

# **2**

## **ALTERNATIVES INCLUDING THE PROPOSED ACTION**

## **Changes between Draft and Final EIS**

### **Chapter 2.1.3**

- **Consolidated the major public and internal issues by resource.**

### **Chapter 2.3.3**

- **We erred in the location of the Inventoried Roadless Area boundary in the vicinity of Unit 1, and a portion of the proposed unit was actually in IRA. Dropping the affected portion removed most of the merchantable volume in the unit, so we eliminated Unit 1 from all alternatives. Tables and acreage figures have been corrected to reflect this change.**

### **Chapter 2.3.4**

- **Removed references to road reconstruction: road reconstruction is defined as an activity that (1) results in an increase of an existing road's traffic service level, expands its capacity, or changes its original design function, or (2) results in a new location of an existing road or portions of an existing road and treatment of the old roadway (36 CFR 212.1). The salvage sale does not propose any road reconstruction. Rather, the road work that is proposed on existing roads is maintenance, defined at 36 CFR 212.1, as the upkeep of the entire forest transportation facility including surface and shoulders, parking and side areas, structures, and such traffic-control devices as are necessary for its safe and efficient utilization.**

### **Chapter 2.4**

- **Table 2.4.2 moved from Chapter 4 to Chapter 2.**

# 2

## ALTERNATIVES INCLUDING THE PROPOSED ACTION

### 2.0 Introduction

This chapter serves with Chapter 1 as part of the Executive Summary. This chapter describes: (1) the process used to formulate alternatives and respond to comments on the Draft EIS, (2) the issues and design criteria that drive alternatives, and (3) the alternatives themselves, including mitigation measures and monitoring requirements. Most important, this chapter summarizes and compares the predicted effects of the alternatives on the human environment. This information provides a clear basis of choice between alternatives for the Forest Supervisor and the public.

### 2.1 Process Used to Formulate Alternatives and Respond to Comments on the Draft EIS

#### 2.1.1 Public Involvement Process

##### Scoping

During and immediately following the 2002 fire season (July-December), the local public remained heavily involved and well informed of fire fighting efforts and post fire rehabilitation (BAER) activities. In addition to television broadcasts and newspaper coverage, Incident Command Teams assigned to the fire kept the public notified through community meetings and briefings. In many instances, local residents

were directly involved with fire suppression activities, emergency restoration work, and associated support services.

Following completion of the Burned Area Assessment and during development of the Proposed Action for the East Fork Fire Salvage Project (March-April 2003), the Forest initiated public involvement by mailing a scoping document on March 10, 2003 containing a preliminary Proposed Action and conducting a scoping meeting on March 18, 2003 at the Historic Railroad Depot in Evanston, Wyoming, the community most directly influenced by the fire (Figure 2.1.1). This meeting provided the public with an opportunity to discuss post fire treatment needs. This meeting also provided a forum for the public to review and critique the previous season’s fire fighting efforts, public involvement during the wildfire season, and other forest management issues.

**Community Scoping Meeting**  
 Evanston – meeting held at Evanston Wyoming on March 18, 2003.

**Figure 2.1.1. Scoping Meeting.** *The Forest conducted a scoping meeting in Evanston, the community near and most directly influenced by the fire.*

Information, comments, and concerns expressed in mailed comments on the scoping document and at the scoping meeting led to a formal proposal to manage lands affected by the East Fork Fire. This became the Wasatch-Cache National Forest East Fork Fire Salvage EIS “Proposed Action”.

##### Notice of Intent – Federal Register Publication

In order to formally notify the public and other Federal and State agencies of the Proposed Action, the Wasatch-Cache National Forest published a "Notice of Intent" in the Federal Register on March 24, 2003 (Figure 2.1.2). This notice indicated that the Forest was proposing to prepare an Environmental Impact Statement on post fire salvage harvesting. The notice provided supplementary information, including a list of proposed activities and the purpose and need for these activities (40 CFR 1508.22). A copy of the Notice of Intent is filed within the East Fork Fire Salvage EIS Project File.

#### Notice of Intent – Federal Register

Federal Register, Volume 68, No. 56. Friday, March 24, 2003. Pages 14178-14179.

**Figure 2.1.2. Notice of Intent.** *The Wasatch-Cache National Forest published a "Notice of Intent" within the Federal Register on Friday, March 24, 2003.*

### ■ Public Scoping and Involvement

#### Stakeholders, Key Publics, and Target Audiences

Communities  
County Commissioners  
Newspapers and Local Media  
Other Government Agencies  
Government Representatives  
Adjacent Landowners  
Timber Industry Representatives  
Environmental Advocacy Groups  
Forest User Groups  
General Interested Publics

**Figure 2.1.3. Stakeholders, Key Public, and Target Audiences.** *The Forest avoided missing or "losing" public involvement by identifying groups of stakeholders, key publics, and target audiences early in the process.*

Several methods were used to communicate with these groups and individuals and to encourage participation in the development of alternative management strategies (Figure 2.1.4).

#### Public Participation Methods

Community Meeting  
Direct Mailings to Established Mailing Lists  
Announcements and Publications in Local Newspapers  
Publication in Federal Register  
Direct Telephone Calls and Individual Contacts  
Forest Web Site and E-Mail Links

**Figure 2.1.4. Public Participation Methods.** *Several methods were used to communicate with groups and individuals and to encourage participation in the development of alternative management strategies.*

### □ Project Scoping

On March 10, 2003, the Wasatch-Cache National Forest began the formal public involvement or "scoping" process by mailing a scoping document containing a summary of the preliminary Proposed Action, Alternatives and Issues to 57 individuals and organizations on the District's established mailing list. (40 CFR 1501.7).

On March 13, 2003, a news release "Proposal to Salvage Fire Damaged Trees" was provided to local newspapers. Addresses for sending written responses, and telephone numbers of the team leader and responsible officials were included. These newspaper articles and other public involvement information are filed in the East Fork Fire Salvage EIS Project File.

Immediately following the media and mailing events, the Forest held an Open House to allow for discussion between the Interdisciplinary Team and the public (Figure 2.1.5). This meeting provided a forum to present detailed maps of the Proposed Action (See Map 2.5.3 in Appendix A) and to discuss issues, concerns and alternatives. Verbal and written comments received at the Open Houses supplemented comments received by mail, e-mail, and telephone.

Figure 2.1.5 summarizes public involvement used to solicit comments on the Forest's Proposed Action.

<p><b>Public Involvement</b></p> <p><b>General Information Packets</b> – mailed on March 10, 2003 to 57 individuals and organizations on Forest’s established mailing list.</p> <p><b>Announcements</b> – on March 13, 2003, a news release was provided to local newspapers requesting comments on the Proposed Action.</p> <p><b>Open House</b> – A public open house was held on March 18th to meet one-on-one with the public and solicit comments.</p>
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**Figure 2.1.5. Public Involvement.** *Several means of public involvement helped to solicit comments on the Forest’s Proposed Action.*

The Draft EIS was posted on the Forest website and copies mailed to interested parties on December 17, 2003. The Notice of Availability was published in the Federal Register on Jan 9, 2004 (Vol. 69(6):1585). Seventeen letters were received during the comment period ending February 23, 2004. Comments and Forest Service response are contained in Appendix D.

■ **Involvement of other Agencies**

In addition to involving the public, the Forest consulted with several other agencies for resource data and issue identification (40 CFR 1508.5). Several of these agencies are responsible by law or special expertise for administering resources such as endangered species and heritage resources.

□ **United States Fish and Wildlife Service**

Under the requirements of Section 7 of the Endangered Species Act (16 U.S.C. Section 1531-1544), at the time the Draft EIS was published, the Forest Supervisor is required to consult with the United States Fish and Wildlife Service (USFWS) to determine the biological significance of activities on any species designated or proposed as threatened and endangered (50 CFR Part 402).

In accordance with the Biological Analysis and Endangered Species Act (ESA) Consultation Process, biologists of the United States Fish and Wildlife Service remained involved throughout the analysis process.

As part of the consultation process, the USFWS has provided assistance with completion of the Biological Evaluations (BE) and Assessment (BA) by the Forest to document the effects of the project on Threatened, Endangered and Sensitive species. Following Formal Section 7 Consultation under the Endangered Species Act (16 U.S.C. 1531 et seq.), the U.S. Fish and Wildlife Service returned concurrence with a “no effect” determination for bald eagle and a biological opinion that the East Fork Fire Salvage is not likely to jeopardize the continued existence of the Canada lynx (USDI 2004).

□ **Other Agencies Contacted**

As part of the public involvement and scoping process, several federal, state and local agencies were contacted. They include but are not limited to: Northwest Band of the Shoshone Nation, Utah Department of Natural Resources, Wyoming Game and Fish, Utah State Historic Preservation Office, and County Commissioners. Additional information is displayed in Chapter 6, Agencies Consulted.

□ **2.1.2 Issue Development**

Potential issues (defined as actual and perceived effects, risks, and hazards of the Proposed Action) were developed from the results of both “internal scoping” and “external scoping” (public involvement). In some cases, written and verbal comments were used verbatim to develop issue statements. In most cases comments were paraphrased, summarized, or combined with other comments to develop an issue statement.

■ **Internal Issue Development**

Following the development of the Proposed Action, the East Fork Fire Salvage Interdisciplinary Team (EFIDT) conducted several internal meetings and field tours to review the project area and assess potential issues, concerns, and opportunities associated with the Proposed Action.

From these meetings, internal issue statements were developed for each resource (e.g. soil, water quality and hydrology, fisheries, vegetation, heritage, wildlife, etc.). Appropriate indicators (means to measure or quantify effects), threshold levels, and measurement techniques were also identified to assist the EFIDT in data collection and research.

■ **Public Issue Development**

As a result of public scoping and involvement, 26 written responses (not including informal discussions and public meeting comments) were received from the public. Each response was assessed by the EFIDT.

Each response was studied and broken into individual issue statements. These statements were then identified, coded, and entered into a database for tracking. Issues were coded into 15 categories. Each category contained subcategories that were specific to certain aspects of the issue. Under all categories, 101 subcategories were available for coding issue statements. As a result of the coding process, 213 public issues were identified and coded.

■ **Literature Citations, References and Attachments used in Issue Identification**

Several letters received from the public during the scoping process included literature attachments. The information in these attachments was considered during the coding of comments that were specific to the project; however, coding of the specific attachment was not performed in all cases.

□ *Beschta et al. (1995)*

In March, 1995, Dr. Robert Beschta, Oregon State University, and other research scientists

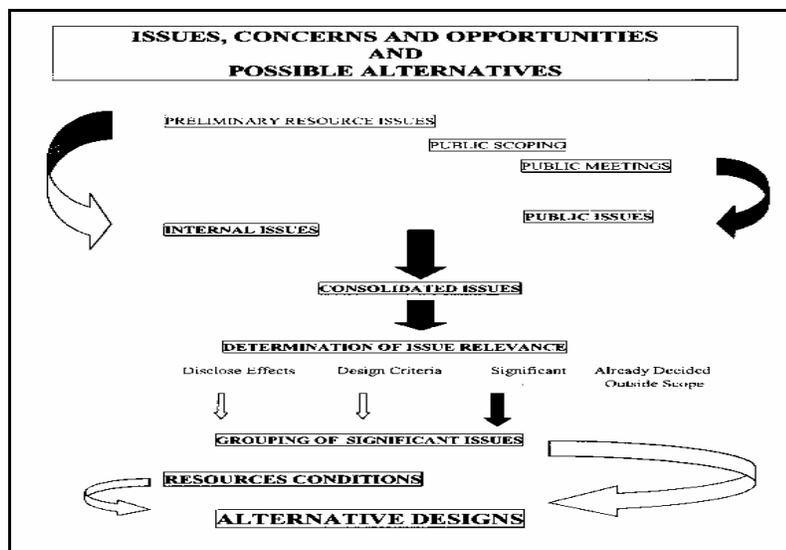
produced a commentary entitled: “Wildfire and Salvage Logging, Recommendations for Ecologically Sound Post-Fire Salvage Logging and Other Post-Fire Treatments on Federal Lands in the West.” This document was prefaced with a discussion of the interrelationships between the natural disturbance cycle and the impacts of past land management, and the need to examine and “focus on the pattern and consequences of current and proposed human manipulation and disturbances of all types at the landscape level.”

Because of the concern about issues discussed by Beschta et al., the principles outlined in this report were used in the development of Design Criteria and Alternatives.

Additional discussion on how the Bestcha et al (1995) report was considered in project design is located in Appendix C.

■ **Consolidation and Identification of Key Internal and Public Issues**

Following the coding process, similar public issues were grouped and consolidated into 109 Consolidated Issue Statements (CIS). Issues which: (1) had a common resource, (2) had similar cause-effect relationships, (3) had common geography, or (4) were linked to the same action, were consolidated into one issue statement (Figure 2.1.7).



**Figure 2.1.7. Development of Alternatives.** Similar internal and public issues were grouped and consolidated into a total of 95 Consolidated Issue Statements. Issues which: (1) had a common resource, (2) had similar cause-effect relationships, (3) had common geography, or (4) were linked to the same action, were consolidated into one issue statement.

To determine which CIS would become “key” or “driving” to the development of alternatives, the “cause-effect” relationship was assessed. This relationship was determined based on three factors (Figure 2.1.8).

**Determination of “Significant”, “Driving” or “Key” Issues**

**Extent** – the geographic distribution of the effects

**Duration** – the length of time the effect is likely to occur

**Magnitude or Intensity** – the value of the effect in relation to acceptable values (including social, economic, and environmental)

**Figure 2.1.8. Key Issues.** *The given cause-effect relationship was assessed to determine which issues would be key to driving alternatives.*

Issues not identified as “Drivers” or “Key” to the development and analysis of alternatives were assigned to five other categories for tracking (Figure 2.1.9).

**Issue Tracking**

**Driving or “Key” Issue** – issues which individually or consolidated will drive the development of an alternative.

**Design Criteria** – issues, which are applicable to all alternatives and will be used to guide the design of activities within the alternatives.

**Disclose Effects** – issues which are applicable but do not have cause-effect relationships which drive alternative development, or have law that requires that effects are disclosed.

**Already Decided** – issues of actions that are ongoing or are already covered by previous Forest decisions.

**Beyond Scope** – issues that are not pertinent to the scope of the Proposed Action and cannot be resolved at the scale of this project

**Figure 2.1.9. Issue Tracking.** *Issues not identified as “Driving Issues” were assigned to five other categories for tracking.*

**2.1.3 Issues used to Develop Alternatives**

Thirty-two of the Consolidated Public Issue Statements were identified as relevant to driving the development of alternatives or mitigation measures (Figure 2.1.10). Driving issues were used to formulate alternatives, prescribe mitigation measures, or analyze environmental effects. Consolidated public issues and internal issues were then combined into “Combined Public and Internal Issue Statements” to be tracked through the EIS (See Appendix B, Issues).

**Consolidated Public Soil Issues**

SOILWATER 4 – Soil Erosion – There is a concern that post-fire logging removes wood that is ecologically valuable for retarding soil erosion.

SOILWATER 14 – Sediment Generation – There is a concern that areas affected by fire often have increased sediment generation and erosion already, which would be exacerbated by both road building and logging and that no management activity including temporary roads should hamper soil integrity, particularly in post-fire areas where soils are under increased stress (physical and ecological productivity as well as sedimentation).

SOILWATER 15 – Severely Burned Areas – There is a concern that logging should not be allowed in severely burned areas.

SOILWATER 16 and 24 – Salvage Treatment – There is a concern that hydrophobic soil conditions and reforestation would not be improved without salvage logging and that there is a need to salvage as much timber as possible with associated reseeding, water bars and other methods of holding the soil in place.

**Combined Public and Internal Soil Issue Statement**

**The fire has increased the potential for accelerated soil erosion to occur by removing ground covering vegetation and litter and creating a hydrophobic layer in some areas. There is an area in the West Fork Blacks Fork with unstable soils and landform where the potential for a landslide due to the fire may have increased. Timber salvage and road construction could result in additional detrimental soil impacts.**

Measures or means of resolving the issue considering mitigation under each of the alternatives:

- a. Adequacy of woody debris retention.
- b. Amount of detrimental soil disturbance.
- c. Risk of landslide.

**Consolidated Public Water Issues**

SOILWATER 10 – Motorized Use Effects – There is a concern about the impacts of the proposal on water quality associated with increased sedimentation from increased motorized use and disruption or destruction of riparian areas due to increased motorized access in the area.

SOILWATER 11 – Wetlands – There is a concern about the impacts of the proposal on wetlands, seeps, bogs and fens (including impacts to upland areas that may alter recharge/hydrology of down-slope wet areas).

SOILWATER 12 – Road Effects – There is a concern that even temporary roads cause significant erosion and that rehabilitation and closure must be given a definite time frame.

SOILWATER 13 – Stream Crossings – There is a concern that road crossings through drainages should be avoided and mitigated when they are necessary.

SOILWATER 23 – Riparian – There is a concern that there should be no logging in riparian areas.

**Combined Public and Internal Water Issue Statement**

**Removal of forest tree cover by the fire can increase erosion, in-stream flows, peak discharges, and sediment loads in streams and wetlands, which may adversely affect channel morphology and stability and ecological functions of streamside riparian areas, seeps, bogs, and fens. Timber salvage operations, road construction, and increased motorized recreational use could further increase these effects. Road maintenance, decommissioning, and salvage operations could also mitigate some of them.**

Measures or means of resolving the issue considering mitigation under each of the alternatives:

- a. Effects on water quality from sediment.
- b. Amount of water yield increase.
- c. Effects on wetlands.

**Consolidated Public Scenery Issues**

SCENIC 1 – Reductions in Aesthetics – There is a concern about the impacts of the proposal on the area's natural beauty due to reductions in visual quality, impacts of litter and off road vehicle damage.

**Combined Public and Internal Scenery Issue Statement**

**Timber salvage and road construction may have impacts on the area's natural beauty due to reductions in visual quality, impacts of litter and off road vehicle damage.**

Measures or means of resolving the issue considering mitigation under each of the alternatives:

- a. Effects on scenic integrity.

**Internal Heritage Issue Statement**

**Timber salvage and road construction carried out within the affected areas have the potential to impact recorded and/or unrecorded prehistoric and historic resources.**

Measures or means of resolving the issue considering mitigation under each of the alternatives:

- a. Effects on heritage resources.

**Consolidated Public Infrastructure Issues**

ROADS 1 – Permanent Roads – There is a concern that permanent roads would have a more lasting impact than temporary roads.

ROADS 5 – No Roads – There is a concern that even temporary roads have adverse impacts on aesthetics, wildlife habitat, soils, and sedimentation and frequently develop into permanent roads.

**Combined Public and Internal Infrastructure Issue Statement**

**Infrastructure: Permanent or temporary road construction and improvements affect commercial uses, aesthetics and recreation opportunities, sometimes positively and sometimes negatively.**

Measures or means of resolving the issue considering mitigation under each of the alternatives:

- a. Effects on public access.
- b. Effects on road conditions.

**Consolidated Public Vegetation Issues**

ECOSYSTEM 5 – Forest Health – There is a concern that without active management, forest health will decline.

**Combined Public and Internal Vegetation Issue Statement**

**Timber salvage and road construction could affect TES plant species. Timber salvage and logging equipment and other off-road vehicle use could spread noxious weed seeds into weed-free areas.**

Measures or means of resolving the issue considering mitigation under each of the alternatives:

- a. Effects on TES species.
- b. Effects on noxious weeds.

**Consolidated Public Fire/Fuels Issues**

FIRE /FUEL 1 – Reburn Without Fuel Treatment - There is a concern that given fire history and extreme hazardous fuels, there is a need to treat fuels in this part of the forest. Risks to investment in establishing a new forest and future

resource damage caused by a reburn must be fully evaluated.

FIRE/FUEL 2 – Fuel Loading Due to Logging - There is a concern that logging increases future fire risk, especially if slash is not treated, and that the Forest Service must disclose the amount of fuel loading in the area

**Combined Public and Internal Fire/Fuel Issue Statement**

**Fire/Fuel: Future fires could result in high intensity reburns with high resistance to control where heavy fuel loading occurs from logging slash and after fire-killed trees fall.**

Measures or means of resolving the issue considering mitigation under each of the alternatives:

- a. Effects from logging slash.
- b. Effects on large diameter fuel loading.
- c. Effects on resistance to control of any future wildfire.

**Consolidated Public Wildlife Issues**

ECOSYSTEM 4 – Restoration of Ecosystem Processes - There is a concern that the proposed salvage simply exacerbates recovery and assures natural processes and historical ecological conditions will not recover.

ECOYSYSTEM 8 – Maintenance of Large Undisturbed Areas – There is a concern that large undisturbed areas need to be left intact to let natural processes restore the ecosystem.

WILDLIFE 2 – Lynx Denning Habitat – There is a concern that extensive salvage logging of large trees could result in loss of denning habitat for lynx.

WILDLIFE 3 – Fragmentation – There is a concern that increased roading and logging could result in fragmentation of habitat, barriers to wildlife movement, and animal-vehicle collisions.

WILDLIFE 5 – Snow Compaction – There is a concern that new roads may facilitate snowmobile and other human uses in the wintertime and that snow compaction aids competing carnivore access to the detriment of lynx.

WILDLIFE 7 – Snags – There is a concern that adequate snag habitat for raptors (200-300 snags/100 acres) is retained.

WILDLIFE 12 – Raptor Perches – There is a concern that at least 1/3 of the tall dead timber should be retained for raptors.

WILDLIFE 17 – Temporary Roads – There is a concern that additional temporary roads could have impacts on wolverine and other wildlife species far beyond the narrow right-of-way.

WILDLIFE 21 – Listed Species – There is a concern about the impacts of the proposal on endangered or threatened species, rare species, vulnerable species, Sensitive Species (USFS), Special Status Species (State Game and Fish), or any species listed as S1, S2, S3 or G1, G2, G3 by Wyoming Natural Diversity Database or Utah Natural Heritage Program.

WILDLIFE 22 – Cavity Nesters – There is a concern about the adverse impacts of the proposal on woodpeckers and other cavity nesters that depend on dead or diseased trees for survival.

WILDLIFE 23 – Disturbance Due to Roads – There is a concern about the impacts of increased wildlife disturbances/stress/harassment, and poaching due to additional new roads.

WILDLIFE 26 – Connectivity – There is a concern that scorched and dead trees should be left unharvested in large patch sizes and connected throughout the area to provide for both meaningful and effective habitat.

WILDLIFE 27 – Wildlife Habitat Components – There is a concern about the impacts of the proposal on old-growth, interior forest, critical range, migration routes and dispersal areas, birthing areas, raptor nests, stands and roosts, snags, wetlands, seeps, bogs and fens.

**Combined Public and Internal Wildlife Issue Statements**

**Timber salvage units and roads could disrupt natural ecosystem processes, fragment large undisturbed areas, increase poaching and cause barriers to wildlife movement.**

Measures or means of resolving the issue considering mitigation under each of the alternatives:

- a. Percent of acres with snag and future down woody debris removal.
- b. Remaining patch distribution and connectivity.

**Salvage of fire-killed timber could adversely affect habitat for large and small wildlife species including avians that use this habitat for foraging, breeding, or hiding cover.**

Measures or means of resolving the issue considering mitigation under each of the alternatives:

- a. Effects on other species at risk.
- b. Effects on management indicator species.
- c. Effects on big game habitat.
- d. Effects on snag habitat.

**Removal of fire-killed stands of dead trees could adversely affect habitat for listed sensitive, threatened, and endangered species including denning habitat for Canada lynx.**

**New roads may facilitate snowmobile and other human uses in the winter that facilitates movement by competing carnivores to the detriment of lynx.**

Measures or means of resolving the issue considering mitigation under each of the alternatives:  
a. Effects on TES species.

#### **Consolidated Public Fishery Issues**

FISH 1 – Sediment Effects on Cutthroat Trout - There is a concern that increased sedimentation from logging close to streams, particularly along sections with steep or unstable hill slopes and loss of shading in riparian areas, stream banks, and ponds, would compromise Colorado River cutthroat trout (CRCT) and Bonneville cutthroat trout (BCT) that may already be in trouble due to other factors and previous activities, further imperiling the subspecies' as a whole, in violation of NFMA regulations.

FISH 3 – Need for Salvage and Erosion Control – There is a concern that positive effects of erosion control on fish will not be accomplished without timber salvage.

WILDLIFE 6 – Boreal Toads – There is a concern that work in riparian areas could have adverse effects on boreal toad habitat.

#### **Combined Public and Internal Fishery Issue Statements**

**Increased sedimentation from logging close to streams, particularly along sections with steep or unstable hill slopes and loss of shading in riparian areas, stream banks, and ponds, could affect cutthroat trout populations.**

Measures or means of resolving the issue considering mitigation under each of the alternatives:  
a. Effects of sediment on fisheries.

**Potential positive effects of erosion control on fish may not be accomplished without timber salvage.**

Measures or means of resolving the issue considering mitigation under each of the alternatives:  
a. Effects of road maintenance.

**Timber salvage or road construction in riparian areas could have adverse effects on boreal toad and other amphibian habitat.**

Measures or means of resolving the issue considering mitigation under each of the alternatives:  
a. Effects of salvage logging.  
b. Effects of temporary roads.

#### **Consolidated Public Recreation Issue**

RECREATION 1 – Reductions in Aesthetics – There is a concern about the impacts of the proposal on the loss of quiet, back-country, non-motorized recreational opportunities due to additional new roads.

#### **Combined Public and Internal Recreation Issue Statement**

**Timber salvage and road construction may result in the loss of quiet, back-country, non-motorized recreational opportunities.**

Measures or means of resolving the issue considering mitigation under each of the alternatives:  
a. Effects on non-motorized recreation.

#### **Consolidated Public Socio/Economic Issue**

SOCIOECON 3 – Salvage Benefits – There is a concern that the local economy could lose timber values if salvage is not accomplished and done in an expeditious manner.

#### **Combined Public and Internal Socio/Economic Issue Statement**

**The local economy could lose timber values if salvage is not accomplished and is not done in an expeditious manner.**

Measures or means of resolving the issue considering mitigation under each of the alternatives:  
a. Expected timber volume.

**Figure 2.1.10. Driving Issues.** *Thirty-two of the Consolidated Public Issue Statements were identified as relevant to driving the development of alternatives. These were combined with internal issues for issue statements to be tracked through the analysis.*

Remaining issues, identified as: (1) design criteria, (2) for effects disclosure, or (3) already decided, are displayed in Appendix B.

### **□ 2.1.4 Issues Eliminated from Further Study**

Of the 109 consolidated internal and external issue statements, 20 were considered “Beyond the Scope” of the project or “Already Decided” and eliminated from further study. These issues included requests for changes in the Purpose and Need, allowing timber salvage on private land, identification of resource impacts and monitoring not pertinent to the scope of the East Fork Fire Salvage Project and compliance with Conservation Strategies, among others. Many of these issues are relevant to National Forest management but must be resolved at Forest, Regional, or National levels. Examples of these issues are displayed in Figure 2.1.11.

**Examples of Issues Beyond the Scope or Already Decided**

Ecosystem 2 – Emphasis in the Purpose and Need  
 SocioEcon 8 – Allow salvage on private land  
 Wildlife 19 – No concerns for Wildlife in Wyoming  
 Fish 10 – Comply with RCA for BCT and CRCT  
 Hazmat 1 – Impacts from carbon, sulphur, and other emissions and from chemical spills.

**Figure 2.1.11. Issues Beyond the Scope.** *Twenty-four issues were considered “Beyond the Scope” of the project and eliminated from further study*

A list of all issues and issue tracking is displayed in Appendix B.

## 2.2 Alternative Design Criteria

In order to avoid developing alternatives that were not environmentally, technically or economically feasible, “Design Criteria” were developed to limit the scope of alternatives within known resource constraints, Forest Plan Standards, and laws and regulations. These constraints served as a basis for resource protection or enhancement when developing all of the action alternatives.

Design Criteria were developed from resource information and issues, field reconnaissance, and from review of current Forest Plan direction, and pertinent laws and regulations governing management of Federal lands.

The Design Criteria served as a “Coarse Filter” for developing alternatives. For example, in a situation where the effects of the East Fork Fire, combined with the effects of past disturbances, left conditions that did not provide opportunities for salvage harvest within economic and environmental constraints, salvage would not be considered. Where the predicted effects of an action exceeded standards set by policy, law or regulation, the action was not proposed unless the effects of that action could be mitigated.

The Design Criteria helped avoid additional resource impacts in some areas by directing management away from those areas. The Design Criteria thus helped to focus the location of activities and to minimize the time and energy spent developing alternatives that could not be implemented.

In concert with the Design Criteria, the Key Issues served as a “Fine Filter,” helping to package the actions to reflect internal and public concerns, resource conditions within the areas that could be managed, and to determine the effects of those activities.

### 2.2.1 Forest Plan Design Criteria

If any activities were proposed, the action alternatives would be designed to meet the Goals, Objectives, and Standards of the Wasatch-Cache National Forest Plan (Figure 2.2.1). Activities would be restricted to suitable Management Area allocations. Table 2.2.1 displays the acreages of timber salvage in each management prescription under Alternatives 2 and 3.

**Table 2.2.1. Proposed Salvage in Management Prescription Areas.** *Where potential impacts to resources were predicted, environmental protection measures would be employed to mitigate the effects of conducting activities.*

Management Prescription	Alt 2	Alt 3
<b>3.1a</b>	11	1
<b>4.4</b>	102	75
<b>5.1</b>	668	521
<b>Total:</b>	781	597

#### Design Criteria from Forest Plan

Restrict proposed timber salvage to Management Prescription Areas that allow timber harvest.

**Figure 2.2.1. Design Criteria from Forest Plan.** *The action alternatives would be designed to meet the Goals, Objectives, and Standards of the Wasatch-Cache National Forest Plan.*

### 2.2.2 Soils and Water Design Criteria

If any activities were proposed, alternatives would be designed to minimize disturbance to soils and degradation of water quality.

To protect soils and water quality, several Design Criteria were identified to ensure minimal impacts to stream banks and riparian areas, and to minimize the potential for erosion and sediment transport from road and vegetation related management activities. See Figure 2.2.2.

These Design Criteria included restrictions on activities within Riparian Habitat Conservation Areas, limiting road development, and requiring use of Water and Soil Conservation Practices (WSCPs) in road management and salvage harvest.

#### **Design Criteria for Soil and Water**

Minimize salvage on severely burned or sensitive soils unless the effects of those activities could be mitigated with timing or other means.

Limit tractor logging to slopes of 40 percent or less. Some areas with slopes greater than 40 percent and slope lengths less than 150 feet may be included but directional felling and winching will be used to keep tractors off those slopes.

Avoid developing major log landings on slopes greater than ten percent. Utilize existing roads and disturbed areas for landings where possible.

Minimize developing landings on areas with high soil burn severity unless the effects of those activities could be mitigated with timing or other means.

Avoid re-disturbing areas where East Fork Fire Salvage suppression and BAER rehabilitation activities have occurred unless those activities were not sufficient to restore or protect the soil resource. Re-rehabilitate disturbed areas that were previously rehabilitated as soon as possible.

In harvested stands provide for Coarse Woody Debris levels that protect soils from future high intensity fires and from loss of soil productivity. Provide at least minimum coarse woody debris to meet Forest Plan Guidelines.

#### **Management Prescription 3.1A**

Management Prescription 3.1A consists of the stream and adjacent riparian areas (or 300 feet either side of the stream whichever is greater). Because of the large number of existing facilities (roads, developed recreation sites, trails), already located within areas mapped as 3.1A, and because of their relatively high value and small proportion of the landscape, development outside already developed areas within this prescription is to be avoided. Protect or restore proper hydrologic functioning.

Timber harvest, vegetation/fuel treatments, prescribed fire, and wildland fire use are allowed only for the purposes of maintaining, improving or restoring riparian and aquatic habitat to desired conditions or to protect property in the wildland urban interface.

Road construction is not allowed except for road crossings.

#### **Riparian Habitat Conservation Areas (RHCAs)**

Unit design would comply with Forest Plan management direction for Riparian Habitat Conservation Areas (RHCAs). RHCAs include traditional riparian corridors, wetlands, intermittent streams, and other areas that help maintain the integrity of aquatic ecosystems by (1) influencing the delivery of coarse sediment, organic matter, and woody debris to streams, (2) providing root strength for channel stability, (3) shading the stream, and (4) protecting water quality. This designation still allows for a full range of activities but it emphasizes the achievement of riparian management objectives that are identified on a site-by-site basis. These objectives should include riparian vegetation and instream habitat condition. The RHCAs, by condition, are defined below.

**Category 1. FISH-BEARING STREAM:** RHCAs consist of the stream and the area on either side of the stream extending from the edges of the active stream channel to 300 feet slope distance (600 feet, including both sides of the stream channel).

**Category 2 - PERMANENTLY FLOWING NON-FISH-BEARING STREAMS:** RHCAs consist of the stream and the area on either side of the stream extending from the edges of the active stream channel to 150 feet slope distance (300 feet, including both sides of the stream channel).

**Category 3 - PONDS, LAKES, RESERVOIRS, AND WETLANDS GREATER THAN 1 ACRE:** RHCAs consist of the body of water or wetland and the area to 150 feet slope distance from the edge of the maximum pool elevation of constructed ponds and reservoirs or from the edge of the wetland, pond or lake.

**Category 4 - SEASONALLY FLOWING OR INTERMITTENT STREAMS, WETLANDS LESS THAN 1 ACRE, LANDSLIDES, AND LANDSLIDE-PRONE AREAS:** This category includes features with high variability in size and site-specific characteristics. At a minimum the interim RHCAs must include, landslides and landslide-prone areas, 100 feet slope distance in watersheds containing Bonneville or Colorado River cutthroat trout, and 50 feet slope distance for watersheds not containing Bonneville or Colorado River cutthroat trout.

In Riparian Habitat Conservation Areas when projects are implemented, retain natural and beneficial volumes of large woody debris. (Snag and woody debris retention is defined in Forest Guideline 16.)

Avoid soil disturbing activities (those that remove surface organic matter exposing mineral soil) on steep, erosive, and unstable slopes, and in riparian, wetlands, floodplains, wet meadows, and alpine areas.

All temporary roads would be obliterated, recontoured, seeded and covered within one season of use.

No fuel storage or equipment refueling would occur within RHCAs.

**New Road Development**

Road development needed for vegetation management or watershed restoration will be limited to temporary Roads. No new Long-Term Specified Roads would be constructed.

New road development would be minimized and restricted to gentle side slopes, ridge tops and high elevation areas. Roads would not be constructed in RHCAs except for crossings.

All temporary roads would be obliterated, recontoured, seeded and covered within one season of use.

**Road Decommissioning, Maintenance, Drainage Improvement, and Closures**

Best Management Practices (BMPs) would be applied to all roads used for accessing treatment areas. All of the proposed activities involving stream channels under the alternatives are covered by a silvicultural exemption under U.S. Army Corps of Engineers 404/401 Permit regulations.

**Harvesting Activities**

All Harvest Activities would follow prescribed BMPs.

**Figure 2.2.2. Design Criteria for Soil and Water.** *The action alternatives would be designed to meet Wasatch-Cache Forest Plan Region Standards and Guides and Region 4 Soil Quality Standards. The action alternatives would be designed to minimize impacts to or restore hydrologic resources.*

**2.2.3 Scenic Resources Design Criteria**

If any activities were proposed, the action alternatives would be designed to minimize disturbance to the scenic resource, or improve known scenic resource problems in areas where existing scenic integrity does not conform to the Forest Plan scenic integrity guidelines. (Figure 2.2.3).

**Design Criteria for Scenic Resources**

Avoid designing harvest and salvage units that do not blend with natural vegetation patterns and landforms (e.g. straight unit edges).

**Figure 2.2.3. Design Criteria for Scenic Resources.** *The action alternatives would be designed to minimize disturbance to the scenic resource.*

**2.2.4 Heritage Resources Design Criteria**

If any activities were proposed, the action alternatives would be designed to minimize impacts to known heritage sites or to enhance interpretation and protection of those sites (Figure 2.2.4).

**Design Criteria for Heritage Resources**

Actions proposed in all alternatives will be designed to minimize impact to known heritage sites or to enhance interpretation and protection of those sites. Avoid salvage and road development activities where those activities may impact known heritage sites unless the effects of those activities could be mitigated.

**Figure 2.2.4. Design Criteria for Heritage Resources.** *The action alternatives would be designed to minimize impacts to known heritage sites.*

**2.2.5 Roadless Resources**

No activities will be proposed in inventoried roadless areas.

**Design Criteria for Roadless Resources**

The Forest Supervisor made a decision prior to scoping for this project to restrict timber salvage to areas outside of inventoried roadless areas.

**Figure 2.2.5. Design Criteria for Roadless Resources.** *The alternatives will avoid IRAs.*

**2.2.6 Infrastructure and Improvements Design Criteria**

If any activities were proposed, the action alternatives would be designed to bring roads and trails needed for long-term land management up to standards meeting Best Management Practices. See Figure 2.2.6. Roads and trails that cause impacts to wildlife, hydrologic, and fisheries resources would be improved or

decommissioned so those impacts were no longer significant in nature.

**Design Criteria for Infrastructure and Improvements**

Existing roads needed for long-term land management would be brought up to Best Management Practice standards.

**Figure 2.2.6. Design Criteria for Infrastructure and Improvements.** *The action alternatives would be designed to bring roads needed for long term land management up to standards meeting Best Management Practices.*

**2.2.7 Vegetation and Forest Resources Design Criteria**

All action alternatives would be designed to minimize impacts to or restore habitat for Threatened, Endangered, and Sensitive (TES) Plant Species and to minimize the potential for expanding existing noxious weed populations or introducing new noxious weed species. Existing populations would be reduced through noxious weed management measures. See Figure 2.2.7.

**Design Criteria for TES Plant Species**

Avoid management activities in areas where known populations of TES plant species exist unless those activities may be mitigated.

**Design Criteria for Noxious and Invasive Plant Species**

Manage known weed populations through treatments including herbicide, mechanical, and prevention.

Minimize management activities in areas where weed populations do not presently exist unless the risk for introducing noxious weeds could be mitigated.

Manage motorized vehicle access in areas where existing weed populations may be spread into adjacent areas free of weeds.

**Figure 2.2.7. Design Criteria for Vegetation and Forest Resources.** *The action alternatives would be designed to minimize impacts to or restore habitat for Threatened, Endangered, and Sensitive (TES) Plant Species and to minimize the potential for expanding existing noxious weed populations or introducing new noxious weed species.*

**2.2.8 Fire and Fuels Design Criteria**

All action alternatives would be designed with consideration of effects on fuel loading and potential for reburn. See Figure 2.2.8.

**Design Criteria for Fire and Fuels**

All landing slash or green slash resulting from temporary road construction would be disposed of.

**Figure 2.2.8. Design Criteria for Fire and Fuels.** *The action alternatives would be designed with consideration of fire and fuels.*

**2.2.9 Wildlife Design Criteria**

All action alternatives would be designed with consideration of all wildlife species. Conflicts with wildlife habitat would be avoided through design rather than through mitigation after design.

To protect big game habitat, large islands and linking corridors of unburned forest would be maintained to provide escape cover and travel corridors.

If any goshawk nests are found in or adjacent to proposed salvage units, prior to or during timber salvage operations, units would be moved or modified to meet goshawk conservation strategy guidelines.

The East Fork Fire has created abundant habitat for species dependent on dead trees. Large areas of this habitat will be maintained and will include connecting corridors.

There are some large islands and corridors of unburned forest within the fire perimeter. These will be maintained intact. Some areas burned at low intensity with scattered pockets of mortality. Older dead trees within these areas will be maintained for old growth and cavity dependent species habitat. See Figure 2.2.9.

**Design Criteria for Wildlife**

**Big Game**

Maintain intact unburned forest islands and corridors within the fire perimeter for travel and escape cover.

**Lynx**

Maintain foraging habitat, potential denning sites and open road density in compliance with lynx conservation strategy .

**Sensitive Species**

Inventory and protect goshawk nesting sites and adjacent habitat.

Maintain large areas of fire killed trees with connecting corridors along riparian areas for three-toed woodpeckers.

**Old Growth Dependent Species**

Maintain intact unburned forest islands and corridors within the fire perimeter for present or future old growth values.

**Figure 2.2.9. Design Criteria for Wildlife.** *The action alternatives would be designed with consideration of all wildlife species.*

**2.2.10 Fish and Aquatic Resources Design Criteria**

If any activities were proposed, the action alternatives would be designed to minimize impacts to or restore hydrologic resources and aquatic habitat.

To protect water quality and fisheries resources, several Design Criteria were identified to ensure minimal impacts to stream banks and riparian areas, and to minimize the potential for erosion and sediment transport from road and vegetation related management activities. See Figure 2.2.10.

These Design Criteria included restrictions on activities within Riparian Habitat Conservation Areas, limiting road development, requiring use of Best Management Practices in road management and harvest, and avoidance of areas heavily impacted by the East Fork Fire or previous land uses.

**Design Criteria for Fisheries**

**Riparian Habitat Conservation Areas (RHCAs)**

No Activities would occur within RHCAs except for activities intended to improve riparian conditions including but not limited to: road maintenance and drainage improvement and BMPs, road closures, road decommissioning, culvert removals, soil stabilization, stream rehabilitation, and riparian planting.

No Harvesting Activities would occur within 150 feet of ponds, lakes, or wetlands > 1 Acre in size unless agreed to based on site visits by the Forest Fisheries Biologist and Hydrologist.

No harvesting activities would occur within 50 feet of seasonally flowing streams, intermittent streams, or wetlands < 1 Acre in size unless agreed to based on site visits by the Forest Fisheries Biologist and Hydrologist.

No fuel storage or equipment refueling would occur within RHCAs or Streamside Management Zones (SMZs)

**New Road Development**

Road development needed for vegetation management or watershed restoration would be limited to temporary roads. No new Long-Term Specified Roads would be constructed.

New road development would be minimized and restricted to gentle side slopes, and ridge tops. Roads would not be constructed in RHCAs except where crossings are necessary.

All temporary roads would be obliterated, recontoured, seeded and covered within one season of use.

**Road Decommissioning, Road Maintenance, Drainage Improvement, and Closures**

Best Management Practices (BMPs) would be applied to all roads used for accessing treatment areas in addition to roads identified for maintenance, drainage improvement or travel restrictions.

**Harvesting Activities**

All Harvest Activities would follow prescribed BMPs.

**Figure 2.2.10. Design Criteria for Fisheries.** *The action alternatives would be designed to minimize impacts to or restore hydrologic resources and aquatic habitat.*

**2.2.11 Recreation Design Criteria**

All action alternatives would be designed with consideration of recreation use patterns and levels. See Figure 2.2.11.

### Design Criteria for Recreation

Undeveloped primitive recreation areas would be maintained unless contributing to resource impacts on wildlife, hydrologic and fisheries resources.

Firewood cutting and other recreational uses would be considered during identification of timber harvest units. No firewood cutting will be allowed in RHCAs.

**Figure 2.2.11. Design Criteria for Recreation.** *The action alternatives would be designed with consideration of recreation use patterns.*

## 2.2.12 Economic Design Criteria

All action alternatives would be designed with consideration of economic viability (Figure 2.2.12). Timber harvest units would be designed for economical yarding distances. Merchantability would be adjusted to meet the economic feasibility of harvesting fire damaged timber and to consider deterioration over the project planning period.

### Design Criteria for Economics

Tractor skidding on maximum slope of 40%.

Minimum harvest volume of 2.0 mbf/acre for tractor skidding.

Salvage of burned trees should occur within 3-year period or loss of value may be substantial.

**Figure 2.2.12. Design Criteria for Economics.** *The action alternatives would be designed with consideration of economic viability.*

## 2.3 Description of Proposed Alternatives

Three alternatives were designed to reflect the range of issues and resource conditions and the purpose and need of the project (Figure 2.3.1).

### Proposed Alternatives

**Alternative 1** – No Action

**Alternative 2** – Proposed Action

**Alternative 3** – No New Road Construction

**Figure 2.3.1. Proposed Alternatives.** *Three alternatives were designed to reflect the range of issues and resource conditions, and to meet the purpose and objectives of the project.*

## 2.3.1 Alternative 1 – No Action

Alternative 1 serves as a baseline for the project and displays existing resource conditions. Under the “No Action” Alternative, ongoing Forest Management would continue. Previously authorized projects, roads and facility maintenance, and other “normal” Forest management activities would remain ongoing. Natural restoration processes would recover areas impacted by the fires and previous land uses. Road management would be in accordance with the current Evanston and Mountain View Districts Travel Plan (USDA Forest Service 2003b).

This alternative would not preclude Forest management activities identified under previous decisions, nor would this alternative preclude the potential for activities identified under future decisions.

## 2.3.2 Alternative 2 - Proposed Action

Alternative 2 responds to the public’s request for an alternative that salvages fire killed timber and captures economic value of the timber (See Appendix A, Map 2.3.2). It responds to the combined internal and public issues that address concerns relating to water quality and effects associated with proposed timber harvest. This alternative focuses primarily on the purpose and need to provide timber for commercial harvest and to capture economic value of timber killed by the East Fork Fire consistent with goals for watershed health, sustainable ecosystems, biodiversity and viability and scenic/recreation opportunities. Alternative 2 responds to Wasatch-Cache National Forest Plan Goals 3 and 10. No management activities would occur in Inventoried Roadless Areas in this Alternative.

This alternative addresses salvage of burned timber and other management activities that are needed to improve vegetation, watershed conditions and public access. Approximately 4.4 miles of temporary road would be needed for access to salvage units. Salvage of timber would reduce high fuel loads on 781 acres. Maintenance would be performed and drainage improved on about 20 miles of existing roads. It includes 100 acres of tree planting. It includes decommissioning of 1.3 miles of existing road #80299 to reduce erosion and protect water quality (see Appendix A Map 4.6.1). This alternative keeps Forest Road #80293 open to public use to allow closure of a ford across Mill Creek in private Section 29.

Figure 2.3.2 summarizes the activities that would be included in this alternative. A detailed description of these activities is included in Section 2.3.4, Alternative Treatment Descriptions.

<b>Alternative 2 - Activities</b>	
<u>Activity</u>	<u>Quantity</u>
Timber Salvage in Burned areas	781 acres
Tree Planting	100 acres
Watershed Treatment	Decommission 1.3 mi. Eliminate Mill Creek Ford
Fuel Treatment	781 ac.
Temporary Roads	4.4 mi.
Road Maintenance and Drainage Improvement	19.8 mi.

**Figure 2.3.2. Alternative 2.** This alternative responds to the public's request for an alternative that focuses on salvaging timber impacted by the East Fork Fire.

### 2.3.3 Alternative 3 - No New Road Construction

Alternative 3 responds to the public's concern with effects of temporary roads and request to provide an alternative that constructs no new permanent or temporary roads (See Appendix A, Map 2.3.3). It responds to Wasatch-Cache National Forest Plan Goals Nos. 3 and 10. No management activities would occur in Inventoried Roadless Areas in this Alternative.

This alternative addresses salvage of burned timber accessible from existing roads and other management activities that are needed to improve vegetation, watershed conditions and public access. Salvage of timber would reduce high fuel loads on 597 acres. Maintenance would be performed and drainage improved on about 12 miles of existing roads. It includes 100 acres of tree planting. It includes decommissioning of 1.3 miles of existing road #80299 to reduce erosion and protect water quality (see Appendix A Map 4.6.1). This alternative keeps Forest Road #80293 open to public use to allow closure of a ford across Mill Creek in private Section 29.

Figure 2.3.3 summarizes the activities that would be included in this alternative. A detailed description of these activities is included in Section 2.3.4, Alternative Treatment Descriptions.

<b>Alternative 3 - Activities</b>	
<u>Activity</u>	<u>Quantity</u>
Timber Salvage in Burned areas	597 ac.
Tree Planting	100 acres
Watershed Treatment	Decommission 1.3 mi. Eliminate Mill Creek Ford
Fuel Treatment	597 ac.
Temporary Roads	0.0 mi.
Road Maintenance and Drainage Improvement	11.9 mi.

**Figure 2.3.3. Alternative 3.** This alternative responds to the public's request for an alternative that focuses on salvaging timber impacted by the East Fork Fire with no new roads.

### 2.3.4 Alternative Treatment Descriptions

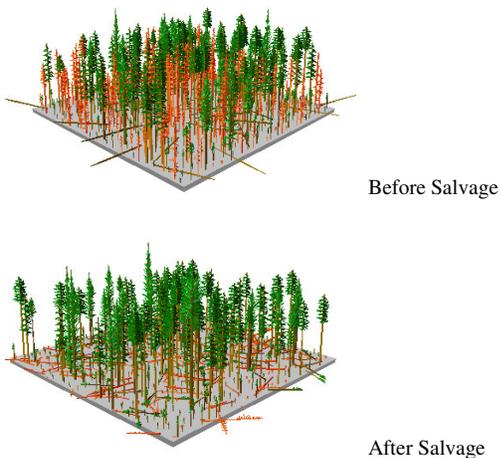
Although the proposed salvage activities would vary by amount, and location (see Figures 2.3.2, 2.3.3, and 2.3.4 and Maps 2.3.2 and 2.3.3), treatments are expected to be similar in nature throughout all of the alternatives. The following paragraphs provide a description of the treatments including (1) where (in general) the treatments would occur, and (2) what they would include. The following paragraphs also describe what the treated areas are intended to look like after completion of the treatment activities.

Although subject to variation at the time of contract preparation and offering (market dependent), salvage of burned timber would be implemented through various timber sale contracts.

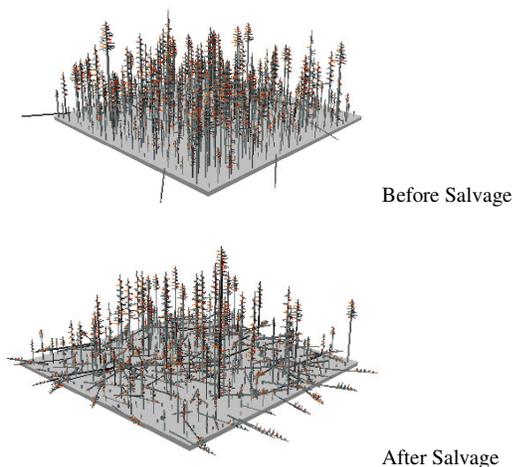
□ **Timber Salvage in Burned Areas**

Timber salvage in burned areas would occur across three drainages. The salvage of burned and insect killed trees would be completed using ground based yarding methods. Standing fire-killed trees with merchantable value would be removed from areas that burned at low to high severities in order to recover economic benefits and reduce fuels. Within the salvage units, some larger “reserve” snags and many smaller snags and down logs would be retained for vertical structure, snag replacement, and long term nutrient recycling, in accordance with Forest Plan guidelines. Snags located within the hydrologic area of protected stream courses and riparian/wet areas would be emphasized and would be part of the retention objectives.

Following salvage, the treated areas would appear more open, yet would still blend with the surrounding burned landscape. These areas would contain moderate numbers of standing and down dead trees, large snags, and scattered unburned trees (Figures 2.3.5 and 2.3.6).



**Figure 2.3.5. Salvage in Low Severity Burns.** *Larger snags and all unburned trees would be retained.*



**Figure 2.3.6. Salvage in High Severity Burns.** *These areas would retain moderate numbers of small diameter standing and down dead trees, and large snags.*

Timber salvage would be completed as a part of timber sale contracts and be financed by timber generated revenue. Timber sale activities would be completed within approximately 2 years.

□ **Tree Planting**

Funding would be requested for planting trees in areas that monitoring show are not regenerating adequately. It is expected that approximately 100 acres scattered through areas that contain mixed conifer and spruce/fir types proposed for timber salvage would need planting to ensure adequate regeneration of spruce and that a 40 acre plantation in the West Fork of the Blacks Fork may need planting to replace lodgepole pine saplings that burned during the fire.

□ **Watershed Treatment**

Forest Road #80299 would be decommissioned to reduce current and large potential future sediment sources. This road has old log culverts that could fail. It would be used as a haul route for salvage harvest units #3 and #4 and then stabilized with cross drains, scarifying, seeding, culvert removal and recontouring of several segments over a distance of 1.3 miles.

Forest Road #80293 was scheduled for decommissioning under the Mountain View and Evanston Travel Plan (2003b). This road had a failed culvert and the public was using a road that crosses Mill Creek at a ford on private land

to gain access between Mill Creek, Lym Lake and Elizabeth Ridge. The ford on this road is a source of sediment in Mill Creek due to steep approaches. Road #80293 would be kept open in Alternatives 2 and 3 to maintain the access while allowing the private landowner to close the road that crosses the ford.

**☐ Fuel Treatment**

Fuel treatment would be accomplished as part of the timber salvage. Merchantable size trees would be removed while retaining snags and down woody material in compliance with Forest Plan Guidelines.

**☐ Temporary Road Construction**

Approximately 4.6 miles of temporary road would be constructed to access timber harvest units in the preferred alternative, Alternative 2 (See Figure 2.3.7). There would be no temporary road construction under Alternative 3. Some “jump landings” would need to be constructed where log landings on heavily used roads would block traffic under Alternative 3. These landings would be within 100 feet of the road and would disturb soils on an average of about 0.1 acre per landing for an estimated 13 landings.

Temporary roads would be constructed to minimal standards. These roads would be located to minimize their potential to impact water quality. As part of the initial road clearing, slash removed from the right-of-way would be placed in a windrow below the excavated soil so that it could be replaced on the recontoured surface following use. Following unit harvest, the road would be fully recontoured. Recontouring efforts would include replacing soil back onto the road prism to return the ground to its natural contour, placing slash and woody debris on the disturbed area, and seeding the disturbed area.

Following use, the road would appear as a linear opening. Within 10 to 15 years (depending on location), the area would become heavily brushed in or grown in with young trees.

Temporary road construction and closure would be completed as a part of timber sale contracts and be financed by timber generated revenue.

<b>Alternative 2 Temporary Roads</b>		
<b>Watershed</b>	<b>Unit</b>	<b>Miles</b>
East Fork Bear	2	0.5
	3	0.2
<b>East Fork Total</b>		<b>0.7</b>
Mill Creek	4	0.9
	5	0.0
	6	0.0
	7	0.2
	8	0.0
	9	0.0
	10	0.2
	11	0.0
	12	0.0
	13	0.0
	14	0.0
West Fork Blacks	15	0.3
	16	0.4
	18	0.3
Mill Creek Total	19	0.0
	<b>Mill Creek Total</b>	
West Fork Blacks	21	0.2
	23	0.7
	24	0.5
<b>West Fork Total</b>		<b>1.5</b>
<b>Analysis Area Total</b>		<b>4.6</b>

**Figure 2.3.7. Alternative 2 Temporary Roads.**  
*Approximately 4.6 miles of temporary road would be constructed to access timber harvest units in only one alternative, Alternative #2.*

**☐ Road Maintenance and Drainage Improvement with Best Management Practices (BMPs)**

Maintenance and drainage improvement using Best Management Practices are proposed on the West Fork Blacks road and Mill Creek Road in the project area. The treated mileage would vary by alternative (see Figures 2.3.2, 2.3.3, and 2.3.4).

Road maintenance and drainage improvement activities would include a variety of treatments intended to reduce the delivery of sediment from road prisms, improve fish passage at culvert locations, reduce weed spread, and bring the roads to Best Management Practice (BMP) standards. In most situations, these treatments would only be applied to roads intended for

long-term Forest access. Best Management Practices would also be applied to any roads intended for timber haul.

Road maintenance and drainage improvement would include: (1) improving driving surface, (2) installing drain dips and other surface water diversions, (3) installing ditch relief culverts, and (4) replacing undersized or improperly positioned culverts.

Culvert installations, removals and replacements would occur at 7 locations under Alternative 2 and 6 locations under Alternative 3. There are several locations where the culverts are old log culverts installed decades ago. These culverts have deteriorated to the point that they could fail.

Following this work, some segments of roads would appear newly disturbed. Culverts would be more obvious until roadside vegetation became reestablished.

This work would be financed by timber generated revenue and would occur prior to or along with timber harvest.

## 2.4 Mitigation Measures and Monitoring Requirements

### 2.4.1 Mitigation Measures

Where potential impacts to resources were predicted, environmental protection measures would be employed to mitigate the effects of conducting activities.

Table 2.4.1 displays mitigation measures that would be used to reduce the effects of each action. Table 2.4.2 displays site specific mitigation measures for individual units determined by the ID Team during on-site visits.

**Table 2.4.1. General Project Mitigation Measures.** *Where potential impacts to resources were predicted, environmental protection measures would be employed to mitigate the effects of conducting activities.*

Mitigation Measure Description	Alternative
<b>Soil, Water, Fisheries and Aquatic Resources</b>	
Where activities occur on mosaic or high severity burned areas, a field review would be conducted by a qualified soils specialist prior to implementing activities to identify potential avoidance areas. This document establishes Best Management Practices and Soil and Water Conservation Practices as proven and effective measures for mitigating the effects of project activities on soil, water, fisheries, and aquatic resources. Erosion control measures would be left in place for one growing season or until no evidence of pedestaling, rills, or surface soil movement was evident	Alt. 2, Alt. 3
Ground based activities would be restricted to dry or frozen ground conditions generally between June 15 and December 30. Operations outside of the specified conditions may only occur on a case-by-case basis following consultation with a qualified soils specialist.	Alt. 2, Alt. 3
As soon as possible following the completion of harvest operations, not to exceed one year, landings would be recontoured to the approximate original surface contour, ripped, and grass seeded with an approved Wasatch-Cache native seed mix. Coarse woody debris would be spread on site to provide for long-term soil productivity.	Alt. 2, Alt. 3
Skid trails would be water barred with slash scattered on their surfaces, and where appropriate, seeded.	Alt. 2, Alt. 3
Road decommissioning of temporary roads would require recontouring to match the natural slope gradient followed by seeding with Wasatch-Cache approved native grass species and spreading coarse woody debris on site to provide for long-term soil productivity.	Alt. 2
Erosion control measures would be inspected and maintained on a recurrent basis until the site was stabilized to ensure their effectiveness. Additional inspections and maintenance would occur following high rainfall events and prior to fall and spring runoff to ensure their effectiveness.	Alt. 2, Alt. 3
If debris or slash were to enter a stream, it would be removed by hand immediately whenever there is a potential for blockage of the stream or crossing structure, or if the stream has the ability to transport such material.	Alt. 2, Alt. 3

Mitigation Measure Description	Alternative
On temporary roads, sediment-buffering devices would be installed below all fill slopes within 300 feet downhill distance of streams or drainage crossings.	Alt. 2.
All temporary roads would be re-contoured, seeded, and cover added within one season of completion of use.	Alt. 2.
Cross drain spacing (dips, grade sags, or water bars) on temporary roads would be approximately 300 feet for road grades between 0 and 5 percent, and approximately 200 feet or less for steeper grades. In unit 24, all drainages would pass through cross drain culverts.	Alt. 2.
Where culverts are removed, fill crossings would be recontoured to a stable slope angle approximating natural undisturbed stream banks adjacent to the site, and fills would be seeded with an approved Wasatch-Cache seed mix.	Alt. 2
Temporary roads would avoid wetlands. (No temporary roads would be constructed under Alternative 3.)	Alt. 2
In unit 24, any temporary road on the old slide area will be located to avoid large cut slopes.	Alt.2
Water bars would be installed every 50 feet on skid trails in Units 1, 3, 4, 9, 15, and 16	Alt. 2, Alt 3.
In units 6, 8, 10, 12, and 13, harvest activities would be restricted to the normal dry season or winter.	Alt. 2, Alt. 3.
<b>Visual Resources</b>	
The Forest Landscape Architect would be involved with the planning of all units to insure that visual quality would be maintained during implementation of this project.	Alt. 2, Alt. 3
<b>Cultural Resources</b>	
Previously recorded heritage resource sites within the salvage units shall be avoided and protected from logging impacts. Appropriate archaeological inventories and consultation under the supervision of the Forest Archaeologist shall occur prior to earth-disturbing activities and operations.	Alt. 2, Alt. 3
Any artifact or structure located during reconnaissance or project implementation would be left undisturbed and reported to the Forest Archeologist immediately.	Alt. 2, Alt. 3
<b>Vegetation and Forest Resources</b>	
Standard timber sale contract clauses would be applied, particularly CT6.4 Conduct of Logging, which addresses resource and residual timber protection by requiring directional felling, pre-approved skid trails and landings, logs yarded with leading edge free of the ground, as well as the provisions under BT6.0 Operations. These provisions would be used to protect conifer and aspen seedlings and steep slopes during salvage harvests.	Alt. 2, Alt. 3
Surveys for sensitive plant species have been completed. If any additional populations are located, the Forest Botanist will be notified, and mitigation will occur as necessary. This could include unit boundary adjustments to exclude populations, alternative harvest methods to minimize ground disturbance, buffers around populations, adjustments in harvest to meet prescriptions for sensitive plant habitats.	Alt. 2, Alt. 3
All equipment that would be used off road would be washed prior to moving into the project area. All equipment would be inspected and approved before operations would begin.	Alt. 2, Alt. 3
Noxious weed treatments would occur on roads identified for reconstruction and on haul routes for timber sales. Weed treatments would be designed to reduce existing noxious weed populations and the potential establishment of new populations. The treated areas would vary by alternative, depending on the mileage of road reconstruction, closures, harvest area disturbance and need determined by existing weed populations (see Figures 2.3.2, 2.3.3, and 2.3.4).	Alt. 2, Alt. 3
Weed treatments would include spraying of appropriate herbicides on established populations. Ground based spraying would occur in compliance with Intermountain Region’s Forest Service Manual 2080, Supplement R4 2000-2001-1. Weed spraying would be timed according to road reconstruction and haul activities. Where access was limited, spraying may occur at the same time as road decommissioning.	Alt. 2, Alt. 3
Where timber haul or soils disturbed by harvest activities occur, weed treatments would be financed by timber generated revenue. Spraying would occur immediately before reconstruction and timber haul. On roads where timber haul would not occur, spraying would be funded entirely from appropriations. In these situations, treatments would be expected to occur within 2 to 10 years.	Alt. 2, Alt. 3
Wasatch-Cache Native Grass Seed Mixes would be used in all areas except where it has been determined there is a high possibility that weeds may be more competitive. Other Wasatch-Cache Grass Seed mixes may be used in these locations.	Alt. 2, Alt. 3

<b>Wildlife</b>	
The Wasatch-Cache National Forest Revised Plan Dead and Down Woody Debris guidelines would be followed where they are applicable.	Alt. 2, Alt. 3
Live trees in harvest units would be retained. The harvest prescription would provide detailed descriptions for each stand.	Alt. 2, Alt. 3
Timber salvage will not be allowed within active northern goshawk nest areas (approximately 30 acres) during the active nesting period.	Alt. 2, Alt. 3
Restrict harvest operations between December 31 and June 15 to minimize disturbance to wildlife	Alt. 2, Alt. 3

**Table 2.4.2. Site Specific Harvest Unit Mitigation Measures.**

<b>Unit Number</b>	<b>Mitigation Measures</b>
2	Unit 2 was split from a single unit into 7 small units to avoid the stream channels and their adjacent riparian zones. The harvest in these units will be restricted to the areas above the breaks to the streams. Based on the Soils and Hydrology Assessment there should be a low risk of sediment delivery into streams or ponds in the areas and thus little to no impacts to aquatic or semi aquatic species. The streams adjacent to these units do not reach fish bearing streams
3	Install a slash filter strip below the lower part of the temporary road and landings. Based on previous monitoring and observations of bmp effectiveness, this slash filter strip and no skidding equipment within 100 feet of the stream should result in low impacts to aquatic and semi aquatic species.
4	Leave a no harvest 100 foot strip between Carter Creek and this unit and allow no skidding equipment within 50' of the unnamed intermittent tributary stream. Based on previous monitoring and observations of bmp effectiveness there would be a low probability that sediment would reach the stream.
5	No additional mitigation identified. The unit is over 500 feet to the closest stream and impacts to aquatic species and semi-aquatic species should not occur.
6	Unit 6 is composed of subunits 6a and 6b to avoid the stream channels and their adjacent riparian zones. No harvest of timber from the slope west of Mill Creek should occur. Install a slash filter strip below the fill slope of the temporary road at the stream crossings. Based on the Soils and Hydrology Assessment there should be a low risk of sediment delivery into streams or ponds in the areas and thus little to no impacts to aquatic or semi aquatic species.
7	No additional mitigation identified. The unit is over 2,500 feet to the closest stream and impacts to aquatic species and semi-aquatic species should not occur.
8	The temporary road to the unit is over 1,100 feet from the closest stream. No skidding equipment will be allowed within 100 feet of a stream between 8A and 8B. There should be no impact to aquatic or semi-aquatic species because of the flatness of the land and the distance to local streams
9	Leave a no harvest 100 strip between the skid trail and the small stream south of the unit. Based on previous monitoring and observations of bmp effectiveness there would be a low probability that sediment would reach the stream.
10	No additional mitigation identified. The unit is over 2,500 feet to the closest stream and impacts to aquatic species and semi-aquatic species should not occur.
11	A 65 foot no harvest buffer between the stream and the unit boundary. Based on previous monitoring and observations of bmp effectiveness, this buffer and no skidding equipment within 100 feet of the stream should result in low impacts to aquatic and semi aquatic species.
12	A 65 foot no harvest buffer between the stream and the unit boundary. Based on previous monitoring and observations of bmp effectiveness, this buffer and no skidding equipment within 100 feet of the stream should result in low impacts to aquatic and semi aquatic species.
13	No mitigation is identified. The shortest distance from the unit to the stream is 160 feet. This should provide protection for aquatic and semi-aquatic species
14	This unit is located adjacent to Mill Creek. There is a 200 foot no harvest buffer between Mill Creek and the unit boundary. No skidding equipment will be allowed within 50 feet of an intermittent stream within the unit. Based on previous monitoring and observations of bmp effectiveness, this buffer and no skidding equipment within 100 feet of the stream should result in

Unit Number	Mitigation Measures
	low impacts to aquatic and semi aquatic species.
15	Mill Creek is located on the west side of this unit. There is a 200 foot no harvest buffer between the unit and Mill Creek. A slash filter strip below the lower part of the temporary road would also need to be installed to reduce the threat from sediment from reaching the stream. No skidding equipment would be allowed within 50 feet of an intermittent stream channel along the south side of the unit. Based on previous monitoring and observations of bmp effectiveness, this slash filter strip, 200 foot buffer, and no skidding within 50 feet of the tributary stream should result in low impacts to aquatic and semi aquatic species.
16	Mill Creek is located on the west side of this unit. This section of Mill Creek is intermittent. There is a 100 to 300 foot no harvest buffer between the unit and the stream. A slash filter strip below the lower part of the temporary road would also need to be installed to reduce the threat of sediment reaching the stream. No skidding equipment would be allowed within 50 feet of the intermittent stream channel along the north side of the unit. Based on previous monitoring and observations of bmp effectiveness, this slash filter strip, 100 foot buffer, and no skidding within 50 feet of the tributary stream should result in low impacts to aquatic and semi aquatic species.
18	On the South side of the unit, leave a 100 foot buffer between the temporary road and the perennial stream. Install a slash filter strip below the temporary road. Based on previous monitoring and observations of bmp effectiveness, this slash filter strip and 100 foot buffer should result in low impacts to aquatic and semi aquatic species.
19	No additional mitigation identified. The unit is over 1,000 feet to the closest stream and impacts to aquatic species and semi-aquatic species should not occur.
21	The unit is 1,400 feet from the harvest unit to the closest stream. A filter strip below the temporary roads should prevent sedimentation from reaching the stream. Based on previous monitoring and observations of bmp effectiveness, this slash filter strip should result in low impacts to aquatic and semi aquatic species.
23A	The north end of the unit is on flat ground near a small tributary stream and about 1,400 feet from the West Fork Blacks Fork. No skidding equipment would be allowed within 50 feet of the intermittent stream channel along the north side of the unit. A filter strip below the temporary road should prevent sedimentation from reaching the stream. Based on previous monitoring and observations of bmp effectiveness, this slash filter strip and no skidding within 50 feet of the stream should result in low impacts to aquatic and semi aquatic species.
23B	The unit is 1,700 feet from the West Fork Blacks Fork and has a 200 foot buffer between the unit and a tributary stream to the north. A filter strip below the temporary road should prevent sedimentation from reaching either stream. Based on previous monitoring and observations of bmp effectiveness, this slash filter strip and no skidding within 100 feet of the stream should result in low impacts to aquatic and semi aquatic species.
24A	The lower end has a 500 foot buffer between the unit and the West Fork Blacks Fork. Most of the unit drains to the north, away from a tributary streams near the south and east sides of the unit. No skidding equipment would be allowed within 50 feet of the streams. A filter strip below the temporary road should prevent sedimentation from reaching either stream. Based on previous monitoring and observations of bmp effectiveness, this slash filter strip and no skidding within 50 feet of the stream should result in low impacts to aquatic and semi aquatic species.
24B	Most of the unit drains to the northwest, away from a tributary stream located about 50 to 100 feet from portions of the south edge of unit 24 B. There is an intermittent stream to the west of the unit with a 100 foot buffer. A filter strip below the temporary roads should prevent sedimentation from reaching this stream. Based on previous monitoring and observations of bmp effectiveness, this slash filter strip and no skidding within 50 feet of the stream should result in low impacts to aquatic and semi aquatic species.

**2.4.2 Monitoring Measures**

Monitoring would be used to: (1) determine whether the original objectives of the activities were met, (2) determine the need for additional

action, and (3) educate and assist in designing future projects.

Monitoring and evaluation would compare the end results to those projected under the project Purpose and Need, and to the Goals, Objectives, and Standards of the Wasatch-Cache National Forest Plan.

Project specific monitoring requirements for this project would be in addition to those already required under the Forest Plan and already scheduled under the Burned Area Emergency Rehabilitation plan. Forest Plan monitoring may include some of the resources and activities on the East Fork Fire. It would be conducted in accordance with the requirements outlined on pages 4-104 thru 4-117 of the Wasatch-Cache National Forest Plan. Forest Plan monitoring, done on a sample basis, may or may not be done on this project. However, this project presents a good opportunity for Forest Plan monitoring and it is likely to be one of the sites monitored for some resource values such as soils, water quality, wildlife, fisheries, and vegetation.

Three types of monitoring would be used to evaluate the activities (Figure 2.4.1).

<b>Monitoring and Evaluation</b>
<b>Implementation Monitoring</b> Used to determine if plans, prescriptions, projects and activities were implemented as designed and in compliance with the plan.
<b>Effectiveness Monitoring</b> Used to determine if plans, prescriptions, projects and activities are effective in accomplishing Plan goals and objectives, and moving toward desired conditions.
<b>Validation Monitoring</b> Used in cases of uncertainty to determine if initial data, assumptions and coefficients used to predict outcomes in the development of the Plan are correct.

**Figure 2.4.1. Monitoring and Evaluation.** Generally, three types of monitoring would be used to evaluate the activities.

Implementation monitoring for sale activities would occur during contract preparation and on the ground implementation activities. All unit layout, marking, road closures, construction, drainage improvement, maintenance, and harvest operations would be monitored by Forest Service representatives to ensure compliance with specifications.

Effectiveness monitoring would be done during and following on the ground implementation activities. Monitoring would be done by Forest Service representatives to determine if the mitigation measures were effective.

Validation monitoring is primarily done during Forest Plan monitoring. If Forest Plan monitoring is done on some of the resources and activities on the East Fork Fire, it would likely include validation monitoring.

Because not all proposed activity areas could be monitored, representative areas would be identified for the proposed activities and sampled. The results of the data and interpretations from the sample sites would be extrapolated to similar areas and activity types. Most monitoring completed under this program would be ongoing for 4 to 5 years.

Funding for monitoring would be allocated through the Wasatch-Cache National Forest annual budgetary process.

#### ■ BAER Monitoring Measures

Post fire monitoring for activities completed under the Burned Area Emergency Restoration Plan are documented within the Wasatch-Cache National Forest East Fork Fire, BAER Monitoring Progress Report (USDA Forest Service 2002). Monitoring for these activities would continue for approximately 3 years. Information obtained from BAER monitoring would supplement monitoring for activities completed under this EIS.

#### ■ Forest Plan Monitoring Measures

Forest Plan monitoring would be conducted in accordance with the requirements outlined in Chapter IV of the Wasatch-Cache National Forest Plan. Monitoring requirements are displayed in Table ME-1 on page 4-107 through 4-117 of the Plan. Monitoring strategies are displayed by resource.

#### ■ Soil and Water Monitoring Measures

Soil and water monitoring would be in compliance with criteria outlined by Forest Plan Table ME-1, item 11 and in compliance with FSH 2509.18, 1/21/03 R4 Supplement, Soil

Quality Monitoring and FSH 2509.22, Soil and Water Conservation Practices. See Figure 2.4.2.

**Soil and Water Monitoring**

Soil and water would be monitored in compliance with FSH 2509.18, 1/21/03 R4 Supplement, Soil Quality Monitoring, and FSH 2509.22, Soil and Water Conservation Practices.

At least two harvest units within the high, moderate and low soils burn severity areas would be monitored. Soils would be monitored for rill erosion, pedestals, and gullies. Photo points would be established and photos taken before, during and after implementation of the proposed activity.

At least two sites in each of the moderate and low soil burn severity areas would be monitored for compaction.

Timber salvage operations would be monitored during and following activities in select areas based on proximity to stream channels and other high-risk areas.

**Figure 2.4.2 Soil and Water Monitoring Procedures.** *The evaluation of soil and water effects would be based on criteria outlined by the Forest Plan.*

**■ Visual Resource Monitoring Measures**

The evaluation of effects on the Visual Resource would be as described in Figure 2.4.3.

**Scenic Resources Monitoring**

Effectiveness monitoring of the Proposed Action effects on scenic resources would be monitored with emphasis on salvage units visible from viewpoints along routes with high scenic integrity objectives identified in Section 3.

Visual monitoring would be prioritized for areas where unit design was consulted on during layout.

Photo monitoring points would be established to document visual conditions prior to implementation, during implementation, immediately following implementation, and three to five years following implementation. Photo monitoring would be coordinated with monitoring requirements for other resources.

**Figure 2.4.3. Scenic Resources Monitoring.** *The evaluation of effects on the Scenic Resource would be based on criteria outlined by the Forest Plan.*

**■ Heritage Monitoring Measures**

The evaluation of effects on the Heritage Resources would be based on criteria outlined by

Section 106 of the National Historic Preservation Act (Figure 2.4.4). Sites determined eligible for listing on the National Register of Historic Places, would be monitored for direct and indirect effects from project activities.

**Heritage Resources Monitoring**

Sites would be monitored during and immediately following harvest activities to ensure compliance with established mitigation measures for site protection.

**Figure 2.4.4. Heritage Resources Monitoring.** *The evaluation of effects on the Heritage Resources would be based on criteria outlined by Section 106 of the National Historic Preservation Act.*

**■ Roadless Resources**

No activities will be proposed in inventoried roadless areas.

**■ Infrastructure Monitoring**

The evaluation of effectiveness of BMP installation would be done with annual inspections during project implementation. (Figure 2.4.5).

**Infrastructure Monitoring**

Annual Inspections would be completed as part of routine road maintenance and during sale activities before the winter and following large rainfall events to assess need for emergency repairs or improvement of SWCPs.

**Figure 2.4.5. Infrastructure Monitoring.** *The evaluation of effectiveness of SWCPs would be done annually during project implementation.*

**■ Vegetation and Forest Resources Monitoring Measures**

The evaluation of vegetation management would be as described in Figure 2.4.6.

**Vegetation and Forest Resources Monitoring**

Silvicultural prescriptions for each unit would require that Wasatch-Cache National Forest Plan standards be met. A silviculturist would assure compliance with the prescriptions during sale preparation, contract administration, and post-harvest activities. Timber sale administration would monitor contractor performance of snag retention.

Range monitoring would include effects of grazing on aspen regeneration prior to and following salvage of timber.

Noxious weed monitoring is scheduled under the BAER program and would be continued for 3 years following timber salvage with appropriated funds.

Transects would be completed in burned areas to determine regeneration success and species composition.

**Figure 2.4.6. Vegetation and Forest Resources Monitoring.** *The evaluation of vegetation management would be based on criteria outlined by the Forest Plan.*

### ■ Fire and Fuels Monitoring Measures

The evaluation of fire and fuels management would be done in conjunction with vegetation monitoring as described in Figure 2.4.7.

#### Fire and Fuels Monitoring

Silvicultural prescriptions for each unit would require that Wasatch-Cache National Forest Plan standards be met. Timber sale administrator would monitor contractor performance of snag retention and down woody material retention.

Transects would be completed in burned areas to determine regeneration success and species composition.

**Figure 2.4.7. Fire and Fuels Monitoring.** *The evaluation of fire and fuels management would be based on criteria outlined by the Forest Plan.*

### ■ Wildlife Monitoring Measures

The evaluation of effects on wildlife would be as described in Figure 2.4.8.

#### Wildlife Monitoring

**MIS:** Baseline surveys would be established within or near the East Fork Fire perimeter for goshawk territories, snowshoe hare, beaver, and cutthroat trout and repeated after 5 years.

**Figure 2.4.8. Wildlife Monitoring.** *The evaluation of effects on wildlife would be based on criteria outlined by the Forest Plan.*

### ■ Fish and Aquatic Resources Monitoring Measures

The evaluation of effects on water quality, aquatic habitat, and fish populations would be as described in Figure 2.4.9.

#### Fish and Aquatic Resources Monitoring

Post fire native fish populations would be monitored followed by monitoring again no more than 10 years later.

Monitoring of effects would also be included under monitoring of soil and water resources.

**Figure 2.4.9. Fish and Aquatic Resource Monitoring.** *The evaluation of effects on water quality, aquatic habitat, and fish populations would be based on criteria outlined by the Forest Plan.*

### ■ Recreation Monitoring Measures

The evaluation of effects on recreation would be based on continued subjective monitoring of use of dispersed camp sites within the burn perimeter. See Figure 2.4.10.

#### Recreation Monitoring

Subjective observations of use of dispersed camp sites within the burn perimeter would be made.

**Figure 2.4.10. Recreation Monitoring.** *The evaluation of effects on recreation would be based on criteria outlined by the Forest Plan.*

## ■ 2.5 Alternatives Considered but Eliminated from Detailed Study

During the review of internal and public issues, and development of alternatives, several variations to alternatives were considered by the East Fork Fire Salvage Interdisciplinary Team.

The following alternatives were considered but eliminated from detailed study.

### 2.5.1 Alternative 4 – Include Harvest of Green Trees

This alternative would encourage regeneration of seral species in partially burned areas and could reduce the likelihood of a bark beetle epidemic in unburned stands adjacent to trees that were weakened by the fire and susceptible to bark beetle attacks.

The interdisciplinary team dropped this alternative from further consideration because:

- Removal of green trees would increase potential impacts on the watershed.
- Although it is likely that some fire weakened trees will be attacked by bark beetles (spruce in particular), it is unlikely that this will trigger a large scale bark beetle epidemic. Adjacent susceptible stands are not extensive. The area is characterized by patchy mixed conifer stands rather than continuous spruce fir stands.

### 2.5.2 Alternative 5 – Include Harvest in Inventoried Roadless Areas

This alternative was considered in response to public comments encouraging as much salvage as possible.

The interdisciplinary team dropped this alternative from further consideration following direction from the Forest Supervisor. It would have provided more timber salvage but:

- It would require more temporary road construction.
- It would result in less continuous snag habitat.
- It would require additional time for analysis and sale preparation, possibly resulting in loss of timber value.

### 2.5.3 Alternative 6 – Original Proposed Action

Alternative 6 was drafted and presented to the public as the Proposed Action during scoping (See Appendix A, Map 2.5.3). It was similar to the current Proposed Action (see Chapter 1). It consisted of more proposed salvaged units, more acres, and more temporary roads.

The interdisciplinary team dropped this alternative from further consideration because it was based on a limited preliminary field reconnaissance and winter GIS mapping and it included:

- Proposed salvage on ground with over 40% slopes.
- Proposed salvage in areas with difficult or environmentally damaging access needs.

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## ■ 2.6 Description of Relevant Past, Present, and Reasonably Foreseeable Future Actions Not Part of the Proposed Action

A variety of past actions in combination with natural events have created the present conditions of the project area’s resources. Many of these actions have been related to human use of the land including logging, grazing and transportation development. Others have been related to forest management, including fire suppression.

The management of both private lands and public lands within the project area is ongoing. Because of the fires, restoration work identified under the Burned Area Emergency Response Plan continues.

### 2.6.1 Past Actions

Prior to Euro-American settlement, aboriginal inhabitants interacted with the resource setting in various ways. Although evidence of aboriginal use has been found in the form of lithic scatter and projectile points, there is little information in the literature about how much use they made of this landscape. The imprint of these activities is not visible on the landscape today due to fire suppression, stand manipulation, and Euro-American development.

The most evident past actions include logging, grazing, and road development.

#### ■ Past Harvesting on National Forest Lands

Prior to the establishment of the Forest Reserves in 1905, many of the lower elevations of the project area were logged for mine and railroad timbers. Following the establishment of the Forest Reserves, and later the Forest Service, logging continued at various intensities. Tie-hack logging for railroad ties continued in the project area through the 1920s and 1930s, ending prior to World War II. Tables 2.6.1 and 2.6.2 and

Appendix A Map 2.6.11 display the more recent logging history, from 1951 through 2001. Logging activities between the 1950s and 1980s included both clearcut and selective systems where in some cases the larger, select trees were removed, and in other cases, a mix of trees was removed. Very little timber harvest has occurred in this analysis area over the last 10 years (1990s to 2003).

The effects of past logging on National Forest System lands are relevant to forest health, water quality and runoff timing, wildlife habitat, and landscape fragmentation where forest stands are threatened by insects, encroachment by less desirable species, or fire, and where wildlife nesting, foraging, and security continues to be affected by changes in forested conditions.

**Table 2.6.1. Past Harvesting on National Forest Lands.** *Records available on the Wasatch-Cache National Forest indicate the following harvest activities within the project area between 1951 and 2002.*

Activity	Acres Treated by Decade						Total
	1951-1960	1961-1970	1971-1980	1981-1990	1991-2000	2001+	
Salvage	0	0	0	3700	100	0	3800
Regeneration	93	285	736	227	0	0	1341

**■ Past Harvesting on Adjacent Private Lands**

The majority of the private land within the Project Area Boundary had been managed prior to the East Fork Fire with both selective logging and clearcut logging practices. The effects of past logging on private land are relevant to forest health, water quality and runoff timing, wildlife

habitat, and landscape fragmentation where forest stands are threatened by insects, encroachment by less desirable species, or fire, and where wildlife nesting, foraging, and security continues to be affected by changes in forested conditions. Table 2.6.2 and Map 2.6.11 displays the private land harvesting activity between 1950 and 2001.

**Table 2.6.2. Past Harvesting on Private Lands.** *The following harvest activities have occurred on private lands within the project area between 1951 and 2002.*

Activity	Acres Treated by Decade						Total
	1951-1960	1961-1970	1971-1980	1981-1990	1991-2000	2001+	
Over-story Removal	124	293	1086	221	0	50	1774

**■ Grazing**

Eleven grazing allotments are partially or totally within the analysis area (approximately 67,784 acres) and have been grazed in the recent past (see Appendix A, Map 2.6.12). All are active except for the Woodpile allotment (approximately 3,500 acres within the project area).

most cases, early pathways and roads developed for logging followed the path of least resistance, some very close to streams. Eventually, many of these routes became Forest Service system roads.

Between the 1950s and 1970s, road building accelerated as timber harvesting increased on both National Forest and private lands in the project area.

The effects of past grazing are relevant to forest health, soil stability, water quality and runoff timing, riparian area stability, wildlife habitat, and weed spread.

In the last 10 years (1990s to 2000), very few new roads have been constructed. These are well located and engineered to minimize resource impacts. Road management has also increased within the project area. Drainage structures have been installed in various locations, improved road maintenance has reduced sediment delivery to nearby channels, and roads no longer needed have been closed. Due to budget constraints,

**■ Road Development**

Road development remains one of the most obvious past activities in the project area. In

road improvement activities such as these have been limited. Detailed information on Forest roads is displayed in the East Fork Fire Salvage EIS Project File.

The effects of roads are relevant to public recreation and land management. They are also relevant where roads continue to impact weed spread, water quality, fisheries habitat and connectivity, and wildlife security.

**■ Trail Reconstruction**

Portions of the Bear River-Smiths Fork Trail were reconstructed following the East Fork Fire. Reconstruction activities included tread improvement, installation of water bars, and rehabilitation of trail right-of-way damaged during fire suppression activities.

The effects of trail improvements are relevant to public recreation access, weed spread, water quality, and wildlife security.

**■ Tree Planting**

Very limited tree planting has been done in the past in this analysis area. Natural regeneration has generally been adequate to restock areas following timber harvest. The effects of tree planting are relevant to vegetation health, and future forest productivity.

**■ Noxious Weed Treatments**

Past noxious weed treatments within the project area have been limited to ground based spraying of Forest roads, grazing allotments and private lands.

The effects of weed spraying are relevant to wildlife habitat, protection of sensitive, rare, threatened and endangered plant species, biodiversity, water quality, soil stability, and vegetation health.

**■ Prescribed Burning**

Historically, prescribed burning within the project area has been primarily used for site preparation following timber harvest activities.

The effects of prescribed burning are relevant to vegetation health, wildlife habitat, weed spread, water quality, air quality, and fuel conditions.

**■ Fire Suppression and Disturbance**

In addition to the effects of the fires themselves, fire suppression activities resulted in the disturbance of many areas (see Appendix A Map 2.6.13).

Fire suppression activities included: (1) the use of open roads leading into and within the fire perimeters, (2) reopening roads previously vegetated prior to the fires for use as fire lines and access routes, (3) construction of dozer lines, (4) construction of hand lines, (5) clearing for safety zones, (6) use of helicopter landings, and (7) use of openings and meadows for staging equipment and personnel. Approximately 54.5 acres were disturbed by fire line construction and fire suppression activities (Figure 2.6.1).

<b>Fire line Construction and Road Drainage Rehabilitation</b>		
<b>Suppression Type</b>	<b>Miles</b>	<b>Acres</b>
Hand and Control Line	42.8	10.7
Dozer Lines	16.4	32.8
Roads Opened/Reclosed	4.5	9.0
Road Relocation	3.3	6.6
Roads Closed	3.4	6.8
Water Bar Installation	17.9	1.2

**Figure 2.6.1 Fire line Construction and Rehabilitation.** *Approximately 55.7 acres were disturbed by fire line construction and road work.*

Streams and ponds near to the fires were used as dip sites for helicopters and for drafting of fire suppression water. Chemical retardant drops were also made in the fire perimeters. Additional information on the contents and effects of fire retardants is discussed in Chapters 3 and 4 of this document.

Fire suppression efforts also included fuels reduction activities such as slashing of understory fuels in order to reduce flame length, and pre-ignition treatments such as back firing from established control lines. Both of the latter two treatments are included within the total fire severity descriptions and acres of areas burned (depending upon severity of burn) in Chapter 3.

Rehabilitation of areas disturbed during fire suppression activities was completed immediately after the fires, and in most cases, by fire suppression personnel. Restoration of hand

lines included: (1) placing water bars on the hand lines to prevent surface erosion, (2) recontouring fire hand lines in proximity to streams and sensitive resources, and (3) seeding disturbed surfaces to reduce erosion until native seeds and roots within the soil germinated or sprouted.

Restoration of dozer lines and unclassified and classified roads that were vegetated prior to the fires included: (1) scarification or recontouring of the disturbed area, (2) placement of slash over the disturbed area, (3) seeding the disturbed area to reduce erosion until native seeds and roots within the soil germinated or sprouted. Stream crossings, including locations where culverts existed, were removed and recontoured to approximate the natural slope position.

Where open roads were used for fire suppression purposes, dust abatement, including water and magnesium or calcium chloride were used to reduce erosion of surface fines which could lead to increased sedimentation of stream channels and road surface damage. Post fire maintenance, including surface blading was also completed on roads that would remain open following the fires.

■ **Post Fire and Burned Area Emergency Rehabilitation (BAER)**

Immediately following the East Fork Fire, rehabilitation was completed on fire lines, safety zones, and other areas disturbed during fire suppression activities (see Appendix A, Map 2.6.13). Suppression restoration activities included water barring and seeding hand lines, scarifying (and in some situations, recontouring), placement of debris, mulching, and seeding of dozer lines, scarifying, placement of debris, seeding, and planting of safety zones, and restoration of sites used for staging equipment and personnel.

Following these activities, emergency restoration activities were begun in order to stabilize the burned areas and prevent catastrophic impacts to water quality, soils, and road resources within the burned areas. This emergency work included installation of drainage structures on existing roads, recontouring and seeding of roads, replacement of a culvert to permit fish passage on the North Slope Road at Carter Creek, contour felling, and relocation of a portion of an existing road. Most of this work was completed in the summer and fall of 2002 (Figure 2.6.2). Detailed information on these activities is

included within the East Fork Fire Salvage EIS Project File and Burned Area Emergency Rehabilitation Project File.

<b>Burned Area Emergency Rehabilitation and Post Fire Treatments</b>	
<u>Treatment Type</u>	<u>Quantity Treated</u>
<b>Land Treatments</b>	
Straw Bale Check Dams	8 dams
Erosion Control Seeding	75 acres
Erosion Control Straw Wattles	29 wattles
Diesel Fuel Spill Cleanup	75 gallons
Noxious Weeds	10 acres
<b>Road and Trail Treatments</b>	
Road Surface Drainage	17.9 miles
Road Decommissioning	3.4 miles
Road Relocation	3.3 miles
Road Culvert Replacement	1 culvert
Road Culvert Installation	3 culverts
Trail Water Bars	.5 miles
Trail Boardwalk Replacement	900 feet
<b>Cultural Treatments</b>	
Heritage Site Survey	25 sites

**Figure 2.6.2 Burned Area Emergency Rehabilitation and Post Fire Treatments.** *Emergency restoration activities were begun in order to stabilize the burned areas and prevent catastrophic impacts to water quality, soils, and road resources within the burned areas.*

The effects of these activities are relevant to soil stability, weed spread, water quality, fisheries habitat and connectivity, and wildlife security.

■ **Historical Fires**

There have been fires that burned large acreage in the past in this analysis area. The effects of these fires on existing conditions are primarily relevant to forest stand ages, species composition, and wildlife habitats (see Appendix A, Map 2.6.14).

□ **2.6.2 Present and Reasonably Foreseeable Future Actions**

■ **Harvesting on National Forest Lands**

No other timber sales are planned or presently

active within the project on National Forest land in the analysis area.

The effects of future sales on National Forest System lands are relevant to forest health, water quality and runoff timing, wildlife habitat, and landscape fragmentation where forest stands are threatened by insects, encroachment by less desirable species, or fire, and where wildlife nesting, foraging, and security continues to be affected by changes in forested conditions.

#### ■ **Harvesting on Adjacent Private Lands**

There will be a timber salvage operation on private land within the project area over the next 2 years. The landowner plans to salvage on about 719 acres. (see Appendix A, Map 2.6.2).

The effects of ongoing and future harvesting on private land are relevant to forest health, water quality and runoff timing, wildlife habitat, and landscape fragmentation where forest stands are threatened by insects, encroachment by less desirable species, or fire, and where wildlife nesting, foraging, and security continues to be affected by changes in forested conditions.

#### ■ **Grazing**

Grazing is an ongoing activity within the burn area. There is a cattle allotment in the East Fork of the Bear River drainage and seven sheep allotments with one in the lower East Fork of the Bear River drainage, two in Mill Creek, and four in the Blacks Fork drainage. The Woodpile allotment in the Blacks Fork does not currently have any permitted grazing.

The effects of ongoing and future grazing are relevant to forest health, soil stability, water quality and runoff timing, riparian area stability, wildlife habitat, and weed spread.

#### ■ **Road/Motorized Trail Development**

No classified road development is occurring or planned on National Forest System or private lands within the project area. Road maintenance activities, including road grading, drainage repairs, and roadside brushing, are the only activities anticipated on Forest roads in the near future.

The effects of road development are relevant to public recreation and land management. It is

also relevant where roads continue to impact weed spread, water quality, fisheries habitat and connectivity, and wildlife security.

#### ■ **Trail Reconstruction and Development**

No trail reconstruction or development is occurring or proposed within the project area. Maintenance activities, however, are expected to continue at an increased level in areas where the fire burned across existing trail systems.

The effects of trail improvements are relevant to public recreation access, weed spread, water quality, and wildlife security.

#### ■ **Special Product Harvest**

Firewood removal is anticipated to increase after 3 to 5 years. Due to the results of monitoring of these activities in 2003, additional “no-firewood cutting” signs will be installed near riparian areas and law enforcement efforts will be increased to prevent damage to riparian areas.

The effects of these activities are relevant to public access, weed spread, soil stability, water quality, and wildlife disturbance.

#### ■ **Tree Planting and Reforestation**

Tree planting is proposed for areas where there is a lack of seed source. The effects of tree planting are relevant to vegetation health, and future forest productivity.

#### ■ **Noxious Weed Treatments**

An estimated 10 acres/year in scattered pockets would be treated for noxious weeds as infestations are identified.

The effects of weed spraying are relevant to wildlife habitat, protection of sensitive, rare, threatened and endangered plant species, biodiversity, water quality, soil stability, and vegetation health.

#### ■ **Post Fire and Burned Area Emergency Rehabilitation**

BAER watershed restoration activities and monitoring will continue through 2004 and conclude in 2005. Detailed information on these activities is included within the East Fork Fire Salvage EIS Project File and Burned Area

Emergency Rehabilitation Project File.

The effects of these activities are relevant to soil stability, weed spread, water quality, fisheries habitat and connectivity, and wildlife security.

## 2.7 Summary

### Comparison of the Activities, the Predicted Achievement of the Project Objectives and the Predicted Environmental Effects of All Alternatives

#### 2.7.1 Introduction

The effects of the alternatives on the human environment vary according to the location and quantity of activities proposed in each alternative. The alternatives can be compared quantitatively and qualitatively by: (1) their activities, (2) how they meet the Purpose and Need, (3) their response to the driving issues, and (4) their effects on individual resources.

The summary comparison of the alternatives provides a clear basis of choice between

alternatives for the Forest Supervisor and the public. The comparison of alternatives is supplemented by information on existing resource conditions displayed in Chapter 3, and by detailed analysis of the effects of the alternatives on each resource as displayed within Chapter 4.

#### 2.7.2 Comparison of Alternative Activities

Because each alternative was designed to address various driving issues, the types and quantity of activities varies by alternative. The following table provides a comparison of the quantity of treatments that would occur under each alternative.

This information provides a baseline for the ability for each alternative to meet the purpose and need of the project, the ability for the alternatives to respond to issues, and the effects of the alternatives on individual resources.

#### 2.7.3 Achieving the Purpose and Need

Because each alternative was designed to address various driving issues, the types and quantity of activities in each alternative provide different levels of meeting the purpose and need. Table 2.7.1 displays how each alternative meets the objectives of the purpose and need.

**Table 2.7.1. Comparison of Achieving the Purpose and Need.** *Because each alternative was designed to address various driving issues, the types and quantity of activities in each alternative provide different levels of meeting the purpose and need.*

	Alternative 1	Alternative 2	Alternative 3
Forest Products and Jobs	No forest products or jobs would be created.	Approximately 9,248 ccf of merchantable sawtimber would be offered for sale.	Approximately 5,706 ccf of merchantable sawtimber would be offered for sale.
Vegetation, Fire and Fuels	There would be no planting funded although it would continue to be considered if necessary.	Approximately 100 acres of trees would be planted. Approximately 781 acres of heavy fuel loading would be reduced.	Approximately 100 acres of trees would be planted. Approximately 597 acres of heavy fuel loading would be reduced.
Watershed	No additional road maintenance or drainage improvement. No changes in infrastructure or travel management to protect watersheds. Completed fire suppression restoration activities and ongoing BAER restoration and road maintenance would protect soil properties.	Road maintenance, drainage improvement, BMPs, road decommissioning, and a travel management change would be conducted to reduce erosion. These activities would be supplemented by completed fire suppression restoration activities, ongoing BAER restoration, and road maintenance activities.	Road maintenance, drainage improvement, BMPs, road decommissioning, and a travel management change would be conducted to reduce erosion. These activities would be supplemented by completed fire suppression restoration activities, ongoing BAER restoration, and road maintenance activities.

## □ 2.7.4 Response to Driving Issues and Resource Concerns

Each alternative was designed to respond to particular groupings of the Driving Issues. Because the effects of the alternatives are resource associated, they are described by resource. The consolidated driving issues associated with each resource heading are listed so the effects on the issue can be compared. Resource and issue comparisons are described in order of resource headings displayed in Chapters 3 and 4.

### ■ Soil

**Soil:** The fire has increased the potential for accelerated soil erosion to occur by removing ground covering vegetation and litter and creating a hydrophobic layer in some areas. There is an area in the West Fork Blacks Fork with unstable soils and landform where the potential for a landslide due to the fire may have increased. Timber salvage and road construction could result in additional detrimental soil impacts.

All alternatives, would maintain long-term soil productivity.

Under Alternative 1, there would be no direct or indirect effects from salvage logging because no salvage logging would occur. There would be continued short-term erosion and sedimentation due to the 2002 East Fork Fire. Accelerated erosion due to the fire is expected to occur for several years and the WEPP model estimates that erosion would revert to pre-fire rates in about 20 years.

Alternatives 2 and 3 could have short-term detrimental impacts to soils associated with ground based yarding in harvest units. Soil compaction, displacement, and rutting would be reduced by implementation of mitigation measures that prohibit equipment operation on wet soils and by requirements for post harvest restoration on sites disturbed during harvest activities. Temporary roads constructed under Alternative 2 and log landings under Alternatives 2 and 3 would be fully rehabilitated following use. For Alternatives 2 and 3, very little if any additional erosion is expected from skid trails during low intensity storm events for all of the harvest units during the 2 to 3 year period of harvesting. This is because skid trails tend to compact the soil that results in lower erosion rates than those under existing conditions and mitigation measures that require installation of water bars every 50 feet that should be effective in controlling runoff and erosion. The WEPP model reflects this for a 10-year event storm in that it shows a reduction in sediment yield rates from existing rates for skid trails on all units and no sediment yield for 17 of the 24 harvest units. For high intensity storms, some erosion is expected from skid trails and for most of the units the sediment yield rate would still be lower than existing rates because of the compaction of the soil from skidding. Compacted soil particles are less easily dislodged and moved off site. With the implementation of mitigation measures, none of the short-term or long-term effects of Alternatives 2 and 3 would exceed soil quality standards.

**Table 2.7.2. Comparison of Effects on Soils.** *With the implementation of mitigation measures, none of the short-term or long-term effects would exceed soil quality standards.*

Comparison of Effects on Soils			
	Alternative 1	Alternative 2	Alternative 3
Maintain Short-Term Soil Productivity	Slightly higher risk of excessive erosion due to 50 year storm or reburn.	Yes, except on temp roads, landings, skid trails.	Yes, except on landings and skid trails
Maintain Long-Term Soil Productivity	Yes	Yes	Yes

Comparison of Effects on Soils			
	Alternative 1	Alternative 2	Alternative 3
Detrimental Soil Disturbance (measured as acres/average percent of activity areas)	N/A	49.6 ac/6.3 % (total)	6.0 % (total)
Harvest Activities on Soils Highly Susceptible to Erosion	0 acres	581 acres	467 acres
Harvest Activities on Soils Highly Susceptible to Compaction	0 acres	1 acre	0 acres

\* Based on 40% of high burn reflectivity from burn reflectivity gis layer.

## ■ Water

**Water:** Removal of forest tree cover by the fire can increase erosion, in-stream flows, peak discharges, and sediment loads in streams and wetlands, which may adversely affect channel morphology and stability and ecological functions of streamside riparian areas, seeps, bogs, and fens. Timber salvage operations, road construction, and increased motorized recreational use could further increase these effects. Road maintenance, decommissioning, and salvage operations could also mitigate some of them.

Under all alternatives, riparian areas and wetlands would be protected. Watershed improvement work initiated under the Burned Area Emergency Rehabilitation (BAER) Plan would continue to be implemented and monitored.

As described in 3.4.12, water yield increases due to past timber harvest and fires are negligible. There will be increased water yields from effects of the East Fork Fire over about 15 years with the higher amounts likely in the first few years, depending on precipitation events. This increase is unlikely to be measurable in the larger drainage.

Salvage harvesting under Alternatives 2 or 3 is unlikely to have any measurable cumulative effect on water yields since the salvage is only removing dead or dying trees and the areas affected have already been burned. A review of watershed research on water yield by Troendle and Nankervis (2000) has shown that studies have shown similar responses in stream flow from fire as in timber harvest.

Most of the past activities have little effect on the water quality of the analysis area as indicated by water sampling that shows that water quality standards have been met in these waters since 1993 when water samples have been collected at regular intervals as part of a cooperative program between the USFS and the State of Utah. The East Fork Fire has a great potential for increasing erosion and sedimentation because of the large area that was burned. Within each of the proposed timber harvest units, the potential for accelerated erosion and sedimentation from the East Fork Fire is expected to be equal to or greater than the proposed timber harvest activities, particularly when considering the mitigation measures that would be in place to reduce the effects of the proposed timber harvest. Cumulatively, the proposed timber harvest is not expected to increase erosion and sedimentation in the analysis area.

**Table 2.7.3. Comparison of Effects on Water Resources.** *With the implementation of mitigation measures, none of the short-term or long-term effects of the action alternatives would exceed those of the no action alternative.*

Comparison of Effects on Water Resources			
	Alternative 1	Alternative 2	Alternative 3
Average Road Densities on all lands in Miles/Square Mile	1.26	1.25	1.25
Predicted Sediment Production from a 10 Year Storm Event (based on WEPP Computer Model)	6.1 tons/acre, average in proposed salvage units under Alternatives 2 and 3	6.0 tons/acre, 781 acres	5.7 tons/acre, 597 acres

Comparison of Effects on Water Resources			
Predicted Sediment Production from a 50 Year Storm Event (based on WEPP Computer Model)	8.8 tons/acre, average in proposed salvage units under Alternatives 2 and 3	8.7 tons/acre, 781 acres	8.1 tons/acre, 597 acres
Water Yield	Increase from fire effects, but unlikely to cause stream channel instability	No measurable increase over Alternative 1.	No measurable increase over Alternative 1.

**Visual Resources**

**Scenic Integrity:** Timber salvage and road construction may have impacts on the area's natural beauty due to reductions in visual quality, impacts of litter and off road vehicle damage.

The East Fork Fire has had substantial effects on the viewsheds within and adjacent to the Fire. Alternative 1 would have no additional effects.

Alternative 2 would have short and long-term effects on scenic integrity and the landscape character. Harvest unit design criteria and mitigation measures would be required to reduce short-term negative scenic impacts. The long-term effect would be the same as alternative 1.

The visual effects of timber harvest activities in Alternative 2, as viewed in the foreground and middle ground from travel ways during the short term would place all units in a scenic integrity of High. The effects to the texture of landscape from the salvage would leave a number of small diameter standing and down dead trees, large snags, and scattered unburned tree to mimic the surrounding wildfire affected forest. Temporary roads and skid trails would be evident during the salvage operation. Their effects would diminish with time as re-contouring and re-vegetation efforts take place.

Alternative 2 would also have short and long-term effects on the landscape character. Harvest unit design criteria and mitigation measures would be required to reduce short-term negative scenic impacts. The long-term effect would be the same as alternative 1. (See Appendix A, Map 4.3.1).

Alternative 3 would have the same effects as alternative 2 other than there would be no temporary roads constructed (See Appendix A, Map 4.3.2).

While all alternatives would show an improving trend in scenic integrity in areas of Low Scenic Integrity, these improvements would occur faster because of timber harvest activities in Alternatives 2 and 3.

All alternatives could meet the scenic integrity objective (SIO) when mitigation is applied as specified within the allocated land in the Wasatch-Cache National Forest Plan.

Because no actions would be proposed within the roadless areas, existing cultural and heritage sites, unique vegetation communities and patterns, and geologic formations would be left in their present status. The removal of surface litter in burned roadless may expose heritage sites that were previously not visible.

**Heritage Resources**

**Heritage:** Timber salvage and road construction carried out within the affected areas have the potential to impact recorded and/or unrecorded prehistoric and historic resources.

Alternative 1 would have no direct effects on the heritage resource.

Alternatives 2 and 3 would include several harvest units that contain heritage sites. Adverse effects to these sites would be prevented through mitigation measures including “no-activity” buffer zone.

**Infrastructure and Improvements**

**Infrastructure:** Permanent or temporary road construction and improvements affect commercial uses, aesthetics and recreation opportunities, sometimes positively and sometimes negatively.

Under Alternative 1, no road construction, temporary or system, on National Forest lands would occur.

Alternative 2 would include road work applied in locations where maintenance and drainage improvement are necessary to protect or restore resources. Road drainage improvement work would occur on approximately 19.8 miles of road within this alternative. Timber sale activities would complete all of the maintenance and drainage improvement. Approximately 4.6 miles of temporary road would be constructed to provide access to proposed timber harvest units. Road 80299 would be decommissioned.

Road drainage improvement would increase maintainability of 19.8 miles of road and would maintain generally good access throughout the area. Decommissioning of Road 80299 would eliminate costly maintenance needs on that road. A very limited amount of motorized recreational access would be lost. Road 80293 would be kept open to provide access to Elizabeth Ridge and Lym Lake. This will provide access that is currently provided by a ford on private land across Mill Creek that will be closed by the landowner.

Alternative 3 is similar to Alternative 2 in that maintenance and drainage improvement work

would be completed on existing system roads used to access timber. However, eliminating some of the units would preclude timber sale associated maintenance and drainage improvement on the West Fork Blacks Road and the East Carter Creek Road. A total of 11.9 miles of maintenance and drainage improvement would be completed with this alternative. No temporary roads would be constructed with this alternative.

Road drainage improvement would increase maintainability of 11.9 miles of road and would maintain generally good access throughout the area. Closure of Road 80299 would depend on gaining appropriated funds. It would eliminate costly maintenance needs on that road. A very limited amount of motorized recreational access would be lost.

The Mountain View / Evanston District Travel Plan Decision in early 2003 has reduced road density within this analysis area to an acceptable level while maintaining and improving the opportunities for loop routes for recreational access. Closure of Road 80299 under Alternatives 2 and 3 would provide a slight further reduction in road density with very little effect on recreational access.

**Table 2.7.4. Comparison of Effects on Infrastructure.** *The major difference between alternatives is maintenance and drainage improvement of existing system roads, and temporary road construction with Alternative 2.*

<b>Comparison of Effects on Infrastructure</b>			
	<b>Alternative 1 (miles)</b>	<b>Alternative 2 (miles)</b>	<b>Alternative 3 (miles)</b>
Road Maintenance and Drainage Improvement	0.0	19.8	11.9
Yearlong Restrictions (Gated)	6.2	6.2	6.2
Open Roads	92.2	90.9	90.9
N.F. Open Road Density	0.99	0.98	0.98
Temporary Road Construction	0	4.4	0
Road Decommissioning	0	1.3	1.3*

\* Dependent on appropriated funds.

■ **Vegetation and Forest Resources**

**Vegetation:**  
Timber salvage and road construction could affect TES plant species.  
  
Timber salvage and logging equipment and other off-road vehicle use could spread noxious weed seeds into weed-free areas.

□ **Insect Predation (Mountain Pine and Spruce Beetles)**

■ **Effects Common to All Alternatives**

Salvage of an estimated 719 acres of fire killed timber from private lands is expected to proceed under all alternatives. Most of those (652 acres) are located within the Mill Creek drainage, with an additional 67 acres in West Fork Blacks.

The effects on beetle predation would be minimal under any alternative because of the extensive acreages that in are in roadless or management prescription categories that preclude management, and the mixed species condition of surrounding stands. Also, no harvest would occur until the second year after the fire, further limiting the effects of any alternative on insect predation.

■ **Alternative 1**

□ **Direct and Indirect Effects**

Alternative 1 would provide no direct reduction of bark beetle (mountain pine beetle and spruce beetle) infestation or risk of future infestation of host trees. There could be some loss of mature and old trees (particularly Englemann spruce) from endemic bark beetle predation in unburned stands within the analysis area.

A beneficial effect of Alternative 1 would be the role bark beetle predation plays in forest succession described in Chapter 3. Early seral species, such as lodgepole pine and aspen would benefit from this successional effect of spruce beetle, although lodgepole would be impaired by the effects of mountain pine beetle.

□ **Cumulative Effects**

Although the fire is not expected to cause widespread beetle outbreaks, the pre-wildfire bark beetle populations and observed predation of host trees could result in an eventual outbreak. The cumulative effects of the eventual outbreak would chiefly relate to the significant mortality of large diameter host trees and the environmental conditions associated with standing dead trees that ultimately fall to the ground, e.g. increased fuel loading and potential for increased wildfire intensity. Whether beetle populations actually increase would depend upon the number of insect brood emerging next year from fire-weakened, infested spruce trees and continued successful host infestation over ensuing years.

Continued unaltered high-risk conditions would predispose stands containing large sized host trees to significant mortality from bark beetles. There have been no recent or planned projects in proximity to the analysis area that would have a noticeable effect on this high-risk condition.

■ **Alternatives 2 and 3**

□ **Direct and Indirect Effects**

The direct, indirect and cumulative effects would be similar to Alternative 1 except that Alternative 2 would treat 435 acres of low and moderate burn reflectance stands that would provide suitable host for beetle populations (refer to Table 4.1.4). This would reduce the risk on adjacent stands. The timing of the treatment would be too late for beetles that have already attacked standing trees, but may be useful in preventing future attacks within the treated acres.

The direct, indirect and cumulative effects of Alternative 3 would be similar to Alternative 2 except that Alternative 3 would treat fewer acres. Approximately 349 acres of low and moderate burn reflectance burn stands would be treated.

□ **Cumulative Effects**

The combined of National Forest and private land harvesting would reduce bark beetle predation and risk on approximately 10 percent of the area within the wildfire perimeters (Alternative 2) and less than 10 percent (Alternative 3). In the untreated areas,

cumulative effects would be the same as Alternative 1.

**☐ Mature and Old Structure**

Burned areas would require at least 80 years of regrowth without major disturbance before they again achieved mature structures, and 150 years before they reach the old class. Therefore, the determination of effects of the alternatives on such structures is limited to the remaining unburned areas within the analysis area. All alternatives provide for more than 40% in mature and old classes.

**☐ Threatened, Endangered and Sensitive Species**

Effects on Threatened, Endangered and Sensitive Species were analyzed by assessing the activities proposed in each alternative and the potential effects to the species that are known or have potential habitat in the project area (refer to Threatened, Endangered and Sensitive Plant section in Chapter 3). There would be no effects to any Federally Listed (Threatened or Endangered), Proposed, or Candidate species. Because no sensitive species are within the harvest units or the burn perimeter, there would be no effects to sensitive species under any alternative (Duncan 2003).

**☐ Noxious Weeds**

Alternative 1 would not have any effect on noxious weed spread. The ground disturbing activities proposed in Alternatives 2 and 3 would have a high risk of weed spread in (1) habitats that have high susceptibility to weed invasion or (2) areas that are already disturbed. However, washing and inspection of logging equipment that would be operated off roads (skidders, dozers, loaders) would be required prior to bringing the equipment onto the Forest. Knutson-Vandenburg (KV) funds would be collected from the timber revenues to fund noxious weed spraying, which would reduce or eradicate noxious weeds and improve the vigor of native vegetation, thereby increasing resistance to further weed invasion. Where KV funds are not available, appropriated funds would be requested. Weed control, both direct herbicide use and non-herbicide prevention measures, would be included as design criteria. Musk thistle and Canada thistle have been recorded near, but not within, proposed harvest units. Both of these species disperse seed primarily by wind. Due to their presence in the fire perimeter and the primary mode of seed dispersal, the movement of harvesting equipment and vehicles in and around the harvest units and between units would have minimal effect on the introduction of these weeds to new sites.

**Table 2.7.5. Comparison of Effects on Vegetation.** Alternatives are compared based on their effects on bark beetle susceptibility, maintenance of old and mature classes, TES and introduction of noxious weeds.

<b>Comparison of Effects on Vegetation</b>			
	<b>Alternative 1</b>	<b>Alternative 2</b>	<b>Alternative 3</b>
<b>Harvest Treatments</b>			
East Fork Bear	0 acres	186 acres	164 acres
Carter Creek	0 acres	70 acres	24 acres
Mill Creek	0 acres	432 acres	375 acres
West Fork Blacks Fork	0 acres	93 acres	34 acres
Total	0 acres	781 acres	597 acres
<b>Mature and Old Age Classes</b>			
Amount of analysis area mature and old forest remaining	40%+	40%+	40%+
<b>Threatened, Endangered or Sensitive Plant Species</b>			
Biological Determination	No Effect	No Effect	No Effect
<b>Noxious Weeds</b>			
Disturbance Area (National Forest + Private Harvest Acres)	719 acres	1500 acres	1316 acres

■ **Fire and Fuels**

**Fire/Fuel:** Future fires could result in high intensity reburns with high resistance to control where heavy fuel loading occurs after fire-killed trees fall.

Alternative 1 would provide no direct reduction of large fuels that pose a future risk of potential soil damage a high intensity reburn on National Forest land. A nominal amount of removal may occur from personal use firewood gathering along open roads. The relevance of any adverse effects would be proportional to the extent of heat duration causing soil damage during a reburn, which is uncertain at this time. Beneficial and adverse effects of Alternative 1 would be the role these a typically high levels of large woody debris play in the forest environment. High levels of large woody debris in severely burned sites would facilitate spruce regeneration on high elevation and high reflectance burn areas by ameliorating the harsh post-fire environment, providing a seed source is available. Adversely, this same woody debris loading would increase the degree of tree mortality in the event of a future wildfire. A total of 7,244 acres of high and moderate burn reflectance stands would remain untreated and provide potential fuel for future wildfires (Table 4.7.2). The removal of future fuel from private lands would reduce the ability of fire to spread through the private lands to adjacent National Forest lands, and may therefore limit the extent of a future fire within the lower elevation, “checkerboard” ownership.

Fuel loading due to logging comes primarily from tops, limbs, and unmerchantable portions of the boles of trees. All landing slash under Alternatives 2 and 3 would be treated. Much of the smaller diameter material would remain on site, but the amount of fine fuels remaining would be lighter than that following harvest of green trees since needles, twigs, small branches, and duff layers were substantially reduced by the

fire in moderate to high reflectance areas. Only fire-killed trees will be removed in those areas mapped as low intensity burn or unburned. Fine fuels would also be fairly light in these areas since generally a small percentage or small patches of the trees would be removed. Fine fuels were substantially reduced by the fire in most of these small patches as well. Alternative 2 would provide direct reduction of large fuels on 781 National Forest acres through salvage of fire-killed timber (See Table 4.7.1 and Appendix A, Map 4.8.1). Of those acres treated, 296 are high and 196 are moderate reflectance. Timber harvest would remove boles of merchantable fire-killed trees, which would eventually become large down woody fuel. The effectiveness of salvage is limited to the merchantable portion of the fire-killed trees and does not include large boles that are non-salvable from decay or severe checking. Alternative 2 would directly reduce uncharacteristic risk conditions on treated sites. The potential for uncharacteristic soil damage to occur in the event of a reburn would be reduced. Continuity of heavy fuel loading would be interrupted where treatments occurred. An additional 719 acres of intermixed private lands are planned for salvage by the private landowner. Approximately 13,409 acres within the burn would receive no treatment, with 6,622 of those in high and moderate burn reflectance (See Table 4.7.2). The remaining untreated acres would become predisposed to the same insect, disease and fire disturbances as discussed under Alternative 1. Continuity of heavy fuel loading would be interrupted where treatments occurred.

The direct, indirect and cumulative effects of Alternative 3 would be similar to Alternative 2, except that Alternative 3 would treat fewer acres (597 acres), and leaves more acres untreated (6,827 acres with high and moderate burn severity).

**Table 2.7.6. Alternative Comparison of Effects on Fire and Fuels.** *Effects on fire and fuels is determined by the acres treated on both private and National Forest lands.*

Comparison of Effects on Fire and Fuels (Acres Treated)			
	Alternative 1	Alternative 2	Alternative 3
National Forest	0 acres	781 acres	597 acres
Private Land	719 acres	719 acres	719 acres

■ **Wildlife**

Salvage of fire-killed timber could adversely affect habitat for large and small wildlife species including avians that use this habitat for foraging, breeding, or hiding cover.

Removal of fire-killed stands of dead trees could adversely affect habitat for listed sensitive, threatened, and endangered species including denning habitat for Canada lynx.

Timber salvage units and roads could disrupt natural ecosystem processes, fragment large undisturbed areas, increase poaching and cause barriers to wildlife movement.

New roads may facilitate snowmobile and other human uses in the winter that facilitates movement by competing carnivores to the detriment of lynx.

unsuitable stands mature. Alternative 1 would have no effects on lynx. Some potential (future) denning habitat would be treated. Salvage of 288 acres of low intensity burn is proposed, reducing potential denning habitat by an estimated 150 acres. Potential denning habitat is abundant in both of the LAUs and the LAU with the least denning habitat still has well over the amount recommended in the Lynx Conservation Assessment and Strategy (LCAS). Alternatives 2 and 3 would salvage some potential denning habitat; therefore, Alternatives 2 and 3 may affect, but would not be likely to adversely affect lynx denning habitat

A Biological Assessment (Hollingshead 2003a) determined that the East Fork Fire Salvage “may affect, but is not likely to adversely affect” Canada lynx. The U.S. Fish and Wildlife (USDI, Fish and Wildlife Service 2004) concurred with this determination in a Biological Opinion issued on February 25, 2004 after requesting and receiving an addendum (Jaureguie 2004) to the Biological Assessment.

□ **Threatened and Endangered Species**

The effects of the alternatives on Threatened, Endangered, Sensitive and Management Indicator species are summarized in Table 2.7.7.

***Bald Eagle***

Because the project area does not include any suitable wintering habitat or nesting habitat for bald eagles, all alternatives would have no effect on bald eagles. None of the alternatives would render any of the project area unsuitable for future use by foraging bald eagles. All alternatives would have no direct, indirect or cumulative effects on bald eagles (Hollingshead 2003a, USDI F&WS 2004).

***Canada Lynx***

No salvage is proposed in any lynx foraging habitat (lodgepole pine stands 15-30 years old) under any alternative; therefore, all alternatives would have no effect on foraging habitat. Gains in foraging habitat would only occur as young,

***Black-footed ferret***

Because the project area does not include any black-footed ferret habitat, all alternatives would have no effect on black-footed ferrets. All alternative would have no direct, indirect or cumulative effects on black-footed ferrets (Hollingshead 2003).

***Western yellow-billed cuckoo***

Because the project area does not include any yellow-billed cuckoo habitat, all alternatives would have no effect on yellow-billed cuckoo. All alternative would have no direct, indirect or cumulative effects on yellow-billed cuckoo.

**□ Sensitive Species**

***Peregrine falcon***

Because no activities would take place near potential nesting habitat in cliffs, all alternatives would have no impact on peregrine falcons. All alternative would have no direct, indirect or cumulative effects on peregrine falcons (Hollingshead 2003).

***Northern goshawk***

The East Fork Fire burned 6,925 acres at high to moderate severity, which moved these stands back to newly developing stands of trees. The severely burned stands will take several decades to return to suitable goshawk habitat. Alternative 1 would have no effects on goshawks. Alternatives 2 and 3 may impact individual goshawks, but are not likely to cause a trend toward federal listing or a loss of viability to the potential goshawk population (Hollingshead 2003).

***Boreal owl***

Boreal owls are not likely to find suitable habitat in acres burned at high or moderate fire intensities, therefore none of the proposed salvage activities in these burned acres would negatively impact boreal owls. Suitable habitat may exist within areas burned at low intensities. Alternative 1 would not affect boreal owls. Alternatives 2 and 3 may impact individual boreal owls, but is not likely to cause a trend toward federal listing or a loss of viability to the potential boreal owl population (Hollingshead 2003).

***Flammulated Owl***

There is no suitable flammulated owl habitat within the East Fork Fire area, therefore all alternatives would have no impact on flammulated owls. All alternatives would have no direct, indirect or cumulative effects on flammulated owls. (Hollingshead 2003)

***Great Gray Owl***

Great gray owls are not likely to find suitable habitat in acres burned at high or moderate fire intensities, therefore none of the proposed salvage activities in these burned acres would

negatively impact great gray owls. Suitable habitat may exist within areas burned at low intensities. Alternative 1 would not affect great gray owls. Alternatives 2 and 3 may impact individual great gray owls, but are not likely to cause a trend toward federal listing or a loss of viability to the potential great gray owl population (Hollingshead 2003).

**□ *Townsend’s big-eared bat***

Because the project area does not contain any caves, mines or abandoned buildings, all alternatives would have no impact on Townsend’s big-eared bats (Hollingshead 2003).

***Three-toed Woodpecker***

All proposed salvage units would have dead trees marked as reserve trees in order to provide habitat for woodpeckers and other snag-dependent wildlife habitat. The Wasatch-Cache Forest Plan direction includes leaving approximately 30 snags per 10 acres of salvage proposed. In many cases the trees would be left in clumps or patches and these would be spread across the landscape or in corridors along riparian areas. Alternative 1 would have no effects on three-toed woodpeckers. Alternatives 2 and 3 may impact individuals or habitat, but would not likely result in a trend toward federal listing of three-toed woodpeckers (Hollingshead 2003).

***Wolverine***

Because all proposed salvage activities are located in previously roaded areas with regular human activity providing little suitable wolverine habitat, all alternatives would have no impact on wolverine (Hollingshead 2003).

**□ Other Species at Risk**

***Williamson’s sapsucker***

Effects for this species are closely associated to those of the three-toed woodpecker. Studies have found sapsuckers’ nesting in snags in post fire areas, while foraging in adjacent live stands. Alternative 1 would have no effects on Williamson’s sapsuckers. Alternatives 2 and 3 may impact individuals or habitat, but would not likely result in a trend toward federal listing of Williamson’s sapsuckers.

## ***Pine Marten***

### **Effects common to All Alternatives**

The loss of vegetative cover in areas burned will cause some level of habitat fragmentation. This level of fragmentation has likely occurred repeatedly through time with the fire regimes of this vegetative type. In areas of high to moderate burning where canopy was decreased to less than 30%, a negative short-term effect is associated with the marten. However martens benefit where fires were less intense and small openings of diverse habitat were created. Marten population numbers tend to return to burn areas several decades after fire when adequate food and cover return. Alternative 1 would not affect the existing situation. Alternative 2 would have a minor effect on amounts of snag and down woody habitat. Temporary roads may affect movement under Alternative 2 in the short term, but there should not be any increase of habitat fragmentation in the long term. Alternative 3 would have a minor effect on amounts of snag and down woody habitat.

### **□ Management Indicator Species**

#### ***Northern goshawk***

See effects on goshawks under “Sensitive Species”. The percentage of monitored territories that were active between 1999 and 2003 remained relatively constant across the Wasatch-Cache National Forest and north slope of the Uinta Mountains, except in 2000 when the percentage was low for some unknown reason. This data is a representation of the population across the planning unit. Except for the low intensity burn areas where some harvest will take place (279 acres out of 781 acres) the rest of the proposed sale area was essentially rendered unsuitable for goshawk habitat by the fire. The nesting areas of the two pairs of goshawks were not burned and post-fledging areas are still adequate despite the fire. These two pairs have been active since the fire and are expected to continue to use their nest territories. The project will not affect the viability or distribution of the goshawk across the planning unit.

#### ***Snowshoe Hare***

Stands of sapling size aspen and conifer are not included for salvage in any alternative, therefore

the salvage activities would have no effects on snowshoe hare habitat. These fire-killed stands would regenerate to a size class of trees that can provide for snowshoe hare foraging and would in turn provide an increase in foraging opportunities for predators that feed on snowshoe hare. All alternatives would have no direct, indirect or cumulative effects on snowshoe hare.

#### ***Beaver***

Because no activities would occur within riparian areas, all of the alternatives would have no effect on beaver habitat. All alternatives would have no direct, indirect or cumulative effects on beaver.

### **□ Big Game Habitat**

There are short-term adverse effects of the East Fork fire on security cover for all big game species. Long term effects of the fire are generally positive due to increased forage. Elk are the most affected by loss of security cover and travel corridors. All alternatives would have no adverse impacts on summer big game habitat. There are no critical calving areas or elk or deer winter range within the fire perimeter. After 15 to 30 years, both the severely burned areas as well as old clearcuts would again provide hiding cover and elk security cover would increase in the herd unit. Alternative 1 would have no effects on big game habitat. Alternatives 2 and 3 would have very little effect on big game habitat. Decommissioning of Forest Road #80299 would increase security cover in the large mature forest strip remaining between the East Fork Fire and the 1980 Lily Lake Fire.

### **□ Snag Habitat**

Removal of snags during harvesting, fire suppression, and extensive salvage programs have impacted snag habitat, a component of old growth forest. Harvesting can remove snags, and fire suppression reduces the number of snags created in a landscape. Alternative 1 would have no effect on snag habitat. Alternatives 2 and 3 would remove fire killed trees from stands that have potential to provide the snag component of old growth habitat within the fire perimeter. This salvage affects approximately 0.6% of the 48,000 forested acres in the analysis area. Older dead trees would be retained and minimum Forest Plan snag densities would be maintained.

All alternatives would meet Forest Plan Guideline 16 for snag retention.

**□ Forest Land Birds**

The effects of any action, from timber harvest to fire suppression, would be an improvement for some species and detrimental for others. Selected bird species with restricted habitat needs (including snag dependent species) are discussed in separate sections in this Wildlife section. All alternatives would likely have little effect on these birds, considering the small extent of the habitat treatments compared with the fire effects.

**□ Fragmentation**

The loss of vegetative cover in areas burned at high and moderate fire intensities will cause some level of fragmentation across the landscape. This level of fragmentation has likely occurred repeatedly through time with the fire regimes of this vegetative type. Alternative 1 would have no effect on fragmentation. Alternatives 2 and 3 would provide a slight decrease in cover and open road density, which may make it easier for some species to move across the landscape. Because there would be only a temporary change in vegetative cover and the open road density would decrease, these alternatives would have little effect on fragmentation.

**Table 2.7.7. Comparison of Effects on Wildlife.** Alternatives are compared based on their effects on several wildlife issues, including TES, MIS, lynx habitat and species at risk.

<b>Comparison of Effects on Wildlife</b>			
	<b>Alternative 1</b>	<b>Alternative 2</b>	<b>Alternative 3</b>
<b>Threatened and Endangered Species</b>			
Bald Eagle	No Effect	No Effect	No Effect
Lynx	No Effect	May affect, but would not likely to adversely affect	May affect, but would not likely to adversely affect
Black-footed ferret	No Effect	No Effect	No Effect
Western Yellow-billed cuckoo	No Effect	No Effect	No Effect
<b>Sensitive Species</b>			
Peregrine Falcon	No Impact	No Impact	No Impact
Northern goshawk	No Impact	May impact individuals, not likely to cause a trend toward listing or a loss of viability	May impact individuals, not likely to cause a trend toward listing or a loss of viability
Boreal owl	No Impact	May impact individuals, not likely to cause a trend toward listing or a loss of viability	May impact individuals, not likely to cause a trend toward listing or a loss of viability
Flammulated Owl	No Impact	No Impact	No Impact
Great Gray Owl	No Impact	May impact individuals, not likely to cause a trend toward listing or a loss of viability	May impact individuals, not likely to cause a trend toward listing or a loss of viability
Townsend’s Big – Eared Bat	No Impact	No Impact	No Impact
Three-toed Woodpecker	No Impact	May impact individuals, not likely to cause a trend toward listing or a loss of viability	May impact individuals, not likely to cause a trend toward listing or a loss of viability
Wolverine	No Impact	No Impact	No Impact
<b>Other Species at Risk</b>			
Williamson’s sapsucker	No effect	May impact individuals, not likely to cause a trend toward listing or a loss of viability	May impact individuals, not likely to cause a trend toward listing or a loss of viability
Pine Marten	No effect	May impact individuals, not likely to cause a trend toward listing or a loss of viability	May impact individuals, not likely to cause a trend toward listing or a loss of viability
<b>Management Indicator Species</b>			

Comparison of Effects on Wildlife			
	Alternative 1	Alternative 2	Alternative 3
Snowshoe Hare	No effect	No effect	No effect
Beaver	No effect	No effect	No effect
Big Game			
Big Game Habitat	No effect	Little Effect	Little Effect
Lynx Habitat			
Open Road Density - LAU 34	0.93 mi/sq mi	0.93 mi/sq mi	0.93 mi/sq mi
Open Road Density - LAU 35	0.94 mi/sq mi	0.93 mi/sq mi	0.93 mi/sq mi
Unsuitable Acres - LAU 34	<b>6120 (12.9%)</b>	<b>6390 (13.5%)</b>	<b>6342 (13.4%)</b>
Unsuitable Acres - LAU 35	<b>1510 (5.4%)</b>	<b>1519 (5.5%)</b>	<b>1517 (5.5%)</b>

## ■ Fish and Aquatic Resources

**Fisheries:** Increased sedimentation from logging close to streams, particularly along sections with steep or unstable hill slopes and loss of shading in riparian areas, stream banks, and ponds, could affect cutthroat trout populations.

Potential positive effects of erosion control on fish may not be accomplished without timber salvage.

Timber salvage or road construction in riparian areas could have adverse effects on boreal toad habitat.

Under existing conditions, soil erosion has been greatly accelerated by severely burned soil conditions resulting from the 2002 East Fork Fire. Much of this increased sediment runoff however did not make it into fish bearing streams because of the large amounts of unburned vegetation which exists in the riparian zones. The exceptions to this include the lower end of Boundary Creek where the fire originated and the west fork of upper Mill Creek where runoff from the burned slopes entered the channel. Runoff from proposed unit 2 did enter the streams but these tributaries fan out prior to reaching the East Fork of the Bear River.

The indirect effects on aquatic and semi-aquatic species from the East Fork Fire include a loss of shading stream and the potential for increased water temperature. Sediment runoff may have also affected some of the macroinvertebrate communities causing a shift to sediment tolerant species. The increased runoff in the drainage has caused what appears to be an increase in spawning habitat in upper Mill Creek as fine

sediment has been washed out of the gravel and more gravel appears to be available.

Under Alternative 1, there would be no direct or indirect effects from salvage logging because no salvage logging would occur. There would be continued short-term erosion and sedimentation due to the 2002 East Fork Fire. Accelerated erosion due to the fire is expected to occur for several years and the WEPP model estimates that erosion would revert to pre-fire rates in about 20 years.

Alternative 2 would harvest 781 acres. A total of 4.6 miles of temporary road would be constructed. Two units (11 and 12) have buffer strips less than 100 feet that, during major storm event, may contribute sediment to the fish bearing streams. During average storm events the mitigation should reduce the risk of sediment to the streams. Mitigation measures were developed to reduce the potential for sediment from reaching fish bearing streams or ponds where amphibians may be impacted. The primary mitigation measure used to protect aquatic and semi-aquatics species was prohibiting logging operations adjacent to water bodies. Other mitigation measures such as limiting skidding operations near the edge of the units; ripping, seeding, slash placement and water barring would slow runoff, increase water infiltration, and enhance revegetation, helping to reduce runoff into the streams and small ponds. The potential for large trees to be recruited into the channel was also considered in setting no harvest areas adjacent to streams.

Cumulative effects on Bonneville cutthroat trout for Alternative 2 are similar to the effects for Alternative 1. The proposed timber harvest

would employ site specific mitigation measures that would reduce or eliminate the impacts of the harvest. Cumulative effects on Colorado River cutthroat trout were not evaluated for the proposed harvest activity in the West Fork Blacks Fork drainage. It is believed that these populations of Colorado River cutthroat trout will persist over the next 15 years in the Blacks Fork Drainage, based on the limited risks and moderate threats. It is anticipated that the Colorado River cutthroat trout will persist over the next 100 years also. Again the risks and threats are expected to remain constant. Affects on other fish in the drainage are believed to be similar to those of the Colorado River cutthroat trout. Cumulative effects on amphibians are similar to those on fish. Past timber harvest has removed trees adjacent to riparian areas in some cases which may have reduced large woody debris recruitment into riparian areas. Road construction across riparian areas has removed riparian habitat. These activities have occurred on a small percentage of the total riparian habitat available in the analysis area. Historic grazing removed riparian vegetation. More recent grazing management has resulted in recovery of riparian areas to a properly functioning condition in this analysis area.

There are no irretrievable losses of the aquatic or semi-aquatic resources under Alternative 2. Best management practices (BMPs) are the primary mechanism to enable achievement of water quality goals and soil retention. BMPs include, but are not limited to, structural and non-structural controls and operations and maintenance procedures to reduce or eliminate introduction of pollutants into receiving waters. Project specific BMPs are in the project file and incorporated by reference.

Alternative 3 would harvest 597 acres. During average storm events the mitigation listed under Alternative 2, for the harvest units, should reduce the risk of sediment to the streams. The direct and indirect effects of Alternative 3 would be the same as Alternative 2 except for the effects of temporary road construction since temporary roads would not be constructed under this alternative. Based on research, roads cause the highest rates of sediment yield. For low intensity storms, very little if any sediment yield would occur from skidding and, based on the WEPP model, would most likely be less than existing conditions because of the same mitigation applied as in Alternative 2. For high

intensity storms, some erosion is expected from skid trails and for most of the units the sediment yield rate would still be lower than existing rates because of the compaction of the soil from skidding.

Cumulative effects for alternative 3 are similar to those for Alternative 2. With the elimination of unit 24, there would be no effect in the Blacks Fork drainage. The elimination of units and associated road construction would also reduce the impacts in the Mill Creek drainage

A Biological Evaluation (Chase 2004) determined that the proposed fire salvage "**may impact individuals**, but is not likely to cause a trend toward federal listing or a loss of viability" to the Bonneville cutthroat trout population on the Forest and that the proposed fire salvage activities will have "**no impact**" on Colorado cutthroat trout due to distance between cutting units and the streams.

Bonneville and Colorado River cutthroat are management indicator species under the Wasatch Cache Forest Plan. Based on post fire monitoring and expected effects on the habitat of these species from Alternative 2, it is believed that the Bear River and Mill Creek populations of Bonneville cutthroat trout and the West Fork Blacks Fork population of Colorado River cutthroat trout will persist over the next 15 years, based on the limited risks and moderate threats. The Mill Creek Drainage is important in that it provides habitat for a metapopulation. It is expected that the risks and threats will increase over the next 15 years as more land is sold for development. The primary concerns in the drainages are the non-native fish and some habitat impacts from historic tie hacking and grazing (Table 3.12.3). It is anticipated that the Bonneville and Colorado River cutthroat trout will persist over the next 100 years also. The risks and threats are expected to increase over the next 100 years as demands for recreational opportunities and water increases.

Major populations of Colorado River cutthroat trout exist in Smiths Fork, Blacks Fork, Brush Creek, and Sage Creek. The synchrony risk is 2 with impacts from historic tie hacking continuing to affect fish habitat. The frequency and potential of large-scale uncharacteristic events is assumed moderate. The harvest of units 23 and 24 in the Blacks Fork Drainage should not

impact the population in the West Fork of the Blacks Fork Drainage.

There are no irretrievable losses of the aquatic or semi-aquatic resources under Alternative 3. Soil and Water Conservation practices (SWCPs) are the primary mechanism to enable achievement of water quality goals and soil retention. SWCPs

include, but are not limited to, structural and non-structural controls and operations and maintenance procedures to reduce or eliminate introduction of pollutants into receiving waters. Project specific SWCPs are in the project file and incorporated by reference.

**Table 2.7.8. Comparison of Effects on Fisheries and Aquatic Resources.**

Comparison of Effects on Fisheries and Aquatic Resources			
	Alternative 1	Alternative 2	Alternative 3
<b>Biological Evaluations of TES Fish Populations</b>			
Bonneville Cutthroat Trout	MIIH*	MIIH*	MIIH*
Colorado River Cutthroat Trout	MIIH*	MIIH*	MIIH*
<b>Road and Related Effects</b>			
Increases in sediment yield have occurred due to fire effects.	No change from existing	Slight improvement over existing	Slight improvement over Alternative 2
Water yields have increased due to fire, but unlikely to be measurable.	No change from existing	No measurable change from existing	No measurable change from existing
Instream debris recruitment is likely to increase due to fire effects.	No change from existing	No change from existing	No change from existing

\* MIIH – May impact individuals or habitat, but will not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species.

## ■ Recreation

**Reduction in Aesthetics:** Timber salvage and road construction may result in the loss of quiet, back-country, non-motorized recreational opportunities.

The broader scale patterns and types of recreation uses would not change appreciably under any of the alternatives. Relatively low density recreation uses such as driving for pleasure, undeveloped primitive car camping, camping, firewood gathering, hunting, cross country skiing, snow shoeing, hiking and horseback riding would continue to occur across all of the project area. There would be no change to the designated Recreation Opportunities Spectrum (ROS) for any of the affected areas. On the Wasatch-Cache National Forest, off highway vehicle (OHV) travel is allowed only on designated routes and areas for winter and summer recreation.

Standing fire-killed trees would present a safety concern for recreationists and a continuing maintenance problem along travelways within the project area.

The popularity of firewood gathering is likely to increase under all alternatives. So long as fire-killed trees remain near open roads, there are likely to be increased levels of firewood collection. This is expected to diminish after several years, when the supply is depleted near roads.

Increased forage production may increase deer and elk numbers in the burned areas somewhat in coming years. It is likely that this and the more open nature of the stands may increase big game hunting opportunities.

Although this project has no effects related to Forest Plan standards for recreational uses, implementation of any of the alternatives would be consistent with guidelines, broad goals and objectives of the revised Wasatch-Cache National Forest Land and Resource Management Plan.

Under Alternative 1, the current system of open, closed, and seasonally restricted roads would remain in place. Undeveloped primitive camping and other recreation activities would remain the same. Choices to camp in certain camps may change because of user preference

for camping in shaded areas. Snowmobile use would continue to be allowed or restricted as it currently is. Because of the opening up of the stands, more snowmobilers may choose to spend time in burnt stem stands. This would be a short term effect as the forest re-growth makes travel difficult as time passes.

Under Alternative 2, roads would be improved to better accommodate logging traffic. As a by-product of this work, recreationists could find roads less rutted with less challenging driving conditions than they now sometimes are. During the salvage operation recreationists would be affected by the truck traffic creating dust and noise but this would be a short-term effect (See Map 4.11.1, Appendix A). Winter recreation would be the same as Alternative 1.

Alternative 2 would have the same effects as Alternative 3 (See Map 4.11.2, Appendix A).

The major past cumulative effect that continues to affect the recreation opportunities in the analysis area is the relatively extensive network of roads. Consequently, recreation opportunities are and would continue to be of a more developed nature (semi-primitive, motorized and roaded natural ROS) around the harvest units.

**■ Socio-Economics**

**Economics:** The local economy could lose timber values if salvage is not accomplished and done in an expeditious manner.

Alternative 1 would produce no economic outputs. There would be no return on the cost of

planning and analysis. Economic impacts of this alternative would be minimal when compared to other alternatives.

Alternative 2 would provide an estimated 9,248 CCF (4.4 MMBF) of timber volume offered for sale, the greatest amount of any alternative. This is approximately 50% of the annual volume needed to supply local mills. It would also maintain a total of almost 20 miles of existing system roads during the period of use. Road maintenance expenditures with this alternative are estimated to be over \$93,000. The total PNV for this alternative is estimated at \$10,500 (refer to Tables 4.11.1, 4.11.2 and 4.11.3).

Alternative 3 would provide an estimated 5,706 CCF (2.7 MMBF) of timber volume for sale. If all the timber volume were sold and harvested, this alternative would provide approximately 30% of the annual volume needed to supply local mills. This alternative would also maintain roads, but because of the lower level of harvest, some roads would not be used and therefore not maintained. Maintenance would not be performed on two roads within the East Fork Bear drainage because the sales would be small offerings, and prospective purchasers are unlikely to have the equipment or expertise to complete such work. The sale in the West Fork of the Blacks also would not maintain any roads I that drainage. However, maintenance deposits would be collected into the road maintenance pool for future use. Road maintenance work and deposits would be approximately \$41,300. The Present Net Value of the alternative is -\$21,400 (refer to Tables 4.11.1, 4.11.2 and 4.11.4).

**Table 2.7.9. Comparison of Economic Effects.** PNV considers costs and benefits over a 60 year timeframe, with the benefits and costs discounted to current values. It provides an additional way to compare alternatives.

<b>Comparison of Economic Effects</b>			
	<b>Alternative 1</b>	<b>Alternative 2</b>	<b>Alternative 3</b>
<b>Timber Sale Volume</b>			
Total Volume	0 ccf	9,248 ccf	5,706 ccf
<b>Sale Size</b>			
Sales Offered Under 2000 ccf	0	0	2
Sales Offered Over 2000 ccf	0	3	2
<b>Present Net Value (PNV)</b>			
Total Discounted Benefits (\$1000)	0	335	210.2
Total Discounted Costs (\$1000)	0	-324.5	-231.6
Total PNVs (\$1000)	0	10.5	-21.4

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## ■ 2.8 Identification of the Agency's Preferred Alternative

The Wasatch-Cache National Forest Supervisor has identified "Alternative 2" as the agency's preferred alternative (40 CFR 1502.14(e)).

Alternative 2 more closely fulfills the objectives of the East Fork Fire Salvage Project as stated within the Purpose and Need than the other proposed alternatives. It also more closely meets the statutory mission and responsibilities of the Wasatch-Cache National Forest, as stated within the Goals, Objectives, and Standards of the Wasatch-Cache National Forest Plan.

Given consideration of the environmental, technical, social, and economic factors identified through both internal and external scoping, this alternative more closely balances the issues, concerns and opportunities associated with restoring and recovering watersheds and the land, and working with communities and people. With carefully selected Design Criteria, Mitigation Measures, and Monitoring Requirements, this alternative protects and improves watershed conditions, and protects or improves habitat for sensitive, threatened, and endangered fish and wildlife species.

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## ■ 2.9 Identification of the Environmentally Preferred Alternative

"Alternative 3" has been identified as the environmentally preferred alternative (40 CFR 1502.14(e)). Alternative 3 also meets the statutory mission and responsibilities of the Wasatch-Cache National Forest, as stated within the Goals, Objectives, and Standards of the Wasatch-Cache National Forest Plan.

Other than reduced volume salvaged and less acres treated for fuel reduction, Alternative 3 is similar in most ways to Alternative 2. However, it does not require any temporary road construction. The primary adverse effect of temporary roads is soil displacement and estimated sediment yields associated with soil exposure. Although Alternative 2 also reduces sediment yield due to effects of compaction on skid trails, the associated temporary road construction negates some of this benefit. Loss of productivity on temporary road locations for an extended period of time is also higher under Alternative 2. Recontouring of temporary roads following one season of use mitigates most other adverse effects of the roads.