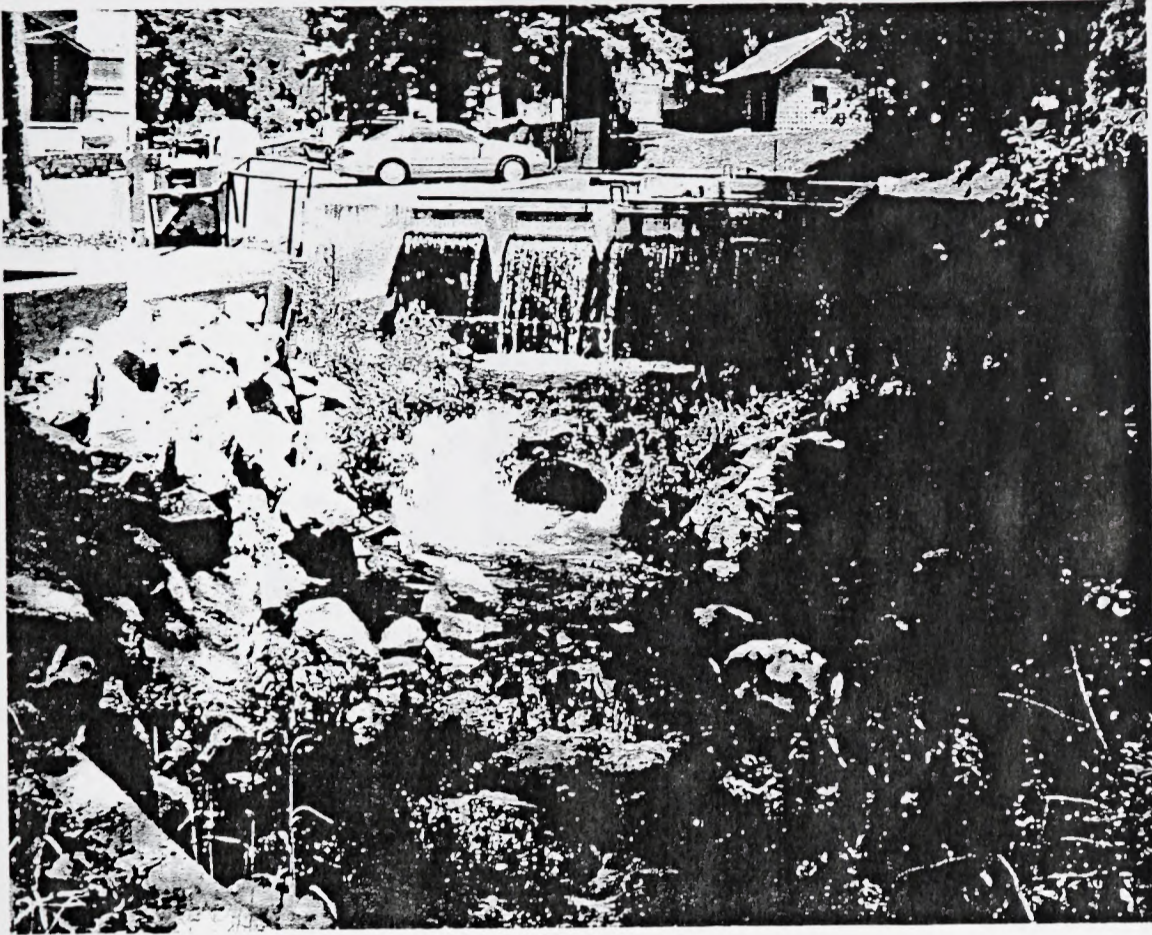
LOOKING W



2. Quarantine Building

The structure at center contains UV decontamination units. Decontaminated water returns to Mitchell Creek via white pipe.

LOOKING N



lower end of front raceways

3. Mitchell Creek water diverted at picture number 1, emerges through culvert at center of picture

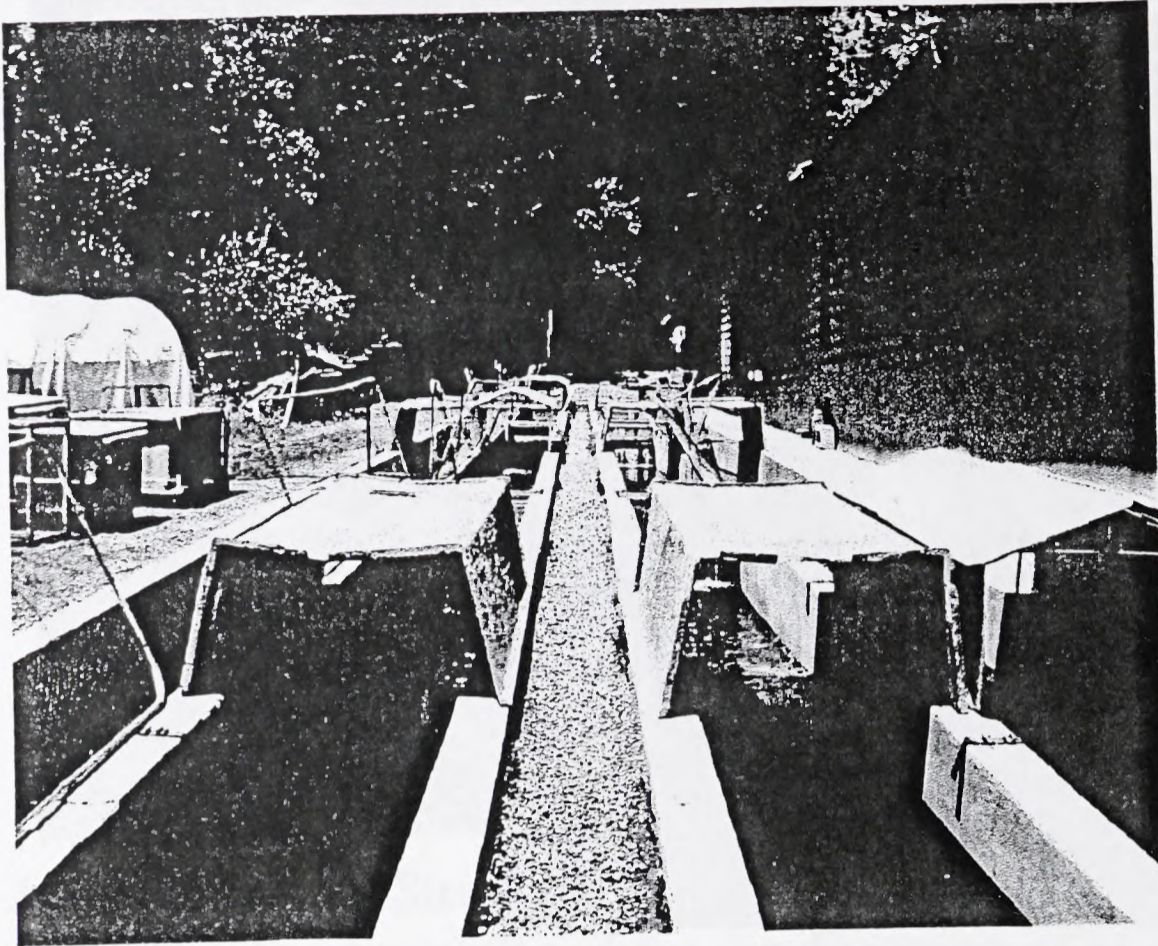


LOOKING NE

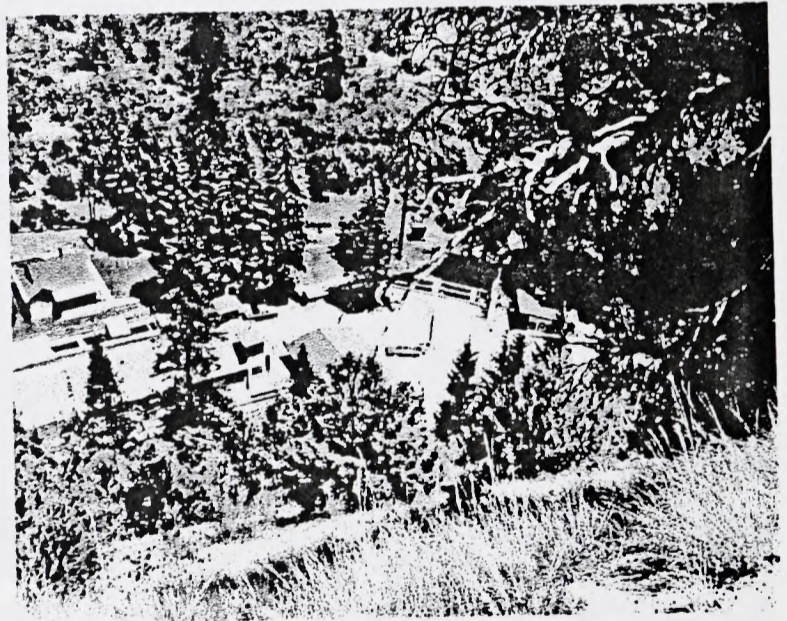
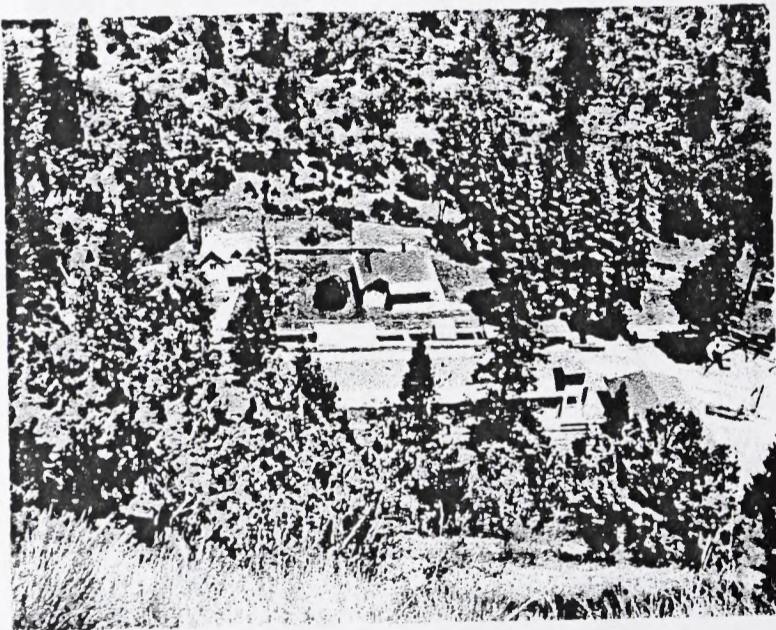
180° from # 1

4. Mitchell Creek immediately above the hatchery.

LOOKING N



5. Nurse basins west of hatchery building.



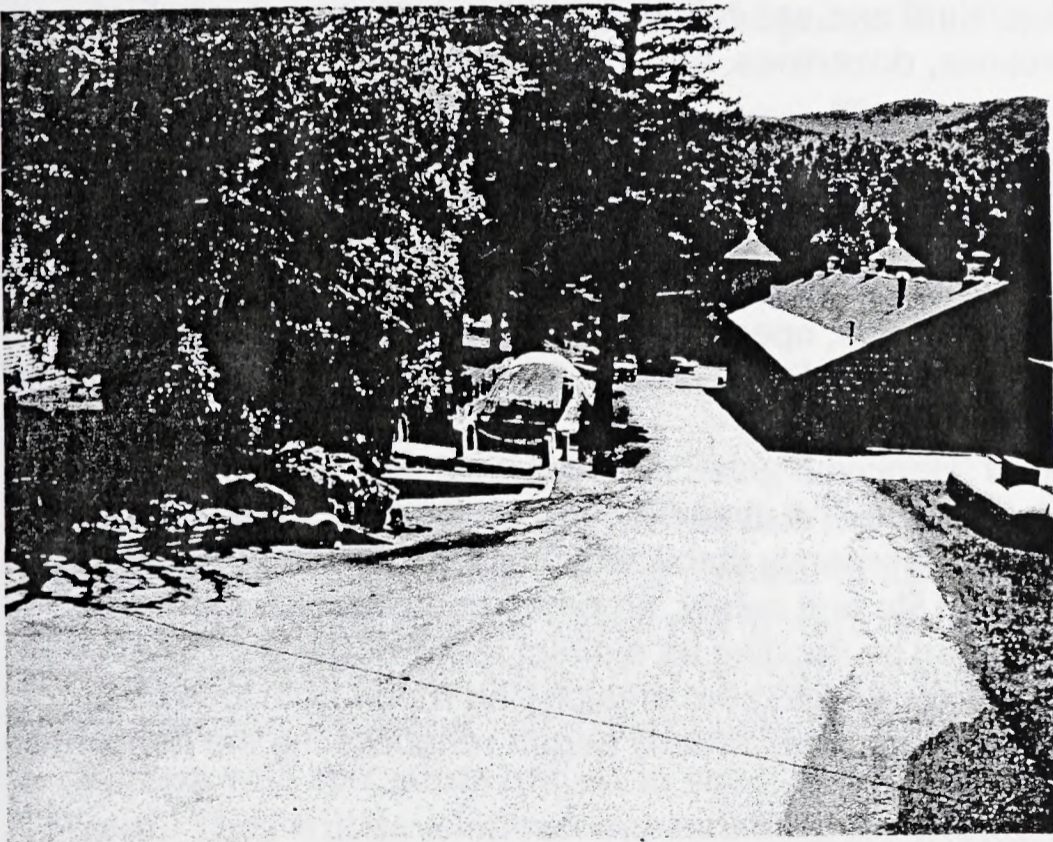
LOOKING E

6. Views of hatchery from ridge to the west.

LOOKING N

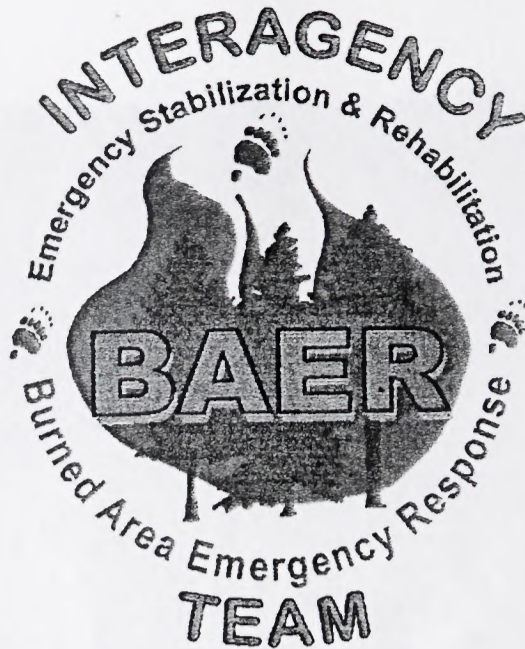


7. Mitchell Creek 100 yards above hatchery. Note thick, overhanging riparian vegetation and steep gradient.



Looking downhill^(S) - creek diversion is out of picture to (L)

8. Front raceways (center) and hatchery building on right. Note there is no existing creek channel.



Press Release – Press Release – Press Release – Press Release
For Immediate Release

June 18, 2002

BURNED AREA EMERGENCY STABILIZATION & REHABILITATION (BAER) TEAM BEGINS WORK ON THE COAL SEAM FIRE

The Interagency Burned Area Emergency Response (BAER) Team arrived on the Coal Seam Fire and began their fire assessments on Sunday, June 17, 2002. The team's primary mission is to assess potential threats to life, property, and critical cultural and natural resources as a result of the wildfire. One potential threat is flooding and mud flows. The team's fire assessments will look at rehabilitation needs for fire suppression impacts and fire effects to both cultural and natural resources and infrastructure. Fire suppression impacts include firelines, dozerlines, and impacted roads.

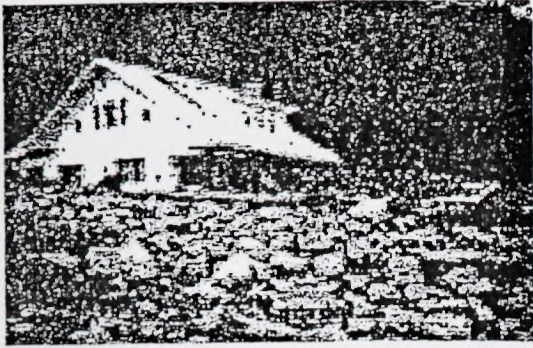
The eleven team members represent Bureau of Indian Affairs, National Park Service, US Fish & Wildlife Service, and US Forest Service. Local Forest Service and BLM staff will augment the national team members. The disciplines on the team include: hydrologist, soil scientist, archeologist, environmental compliance, geographic information system specialist, wildlife biologist, and vegetation, operations and documentation specialists. The team is co-led by Erv Gasser, National Park Service, Seattle, Washington and TJ Clifford, Forest Service, Boise, Idaho.

Following the fire assessment to evaluate the overall burn severity a determination will be made as to the necessity of any emergency stabilization or rehabilitation treatments. The primary objectives are to protect life and safety, property, and reduce further resource damage that may be caused by flooding as a direct result of the fire. The BAER Team's focus is the potential for accelerated erosion and runoff from loss of vegetation and charred soils. Fire crews have already begun rehabilitating the handlines and dozerlines and taking down tree hazards.

Following field assessments, the BAER Team will prepare an Emergency Stabilization & Rehabilitation Plan. The plan will cover the area within and down drainage from the fire. It's anticipated that the fire assessments will be completed by the end of the week and the plan delivered to the agencies the following week.

Contact: Erv Gasser, 505-863-8405

May 14, 2002



Flash floods and mud flows are a high possibility following a fire event. The following are guidelines, and emergency procedures, for surviving a flood or mudflow event. They were developed by a citizen and agency task force

Guidelines:

1. Monitor the weather for forecasted thunderstorm potential.
2. Flash flood **WATCH** – If thunderstorms are forecasted, listen to the radio, monitor the Weather Service web site, local TV stations, or call numbers listed below for information.
3. Flash Flood **WARNING** – This will be implemented when a thunderstorm cell is observed entering our area. A “reverse 911” system is being installed that will call your home number with a warning to immediately leave the area (*You must remove any call-blocking first for this to work*). In addition several neighbors will receive a page alert and attempt to personally contact homes at risk. A fire truck also will be sent through the neighborhood with a siren and loudspeaker alert. **IN THIS SITUATION YOU SHOULD LEAVE A DANGER ZONE IMMEDIATELY.**

BE YOUR OWN RESCUER

In case of immediate danger, climb to the nearest high ground, preferably in a non-burned area.

What do you do if a WARNING is implemented? Leave the danger area immediately seeking the safest routes possible.

Where should you go? Go to the Glenwood Springs High School for information and check in.

False Alarms – Weather is an imperfect science. There will be false alarms and you may be inconvenienced for several hours until the anticipated risk is mitigated. Those who remember the *1994 Storm King flash flood* know how quickly a dry creek bed becomes a raging torrent full of trees and debris.

Future Actions –

- A more refined risk assessment is being developed to better define homes or business sites at most risk. You will be supplied with that information.
- A neighborhood meeting is being planned to discuss emergency procedures and how you and the neighborhood can directly help warn others in your area.
- A weather monitoring station may be installed high in the drainage to assist you and emergency responders with better rainfall information.
- A team with specialists trained in water and soil impacts is evaluating the recently burned area. They will develop recommendations for erosion control that would be implemented this summer. But the reality is even with such erosion control work the amount of bare soil can easily create a flash flood (this was demonstrated with the 1994 Storm King mud flow)!

For updated information you may call:

Ron VanMeter	Garfield County Sheriff's Office	970-384-3611
Dale Hancock	Garfield County Operations	970-384-5001

Federal Emergency Management Agency

PRESS RELEASES

FEMA NEWS ROOM

[[home](#) | [feedback](#) | [library](#) | [privacy policy](#) | [search](#) | [site help](#) | [site index](#)]

President Declares Major Disaster For Colorado Fires

[For Complete Coverage of this Disaster](#)

Release No.: 02-086

Release Date: June 19, 2002

Washington-- The head of the Federal Emergency Management Agency (FEMA) announced today that President Bush has declared a major disaster for Colorado, triggering the release of federal disaster funds for people besieged by wildfires that have raged across the state since early this year.

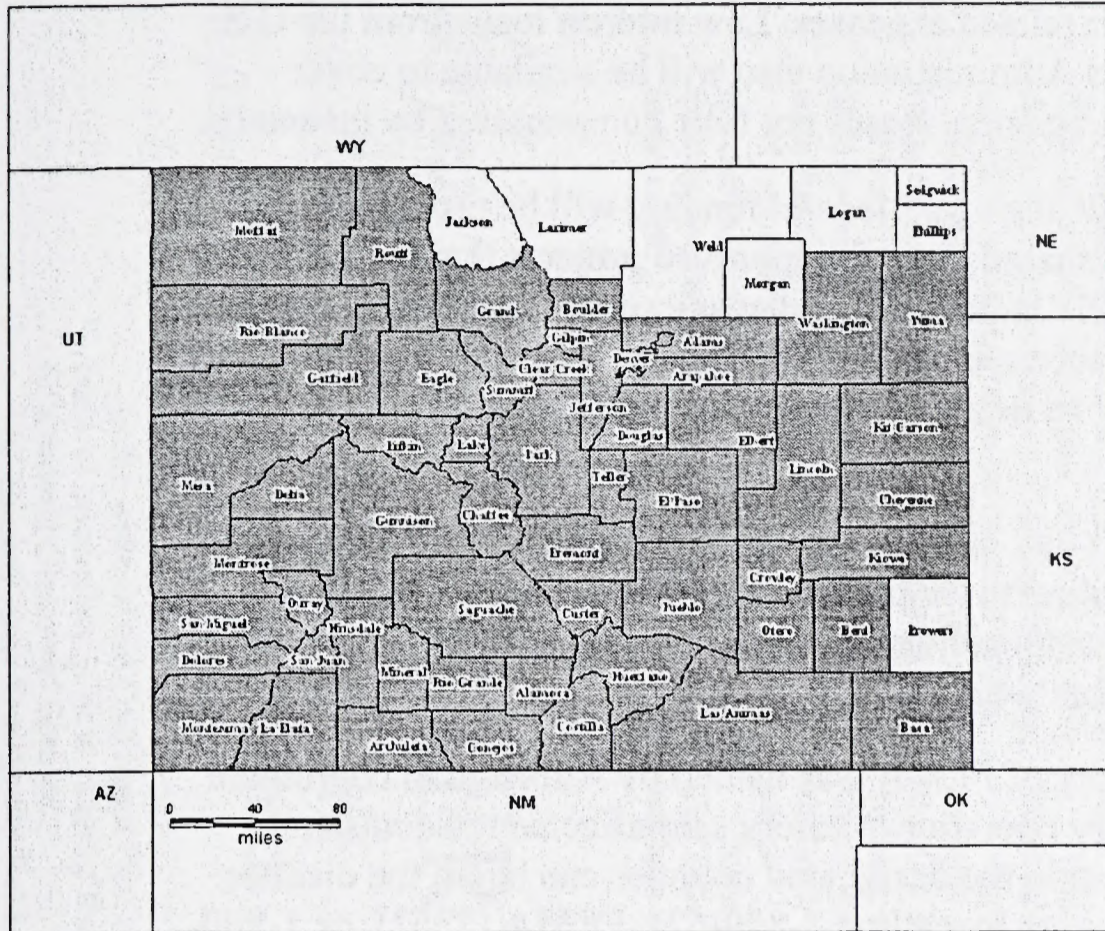
FEMA Director Joe M. Allbaugh said the President took the action following a review of the agency's analysis of the state's request for federal assistance. The declaration covers damage to private property from wildfires that began April 23.

"The President's declaration expresses his deep concern for the safety and welfare of the many families that have stood in path of these unprecedented firestorms," Allbaugh said. "The assistance he ordered today provides the means for helping them to recover from their losses as we continue to support the state's firefighting efforts."

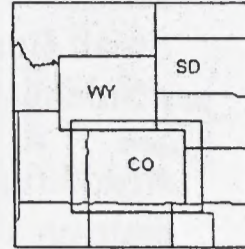
After the declaration, Allbaugh designated the following jurisdictions eligible for aid to affected residents and business owners: the counties of Adams, Alamosa, Arapahoe, Archuleta, Baca, Bent, Boulder, Broomfield and the city of Broomfield, Chaffee, Cheyenne, Clear Creek, Conejos, Costilla, Crowley, Custer, Delta, Denver and the city of Denver, Dolores, Douglas, Eagle, Elbert, El Paso, Fremont, Garfield, Gilpin, Grand, Gunnison, Hinsdale, Huerfano, Jefferson, Kiowa, Kit Carson, Lake, La Plata, Las Animas, Lincoln, Mesa, Mineral, Moffat, Montezuma, Montrose, Otero, Ouray, Park, Pitkin, Pueblo, Rio Blanco, Rio Grande, Routt, Saguache, San Juan, San Miguel, Summit, Teller, Washington and Yuma, and the Southern Ute and Ute Mountain

FEMA-1421-DR, Colorado

Disaster Declaration as of June 19, 2002



Location Map



Legend

Designated Counties
 (All counties are eligible for Hazard Mitigation)

■ is (SS)



ITS Mapping and Analysis Center
 Washington, DC
 06/19/2002 -- 16:39:38 DST

reservations.

The assistance, to be coordinated by FEMA, can include grants to help pay for temporary housing, emergency home repairs and other serious disaster related expenses. Low interest loans from the U.S. Small Business Administration also will be available to cover residential and business losses not fully compensated by insurance.

In addition, Allbaugh said federal funding will be provided for the state on a cost-shared basis for approved projects that reduce future disaster risks. He indicated that damage surveys are continuing as areas become accessible and more counties and additional forms of assistance may be designated later based on the results of the assessments.

Besides today's aid, Allbaugh noted that the agency already has authorized funding to supplement the state's costs for fighting 11 designated fires, including a \$20 million advance payment that was made to state last week

Steven R. Emory of FEMA was named by Allbaugh to coordinate federal recovery operations. Emory said affected residents and business owners in the designated counties can begin the disaster application process by calling **1-800-621-FEMA (3362), or 1-800-462-7585 (TTY) for the hearing and speech impaired.** The toll free telephone numbers will be available starting Thursday, June 20, from 8 a.m. to 6 p.m. seven days a week until further notice.

Updated: June 19, 2002

Floods, falling trees, even weeds a concern

Threat

continued from page 1

This week the team will collate its data and draw up a plan to mitigate areas of possible debris flow around homes and other buildings as well as prevent erosion on denuded slopes.

Soil scientists will measure soils in the basin for a condition called "hydrophobicity."

Literally translated, it means lacking an affinity for water. To a soil scientist, it means soils that repel water instead of absorbing it.

Hydrophobic soils, if they exist along Mitchell Creek, would allow water to run off quickly, increasing the volume of flood water in the creek.

One of the challenges will be to identify the potential for debris flows and flooding in an area that also has its share of earth movement.

"This is not a static environment," Holland-Sears said.

Danger also lies in the large trees along the margins of the creek that were destroyed by the fire but are still standing. Already, fire-fighting crews have been at work on Mitchell Creek, cutting down many of those trees that threaten to fall across the road or into the creek.

Some of the BAER crew will also monitor fire lines cut by bulldozers for the growth of noxious weeds.

"During fire suppression there's always a risk of introducing noxious weeds to areas where they haven't been before," Holland-Sears said.

Helicopters landing in a field infested with weeds can pick up the seeds on their skids and transfer them to the areas where they land.

"Even firefighters' boots can bring seeds in," Holland-Sears said.

Even with rehabilitation of fire lines and preventive measures, it's still a roll of the dice as to what will really happen when the rains come this summer.

"It's all probability, because Mother Nature is in charge," Holland-Sears said.

6/24/02

Glenwood SpS

Post Independent

This BAER's welcome in Glenwood

Team looks to tame threat of flows, floods

By Donna Daniels
Staff Writer

In the wake of the Coal Seam Fire, a team of specialists is now ranging the hills around Glenwood Springs.

The Burned Area Emergency Rehabilitation team is made up of hydrologists, who study the dynamics of water on land; soil scientists; fisheries and wildlife biologists; foresters; archaeologists and geologists.

They come from a variety of government agencies: the Bureau of Indian

Affairs, the National Park Service, the U.S. Bureau of Land Management, the U.S. Forest Service and the Natural Resources Conservation Service.

Last week and this week the BAER team will determine the nature and extent of fire damage, specifically the potential threat of debris flows and floods.

Once the data has been collected, the team will make a plan to lessen the potential damage to homes and natural resources, said Andrea Holland-Sears, hydrologist for the White River National Forest.

The team mapped the profile of the narrow Mitchell Creek valley on Friday.

That background information will help the team develop a model of flood scenarios. Floods in the burned area could potentially cause more damage, since in some areas there is little or no vegetation to arrest or at least slow down the flow.

"The team is looking at Mitchell Creek first because of a concern with homes there," Holland-Sears said. "They're trying to assess the potential magnitude of rainstorms."

The team will also examine the burned areas of Red Mountain, she said.

Threat

continued on page 9

Command team to for Coal Seam to head home today

By David Frey

Aspen Daily News Correspondent

GLENWOOD SPRINGS — The incident command team responsible for taming the Coal Seam Fire is set to leave today, and will be replaced with a new management team charged with handling the rest of the blaze, as the fire's threat decreases and firefighters move on to other fires.

I n c i d e n t
Commander Steve Hart and his Type One command team are scheduled to turn over the command at 6 a.m. They will be replaced by Wayne Cook's Type Two team, a smaller team organized to handle smaller blazes.

"A Type One is called in to fight extreme fire danger, huge," said fire team spokesman Vinnie Picard. "A Type Two team, you know the fire has a lower complexity level now."

The first of the new team arrived Wednesday. Hart's team goes to mandatory rest before being deployed to other fires, after succeeding in containing 90 percent of the fire.

With the transition comes a change in strategy for fighting the remaining flames in the

burn into the Flat Tops north of Glenwood.

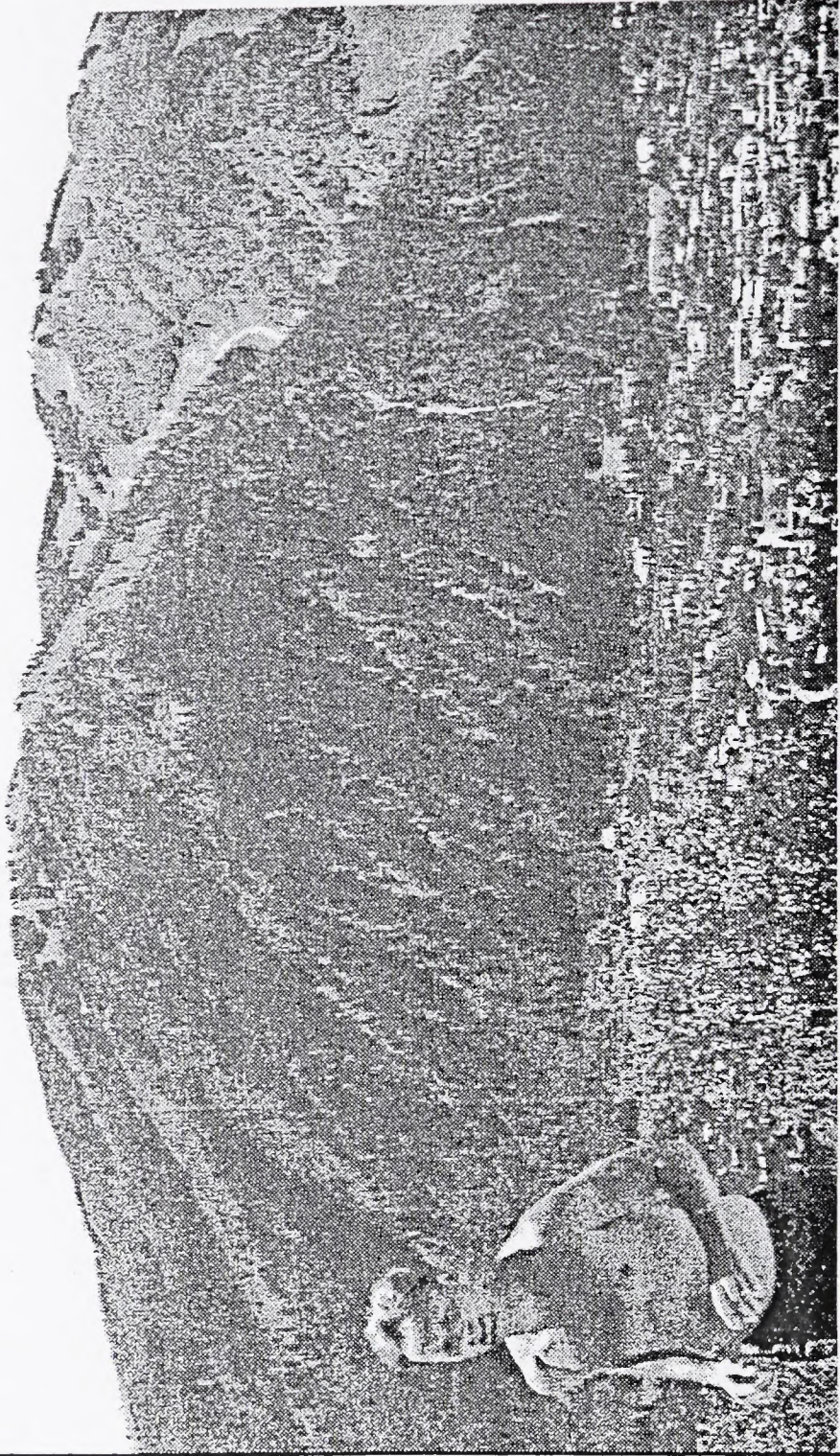
Firefighters plan to switch from a containment strategy, to actively battling the fire, to confining it within an area where it will be allowed to burn.

"The flanks of the fire on the northeast and northwest really have cooled off," Picard said. "There's not much activity there. I think they've really pinched it to an area where, failing an extremely radical shift in weather and particularly wind, it's not going to burn anything, no structures."

While the entire southern portion is contained and all but a few lingering hot spots around Glenwood Springs have been doused, the fire continues to burn in rough terrain and spotty stands of dense timber near the Flat Tops north of town.

Hotshot crews have been camped in spike camps near the blaze to reach firelines quickly, and helicopters have dropped water on the fire, but officials say the tricky landscape has made it difficult and dangerous for firefighters to reach it.

"Without having any houses



Mike Tyler runs Smuggler Mountain's 1.8-mile uphill Tuesday. Tyler, who works in Aspen, usually "runs the trail every other day" on his lunch break.

Chip Strait/Aspen Daily News

Forest Service worker charged with arson in Colorado fire

By Jennifer Hamilton
Associated Press Writer

DENVER — A federal grand jury charged a veteran U.S. Forest Service worker Wednesday with intentionally setting the largest wildfire in Colorado history, saying she maliciously sent flames licking through bone-dry timber southwest of Denver.

The charges came after prosecutors expressed doubt about Terry Barton's story that the fire got out of hand when she tried to burn a letter from her estranged husband. Investigators now contend the fire was staged to look like an escaped campfire.

Barton, 38, was charged with setting fire to timber in a national forest, damaging federal property, including a firefighter's house to

Investigators said Barton initially told them she was patrolling the Pike National Forest about 40 miles southwest of Denver when she smelled smoke and discovered the fire.

commit a felony. U.S. Attorney John Suthers said two of the counts are related to arson.

"These counts reflect the government's contention that the Hayman Fire was deliberately

bee fire in nar

Sec AL SL on pay

New team to take helm at Coal Seam Fire

COAL SEAM from page 3

where the fire is burning right now, it doesn't make any sense to risk firefighters' lives," Picard said.

The fire grew Tuesday to 12,209 acres. Firefighters' ranks have already dropped to 386, down from 557 Tuesday, and from a peak of around 700.

Those still battling the blaze Wednesday included three hotshot crews and three other hand crews. Three helicopters, three bulldozers and 12 engines also remained on the fire.

Fire team spokesman Jim Dale said those numbers are likely to continue to drop, but several teams are likely to remain on the fire as it lingers.

"You don't want to turn it loose too quick," he said. "If we don't finish this thing off and put it to rest, there's still the potential that it could still creep around out there and cause more damage. We don't think it's

going to do that."

In its eleventh day, the costs of the fire grew to nearly \$5.7 million.

The cost is so high, he said, because of the amount of expensive equipment brought in, including heavy helicopters and costly radiometric mapping technology.

"Fire is not an inexpensive type of operation," Dale said. "It's very unfortunate it's as expensive as it is, but in order to do a good job, this team, on behalf of this community, has spared nothing that they thought needed to be brought in."

Fire strategists have switched from trying to contain the blaze there to trying to confine it, essentially drawing a line around the fire and letting it spread inside the line, where it won't threaten property.

Picard said the long-term strategy will likely develop over the next few days under the new com-

mand team.

Firefighting efforts could be buoyed by favorable weather, with a long-term outlook that could ease the state's drought and lessen its tinder-dry fire conditions.

In the short term, firefighters expect lower temperatures and higher humidity. Those trends may stretch into the longer term, too, with rains projected throughout the summer.

"We've been looking at the long-term weather outlook and it looks like Colorado's going to be pulling itself out of the drought over the next couple months and into September," Picard said.

That would not only help firefighters battle existing fires, he said, but would also lessen the danger of future fires by increasing the moisture of the grasses, shrubs and trees that fires use for fuel.

See FIRE on page 4

"These counts reflect the government's contention that the Hayman Fire was deliberately

commit a felony. U.S. Attorney John Suthers

said two of the counts are related to arson.

Initially told them she was patrolling the Pike National Forest about 40 miles southwest of Denver when she smelled smoke and discovered the fire.

See COAL SEAM on page 4

"Without having any houses reach it.

Hotshot crews have been camped in spike camps near the blaze to reach firelines quickly, and helicopters have dropped water on the fire, but officials say the tricky landscape has made it difficult and dangerous for firefighters to

and spotty stands of dense timber near the Flat Tops north of town.

where the fire continues to northern end of the fire area, change in strategy for fighting the remaining flames in the

With the transition comes a

change in strategy for fighting the remaining flames in the northern end of the fire area, arrived Wednesday. Hart's team goes to mandatory rest before being deployed to other fires, after succeeding in containing 90 percent of the fire.

The first of the new team level now." A spokesman Vinnie Picard. "A Type Two team, you know the fire has a lower complexity level now."

property, injuring a firefighter and using fire to

Barton, 38, was charged with setting fire to timber in a national forest, damaging federal

Investigators now contend the fire was staged to look like an escaped campfire.

That the fire got out of hand when she tried to burn a letter from her estranged husband.

Investigators now contend the fire was staged to look like an escaped campfire.

west of Denver.

Flames licking through bone-dry timber south-

west of Denver.

Flames licking through bone-dry timber south-

west of Denver.

See COAL SEAM on page 4

"Without having any houses reach it.

Hotshot crews have been camped in spike camps near the blaze to reach firelines quickly, and helicopters have dropped water on the fire, but officials say the tricky landscape has made it difficult and dangerous for firefighters to

and spotty stands of dense timber near the Flat Tops north of town.



In an aerial view, firefighters, with their red helmets and yellow shirts, reinforce the control lines above No Name Creek in the White River National Forest north of Glenwood Springs Wednesday. Flight courtesy of the U.S. Forest Service. Kelley Cox photo.

Bush declares state of Colorado a disaster area

By Donna Daniels
Staff Writer

In light of the wildfires that have ravaged Colorado in the last few months, and at the request of Colorado Governor Bill Owens, President Bush declared the state a disaster area on Wednesday.

"As I visited the fires burning around our state, the saddest and most difficult times were when I talked with families who had lost their homes and possessions," Owens said in a prepared statement. "The federal assistance will help many of these families start rebuilding their lives."

For the victims of the Coal Seam Fire in Glenwood Springs, that means they can now apply for federal financial assistance, said Gary Gleason, public information officer for the federal agency. Age...

He urged anyone who feels they have suffered a loss to call 1-800-621-FEMA (3362). "Don't disqualify yourself by not calling," he said.

Individuals and families who were officially evacuated for more than five days, especially those who are either uninsured or don't have enough insurance to cover their losses, can receive grants ranging from \$2,000 to \$14,800. Those grants can be used to cover clothing, medical costs, eyeglasses and transportation, Gleason said. They can also cover the expense of temporary housing.

Low-interest disaster loans are also available from the Small Business Administration to help home owners and renters, as well as businesses, to repair or replace disaster-related damages to home or personal property, he said.

able for up to \$200,000 for a primary residence and \$40,000 for personal property. Loans are available for up to \$1.5 million for business property not fully covered by insurance.

People applying to FEMA for assistance should be prepared to provide basic information including insurance coverage and information to help substantiate the losses, the fact sheet said.

Locally, Glenwood Springs True Value is inviting victims who lost their home to set up an account of up to \$500 to purchase merchandise.

"They don't need to spend it all at once," said True Value office manager Kim Price. "They can use the account as needed to help them put their lives back together."

For more information, contact Glenwood Springs True Value at 945-...

Type II team is moving in

Containment now at 90 percent

By Greg Massé
Staff Writer

A new incident management team led by Wayne Cook will take over the Coal Seam Fire today, replacing Steve Hart's Type I firefighting team with a Type II team.

Meanwhile, on the front lines of the Coal Seam Fire Wednesday, firefighting efforts brought some good news. According to fire information officer Jim Dale, as of 4 p.m. Wednesday the fire was 90 percent contained.

The main activity on Wednesday consisted of mopping up critical portions of the line and the dismantling of spike camps near the fire. Firefighters were flown back to base camp for the night.

Today's plan is to continue the mop up hot spots and prepare long-term fire assessment as part of the confinement strategy on the northern perimeter. The fire itself is expected to torch what officials call "interior islands" and within fir pockets surrounded by aspen trees.

Type II
continued on page 7

Inside:

The official guide to Strawberry

worry as fire subsides

Rehab team looks to limit mudslides

By Donna Daniels
Staff Writer

Now that the Coal Seam Fire has apparently done its worst, residents now have another worry: mudslides.

Thousands of acres around Glenwood Springs have been denuded of vegetation and those red hillsides could spew walls of mud with the next heavy rainstorm.

A month after the Storm King Fire of 1994, a heavy rainfall caused a slide that deposited tons of mud across both lanes of Interstate 70 just south of Storm King Mountain, washing cars into the Colorado River. Fortunately, no one was killed.

In an effort to counteract the effect of the loss of vegetative cover on surrounding hillsides, a Burned Area Emergency Rehabilitation Team was called in to assess the damage caused by the Coal Seam Fire and develop a mitigation plan.

On Monday and Tuesday, the team of hydrologists, soil scientists, biologists, archaeologists and other resource specialists flew over the fire area to determine what needs to be done to arrest erosion.

Their goal, said a report from the fire information office, is "to reduce safety hazards, prevent unacceptable resource degradation and to help return watersheds to their pre-fire state.

"Erosion may lead to loss of wildlife habitat and native plant species and a decline in water quality. Flooding may result from the lack of adequate vegetative ground cover."

Glenwood Springs' steep slopes and loose soils will compound the damage caused by the fire, the report said.

Among the most pressing issues, said Dan Sokal of the

of the U.S. Bureau of Land Management, local liaison to the BAER team, are potential debris flows on Storm King and Red mountains.

"Everywhere between Glenwood Springs and South Canyon is going to wash down," Sokal said of Red Mountain and the south-facing slopes of Storm King.

The BAER team is also concerned about the cutthroat trout population at the Mitchell Creek Fish Hatchery.

Mitchell Creek contains one of the West Slope's pure populations of native Colorado River cutthroat trout.

"Ash (from the fire) could increase the pH of the water and limit their ability to survive," Sokal said of the fish.

Sedimentation and debris in the creek could impact the hatchery's water quality.

Fishery managers will work with BAER team to ensure survival of this sensitive fish species.

Methods used in the past to forestall erosion include removing debris from

"Everywhere between Glenwood Springs and South Canyon is going to wash down."

— Dan Sokal
U.S. Bureau of Land
Management

creeks and rivers, and using straw wattles, contour logs, seeding and mulching, the report said.

Straw wattles are cylinders of compressed, weed-free straw placed on steep slopes where more than half of the vegetation has burned. Straw wattles and contour logs are placed parallel to each other across the slope to catch and hold soil and water.

Seeding with grasses provides temporary soil stabilization on severely burned areas, and also helps prevent the growth of noxious weeds. Mulching reduces the erosive action of raindrops hitting bare soil, the report said.

After examining the fire area, the BAER team will develop a plan to mitigate specific issues such as debris flows and soil erosion. The team will work with local BLM and U.S. Forest Service specialists to put the plan into action.

PRODUCTS!
THE

Gullywashers next
worry as fire subsides

Gullywashers next worry as fire subsides

Rehab team looks to limit mudslides

By Donna Daniels
Staff Writer

Now that the Coal Seam Fire has apparently done its worst, residents now have another worry: mudslides.

Thousands of acres around Glenwood Springs have been denuded of vegetation and those red hillsides could spew walls of mud with the next heavy rainstorm.

A month after the Storm King Fire of 1994, a heavy rainfall caused a slide that deposited tons of mud across both lanes of Interstate 70 just south of Storm King Mountain, washing cars into the Colorado River. Fortunately, no one was killed.

In an effort to counteract the effect of the loss of vegetative cover on surrounding hillsides, a Burned Area Emergency Rehabilitation Team was called in to assess the damage caused by the Coal Seam Fire and develop a mitigation plan.

On Monday and Tuesday, the team of hydrologists, soil scientists, biologists, archaeologists and other resource specialists flew over the fire area to determine what needs to be done to arrest erosion.

Their goal, said a report from the fire information office, is "to reduce safety hazards, prevent unacceptable resource degradation and to help return watersheds to their pre-fire state."

"Erosion may lead to loss of wildlife habitat and native plant species and a decline in water quality. Flooding may result from the lack of adequate vegetative ground cover."

Glenwood Springs' steep slopes and loose soils will compound the damage caused by the fire, the report said.

Among the most pressing issues, said Dan Sokal of the Glenwood Springs field office

of the U.S. Bureau of Land Management, local liaison to the BAER team, are potential debris flows on Storm King and Red mountains.

"Everywhere between Glenwood Springs and South Canyon is going to wash down," Sokal said of Red Mountain and the south-facing slopes of Storm King.

The BAER team is also concerned about the cutthroat trout population at the Mitchell Creek Fish Hatchery.

Mitchell Creek contains one of the West Slope's pure populations of native Colorado River cutthroat trout.

"Ash (from the fire) could increase the pH of the water and limit their ability to survive," Sokal said of the fish.

Sedimentation and debris in the creek could impact the hatchery's water quality.

Fishery managers will work with BAER team to ensure survival of this sensitive fish species.

Methods used in the past to forestall erosion include removing debris from

creaks and rivers, and using straw wattles, contour logs, seeding and mulching, the report said.

Straw wattles are cylinders of compressed, weed-free straw placed on steep slopes where

more than half of the vegetation has burned. Straw wattles and contour logs are placed parallel to each other across the slope to catch and hold soil and water.

Seeding with grasses provides temporary soil stabilization on severely burned areas, and also helps prevent the growth of noxious weeds. Mulching reduces the erosive action of raindrops hitting bare soil, the report said.

After examining the fire area, the BAER team will develop a plan to mitigate specific issues such as debris flows and soil erosion. The team will work with local BLM and U.S. Forest Service specialists to put the plan into action, Sokal said.

"Everywhere between Glenwood Springs and South Canyon is going to wash down."

— Dan Sokal
U.S. Bureau of Land Management

Silt Police Department is

The Markets

Stocks mixed after thrill of Monday

NEW YORK (AP) — Wall Street waffled Tuesday as a revenue downgrade for IBM reminded the market that the economic recovery isn't assured yet. Stocks closed narrowly mixed, having fluctuated throughout the session as investors cashed in some profits from Monday's big rally.

The news on IBM was offset

somewhat by an upbeat housing report. Analysts said investors who felt more optimistic about a business recovery on Monday were now less willing to commit to stocks until the rebound in earnings and the economy is a sure bet.

After shifting between gains and losses through the day, the Dow Jones industrial average

closed up 18.70, or 0.1 percent, at 9,706.12. The advance slight compared with a 2 percent surge Monday which claimed its biggest gain since May 8, when it rose 305.28. The Standard & Poor's 500 index inched up 0.9 percent, at 1,037.14. The composite index declined 0.7 percent, to 1,542.9

AT&T Broadband

AT&T BROADBAND IS IN THE PROCESS UPGRADING OUR CABLE SYSTEM WE WILL BE IN THE AREA OF:

4 Mile Rd., 4 Mile Blvd., Alpine Ct., Sunlight Dr., Deer Park Ct., Stantnn Rd., Faranhyl Rd.
Areas of: Oak Meadows Subdivision, Sun King, N. Oakway, S. Oakway, Sunlight Ct., Oakland Knoll Rd., Aspenway Rd., N. Meadowview, S. Meadowview, Home Pl., Cherlyn Rd., Van Dorn Rd., Cheylyn Acres, Spring Ridge Dr., Deer Valley Dr., Piedmont Dr., Valley Veiw Dr., Cottonwood Ln., Glen Oak Ln., Mountain Dr., Westlook Dr., Meadow Run, Park West Dr., Old Lodge Rd., Mt Sopris Dr., Brush Creek Dr., Red Cliff Condos

YOUR SERVICES WILL BE DOWN TEMPORARILY WHILE THIS WORK IS BEING PERFORMED. THANK YOU FOR YOUR PATIENCE.
IF YOU HAVE ANY QUESTIONS CALL 945-7292.

SONY

XBR + WEGA TV

DESIGN

Next to Big O • West Glenwood
945-6610

Just in Time for Vacation

See Disney World, the Statue of Liberty & Las Vegas
No Roaming, No Long Distance

- Unlimited Nights & Weekends
- 300 Anytime Minutes
- \$34.99/mo

Just sign up on AT&T Wireless National Network for 2 years and get all these minutes, plus Nationwide long distance from the AT&T Wireless National Network. We'll even waive the \$36 Activation Fee! Other restrictions apply, see store for details.

DEALER EXCLUSIVE

AT&T Wireless
authorized dealer

Ask how you and a friend can get FREE accessories

AUTHORIZED NOKIA SERVICE CENTER

Dillon Ridge Marketplace 262-3700
Edwards Village II 926-3811
Gypsum 524-0503

active
communications, inc.™

Glenwood 947-
Grand 25-

Sony Eric R30
• Voice D
• Lightweight
• Large Display
• Much more

THE SOURCE
FOR REAL ESTATE

Sitting Pretty

On one-quarter acre. Professionally landscaped. This three-bedroom, three-bath home is right out of a picture book. Gleaming inside and out. Offered for \$348,500.

LIKE TO GOLF?
Your golfing buddies will love you in this cozy, three-bedroom, two-bath home across from the new clubhouse in Rifle. U.S. property with spectacular views and rental unit. \$299,000.

BORN AGAIN
This newly remodeled Glenwood home has increased its value 60 percent! Three bedrooms, two baths, second floor apartment, large deck and fenced yard. Offered for \$259,000.

Coal Seam firefight focus is on protecting city's drinking water

Crews keep eye on No Name Creek

By Lynn Burton
Staff Writer

The Coal Seam Fire is 90 percent contained, as wary firefighters pay particular attention to protecting No Name Creek, Glenwood Springs' primary water source.

Firefighters are stationed along the creek, keeping a close eye on the fire, said fire information officer Jim Dale. "It is not giving us any indication that it will make a run, but No Name is a high priority."

Dale said it's important to keep the fire away from No Name Creek because excessive ash in the water could affect the city's water treatment plant. A fire along No Name Creek could destroy vegetation that keeps soils in place and out of the creek.

The fire's south side has been contained, Dale said, although one 20-member crew, with an engine, is monitoring a hillside up South Canyon that keeps burning in spots.

"It is about halfway up a hill where there isn't any green vegetation," Dale said. "It's been creeping around for several days."

Crews are still busy monitoring numerous hot spots. Dale said one engine crew member on Sunday put water in a hole where a hot spot was reported.

"He said the water began to boil shortly after being pumped on the site," Dale said.

A total of 119 firefighters and management team members are now in their third week on the Coal Seam Fire, which has burned a 12,209-acre area since erupting on June 8.

Dale said two crews of 20 members each worked the fire's north end on Monday.

The north end crews were aided by a helicopter that can drop 1,600 gallons of water from a tank and a smaller helicopter that hauls water in a hanging bucket. Six engine crews, one bulldozer, one backhoe and a reconnaissance helicopter are also working the fire.

Dale said wildfires that erupted elsewhere across the West in recent days will not affect the resources dedicated to containing the Coal Seam Fire.

The fire's north end is proving the hardest to fight because access is so difficult. "It's really rough country. We're using air support to keep it from spreading," Dale said.

Dale said scattered burning continues in conifer stands north of Glenwood Springs, and islands of unburned fuel within the control lines continue to flare up.

"Aspen stands will be used as natural barriers in appropriate locations," Dale continued. "There's enough green vegetation with aspen to stop the fire dead in its tracks."

Debriefing on blaze planned for Thursday

The M

Tech

NEW YORK
burst of buy
noon tech r
Monday, re
selloff tha
composite i
the closing
the Sept.
Stocks end
but the maj

Decli

Library
continued on 1

toll-free ph
number will

The ser
effect July 1.

"It's extre
Spuhler said
She added t
the cuts "bec
state employ

L
NOW
16,



6/25/02

Glenwood Springs' primary water source.

Firefighters are stationed along the creek, keeping a close eye on the fire, said fire information officer Jim Dale. "It is not giving us any indication that it will make a run, but No Name is a high priority."

Dale said it's important to keep the fire away from No Name Creek because excessive ash in the water could affect the city's water treatment plant. A fire along No Name Creek could destroy vegetation that keeps soils in place and out of the creek.

The fire's south side has been contained, Dale said, although one 20-member crew, with an engine, is monitoring a hillside up South Canyon that keeps burning in spots.

"It is about halfway up a hill where there isn't any green-vegetation," Dale said. "It's been creeping around for several days."

Crews are still busy monitoring numerous hot spots. Dale said one engine crew member on Sunday put water in a hole where a hot spot was reported.

members each worked the fire's north end on Monday.

The north end crews were aided by a helicopter that can drop 1,600 gallons of water from a tank and a smaller helicopter that hauls water in a hanging bucket. Six engine crews, one bulldozer, one backhoe and a reconnaissance helicopter are also working the fire.

Dale said wildfires that erupted elsewhere across the West in recent days will not affect the resources dedicated to containing the Coal Seam Fire.

The fire's north end is proving the hardest to fight because access is so difficult. "It's really rough country. We're using air support to keep it from spreading," Dale said.

Dale said scattered burning continues in conifer stands north of Glenwood Springs, and islands of unburned fuel within the control lines continue to flare up.

"Aspen stands will be used as natural barriers in appropriate locations," Dale continued. "There's enough green vegetation with aspen to stop the fire dead in its tracks."

Debriefing on blaze planned for Thursday

Staff Report

Local agencies will meet with residents and businesses impacted the Coal Seam Fire at Glenwood Springs High School at 6:30 p.m. on Thursday, June 27.

On hand at the meeting will be officials from the Garfield County sheriff's office, the Glenwood Springs fire department, plus state and federal officials.

Information will be provided

regarding mitigation and safety updates for areas of Mitchell Creek, Red Mountain and South Canyon.

The meeting will last about one hour, and rooms will be available afterward for citizens to speak individually with officials.

For more information, call Ron VanMeter at the Garfield County sheriff's department, 945-0453.

Company's safety record previously untarnished

Firefighter

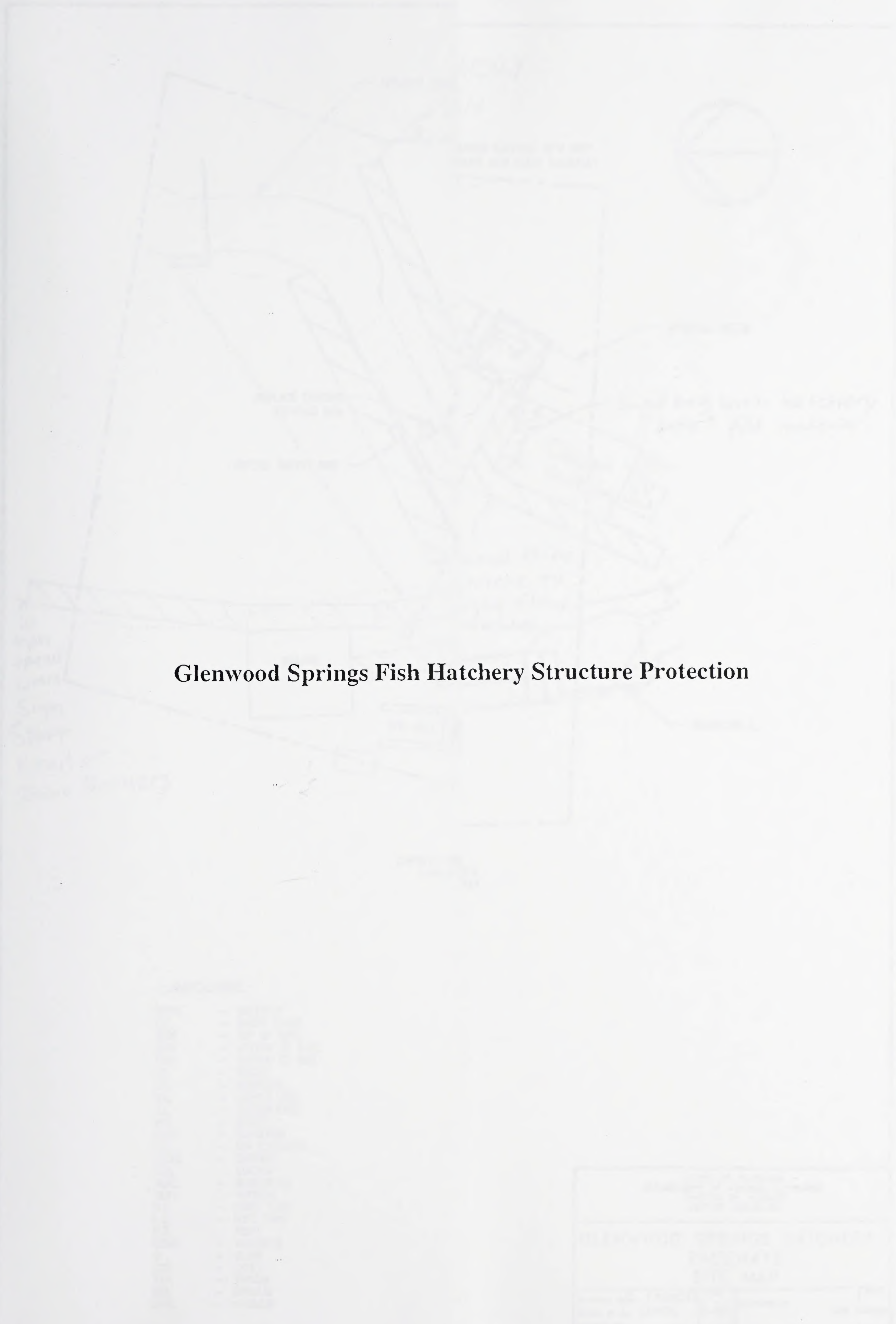
continued from page 1

Wheelock said no employees of his 23-year-old company had ever suffered a death or serious injury until Friday. He said he would re-examine procedures.

"We felt we had one of the best safety policies in the indus-

• For more on the West's wildfires, see page 10.

• Killed were Retha Shirley, 19, and Daniel Rama, 28, of Baker City, Ore.; Jake Martindale, no age available, of Boise; and Zachary Zigich, 19, of Twin Falls, Idaho.



Glenwood Springs Fish Hatchery Structure Protection

STATE OF COLORADO
DEPARTMENT OF AGRICULTURE
DIVISION OF FISHERIES
GLENWOOD SPRINGS FISH HATCHERY
STRUCTURE PROTECTION
SITE PLAN
DATE: 1964

Company's safety record

previously unblemished

Company's safety record

previously unblemished

Company's safety record

previously unblemished

Company's safety record

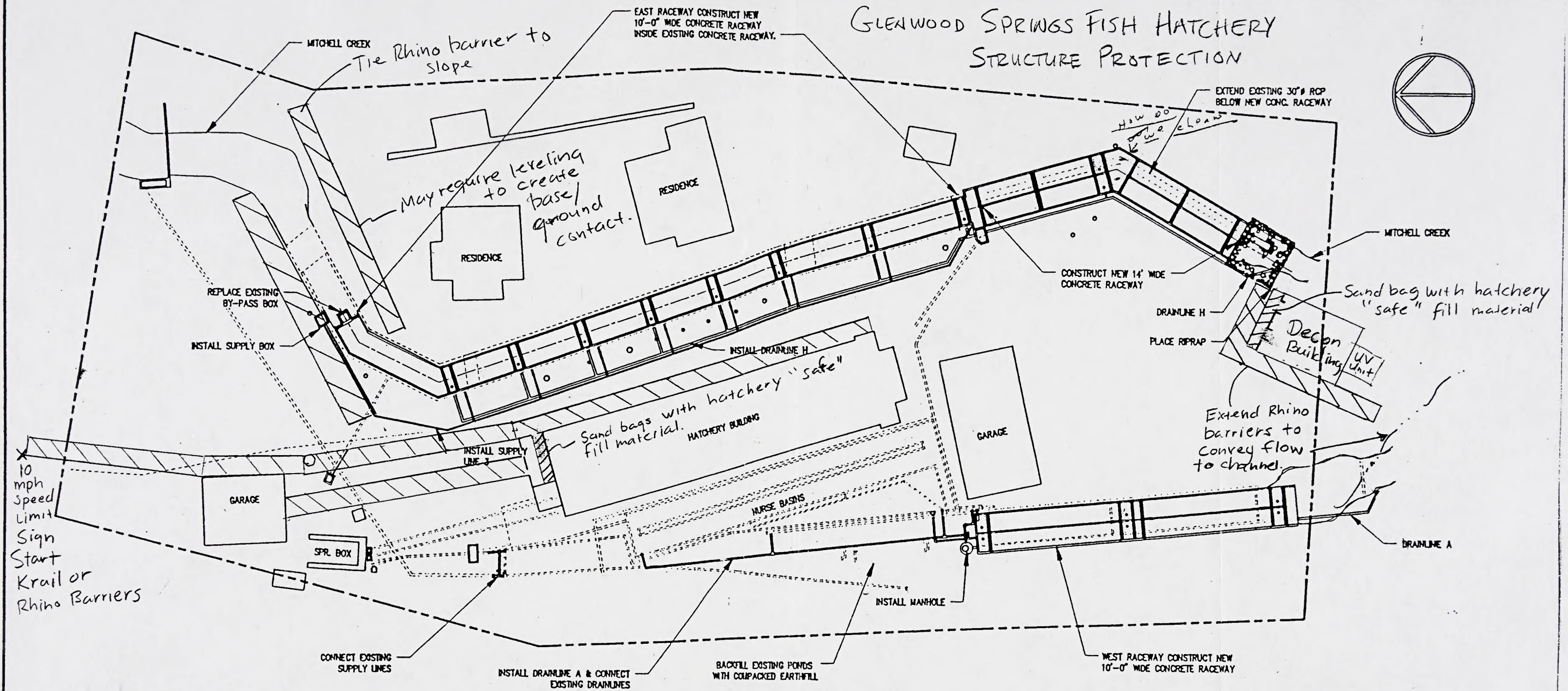
previously unblemished

Company's safety record

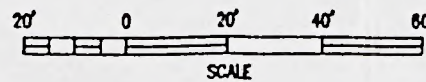
previously unblemished

Company's safety record

GLENWOOD SPRINGS FISH HATCHERY STRUCTURE PROTECTION



SITE PLAN - GLENWOOD SPRINGS HATCHERY



ABBREVIATIONS

RCWY	- RACEWAY
F.F.	- FINISH FLOOR
TOW	- TOP OF WALL
BOW	- BOTTOM OF WALL
BOB	- BOTTOM OF BOX
HT.	- HEIGHT
D.L.	- DRAINLINE
S.L.	- SUPPLY LINE
C.L.	- CENTER LINE
INV.	- INVERT
ELEV.	- ELEVATION
R.E.	- RIM ELEVATION
EXIST.	- EXISTING
STA.	- STATION
HORZ.	- HORIZONTAL
VERT.	- VERTICAL
R.T.	- RIGHT TURN
L.T.	- LEFT TURN
P.T.	- POINT
CONC.	- CONCRETE
S.	- SLOPE
SHT.	- SHEET
TYP.	- TYPICAL
MIN.	- MINIMUM
MAX.	- MAXIMUM

Barrier placement Not to Scale

- Rhino Barrier with Deflector Shield
see attached specifications

~ 750 L.F. REQD

STATE OF COLORADO
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF WILDLIFE
DENVER, COLORADO

**GLENWOOD SPRINGS HATCHERY
RACEWAYS
SITE MAP**

DESIGNED BY: C. FRANZEL	DATE: 3-89	APPROVED BY: [Signature]	SHEET: 1
DRAWN BY: J. CONTE	CHECKED BY: [Signature]	DATE: 3-89	SCALE: AS SHOWN

THE UNIVERSITY OF CHICAGO
LIBRARY

STATE HIGHWAY
PLANNING BOARD
CHICAGO, ILLINOIS



CHICAGO - ILLINOIS



CHICAGO - ILLINOIS
STATE HIGHWAY
PLANNING BOARD

CHICAGO - ILLINOIS
STATE HIGHWAY
PLANNING BOARD



Flow Model Curve Numbers

Hydro Group A	Vegetation Type	Good	Rx Fire	Fair	Poor	Mod Burn	High Burn	Adjusted for Hydrophobicity	
								Mod Burn	High Burn
	Oak-Aspen-Mtn Brush					77	77	82.25	98
	Herbaceous-grass-brush	51				77	77	82.25	82.25
	Conifer	27		36	45	77	77	82.25	98
	Sagebrush-grass					77	77	82.25	82.25
	Oak woodland	32		44	55	77	77	82.25	98
	Pinyon juniper					77	77	82.25	98
	Broad leaf chaparral	31		40	53	77	77	82.25	98
	Narrow leaf chaparral			55	70	77	77	82.25	98
	Barren				77	77	77	82.25	82.25
	Annual grass	38		49	65	77	77	82.25	82.25
Hydro Group B	Vegetation Type	Good	Rx Fire	Fair	Poor	Mod Burn	High Burn	Mod Burn	High Burn
	Oak-Aspen-Mtn Brush	30	53	48	66	63	86	71.75	98
	Herbaceous-grass-brush	62	76	74	85	81	86	85.25	85.25
	Conifer	55	83	60	66	73	86	79.25	98
	Sagebrush-grass	35	60	51	67	65	86	73.25	73.25
	Oak woodland	58	69	65	73	80	86	84.5	98
	Pinyon juniper	41	68	58	75	77	86	82.25	98
	Broad leaf chaparral	57	67	63	70	75	86	80.75	98
	Narrow leaf chaparral	65	77	72	82	77	86	89	98
	Barren	86	86		86	86	86	89	89
	Annual grass	61	74	69	78	83	86	86.75	88.75
Hydro Group C	Vegetation Type	Good	Rx Fire	Fair	Poor	Mod Burn	High Burn	Mod Burn	High Burn
	Oak-Aspen-Mtn Brush	41	63	57	74	72	91	78.5	98
	Herbaceous-grass-brush	74	88	81	87	89	91	91.25	91.25
	Conifer	70	75	73	77	84	91	87.5	98
	Sagebrush-grass	47	73	63	80	78	91	83	83
	Oak woodland	72	79	76	82	89	91	91.25	98
	Pinyon juniper	61	83	73	85	87	91	89.75	98
	Broad leaf chaparral	71	77	75	80	81	91	85.25	98
	Narrow leaf chaparral	77	83	81	88	85	91	88.25	98
	Barren	91	91		91	91	91	92.75	92.75
	Annual grass	75	83	79	86	90	91	92	92

Flow Model Curve Numbers

Hydro Group D	Good	Rx Fire	Fair	Poor	Mod Burn	High Burn	Mod Burn	High Burn
Vegetation Type								
Oak-Aspen-Mtn Brush	48	69	63	79	93	93	94.25	98
Herbaceous-grass-brush	85	91	89	93	93	93	94.25	94.25
Conifer	77	81	79	83	93	93	94.25	98
Sagebrush-grass	55	78	70	85	93	93	94.25	94.25
Oak woodland	79	84	82	86	93	93	94.25	98
Pinyon juniper	71	85	80	90	93	93	94.25	98
Broad leaf chaparral	78	82	81	85	93	93	94.25	98
Narrow leaf chaparral	83	87	86	90	93	93	94.25	98
Barren	93	93		93	93	93	94.25	94.25
Annual grass	81	87	84	89	93	93	94.25	94.25

Oak-Aspen-Mtn Brush Assumes 60% of the mineral soil not protected by canopy,litter, duff and exposed to direct raindrop impact.
 Herbaceous-grass-brush Assumes 70% of the mineral soil not protected by canopy,litter, duff and exposed to direct raindrop impact.
 Conifer Assumes 20% of the mineral soil not protected by canopy,litter, duff and exposed to direct raindrop impact.
 Sagebrush-grass Assumes 70% of the mineral soil not protected by canopy,litter, duff and exposed to direct raindrop impact.
 Oak woodland Assumes 70% of the mineral soil not protected by canopy,litter, duff and exposed to direct raindrop impact.
 Pinyon juniper Assumes 60% of the mineral soil not protected by canopy,litter, duff and exposed to direct raindrop impact.
 Broad leaf chaparral Assumes 60% of the mineral soil not protected by canopy,litter, duff and exposed to direct raindrop impact.
 Narrow leaf chaparral Assumes 60% of the mineral soil not protected by canopy,litter, duff and exposed to direct raindrop impact.
 Barren
 Annual grass

Final Report Submitted for Final Risk Assessment of Coal Seam Fire

Prepared by
Austrian National Agency
for the Environment
and Waste Management

This document provides information on the results of the assessment of the
MUSA Atlas 2000. The following information is provided in the
Appendix:

- 1. Table 11 in the MUSA Atlas 2000, which was estimated for 2 years and
which was revised. The following information is provided in the
Appendix:

$$Y_{10} = 100 - 10 \cdot \ln(1 + 0.01 \cdot X)$$

$$Y_{10} = 100 - 10 \cdot \ln(1 + 0.01 \cdot X)$$

- 2. The following information is provided in the Appendix:
- 1. $T_{10} = 100 - 10 \cdot \ln(1 + 0.01 \cdot X)$
 - 2. $T_{10} = 100 - 10 \cdot \ln(1 + 0.01 \cdot X)$
 - 3. $T_{10} = 100 - 10 \cdot \ln(1 + 0.01 \cdot X)$
 - 4. $T_{10} = 100 - 10 \cdot \ln(1 + 0.01 \cdot X)$
 - 5. $T_{10} = 100 - 10 \cdot \ln(1 + 0.01 \cdot X)$
 - 6. $T_{10} = 100 - 10 \cdot \ln(1 + 0.01 \cdot X)$

Precipitation Analysis

- 2. The following information is provided in the Appendix:

- 1. The following information is provided in the Appendix:
- 1. 10-yr, 20-yr, 50-yr, and 100-yr return periods for 2 yr, 3 yr,
5 yr, 10 yr, 20 yr, 50 yr, and 100 yr return periods, which were estimated using
the following information provided in Table 12 of the MUSA Atlas 2000:



Year	1999	2000	2001
Income			
Dividends			
Interest			
Capital gains			
Other			
Total			

Income tax paid by the estate for the year ending 12/31/01 is \$0.00. The estate is entitled to a refund of \$0.00.



Precipitation Estimates for Flood Risk Assessment of Coal Seam Fire

*prepared by
Andrea Holland-Sears
Hydrologist
White River National Forest*

Short duration precipitation values were estimated using a procedure described in the NOAA Atlas 2 for Colorado. The following steps were used in estimating durations of 1-hr and less:

1. Using Table 11 in the NOAA Atlas 2, 1-hr values were estimated for 2-yr and 100-yr storm events. Equations for Region 2 (Upper Colorado River Basin) were used for this analysis:

$$Y_2 = -0.011 + 0.942[(X_1)(X_1/X_2)]$$

$$Y_{100} = 0.494 + 0.755[(X_3)(X_3/X_4)]$$

Y_2 = 2-yr 1-hr estimated value

Y_{100} = 100-yr 1-hr estimated value

X_1 = 2-yr 6-hr value from precipitation-frequency map

X_2 = 2-yr 24-hr value from precipitation-frequency map

X_3 = 100-yr 6-hr value from precipitation-frequency map

X_4 = 100-yr 24-hr value from precipitation-frequency map

2. The 1-hr values for precipitation depth for return periods greater than 2 years and less than 100 years were estimated using the nomogram in Figure 6 of the Atlas.
3. Values for 5-minute, 10-minute, 15-minute, and 30-minute durations for 2-yr, 5-yr, 10-yr, 25-yr, 50-yr, and 100-yr storms were estimated using corresponding adjustment values presented in Table 12 of the Atlas.



Using these steps, our estimates of precipitation for a range of storm durations were made as follows:

1. For the areas impacted by the Coal Seam Fire, estimates of precipitation values for a range of durations were based on the following.

From the precipitation-frequency maps:

2-yr 6-hr (X_1) = 1.0 inches
2-yr 24-hr (X_2) = 1.8 inches
100-yr 6-hr (X_3) = 2.4 inches
100-yr 24-hr (X_4) = 3.2 inches

From the equation for the Upper Colorado River Basin:

$Y_2 = 0.51$ inches
 $Y_{100} = 1.85$ inches

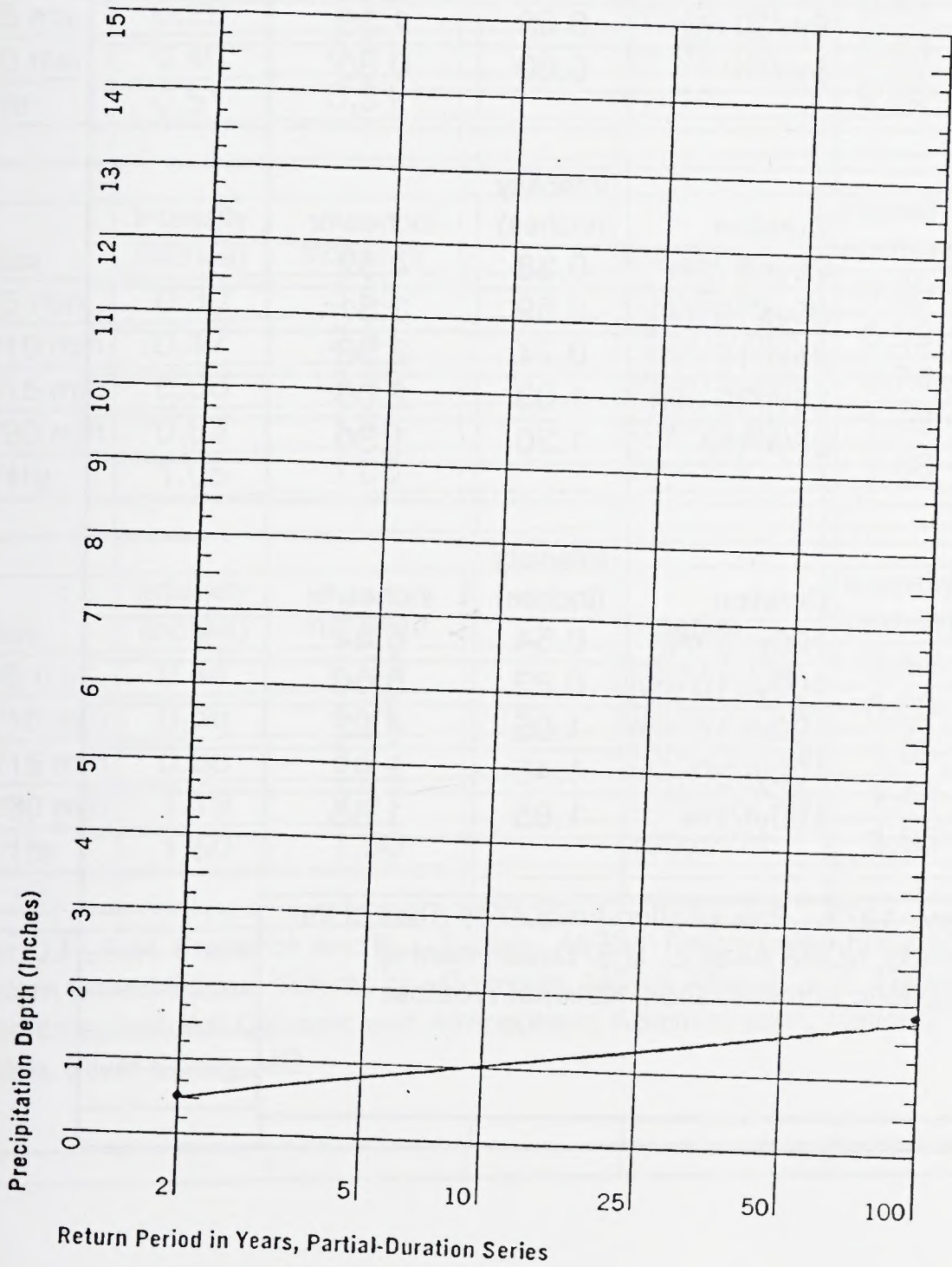
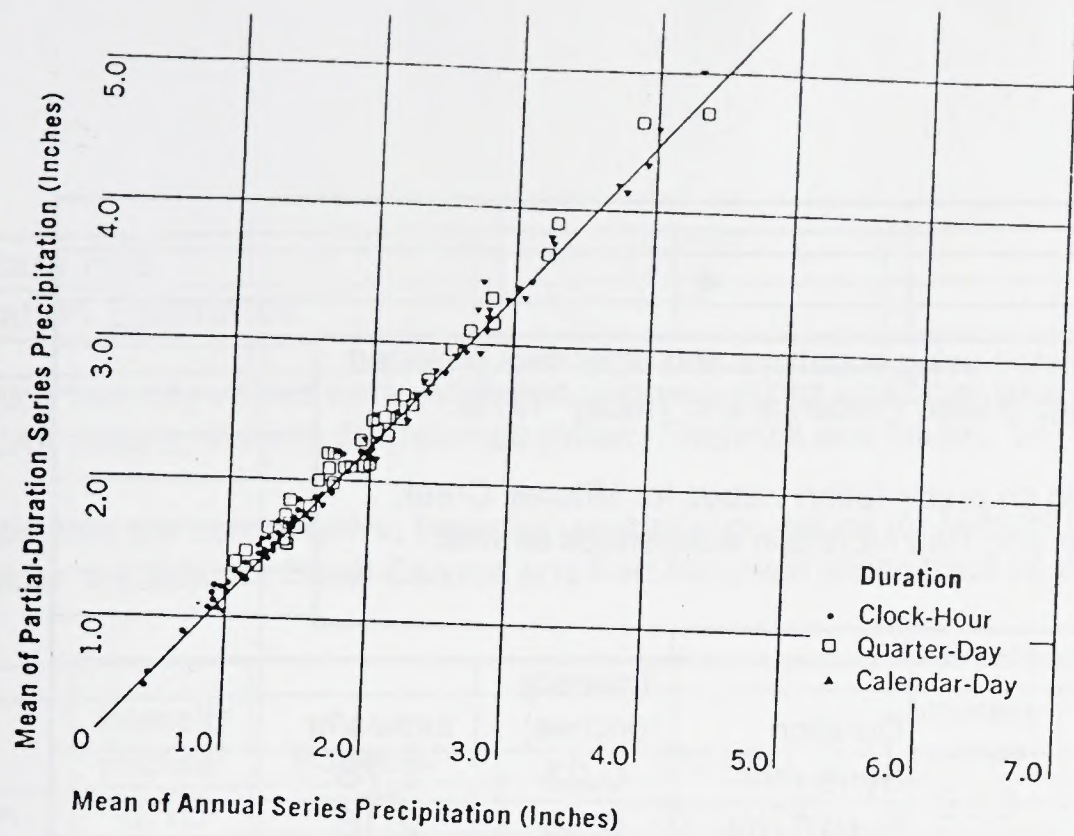
2. From the nomograph (see attached):

5-yr = 0.80 inches
10-yr = 1.05 inches
25-yr = 1.30 inches
50-yr = 1.50 inches

3. From Table 12, the following adjustment factors were used to estimate a range of storm durations:

Duration (min)	5	10	15	30
Ratio to 1-hr	0.29	0.45	0.57	0.79

Values for each storm duration are presented in the attached spreadsheet.



portant. Next, an examination was made of topographic and meteorologic considerations in relation to moisture sources. Each factor was of some physical reality, and each was subject to variation in the precipitation-frequency relationship.

Finally, various climatological and meteorological factors could be indexes of variation of the precipitation-frequency relationship. The procedure used for determining these factors was a multiple-regression screening process. This was done by computer using a least-squares computer program capable of accepting as many independent variables for as many locations as desired. The number of variables screened for the variation was between 60 and 100. This does not mean that completely different factors could be identified. The factors might involve different measures of slope, different measures of slope might be over different distances, or different orientations. In each instance, the program selected the most critical of the variables.

Although the computer program treated each factor equally during the regression analysis, it was possible to select the variable that, combined with the other factors, would explain the greatest variation in precipitation-frequency values. The third, fourth, fifth, and sixth factors were selected in a similar manner. The program

Figure 6. Precipitation depth versus return period for partial-duration series.

Coal Seam Fire

Precipitation Estimates

Precipitation intensity values were estimated using equations and other data provided in the NOAA Atlas 2, Volume III, Colorado (Miller, Frederick and Tracey 1973).

*note: estimates are conservative, based on precipitation values for Mitchell Creek area. Values are valid for South Canyon and Red Mountain watersheds as well.

Duration	Intensity (inches)	inches/hr	Duration	Intensity (inches)	inches/hr
2yr/5 min	0.15	1.77	5yr/5 min	0.23	2.78
2yr/10 min	0.23	1.38	5yr/10 min	0.36	2.16
2yr/15 min	0.29	1.16	5yr/15 min	0.46	1.82
2yr/30 min	0.40	0.81	5yr/30 min	0.63	1.26
2yr/1hr	0.51	0.51	5yr/1hr	0.80	0.80
Duration	Intensity (inches)	inches/hr	Duration	Intensity (inches)	inches/hr
10yr/5 min	0.30	3.65	25yr/5 min	0.38	4.52
10yr/10 min	0.47	2.84	25yr/10 min	0.59	3.51
10yr/15 min	0.60	2.39	25yr/15 min	0.74	2.96
10yr/30 min	0.83	1.66	25yr/30 min	1.03	2.05
10yr/1hr	1.05	1.05	25yr/1hr	1.30	1.30
Duration	Intensity (inches)	inches/hr	Duration	Intensity (inches)	inches/hr
50yr/5 min	0.44	5.22	100yr/5 min	0.54	6.44
50yr/10 min	0.68	4.05	100yr/10 min	0.83	5.00
50yr/15 min	0.86	3.42	100yr/15 min	1.05	4.22
50yr/30 min	1.19	2.37	100yr/30 min	1.46	2.92
50yr/1hr	1.50	1.50	100yr/1hr	1.85	1.85

Miller, J.F., R.H. Frederick and R.J. Tracey. 1973. Precipitation-Frequency Atlas of the Western United States: Volume III - Colorado, NOAA Atlas 2. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service, Silver Spring, MD.

Coal Seam Fire

Precipitation Estimates

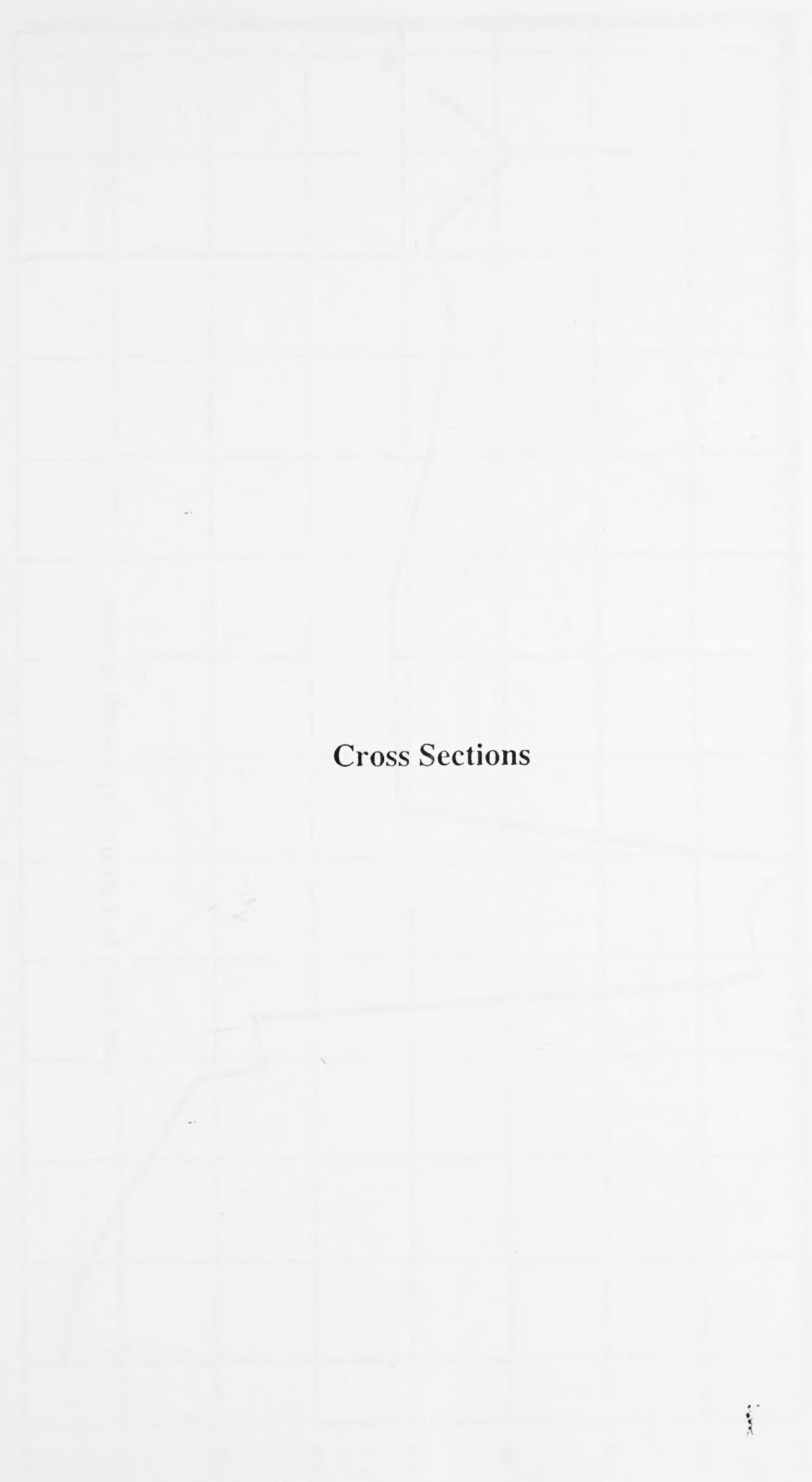
Precipitation intensity values were estimated using equations and other data provided in the NOAA Atlas 2, Volume III, Colorado (Miller, Frederick and Tracey 1973).

*note: estimates are conservative, based on precipitation values for Mitchell Creek area. Values are valid for South Canyon and Red Mountain watersheds as well.

Duration	Intensity (inches)	inches/hr	Duration	Intensity (inches)	inches/hr
2yr/5 min	0.15	1.77	5yr/5 min	0.23	2.78
2yr/10 min	0.23	1.38	5yr/10 min	0.36	2.16
2yr/15 min	0.29	1.16	5yr/15 min	0.46	1.82
2yr/30 min	0.40	0.81	5yr/30 min	0.63	1.26
2yr/1hr	0.51	0.51	5yr/1hr	0.80	0.80
Duration	Intensity (inches)	inches/hr	Duration	Intensity (inches)	inches/hr
10yr/5 min	0.30	3.65	25yr/5 min	0.38	4.52
10yr/10 min	0.47	2.84	25yr/10 min	0.59	3.51
10yr/15 min	0.60	2.39	25yr/15 min	0.74	2.96
10yr/30 min	0.83	1.66	25yr/30 min	1.03	2.05
10yr/1hr	1.05	1.05	25yr/1hr	1.30	1.30
Duration	Intensity (inches)	inches/hr	Duration	Intensity (inches)	inches/hr
50yr/5 min	0.44	5.22	100yr/5 min	0.54	6.44
50yr/10 min	0.68	4.05	100yr/10 min	0.83	5.00
50yr/15 min	0.86	3.42	100yr/15 min	1.05	4.22
50yr/30 min	1.19	2.37	100yr/30 min	1.46	2.92
50yr/1hr	1.50	1.50	100yr/1hr	1.85	1.85

Miller, J.F., R.H. Frederick and R.J. Tracey. 1973. Precipitation-Frequency Atlas of the Western United States: Volume III - Colorado, NOAA Atlas 2. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service, Silver Spring, MD.

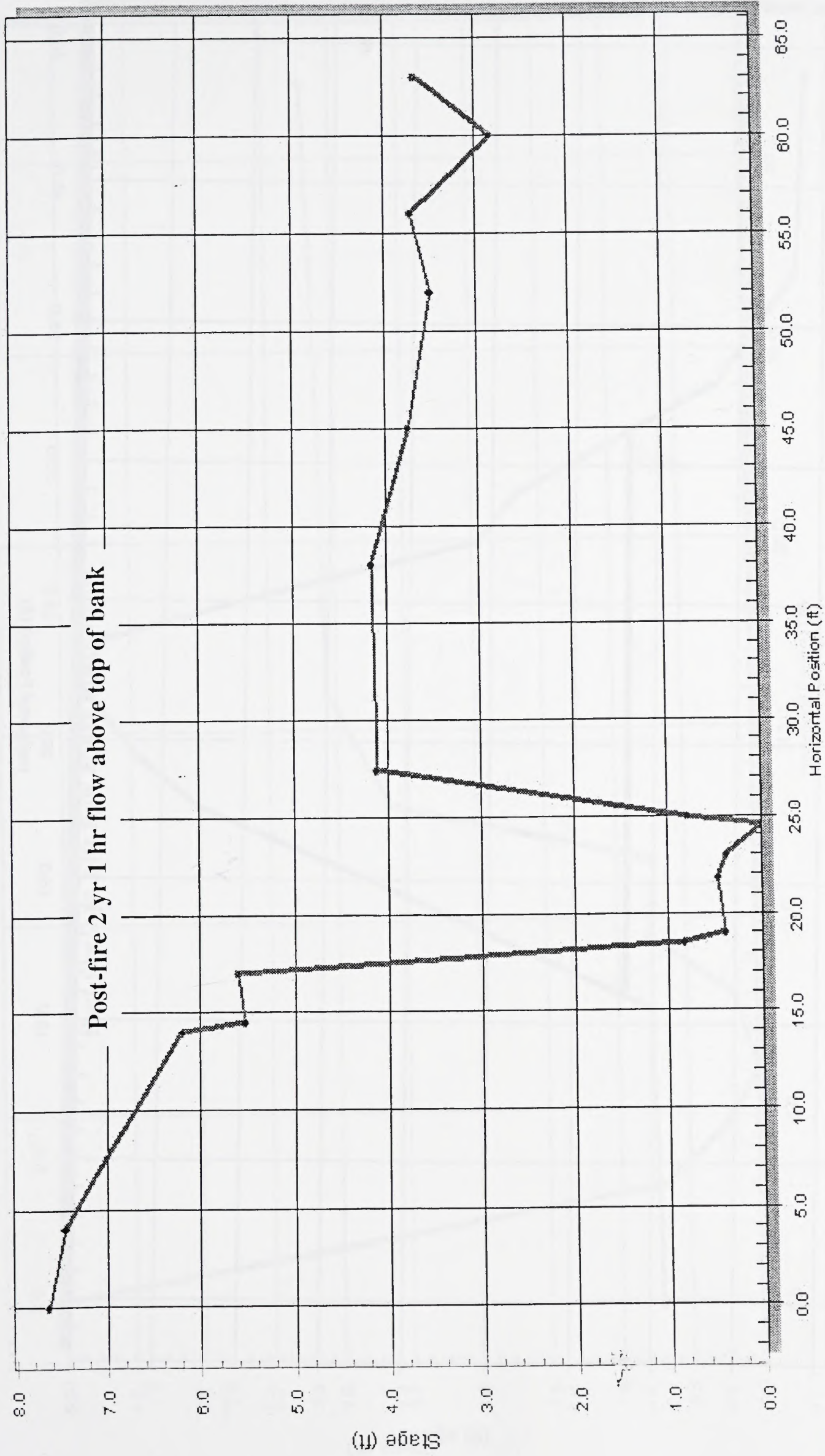
Cross Section 1 - Bridge at Upper
House Watershed



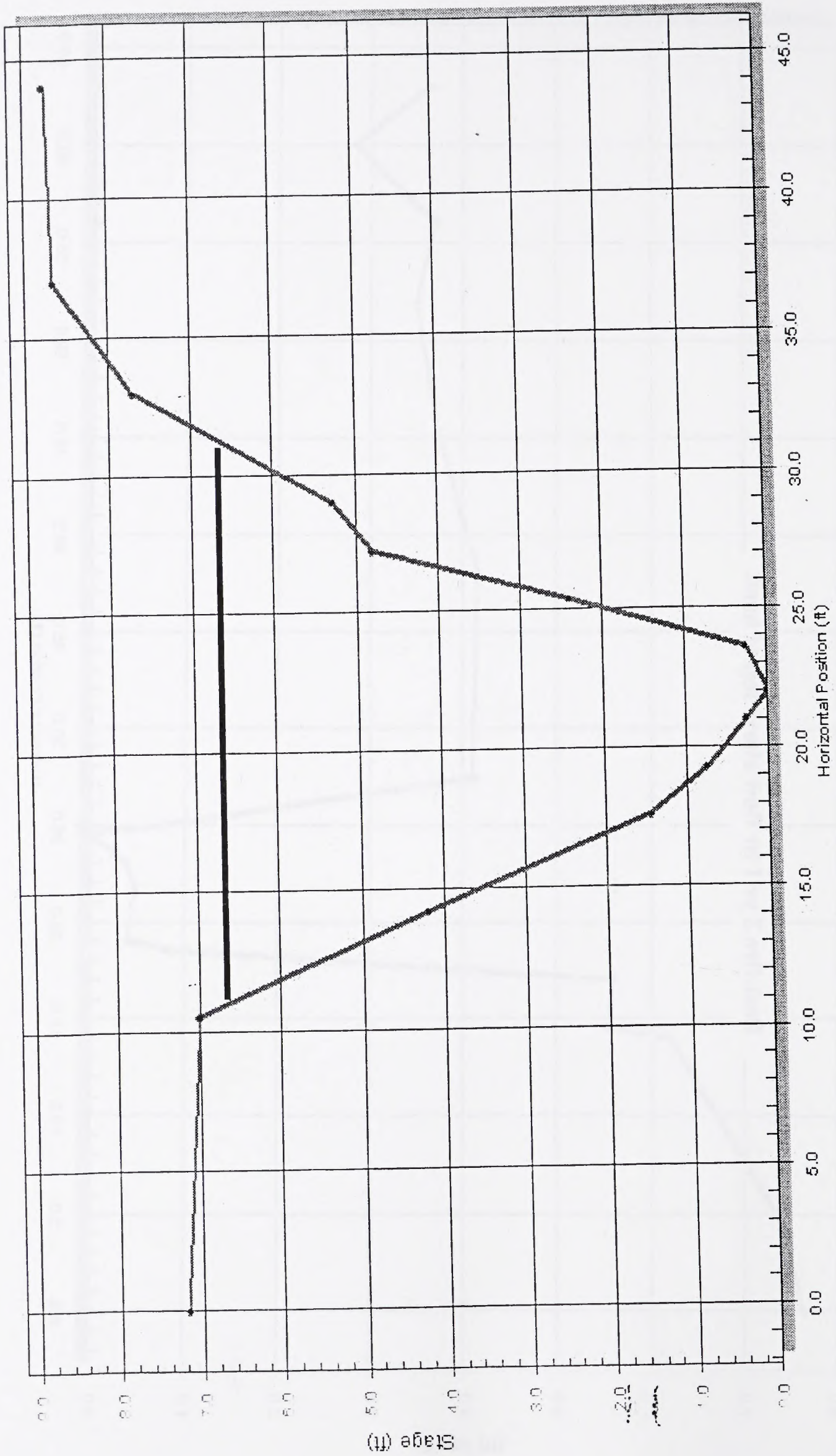
Cross Sections



Cross Section 1 - Bridge at Upper House Watershed

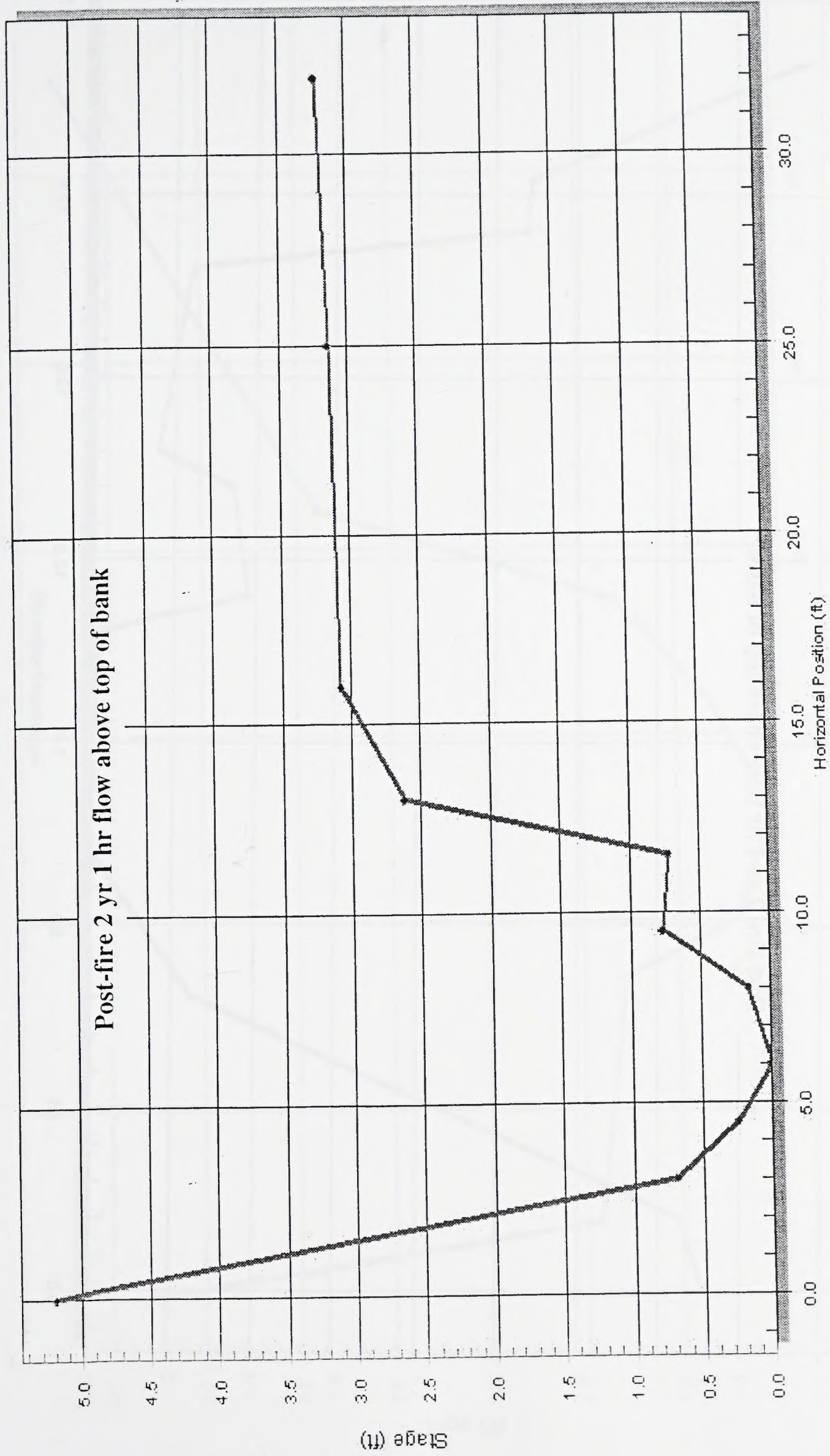


Cross Section 2 - Bridge at Unburned House Watershed

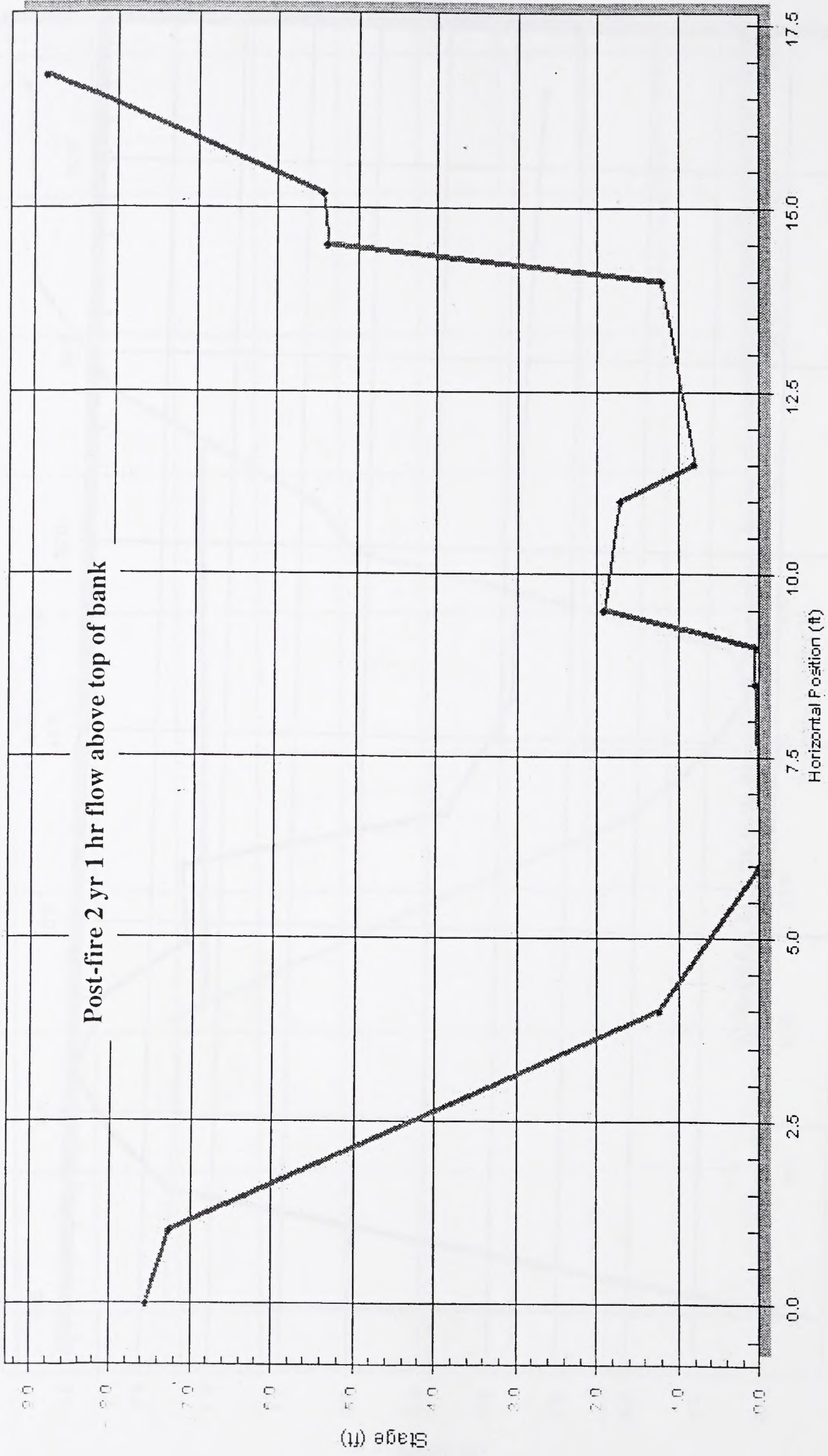


Post-fire 2 yr 1 hr flow - 905 cfs

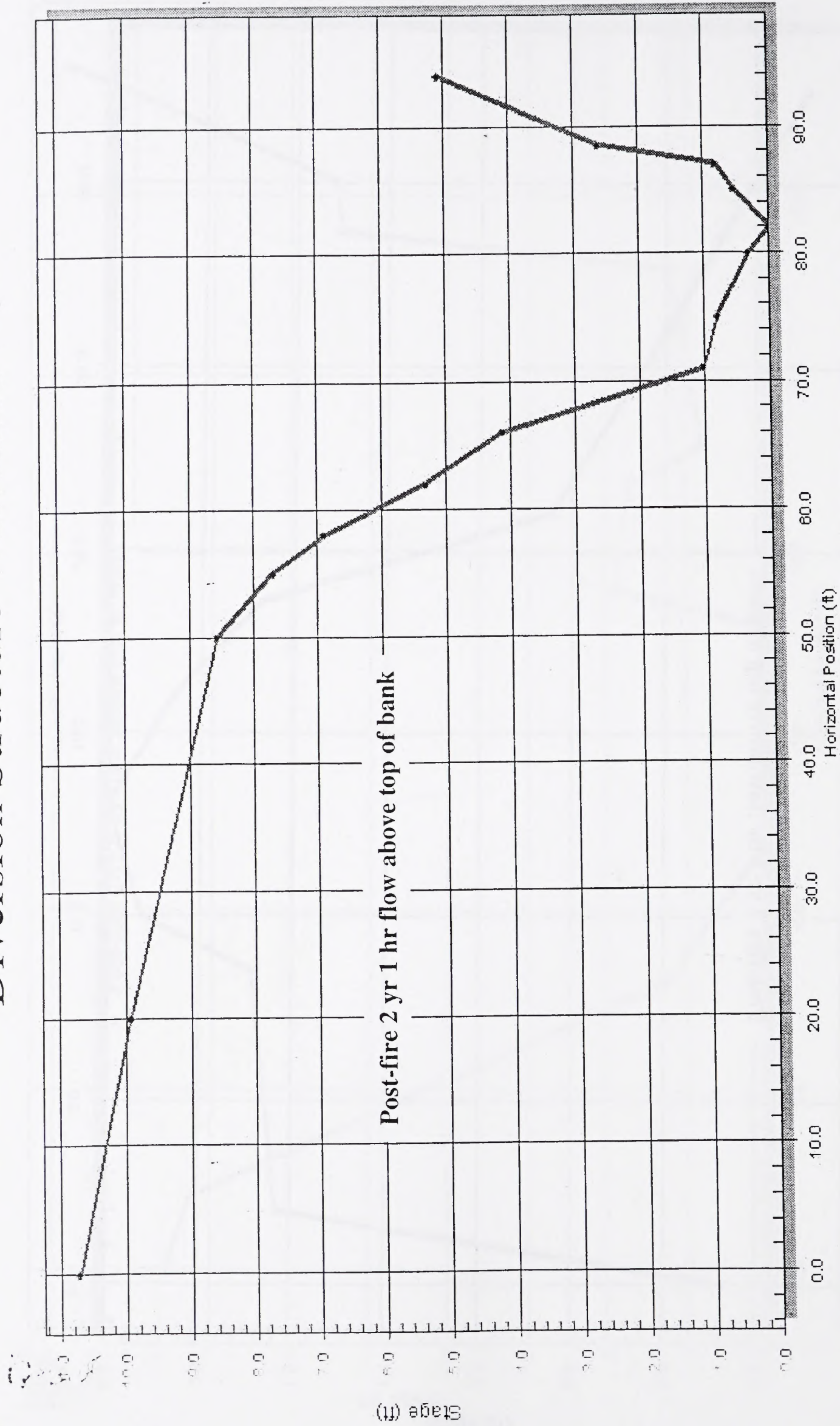
Cross Section 3 - Mitchell Road Low Point Watershed



Cross Section 4 - Bridge Below Hatchery Watershed



Cross Section 10 - Barn Diversion Structure Watershed



Xsection	Q at water level 6/20/02						Bankfull	Bankfull
	Stage	A	R	S	Q	n	stage	Q
1	0.8	2.69	0.38	0.0512	2.9	0.164	4.1	90
2	0.5	1.09	0.28	0.0394	2.9	0.048	7.0	1049
3	0.6	2.21	0.37	0.0907	2.9	0.176	2.6	75
4	1.2	5.40	0.57	0.0703	2.9	0.506	7.2	125
9	0.8	5.08	0.46	0.0203	2.9	0.222	2.4	44
10	0.8	4.31	0.36	0.0623	2.9	0.280	2.6	68

*****WinXSPRO*****												
C:\My Documents\BAER - my files\Coal Seam\XSections\mitchell1.out												
Input File: C:\My Documents\BAER - my files\Coal Seam\XSections\Mitchell1.txt												
Run Date: 06/22/02												
Analysis Procedure: Hydraulics												
Cross Section Number: 1												
Survey Date: 06/21/02												
Subsections/Dividing stations												
Resistance Method: Manning's n												
SECTION A												
Low Stage n 0.164												
High Stage n 0.164												
Unadjusted horizontal distances used												
STAGE	#SEC	AREA	PERIM	WIDTH	R	DHYD	SLOPE	n	VAVG	VAVG	Q	SHEAR
(ft)		(sq ft)	(ft)	(ft)	(ft)	(ft)	(ft/ft)		(ft/s)	(ft/s) cfs	(cfs)	psf
0.1	T	0.02	0.53	0.46	0.04	0.05	0.0512	0.164	0.25	0.01	0.14	
0.2	T	0.09	1.05	0.92	0.09	0.1	0.0512	0.164	0.4	0.04	0.28	
0.3	T	0.21	1.58	1.38	0.13	0.15	0.0512	0.164	0.53	0.11	0.42	
0.4	T	0.37	2.29	2.02	0.16	0.18	0.0512	0.164	0.61	0.22	0.51	
0.5	T	0.82	6.3	5.94	0.13	0.14	0.0512	0.164	0.53	0.44	0.42	
0.6	T	1.43	6.57	6.12	0.22	0.23	0.0512	0.164	0.74	1.06	0.69	
0.7	T	2.05	6.84	6.3	0.3	0.32	0.0512	0.164	0.92	1.88	0.96	
0.8	T	2.69	7.12	6.48	0.38	0.41	0.0512	0.164	1.07	2.88	1.21	
0.9	T	3.34	7.36	6.61	0.45	0.51	0.0512	0.164	1.21	4.06	1.45	
1	T	4.01	7.59	6.71	0.53	0.6	0.0512	0.164	1.34	5.38	1.69	
1.1	T	4.68	7.82	6.82	0.6	0.69	0.0512	0.164	1.46	6.84	1.91	
1.2	T	5.37	8.04	6.92	0.67	0.78	0.0512	0.164	1.57	8.43	2.13	
1.3	T	6.07	8.27	7.02	0.73	0.86	0.0512	0.164	1.67	10.14	2.34	
1.4	T	6.77	8.5	7.13	0.8	0.95	0.0512	0.164	1.77	11.97	2.55	
1.5	T	7.49	8.73	7.23	0.86	1.04	0.0512	0.164	1.86	13.91	2.74	
1.6	T	8.22	8.96	7.33	0.92	1.12	0.0512	0.164	1.94	15.96	2.93	
1.7	T	8.96	9.18	7.44	0.98	1.2	0.0512	0.164	2.02	18.11	3.12	
1.8	T	9.71	9.41	7.54	1.03	1.29	0.0512	0.164	2.1	20.37	3.29	
1.9	T	10.47	9.64	7.64	1.09	1.37	0.0512	0.164	2.17	22.73	3.47	
2	T	11.24	9.87	7.75	1.14	1.45	0.0512	0.164	2.24	25.18	3.64	
2.1	T	12.02	10.1	7.85	1.19	1.53	0.0512	0.164	2.31	27.74	3.8	
2.2	T	12.81	10.32	7.95	1.24	1.61	0.0512	0.164	2.37	30.39	3.96	
2.3	T	13.61	10.55	8.06	1.29	1.69	0.0512	0.164	2.44	33.13	4.12	
2.4	T	14.42	10.78	8.16	1.34	1.77	0.0512	0.164	2.5	35.97	4.27	
2.5	T	15.24	11.01	8.26	1.38	1.84	0.0512	0.164	2.55	38.91	4.42	
2.6	T	16.07	11.24	8.37	1.43	1.92	0.0512	0.164	2.61	41.93	4.57	
2.7	T	16.91	11.46	8.47	1.48	2	0.0512	0.164	2.66	45.05	4.71	
2.8	T	17.77	11.69	8.58	1.52	2.07	0.0512	0.164	2.72	48.26	4.85	
2.9	T	18.65	12.51	9.25	1.49	2.02	0.0512	0.164	2.68	50.02	4.76	
3	T	19.62	13.58	10.17	1.44	1.93	0.0512	0.164	2.63	51.54	4.61	
3.1	T	20.68	14.65	11.09	1.41	1.87	0.0512	0.164	2.59	53.5	4.51	
3.2	T	21.84	15.71	12.01	1.39	1.82	0.0512	0.164	2.56	55.89	4.44	
3.3	T	23.08	16.78	12.93	1.38	1.79	0.0512	0.164	2.54	58.68	4.39	
3.4	T	24.42	17.85	13.85	1.37	1.76	0.0512	0.164	2.53	61.86	4.37	
3.5	T	25.85	18.92	14.77	1.37	1.75	0.0512	0.164	2.53	65.43	4.36	
3.6	T	27.61	24.7	20.39	1.12	1.35	0.0512	0.164	2.21	61.13	3.57	
3.7	T	29.93	30.37	25.87	0.99	1.16	0.0512	0.164	2.04	60.92	3.15	
3.8	T	32.67	33.21	28.49	0.98	1.15	0.0512	0.164	2.03	66.42	3.14	

3.9	T	35.61	35.29	30.34	1.01	1.17	0.0512	0.164	2.07	73.64	* 3.22
4	T	38.74	37.37	32.19	1.04	1.2	0.0512	0.164	2.11	81.55	* 3.31
4.1	T	42.05	39.45	34.05	1.07	1.24	0.0512	0.164	2.14	90.18	* 3.40
4.2	T	46.26	51.14	45.56	0.9	1.02	0.0512	0.164	1.92	88.94	* 2.89
4.3	T	50.82	51.35	45.59	0.99	1.11	0.0512	0.164	2.04	103.74	* 3.16
4.4	T	55.38	51.55	45.62	1.07	1.21	0.0512	0.164	2.16	119.4	* 3.43
4.5	T	59.95	51.76	45.65	1.16	1.31	0.0512	0.164	2.27	135.89	* 3.70
4.6	T	64.51	51.96	45.69	1.24	1.41	0.0512	0.164	2.37	153.17	* 3.96
4.7	T	69.08	52.17	45.72	1.32	1.51	0.0512	0.164	2.48	171.23	* 4.23
4.8	T	73.66	52.37	45.75	1.41	1.61	0.0512	0.164	2.58	190.04	* 4.49
4.9	T	78.23	52.58	45.78	1.49	1.71	0.0512	0.164	2.68	209.58	* 4.75
5	T	82.81	52.78	45.81	1.57	1.81	0.0512	0.164	2.78	229.82	* 5.01
5.1	T	87.4	52.99	45.84	1.65	1.91	0.0512	0.164	2.87	250.76	* 5.27
5.2	T	91.98	53.19	45.87	1.73	2.01	0.0512	0.164	2.96	272.37	* 5.52
5.3	T	96.57	53.4	45.91	1.81	2.1	0.0512	0.164	3.05	294.64	* 5.78
5.4	T	101.16	53.6	45.94	1.89	2.2	0.0512	0.164	3.14	317.54	* 6.03
5.5	T	105.76	53.81	45.97	1.97	2.3	0.0512	0.164	3.23	341.08	* 6.28
5.6	T	110.45	56.6	48.55	1.95	2.27	0.0512	0.164	3.21	354.48	* 6.23
5.7	T	115.31	56.83	48.63	2.03	2.37	0.0512	0.164	3.29	379.85	* 6.48
5.8	T	120.17	57.05	48.7	2.11	2.47	0.0512	0.164	3.38	405.87	* 6.73
5.9	T	125.05	57.28	48.78	2.18	2.56	0.0512	0.164	3.46	432.54	* 6.97
6	T	129.93	57.5	48.85	2.26	2.66	0.0512	0.164	3.54	459.85	* 7.22
6.1	T	134.82	57.72	48.93	2.34	2.76	0.0512	0.164	3.62	487.77	* 7.46
6.2	T	139.71	57.95	49	2.41	2.85	0.0512	0.164	3.7	516.31	* 7.70
6.3	T	144.65	58.84	49.79	2.46	2.91	0.0512	0.164	3.74	541.54	* 7.85
6.4	T	149.67	59.74	50.57	2.51	2.96	0.0512	0.164	3.79	567.48	* 8.00
6.5	T	154.77	60.63	51.36	2.55	3.01	0.0512	0.164	3.84	594.14	* 8.15
6.6	T	159.94	61.52	52.15	2.6	3.07	0.0512	0.164	3.89	621.53	* 8.30
6.7	T	165.2	62.42	52.94	2.65	3.12	0.0512	0.164	3.93	649.66	* 8.45
6.8	T	170.53	63.31	53.72	2.69	3.17	0.0512	0.164	3.98	678.53	* 8.60
6.9	T	175.94	64.21	54.51	2.74	3.23	0.0512	0.164	4.02	708.15	* 8.75
7	T	181.43	65.1	55.3	2.79	3.28	0.0512	0.164	4.07	738.52	* 8.90
7.1	T	187	65.99	56.09	2.83	3.33	0.0512	0.164	4.12	769.66	* 9.05
7.2	T	192.65	66.89	56.87	2.88	3.39	0.0512	0.164	4.16	801.57	* 9.20
7.3	T	198.38	67.78	57.66	2.93	3.44	0.0512	0.164	4.21	834.26	* 9.35
7.4	T	204.18	68.67	58.45	2.97	3.49	0.0512	0.164	4.25	867.74	* 9.50
7.5	T	210.07	70	59.67	3	3.52	0.0512	0.164	4.28	898.36	* 9.58
7.6	T	216.15	72.32	61.89	2.99	3.49	0.0512	0.164	4.26	921.8	* 9.54

*****WinXSPRO*****

C:\My Documents\BAER - my files\Coal Seam\XSections\mitchell2.out
 Input File: C:\My Documents\BAER - my files\Coal Seam\XSections\Mitchell2.txt
 Run Date: 06/22/02
 Analysis Procedure: Hydraulics
 Cross Section Number: 2
 Survey Date: 06/21/02

Subsections/Dividing stations

Resistance Method: Manning's n
 SECTION A
 Low Stage n 0.048
 High Stage n 0.048

Unadjusted horizontal distances used

STAGE (ft)	#SEC	AREA (sq ft)	PERIM (ft)	WIDTH (ft)	R (ft)	DHYD (ft)	SLOPE (ft/ft)	n	VAVG (ft/s)	VAVG (ft/s)	Shear (cfs/ft)
0.1	T	0.05	1.02	1	0.05	0.05	0.0394	0.048	0.82	0.04	0.12
0.2	T	0.2	2.04	2	0.1	0.1	0.0394	0.048	1.31	0.26	0.24
0.3	T	0.45	2.85	2.77	0.16	0.16	0.0394	0.048	1.79	0.8	0.38
0.4	T	0.74	3.34	3.2	0.22	0.23	0.0394	0.048	2.26	1.68	0.55
0.5	T	1.09	3.83	3.63	0.28	0.3	0.0394	0.048	2.66	2.89	0.7
0.6	T	1.47	4.33	4.07	0.34	0.36	0.0394	0.048	3	4.42	0.84
0.7	T	1.9	4.82	4.5	0.39	0.42	0.0394	0.048	3.31	6.29	0.97
0.8	T	2.37	5.26	4.88	0.45	0.49	0.0394	0.048	3.62	8.58	1.11
0.9	T	2.87	5.65	5.2	0.51	0.55	0.0394	0.048	3.92	11.27	1.25
1	T	3.41	6.05	5.53	0.56	0.62	0.0394	0.048	4.21	14.34	1.39
1.1	T	3.98	6.44	5.86	0.62	0.68	0.0394	0.048	4.47	17.78	1.52
1.2	T	4.58	6.83	6.18	0.67	0.74	0.0394	0.048	4.72	21.62	1.65
1.3	T	5.22	7.23	6.51	0.72	0.8	0.0394	0.048	4.96	25.86	1.77
1.4	T	5.88	7.62	6.84	0.77	0.86	0.0394	0.048	5.19	30.51	1.9
1.5	T	6.58	7.96	7.1	0.83	0.93	0.0394	0.048	5.43	35.72	2.03
1.6	T	7.3	8.25	7.31	0.89	1	0.0394	0.048	5.68	41.48	2.18
1.7	T	8.04	8.54	7.52	0.94	1.07	0.0394	0.048	5.92	47.62	2.32
1.8	T	8.81	8.83	7.73	1	1.14	0.0394	0.048	6.15	54.16	2.45
1.9	T	9.59	9.12	7.94	1.05	1.21	0.0394	0.048	6.37	61.1	2.59
2	T	10.39	9.41	8.14	1.1	1.28	0.0394	0.048	6.58	68.43	2.72
2.1	T	11.22	9.7	8.35	1.16	1.34	0.0394	0.048	6.79	76.16	2.84
2.2	T	12.06	9.99	8.56	1.21	1.41	0.0394	0.048	6.99	84.3	2.97
2.3	T	12.93	10.28	8.77	1.26	1.47	0.0394	0.048	7.18	92.84	3.09
2.4	T	13.82	10.57	8.97	1.31	1.54	0.0394	0.048	7.37	101.79	3.21
2.5	T	14.72	10.85	9.17	1.36	1.61	0.0394	0.048	7.55	111.19	3.34
2.6	T	15.65	11.14	9.37	1.41	1.67	0.0394	0.048	7.73	121.01	3.46
2.7	T	16.6	11.42	9.57	1.45	1.73	0.0394	0.048	7.91	131.23	3.57
2.8	T	17.57	11.71	9.77	1.5	1.8	0.0394	0.048	8.08	141.88	3.69
2.9	T	18.55	11.99	9.97	1.55	1.86	0.0394	0.048	8.24	152.94	3.8
3	T	19.56	12.27	10.17	1.59	1.92	0.0394	0.048	8.41	164.44	3.92
3.1	T	20.59	12.56	10.37	1.64	1.99	0.0394	0.048	8.57	176.36	4.03
3.2	T	21.63	12.84	10.56	1.68	2.05	0.0394	0.048	8.72	188.72	4.14
3.3	T	22.7	13.13	10.76	1.73	2.11	0.0394	0.048	8.88	201.51	4.25
3.4	T	23.79	13.41	10.96	1.77	2.17	0.0394	0.048	9.03	214.75	4.36
3.5	T	24.89	13.69	11.16	1.82	2.23	0.0394	0.048	9.18	228.44	4.47
3.6	T	26.02	13.98	11.36	1.86	2.29	0.0394	0.048	9.32	242.58	4.58
3.7	T	27.16	14.26	11.56	1.9	2.35	0.0394	0.048	9.47	257.17	4.68
3.8	T	28.33	14.55	11.76	1.95	2.41	0.0394	0.048	9.61	272.22	4.79

3.9	T	29.51	14.83	11.95	1.99	2.47	0.0394	0.048	9.75	287.74	4.89
4	T	30.72	15.11	12.15	2.03	2.53	0.0394	0.048	9.89	303.72	5
4.1	T	31.94	15.4	12.35	2.07	2.59	0.0394	0.048	10.02	320.18	5.1
4.2	T	33.19	15.68	12.55	2.12	2.64	0.0394	0.048	10.16	337.12	5.2
4.3	T	34.46	15.97	12.76	2.16	2.7	0.0394	0.048	10.29	354.45	5.3
4.4	T	35.74	16.26	12.96	2.2	2.76	0.0394	0.048	10.42	372.27	5.4
4.5	T	37.05	16.55	13.17	2.24	2.81	0.0394	0.048	10.54	390.59	5.5
4.6	T	38.38	16.84	13.38	2.28	2.87	0.0394	0.048	10.67	409.42	5.6
4.7	T	39.72	17.13	13.58	2.32	2.92	0.0394	0.048	10.79	428.76	5.7
4.8	T	41.09	17.42	13.79	2.36	2.98	0.0394	0.048	10.92	448.6	5.8
4.9	T	42.5	17.98	14.3	2.36	2.97	0.0394	0.048	10.93	464.66	5.81
5	T	43.95	18.53	14.8	2.37	2.97	0.0394	0.048	10.96	481.64	5.83
5.1	T	45.46	19.08	15.31	2.38	2.97	0.0394	0.048	10.99	499.55	5.86
5.2	T	47.01	19.64	15.82	2.39	2.97	0.0394	0.048	11.03	518.41	5.89
5.3	T	48.62	20.15	16.28	2.41	2.99	0.0394	0.048	11.08	538.9	5.93
5.4	T	50.26	20.51	16.58	2.45	3.03	0.0394	0.048	11.2	562.95	6.03
5.5	T	51.94	20.87	16.87	2.49	3.08	0.0394	0.048	11.32	587.7	6.12
5.6	T	53.64	21.23	17.17	2.53	3.12	0.0394	0.048	11.43	613.16	6.21
5.7	T	55.37	21.58	17.47	2.57	3.17	0.0394	0.048	11.55	639.34	6.31
5.8	T	57.13	21.94	17.76	2.6	3.22	0.0394	0.048	11.66	666.25	6.4
5.9	T	58.92	22.3	18.06	2.64	3.26	0.0394	0.048	11.78	693.9	6.5
6	T	60.74	22.66	18.36	2.68	3.31	0.0394	0.048	11.89	722.29	6.59
6.1	T	62.59	23.02	18.65	2.72	3.36	0.0394	0.048	12.01	751.44	6.69
6.2	T	64.47	23.37	18.95	2.76	3.4	0.0394	0.048	12.12	781.35	6.78
6.3	T	66.38	23.73	19.24	2.8	3.45	0.0394	0.048	12.23	812.03	6.88
6.4	T	68.32	24.09	19.54	2.84	3.5	0.0394	0.048	12.35	843.49	6.97
6.5	T	70.29	24.45	19.84	2.88	3.54	0.0394	0.048	12.46	875.74	7.07
6.6	T	72.29	24.8	20.13	2.91	3.59	0.0394	0.048	12.57	908.78	7.17
6.7	T	74.32	25.16	20.43	2.95	3.64	0.0394	0.048	12.68	942.62	7.26
6.8	T	76.38	25.52	20.73	2.99	3.69	0.0394	0.048	12.8	977.28	7.36
6.9	T	78.46	25.88	21.02	3.03	3.73	0.0394	0.048	12.91	1012.75	7.45
7	T	80.58	26.24	21.32	3.07	3.78	0.0394	0.048	13.02	1049.05	7.55
7.1	T	82.97	32.01	27.06	2.59	3.07	0.0394	0.048	11.63	964.74	6.37
7.2	T	85.98	37.16	32.16	2.31	2.67	0.0394	0.048	10.78	926.8	* 5.69
7.3	T	89.21	37.45	32.33	2.38	2.76	0.0394	0.048	10.99	980.31	* 5.86
7.4	T	92.45	37.74	32.49	2.45	2.85	0.0394	0.048	11.2	1034.99	* 6.02
7.5	T	95.7	38.04	32.65	2.52	2.93	0.0394	0.048	11.4	1090.85	* 6.19
7.6	T	98.98	38.33	32.82	2.58	3.02	0.0394	0.048	11.6	1147.87	* 6.35
7.7	T	102.27	38.62	32.98	2.65	3.1	0.0394	0.048	11.79	1206.04	* 6.51
7.8	T	105.58	39.14	33.38	2.7	3.16	0.0394	0.048	11.94	1260.8	* 6.63
7.9	T	108.94	39.67	33.81	2.75	3.22	0.0394	0.048	12.08	1316.36	* 6.75
8	T	112.35	40.21	34.23	2.79	3.28	0.0394	0.048	12.22	1373.21	* 6.87
8.1	T	115.79	40.75	34.66	2.84	3.34	0.0394	0.048	12.36	1431.38	* 6.99
8.2	T	119.28	41.28	35.09	2.89	3.4	0.0394	0.048	12.5	1490.88	* 7.10
8.3	T	122.81	41.82	35.51	2.94	3.46	0.0394	0.048	12.64	1551.7	* 7.22
8.4	T	126.38	42.36	35.94	2.98	3.52	0.0394	0.048	12.77	1613.87	* 7.34
8.5	T	130	42.9	36.36	3.03	3.58	0.0394	0.048	12.9	1677.39	* 7.45
8.6	T	133.65	43.43	36.79	3.08	3.63	0.0394	0.048	13.04	1742.25	* 7.57

*****WinXSPRO*****											
C:\My Documents\BAER - my files\Coal Seam\XSections\mitchell3.out											
Input File: C:\My Documents\BAER - my files\Coal Seam\XSections\Mitchell3.txt											
Run Date: 06/22/02											
Analysis Procedure: Hydraulics											
Cross Section Number: 3											
Survey Date: 06/21/02											
Subsections/Dividing stations											
Resistance Method: Manning's n											
SECTION A											
Low Stage n 0.176											
High Stage n 0.176											
Unadjusted horizontal distances used											
STAGE	#SEC	AREA	PERIM	WIDTH	R	DHYD	SLOPE	n	VAVG	VAVG	Shear
(ft)		(sq ft)	(ft)	(ft)	(ft)	(ft)	(ft/ft)		(ft/s)	(ft/s) cfs	(lbf/ft ²) psf
0.1	T	0.09	1.89	1.88	0.05	0.05	0.0907	0.176	0.34	0.03	0.28
0.2	T	0.37	3.38	3.35	0.11	0.11	0.0907	0.176	0.58	0.21	0.61
0.3	T	0.74	4.11	4.04	0.18	0.18	0.0907	0.176	0.81	0.6	1.02
0.4	T	1.17	4.72	4.62	0.25	0.25	0.0907	0.176	1.01	1.18	1.41
0.5	T	1.66	5.33	5.2	0.31	0.32	0.0907	0.176	1.17	1.95	1.77
0.6	T	2.21	5.95	5.78	0.37	0.38	0.0907	0.176	1.32	2.92	2.11
0.7	T	2.82	6.54	6.33	0.43	0.45	0.0907	0.176	1.46	4.11	2.44
0.8	T	3.58	8.95	8.64	0.4	0.41	0.0907	0.176	1.39	4.96	2.27
0.9	T	4.45	9.19	8.78	0.48	0.51	0.0907	0.176	1.57	7	2.74
1	T	5.34	9.44	8.93	0.57	0.6	0.0907	0.176	1.74	9.31	3.2
1.1	T	6.24	9.69	9.07	0.64	0.69	0.0907	0.176	1.9	11.86	3.64
1.2	T	7.15	9.94	9.22	0.72	0.78	0.0907	0.176	2.05	14.65	4.07
1.3	T	8.08	10.18	9.36	0.79	0.86	0.0907	0.176	2.19	17.66	4.49
1.4	T	9.03	10.43	9.51	0.87	0.95	0.0907	0.176	2.32	20.9	4.9
1.5	T	9.98	10.68	9.66	0.93	1.03	0.0907	0.176	2.44	24.34	5.29
1.6	T	10.96	10.93	9.8	1	1.12	0.0907	0.176	2.55	27.99	5.68
1.7	T	11.94	11.17	9.95	1.07	1.2	0.0907	0.176	2.67	31.84	6.05
1.8	T	12.95	11.42	10.09	1.13	1.28	0.0907	0.176	2.77	35.88	6.42
1.9	T	13.96	11.67	10.24	1.2	1.36	0.0907	0.176	2.87	40.12	6.77
2	T	14.99	11.92	10.38	1.26	1.44	0.0907	0.176	2.97	44.55	7.12
2.1	T	16.04	12.16	10.53	1.32	1.52	0.0907	0.176	3.07	49.17	7.46
2.2	T	17.1	12.41	10.68	1.38	1.6	0.0907	0.176	3.16	53.98	7.8
2.3	T	18.17	12.66	10.82	1.44	1.68	0.0907	0.176	3.24	58.97	8.13
2.4	T	19.26	12.91	10.97	1.49	1.76	0.0907	0.176	3.33	64.15	8.45
2.5	T	20.37	13.15	11.11	1.55	1.83	0.0907	0.176	3.41	69.5	8.76
2.6	T	21.49	13.4	11.26	1.6	1.91	0.0907	0.176	3.49	75.04	9.07
2.7	T	22.64	14.09	11.87	1.61	1.91	0.0907	0.176	3.5	79.19	9.1
2.8	T	23.86	14.88	12.61	1.6	1.89	0.0907	0.176	3.49	83.35	9.08
2.9	T	25.16	15.68	13.34	1.6	1.89	0.0907	0.176	3.5	87.93	9.08
3	T	26.53	16.47	14.07	1.61	1.89	0.0907	0.176	3.5	92.95	9.12
3.1	T	28.03	20.92	18.46	1.34	1.52	0.0907	0.176	3.1	86.85	7.58
3.2	T	30.45	31.43	28.92	0.97	1.05	0.0907	0.176	2.5	76	5.48
3.3	T	33.5	33.38	30.74	1	1.09	0.0907	0.176	2.56	85.62	* 5.68
3.4	T	36.58	33.6	30.81	1.09	1.19	0.0907	0.176	2.7	98.69	* 6.16
3.5	T	39.66	33.82	30.87	1.17	1.28	0.0907	0.176	2.84	112.45	* 6.64
3.6	T	42.75	34.04	30.94	1.26	1.38	0.0907	0.176	2.97	126.88	* 7.11
3.7	T	45.85	34.26	31.01	1.34	1.48	0.0907	0.176	3.1	141.96	* 7.57
3.8	T	48.95	34.48	31.07	1.42	1.58	0.0907	0.176	3.22	157.66	* 8.03

3.9	T	52.06	34.7	31.14	1.5	1.67	0.0907	0.176	3.34	173.97	* 8.49
4	T	55.18	34.92	31.21	1.58	1.77	0.0907	0.176	3.46	190.86	* 8.94
4.1	T	58.31	35.14	31.27	1.66	1.86	0.0907	0.176	3.57	208.33	* 9.39
4.2	T	61.44	35.36	31.34	1.74	1.96	0.0907	0.176	3.68	226.37	* 9.83
4.3	T	64.57	35.59	31.41	1.81	2.06	0.0907	0.176	3.79	244.94	* 10.27
4.4	T	67.72	35.81	31.47	1.89	2.15	0.0907	0.176	3.9	264.05	* 10.70
4.5	T	70.87	36.03	31.54	1.97	2.25	0.0907	0.176	4	283.68	* 11.13
4.6	T	74.03	36.25	31.61	2.04	2.34	0.0907	0.176	4.1	303.82	* 11.56
4.7	T	77.19	36.47	31.67	2.12	2.44	0.0907	0.176	4.2	324.46	* 11.98
4.8	T	80.36	36.69	31.74	2.19	2.53	0.0907	0.176	4.3	345.58	* 12.40
4.9	T	83.54	36.91	31.81	2.26	2.63	0.0907	0.176	4.4	367.19	* 12.81
5	T	86.72	37.13	31.87	2.34	2.72	0.0907	0.176	4.49	389.26	* 13.22

*****WinXSPRO*****												
C:\My Documents\BAER - my files\Coal Seam\XSections\mitchell4.out												
Input File: C:\My Documents\BAER - my files\Coal Seam\XSections\Mitchell4.txt												
Run Date: 06/22/02												
Analysis Procedure: Hydraulics												
Cross Section Number: 4												
Survey Date: 06/21/02												
Subsections/Dividing stations												
Resistance Method: Manning's n												
SECTION A												
Low Stage n 0.506												
High Stage n 0.506												
Unadjusted horizontal distances used												
STAGE	#SEC	AREA	PERIM	WIDTH	R	DHYD	SLOPE	n	VAVG	VAVG	Q	Shear
(ft)		(sq ft) C1	(ft)	(ft)	(ft)	(ft)	(ft/ft)		(ft/s)	(ft/s) cfs	(cfs) psf	
0.1	T	0.22	3.24	3.17	0.07	0.07	0.0703	0.506	0.13	0.03	0.3	
0.2	T	0.55	3.54	3.36	0.15	0.16	0.0703	0.506	0.23	0.12	0.68	
0.3	T	0.89	3.83	3.55	0.23	0.25	0.0703	0.506	0.3	0.26	1.02	
0.4	T	1.26	4.12	3.74	0.31	0.34	0.0703	0.506	0.35	0.45	1.34	
0.5	T	1.64	4.42	3.93	0.37	0.42	0.0703	0.506	0.4	0.66	1.63	
0.6	T	2.04	4.71	4.12	0.43	0.5	0.0703	0.506	0.45	0.91	1.9	
0.7	T	2.46	5	4.3	0.49	0.57	0.0703	0.506	0.49	1.2	2.16	
0.8	T	2.9	5.3	4.49	0.55	0.65	0.0703	0.506	0.52	1.52	2.41	
0.9	T	3.4	6.34	5.36	0.54	0.63	0.0703	0.506	0.52	1.75	2.35	
1	T	3.98	7.38	6.23	0.54	0.64	0.0703	0.506	0.52	2.06	2.36	
1.1	T	4.64	8.42	7.1	0.55	0.65	0.0703	0.506	0.53	2.44	2.42	
1.2	T	5.4	9.46	7.96	0.57	0.68	0.0703	0.506	0.54	2.9	2.5	
1.3	T	6.2	9.92	8.15	0.63	0.76	0.0703	0.506	0.57	3.54	2.74	
1.4	T	7.03	10.35	8.3	0.68	0.85	0.0703	0.506	0.6	4.24	2.98	
1.5	T	7.86	10.78	8.44	0.73	0.93	0.0703	0.506	0.63	4.97	3.2	
1.6	T	8.71	11.21	8.58	0.78	1.02	0.0703	0.506	0.66	5.75	3.41	
1.7	T	9.58	11.64	8.73	0.82	1.1	0.0703	0.506	0.69	6.57	3.61	
1.8	T	10.49	12.65	9.5	0.83	1.1	0.0703	0.506	0.69	7.23	3.64	
1.9	T	11.48	13.72	10.34	0.84	1.11	0.0703	0.506	0.69	7.96	3.67	
2	T	12.52	14.02	10.48	0.89	1.2	0.0703	0.506	0.72	9.07	3.92	
2.1	T	13.57	14.23	10.54	0.95	1.29	0.0703	0.506	0.76	10.27	4.18	
2.2	T	14.63	14.44	10.6	1.01	1.38	0.0703	0.506	0.79	11.52	4.44	
2.3	T	15.69	14.66	10.66	1.07	1.47	0.0703	0.506	0.82	12.82	4.7	
2.4	T	16.76	14.87	10.72	1.13	1.56	0.0703	0.506	0.85	14.18	4.95	
2.5	T	17.84	15.08	10.78	1.18	1.65	0.0703	0.506	0.87	15.58	5.19	
2.6	T	18.92	15.29	10.85	1.24	1.74	0.0703	0.506	0.9	17.02	5.43	
2.7	T	20.01	15.51	10.91	1.29	1.83	0.0703	0.506	0.93	18.51	5.66	
2.8	T	21.1	15.72	10.97	1.34	1.92	0.0703	0.506	0.95	20.05	5.89	
2.9	T	22.2	15.93	11.03	1.39	2.01	0.0703	0.506	0.97	21.63	6.11	
3	T	23.31	16.14	11.09	1.44	2.1	0.0703	0.506	1	23.25	6.33	
3.1	T	24.42	16.36	11.16	1.49	2.19	0.0703	0.506	1.02	24.91	6.55	
3.2	T	25.54	16.57	11.22	1.54	2.28	0.0703	0.506	1.04	26.61	6.76	
3.3	T	26.66	16.78	11.28	1.59	2.36	0.0703	0.506	1.06	28.35	6.97	
3.4	T	27.79	16.99	11.34	1.64	2.45	0.0703	0.506	1.08	30.13	7.18	
3.5	T	28.93	17.21	11.4	1.68	2.54	0.0703	0.506	1.1	31.94	7.38	
3.6	T	30.08	17.42	11.47	1.73	2.62	0.0703	0.506	1.12	33.8	7.57	
3.7	T	31.23	17.63	11.53	1.77	2.71	0.0703	0.506	1.14	35.69	7.77	
3.8	T	32.38	17.84	11.59	1.81	2.79	0.0703	0.506	1.16	37.61	7.96	

3.9	T	33.54	18.06	11.65	1.86	2.88	0.0703	0.506	1.18	39.58	8.15
4	T	34.71	18.27	11.71	1.9	2.96	0.0703	0.506	1.2	41.58	8.34
4.1	T	35.89	18.48	11.78	1.94	3.05	0.0703	0.506	1.22	43.61	8.52
4.2	T	37.07	18.69	11.84	1.98	3.13	0.0703	0.506	1.23	45.68	8.7
4.3	T	38.25	18.91	11.9	2.02	3.21	0.0703	0.506	1.25	47.78	8.88
4.4	T	39.45	19.12	11.96	2.06	3.3	0.0703	0.506	1.27	49.92	9.05
4.5	T	40.65	19.33	12.02	2.1	3.38	0.0703	0.506	1.28	52.08	9.22
4.6	T	41.85	19.54	12.08	2.14	3.46	0.0703	0.506	1.3	54.29	9.39
4.7	T	43.06	19.76	12.15	2.18	3.55	0.0703	0.506	1.31	56.52	9.56
4.8	T	44.28	19.97	12.21	2.22	3.63	0.0703	0.506	1.33	58.79	9.73
4.9	T	45.5	20.18	12.27	2.25	3.71	0.0703	0.506	1.34	61.09	9.89
5	T	46.73	20.39	12.33	2.29	3.79	0.0703	0.506	1.36	63.42	10.05
5.1	T	47.97	20.61	12.39	2.33	3.87	0.0703	0.506	1.37	65.79	10.21
5.2	T	49.21	20.82	12.46	2.36	3.95	0.0703	0.506	1.39	68.19	10.37
5.3	T	50.46	21.03	12.52	2.4	4.03	0.0703	0.506	1.4	70.61	10.53
5.4	T	51.72	21.56	12.93	2.4	4	0.0703	0.506	1.4	72.36	10.52
5.5	T	53.05	22.1	13.36	2.4	3.97	0.0703	0.506	1.4	74.24	10.53
5.6	T	54.39	22.33	13.46	2.44	4.04	0.0703	0.506	1.41	76.88	10.69
5.7	T	55.74	22.55	13.55	2.47	4.11	0.0703	0.506	1.43	79.56	10.84
5.8	T	57.1	22.77	13.65	2.51	4.18	0.0703	0.506	1.44	82.28	11
5.9	T	58.47	22.99	13.75	2.54	4.25	0.0703	0.506	1.45	85.05	11.16
6	T	59.85	23.22	13.84	2.58	4.32	0.0703	0.506	1.47	87.85	11.31
6.1	T	61.24	23.44	13.94	2.61	4.39	0.0703	0.506	1.48	90.7	11.46
6.2	T	62.64	23.66	14.04	2.65	4.46	0.0703	0.506	1.49	93.59	11.61
6.3	T	64.05	23.88	14.13	2.68	4.53	0.0703	0.506	1.51	96.52	11.76
6.4	T	65.46	24.1	14.23	2.72	4.6	0.0703	0.506	1.52	99.49	11.91
6.5	T	66.89	24.33	14.33	2.75	4.67	0.0703	0.506	1.53	102.51	12.06
6.6	T	68.33	24.55	14.42	2.78	4.74	0.0703	0.506	1.54	105.56	12.21
6.7	T	69.78	24.77	14.52	2.82	4.81	0.0703	0.506	1.56	108.66	12.36
6.8	T	71.23	24.99	14.62	2.85	4.87	0.0703	0.506	1.57	111.8	12.5
6.9	T	72.7	25.21	14.71	2.88	4.94	0.0703	0.506	1.58	114.98	12.65
7	T	74.18	25.44	14.81	2.92	5.01	0.0703	0.506	1.59	118.21	12.79
7.1	T	75.66	25.66	14.91	2.95	5.08	0.0703	0.506	1.61	121.47	12.94
7.2	T	77.16	25.88	15	2.98	5.14	0.0703	0.506	1.62	124.78	13.08
7.3	T	78.67	26.23	15.25	3	5.16	0.0703	0.506	1.62	127.74	13.16
7.4	T	80.21	26.7	15.64	3	5.13	0.0703	0.506	1.63	130.39	13.18
7.5	T	81.79	27.17	16.03	3.01	5.1	0.0703	0.506	1.63	133.16	13.21
7.6	T	83.41	27.48	16.22	3.04	5.14	0.0703	0.506	1.64	136.52	* 13.32
7.7	T	85.03	27.69	16.26	3.07	5.23	0.0703	0.506	1.65	140.26	* 13.47
7.8	T	86.66	27.9	16.31	3.11	5.31	0.0703	0.506	1.66	144.04	* 13.63
7.9	T	88.3	28.11	16.36	3.14	5.4	0.0703	0.506	1.67	147.85	* 13.78
8	T	89.93	28.32	16.4	3.18	5.48	0.0703	0.506	1.69	151.69	* 13.93
8.1	T	91.58	28.53	16.45	3.21	5.57	0.0703	0.506	1.7	155.57	* 14.08
8.2	T	93.22	28.74	16.5	3.24	5.65	0.0703	0.506	1.71	159.48	* 14.23
8.3	T	94.87	28.95	16.54	3.28	5.74	0.0703	0.506	1.72	163.42	* 14.37
8.4	T	96.53	29.16	16.59	3.31	5.82	0.0703	0.506	1.73	167.39	* 14.52
8.5	T	98.19	29.37	16.64	3.34	5.9	0.0703	0.506	1.75	171.4	* 14.66
8.6	T	99.86	29.58	16.68	3.38	5.99	0.0703	0.506	1.76	175.44	* 14.81
8.7	T	101.53	29.79	16.73	3.41	6.07	0.0703	0.506	1.77	179.51	* 14.95
8.8	T	103.2	30	16.78	3.44	6.15	0.0703	0.506	1.78	183.6	* 15.09

*****WinXSPRO*****

C:\My Documents\BAER - my files\Coal Seam\XSections\mitchell9.out
 Input File: C:\My Documents\BAER - my files\Coal Seam\XSections\Mitchell9.txt
 Run Date: 06/22/02
 Analysis Procedure: Hydraulics
 Cross Section Number: 9
 Survey Date: 06/21/02

Subsections/Dividing stations

Resistance Method: Manning's n
 SECTION A
 Low Stage n 0.222
 High Stage n 0.222

Unadjusted horizontal distances used

STAGE (ft)	#SEC	AREA (sq ft)	PERIM (ft)	WIDTH (ft)	R (ft)	DHYD (ft)	SLOPE (ft/ft)	n	VAVE (ft/s)	VAVE (ft/s)	Q (cfs)	Q (cfs)
0.1	T	0.13	2.56	2.55	0.05	0.05	0.0203	0.222	0.13	0.02	0.06	0.06
0.2	T	0.51	4.84	4.81	0.1	0.11	0.0203	0.222	0.21	0.11	0.13	0.13
0.3	T	1.05	5.99	5.95	0.17	0.18	0.0203	0.222	0.3	0.31	0.22	0.22
0.4	T	1.69	6.95	6.88	0.24	0.25	0.0203	0.222	0.37	0.63	0.31	0.31
0.5	T	2.42	7.77	7.67	0.31	0.32	0.0203	0.222	0.44	1.06	0.39	0.39
0.6	T	3.22	8.59	8.46	0.38	0.38	0.0203	0.222	0.5	1.6	0.48	0.48
0.7	T	4.11	9.41	9.25	0.44	0.44	0.0203	0.222	0.55	2.26	0.55	0.55
0.8	T	5.08	11.1	10.92	0.46	0.47	0.0203	0.222	0.57	2.89	0.58	0.58
0.9	T	6.42	16	15.79	0.4	0.41	0.0203	0.222	0.52	3.34	0.51	0.51
1	T	8.09	17.22	16.94	0.47	0.48	0.0203	0.222	0.58	4.68	0.6	0.6
1.1	T	9.8	17.53	17.18	0.56	0.57	0.0203	0.222	0.65	6.36	0.71	0.71
1.2	T	11.53	17.84	17.41	0.65	0.66	0.0203	0.222	0.71	8.24	0.82	0.82
1.3	T	13.28	18.16	17.65	0.73	0.75	0.0203	0.222	0.78	10.31	0.93	0.93
1.4	T	15.06	18.47	17.89	0.82	0.84	0.0203	0.222	0.83	12.57	1.03	1.03
1.5	T	16.86	18.78	18.12	0.9	0.93	0.0203	0.222	0.89	15	1.14	1.14
1.6	T	18.68	19.1	18.36	0.98	1.02	0.0203	0.222	0.94	17.61	1.24	1.24
1.7	T	20.53	19.41	18.6	1.06	1.1	0.0203	0.222	0.99	20.39	1.34	1.34
1.8	T	22.4	19.72	18.83	1.14	1.19	0.0203	0.222	1.04	23.33	1.44	1.44
1.9	T	24.3	20.03	19.07	1.21	1.27	0.0203	0.222	1.09	26.43	1.54	1.54
2	T	26.22	20.35	19.3	1.29	1.36	0.0203	0.222	1.13	29.69	1.63	1.63
2.1	T	28.16	20.66	19.54	1.36	1.44	0.0203	0.222	1.18	33.1	1.73	1.73
2.2	T	30.13	20.97	19.78	1.44	1.52	0.0203	0.222	1.22	36.67	1.82	1.82
2.3	T	32.11	21.29	20.01	1.51	1.6	0.0203	0.222	1.26	40.4	1.91	1.91
2.4	T	34.13	21.66	20.32	1.58	1.68	0.0203	0.222	1.29	44.19	2	2
2.5	T	36.2	22.62	21.22	1.6	1.71	0.0203	0.222	1.31	47.38	2.03	2.03
2.6	T	38.37	23.57	22.12	1.63	1.73	0.0203	0.222	1.32	50.77	2.06	2.06
2.7	T	40.63	24.53	23.02	1.66	1.76	0.0203	0.222	1.34	54.39	2.1	2.1
2.8	T	42.98	25.49	23.93	1.69	1.8	0.0203	0.222	1.35	58.22	2.14	2.14
2.9	T	45.41	26.44	24.83	1.72	1.83	0.0203	0.222	1.37	62.28	2.18	2.18
3	T	47.94	27.4	25.73	1.75	1.86	0.0203	0.222	1.39	66.57	2.22	2.22
3.1	T	50.56	28.37	26.65	1.78	1.9	0.0203	0.222	1.41	71.08	2.26	2.26
3.2	T	53.27	29.34	27.57	1.82	1.93	0.0203	0.222	1.42	75.82	2.3	2.3
3.3	T	56.08	30.31	28.48	1.85	1.97	0.0203	0.222	1.44	80.82	2.34	2.34
3.4	T	58.97	31.25	29.33	1.89	2.01	0.0203	0.222	1.46	86.1	* 2.39	* 2.39
3.5	T	61.94	32.19	30.17	1.92	2.05	0.0203	0.222	1.48	91.63	* 2.44	* 2.44

*****WinXSPRO*****

C:\My Documents\BAER - my files\Coal Seam\XSections\mitchell10.out

Input File: C:\My Documents\BAER - my files\Coal Seam\XSections\Mitchell10.txt

Run Date: 06/22/02

Analysis Procedure: Hydraulics

Cross Section Number: 10

Survey Date: 06/21/02

Subsections/Dividing stations

Resistance Method: Manning's n

SECTION A

Low Stage n 0.280

High Stage n 0.280

Unadjusted horizontal distances used

STAGE (ft)	#SEC	AREA (sq ft)	PERIM (ft)	WIDTH (ft)	R (ft)	DHYD (ft)	SLOPE (ft/ft)	n	VAVG (ft/s)	Q (cfs)	SHEAR (psf)
0.1	T	0.06	1.2	1.18	0.05	0.05	0.0623	0.28	0.18	0.01	0.19
0.2	T	0.24	2.39	2.36	0.1	0.1	0.0623	0.28	0.28	0.07	0.38
0.3	T	0.53	3.59	3.54	0.15	0.15	0.0623	0.28	0.37	0.2	0.57
0.4	T	0.96	5.12	5.06	0.19	0.19	0.0623	0.28	0.43	0.42	0.73
0.5	T	1.54	6.73	6.65	0.23	0.23	0.0623	0.28	0.5	0.77	0.89
0.6	T	2.29	8.44	8.35	0.27	0.27	0.0623	0.28	0.56	1.28	1.06
0.7	T	3.21	10.2	10.1	0.31	0.32	0.0623	0.28	0.61	1.98	1.22
0.8	T	4.31	11.97	11.86	0.36	0.36	0.0623	0.28	0.67	2.9	1.4
0.9	T	5.6	14.04	13.88	0.4	0.4	0.0623	0.28	0.72	4.03	1.55
1	T	7.09	15.99	15.79	0.44	0.45	0.0623	0.28	0.77	5.47	1.72
1.1	T	8.71	16.64	16.36	0.52	0.53	0.0623	0.28	0.86	7.51	2.03
1.2	T	10.36	16.96	16.61	0.61	0.62	0.0623	0.28	0.96	9.9	2.37
1.3	T	12.03	17.28	16.85	0.7	0.71	0.0623	0.28	1.04	12.55	2.71
1.4	T	13.73	17.6	17.1	0.78	0.8	0.0623	0.28	1.13	15.45	3.03
1.5	T	15.45	17.92	17.34	0.86	0.89	0.0623	0.28	1.2	18.59	3.35
1.6	T	17.19	18.24	17.59	0.94	0.98	0.0623	0.28	1.28	21.96	3.67
1.7	T	18.97	18.56	17.83	1.02	1.06	0.0623	0.28	1.35	25.56	3.97
1.8	T	20.76	18.88	18.07	1.1	1.15	0.0623	0.28	1.42	29.38	4.28
1.9	T	22.58	19.2	18.32	1.18	1.23	0.0623	0.28	1.48	33.42	4.57
2	T	24.42	19.52	18.56	1.25	1.32	0.0623	0.28	1.54	37.67	4.86
2.1	T	26.29	19.84	18.81	1.33	1.4	0.0623	0.28	1.6	42.14	5.15
2.2	T	28.19	20.16	19.05	1.4	1.48	0.0623	0.28	1.66	46.81	5.44
2.3	T	30.1	20.48	19.3	1.47	1.56	0.0623	0.28	1.72	51.7	5.71
2.4	T	32.05	20.8	19.54	1.54	1.64	0.0623	0.28	1.77	56.78	5.99
2.5	T	34.01	21.12	19.79	1.61	1.72	0.0623	0.28	1.83	62.07	6.26
2.6	T	36	21.44	20.03	1.68	1.8	0.0623	0.28	1.88	67.57	6.53
2.7	T	38.02	21.85	20.39	1.74	1.87	0.0623	0.28	1.92	73.07	6.77
2.8	T	40.08	22.28	20.77	1.8	1.93	0.0623	0.28	1.96	78.74	6.99
2.9	T	42.18	22.72	21.16	1.86	1.99	0.0623	0.28	2.01	84.63	7.22
3	T	44.31	23.15	21.54	1.91	2.06	0.0623	0.28	2.05	90.74	7.44
3.1	T	46.49	23.58	21.92	1.97	2.12	0.0623	0.28	2.09	97.06	7.66
3.2	T	48.7	24.02	22.31	2.03	2.18	0.0623	0.28	2.13	103.62	7.88
3.3	T	50.95	24.45	22.69	2.08	2.25	0.0623	0.28	2.17	110.39	8.1
3.4	T	53.24	24.89	23.08	2.14	2.31	0.0623	0.28	2.21	117.39	8.32
3.5	T	55.56	25.32	23.46	2.19	2.37	0.0623	0.28	2.24	124.62	8.53
3.6	T	57.93	25.75	23.84	2.25	2.43	0.0623	0.28	2.28	132.09	8.74
3.7	T	60.33	26.19	24.23	2.3	2.49	0.0623	0.28	2.32	139.78	8.96
3.8	T	62.77	26.62	24.61	2.36	2.55	0.0623	0.28	2.35	147.71	9.17
3.9	T	65.25	27.06	25	2.41	2.61	0.0623	0.28	2.39	155.88	9.38

4	T	67.77	27.49	25.38	2.47	2.67	0.0623	0.28	2.42	164.28	9.58
4.1	T	70.33	27.92	25.76	2.52	2.73	0.0623	0.28	2.46	172.93	9.79
4.2	T	72.93	28.48	26.28	2.56	2.77	0.0623	0.28	2.49	181.3	9.95
4.3	T	75.59	29.08	26.84	2.6	2.82	0.0623	0.28	2.51	189.81	10.11
4.4	T	78.3	29.67	27.4	2.64	2.86	0.0623	0.28	2.54	198.61	10.26
4.5	T	81.07	30.26	27.95	2.68	2.9	0.0623	0.28	2.56	207.7	10.41
4.6	T	83.89	30.85	28.51	2.72	2.94	0.0623	0.28	2.59	217.07	10.57
4.7	T	86.77	31.44	29.07	2.76	2.99	0.0623	0.28	2.61	226.73	10.73
4.8	T	89.7	32.04	29.62	2.8	3.03	0.0623	0.28	2.64	236.69	10.89
4.9	T	92.69	32.63	30.18	2.84	3.07	0.0623	0.28	2.66	246.95	11.04
5	T	95.74	33.22	30.73	2.88	3.12	0.0623	0.28	2.69	257.52	11.2
5.1	T	98.84	33.8	31.27	2.92	3.16	0.0623	0.28	2.72	268.47	* 11.37
5.2	T	101.98	34.25	31.6	2.98	3.23	0.0623	0.28	2.75	280.37	* 11.58
5.3	T	105.16	34.69	31.93	3.03	3.29	0.0623	0.28	2.78	292.54	* 11.78
5.4	T	108.37	35.08	32.21	3.09	3.36	0.0623	0.28	2.82	305.28	* 12.01
5.5	T	111.6	35.46	32.46	3.15	3.44	0.0623	0.28	2.85	318.34	* 12.24
5.6	T	114.86	35.83	32.72	3.21	3.51	0.0623	0.28	2.89	331.65	* 12.46
5.7	T	118.14	36.21	32.97	3.26	3.58	0.0623	0.28	2.92	345.2	* 12.68
5.8	T	121.45	36.58	33.23	3.32	3.65	0.0623	0.28	2.96	359	* 12.91
5.9	T	124.79	36.96	33.49	3.38	3.73	0.0623	0.28	2.99	373.03	* 13.13
6	T	128.15	37.34	33.74	3.43	3.8	0.0623	0.28	3.02	387.32	* 13.34
6.1	T	131.54	37.71	34	3.49	3.87	0.0623	0.28	3.05	401.84	* 13.56
6.2	T	134.95	38.09	34.26	3.54	3.94	0.0623	0.28	3.09	416.61	* 13.77
6.3	T	138.39	38.46	34.51	3.6	4.01	0.0623	0.28	3.12	431.62	* 13.99
6.4	T	141.85	38.84	34.77	3.65	4.08	0.0623	0.28	3.15	446.87	* 14.20
6.5	T	145.34	39.21	35.03	3.71	4.15	0.0623	0.28	3.18	462.37	* 14.41
6.6	T	148.86	39.59	35.28	3.76	4.22	0.0623	0.28	3.21	478.11	* 14.62
6.7	T	152.4	39.96	35.54	3.81	4.29	0.0623	0.28	3.24	494.1	* 14.83
6.8	T	155.97	40.34	35.79	3.87	4.36	0.0623	0.28	3.27	510.34	* 15.03
6.9	T	159.56	40.73	36.07	3.92	4.42	0.0623	0.28	3.3	526.63	* 15.23
7	T	163.18	41.22	36.44	3.96	4.48	0.0623	0.28	3.32	542.44	* 15.39
7.1	T	166.85	41.7	36.81	4	4.53	0.0623	0.28	3.35	558.52	* 15.55
7.2	T	170.55	42.18	37.19	4.04	4.59	0.0623	0.28	3.37	574.88	* 15.72
7.3	T	174.28	42.67	37.56	4.08	4.64	0.0623	0.28	3.39	591.52	* 15.88
7.4	T	178.06	43.15	37.93	4.13	4.69	0.0623	0.28	3.42	608.43	* 16.04
7.5	T	181.87	43.64	38.3	4.17	4.75	0.0623	0.28	3.44	625.62	* 16.20
7.6	T	185.72	44.12	38.67	4.21	4.8	0.0623	0.28	3.46	643.1	* 16.36
7.7	T	189.6	44.62	39.06	4.25	4.85	0.0623	0.28	3.48	660.67	* 16.52
7.8	T	193.54	45.3	39.63	4.27	4.88	0.0623	0.28	3.5	676.84	* 16.61
7.9	T	197.53	45.98	40.19	4.3	4.91	0.0623	0.28	3.51	693.37	* 16.70
8	T	201.58	46.65	40.76	4.32	4.95	0.0623	0.28	3.52	710.26	* 16.80
8.1	T	205.68	47.33	41.33	4.35	4.98	0.0623	0.28	3.54	727.51	* 16.89
8.2	T	209.84	48.01	41.9	4.37	5.01	0.0623	0.28	3.55	745.12	* 16.99
8.3	T	214.06	48.68	42.47	4.4	5.04	0.0623	0.28	3.56	763.09	* 17.09
8.4	T	218.34	49.36	43.03	4.42	5.07	0.0623	0.28	3.58	781.43	* 17.20
8.5	T	222.67	50.04	43.6	4.45	5.11	0.0623	0.28	3.59	800.15	* 17.30
8.6	T	227.06	51.21	44.67	4.43	5.08	0.0623	0.28	3.58	813.99	* 17.24
8.7	T	231.64	53.53	46.89	4.33	4.94	0.0623	0.28	3.53	816.99	* 16.82
8.8	T	236.44	55.86	49.11	4.23	4.81	0.0623	0.28	3.48	821.78	* 16.46
8.9	T	241.46	58.18	51.33	4.15	4.7	0.0623	0.28	3.43	828.25	* 16.13
9	T	246.71	60.51	53.56	4.08	4.61	0.0623	0.28	3.39	836.32	* 15.85
9.1	T	252.17	62.83	55.78	4.01	4.52	0.0623	0.28	3.35	845.91	* 15.60
9.2	T	257.86	65.16	58	3.96	4.45	0.0623	0.28	3.32	856.95	* 15.39
9.3	T	263.77	67.48	60.22	3.91	4.38	0.0623	0.28	3.3	869.38	* 15.20
9.4	T	269.91	69.8	62.44	3.87	4.32	0.0623	0.28	3.27	883.17	* 15.03
9.5	T	276.26	72.13	64.67	3.83	4.27	0.0623	0.28	3.25	898.27	* 14.89
9.6	T	282.84	74.45	66.89	3.8	4.23	0.0623	0.28	3.23	914.65	* 14.77
9.7	T	289.64	76.78	69.11	3.77	4.19	0.0623	0.28	3.22	932.28	* 14.67
9.8	T	296.66	79.1	71.33	3.75	4.16	0.0623	0.28	3.21	951.16	* 14.58
9.9	T	303.91	81.43	73.56	3.73	4.13	0.0623	0.28	3.2	971.25	* 14.5
10	T	311.38	83.97	76	3.71	4.1	0.0623	0.28	3.18	990.84	* 14.42

Conceptual Flood and Debris Flow Emergency Preparedness Alert Plan Glenwood Springs, CO

The City of Glenwood Springs, Colorado, is located in the heart of the Grand and Battlement Canyons, and is a beautiful town with a rich history. The town is situated in a high-altitude area, and is surrounded by mountains. The town is a popular destination for tourists, and is a great place to visit. The town is a beautiful town with a rich history. The town is a popular destination for tourists, and is a great place to visit.

The following flood and debris flow emergency preparedness alert plan is designed to help the town and its residents prepare for and respond to flood and debris flow emergencies. The plan is based on the town's geographic location and the potential for flood and debris flow events.

The plan is designed to help the town and its residents prepare for and respond to flood and debris flow emergencies. The plan is based on the town's geographic location and the potential for flood and debris flow events. The plan is designed to help the town and its residents prepare for and respond to flood and debris flow emergencies. The plan is based on the town's geographic location and the potential for flood and debris flow events.

The plan is designed to help the town and its residents prepare for and respond to flood and debris flow emergencies. The plan is based on the town's geographic location and the potential for flood and debris flow events. The plan is designed to help the town and its residents prepare for and respond to flood and debris flow emergencies. The plan is based on the town's geographic location and the potential for flood and debris flow events.

Conceptual Flood and Debris Flow Emergency Preparedness Alert Plan Glenwood Springs, CO

1. Flood and debris flow emergency preparedness alert plan is a key component of the town's emergency preparedness plan.
2. The plan is designed to help the town and its residents prepare for and respond to flood and debris flow emergencies.
3. The plan is based on the town's geographic location and the potential for flood and debris flow events.
4. The plan is designed to help the town and its residents prepare for and respond to flood and debris flow emergencies. The plan is based on the town's geographic location and the potential for flood and debris flow events.

The plan is designed to help the town and its residents prepare for and respond to flood and debris flow emergencies. The plan is based on the town's geographic location and the potential for flood and debris flow events. The plan is designed to help the town and its residents prepare for and respond to flood and debris flow emergencies. The plan is based on the town's geographic location and the potential for flood and debris flow events.

5. The plan is designed to help the town and its residents prepare for and respond to flood and debris flow emergencies. The plan is based on the town's geographic location and the potential for flood and debris flow events.
6. The plan is designed to help the town and its residents prepare for and respond to flood and debris flow emergencies. The plan is based on the town's geographic location and the potential for flood and debris flow events.
7. The plan is designed to help the town and its residents prepare for and respond to flood and debris flow emergencies. The plan is based on the town's geographic location and the potential for flood and debris flow events.
8. The plan is designed to help the town and its residents prepare for and respond to flood and debris flow emergencies. The plan is based on the town's geographic location and the potential for flood and debris flow events.

Conceptual Flood and Debris Flow Emergency Preparedness and Alert Plan Glenwood Springs, CO

The Coal Seam Fire burned more than 12,000 acres of land, mostly within the watersheds that feed South Canyon, Paradise, and Mitchell Creeks as well as the north face of Red Mountain. With the loss of vegetation and increased potential of erosion, there is greater risk of flooding and debris flows within these basins. A warning system is needed to alert those who may be in the path of floods or debris flows resulting following a rainstorm event.

The following three stages of alert and preparedness are proposed as a framework for responding to any potential flood/debris flow emergencies. Specific action plans should be developed by the appropriate emergency response agencies.

Stage 1 Alert: Monitor the quantitative precipitation forecast (QPF) from the National Weather Service. The QPF is available at <http://www.hpc.ncep.noaa.gov/qpf/qpf2.html>. The forecasts provide predicted precipitation forecasts in the form of isohyetal lines. If the QPF indicates that forecast precipitation will exceed the threshold value, emergency response agencies should activate contingency plans and prepare for emergency response actions during the forecast period.

Stage 2: When the Stage 1 alert is triggered, emergency response agencies should maintain contact with the National Weather Service to monitor and track storm cells. This forecast is already in place and provides law enforcement and emergency response teams (through Rifle Dispatch) an early warning that a significant rain storm may occur over the area. If the NWS forecasts or data indicate a storm cell is approaching the Coal Seam Fire area the following actions should be initiated:

- Flood and debris control structures should be moved into place at access points:
 - a. Driveways of homes on Donegan street,
 - b. Moveable structures at the Glenwood Springs Fish Hatchery,
 - c. Citizens should move their vehicles to locations that would be accessible if evacuation is necessary.
- Residents west of Mitchell Creek Road in watersheds Structure 2 and 3 should be evacuated because the time of concentration for the watersheds above these structures is less than 30 minutes.

Stage 3: This level of alert would be activated by automatic precipitation measurement devices located in the Coal Seam Fire area. The precipitation measurement devices should be linked to the following systems and agencies:

- Rifle Dispatch and/or law enforcement and emergency response teams, and Citizens in the Mitchell Creek flood zone area above Donegan Road should immediately evacuate when the siren sounds. Streamflow in Mitchell Creek should be monitored by emergency response personnel. If flow begins to rise citizens below the Donegan Road should be evacuated.
- Citizens or other interested parties can monitor rainfall recorded at <http://raws.boi.noaa.gov/rawsobs.html>. Once the web page is accessed scroll to COLORADO and double click on the following Remote Automatic Weather Stations: STORM KING MOUNTAIN, MITCHELL CREEK, FISH HATCHERY, SOUTH CANYON.

