

Assessment Team Considerations for Emergency Stabilization

Primary Treatment Use	Facility safety work includes a variety of methods to repair minor facilities, such as signs, guardrails, or sanitary facilities where human health or safety is at risk (BAER Guidance Paper-Facility Replacement).
Description	BAER funds are available to replace warning and safety control facilities damaged or destroyed by fire. Treatments include replacing accident and safety signs on or in buildings, campgrounds, and other areas where signs specify hazards to the public or property. Delineators and guardrails can be replaced if the road remains open and an emergency is identified. Road delineators are reflective devices mounted in a series at the side of a roadway to help indicate the roadway alignment and ensure driver safety. Other facility safety work includes replacement of sanitary facilities if human health is at risk, costs are minor, and closure of the facility is not feasible. Fire-damaged buildings can be signed using BAER funds until the facility is repaired.
Purpose of Treatment	Facilities safety work reduces an identified safety or health risk that was created by the fire.
Emergency Stabilization Objective	Emergency facility safety work protects life and property.
Suitable Sites	This treatment is intended for use in one or more of the following locations: • USDA Forest Service roads where delineators have been burned. • Sanitary facilities that are damaged but must be kept open for use. • Facilities damaged where human health or safety is at risk and no other treatment options are available.
Cost	Costs vary depending on the type of facility being replaced. Check with forest resources in watershed, engineering, or facilities to obtain cost information. Cost factors include the following variables: • Type of treatment implemented. • Site location. • Suppliers/contractors available to perform work.
Treatment Effectiveness	Facility safety work is a recent BAER treatment that has no quantitative monitoring information. Anecdotal information on replacement of delineators along a forest road showed a favorable response. Use of BAER funds is limited to minor structures with an identified emergency that could not be treated otherwise.

Project Design and Implementation Team Information

Design	Once the BAER team has identified an emergency related to facility-safety work and that treatment has been approved, repair can begin. Review the BAER assessment team findings on the ground to validate the treatment areas. Use stakes, flagging, or GPS coordinates to identify the treatment area.
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Take necessary precautions to ensure no one is injured while waiting for the treatment to be implemented. Areas may have to be closed temporarily until the treatment can be implemented.

Safety

Facility-safety work is implemented more safely when all hazards are mitigated and reviewed daily to avoid injuries. Include the following in the JHA.

- Hazardous driving conditions.
- Hazardous facilities including burned buildings.
- Unsafe sanitary facilities.

Due to the nature of these treatments, take necessary preventative measures for unsafe areas. Include safety updates and messages to BAER implementation teams as facility-safety work is being performed.

Treatment Monitoring Recommendations

Implementation

- Was the treatment implemented as designed?
- Was the treatment implemented in a timely manner?
- Were temporary closures or restrictions necessary?

Effectiveness

- Did the treatment protect human health and safety?

Assessment Team Considerations for Emergency Stabilization

Primary Treatment Use	Flood-warning systems are installed in locations where a direct risk to human life from floods or mass failures is identified.
Description	Flood-warning systems, commonly called early-warning systems (EWS), are installed in burned watersheds on USDA Forest Service lands. EWS provide local emergency networks, such as police, fire, or emergency preparedness organizations with information on rainfall intensity and duration allowing early detection of hazardous conditions. The National Weather Service is responsible for setting thresholds relative to precipitation and issuing flashflood warnings. The USDA Forest Service is involved in procuring and locating the EWS. The local emergency network maintains the EWS. (U.S. Department of Commerce, Web site; ALERT, Web site; Douglas, 2005)
Purpose of Treatment	Warning systems provide notification to people in areas susceptible to flooding or mass failures as a result of the wildfire.
Emergency Stabilization Objective	Warning systems prevent loss of life and/or property from storm runoff and/or debris flows.
Suitable Sites	This treatment is intended for use in one or more of the following locations: • Watersheds with high- and moderate-burn severity. • Watersheds that burned and are adjacent to the urban interface. • Areas (burned) above USDA Forest Service, State, and county roads that are not closed and are susceptible to flooding or debris flows.
Cost	Weather station dataloggers vary in price depending on the system selected. New systems with 15 sensors to measure temperature, relative humidity, rainfall, soil moisture, and wind speed are as low as \$400. Four AA batteries power the unit for 1 year. (ONSET, Web site; C Microdog.com, Web site) However, given the importance of this unit in alerting people to potential flooding and other hazards, ensure that the system is reliable and provides information that the National Weather Service can use. Cost factors include the following variables: • Knowing number of EWS required for the burned area. • Selecting areas and installing stations. • Accessing identified sites.
Treatment Effectiveness	No documented effectiveness monitoring information exists on EWS. Anecdotal information indicates these systems work best with well established emergency preparedness organizations. Problems can arise when the USDA Forest Service assumes responsibility for maintaining and operating the equipment. It is best to work collaboratively with the local emergency preparedness organization and define roles and responsibilities.

Project Design and Implementation Team Information

Design	After the BAER assessment team has designated areas susceptible to flashflooding and mass wasting, coordinate with local community emergency response networks. Implementation teams should share documentation and area maps that are threatened by potential floods or mass failures. Local emergency response groups can identify areas where additional precipitation data would improve existing precipitation data coverage. Once additional sites are selected in a collaborative manner, the forest can purchase the EWS and assist in the installation (BAER Guidance Paper-Early Warning System).
Tools/Equipment	Several weather station dataloggers are available for purchase online. Most new systems are easy to install, run on battery power, and have remote access to data. New wireless transceivers can transmit data to any internet browser for additional cost, but not all areas may have adequate network coverage. Before selecting a unit ensure that the weather station can reliably transmit real time data. Consult the ALERT Web site for information on equipment and the early warning process.
Safety	Flood warning systems or EWS installation is implemented safely when hazards are identified and mitigated. Review and update the JHA to avoid injuries. Include the following in the JHA. • Road conditions may be hazardous. • Work in areas with unstable footing. • Area has hazard trees near installation.
Treatment Monitoring Recommendations	Implementation • Was the EWS installed? • How many? Effectiveness • Was the EWS data used? • Did flashflooding or mass failures occur in the area delineated by the BAER team?

Assessment Team Considerations for Emergency Stabilization

Primary Treatment Use	Treatment of hazard trees and unstable rocks is prescribed to protect life along roads, high-use areas, permanent structures, and recreation areas that cannot be closed during the emergency. BAER assessment teams must identify the appropriate level of response based on risk factors (BAER Guidance Paper-Hazardous Tree and Rock Removal). Note: Hazard-tree removal to protect USDA Forest Service workers or crews implementing BAER treatments is NOT a separate treatment but is included in the unit cost of the BAER treatment being implemented.
Description	Large boulders destabilized by wildfire and severely burned trees pose a preventable risk to public safety. Hazard-tree and unstable-rock areas are identified by the BAER assessment team. An urgent significant hazard is identified when the collapse or breakdown of the burned or unstable object is “highly likely to occur within the year and could result in property damage, personal injury or death.”(BAER Guidance Paper-Hazardous Tree and Rock Removal)
Purpose of Treatment	Hazard-tree and unstable-rock treatments reduce the risk to public safety.
Emergency Stabilization Objective	Remove identified hazards to reduce the threat to life and property from both hazard trees and unstable rocks.
Suitable Sites	This treatment is intended for use in one or more of the following locations: • Areas of high use. • Access routes that cannot be closed. • Areas of high values and/or unique resources. • Areas adjacent to permanent structures.
Cost	Hazard-tree removal is considered a linear unit and costs are based on a per-mile cost. Actual costs from the Southwest Region (R3) during FY 2000 to 2003 range from \$340 to \$1,200 per mile. Cost factors include the following variables: • Number of trees to be removed. • Diameter of the trees. • Density of the trees. • Distribution of treatment areas. • Need for secondary treatment including placement of trees to ensure safety. • Hazard associated with tree removal (risk to chain saw operator). Cost for treating boulders destabilized by wildfire varies by location and treatment method. In some cases, blasting the rock can reduce the risk, in other cases using heavy equipment may remove the threat. Anchoring nets trap and reduce rockfall onto the road. Maintenance of these structures varies with the extent of the hazard.

Chapter 5 Protection and Safety Treatments

Treatment Effectiveness

Hazard-tree removal and clearing of unstable rocks has not been monitored for treatment effectiveness. Determining the appropriate level of response, by following the criteria used in the BAER Guidance paper, helps assessment teams define the emergency and develop treatment recommendations. Assessment teams should recommend stabilization or removal of hazards that threaten life or property when there are no other protection options.

Project Design and Implementation Team Information

Design

After the BAER assessment team has designated potential treatment areas, validate the field sites. Key design considerations include validating the risk level as low, moderate, or high as defined below.

- Low risk – Areas with no vehicles, no structures, or infrequent use.
- Moderate risk – Areas with intermittent use by people or moving vehicles.
- High risk – Areas of high use with concentration of people, parked vehicles, and permanent structures.

In areas of moderate risk, the appropriate emergency response is to post signs warning of the danger and describing conditions under which the hazard may occur. (See Treatment Warning Signs for appropriate signs.)

For high-risk areas, where closure (both public and administrative) cannot be implemented, validate the treatment recommendation identified by the BAER assessment team.

Construction Specifications

Treatment of hazard trees is conducted by the USDA Forest Service or contract crews. In some cases heavy equipment can move downed material off the road prism.

- Mark hazard trees within high-risk areas where collapse or breakdown of the tree is expected to occur within the year.
- Review hazards of felling trees.
- Fell and remove any burned hazardous tree that could fall on road, parking area, building, or unique site.
- Place trees on contour (where possible) in locations that do not adversely affect road drainage.

Tools/Equipment

Tools

- Chain saws.
- Extra chain.
- Shovel.
- Blasting materials.

Equipment.

- Backhoe.
- Loader.

Removal of unstable rocks is conducted by the USDA Forest Service or contract crews.

- Identify hazard areas subject to rocks and boulder movement.
- Determine whether boulder can be moved to a stable site with heavy equipment.

- Determine whether boulder can be treated in place if it cannot be moved.

Safety

Hazard removal is implemented more safely when hazards are identified and mitigated. Review, update and include the following in the JHA.

- Crews operating in area.
- Chain saw operation.
- Road closure plan during operations.
- Vehicles within the area.
- Equipment used for blasting trees and rocks.

Treatment Monitoring Recommendations

Implementation

- Were identified hazard trees removed as specified?
- Were unstable rock hazards removed as specified?

Effectiveness

- Were there any losses of life or property occur in the treatment area?
- Do additional threats to life and property exist in the treatment area?
- Is additional hazard-tree removal necessary?
- Did hazard trees fall in this area without impacts to life and property?
- Is additional rock-removal treatment necessary?

Assessment Team Considerations for Emergency Stabilization

Primary Treatment Use	Protection-enforcement treatments are recommended by BAER teams either when enforcing a forest order, or as a stand-alone treatment when no feasible treatment is available.
Description	If the BAER team obtained a forest order for resource protection, the order has to be enforceable. Identify personnel available to enforce the order before placing a forest order (FSH 7709.59 Chapter 20). In situations where the fire's effect is limited and the BAER team does not want to recommend a forest or area closure, the team can recommend patrols and public contact to ensure effective resource protection.
Purpose of Treatment	Reduce adverse impacts to resources by patrolling identified areas when there are no other effective alternatives.
Emergency Stabilization Objective	The objective is to prevent unacceptable degradation of critical natural or cultural resources or downstream values.
Suitable Sites	This treatment is intended for use in one or more of the following locations: • Natural recovery areas. • High public-use areas. • Adjacent to off-highway vehicle (OHV) routes. • New areas with forest closure orders.
Cost	Costs for this treatment depend on the enforcement level required and the patrol frequency to ensure treatment effectiveness. Cost estimates can be made using employee grade levels and vehicle costs.
Treatment Effectiveness	No quantitative effectiveness monitoring of this treatment exists. Anecdotal information indicates protection and enforcement creates public awareness regarding their role in ensuring recovery after a fire. Patrolling and public contact can include the use of volunteer OHV groups, native plant groups, or hiking clubs interested in the forest recovery. If volunteer groups and organizations are used, ensure that adequate time and funding is allocated for training and support and safety concerns are thoroughly addressed.

Project Design and Implementation Team Information

Design	Review the BAER assessment team findings in the field with a law enforcement officer to identify the implementation strategy. Consider the size of the area, values at risk, and key areas for protection and enforcement. Evaluate the potential use of forest OHV patrols, and fire prevention and recreation staff to inform the public about resource concerns created by the fire. In some areas informative signs are used in addition to protection enforcement. A positive message at a kiosk helps achieve public support and provide valuable information.
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Chapter 5 Protection and Safety Treatments

For areas that have barricades to protect natural resources or for public safety, a forest order is required. The forest order must be enforceable. Review the areas on the ground with a law enforcement officer to identify the best barricade location to ensure its success (CFR 261.54).

Safety

Protection enforcement is implemented more safely when hazards are identified and mitigated. Review and update the JHA to avoid injuries. Include mitigation in the JHA for the following:

- Potential confrontations with the public. In some cases, the public may be very frustrated with forest closures or access restrictions.
- Unsafe or rough driving conditions in patrol areas.

Treatment Monitoring Recommendations

Implementation

- Was the protection-enforcement treatment implemented as designed?
- Were informational displays a component of the protection enforcement strategy?
- Was a forest order used according to CFR 261.54 as identified in FSH 7709.59 Chapter 20- Traffic Management?

Effectiveness

- Was the frequency of patrol and enforcement commensurate with the use of the area and the emergency identified?
- Was the closure order effective?

Writing Forest Orders

When a BAER team recommends a barrier to restrict use on a forest road, a written order is required. Orders may be written for individual roads, groups of roads, or for all roads in an administrative unit. Clearly state the prohibition that applies to individual roads.

Review and validate travel management plans, values at risk, and BAER treatment objectives before preparing the order. Show the road restrictions on forest visitor maps.

Post the order to notify road users of the prohibition that applies to the road. Place a copy of the order in ranger district and forest supervisor offices. Bring the prohibition to the attention of affected users through the use of letters, news releases, and informational display boards.

Terminate the order when no longer necessary. The termination can be a fixed date in the original order or a separate termination order.

Remove signs related to the prohibition when the termination goes into effect. Notify users of the termination with similar news releases, letters, and informational displays.

Optional items for inclusion in an order:

- A numbering system.
- A penalty statement (36 CFR 261.1b). If a penalty statement is included, use the wording shown in the example attached.
- A termination date. (FSH 7709.59 chapter 20)

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

P.O. Box 4040
Foresttown, California 96007
Order of the Forest Supervisor

SMOKEY NATIONAL FOREST
FOREST SUPERVISOR'S ORDER NO. 67
April 2, 1990

Pursuant to 36 CFR 261.50(b), it is hereby ordered that the prohibitions hereinafter set forth apply to FDR 210, Roaring River Road, on the River Ranger District, Smokey National Forest:

1. Parking on the paved part of the roadway.
2. Logging trucks and other trucks with a GVW over 30,000 lbs. being on the road Saturdays and Sundays from Memorial Day to Labor Day and from October 10 to November 1 annually.
3. Logging trucks and other trucks with GVW over 30,000 lbs. being on the road on Memorial Day, July 4, and Labor Day.
4. Commercial timber sale and other vehicles larger than tandem, tri-axle or self-tracking trailer without pilot vehicle.

Violation of this order is prohibited by the provisions of the regulations cited, and under 16 USC 551 and 7 USC 1011(f). Any violation is subject to punishment by a fine of not more than \$500 or imprisonment of not more than six months, or both.

/s/ Samuel Forester
SAMUEL FORESTER, Forest Supervisor

Assessment Team Considerations for Emergency Stabilization

Primary Treatment Use	Protective fences and barriers protect public safety, BAER treatment areas, and naturally recovering areas from access.
Description	Protective fences and barriers include a variety of methods; gates, fences, boulders, jersey barriers, and logs. The type of fence or barrier selected depends on the access permitted and the size of the area.
Purpose of Treatment	Protective fences and barriers provide public safety, protect BAER treatments, and allow natural vegetative recovery of a burned area (BAER Guidance Paper-Gates, Fences, & Barriers). Roads and areas closed to the public must have a forest order that regulates and controls traffic. Direction for forest orders is in FSH 7709.59 chapter 20-Traffic Management. If use is prohibited on forest development roads, cite 36 CFR 261.54. Traffic rules and orders regulate or control traffic to prevent roadway damage, mitigate unsafe conditions, or to implement a specific resource management activity.
Emergency Stabilization Objective	Protective fences and barriers help prevent threats to human life in unstable areas. These fences protect treated and recovering areas from vehicles, cattle, and other uses that can impede the success of the treatment.
Suitable Sites	This treatment is intended for use in one or more of the following locations: • Areas of public use including campgrounds, popular dispersed camping areas, and road segments that are susceptible to rock-fall or flooding as a result of the fire. • Areas where natural barriers have been burned exposing sensitive sites to vehicle or recreational use. • Areas seeded or treated with straw mulch that have an active range allotment.
Cost	Unit-cost data for fencing in the Southwest Region (3) during FY 2000 to 2003 was \$5,000 per mile. Access gates were \$2,500. Jersey barriers are estimated at \$34 per linear foot. Boulder placement is \$250 to block vehicle access. Cost factors include the following variables: • Location of site and access constraints. • Availability of materials in close proximity to site (boulders). • Type of fence (smoothwire, barbed wire, electric). • Type of animal or use that is being restricted may increase costs. • Type of barrier selected.
Treatment Effectiveness	Monitoring information on fencing to protect treated areas identifies the importance of knowing which grazers are present. Different and more costly fence requirements are necessary when excluding elk versus cattle. Once the type of grazer is identified, the success rate for the fencing treatment increased.

Identify the type of access allowed to determine appropriate barriers to restrict access. To prevent all-vehicle access on roads, placing jersey barriers and boulders in key locations are effective. If partial access is allowed, a gate with informational signing is effective.

Project Design and Implementation Team Information

Design

After the BAER assessment team has designated potential treatment areas, review the field sites.

For fencing treatments consider the following:

- Type of animal to be excluded?
- Vehicle access needs beyond the site?
- Resource objective (long term) for fencing where forest funds could be used.
- Presence of all terrain vehicles in the area and likelihood of cross-country riding.
- Availability of crews to install fence.
- Type of fence that will address emergency treatment objectives.
- Hazards present within the treatment area that need to be removed prior to installation.
- Design an exit strategy to remove any animals that may enter the enclosure.

Barrier and barricade design considerations include the following:

- Access by large vehicles to the closure site. Can a truck with jersey barriers offload and set the barriers?
- Availability of boulders near the treatment area?
- Level of public use of the area?
- Signs that properly inform users?
- Barrier effectiveness based on local conditions.
- Barrier that prohibits motor vehicle use has an order pursuant to 36 CFR 261.54. (FSM 7731.1 Traffic Management)

Tools/Equipment

Basic equipment required for fence construction includes metal fenceposts, wire, wooden braces, and fence staples. A dumptruck, loader, and backhoe are used for most barricades.

Safety

Protective fencing and barriers are implemented more safely when hazards are identified and mitigated. Review and update the JHA to avoid injuries. Include the following in the JHA.

- Working with heavy equipment.
- Building fences and avoiding cuts, scrapes, and eye injuries.

Treatment Monitoring Recommendations

Implementation

- Was the treatment implemented as designed?
- Were informative signs posted?

Effectiveness

- Did the closure (fence or barricade) keep animals or people out of the area?
- Did the treatment reduce the risk to human life?
- Did the identified emergency occur?
- Did the fence enable the treatment to function as designed?
- Did natural recovery occur?



Figure 101a—Wire fence to restrict access to an area that is naturally recovering.



Figure 101b—Metal fencing to restrict vehicle access to an area that is naturally recovering.



Figure 102—Boulders can serve as barriers to sensitive areas.



Figure 103—Jersey barriers (k-rails) line this road to protect vehicles on the road from debris flows.



Figure 104—Gates prevent access to hazardous areas.



Figure 105—Boulder barricade prevents vehicle entry but allows pedestrian access.



Figure 106—Gate restricts vehicle access to unsafe areas within the burn.



Figure 107—Jersey barriers (K-rail) can be used to limit vehicle access.



Figure 108—Jersey barriers can be removed from the road prism once the emergency is over.

Assessment Team Considerations for Emergency Stabilization

Primary Treatment Use	Warning signs alert drivers and recreational users of existing or potentially hazardous conditions created by the wildfire.
Description	Warning signs are a component of the overall travel control devices (TCDs) for the burned area (USDA Forest Service-EM7100-15, 2005). TCDs include all signs, signals, markings, and other devices used to regulate, warn, or guide traffic. The purpose of TCDs is to promote road safety by providing for the orderly and predictable movement of all motorized traffic. TCDs use the standards and guidance contained in the Manual on Uniform Traffic Control Devices (MUTCD) for all signs and traffic markings intended to control or regulate use on National Forest System Roads (NFSRs). The MUTCD and FSM 7731.15 -Signing and Traffic Control devices detail specifically the size, shape, color, and marking requirements for TCDs to ensure driver safety. All signs intended for drivers must meet these guidelines. No warning sign should be installed without an engineering study or application of engineering judgment to determine the need for and appropriateness of the sign and correct sign message. Signs designed for pedestrians are also covered in the EM 7100-15 chapter 13 and are not required to meet MUTCD guidelines. Pedestrian warning signs should be retroreflective, if intended to be read at night.
Purpose of Treatment	Warning signs inform the public of potential hazards created by the fire including flooding, falling rock, and debris.
Emergency Stabilization Objective	Objectives are to protect life and property by alerting users to the hazards within the area.
Suitable Sites	This treatment is intended for use in one or more of the following locations: • Access routes to recreational areas. • Trailheads providing access into the burn area. • Informational kiosks located near the area affected by the fire. • Hazards along access roads that enter the fire area. • Roads closed with a forest order.
Cost	Unit cost for warning signs in the Southwest Region (R3) from FY 2000 to 2003 ranged from \$80 to \$300. Cost factors include the following variables: • Number of signs ordered. • Installation costs. • Size of signs.
Treatment Effectiveness	No documented monitoring data exists on the effectiveness of warning signs as a treatment. Warning signs frequently are prescribed on key access roads where potential hazards are identified. Warning signs are inexpensive and convey an important message to forest users. Current direction requires an engineering study or application of engineering judgment to determine the need for and appropriateness of the sign and correct sign language. Previous signs often were too lengthy or the message was misunderstood by the public.

Project Design and Implementation Team Information

Design Review the BAER assessment team findings on the ground with an engineer to determine the need for either an engineering study or application of engineering judgment to identify the appropriate sign and correct sign message for the location.

Engineering studies and engineering judgment are terms defined in the MUTCD to denote evaluations that are performed by qualified individuals. For most emergency BAER treatments and signing needs on NFSRs may be determined based on engineering judgment. This less technical type of evaluation consists of a review, evaluation, and decision on the proper application of TCDs. It is advisable to document the analysis process, the date the work was done, and the name and signature of the person making the judgment as a component of the BAER records and sign plan inventory for the road.

The travel management strategy identifies the type of signing necessary. If the management strategy is to discourage use at certain times of the year when the risk is higher, a warning sign is appropriate. If the threat to life in an area is identified, signing combined with a physical closure or barrier may be required. If prohibiting traffic, prepare and enforce a legal order citing the appropriate CFR. Install restrictions as necessary. Sign the area with the appropriate TCD.

Warning signs warn drivers of unexpected conditions on or adjacent to a road and to situations that might not be apparent. Warning signs indicate the need for caution on the part of the vehicle operator and may call for a reduction of speed or a vehicle maneuver that is not consistent with driver expectancy. The following signs are used to identify warnings in or adjacent to a burned area.

Contact the forest or regional sign coordinator on the engineering staff for sign ordering advice, vendors, and order forms. Nonstandard signs must be approved by the regional sign coordinator.

Use the following caution signs for trails and roads.



Warning Information
signs for trails
2-inch letters 12 x 24 min

Figure 109—Entering burn area, stay on trail.



Warning Information sign
Roads less than 35 mph
4-inch letters 36 x 48

Roads 35-50 mph
5-inch letters 42 x 60

Figure 110—Entering burn area, stay on roads and trails.

If these signs are warning only and there is no order to keep people on roads and trails use yellow and black signs. If there is a closure order to prohibit off road or trail use, then black and white signs should be used.



FW8-7a Forest Service Standard sign
Many States have their own supplement such
as WATCH FOR ROCKS

Figure 111—Falling Rock – FW8-7a Forest Service Standard sign. Many States have their own supplement such as WATCH FOR ROCKS.



FW5-1f

Figure 112—Impassable during high water.

The IMPASSABLE DURING HIGH WATER and FLASH FLOOD AREA signs may be used where unexpected or seasonal high water would prevent passage. Dry washes that drain a large area in desert country are an example of places to use the FLASH FLOOD AREA sign. A depth gauge may be used with either sign but is especially helpful in dry wash installations. An engineering study is recommended before installing depth gauges.



FW5-1g

Figure 113—Flash flood area.

Use individual warning signs at specific locations where the hazard exists. Avoid oversigning as disrespect of the message will occur and signs lose their effectiveness.



Figure 114—Falling rock and debris.

This sign is used for areas of trees, limbs, rocks, stumps that may be coming off the side slope and entering the travelway.



Figure 115—Falling rock and debris flash flood area next __ miles.

Tools/Equipment	Tools necessary for implementing warning signs include posthole diggers, drills, and screws. Ensure the correct mounting method is used for the appropriate signs.
Safety	Warning sign installation is implemented more safely when hazards are identified and mitigated. Review and update the JHA to avoid injuries. Include the following in the JHA. • Working in areas with unstable footing. • Lifting large signs may cause muscle and back strain.
Treatment Monitoring Recommendations	Implementation • Were signs installed in all locations as designed? • Do the signs meet FSM direction for warning signs? Effectiveness • Did users alter their use of the area as a result of the warning signs? • Did the identified emergency occur in the areas designated? • Was a travel management strategy for the burned area identified? • Was the treatment responsive to the travel management strategy selected (discourage, eliminate, or prohibit)?