Burned Area Emergency Rehabilitation

National Park Service Team Leader Field Reference Book

1995

FIRE ORDERS

Fight fire aggressively but provide for safety first
Initiate all action based on current and expected fire behavior.
Recognize current weather conditions and obtain forecasts.
Ensure instructions are given and understood
Obtain current information on fire status.
Remain in communication with crew members. your supervisor, and adjoining forces.
Determine safety zones and escape routes.
Establish lookouts in potentially hazardous situations.
Retain control at all times.
Stay alert, keep calm, think clearly, act decisively.

COMMON DENOMINATORS OF FIRE BEHAVIOR ON TRAGEDY FIRES

- Most incidents happen on the smaller fires or on isolated portions of larger fires.
- Most fires are innocent in appearance before the "flare-ups" or "blow-ups." In some cases, tragedies occur in the mop-up stage.
- Flare-ups generally occur in deceptively light fuels.
- Fires run uphill surprisingly fast in chimneys gullies, and on steep slopes.
- Some suppression tools, such as helicopters or air tankers, can adversely affect fire behavior. The blasts of air from low flying helicopters and air tankers have been known to cause flare-ups.

BURNED AREA EMERGENCY REHABILITATION

Team Leader Field Guide

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BURNED AREA EMERGENCY REHABILITATION

Objective: To initiate actions during and immediately following wildfire which minimize, to the extent practicable:

- Threats to human life and property, onsite and offsite (restore safe visitor use conditions, reduce the movement of soil and debris to watersheds outside affected area, etc.).
- Irreversable loss of cultural/natural resources.
- Unnatural, post fire successional patterns which threaten the potential for reestablishment of a natural system.
- The degree to which recreational values are compromised over the long term (can be especially important in national recreation areas).

Criteria for conducting rehabilitation work in National Park Service areas:

- Actions proposed must be necessary to meet the objectives stated above.
- Proposed treatment measures must be proven effective.
- Proposed treatments must be consistent with long term restoration of the burned area and rehabilitation specifications described in Appendix F, Western Region Wildland Fire Resource Advisors Handbook (1994).

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REMEMBER:

- Requests for the use of long-term, PWE 385 FIRE-PRO Emergency Rehabilitation Funding must be reviewed by the Western Regional Office Branch of Fire Management and approved by NPS-NIFC via the NPS-Western Region Rehabilitation Plan and Accomplishment Report (RA3).

- Rehabilitation efforts initiated through PWE 385 funding must be completed within two full growing seasons following fire occurence.

- Generally speaking, PWE 385 Rehabilitation funding must not be used specifically to restore or upgrade existing pre-fire conditions (even though such conditions may be restored as the minimally acceptable level of post fire mitigation). The specific objective of NPS emergency rehabilitation efforts are to stabilize and prevent unnatural resource degradation and/or restore safe conditions for visitor use. PWE 385 funds may be supplemented with ONPS funds to restore conditions to original specification or to upgrade facilities.

- National Park Service rehabilitation efforts are funded through emergency appropriations, either as a short or long term programs. Actions taken must be of an emergency nature, the scope of which is unaffected by the pre-fire condition.

- The National Park Service BAER authority extends only to federal lands administered by the National Park Service.

BURN REHABILITATION FUNDING AUTHORITIES

- **Annual Appropriations Act for Interior and Related Agencies**

  The National Park Service authority to suppress wildfires, including necessary rehabilitation of suppression caused damages.

  Provides annual authorization to expend funds for Burned Area Emergency Rehabilitation for (preventing unnatural resource degradation or loss and/or to restore conditions safe for visitor use).

  National Park Service appropriations and application of BAER funds may be very different than other Interior agencies and the USFS, despite the fact that the funding source is the same.

- **Agricultural Credit Act, Section 403**

  Funds administered by the Soil Conservation Service for treatment of exigency and nonexigency watershed conditions which threaten life and property. This funding authority is normally to be used only on private lands.

QUALIFYING EXPERIENCE

A minimum of one qualifying experience as a Burned Area Emergency Team Leader Trainee, assigned to a fully qualified Team Leader, is required for full certification. Prior to accepting a Team Leader Trainee assignment, trainees must have served as a BAER team member, in any assigned discipline, on at least one prior fire of high complexity. The certifying team leader must complete the bottom portion of this experience record after the trainee has successfully performed in the shadow assignment.

Trainee Team Leader	Duty Station	Telephone #

Certifying Team Leader	Duty Station	Telephone #

Qualifying Fire Name	Location	Agency	Incident #

Performance Narrative:
(trainee performance & recommendations for improvement)

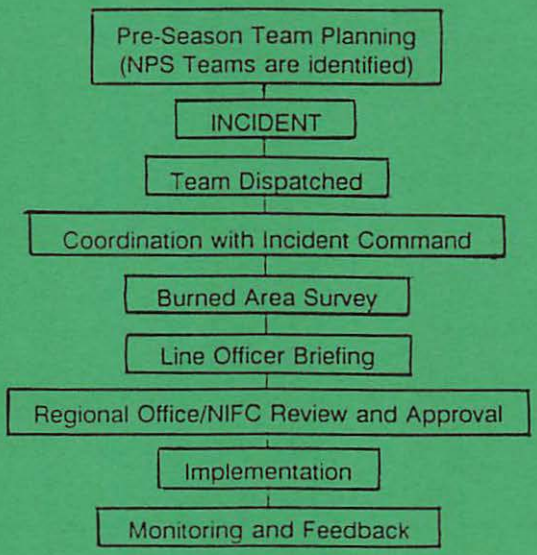
Performance Rating:

Outstanding	Exceeds Satisfactory	Fully Satisfactory	Unsatisfactory

Certifying Team Leader (Signature)	Date	Trainee Team Leader (Signature)	Date

BURNED AREA REHABILITATION PROCESS

Remember: potential emergency conditions exist from the time the incident begins until the time that the treatments have been implemented and become effective. The emergency does not stop when the fire Incident is over.



The diagram above is representative of a simplified flow of events which typically occurs during or following wildfire. There are many possible versions of this scenario, depending on the duration and severity of the incident, the use of Wildland Fire Resource Advisors (WFRA's) and whether or not long term rehabilitation (PWE-385) treatments are prescribed. (See page 16 of the Western Region Wildland Fire Resource Advisors Task Book, 1994).

SAFETY CONSIDERATIONS

- The safety of personnel who are conducting burned area rehabilitation surveys and analysis is the primary concern for the team leader. A Job Hazard Analysis should be completed and reviewed with the team members during each team assignment. A separate Job Hazard Analysis should be prepared for work associated with the long term implementation of rehabilitation prescriptions.

- The team leader is responsible for maintaining close communications with the incident command structure while suppression efforts are still under way.

- All rehabilitation team members should be fully knowledgeable of fire hazards, the status of the fire, hazards associated with the use of aircraft and ground vehicles and the health risks associated with working within a fire perimeter.

- Safety extends to all aspects of the rehabilitation effort... it begins with travel to the incident and ends with travel home.

- All rehabilitation team members must have appropriate safety equipment and clothing to work on the burned area survey. National Park Service BAER Team members must be red-carded, maintaining an arduous physical fitnesses score of 40.

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- Fire rehabilitation members can often choose where and when they work in the burned area. It is generally feasible to schedule survey work in areas which are secure and present less risk to survey teams. Placing team members in positions of risk associated with "live fire" should be avoided when possible. Nevertheless, team members will be "red-carded" in the event that work within active fire perimeter is required.

- NPS BAER team members qualify for hazard pay when they are subjected to risks associated with aircraft or are working within the fire's perimeter, before the fire is declared controlled. Hazard pay for BAER team members will be charged to the incident and not to PWE 385 funds.

- All persons using helicopters should review NWCG Handbook 3 (Fireline Handbook), Chapter 4, on helicopter safety.

- All BAER Team Leaders and members must operate within the standard fire orders and must be able to recognize the 18 "watch out" fire situations.

COORDINATION WITH THE INCIDENT COMMAND SYSTEM ORGANIZATION

The BAER Team Leader must coordinate with the Incident Commander when an Incident Management Team is assuming the management responsibility for the fire. The Incident Team shift briefing is the best opportunity to initially introduce yourself and the Burned-Area Rehabilitation Team. A presentation by the BAER Team Leader should become a regular feature of each shift briefing.

Key positions in the Incident Command organization for contact and coordination include:

- Incident Commander - The BAER team may report directly to Incident Command on small fires.
- Safety Officer - Knowledgeable on safety and operational concerns within fire perimeter.
- Operations Section Chief - In charge of air operations and Division Supervisors. Division Supervisors are the best source of knowledge on fire effects and suppression related impacts.
- Air Operations Director - Supervises helicopter and fixed wing operations.
- Helibase and Helispot Managers - Responsible for aviation safety and operations.
- Planning Section Chief - Has information on fire behavior, incident management, and suppression tactics, personnel availability (including technical specialists and resource advisors), etc. On larger fires managed by a Class I or II Team, the BAER team Leader reports to the Planning Section Chief.
- Logistics Chief - Coordinates ground/air communications.

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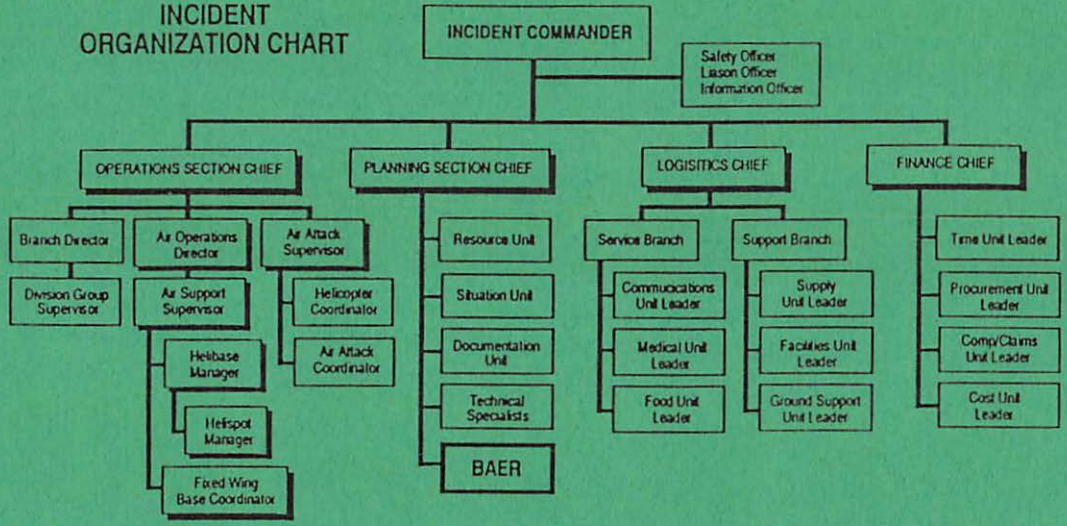
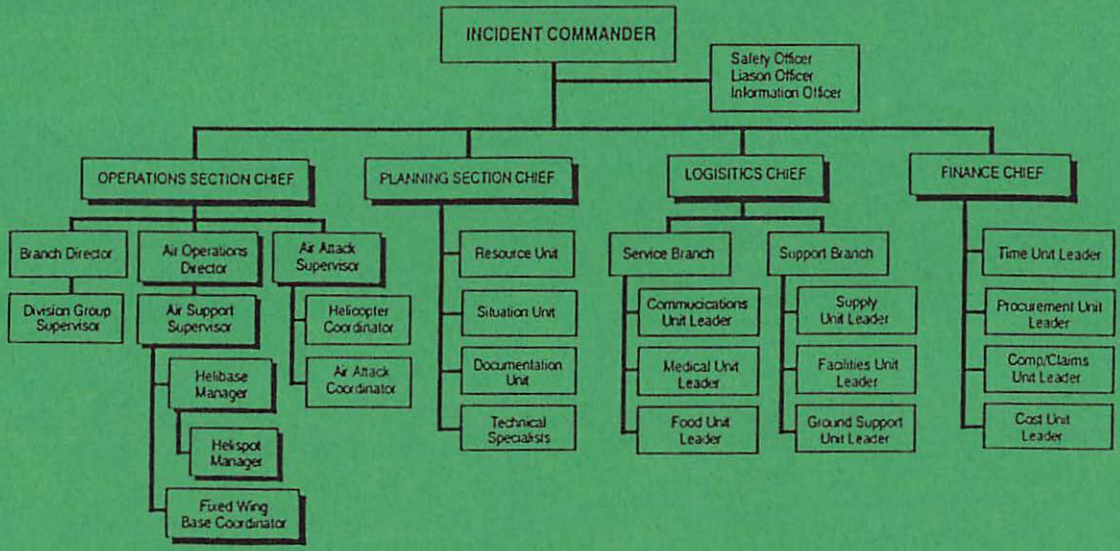
INCIDENT ORGANIZATION CHART



Critical areas to be evaluated for rehabilitation needs include:

- Fire lines (hand and tractor).
- Roads.
- Water sources.
- Camps.
- Heliports and equipment service areas.
- Known T & E species habitat.
- Sensitive watersheds or drainages on or near the boundary of the park, which may extend onto private or other agency lands. If USFS lands are involved in rehabilitation plan (2500-8), all watersheds will be surveyed for post fire losses in site productivity and watershed integrity.

INCIDENT ORGANIZATION CHART



PRE-PLANNING
WHAT TO DO DURING THE "PRE-SEASON"

Team Organization

- Identify team members and obtain advanced supervisory approval for their participation on Regional BAER Teams.

- Hold an organizational meeting for all team members to review objectives, authorities, and procedures of the burned area rehabilitation process. Cover any changes to procedures or report format.

- When appropriate, review burned area rehabilitation efforts from the previous year. Include team function, project implementation and effectiveness in this review.

Coordination

- Coordinate with State and other Federal agencies which are routinely involved in burn rehabilitation efforts (e.g., USFS, SCS, U.S. Fish and Wildlife).

- Coordinate Regional BAER team assignments where applicable.

- Individual Preparation (equipment, training, physical fitness, knowledge).

- Participate in appropriate winter planning meetings.

- Participate in required training sessions. NPS Team Leaders must meet all training requirements and experience levels.

- Become familiar with local and/or regional changes in land use policy, politics, and external threats.

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- Maintain understanding of applicable rehabilitation methods for specific regions, areas or parks.

- Prepare and/or upgrade your personal field kit Appendix B) and gear bag.

- Maintain physical fitness standards and proper conditioning (step test score of 40 for NPS-WR BAER personnel).

Fire Season Readiness

- Keep Fire Dispatch or Fire Management Officer aware of your general schedule and where you can be reached, i.e., telephone numbers, pagers, etc.

- Arrange backup when not available as Team Leader. (Approved alternate team leader).

- Maintain awareness of a worsening local fire condition and/or regional situations.

When Dispatched to an Incident (in order of priority).

- Receive assignment from zone dispatch. Provide dispatch with the names, duty stations, and telephone numbers of team members.

- Request from Dispatch:

  - Fire name.
  - Fire number.
  - Charge code number.
  - Incident order number.
  - Requested arrival time (report to Incident Command).
  - Dispatcher s name/telephone number.

- Logistics Chief's name and telephone number (assigned to fire).
- Receive travel/lodging authorities and approvals from dispatch (request ground transportation and lodging arrangements for Team). Team must arrive at fire camp tegether, as a single resource unit.

- Prepare fax with above information. Fax to all team members, and to the Western Region Office Branch of Fire Management.

- Provide to Dispatch:

  - Team member names, duty stations, and telephone numbers.

  - Team staging time and location. Team Leader should stage team in pre-designated area before transporting to fire camp.

  - Special team needs - computers, aircraft, generators or power, etc.

- Always check in with the Incident Commander first and then the Time Unit Leader. Depending on the size and complexity of the fire, you may be reassigned to the Planning Section Chief. Receive initial briefing and specific assignments.

- Obtain applicable management and safety information including fire behavior forecasts and shift briefing package.

- Perform your team leader assignment:

  - Attend all appropriate shift briefings and conduct subsequent team briefings **(after the morning shift briefing, and before the evening shift briefing).**

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- Complete necessary field reports and forms, including all appropriate sections (Rehabilitation Report - RA3, Fire Time Reports and/or CTA's, Travel Vouchers, Unit Log (ICS 214), etc. (See Appendix A.))

- Perform duties within ICS arena and standards - communicate needs to Incident Commander or Planning Section Chief, not to other section chiefs or fire personnel.

- Review Checklist for Developing Policy and Cost Conscious Emergency Fire Rehabilitation Actions, Appendix F.

- Make professional BAER presentation to Line Officer.

Other Job Performance Considerations.

- During incident, seek opportunities as a BAER Team Leader to provide input to Incident Commander, Planning Section Chief, and/or Resource Advisor on resource impact avoidance strategies.

  - During daily planning or shift briefings via the NPS-WR Daily Resource Assessment Report (RA1), Unit Log (ICS-214), copies of field notes/observations, etc.

  - During revisions and resubmissions of the Escaped Fire Situation Analysis.

- Manage your time effectively. Develop a team work-schedule to allow for prompt reporting and free time. Keep the Planning Section Chief aware of your schedule.

- Select appropriate working and sleeping area for Team (near facilities but away from noise and general firefighter population in camp).

- Make sure you get regular and scheduled rest. The integrity of your observations, calculations and reports depends on proper rest.

- Stay neat and organized. Your ability to do so will be reflected in your reports and the products/efforts of the Team as a whole. Use laptop/PC version of RA-3. The NPS RA-3 must be typed.

- Know and respect your physical and mental limitations as well as the limitations of team members.

- Maintain a positive and professional attitude. This is especially important in establishing a line of communication with fire overhead.

- Recommend and/or review strategy and tactics for the control of the fire and to reduce impact on resources. Coordinate and consult with the Wildland Fire Resource Advisor (if assigned to fire).

- BAER Team Leader Field Kit - Keep your equipment in proper working condition. The equipment that a BAER Team Leader can take to a fire is limited. If you drive to the fire more can be taken. You are limited to 55 pounds of personal gear and your BAER Team Leader Kit (when dispatched by air). The BAER Team Leader Kit should contain equipment that can be carried in a 16" X 14" leather briefcase, available from GSA. Each Team Leader develops individual preference for kit contents.

- Maintain proper working understanding of basic ICS forms, especially ICS 214 (Unit Log).

- Communicate effectively with all fire personnel, especially when using radio. Make sure you understand call signs, appropriate channel and net use. Stay off inappropriate channels or frequencies and keep messages short. Make sure IC and/or Planning Section Chief knows your schedule for each day, and your whereabouts on the fire - especially while working within "hot line".

WHAT REHABILITATION TEAM MEMBERS SHOULD BRING TO THE REHABILITATION ASSIGNMENT

- FFS red pack and webb gear.
- Fire pants, shirt, and fire shelter.
- Hard hat w/chin strap(fire certified/plastic)/nightlight
- Gloves.
- Leather boots. KNOW YOUR BOOTS!
- Goggles.
- Canteen.
- Camera.
- First aid kit.
- Vehicle. (if applicable)
- Tile spade or shovel.
- Clinometer.
- Water bottles for testing water repellency.
- Clipboard / tatum / notepad / forms.
- Binoculars (optional).
- Pocket stereoscope.
- Loggers and D-Tapes.
- Compass.
- Cruiser Vest or pack.
- Calculator.
- Pens / pencils / grease pens / paper.
- Appropriate forms (RA3/ICS 214/CTR's/Field PO's, etc.).Wildland Fire Resource Advisors Handbook, 1994
- Flashlight.
- Sleeping bag/ground cloth (try to inform team members of when bag will be necessary or if paper bags are available)

JOB QUALIFICATIONS

The following list of qualifications, skills, knowledge, and experience are the minimum job qualifications for the position of NPS Burned Area Emergency Rehabilitation Team Leader (Western Region).

Resource Management Knowledge:

- Ability to acquire knowledge of local politics (local community; county; interagency) and land use plans (e.g., NPS General Management Plans, and Fire Management Plans).

- Ability to acquire knowledge of the area (topographic features, vegetation types), critical areas, types of visitors/inhabitants, improvements, roads, etc.

- Basic understanding of the potential effects of wildland fire on natural and cultural resources.

- Basic knowledge of fire suppression impacts on natural and cultural resources.

Fire Management:

- Completion of the following training courses is required.

  1. S-130, Basic Fire Fighter.
  2. S-190, Introduction to Fire Behavior.
  3. S-270, Fire Business Management.
  4. S-390, Intermediate Fire Behavior.
  5. I-220, Basic Incident Command System.
  6. I-244, Field Observer.
  7. RX-93, Fire Effects (NPS/BLM) or equivalent.

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8. Fire in Ecosystem Management (NARTC), or equivalent.
9. Burned Area Emergency Rehabilitation (NARTC).

Physical:

- Meet minimum physical requirements. Step test score of 40 (**Red Card required**).

General:

- Knowledge and experience in NPS guidelines, natural and cultural resource management policies (NPS-77), including mitigation and protection measures.
- Oral and written communication skills.

Qualifying Experience:

- Qualifying experience will consist of one satisfactory trainee assignment (see qualifying experience record, Section II of this field guide).

SURVEY TEAM ORGANIZATION

- Management Requirements: the line officer will provide a briefing of specific management concerns and requirements associated with the fire rehabilitation process.

- Team Formation: make sure that the needed skills are represented on the team. Keep the teams small and efficient...use only those skills needed to address the situation. NPS-WR Teams must maintain "core" membership for all incidents.

- Coordinate with other agencies and landowners as needed. Consider making representatives from other agencies part of the rehabilitation team.

- Brief the rehabilitation team. Explain authorities, objectives, and management concerns. Cover timeframes, internal coordination, communications, record and time keeping, and SAFETY. Assure that hazard pay and overtime authorizations are approved when appropriate. BE VERY SPECIFIC when addressing your expectations from each team member.

- Logistical Concerns.

  - Radios.

  - Flight needs and schedules (SAFETY).

  - Vehicles and movement within the fire perimeter.

  - Motels, spike camps, food.

  - Clothing: Nomex, boots, hardhats, gloves.

  - Supplies: GIS, maps, photos, other management plans/supporting documentation, notepads, etc.

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- Coordinate with contracting authorities in park and Western Regional Office.
- Establish accounting procedures or receive accounting instructions from the park/fire organizations.
- Provide for frequent line officer or "line officer rep" updates.
- Fire park should execute the necessary travel authorization for requested team members.

LINE OFFICER BRIEFING

After completing the burned area survey, the team leader must make a Line Officer briefing. This briefing must provide sufficient information and detail for decision making.

The objectives of the Line Officer briefing are:

*Provide information about emergency conditions created by the fire.

*Provide an assessment of the environmental, social and economic damage and rehabilitation needs.

*Provide recommendations for specific treatment of the burned area.

*Provide a description of the probability of treatment success and the timing of treatment efficiency.

The briefing should be efficient and thorough. Encourage questions about treatments and rehabilitation assumptions. Make sure that resource values and probabilities of success and failure are clear to the Line Officer. Thoroughly discuss the idea of a "fall back" strategy and the potential for funding the "fall back" plan if a primary treatment fails. Make sure the Line Officer knows:

*What the emergency is.

*What the prescribed treatment(s) are and who will perform each treatment.

*What each treatment will cost.

*How successful you expect the treatment(s) to be.

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*What should be done if the recommended treatment fails.

*What types of long-term monitoring will be required and the associated commitment of park staff.

*What will be funded via PWE 382 and 385 sources. Specify the opportunity to spend ONPS dollars to restore pre-fire conditions or to upgrade facilities.

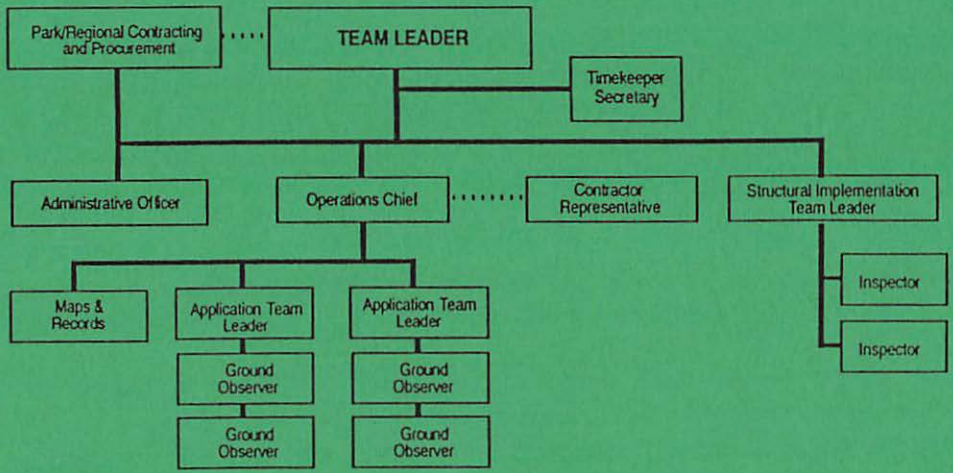
Whenever possible, Line Officer briefing should be done in the presence of IC and the park resources management staff/ wildland fire resource advisor; both must review and support the final BAER plan (must sign form RA-3 as reviewers). Also, IC will be in a better position to direct Division supervisors/crew bosses in relation to short term rehabilitation needs (suppression impacts).

PROJECT OPERATIONS PLAN

The following is a sample outline of a Project Operations Plan for implementation of long term, major rehabilitation treatments on a large fire.

- Introduction.
- Project objectives.
- Descriptions of the project area.
- Project organization.
  - Organizational chart.
  - Position descriptions.
- Communications and dispatch.
- Air operations.
  - Typical operations day.
  - Weather conditions required.
  - Reports and record keeping.
  - Monitoring and accepting seed application.
- Structural implementation.
  - Typical operations day.
  - Contract specifications.
  - Reports and record keeping.
  - Final acceptance and approval.
- Administration.
  - Budgeting and accounting.
  - T&A's.
  - Travel and per diem.
- Liason.
  - Within the Forest Service.
  - Other Federal and State agencies.
- Public information.
- Project Safety.

Implementation Team Organization



FLAGGING USE FOR RESOURCE PROTECTION AND REHABILITATION PLANNING

DURING SUPPRESSION (AREAS TO BE AVOIDED):

Resource	Flagging Color
• Sensitive flora/fauna populations and/or habitat.	Chartruse/lime green
• Cultural Sites (including archeological/historical)	Florescent Pink
• Install Fireline (used by hotshots Division Supervisors).	Orange

POST-FIRE REHABILITATION:

Resource	Flagging Color
• Sensitive flora/fauna population and/or habitat survey required).	Chartruse/lime green
• Cultural Sites (survey required).	Florescent Pink
• Line rehabilitation required.	Orange/White stripe
• Hazard Trees (to be felled).	Yellow (use paint on base)
• Perimeter marking (boundary for any area treatment).	Black/white stripe
• Stream Course stabilization required.	Blue
• Install waterbars or erosion control devise (as specified in plan).	Red
• Construct stream course stabilization structure.	Blue/white
• Other rehabilitation needs as specified in plan.	Orange/black stripe

BAER TEAM LEADER'S ASSIGNMENT CHECKLIST

Before Dispatch:

_____ Do you have your BAER Team Leader Kit?

_____ Do you have your personal gear?

_____ Have you obtained all necessary dispatch information?

_____ Have you contacted WFRA or Resources Specialist in receiving (fire) park to discuss the availability of site specific planning data and support needs?

_____ Have you acquired ground transportation and working facilities for TEAM?

On Site:

_____ Have you checked in with IC and/or Planning Sections Chief?

_____ Have you checked in with Time Recorder?

_____ Have you received initial briefing - i.e., fire behavior and weather, location, size, perimeter, fuel type, available resources, etc. Specifically request information relative to suppression impacts/tactics (see Shift Incident Action Plan).

_____ Identify priority areas to be surveyed (convey to IC). — RESAI Email

_____ Gather recon information relative to suppression impacts from Division Supervisors.

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BAER TEAM LEADER'S ASSIGNMENT CHECKLIST (Con't)

_____ Maintain Unit Log (ICS 214).

_____ Turn in CTR's each operational period.

_____ Maintain integrity of Team work and sleeping environment.

_____ Ensure that Team has necessary field support, transportation, communications, food, water, etc.

_____ COORDINATE DEVELOPMENT OF BAER PLAN - PROVIDE SOUND LEADERSHIP AND BE DECISIVE!!

------- Prepare press briefings or manage team exposure to press through the Fire Information Officer assigned to incident.

<u>During/After Demobilization</u>:

_____ Ensure distribution of BAER plan to necessary parties.

_____ Distribute firetime reports to all Team members; ensure accurateness and resolve all discripencies <u>before leaving fire camp</u>.

_____ Complete team member ratings and forward to appropriate supervisors.

_____ Complete travel voucher, and submit firetime report.

BAER TEAM LEADER'S ASSIGNMENT CHECKLIST (Con't)

_____ Contact Regional FMO relative to attendance at required post-fire review.

_____ Respond to post-fire inquiries relative to the BAER plan, In writing, as soon as possible - (funding and project implementation may be delayed otherwise.)

PHONE LIST BAER CONTACT

SOURCE	DUTY STATION	TELEPHONE NUMBER
NPS-NIFC Financial Analyst: Steve Botti	NPS-NIFC	(208) 387-5210
NPS-BAER Program Coordinator: Tom Gavin	NPS-VOTR	(619) 367-3523 (619) 366-2338 H
Regional FMO:		
Regional Dispatch Office:		
Interagency BAER Contacts: USFS: BLM: BIA USFWS: SCS: STATE: OTHER:		

BURNED AREA EMERGENCY REHABILITATION VIABLE TREATMENTS

NPS-WR FORM RA3, APPENDIX E:

NPS - WESTERN REGION FIRE REHABILITATION SPECIFICATIONS

The Western Region Wildland Fire Rehabilitation specifications were adopted as Western Regional Policy in accordance with the Western Regional Director's approval of the Task Book and the memorandum dated May 1, 1992, file code Y18, subject: Western Region Wildland Fire Resource Advisors Task Book. In some cases, the policies expressed are more detailed and/or stringent than Service-wide policy; but, in all cases these policies meet the established NPS-18 requirements (1990 revision) found in Section IV, Chapter 1, pages 16-18. Policies have been developed primarily as FIREPRO funding constraints. Rehabilitation specifications outside the limits of these specifications may be proposed by BAER Teams but must designated as not eligible for FIREPRO funding.

CRITERIA FOR DETERMINING WHETHER OR NOT REHABILITATION IS NECESSARY:

1. **RESOURCES AT RISK:** Most fire located in flat or gently sloping terrain may not require rehabilitation. If there is the potential for irreversible loss of resources (i.e. threatened or endangered species, documented cultural sites, etc.) or suppression actions result in significant soil disturbance in burned areas (i.e., line cut through meadows, numerous cut stumps) rehabilitation must be considered to restore natural conditions.

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2. SAFETY AND COST-EFFECTIVENESS: Consider the real need for rehabilitation. Is there potential for loss of life or property if burned area is not rehabilitated? Consider also whether or not rehabilitation can be done safely. For example, if crews must be flown into unimproved landing zones for rehabilitation, the safety risks must be weighed.

3. POTENTIAL FOR ADDITIONAL IMPACTS: Will initiation of rehabilitation plan result in additional impacts to resources which would out-weigh potential benefits. For example, if a full 20-person crew is used, will they create impacts which could expose archeological sites?

NOTE: All three of these criteria should be considered together. For example, if a .2 acre fire is near a road and can be easily approached, the line should be rehabilitated. However, it may not be reasonable to rehabilitate a .2 acre fire 20 miles from a road (requires a flight and possibly additional impacts).

The following set of specifications must be adhered to when carrying out emergency rehabilitation actions funded by wildfire suppression and emergency wildfire rehabilitation accounts (currently PWE 382 and 385). IN ORDER TO USE SUPPRESSION FUNDS FOR SHORT-TERM REHABILITATION, PARKS MUST FIRST PREPARE AND OBTAIN SUPERINTENDENT'S APPROVAL OF A REHABILITATION PLAN AND ACCOMPLISHMENT REPORT, AS LISTED IN APPENDIX A. IN ORDER TO USE EMERGENCY FUNDS FOR LONG-TERM REHABILITATION, THE SAME PLAN FORMAT MUST BE USED. WITH ADDITIONAL REGIONAL AND NATIONAL APPROVALS REQUIRED. Only proposed rehabilitation projects which utilize PWE 385 funding need plan review or approval by the regional office and NIFC.

Natural Resources Rehabilitation Measures

N1. Reseeding.

All reseeding with non-native stock is prohibited unless activity occurs within a developed zone specified in the park General Management Plan or along major, paved road corridors in the park. Reseeding will be done only for purposes of protecting life and property or for preventing the loss of unreplaceable resources (T & E species, sensitive/unique flora/fauna populations or habitat, etc.). Specific park legislation may also provide specific justification for protecting soil and/or watershed values (i.e. Redwood National Park). Reseeding specifications for rehabilitation purposes must be specifically approved in the park's approved Natural Resources Management Plan. Parks without specifically approved plans must submit reseeding proposals in accordance with the Western Region Research Proposal Guidelines and Format and attached to WR Form RA3.

N2. Landscaping/Revegetation.

All landscaping is prohibited unless activity occurs within a developed zone specified in the park General Management Plan. A separate landscaping plan must be included as an attachment to the NPS Western Region Rehabilitation Plan and Accomplishment Report and must be developed in accordance with the Western Region Revegetation Rehabilitation Handbook (Draft, 1991).

Revegetation efforts in undeveloped areas may be approved to encourage or initiate natural revegetation processes in areas specifically impacted by fire suppression tactics.

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N3. Mulch.

Only formally certified seed-free straw, rice straw or tree bark is permitted for use, not to exceed a range of 2000-6000 lbs./acre. Uncertified straw may be used as a last resort in developed areas but areas must be monitored post - rehabilitation for invasion of noxious and alien species.

N4. Soil Netting.

Biodegradable soil netting is permitted only on slopes in excess of 50 percent and following approval by the Chief, Branch of Fire Management, Western Region, of specifications and manufacturer information. Parks are not encouraged to routinely use this material to facilitate the rehabilitation process.

N5. Check Dams (in-channel structures) and Debris Basins.

The primary objective for the installation of check dams is to trap sediment that could be mobilized, causing landslides and flash floods in developed zones. Generally speaking, check dams will be installed only on highly sensitive soils on intensively burned areas in park developed zones defined specifically in the park General Management Plan. Only log, loose rock or straw bale check dams will be constructed with the use of emergency rehabilitation funding. The use of logs or rocks in check dam construction must be specifically approved in the NPS-Western Region Rehabilitation Plan. A detailed set of specifications, specifying frequency and procedures for installing check dams, is maintained in the office of the Regional Forester, Western Regional Office. In non-developed zones, check dams may be installed to protect protected species or to prevent debris flows from leaving the park and causing subsequent damage on private/other agency lands.

Debris basins may be installed where increased debris flow could impact human lives or property, including streams. Building specifications are dependent on the availability of local natural materials and access although rock gabin structures are preferred. Long term maintenance of these structures must be specifically addressed in the WR Rehabilitation Plan and Accomplishment Report (RA3), Part G.

N6. Stream Stabilization.

Streams may be restored using emergency rehabilitation funds, primarily to excavate fill pushed into channels during suppression tactics and ordinary collapse following exposure of stream banks; such material will be placed back onto the cut slopes from which it came. The channel will be reshaped to match the pre-existing stream valley form and channel gradient. Nearby natural duff and litter will be scattered onto the side slopes to help reduce surface erosion. All other debris placed into stream courses as a result of suppression actions will be removed, including felled trees. See N5 for check dam information and the following guidelines pertaining to removal of stream debris. Riparian areas are inherently fragile, and resource advisors should be particularly alert for proposed control oriented suppression actions in such areas.

STREAM DEBRIS[1] REMOVAL KEY AND GUIDELINES

A. When is it necessary to consider the removal of debris from stream channels, the following removal key can be used. (Use as a dichotomous key starting with couplet 1):

1. a. Debris anchored or buried in the streambed or bank at one or both ends or along the upstream face - LEAVE.
   b. Debris not anchored - 2.
2. a. Debris longer than 30 feet - LEAVE.
   b. Debris shorter than 30 feet - 3.
3. a. Debris greater than 18 inches in diameter - 4.
   b. Debris less than 18 inches in diameter - 5.
4. a. Debris longer than 15 feet - LEAVE.
   b. Debris shorter than 15 feet - 5.
5. a. Debris braced on downstream side by boulders, bedrock outcrops, or stable pieces of debris - LEAVE.
   b. Debris not braced on downstream side - REMOVE.

B. Debris Removal Guidelines to be considered in addition to the specifications in the key above.

1. Use the key above visualizing condition during bankful stream flow (indicated high water level[2]) and consider whether the orientation of debris effect streamflow, destabilizing bank and hill slope above.

2. Remove (a) all fresh (recently dropped) limbs and logs, and (b) all other debris that is greater than 6 inches in diameter and/or greater than 3 feet long from the indicated high water level.

3. Remove debris to a location that is above the indicated high water level. On steep slopes try to (a) lay as much of the debris as possible parallel to the

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slope (b) secure the debris against sliding back into the channel (i.e., place behind trees, rocks, etc. or dig downslope end into slope) (c) Remove from stream and burn.

4. In areas where the debris must be removed onto steep slopes, (a) use guideline #3 above, and (b) remove as much debris as possible and buck the remainder into 2-3 foot lengths.

5. Where a once anchored log has been weakened by fire to the point where it could potentially be broken into smaller pieces by high flows, remove it.

6. Because of their brittleness, remove all cedar logs of less than 18 inch diameter (measured near its base). This includes anchored logs and logs longer than 30 feet, but does not include logs well anchored in established log jams.

7. Except cedar (see guideline #6 above), remove all limbs and tops from fresh (recently dropped) trees that are anchored at their base and longer than 30 feet. The tree trunk can remain.

8. All individuals who work in the water must wear heavy-duty waders with non-slip (felt) soles.

9. SAFETY FIRST. If in doubt about a worker's safety, do not remove the debris.

[1]**Debris** - includes only woody material.

[2]**Indicated High Water Level** - Shown on the channel banks by cleaned (scoured) rocks below and accumulated soil and debris above.

N7. Fence.

A detailed set of approved fence specification is kept on file in the office the Regional Forester, Western Region. Fencing proposed within the NPS-Western Region Fire Rehabilitation Plan must be specifically approved by the Regional Forest/Range Conservationist. Only temporary fence will be built with FIREPRO funds (new construction). Proposals will address minimum specifications required to restrict the movement of domestic livestock or feral animals for a period not to exceed one year. These funds may be supplemented with NPS funds to restore fence to original specifications and condition. Electrical fence may be constructed to restrict cattle movement over the short term in frontcountry areas. Aesthetic or drift fencing will not be replaced with emergency rehabilitation funding. FIREPRO will pay only for the installation and not the eventual removal of temporary fence. FIREPRO will also fund the replacement of barbed wire or original fence posts when new fence construction is not required.

N8. Trail Stabilization.

Trails will be rehabilitated and/or stabilized to its pre-fire standard or to staisfy all the requirements for resource protection in and along the trail. The rehabilitation of any trail to a standard above its pre-fire standard is strictly prohibited.

Appropriate trail rehabilitation measures which may be funded with emergency rehabilitation funds include the following:

1. Removal of newly constructed fire access after the fire is controlled;

2. Clearance of downed timber or other obstructions which may create post-fire safety hazards;

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3. For safety reasons, rehabilitation of the grade and shape of water bars damaged or removed during fire. The following minimum standards are guidelines to use when installing new or replacing water bars:

TRAIL / FIRELINE GRADIENT	SPACING OF WATER BARS	
	ERODIBILITY OF SOIL ON FIRELINE	
	MEDIUM (M)	HIGH (H)
Less than 15%	200'	150'
15 to 30%	100'	75'
30 to 45%	65'	50'
Steeper than 45%	30'	25'

* WATER BARS SHALL BE PUT IN BY HAND (*NO BULLDOZERS* on handlines).

* THESE ARE MINIMUM STANDARDS AND ARE NOT INTENDED TO RESTRICT THE IMPLEMENTATION OF MORE WATER BARS IF THE NEED IS JUSTIFIED AND APPROVED IN THE PLAN.

General interpretive or location signs displayed along trail routes and destroyed or damages by fire will not be replaced with emergency rehabilitation funds unless such signs are required for visitor safety (keep visitors from getting lost). Signs which pertain to an emergency trail closure directly related to the fire, safety information related to continuing fire activity or deteriorating trail conditions related to suppression activities may be purchased and constructed with emergency rehabilitation funds.

N9. **Road/Fireline and Disturbed Site Rehabilitation**

Firelines, fireroads, helispots, staging areas, etc. placed in once undisturbed wild areas represent some of the most notable suppression impacts. Such disturbances, created as a result of a fire suppression tactic, qualify for FIREPRO rehabilitation funding.

Hand fireline generally is constructed to a width of two to four feet, dug to mineral soil and vegetation cleared about six to ten feet beyond the line. The line is usually reinforced by burnout. Cup trenching and ditches are also constructed to catch rolling embers and burning debris from going beyond the line. Once the line is dug, it is used as a walking trail for the duration of the fire.

Handline:

Most handline removal should normally be completed as part of short term rehabilitation. The basic techniques in recontouring hand fireline are similar to bulldozer work, but on a smaller scale. Hand firelines result in less locally severe impacts, but usually cover much larger distances. Complete removal of handlines will be completed by using hand tools to recontour the fireline to blend in with the surrounding topography. Cup trenching and ditches which were constructed will be completely obliterated by knocking in the ridge and shaping this fill to match the surrounding terrain. In situations where handlines have been cut down steep slopes, the bare mineral soil will be scarified on contour, or horizontally. Significantly compacted areas will also be scarified. Berms containing top soil, duff, and slash shall be raked back over the newly recontoured fireline to a depth of two to four inches. This final organic layer will improve water infiltration and provide protection for germinating seedlings. Slash scattered over the final organic

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layer will be in a radom manner, by feathering the edge to eliminate the appearance of a straight line disturbance. Rocks from berms will be scattered, keeping exposed, lichen-covered or weathered sides up. Whenever possible, hand firelines will have permanent photo points established to document conditions of the lines prior to rehabilitation, during rhabilitation work and after restoration work has been completed. Photos and video tapes may also be taken during subsequent years to monitor the success of the restoration.

MINIMUM STANDARDS - REHABILITATION OF FIRELINES:

Flat or Gentle Sloping Terrain (0 - 14 % slopes):

1. Recontour line by pulling soil, litter, duff and rocks back over line.
2. Remove/recontour trenches.
3. Scatter piles of slash near and over line.
4. Flush cut stumps.

Moderately Sloping Terrain (15 - 29 % slopes):

1. Recontour line to match surrounding terrain.
2. Remove/recontour trenches.
3. Pull litter, duff, and rocks back over line.
4. Scatter piles of slash near and over line.
5. Flush cut stumps but leave a few to anchor debris.

Steeply Sloping Terrain (> 29 % slopes):

1. Rake along contour to create small, shallow trenches across fall line.
2. Recontour line to match surrounding terrain.
3. Remove/recontour trenches.
4. Pull 2 - 4" of litter and duff back over line.
5. Place rock (with previously exposed, lichen-side up) and logs randomly on fall line to intercept surface runoff.
6. Scatter piles of adjacent slash near and over line.
7. Flush cut stumps but leave a few to anchor debris.

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Dozer line:

Dozer line removal is usually a long term rehabilitation activity. All dozer firelines are usually created using either a bulldozer or front-end loader. The equipment of choice for complete obliteration of these firelines is a hydraulic track mounted excavator. The maneuverability of this machine and the ability to recontour with minimal additional ground disturbance makes it the ideal machine for complete fireline restoration work. A medium-sized (1.5 cubic yard bucket capacity) excavator will be used on all the dozer firelines. The excavator will also have a clamp attachment on the bucket to help increase the efficiency of retrieving brush, duff, and litter and placing it back onto the finished outslope areas.

In areas where the dozer fireline traversed across a slope creating cuts and fills, the rehabilitation prescription in these areas is to retrieve the fill and place it against the cut slope, and shape the newly outsloped areas to mimic the natural surrounding topography. Before fill is placed against the cut slope, the compacted cut areas will be decompacted (ripped) to a depth of 6 inches using the bucket teeth on the excavator. This will return the natural infiltration process to the area. Once the area has been completely decompacted and recontoured, unburned brush which was cut and pushed to the outside berm to create the fireline will be placed back onto these newly outsloped areas as a natural mulch to reduce surface erosion and provide for a better seedbed for natural regeneration of native plants to the area. In areas where the line crosses boulder fields,boulders will be placed back onto the outsloping to recreate the natural appearance that existed prior to the fireline construction.

Dozer firelines which are constructed on ridge tops will also be completely obliterated using the hydraulic excavator. All surfaces will first be decompacted. Once again, brush, litter, and logs will be placed onto the newly shaped slopes to provide natural mulch which will reduce surface erosion. Safety zones will also be decompacted, recontoured if necessary, and mulched with the natural brush, duff and logs. In areas where logs or waterbars are placed back onto the finished slope, care will be taken in their placement so as to not concentrate sheet wash and thus create unnatural surface erosion. Also, logs will only be partially placed onto the recontoured firelines in a manner so they do not give the appearance of an unnatural linear feature across the landscape.

N10. Protection of Threatened and Endangered Species

This activity involves the documentation of immediate post-fire effects on Threatened, Endangered, and sensitive species and actions to prevent further recovery of formally designated critical habitat and potential adverse impacts of specific suppression actions within potential (unsurveyed) critical habitat. It does not include development and implementation of long term recovery plans but may include costs associated with immediate consultation of recovery team members or further compliance with recovery plans. Rehabilitation actions cannot extend beyond two summer growing seasons.

Cultural Resources Rehabilitation Measures

The goals of these measures are to protect historical and archeological resources from adverse effects during wildland fire, suppression and rehabilitation projects as much as possible, and to meet legal requirements. The following are activities which may be paid with fire funds:

C1. Cultural Resource Damage Assessment (including archeological), Compliance and Rehabilitation

1. Archeological damage assessment, in previously documented archeological sites, are mandatory during the rehabilitation phase for the following areas impacted by fire or fire suppression activities:

   - fire camps and staging areas;
   - dozer lines;
   - handlines;
   - spot assessment of each known site, to include materials exposed by fire suppression activities.

   A 100 percent cultural resource damage assessment (archeological) of the above items is appropriate and is defined as the systematic location and documentation of sites and artifacts in areas disturbed by suppression activity or with the potential to be impacted by rehabilitation activities in these areas. Impacted sites must be fully recorded and mapped according to Archeology and Historic Preservation, Secretary of the Interior's Standards and Guidelines (Federal Register, Vol. 48, No. 190, September 29, 1983, pp. 44716-44740). A survey of sites or burned areas not meeting the above criteria (e.g., a 100 percent survey of the entire fire area) for any affected cultural resource cannot be carried out with emergency wildfire rehabilitation funds.

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Work funded under a specific archeological damage assessment/cultural resource damage assessment must be carried out with PWE 382 funds as part of suppression effort and within 60 days after the fire is declared controlled, unless a specific time waiver is approved by NIFC.

2. Fire Specific Cultural Resources and Archeological Compliance: The BAER archeologist should contact the pertinent cultural resource staff person prior to finalizing the rehabilitation plan if cultural resource sites have been or will be impacted. This will stream line subsequent Section 106 consultation. For compliance on a regional or national scale, programmatic memorandums of agreement are appropriate (e.g. 1990 Programmatic Memorandum of Agreement between NPS, the Advisory Council on Historic Preservation and the National Association of State Historic Preservation Officers). Furthermore, emergency wildfire rehabilitation funds cannot normally be used for salary and support costs associated with initial consultation with the Advisory Council on Historic Preservation and the State Historic Preservation Office in relation to the preparation of documentation required to implement Section 106, 110 and others of the National Historic Preservation Act as amended (in the absence of a specific Programmatic Memorandum of Agreement for the appropriate fire management function, a separate 106 process must be undertaken for each fire). The only exception will be when normal staff is unavailable to fulfill this function, and only in relation to compliance for the emergency rehabilitation actions carried out under the provisions in C1, number 1, listed above. Archeological compliance is required by law if ground disturbance will occur during any project on Federal lands. When wildfires threaten life and/or property values, it is not required that an archeological survey be completed and available prior to locating emergency staging areas or firelines.

3. General Rehabilitation/Preservation Techniques for Sites (pending cultural/archeological compliance):

   A. While a wide range of rehabilitation options, ranging from no action to full excavation may be warranted and eventually funded with FIRE-PRO Emergency Rehabilitation Funding, actions in addition to those listed below must be specifically listed in Form WR RA3 and must be based on damage caused by the fire or the suppression of the fire and approved by the Western Regional Archeologist and NIFC. In the instance of excavation, the cultural resource assessment must demonstrate that subsurface damage has occurred and that it is impossible to stabilize or preserve the site without this activity or further data recovery. Known archeological sites damaged by handline, dozer line, staging areas and fire camps always require a complete evaluation and damage assessment.

      The following site stabilization procedures are appropriate and may be carried out utilizing suppression (PWE 382) funds without WRO/NIFC approval and as short-term rehabilitation. These actions are appropriate on significant sites that were or will be severely impacted from suppression actions, emergency rehabilitation actions, or by fire induced erosion.

      1. Physical manipulation of fuels to allow sites to "blend with the landscape." Brush left stacked on unburned sites will be removed. Fuel will be reduced on sites left specifically as vegetation "mosaics."

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2. Site stabilization through erosion control (as specified in trail/road rehabilitation): see N1, N2, N3, N4, N8, and N9. Site stabilization includes removal or protection of surface artifacts that may be lost or damaged by erosion or lost through vandalism.

B. Short-term archeological site protection and surveillance may range from remote instrument surveillance to increased law enforcement patrols (funded by ONPS) that are periodic and of short duration in park developed areas, major viewsheds, and sites that are readily accessible to the public.

Under some circumstances, placement of a full time officer on highly sensitive arch sites may be warranted. However, under no circumstances will these activities be funded from FIREPRO emergency monies. Development of the most appropriate strategies, practices and costs associated with the protection of sites from poaching or vandalism should be coordinated and funded by the park Ranger Activities/Law Enforcement Division.

C. Considerable cultural resources and archeological coordination must occur throughout all phases of both the rehabilitation planning phase and plan implementation. A qualified seasonal or contract archeologist will be hired to monitor or direct these activities via FIREPRO Emergency Rehabilitation Funding when archeological sites or remains are present in areas where "ground disturbance" in association with the implementation of the rehabilitation plan are to occur. This is particularly important in relation to the rehabilitation of disturbed sites listed above (C1.1) but may also apply to other rehabilitation activities including fencing, construction of check dams, revegetation, etc.

C2. Structural Surveys (National Register Properties).

Documentation of significant historic structures and condition assessments within the fire perimeter is required. The following activities may be funded by emergency rehabilitation funds:

1. Condition assessments of each affected or damaged historic structure or potentially significant historic structure by the Regional Historical Architect and/or team. Each assessment will involve a 100 percent survey of damages and the preparation of a detailed report on the rehabilitation of the structure to its orginial historical significance (includes salary and support of team members).

2. Emergency stabilization of damaged structures including bracing, weatherproofing, removal of water, etc. It may also be necessary to secure structures from entry by the public, including increased security by law enforcement personnel.

3. Properties that are potentially eligible for the Register (e.g., greater than 50 years old) will be treated as if they were listed.

Safety Resources Rehabilitation Measures

S1. Resource Protection and Public Safety Actions

The following law enforcement activities should be considered and if appropriate, funded from Ranger Activities accounts:

1. Increased law enforcement patrols of historical structures and known and known and exposed archeological sites.

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2. Increased law enforcement patrols for post-fire safety reasons (e.g., traffic control, exposed hazards, unsafe trail conditions).

S2. Structural Stabilization and Clean-up

A visual inspection for hazardous conditions/materials and structural integrity of structures affected by fire is required prior to the structure being reopened or made accessible to the public. Inspections will always be conducted for structural integrity by a park or regional engineer. A written condition assessment of each affected structure will be submitted to the Superintendent and NIFC as a part of the NPS-Western Region Fire Rehabilitation Plan. The preparation of this assessment is a legitimate FIREPRO emergency rehabilitation funding item. Emergency rehabilitation funding will not be used to develop reconstruction or repair plans or to initiate or complete any of the work outlined in these documents. Unlike historical structures, emergency rehabilitation funds will not be used for temporary support or bracing and waetherproofing of affected developments. For safety purposes, security measures required to block access by the public to damaged structures may be funded by the FIREPRO rehabilitation program.

S3. Slash Mitigation

Fire suppression activities can result in the accumulation of slash in unnatural and/or hazardous forms. The mitigation of downed slash which is a direct result of suppression actions may be mitigated via FIREPRO emergency rehabilitation funding. The following examples of circumstances which warrant mitigation actions may be used as a guideline:

- Slash accumulation along dozer constructed fire-lines needs to be scattered in order to prevent runoff and landslides, and to expose unburned pockets of vegetation or burning stumps.

- The removal of vegetation in close proximity to park development during suppression operations may be necessary to protect such development from fire, but in the long term, may further perpetuate the fire environment. Such fuels/slash accumulations should be mitigated via FIREPRO.

  Generally speaking, fuel or slash mitigation purely for the purposes of promoting "naturalness", restoring visual quality or perpetuating a nonthreatened or nonendangered species habitat are not acceptable FIREPRO expenses. Slash removal from a given site via mechanical means or prescribed burning requires prior and specific approval by NIFC via the NPS-Western Region Rehabilitation Plan.

S4. Tree Hazards

Timber salvage will not be authorized other than for safety reasons (mitigation of post-fire fuel accumulations). Timber salvage is to be permitted only in developed zones, including major road corridors, designated trails/campsites, etc. listed in the park General Management Plan.

All other trees to be felled must be killed or damaged directly by the fire or the management thereof and must display an overall hazard rating of 5 in accordance with the Western Region Tree Hazard Rating System (Western Region Tree Hazard Handbook, draft 1992). Trees to be salvaged will be felled in the same direction, upslope from the direction of removal.

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Felled trees to be left on site will not be bucked or limbed except in developed zones. Whenever practical and necessary for aesthetic reasons, stumps will be flush cut. Tree hazards should be reassessed two full growing seasons after the fire to detect delayed mortality effects.

Other Rehabilitation Measures

O1. Sanitation.

The removal of all trash and human-made debris from the burned or staging areas and resulting from suppression activities may be conducted via emergency FIREPRO rehabilitation funding. Legitimate expenses include equipment rental and personnel services.

O2. Development Replacement.

The use of emergency wildfire rehabilitation funds for the replacement or maintenance of any road, bridge or other park development (including access routes) and/or recreational facilities following a wildfire loss is prohibited unless such facilities are absolutely necessary for immediate visitor safety and/or protection, and prior and specific approval is received from NIFC via the NPS-Western Region Rehabilitation Plan. If the above criteria are met, the following activities related to road and bridge maintenance may be funded with emergency rehabilitation funds (FIREPRO):

- Make repairs on existing roads and bridges damaged during suppression activities.
- Restore surface, grade and shape of permanent road to meet minimum safety standards.
- Install or add water bars on roads where increased runoff is expected.

* Clean and/or enlarge road culverts and channels in preparation for increased runoff, debris and sediment.

* Install trash racks to prevent culvert plugging.

* Dust abatement during and immediately following fire suppression.

* Increased road and culvert maintenance and patrol.

O3. Fire-related Monitoring.

Monitoring, either short or long term, will be funded by emergency FIREPRO rehabilitation funding only when it is performed to meet one of the following objectives:

* To ensure that the treatment or rehabilitation measures are working as designed.

* To determine when the usefulness of rehabilitation measures has been exhausted.

* To evaluate the immediate post fire invasion of non-native plants and/or animals.

* Plots will not be installed using FIREPRO funds when intended to monitor general or specific non fire-related resource changes.

In any case, monitoring activity will only be approved following the submission of a monitoring plan as an attachment to the NPS-Western Region Rehabilitation

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Plan. Under no circumstances will monitoring activity be funded for longer than the proposed rehabilitation period or a maximum of two full growing seasons post burn. All monitoring of vegetation will be done in accordance with the Western Region Fire Monitoring Handbook (1991). Monitoring of vegetation will be approved only when an exotic, fire adaptive species is present pre-fire and a removal or mitigation program was ongoing pre-fire and documented in the park NCRMP.

CHECKLIST OF ACTIONS THAT MAY BE FUNDED BY FIREPRO WITH APPROPRIATE APPROVALS

1. Reseeding and other revegetation efforts to prevent erosion; not for visual and lanscaping purposes.
2. Mulching and soil netting to prevent erosion.
3. Check dams to prevent degradation of riparian areas and flooding and erosion into developed areas.
4. Water course stabilization to prevent erosion only in first order drainage.
5. Temporary replacement fencing to prevent trespass by livestock and feral animals.
6. Repair of existing trails to minimum standards safe for visitor use and necessary to prevent erosion and other land degradation problems.
7. Removal of firelines.
8. Documentation of immediate post-fire threats to Threatened, Endangered and sensitive species and actions to prevent further degradation of critical habitat. Does not include long-term recovery plans.
9. Archeological damage assessments of previously documented sites suspected to be impacted by fire suppression activities.
10. Salary for personnel who coordinate cultural resource compliance (section 106) and consultation with the State Historic Preservation Office. Funded only if the park does not have personnel on its staff capable of carrying out this function.
11. Site stabilization of archeological sites impacted by suppression activities, including the removal or protection of artifacts that might be further damaged by erosion or vandalism.
12. Limited or full data recovery of archeological sites (when a damage assessment indicates that subsurface damage has occurred and that it is impossible to stabilize or preserve the site without excavation).

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13. Condition assessments and emergency stabilization measures for fire-damaged historic/prehistoric structures.
14. Condition assessments of non-historic fire damaged structures.
15. Mitigation of slash and debris problems caused by fire suppression activities (only if the slash and debris presents an immediate threat to other resources).
16. Removal of hazard trees in developed zones on along/in designated trails/campsites.
17. Removal of trash and debris accumulated as a result of fire suppression activities.
18. Repair of roads, bridges or other structures that present an immediate safety problem.
19. Monitoring the effectiveness emergency rehabilitation actions.
20. Actions to prevent the immediate invasion of non-native plants or animals.
21. Stump flushing for the mitigation of scars produced following hazardous tree removal.
22. Section 7 consultations.
23. Detailed landslide threats assessment.
24. Road safety assessment.

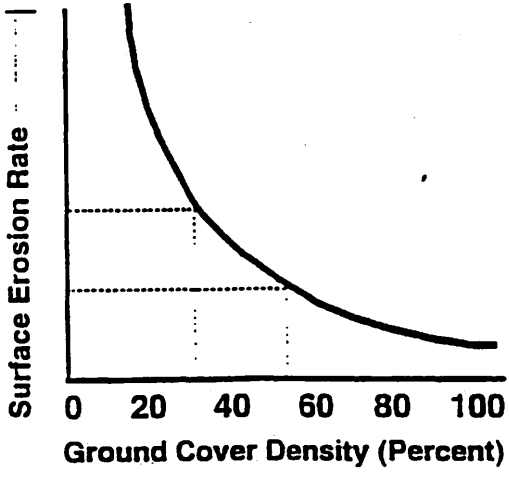
GRASS SEEDING AND EROSION CONTROL

The objective of seeding a wildfire with grass is to provide sufficient ground cover to reduce surface erosion. Remember, time is of the essence.

Factors to consider when prescribing seed include:

- Climatic influences.
- Elevation.
- Slope and aspect.
- Timing of applications.
- Soil characteristics.
- The need for structural aids (mulch, site prep, etc.).
- Management direction for the area.
- Runoff characteristics of the area.

The goal is to provide acceptable ground cover. Generally, this means 30-50 percent ground cover.



CALCULATING SEEDING RATES BASED ON PURE LIVE SEED PER SQUARE FOOT

Seeding rates for grasses are generally expressed in pounds per acre. However, if a seeding prescription is based on pounds per acre instead of Pure Live Seed (PLS) per square foot, excess costs can be experienced. Generally, to achieve efficient erosion control, seeding rates should be in the range of 30 to 60 PLS per square foot.

Seeding rates can be calculated if you know:

1. The total number of seeds per pound.
2. The percentage of each pound that is PLS.
3. How many acres you need to treat.
4. The target PLS per square foot rate.

Example: Seed 1 acre with standard crested wheatgrass which has 175,000 seeds per pound and is 76 percent PLS to get a result of 40 PLS per square foot.

(lac.)*(43,560 sq.ft./ac.)*(40) = 1,742,400 PLS
(175,000)*(0.76) = 133,000 PL/lb.
(1,742,400) / (133,000) = 13.1 lb.

Example: Seed 1 acre with 3 species at different rates to obtain a coverage of 30 PLS/square foot.

Species 1=175,000 seeds/lb;76 percent PLS;30 percent of mix
Species 2=645,000 seeds/lb;71 percent PLS;40 percent of mix
Species 3=227,000 seeds/lb;87 percent PLS;30 percent of mix

(1 ac.)*(43,560 sq.ft./ac.)*(30) = 1,306,800 PLS
Species 1: 1,306,800 * 0.30 = 392,040 PLS
175,000 * 0.76 = 133,000 PLS / lb.
392,040/133,000 = 2.95 lb
Species 2: 1,306,800 * 0.40 = 522,720 PLS
645,000 * 0.71 = 457,950 PLS / lb.
522,720/457,950 = 1.14 lb
Species 3: 1,306,800 * 0.30 = 392,040 PLS
227,000 * 0.87 = 197,490 PLS / lb.
392,040/197,490 = 1.99 lb
Total mix = 6.08 lb/ac

CALIFORNIA NATIVES
APPROVED FOR USE IN NATIONAL PARK SERVICE
CALIFORNIA/ARIZONA PARKS

Agrostis exerata

NO COMMON NAME: Common, moist or disturbed areas, open woodland, coniferous forest below 2,000 meters. California Floristic Province to Alaska, South Dakota and Mexico.

Agrostis hallii

NO COMMON NAME: Open oak woodland, coniferous forest below 1,500 meters. Northwestern California, Central Coast, San Francisco Bay Area, Sacramento Valley, northern South Coast, and Western Transverse Range.

Agrostis idahoensis

NO COMMON NAME: Common, open wet meadows, coniferous forest below 3,500 meters. Northwestern California, Cascade Range, northern San Francisco Bay Area, San Bernadino Mountains, San Jacinto Mountains, to Alaska, Montana, New Mexico.

Agrostis pallens

NO COMMON NAME: Common open meadows, woodlands, forest, subalpine 200-3,500 meters. California Floristic Province, Great Basin to British Columbia, Montana.

Agrostis scabra

NO COMMON NAME: Open roadsides, meadows, coniferous forest 1,000-3,000 meters. Klamath Ranges, North Coast Range, Sierra Nevada, Transverse Ranges, San Jacinto Mountains, east of Sierra Nevada to Alaska, northeastern United States.

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Agrostis thurberiana

NO COMMON NAME: Moist often heavy coils, coniferous forest 1,300-3,500 meters. Klamath Ranges, High North Coast Ranges, High Cascades, High Sierra Nevada, to Alaska, Montana, Colorado.

Agropyron dacystachyum, Elymus lanceolate

THICKSPIKE WHEATGRASS: Open sites, woodland, coniferous forest; 500-1,200 meters elevation; Cascade Range, northern Sierra Nevada, Great Basin, Modoc Plateau to Alaska, Rocky Mountains.

Agropyron riparium

STEAMBANK WHEATGRASS: (Now considered to be same species as dasystachyum above.)

Agropyron smithii, Pascopyrum smithii

WESTERN WHEATGRASS: Dry aklaline soils, flats; 1,500-2,000 meters. Great Basin Province to southern Canada, Great Plains.

Agropyron spicatum, Pseudoroegneria spicata

BLUEBUNCH WHEATGRASS: Sagebrush steepe, open woodlands, 800-1,650 meters North Coast Range, Cascade Range, North and Central Sierra Nevada, Modoc Plateau to Southern Canada, Colorado.

Agropyron trachycaulm, Elymus trachycaulus

SLENDER WHEATGRASS: Dry to moist open areas, forest woodland, below 3,400 meters. California Great Central Valley to Alaska, eastern United States, ssp. subsecundus 1,000-3,400 meters Sierra Nevada, Modoc Plateau to Rocky Mountains, ssp. trchycaulus below 3,300 meters, California Great Central Valley to Alaska.

Andropogon glomeratus

SOUTHWESTERN BUSHY BLUESTEM: Moist, open disturbed areas, seeps below 600 meters. Transverse Ranges, Majave Desert, North Coast, Outer North Coast Ranges, northern Sierra Nevada Foothills, Sierra Nevada, Sacramento Valley, South Coast to New Mexico, Baja.

Aristida purpurea var. fendleriana

FENDLER THREE AWN: Dry, rocky, slopes, shrubland 1,000-2,000 meters. San Bernadino Mountains, Peninsular Range, Eastern Sierra Nevada Range, Mojave Desert to Montana, Great Plains, northern Mexico.

Aristida purpurea var. longiseta

RED THREE AWN: Dry slopes, plains, shrubland 300-1,600 meters. San Bernadino Mountains, Desert to southwestern Canada, northern Mexico.

Aristida purpurea var. purpurea

PURPLE THREE AWN: Dry slopes, plains, shrubland 250-800 meters, South Coast, San Bernadino Mountains, Peninsula Range, Desert Mountains to Arkansas, northern Mexico.

Aristida purpurea var. wrightii

WRIGHT THREE AWN: Sandy to rocky slopes, shrubland 500-1,800 meters. Peninsula Range, Mojave Desert to southern Utah, Oklahoma, northern Mexico.

Bouteloua aristidoides

NEEDLE GRAMA: Dry, open, sandy to rocky slopes, flats, washes, disturbed sites, scrub, woodland below 1,800 meters. Eastern Peninsula Range, Mojave Desert, Sonoran Desert to Utah, Texas, southern Mexico, South America.

(OVER)

Bouteloua barbata var. barbata

SIX WEEKS GRAMA: Open, sandy to rocky slopes, flats, washes, roadsides, disturbed sites, scrub, woodland, pine forest below 1,700 meters. San Joaquin Valley, eastern Peninsula Range, Desert to Colorado, Texas, southern Mexico.

Bouteloua curtipendula

SIDEOUTS GRAMA: Dry, rocky, slopes, crevices, sandy to rocky drainages, scrub, woodlands; below 1,900 meters. California Floristic Province southern Sacramento Valley (Yolo County roadside), Desert Province (Mojave), Peninsula Range (Santa Rosa, Cuyamaca Mountains), eastern and southern desert mountains.

Bouteloua gracilis

BLUE GRAMA: Sandy to rocky slopes, flats, drainages, scrub, woodland, pine forest below 2,300 meters. California Floristic Province, southwestern California, Transverse Range, San Bernardino Mountains (Ivanpah, New York, Clark Mountains).

Bromus carinatus

CALIFORNIA (MOUNTAIN) BROME: Open, shrubland, woodland, coniferous forest below 3,000 feet. California Great Central Valley, Desert Province, Colorado Desert.

Bromus carinatus var. carinatus

Great Basin, North Coast, Dunes, meadows below 100 meters. North Coast, Central Coast, San Francisco Bay Area, northern Sacramento Valley, Channel Islands, Oregon.

Calamagrostis koelerioides

NO COMMON NAME: Meadows, slopes, dry hills, ridges below 2,300 meters. Northwestern California, central western California, Peninsula Range to Idaho, Wyoming.

Calamagrostis nutkaensis

NO COMMON NAME: Wet areas, beaches, dunes, coastal woodlands below 1,000 meters. North Coast, Central Coast, San Francisco Bay Area to Alaska.

Calamagrostis rubescens

PINE GRASS: Wooded slopes, Montana forests below 900 meters. North Coast, Outer Coast Range, northern Channel Islands to southwest Canadian Rocky Mountains.

Elymus canadensis

CANADIAN WILDRYE: Disturbed places below 200 meters. North Coast Range to British Columbia, eastern United States.

Elymus elymoides

SQUIRRELTAIL: Dry open areas 600-4,200 meters. Klamath Ranges, Cascade Ranges, Sierra Nevada, Transverse Range, Peninsula Range, Great Basin, Deserts to Great Plains, Texas and northern Mexico.

Elymus elymoides ssp. brevifolius

Dry, open areas 600-3,000 meters. San Bernadino Mountains, Peninsula Range, Modoc Plateau, Mojave Desert to Oregon, Great Plains and northern Mexico.

(OVER)

Elymus elymoides ssp. californicus

Dry, open areas 800-4,200 meters. Klamath Ranges, Cascade Range, Sierra Nevada, San Gabriel Mountains, San Bernadino Mountains, San Jacinto Mountains, East Sierra Nevada to Washington, Montana and Utah.

Elymus elymoides ssp. hordeoides

Dry, open areas 800-1,000 meters. Klamath Ranges (Siskiyou County) to Washington and Nevada.

Elymus glaucus

BLUE WILDRYE: Open areas, chaparral, woodland, forest below 2,500 meters. California to Alaska, Great Plains, and northern Mexico.

Elymus glaucus ssp. jepsonii

Coniferous forest, woodland 900-2,200 meters. Klamath Range, North Coast Range, Cascade Range, northern Sierra Nevada, South Coast Range, Transverse Range, Peninsula Range to Rocky Mountains and Baja.

Elymus glaucus ssp. virescens

Coniferous forest, chaparral below 300 meters. North Coast, North Coast Range to Alaska.

Elymus lanceolatus

THICKSPIKE WHEATGRASS: Open sites, woodland, coniferous forest 500-1,200 meters. Cascade Range, northern Sierra Nevada. Modoc Plateau to Alaska, Rocky Mountains.

Elymus multisetus

BIG SQUIRRELTAIL: Open, sandy to rocky areas below 3,200 meters. California to Washington, Rocky Mountains.

Elymus trachycaulus ssp. trachycoulus

SLENDER WHEATGRASS: Dry to moist, open areas, forest, woodland below 3,400 meters. California to Alaska.

Fescue californica

CALIFORNIA FESCUE: Open forest, chaparral below 1,800 meters. Northwestern California, Cascade Range, north and central Sierra Nevada, San Bernadino Mountains, Oregon. Stabilizer, good for restoring degraded areas.

Fescue elmeri

NO COMMON NAME: Moist, wooded slopes, under trees in rich soil below 300 meters. Northwestern California, central and western California to Oregon. Untested for erosion control but worth testing.

Fescue idahoensis

IDAHO FESCUE, BUNCHGRASS: Dry, open or shady places below 1,800 meters. northwestern California, Cascade Range, northern and central Sierra Nevada, Modoc Plateau to Canada and Colorado. Stabilizer, good for restoring degraded areas.

Fescue kingii

NO COMMON NAME: Dry, sandy places, sagebrush plains to subalpine forest above 2,000 meters. Southern Sierra Nevada, San Bernadino Mountains, Great Basin to Oregon.

Fescue occidentalis

WESTERN FESCUE: Open pine/oak woodland, redwood forest above 1,900 meters. Northwestern California, Cascade Range, Sierra Nevada, Peninsula Range, Modoc Plateau to British Columbia and eastern United States. Requires moderate summer irrigation.

(OVER)

Fescue rubra

RED FESCUE: Sand dunes, grassland, subalpine forest below 2,500 meters, northwestern California, Cascade Range, north and central Sierra Nevada, Transverse Range. Requires moderate summer irrigation, does best in full or part shade, cultivars are available in trade, good ground cover.

Fescue subulata

BEARDED FESCUE: Open places, moist banks, forest below 3,500 meters, northwestern California, Cascade Range, north and central Sierra Nevada to Alaska, Wyoming and Utah. Requires excellent drainage, does best in full to partial shade, requires moderate irrigation.

Fescue subuliflora

CRINKLE-AWN FESCUE: Near streams, redwood, oak/pine forest below 700 meters. North Coast Range, Klamath Ranges, north Sierra Nevada, San Francisco Bay Area to British Columbia. Requires excellant drainage, does best in full to partial shade, and requires summer irrigation.

Fescue viridula

MOUNTAIN BUNCHGRASS, GREEN FESCUE: Subalpine meadows, open forest, rocky slopes above 2,000 meters. Klamath Ranges, north Sierra Nevada to British Columbia, Idaho and Colorado.

Hesperostipa comata ssp. intermedia

NEEDLE-AND-THREAD: Pinyon/juniper woodland, coniferous forest 1,500-3,500 meters. Northern Sierra Nevada to southern Canada and Rocky Mountains.

Melica californica

CALIFORNIA MELICA: Open hillsides, oak woodland, coniferous forest below 2,100 meters. Nnorthwestern California, Sierra Nevada Foothills, Tehachapi Mountain Area, western Transverse Range. Good for erosion control and stabilization.

Melica harfordii

HARFORD MELICA: Dry slopes, coniferous forest below 2,500 meters. Northwestern California, Cascade Range Foothills, north and central Sierra Nevada, San Francisco Bay Area, north South Coast Range to British Columbia. Good for erosion control and stabilization.

Melica imperfecta

NO COMMON NAME: Dry, rocky hillsides, chaparral, woodland below 1,500 meters. Central to southern Sierra Nevada, San Francisco Bay Area, South Coast Range, western Mojave Desert to Baja. Good for erosion control and stabilization.

Melica subulata

NO COMMON NAME: Moist sites, streambanks, coniferous forest below 2,300 meters. Northwestern California, Cascade Range, north and central Sierra Nevada, San Francisco Bay Area, north South Coastal Range, Modoc Plateau to Alaska, Rocky Mountains. Good for erosion control and stabilization.

Nassella cernua

NODDING NEEDLEGRASS: Grassland, chaparral, juniper woodland below 1,400 meters. North Coastal Range, eastern San Francisco Bay Area, South Coastal Range, Transverse Range, Peninsula Range, to Baja. Good for erosion control and stabilization.

(OVER)

Panicum hirticaule

NO COMMON NAME: Sandy soils, open sites, creosote-bush scrub below 1,400 meters. Sonoran Desert to Texas and northern Mexico. Good for erosion control and stabilization.

Panicum urvilleanum

NO COMMON NAME: Sandy soils, dunes below 900 meters, South Coast, Deserts to Arizona, Northern Mexico and South America. Good for erosion control and stabilization.

Phleum alpinum

MOUNTAIN TIMOTHY: Wet meadows, streambanks, coniferous forest, alpine 1,500-3,350 meters. North Coast, Klamath Ranges, north and central North Coast Range, Cascade Range, High Sierra Nevada, San Bernadino Mountains, San Jacinto Mountains, White and Inyo Mountains to Alaska, eastern Canada, northeast United States, Mexico. Good for erosion control and stabilization.

Pleuraphis jamesii

CALLETA: Dry, sandy to rocky slopes, flats, scrub, woodland 1,000-2,500 meters. Eastern Sierra Nevada, Desert Mountains to Wyoming and Texas. Good for erosion control and stabilization.

Pleuraphis rigida

BIG GALLETA: Dry, open sandy to rocky slopes, flats and washes, sand dunes, scrub, woodland below 1,600 meters. Peninsula Range, east and southern Mojave Desert, Sonoran Desert to Utah and northern Mexico. Good for erosion control and stabilization.

Poa bolanderi

NO COMMON NAME: Mountains, especially in open pine forest 1,500-3,000 meters. Northwestern California, High Sierra Nevada, San Jacinto Mountains to Washington, Idaho, Utah. Good for erosion control and stabilization.

Poa fendleriana

LONGTONGUE MUTTON GRASS: Mountain slopes, sagebrush scrub to subalpine 2,000-3,200 meters. Southern Sierra Nevada, Great Basin, Desert Mountains to British Columbia, South Dakota and northern Mexico. Good for erosion control and stabilization.

Poa wheeleri

NO COMMON NAME: Mountains, open forest in rich soil 1,300-3,800 meters. Klamath Ranges, North Coastal Range, Cascade Range, Sierra Nevada, Great Basin to southern Canada and Colorado. Good for erosion control and stabilization.

Sporobolus airoides

ALKALI SACATON: Seasonally moist, alkali areas below 2,100 meters. Sierra Nevada Foothills, Tehachapi Mountain Area, Sacramento Valley, San Jaquin Valley, southern South Coastal Range, eastern Sierra Nevada, Deserts to eastern Washington, Mexico. Good for erosion control and stabilization.

Sporobolus cryptandru

SAND DROPSEED: Rocky to sandy washes, slopes, shrubland, woodland 350-2,800 meters. Eastern and central Sierra Nevada, San Bernadino Mountains, Peninsula Range, Deserts widespread to southern Canada and northern Mexico. Good for erosion control and stabilization.

GUIDELINES FOR EVALUATING POTENTIAL TREATMENTS

The following guidelines are intended to give the Team Leader some indication of treatment acceptability. Treatments should be challenged if any of the following are true. However, there are certainly local conditions which will cause variance from the given prices or rates. The list below is intended to be used for an initial screening of viable treatments.

Challenge when:

* Sediment storage basins or major sediment structures are proposed.
* Seeding is proposed or seed species is not native.
* Individual seed species should cost more than $6.00 per pound; cost per acre exceeds $50 when aerially broadcasted over a minimum of 1,000 acres.
* Seeding rates which provide less than 30 or more than 60 live pure seed per square foot.
* Temporary fence costs more than $4,500 per mile, including labor.
* Treatments will take longer than 180 days to implement.
* Treatments are experiemental.
* Mulch rates are greater than 4,000 pounds per acre.
* New road or trail construction is proposed.
* Prescriptions are trying to remedy problems which existed before the fire or to restore conditions to a higher standard than existed pre-fire.
* High archeological or T & E species habitat survey funding is requested (screen individual requests when they exceed 50 percent of entire rehabilitation funding package).
* Large amounts of funding is requested to restore safe visitor conditions in designated wilderness.
* Proposals call for the purchase of capitalized equipment.
* Line Officer proposes to complete routine rehabilitation work (line mitigation, sanitation, etc.) under contract or with day labor and not fire crews.

STREAM CLASSIFICATION/SIGNIFICANCE DEFINITIONS

Class I. Highly Significant. These are either perennial or intermittent streams, or segments thereof, which meet one or more of the following criteria:

a. Are habitat for large numbers of resident and/or migratory fish for spawning, rearing, or migration.
b. Furnish water locally for domestic or municipal supplies.
c. Have flows large enough to materially influence downstream water quality.
d. Are characterized by major fishing or other water-oriented recreational uses.
e. Have special classification or designation, such as wild, scenic, or recreation rivers.
f. Have special visual or distrinctive landscape features and are classified as variety class A as defined in "National Forest Landscape Management Volume 2" (Agr. Handbook 462).
g. Are habitat for threatened or endangered animal species, or contain plants which are potential or viable candidates for threatened or endangered classification.
h. Exhibit ethnological, historical, or archeological evidence that makes them eligible for or are included in the "National Register of Historical Places" (FSM 2361).

Class II. Significant. These are either perennial or intermittent streams or segments thereof, which meet one or more of the following criteria:

a. Are used by moderate numbers of fish for spawning, rearing, or migration.
b. Furnish water locally for industrial or agricultural use.
c. Have enough water flow to exert a moderate influence on downstream quality.
d. Are used moderately for fishing and other recreation purposes.
e. Are of moderate visual quality and meet variety class B as defined in "National Forest Landscape Management Volume 2" (Agr.Handbook 462).

(OVER)

Class III. Moderately Significant. These include perennial or intermittent streams, or segments thereof, which meet one or more of the following criteria:

a. Are habitat for few fish for spawning, rearing, or migration.
b. Are rarely used for fishing or other recreational purposes.
c. Have enough water flow to exert minimum influence on downstream water quality.
d. Are of relatively low visual quality in the landscape and classified as variety class B as defined in "National Forest Landscape Management Volume 2" (Agr.Handbook 462).

Class IV. Minor Significance. These are intermittent or ephemeral streams, or segments thereof, not previously classified.

WILDFIRE BURN INTENSITY DEFINITIONS

LOW INTENSITY

Low burn intensity varied from unburned areas to less than 50 per cent scorched canopy. Generally, the litter layer was consumed by a ground fire which had low flame lengths such as a backing fire. Most or all of these areas were under a closed canopy. The average appearance of the low intensity burn was predominantly that of a green canopy with scattered scorched-canopy areas. Conifer needles were intact and fell to the ground within a few weeks after the fire. Needle fall included green and scorched needles. The needle fall provided 80 to 95 per cent soil cover. The needle cover was one needle thick and not an interlocking mat as characteristic of normal litter cover. Vegetative mortality was assumed to be low although this was not always the case. Conifer canopy was mostly intact.

MODERATE INTENSITY

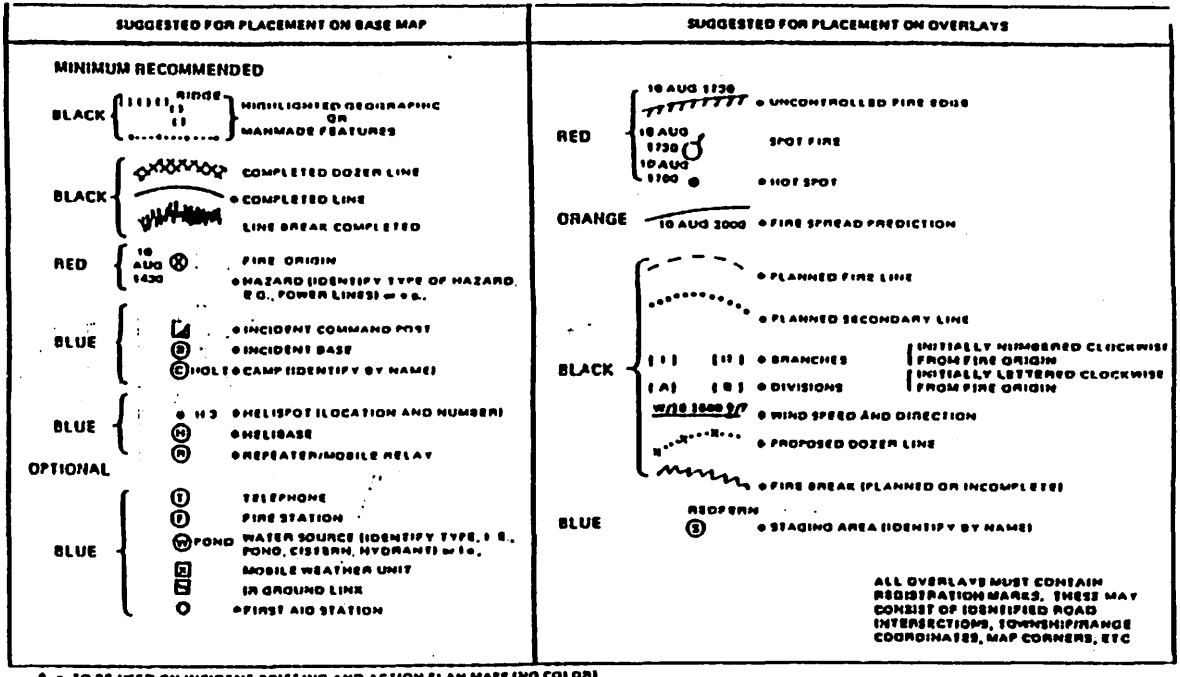
Moderate burn intensity category varied from greater than 50 to 100 per cent scorched canopy. Most of the areas have greater than 75 per cent scorched canopy. Scorched canopy is defined as fire-killed needles and leaves that remain on the trees and/or brush. The fire as a ground fire which consumed the litter and some of the larger ground fuels, generating sufficient heat to scorch the canopy. It as assumed that 90 to 100 per cent of the vegetation was fire-killed, or top-killed in the case of certain hardwoods and brush. Needle fall and subsequent soil cover was similar to that mentioned under the low intensity description except most needles were scorched rather than green. After needle fall, the trees are predominately needle-less and provide no protection from rainfall.

(OVER)

HIGH INTENSITY

High burn intensity was identified as those areas that exhibited a ground and crown fire. The canopy was completely consumed leaving only black needle-less trees and leafless hardwoods and brush. In some areas the brush was completely consumed, leaving a small stem at the soil surface. Occasionally the root structure burned, leaving conduits for air and water. There was no needle or leaf fall in these areas. Post-fire soil cover was minimal to none. It was assumed that 100 per cent conifer mortality occurred in these areas.

ICS MAP DISPLAY SYMBOLOGY



• = TO BE USED ON INCIDENT BRIEFING AND ACTION PLAN MAPS (NO COLOR)

BAER MAP RATING CLASSIFICATIONS (EROSION/SLOPES)

Soil Erodibility

V. High Sensitivity	5
High Sensitive	4
Mod. Sensivity	3
Low Sensitivity	2
Very Low Sensitivity	1

Slope Stability

Very High Risk for Mass Wasting	5
High Risk	4
Mod. Risk	3
Low Risk	2
Very Low Risk	1

NPS HAZARD TREE RATING SYSTEM

Hazard Rating Values for Risk of Exposure, Location and Target Value.

HIGHEST LEVEL - 3 - Overnight Exposure

Indicators include:

- Campgrounds (may be closed part of year).
- Lodges, hotels, dormitories.
- Residence areas.
- Visitor serving facilities designed to operate during evening hours (in addition to daytime use).

MEDIUM LEVEL - 2 - Daytime Exposure

Indicators include:

- Paved trails.
- Interpretive sites, such as ampitheatres, kiosks.
- "High use" road networks where occupancy is "constant" (substantial traffic, "grid-lock" or slow-moving vehicles).
- Roadside atrractions, such as vista points or historic stops.
- Information stations, visitor centers, fee collection portals.
- Designated parking areas associated with high-occupancy facilities; designated trailhead parking areas.
- Utilities, intrastructure.
- "High use" areas where occupancy is "constant" (plazas, staging areas, commercial sites).
- Picnic areas.

(OVER)

LOW LEVEL - 1 - Transitory Exposure

Indicators include:

- Highway corridors.
- Unimproved roads.
- Turnouts.
- Bicycle paths
- Structures with sporadic occupancy (e.g., restrooms associated with parking areas, storage buildings).

Hazard Rating Values for Defect Condition and Likelihood of Failure. (Defects and conditions listed are indicators generalized from montane California areas and are not intended to be adopted as all inclusive; localized conditions must be investigated and park-specific diagnostic aid developed).

VALUES	Highest Level = 3
CONDITION	Live, dying, or dead tree or significant limb with visible defect or damage, which in the judgement of the rater predisposes it to failing within 3 years or before the next scheduled inspection (whichever is less). Includes forseeable effects from known periodic, high-failure, risk-prone conditions, such as tropical hurricane winds, heavy fall snow, flood-saturated soils (a park may have more than one high-risk period). Height is a factor only in that it dictates the size of the target area.

Indicators may include:

- Crown $\geq$ 1/2 dead.
- Cat face/canker affecting $\geq$ 50 percent of diameter.
- Heart rot/hollow $\geq$ 70 percent of diameter.
- Ground saturation indicating that the root system is unstable and tree is likely to uproot.
- Dead limbs 4-6 inches in diameter, affects $\geq$ 40 percent of crown.
- Dead limbs 6-8 inches affecting $\geq$ 20 percent of crown.
- Dead limbs $\geq$ 8 inches in diameter.
- Hangers $\geq$ 2 inches in diameter.
- Mushrooms (of root decay fungi) at root crown, or loose bark at ground level indicating root rot.
- Live limbs with visible signs of rot, or are splitting out.
- Multiple conks on bole or limbs $\geq$ 6 inches, indicating extensive heartrot.
- Exhibits characteristics (risky climbing, slabbing bark, etc.) which could make deferred removal more unsafe for employees.

NPS HAZARD TREE RATING SYSTEM

Hazard Rating Values for Defect Condition and Likelihood of Failure. (Defects and conditions listed are indicators generalized from montaine California areas and are not intended to be adopted as all inclusive; localized conditions must be investigated and park-specific diagnostic aid developed).

VALUES — Medium Level = 2

CONDITION — Visibly declining. Defects and damage from insects and disease are obvious. Failure not readily apparent; judgement is there may be a shift to level 3 condition class within several years.

Indicators include:

- Reduced growth; top of conifers are flattened.
- Many dead or dying branches scattered throughout the crown.
- Evidence of dead limbs having been broken off.
- Decay from rot tends to be localized.
- Color of foliage obviously not normal.
- Conifer crown has 1/3 to 2/3 branches dead; hardwood crown has 1/3 to 1/2 branches dead.
- Cankers, cat faces affect from 1/3 and up to 1/2 diameter, single conks.
- Heart rot/hollow areas affect 30 percent to 70 percent of diameter.
- Dead limbs 4-6 inches in 20-40 percent of crown.
- Dead limbs 6-8 inches in 10-20 percent of crown.
- Live/green limbs with rot, hollow or dead areas.

(OVER)

VALUE — Low Level = 1

CONDITIONS — Tree is beginning to show signs of decline or has small defects in roots, butt, bole, limbs or crown.

Indicators include:

- Reduced growth, top is rounded in conifers.
- Color of foliage is abnormal.
- Density of foliage is thinner than normal.
- Evidence of insect activity, disease or mechanical injury that weakens structure of tree (ants, single conk, galls, open wounds, etc.).
- Canker, cat face or mechanical injury affects $\geq$ 1/3 diameter.
- Heart rot/hollow affects $\geq$ 1/3 diameter.
- Dead limbs 2-4 inches in $\geq$ 20 percent of crown.

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WATCH OUT SITUATIONS

1. Fire not scouted and sized up.
2. In country not seen in daylight.
3. Safety zones and escape routes not identified.
4. Unfamiliar with weather and local factors influencing fire behavior.
5. Uninformed on strategy, tactics, and hazards.
6. Instructions and assignments not clear.
7. No communication link with crew members or supervisor.
8. Constructing line without safe anchor point.
9. Building fireline downhill with fire below.
10. Attempting frontal assault on fire.
11. Unburned fuel between you and fire.
12. Cannot see main fire, not in contact with someone who can.
13. On a hillside where rolling material can ignite fuel below.
14. Weather becoming hotter and drier.
15. Wind increases and/or changes direction.
16. Getting frequent spot fires across line.
17. Terrain and fuels make escape to safety zones difficult.
18. Taking nap near fireline.