The BAER Facts

- BAER Team Pre-season Meeting Guide
- BAER Team Ready Reference

Burned Area Emergency Rehabilitation

Stanislaus National Forest
June 2002

THE BAER FACTS

The BAER Facts is a condensed version of the procedures for conducting Burned Area Emergency Rehabilitation. Its purpose is to serve as a guide for BAER Pre-Season Meetings and a ready reference for BAER personnel. The highlighted text in the BAER Facts indicates key points that should be discussed in BAER Pre-Season Meetings.

The BAER Facts is organized into the following sections:

- Introduction (BAER Objectives, Policy, Responsibilities and Safety)
- BAER Survey
- BAER Treatment Implementation
- BAER Monitoring and Evaluation
- Appendices

The BAER Facts consists of the following information:

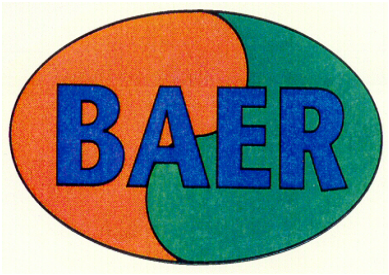
- Excerpts from FSM 2500 and FSH 2509.13 that cover the key points for BAER Authority and Responsibilities, BAER Survey and Implementation and BAER Monitoring.
- Appendices of other information useful to discuss at a BAER Pre-Season Meeting (i.e., key websites, safety, team activity checklist, personnel gear and survey team specialist report format).

The BAER Facts is not a comprehensive guide to all BAER responsibilities and requirements. Team Leaders and members should use all available information when conducting surveys and implementing and monitoring treatments. BAER policies and procedures will continue to change. Team Leaders and Team Members should keep current on such changes.

The BAER Facts was originally created for use on the Stanislaus National Forest. It was organized in 1995 by Jim Frazier, Forest Hydrologist and BAER Coordinator. It was updated in 2002 by Jim Frazier and Sharon Grant, Stanislaus National Forest Hydrologic Technician, so that it could be distributed on-line.

INTRODUCTION

- ✶ BAER Objectives (FSM/FSH)
- ✶ BAER Policy (FSM/FSH)
- ✶ BAER Responsibility
- ✶ BAER Team Checklist
- ✶ Safety (Sample JHA)



FOREST SERVICE MANUAL
Washington, D.C.

TITLE 2500 - WATERSHED AND AIR MANAGEMENT

Amendment No. 2500-2000-2

Effective May 25, 2000

2523 - BURNED-AREA EMERGENCY REHABILITATION.

2523.02 - Objectives.

1. To determine if emergency resource or human health and safety conditions exist.

2. To alleviate emergency conditions following wildfire to help stabilize soil; to control water, sediment, and debris movement; to prevent permanent impairment of ecosystem structure and function; and to mitigate significant threats to health, safety, life, property, or downstream values.

3. To monitor the implementation and effectiveness of prescribed emergency treatments.

2523.03 - Policy. Conduct burned area surveys promptly on all burned areas to determine if emergency rehabilitation treatment is needed. Interdisciplinary teams shall conduct burned area surveys of all class E (300 acres) and larger fires. For burned area survey procedures, team skills, and reporting requirements, see FSH 2509.13, Burned-Area Emergency Rehabilitation Handbook. Section 03 of the Handbook contains criteria required for funding approval.

Undertake treatments only when an analysis of risks shows that planned actions are likely to reduce risks significantly and are cost-effective. To qualify for emergency funding, treatment measures must provide essential and proven protection at minimum cost to prevent unacceptable natural and cultural resource degradation or to minimize significant threats to human health and safety or property.

Treatments are primarily temporary measures that do not generally require maintenance or are removed after objectives have been met. Costs covered by emergency funding authority include the removal of treatments when they are no longer needed and the maintenance of treatments for up to three years when deemed necessary to maintain their effectiveness.

1. Order of Treatment Preference. Observe the following order in undertaking treatments:

   a. No Treatment: In situations where no emergency exists or where practical preventive measures are not feasible, natural recovery is preferred.

   b. Prevention: For emergency situations, proven measures should be applied to stabilize soil or biotic communities in order to prevent unacceptable degradation or to minimize

risks to life or property and to stabilize and prevent unacceptable degradation of critical or significant cultural resources.

c. Mitigation: When preventive treatments are not cost-effective or practical, actions to moderate the intensity or severity of effects may be appropriate. The scope and cost of such actions should be the minimum necessary to alleviate significant threats.

2. Appropriate Treatments and Measures. Use appropriate treatments and other measures as follows:

   b. Plant Materials. Seeding or planting of grass, forbs, shrubs, or trees when needed to prevent unacceptable erosion, to prevent permanent impairment to ecosystem structure and function, or to prevent detrimental invasion by non-native plants. Natural recovery by native species is preferred. Removal or control of undesirable plants can be accomplished where needed to prevent permanent impairment of ecosystem structure and function.

   c. Structures. Structural measures when needed to prevent unacceptable erosion, to minimize unacceptable degradation of water quality, or to protect treated or recovering areas from uses that will cause erosion or interfere with recovery.

   d. Hazard Removal, Warning, and Controls. Stabilization or removal of physical hazards caused or aggravated by the fire that threaten life or property when there are no other protection options. Signing or other measures can be used to limit immediate threats to public safety or limit public access in order to protect treated or recovering areas.

   e. Facility Replacement. Replacement of destroyed or damaged minor facilities, such as signs or guardrails, where human health or safety is at risk and there are no other protection options.

   f. Heritage Resources. Consultation with Tribes, State historic preservation offices, and others, as well as the actions needed to stabilize and prevent unacceptable degradation of critical or significant cultural resources.

   g. Monitoring. Monitoring the implementation and effectiveness of treatments as well as the consequence of decisions not to treat certain areas.

3. Timeliness. Ensure that approved, burned-area emergency rehabilitation measures are expeditiously installed prior to the time when damaging or degrading events are likely to occur. Use only planted materials that will be effective within two growing seasons.

4. Compatibility with Forest Plans. Ensure that treatments do not conflict with desired conditions or with ecosystem health and biological diversity.

   Conduct biological evaluations and cultural/heritage resource surveys prior to installing ground-disturbing treatments and only within areas considered for treatment.

   Include native plant materials when possible to meet the objectives of the burned-area emergency rehabilitation. When practicable, use seeds and plants in burned-area emergency rehabilitation projects that originate from genetically local sources of native

species. When native materials are not available or suitable, give preference to non-native species that meet the treatment objectives, are nonpersistent, and are not likely to spread beyond the treatment area.

5. Wilderness. Ensure that treatments are consistent with wilderness management objectives (FSM 2320 and FSH 2509.13, sec. 26).

6. Fire Suppression Damage. Address damage caused by, or resulting from, fire suppression activities as part of the fire suppression effort.

2523.04 - Responsibility.

2523.04c - Forest Supervisors. Forest Supervisors have the responsibility to:

1. Designate an interdisciplinary burned area emergency rehabilitation team, including a qualified team leader, to perform a burned-area survey of class E (300 acres) and larger fires using procedures in FSH 2509.13.

2. Submit an initial Form FS-2500-8, Burned Area Report and monitoring plan, if applicable, to the Regional Forester within seven days after total containment of the fire.

2523.04d - District Rangers. District Rangers have the responsibility to:

1. Brief the burned-area emergency rehabilitation team leaders, to ensure that they are thoroughly familiar with the management objectives for the emergency rehabilitation project and with the Forest Plan objectives for the area.

2. Install or ensure that the fire suppression organization promptly installs necessary remedial measures on areas damaged by suppression activities.

3. Install approved and funded emergency rehabilitation measures on fire-damaged areas.

4. Monitor burned areas to ensure rehabilitation treatments and other measures are functioning as planned and are effective. Monitor for the post-fire presence of invasive species. Maintain treatments to keep them functioning as designed. Use monitoring results to plan follow-up actions, including the control of invasive species.

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ZERO CODE

This Handbook provides direction on the process for determining the need for planning, implementing, and managing emergency rehabilitation work for a burned area. Characteristics of the watershed, fire, and values at risk dictate the intensity and scope of planning and identification of emergency treatments.

02 – OBJECTIVE: (FSM 2523.02). The objective of emergency rehabilitation is to initiate action promptly for immediate rehabilitation of watersheds following wildfire to minimize the following potential effects, to the extent practicable, and in compliance with the Forest Land and Resource Management Plan (Forest plan):

1. Loss of Soil Productivity: Removal of the soil's protective cover increases the potential for accelerated soil erosion. Loss of surface soil horizons means loss of the nutrients, native seeds, and microorganisms that may affect the potential to achieve the desired future condition as stated in the Forest Plan (see ch. 20 for treatments).

2. Deterioration of Water Quality: Increased overland runoff results from destruction of the vegetative cover, development of water repellent soils, and consumption of organic litter. The increased runoff lowers water quality due to increased channel scour, sedimentation, and nutrient concentrations (see ch. 20 for treatments).

3. Threats to Human Life and Property: High water, sediment, debris flows, and soil mass movement are potential sources of damage to human life and property following wildfires (see ch. 20 for treatment).

03 – POLICY: To qualify for funding under the emergency rehabilitation authority (FSM 2523), ensure that proposed burned-area rehabilitation projects meet the following criteria:

1. Emergency Rehabilitation Is Necessary To Protect Soil and Water Resources From Unacceptable Losses, or To Prevent Unacceptable Downstream Damage. Base the judgment of acceptability on a review of the extent and value of resources vulnerable to damage, and the chance of continuing loss or degradation of resources. Such values may be expressed in monetary or nonmonetary terms.

2. Prescribed Rehabilitation Measures Are Proven Effective and Are Feasible To Implement Before Anticipated Damage-Producing Storms. Place heavy reliance on local experience for effective emergency treatments that can be successfully implemented before the first significant rain. This is particularly important when selecting plant species to establish ground cover.

3. Prescribed Rehabilitation Measures Are Environmentally and Socially Acceptable and Are Compatible With Long-Term Restoration Needs and the Forest Plan. Design burned-area rehabilitation treatments to complement or, at a minimum, not to impede the long-term recovery of ecosystem functions and the ability to move toward desired future conditions described in the Forest plan.

4. Costs Are Minimal While Still Providing Essential Protection. Use cost-risk analysis and comparison with established evaluation criteria to compare alternative treatments and clearly distinguish between emergency rehabilitation and long-term restoration, as defined in FSM 2523, to avoid inappropriate use of emergency funds.

04 – RESPONSIBILITY: For additional responsibilities of line managers and staff directors at the various administrative levels, see FSM 2523.04.

04.1 - Burned-Area Survey Team Leader: The Burned-Area Survey Team Leader at the Region, Forest, and District level has the responsibility to:

1. Call a pre-incident meeting of designated Forest Service team members and representatives of other agencies to assemble working tools and discuss responsibilities (sec. 13).

2. Report to the Forest Supervisor for a briefing before starting the burned-area survey (sec. 14).

3. Determine if a survey team is needed by conducting a reconnaissance survey to obtain an overview of the potential damage situation and to delineate flood source areas. (sec. 22):

    a. If the reconnaissance survey shows that emergency rehabilitation is not needed or justified, document this conclusion on Form FS-2500-8 (Burned-Area Report), and recommend to the Forest Supervisor that the burned-area survey not be conducted and that emergency rehabilitation of burned-area survey is unnecessary.

    b. If the reconnaissance survey shows that emergency rehabilitation is needed and justified, document this conclusion on Form FS-2500-8 (Burned-Area Report), and recommend to the Forest Supervisor that the burned-area survey team be formed. After obtaining the Forest Supervisor's approval, proceed with the following steps:

        (1) Arrange for appropriate team members to report promptly.

        (2) Notify the Incident Commander that a burned-area survey team has been formed. Contact the Resource Advisor and the Planning Section Leader of the Incident Command Team for information on problem areas, transportation opportunities, and safety concerns (sec. 21.1).

        (3) Establish a system for recording the field survey, analysis, and team administration records and ensure the team understands the system (sec. 21.2).
        (4) Plan for most efficient use of the team's time to complete the burned-area survey as quickly as conditions safely permit and not later than two days after control of the fire (sec. 21).

(5) Supervise detailed on-the-ground observations that are relevant for determination of watershed problems (sec. 23).

(6) Lead the development of appropriate alternative emergency rehabilitation treatments (sec. 24, 25, 26).

(7) Facilitate the analysis of alternatives based on treatment costs, probability of success, and potential resource value losses (ch. 30).

(8) Present the results of the evaluation of alternatives to the Forest Supervisor (sec. 42).

(9) Complete the initial Burned-Area Report, Form FS-2500-8, and submit it to the Regional Forester (sec. 41, 43).

(10) Ensure that all working papers and field records are properly documented and filed at the Forest level (sec. 21.2) before team release.

(11) Ensure that an orderly transition from the survey team to an implementation team occurs, through coordination with District Ranger(s). If requested, give the Forest Supervisor the team's recommendations for coordination of emergency rehabilitation with long-term restoration and resource utilization and management needs.

04.2 - Burned-Area Treatment Implementation Team Leader. The Burned-Area Treatment Implementation Team Leader has the responsibility to:

1. Report to the Forest Supervisor or District Ranger for briefing.

2. Coordinate with the Burned-Area Survey Team Leader to fully understand planned treatment objectives.

3. Determine which skills are required to accomplish work within established timeframes and follow appropriate procedures for obtaining qualified personnel.

4. Develop a project operations plan that includes project objectives and organization chart, timelines, safety plan, and communication plan. Ensure that the operations plan is consistent with the Forest plan.

5. Determine project map needs.

6. Work with contracting personnel to develop suitable contract specifications for all required work and acquisitions and serves as the contracting officer's representative or inspector as necessary.

7. Modify burned-area emergency rehabilitation prescriptions if site-specific conditions dictate.

BAER SURVEY

- ✶ In a Nutshell...
- ✶ Team Organization
- ✶ Team Orientation
- ✶ Team Management
- ✶ Reconnaissance Survey
- ✶ On-the-ground Observations
- ✶ Treatments

BAER Survey in a Nutshell…or I've been assigned and can baerly remember what to do!

What do I look for? Did the fire damage my resource? Did it cause conditions that will create an emergency if not treated? Will my resource be affected by treatment of other resources?

Why am I doing this? To protect my resource from an emergency by the fire and to coordinate my resource with others affected by the fire.

When do I survey? As soon as I get called I have to begin my resource survey because the BAER Survey Team has to have its work completed within 7 days after the fire is declared contained.

Where do I survey? In the portion of the fire area that most severely affects my resource. I won't have time to look at every acre in the fire area.

How do I survey?

⇒ I first attend Team Orientation for instructions
⇒ I collect known information for my resource – resource surveys, source documents (LMP, other plans, etc).
⇒ I stratify the burned area – survey only the portions most affected by the fire and survey them in priority of most to least affected.
⇒ If there is time I first do a reconnaissance survey – helicopter or drive through.
⇒ I do an on-the-ground survey in the stratified areas.
⇒ I attend team survey follow-up meetings to discuss findings and determine if an emergency exists. If so, I may help develop treatment alternatives – including no action. If no emergency exists, I still have to:
⇒ Prepare my resource report – I don't get demobilized until I do.
⇒ I attend the team's presentation to the Forest Supervisor.
⇒ I go home unless I'm assigned to the implementation team, in which case I get to keep right on working in dust and ashes for several more weeks!

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CHAPTER 10 - BURNED-AREA SURVEY TEAM ORGANIZATION

12.1 - Exhibit 01

SKILLS THAT MAY BE APPROPRIATE FOR BURNED-AREA SURVEY TEAMS

FOREST SERVICE

- ☑ Team Leader and Assistant
- ☑ Hydrologist
- ☑ Soil Scientist
- ☑ Geologist
- ☑ Botanist
- ☑ Ecologist
- ☑ Cultural Resources
- ☑ Engineer
- ☑ Range/Plant Materials
- ☑ Reforestation Specialist
- ☑ Fish Biologist
- ☑ Administrative Officer
- ☑ Public Affairs Specialist
- ☑ Contracting Specialist
- ☑ Typist/Clerical
- ☑ Computer Services (GIS)
- ☑ Financial Management
- ☑ Infrared Photo Interpreter
- ☑ Local Forest Representative
- ☑ Fire Management Specialist
- ☑ Insect & Disease Specialist
- ☑ Wildlife Biologist

OTHER AGENCIES

- ☑ Soil Conservation Service
- ☑ State Forestry Departments
- ☑ State Water Quality Agencies
- ☑ State Dept. of Fish & Wildlife
- ☑ State Soil & Water Conservation Districts
- ☑ Other Federal Agencies as Appropriate
- ☑ U.S. Fish & wildlife Service
- ☑ National Marine Fisheries Service
- ☑ Bureau of Land Management
- ☑ National Park Service
- ☑ Irrigation Districts

14 - BURNED-AREA SURVEY TEAM ORIENTATION. Before the team begins the survey, the Forest Supervisor or designated acting briefs team members on pertinent management goals and important environmental or other constraints from the Forest plan. These goals should be expressed in terms of resource management needs, or problems, rather than as specific levels of activities. The Forest Supervisor must appoint a local Forest representative if the team is not from the Forest (sec. 12.1).

If appropriate, the Forest Supervisor may direct the team to gather additional information needed for requesting other emergency flood prevention funds (FSM 2528, FSM 3540) under the Emergency Watershed Protection Program (7 CFR 624), administered by the Soil Conservation Service (sec. 01). These funds may be requested and used when resources of other programs are not sufficient to implement emergency measures following natural disasters or when non-Federal lands are involved.

CHAPTER 20 - BURNED-AREA SURVEY AND EMERGENCY TREATMENT STRATEGY

20.4 - Responsibility.

20.41 - Burned-Area Survey Team. The Burned-Area Survey Team has the responsibility to:

1. Assess on-the-ground conditions and describe the adverse effects of the fire on the watersheds.

2. Identify and define the emergency created by the effects of the fire on the watershed.

3. Locate any emergency flood source within the burned area.

4. Locate the potential emergency treatment measures in relation to the adverse effects of the fire on the watersheds.

21 - TEAM MANAGEMENT. The Burned-Area Survey Team must initiate and complete the survey promptly so that an initial request for funding can be submitted to meet the emergency.

The burned-area survey provides the field information needed to complete Form FS-2500-8, Burned-Area Report. (Instructions on completing this form are in ch. 40). The Burned-Area Report is the basis for the initial emergency funding request or a declaration that no emergency exists as a result of the wildfire. The report also provides a starting point for subsequent assessments and evaluations of site-specific treatments.

21.1 - Expediting Burned-Area Survey. The Burned-Area Survey Team Leader organizes and directs the team to make the maximum efficient use of time. Generally, the survey consists of two levels: a broad-view reconnaissance phase (sec. 22) and an on-the-ground sample observation phase (sec. 23).

Options available to obtain rapid and effective coverage of the area to be surveyed depend on local conditions and personnel and equipment available. The Team Leader should immediately contact the Resource Advisor and Planning Section Leader of the Incident Command Team for information on problem areas and to coordinate use of helicopters and other equipment to provide rapid field coverage.

CHAPTER 20 - BURNED-AREA SURVEY AND EMERGENCY TREATMENT STRATEGY

22 - RECONNAISSANCE SURVEY. The reconnaissance activities described in this section pertain to the broad levels of survey by the team. Another form of reconnaissance may be performed at an earlier stage by the Survey Team Leader to determine disciplines needed and develop a plan of action. The objective of reconnaissance is to provide an overall estimate of the emergency situation and to tentatively locate the flood source areas.

Preliminary land stratification made during presurvey preparations will be further stratified during the reconnaissance phase. Aerial reconnaissance, aerial photographs, and maps are the principal tools for recording observations.

23 - ON-THE-GROUND OBSERVATIONS. The restricted amount of time available limits the level of detail that can be gathered on the ground within the area to be surveyed. However, with the availability of prefire inventories and plans, data can usually be collected in a very short time that are adequate for reliable evaluations and prescriptions of emergency treatments and their costs.

In the following sections 23.1 to 23.4, the term "sample" refers to an ocular observation made by an experienced team member at a point on the ground within a previously delineated flood source area. Estimators should understand sampling principles so that data collected are as objective as time limits allow.

23.1 - Travel Within Burned Area. Use rapid means of travel to complete the on-the-ground sample observations phase within the established timeframe. Evaluate the savings in time against the costs throughout the survey process. For instance, consider using helicopters for moving team members to predetermined sample point locations or to dropoff points from which access can be made quickly on foot.

All persons using helicopters shall review the directions on helicopter safety in the chapter 4 of the Fireline Handbook (FSH 5109.32a).

23.2 - Sampling Techniques. Carefully consider various techniques of sampling. For example, if the potential flood source areas are delineated by aerial reconnaissance, then these should be the areas where most of the site information is collected. Lightly burned and some moderately burned areas can be passed over quickly if their runoff efficiency is relatively the same after the burn as before. Routes of travel also affect the rate of survey progress significantly in steep, rugged terrain. Techniques to be considered include:

1. Work in a downhill direction in teams, with one team member responsible for picking up the team at some downhill point.

2. Begin the survey in those areas already identified as flood sources and complete an accurate inventory on each. When the known flood sources have been assessed, the survey can move on to the less hazardous areas.

3. Select stops within delineated flood source areas to be certain that the most dangerous emergency conditions are given the most thorough investigation.

4. Check all potential emergency problem areas that were tentatively identified during the reconnaissance phase of the survey. Note questions that arise for followup with local personnel.

23.3 - Watershed Condition Inventory. The objective of this inventory is to evaluate the effects of the wildfire on the watersheds that could result in destructive flooding or loss of soil productivity.

Essentially, this means identifying the cause of the watershed emergency. The treatment prescriptions will be developed around the findings of this survey to direct treatments at the identified causes. Criteria for assessing emergency condition include:

1. Not all wildfires create emergency watershed conditions, and not every acre of any wildfire contributes to emergency conditions. The mission of the Burned-Area Survey Team is to identify the mosaic land units within the burned area that are potential flood source areas and to evaluate the magnitude of the emergency. The conditions that seem to create the more hazardous emergency watershed situations are:

    a. High-intensity fire, with long residence times.

    b. Site characteristics affected by high-intensity fire, such as the site factors that create water-repellent soils or loss of protective soil cover.

    c. On-site sediments that may be stored upslope of plant root crowns and organic debris, in depressions, and in other places. If the fire consumes the root crown and organic debris, then the sediments are released. If the runoff efficiency is also significantly increased by the fire, then excessive overland runoff can suspend and transport sediments that were temporarily stored on the slopes.

26 - TYPES OF EMERGENCY REHABILITATION TREATMENTS. A variety of treatments are commonly used within a burned-area; generally some form of hillslope treatment (for example, seeding or log terraces) in conjunction with channel treatment (for example, debris clearing and check dams). Treatments should provide the needed level of protection to the entire watershed beginning at the top of the watershed and working downslope.

26.1 - Land Treatments. The primary objective of land treatments within a burned-area is to protect site productivity by lowering the erosion hazard following the fire. Treatments are designed to provide effective ground cover for reducing surface erosion potential and to increase infiltration rates; to control overland runoff, thereby reducing erosion; and to protect

water quality by reducing surface erosion, stabilizing residual ashes, and enhancing infiltration rates within the flood source areas.

1. Surface Stabilization and Protection. These are surface treatments for first-year effectiveness. Treatments include:

    a. Adding mulch to provide immediate protection for the soil surface and to increase the success of revegetation. Mulch reduces moisture loss from a site and helps to moderate surface temperatures while seeded species are becoming established. The rate of straw mulch reaches its optimum effectiveness at about 2,000 pounds per acre.

    b. Spreading limbs and branches of trees and shrubs on a slope (slashing) to provide protection from raindrop impact. If the branches and limbs can be crushed or worked into contact with the soil surface, they will also help break up concentrated surface runoff and reduce erosion.

    c. Creating log terraces by falling trees perpendicular to the slope, limbing them to allow direct contact with the surface of the ground, and backfilling any gaps that exist between the tree stem and the ground. The objective of the treatment is to get the stems of the trees oriented perpendicular to the slope to act as barriers to surface runoff. Base the spacing between successive rows of terraces on the slope and erosion hazard of the site to prevent concentrated runoff.

    d. Constructing hillslope sediment traps using straw bales or wattles laid end to end on the contour of the slope to trap and hold sediments.

    e. Prescribing mechanical earthwork to control runoff. Treatments such as ripping or discing on the contour can be used to increase infiltration.

    f. Prescribing chemical treatments to decrease water repellency. Chemical amendments may have application in limited situations but have generally not proven to be effective for broad application within burned areas.

2. Protection for Emergency Treatments. Prescribe these measures when other emergency treatments require protection to obtain their design effectiveness. Protection measures include:

    a. Temporary fences to exclude livestock.

    b. Road closures and/or explanatory signs to control entry.

26.2 - Channel Treatments.

Grade Control Structures.

Straw Bale Check Dams.

Armoring.

Debris Removal.

26.3 - Road and Trail Treatments. Roads and trails often act as conduits for surface flow. The drainage design of a given road system may not be sufficient to handle the magnitude of flows that will be produced as the result of a fire. Design any treatments of roads and trails to provide adequate drainage for the increased flows to protect water quality, the road, and downstream values. Prescribe treatments that create the least disturbance and have the least cost while providing for adequate drainage. Types of road and trail treatments include:

1. Installation of trash racks or culvert sediment traps.

2. Installation of culvert risers.

3. Ditch construction or enlargement.

4. Construction of cross drains or waterbars, including straw bale waterbars for limited use roads. The center bale can be temporarily removed to provide access, then replaced.

5. Removal of berms.

6. Removal or bypass of existing culverts.

7. Installation of larger culverts in special cases.

8. Armoring of culvert inlets or bridge abutments.

9. Road patrol used in lieu of structural treatments that are more expensive or present significant risk.

26.4 - Structures. Prescribe the design and construction of major structures for treatment of emergency watershed conditions only when all other treatments have been evaluated and shown to be insufficient to reduce the emergency to an acceptable level. Design these structures to provide direct protection to life and property downstream. Generally, this type of treatment has limited applicability for the following reasons:

1. The design of major structures must be prepared by certified, professional engineers and may require State or Federal permits and approval. The minimum acceptable design probability is a 100-year flood.

2. The construction of the structures generally requires several months and may extend well into the "high risk" timeframe associated with the first damage-producing storms.

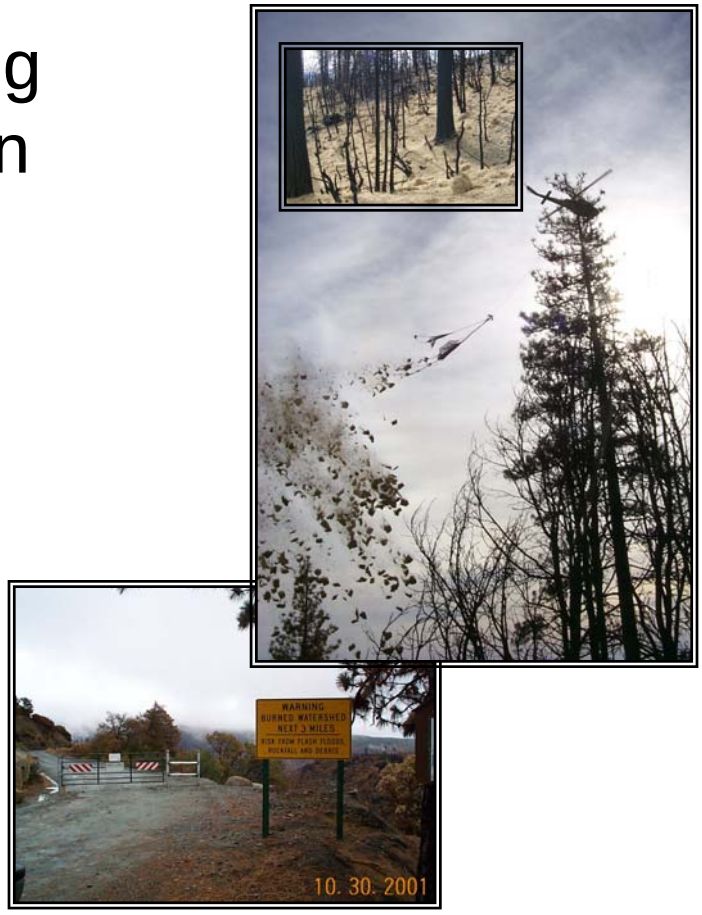
3. While major structures can be constructed using emergency rehabilitation funds, necessary operation and maintenance must be accomplished using appropriated funds.

26.5 - Evaluating Risk. Risk and uncertainty are basic considerations in emergency fire rehabilitation decisions. The line officer must determine acceptable levels of risk and must ensure that selected alternatives meet the specified standards of feasibility and performance. Two basic factors enter into calculating risk.

The first is the percent probability of success desired, which varies with resource and downstream values. The second is the time period, in years, that the activity will be exposed to the risk before satisfactory watershed conditions will be achieved. Alternatives that shorten the exposure period allow a much higher probability of success for a given design storm. Probability of success and period of risk determine the equivalent return period in years for the design storm and associated flow.

BAER TREATMENT IMPLEMENTATION

- ✶ Project Planning
- ✶ Implementation
- ✶ Accounting
- ✶ Reporting



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2509.13,50

51 - PROJECT PLANNING.

51.1 - Project Work Plans. The time constraint imposed on the Emergency Burned-Area Survey Team often does not permit to develop site specific, technically precise treatment prescriptions at the time of the initial funding request. The Implementation Team Leader begins to design final, site-specific treatments as soon as a team is assigned to the project.

If the team identifies the need for different types of treatments or anticipates substantial differences in cost estimates, the team leader must submit a revised Form FS-2500-8, Burned-Area Report.

The Implementation Team Leader shall finalize the design of each emergency treatment and prepare a separate project work plan for each emergency treatment for funding and individual project cost accounting. The project work plans reflect and amplify the information contained on Form FS-2500-8, Burned-Area Report.

51.2 - Revision of Burned-Area Report. During the implementation of emergency treatments, approval for the additional funding must be obtained by submitting an interim Form FS-2500-8, Burned-Area Report, to the Regional Foresters. Regional Foresters (sec. 50.41) can approve updated funding requests within their delegated authority or forward them to the Washington Office, Watershed and Air Management Staff Director, for approval.

51.3 - Coordination. Ensure proper coordination of activities so that the emergency rehabilitation measures do not conflict with the management objectives of other resources such as threatened, endangered, or sensitive species or cultural resources. Complete any required biological evaluations or outside agency consultations in an expedient manner, considering the emergency nature of the burned area rehabilitation needs.

52 - INSTALLATION OF EMERGENCY REHABILITATION MEASURES. The Implementation Team Leader shall utilize available reference material and technically qualified specialists to ensure that emergency measures are located, designed, and constructed to operate properly. Examples of good sources of information for installation of treatment measures are Forest Service equipment development centers and research station publications. However, these publications usually provide technical specifications for land treatment measures under nonemergency situations and should be carefully evaluated before use in emergency rehabilitation conditions.

53 - ACCOUNTING FOR EXPENDITURES. Expenditures for burned-area emergency treatments must conform to fiscal management laws, rules and regulations relative to appropriate usage (FSM 6500). The approved spending authority is issued for the period of time needed to complete treatments.

Unspent funding authority following completion of treatments is withdrawn after submission of the final Form FS-2500-8, Burned-Area Report. Keep accurate cost accounting records of actual expenditures by fiscal year for this report.

55 - ACCOMPLISHMENT REPORTING. The Forest Supervisor reports accomplishments on projects and expenditures of funds under the emergency funding authority by completing part VI of Form FS-2500-8, Burned-Area Report, and submitting it no later than 60 days after completion of planned and funded work. The Regional Forester forwards a copy of the report to the Chief. A short narrative with photographs of each treatment may be included. For selected fires, the Chief may request special interim reports on Form FS-2500-8, Burned-Area Report, for progress on emergency work under way.

56 - MAINTENANCE. In some projects, emergency rehabilitation measures may require maintenance to ensure continuous and effective functioning and to protect the financial investment in the treatment. In these cases, provide adequate maintenance until the conditions specified in the emergency rehabilitation plan are met and the treatment measures are no longer needed. Structures used in rehabilitation may be removed rather than maintained or replaced after they have outlived their design life and after the conditions in the plan are met.

Maintenance and removal of emergency measures shall be funded through the ongoing program planning process, not with emergency rehabilitation funds.

57 - LONG-TERM RECOVERY NEEDS. Long-term recovery measures are those treatments that should be considered in the survey to facilitate the area's attainment of the desired future condition, but are not of an emergency nature. Long-term recovery measures do not qualify for emergency funding authority, but may be considered for accomplishments with regular program funding.

BAER MONITORING

- ✶ Responsibility
- ✶ Conditions to Monitor
- ✶ Project Evaluation

CHAPTER 60 - MONITORING AND EVALUATION

61 - MONITORING.

61.04 - Responsibility. District Rangers are responsible for monitoring conditions on burned-over areas and maintaining rehabilitation measures to keep them functioning as designed and built (FSM 2523.04).

61.1 - Conditions To Be Monitored. As a minimum, examine rehabilitation projects following major storms and runoff seasons, and at least annually until watersheds are stabilized.

Conditions that should be monitored include:

1. The effectiveness and proper functioning of rehabilitation measures, especially road drainage facilities and channel structures.

2. Need for retreatment, maintenance, and removal of temporary structures.

3. Quality and quantity of water leaving the burned area, and the location and causes of problems.

4. Rate of recovery of vegetation.

5. Effects of resource utilization and restoration activities and emergency rehabilitation measures on each other.

62 - PROJECT EVALUATION. In addition to routine monitoring, systematic evaluation may be conducted of various phases of selected burned-area projects and of decisions not to implement emergency treatments. Such evaluations help determine whether expected results have been achieved; whether modifications are needed for the treatments; or if treatments should be implemented where a decision had been made previously not to implement treatment.

APPENDICES

A. KEY BAER WEBSITES

B. SAFETY (SAMPLE JOB HAZARD ANALYSIS)

C. PERSONNEL EQUIPMENT

D. TEAM ACTIVITY CHECKLIST

E. SAMPLE BAER SURVEY TEAM SPECIALIST REPORT FORMAT

APPENDIX A - KEY BAER WEBSITES

1. National BAER Website

http://fsweb.gsc.wo.fs.fed.us/baer

The W.O. BAER website has many useful items that can be referred to, downloaded or copied for the BAER preseason meeting and during BAER Assignments. One of the most useful items is the section of White Papers under the Assessment and Planning tab on the home page. These papers represent policy updates that identify what qualifies and doesn't qualify for funded BAER Treatments, as well as policy statements. Topics covered include noxious weeds, facility repair, fences/barriers, USFWS consultation, hazardous materials, etc.

Many other portions of the website are useful prior to and during BAER assignments. It has links to regional BAER web sites as well as examples of completed 2500-8's and monitoring reports.

2. Remote Sensing Applications Center

http://fsweb.rsac.fs.fed.us

The Remote Sensing Applications Center (RSAC) can provide graphics of fire areas that can significantly help a BAER survey effort.

Contact them at the outset of your BAER effort...it's never to soon to acquire imagery.

They can be contacted by web or by calling or emailing the following persons:

Annette Parsons, BAER/RSAC Liasion
(541) 618-2341 (office)
(541) 941-0838 (cell)
aparsons@fs.fed.us

Andrew Orlemann, Remote Sensing Specialist
(801) 975-3769 (0ffice)
aorlemann@fs.fed.us

APPENDIX B – JOB HAZARD ANALYSIS

FS-6700-7 (3/98)

U.S. Department of Agriculture Forest Service	1. WORK PROJECT/ACTIVITY **Burrned Area Emergency Rehabilitation**	2. LOCATION	3. UNIT
JOB HAZARD ANALYSIS (JHA) References-FSH 6709.11 and -12 (Instructions on Reverse)	4. NAME OF ANALYST	5. JOB TITLE **BAER Survey**	6. DATE PREPARED

7. TASKS/PROCEDURES	8. HAZARDS	9. ABATEMENT ACTIONS Engineering Controls * Substitution * Administrative Controls * PPE
General Field work, monitoring	**General personal safety**	**If going to a remote area alone let someone know specifically where you will be;** **Be sure someone knows you have returned.**
	Sun and hyperthermia	**Carry sunglasses to wear on bright days and in snow to prevent eye sunburn (snow blindness).**
		Use sunscreen to prevent sunburn.
		Drink enough water to keep hydrated and prevent heat exhaustion or heat stroke (at least 2 quarts in summer).
		Pace yourself when climbing steep, open slopes.
	Hypothermia and cold	**Carry extra clothes; wear layers to prevent sweating and subsequent cooling.**
		Bring rain gear, hat, warm gloves with you everyday.
		Use extra caution in stream bottoms to prevent falling in water and hypothermia.
	Giardia and ticks	**Don't drink unfiltered or untreated water from creeks.**
		Check yourself daily for ticks, especially hair.
		Tuck pants into boots, shirt into pants, wear long sleeves.
	Fatigue, carelessness	**Get plenty of sleep at night;** **Be careful and do job right the first time, safely.**
	Trip and fall, eye poking	**Watch for down trees and debris on forest floor.** **Wear goggles when walking in thick, shrubby areas.**
	Crossing creeks	**Watch where you walk in stream, expect rocks to be slippery, don't cross if you feel unsafe.**
		Cross facing upstream so knees don't buckle, use a stick for extra balance.

Field surveys, monitoring	**Steep slopes, Remote worksites**	**Wear vibram soled shoes, with good ankle support.** **Carry a radio, leave itinerary.**
Mapping/Inventory Within Fire Perimeter	**Working within fire perimeter.**	**Wear PPE (Hard Hat, leather boots, NOMEX, fire shelter, goggles, and gloves) at all times. Recognize fires are not controlled. Know your 10 standard fire orders and "watch out" situations.**
	Stump/root holes	**Keep your eyes on path of travel. Stop your travel and complete task if your attention is diverted.**
	Snags/Hazard trees	**Size up your surroundings. Avoid work in areas where hazards exist. Be aware of expected conditions.**
	Slippery footings	**Be aware in areas of wet ash, loose rocks, and unstable slopes.**
	Rattle snakes	**Be aware at all times**
Communication/Coordination with Team Leaders and Suppression Personnel	**Personal Health and Safety**	**Take care of cuts, bruises, and blisters immediately. Report accident to Team Leader and complete accident report.**
	Lightning	**Check weather report, stay off ridge tops and open slopes during lightning storms**
		If stuck in open keep radio and metallic objects away from you, squat down with only feet on ground using insulate pad if possible, keep as much of your body off the ground as possible.
	Falling rocks	**Wear hardhat if in area with loose rocks; don't work directly above another person; be wary of rocks.**
	Heavy brush	**Wear long sleeve shirt; goggles**
	Insect bites	**Wear long sleeve shirt and hat; use repellent at your discretion.**
		Carry anti-histamine and asthma-inhaler for bee stings. If known allergic carry proper medication and instruct coworkers in administration.
		Report your next day's work area to Team Leader by 1800 the previous day In order to be included in next day's shift plan).
	Communication	**Be Sure to check in with Division Sup.Group before entering and leaving fire perimeter.**
Driving	**Vehicle accidents and associated injury**	**Always wear safety belts and make sure everyone else is!** **Keep windows clean and garbage from cab of truck.** **Drive extremely carefully in parking lot.**

Driving, cont.	**Vehicle accidents and associated injury**	**Drive carefully in snow and mud, chain up BEFORE you get stuck. Don't attempt accessing remote areas if conditions are bad**
		Forest roads are narrow, drive defensively, giving yourself enough time and space to react to other drivers.
		Stop and take a break if you feel sleepy while driving, or let someone else drive.
		If possible, remove hazards from roadbed rather than try to drive over or around them.
HELICOPTER OPERATIONS: **1. Approach Departure**	**Rotor and engine exhaust location on different helicopter types pose danger of serious injury.**	**Approach operating helicopter only when instructed to do so by pilot, manager, or helitack personnel. All personnel must receive a briefing on the specific type/model of helicopter before working around that helicopter. Each type/model may have different procedures for approach and departure. Standard Procedure is as follows: 1) Approach from the front or front side of helicopter, in a slight crouch and in clear view of the pilot. 2) Never go near the rear of the helicopter unless instructed to do so (for models without a tail rotor hazard). 3)Allow helitack personnel to carry long objects, or carry them horizontally, low to the ground if authorized to do so. 4)Approach/depart helicopters to/from the downhill side (never uphill).**
2. Loading/Unloading	**Some aircraft components are fragile and easily broken. Improperly entering or exiting helicopter could adversely shift the position or orientation of the helicopter**	**Stay at least 3 feet from aircraft while walking around it. Open/close doors only when and as instructed. Do not straddle the skid or step immediately adjacent to skid. Use only designated handholds to enter or exit--DO NOT PUT ANY WEIGHT ON THE DOOR. Enter and exit the aircraft in a carefully controlled manner to avoid shifting the aircraft position. Remain seated and belted in until directed otherwise. Secure the seatbelt back inside the helicopter upon exiting.**
3. PPE	**Potential for flash fire and Potential for serious head trauma in the event of an accident.**	**For all helicopter flights, PPE must include: Nomex or fire resistant cotton shirt and trousers, Leather or Nomex gloves, Leather boots, *Aviator Flight Helmet*, 2" overlap of all PPE. *NOTE: Firefighters being transported to a managed helispot may substitute a hardhat with chinstrap and earplugs for the aviator flight helmet.**
10. LINE OFFICER SIGNATURE	11. TITLE	12. DATE

JHA Instructions (References-FSH 6709.11 and .12)

The JHA shall identify the location of the work project or activity, the name of employee(s) involved in the process, the date(s) of acknowledgment, and the name of the appropriate line officer approving the JHA. The line officer acknowledges that employees have read and understand the contents, have received the required training, and are qualified to perform the work project or activity.

Blocks 1, 2, 3, 4, 5, and 6: Self-explanatory.

Block 7: Identify all tasks and procedures associated with the work project or activity that have potential to cause injury or illness to personnel and damage to property or material. Include emergency evacuation procedures (EEP).

Block 8: Identify all known or suspect hazards associated with each respective task/procedure listed in block 7. For example:

a. Research past accidents/incidents.

b. Research the Health and Safety Code, FSH 6709.11 or other appropriate literature.

c. Discuss the work project/activity with participants.

d. Observe the work project/activity.

e. A combination of the above.

Block 9: Identify appropriate actions to reduce or eliminate the hazards identified in block 8. Abatement measures listed below are in the order of the preferred abatement method:

a. Engineering Controls (the most desirable method of abatement). For example, ergonomically designed tools, equipment, and furniture.

b. Substitution. For example, switching to high flash point, non-toxic solvents.

c. Administrative Controls. For example, limiting exposure by reducing the work schedule; establishing appropriate procedures and practices.

d. PPE (least desirable method of abatement). For example, using hearing protection when working with or close to portable machines (chain saws, rock drills, and portable water pumps).

e. A combination of the above.

Block 10: The JHA must be reviewed and approved by a line officer. Attach a copy of the JHA as justification for purchase orders when procuring PPE.

Blocks 11 and 12: Self-explanatory.

Emergency Evacuation Instructions (Reference FSH 6709.11)

Work supervisors and crew members are responsible for developing and discussing field emergency evacuation procedures (EEP) and alternatives in the event a person(s) becomes seriously ill or injured at the worksite.

Be prepared to provide the following information:

a. Nature of the accident or injury (avoid using victim's name).
b. Type of assistance needed, if any (ground, air, or water evacuation).
c. Location of accident or injury, best access route into the worksite (road name/number), identifiable ground/air landmarks.
d. Radio frequencies.
e. Contact person.
f. Local hazards to ground vehicles or aviation.
g. Weather conditions (wind speed & direction, visibility, temperature).
h. Topography.
i. Number of individuals to be transported.
j. Estimated weight of individuals for air/water evacuation.

The items listed above serve only as guidelines for the development of emergency evacuation procedures.

JHA and Emergency Evacuation Procedures Acknowledgment

We, the undersigned work leader and crew members, acknowledge participation in the development of this JHA (as applicable) and accompanying emergency evacuation procedures. We have thoroughly discussed and understand the provisions of each of these documents:

SIGNATURE	DATE	SIGNATURE	DATE

APPENDIX C - BAER PERSONNEL EQUIPMENT

SAMPLE
BAER TEAM MEMBER EQUIPMENT CHECKLIST

TRANSPORTATION

4WD VEHICLE – Check to see if you'll need to take one to the fire.

PERSONAL PROTECTIVE EQUIPMENT

NOMEX CLOTHING

LEATHER BOOTS

RADIO

FIRE SHELTER

HARD HAT WITH CHIN STRAP AND GOGGLES

FIRST AID KIT

OBSERVATION EQUIPMENT

CAMERA, BINOCULARS

DOCUMENTATION EQUIPMENT

LAPTOP COMPUTER AND ACCESSORIES

CALCULATOR

FIELD NOTEBOOKS/DATA FORMS/CLIPBOARD/FLAGGING, ETC.

DOCUMENTS

BAER HANDBOOKS AND OTHER REFERENCES RELATIVE TO YOUR RESOURCE

SPECIALTY EQUIPMENT

EACH RESOURCE SHOULD DEVELOP ITS LIST

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APPENDIX D - BAER TEAM ACTIVITY CHECKLIST

This list shows the sequence of events for the entire BAER process – from pre-season meetings to post-project monitoring. While it is intended primarily for team leaders, team members can also use the list to find where their activities fit into the BAER process. The list can serve as a guide for tracking BAER program activities throughout the year.

Leadership Responsibility	***Forest Team Leader***	***Survey Team Leader(s)***	***Implementation Team Leader(s)***	***FSH 2509.13 Section***	***Others Responsible and/or Remarks***
Pre-Incident Planning Meetings	X*			04,13	
Select Forest BAER Team(s)	X			04,11,12	Coordinate with Forest Supervisor
Pre-Season Meeting	X			04.1(1),13	Essential Task
Initial Incident Contact with ICS	X	A**		04,1	Forest Supervisor: Is BAER needed?
Mobilize BAER Survey Team(s)	S***	X		04.(b),1	
BAER Survey Team Orientation	S	X		14	Forest Supervisor or Delegated
ICS Coordination Re: BAER Survey		X		21.1	
Conduct BAER Field Survey	S	X		21,26	For Fire Suppression and Watershed Damage
Prescribe BAER Treatments		X		25	
Cost/Risk Assessment		X		30	
Prepare Initial 2500-8	S	X		41.1	
Present/Select Treatment Strategy	S	X		41.2	Forest Supervisor/District Ranger
Organize/File Baer Documents	S	X		21.2	
Release BAER Survey Team	S	X		04.1(3)a, 04.1(3)b11	
Maintain all BAER Documentation	X			21.2	Per Forest Filing Sustem
Designate BAER Implementation Team	X	A		50	Forest Supervisor Designates
Review BAER Survey Team Treatment Rx		A	X	51	Amend as Needed, Finalize
Procurement			X	54	
Implement BAER Treatments			X	52	
Expenditure Accounting			X	53	Keep Accurate Record
Prepare Interim and Final 2500-8	A		X	51.2,55	
Post-Project BAER Analysis	X	S	S	62	FTL, STL, ITL, Line/Staff, etc.
BAER Monitoring and Maintenance	X	S	S	56,61	District Ranger plus Specialists

*X = Primary responsibility; ** A = Assist; participate with the leader having primary responsibility;
***S = Support; provide information, references, etc.

APPENDIX E - BAER SURVEY SPECIALIST REPORT FORMAT

A BAER specialist report should be clear and concise. The body of the report should be 5 pages or less; use appendices for supporting information. It is important that all specialists use the same format on the fire. The sample below is one that has been used successfully for many years.

Header

Resource Specialty:
Fire Name:
Month and Year:
Author(s) Name and Home unit Name:

Report

I. Potential Values at Risk (identified prior to the on-the-ground survey)

II. Resource Condition Assessment

A. Resource Setting – brief description of your resource in the fire area
B. Findings of the On-The-Ground Survey
   1. Resource condition resulting from the fire
   2. Consequences of the fire on values at risk

II. Emergency Determination – Describe the emergency to your resource caused by the fire. If no emergency, state so and go to Section IV.

III. Treatments to Mitigate the Emergency

A. Treatment Type (including monitoring if applicable)
B. Treatment Objective
C. Treatment Description
D. Treatment Cost

IV. Discussion/Summary/Recommendations – Discuss or summarize as desired.

V. References – Document references used in your analysis

VI. Appendices – Attach materials not in body of report.

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