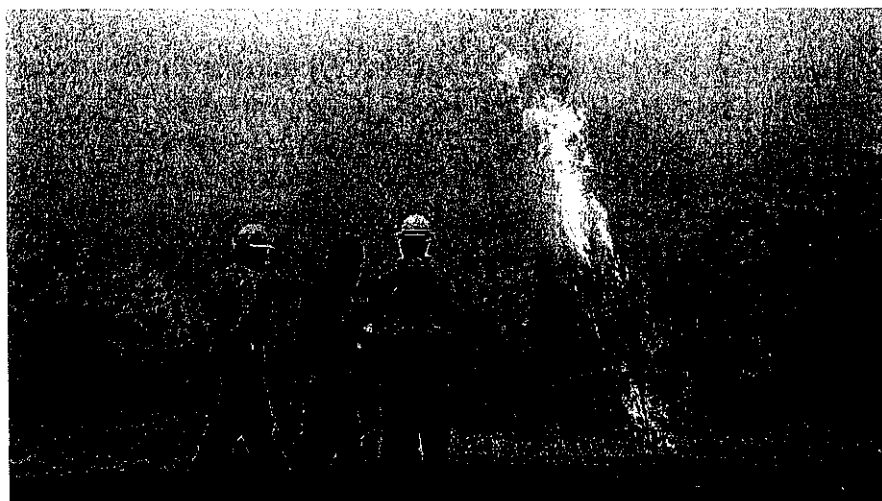


**FIRE SUPPRESSION REPAIR PLAN
for the
McKinney FIRE**

**Klamath National Forest
Oak Knoll and Scott River Ranger Districts**

USDA Forest Service

Amended 10/04/2022



Approved by: *Kris Sextant*
Kris Sextant, Deputy Forest Supervisor/ Agency Administrator
Klamath National Forest

Approved by: *Keoki Correa*
Keoki Correa , Incident Commander
Klamath National Forest

Approved/ Prepared by: *Matthew Nourmohamadian*
Matthew Nourmohamadian, Lead Resource Advisor

OVERVIEW

The overall objective of this plan is to describe how damage caused by fire *suppression activities* will be repaired. Detrimental effects and damage to resources caused by the *wildfire* itself are not considered under this plan.

Implementation of this fire suppression repair plan will be in compliance with all pertinent rules and regulations regarding fire suppression activities, including policies covered in FSH 6509.11g_50. This repair plan complies with management direction, standards, and guidelines in the Klamath National Forest *Land and Resource Management Plan*. Damage to State, County, and private lands caused by wildland fire suppression activities will be repaired to the minimum extent needed to prevent further loss or injury. Treatment of the various fire suppression activities, as well as the responsibility for implementation are indicated in the following description.

This fire suppression repair plan is organized in two stages of implementation in order to define the timing of activities depending on fire behavior and available line personnel.

Stage 1 suppression repair is the responsibility of the Incident Management Team (IMT) in place when the timing is right to accomplish the repairs. Repairs will be accomplished in close coordination with the lead resource advisor (READ). A list of necessary repairs will be developed and approved by the READ. Repair guidelines are in the appendices at the end of this document.

Stage 1 repairs will occur on roads, trails, fire lines, drop points, staging areas, spike camps, helispots, water drafting sites, and all other facilities used by suppression resources. Examples of Stage 1 repairs include erosion control measures (water bars, rolling dips, road berm removal, opening of culverts and road ditches, etc.), grading, ditch clearing, and decking of felled trees along utilized system roads, restoring drafting sites and water crossings, and removing all trash, cached supplies, and hose lays from the fire area. Stage 1 repairs, in contrast to stage 2, are prioritized by the urgency in properly controlling erosion and user safety prior to the onset of winter precipitation. The timing of these actions should coincide with a reduction in fire behavior which provides for the safety of all repair personnel.

Hazard reduction to facilitate safe access within the fire perimeter will occur during suppression repair.

Stage 2 suppression repairs will be a shared responsibility of the IMT and Klamath National Forest. The IMT will be expected to complete as much stage 2 repair as possible as fire conditions warrant. The agency administrator representative and the READ will work with the IMT on the expectations of stage 2 repair.

Stage 2 repairs for damage caused by fire suppression efforts include but are not limited to hand and machine piling of slash on fire lines, preventing vehicular access to formerly closed roads and dozer lines (log & earthen berms). These repairs could also include mulching & seeding of fire lines, chipping accessible slash piles, among other measures. These repairs will occur at the appropriate time(s), generally after stage 1 activities have been completed and after the fire has been contained.

Repairs on non-forest service land are the responsibility of the landowner.

McKinney Fire Suppression Repair Plan

This plan has been approved by the Incident Commander of the IMT. Any additions or clarification of guidelines will be incorporated by addendum. All suppression repairs will be charged to fire code **0505 P5PX2F22/23**.

The objectives of suppression repair on the McKinney Fire are:

- 1) Minimize sediment delivery to stream channels
- 2) Minimize loss of soil productivity due to potential erosion in cleared areas.
- 3) Repair damage to NFS roads and trails.
- 4) Minimize suppression impacts to inventoried roadless areas and wild and scenic river corridors.
- 5) Restore facilities used by suppression resources.
- 6) Minimize impacts to cultural and historic resources.
- 7) Treat fuels created during fire suppression activities and suppression repair activities.
- 8) Minimize damage to impacted meadows and wetlands.

These objectives will be reviewed and validated by the READs assigned to the incident by verifying work has been completed to standard in Field Maps.

GENERAL REPAIR GUIDELINES

Unless otherwise recommended by the READ, the following guidelines will be followed in the course of suppression repair. Resource advisors will identify all repair needs (see Appendix F) and verify their successful completion to the READ.

STAGE 1

A. Heritage (Archaeological, Cultural, and Historical) Resources

1. Prior to repair work at known heritage resource sites consult with the assigned archaeologist.

B. Fire Lines (Hand and Dozer)

1. Construct water bars and/or rolling dips on all fire lines where surface erosion is likely to be a concern.
 - Water bar design and placement should follow the intent of the attached specifications (Appendices A and B) and be implemented according to the terrain and soil types present at each fire line.
 - Highly erodible, steep slopes may warrant more frequent water bar placement than the guidelines indicate. Back-blading may be useful for compacting very steep dozer lines perpendicular to the hillside contour.
 - Excavators are preferable to dozers for completing repairs on dozer lines and should be used when available.
 - Hand clearing of water bar outlets may be needed to ensure proper drainage.
 - Water bars and rolling dips should alternate drainage directions when practical, and drain into natural channels, if present.

McKinney Fire Suppression Repair Plan

2. Where practical, trenched hand lines should be pulled back to the natural contour of the slope to reduce channeling water erosion.
3. Fire lines that cross drainages will be cleaned of debris, excess dirt, and recontoured to the original slope to the extent feasible (Appendix C). Constructed stream crossings (temporary culverts, Humboldt crossings, etc.) will be removed. Vegetation should be lopped and scattered off the fire line or piled for burning, chipping, or removal. A READ should be present during the implementation of this repair activity.

C. Discrete Suppression Activity Areas (Spike Camps, Drop Points, Staging Areas, Safety Zones, Tanks, Helispots, Sling Sites, etc.)

1. Constructed or improved discrete suppression activity areas will have any accumulated berms spread out to reduce the likelihood of pooling and improper drainage.
2. Pile and plastic cover all slash generated during area construction directly on the area for ease of burning. Piles will be burned when conditions are appropriate under an approved burn plan.
3. All discrete suppression activity areas identified as Primary (see Appendix F) will have no slash scattered across their surfaces.
4. All discrete suppression activity areas identified as non-rimary (see Appendix F) may have adjacent slash spread across their surfaces. Slash pile construction is still preferable to scattering and may be necessary for excessive quantities of slash.

D. FS System Trails

1. Restore system trails to pre-fire condition specifications. Spread accumulations of duff and mineral soil but consider keeping foot trail to bare mineral soil. Desired trail bed width is 24 inches on primary trails and 18 to 24 inches on secondary trails.
2. Restore trail surface and water drainage features. identified in their Trail Management Objective.

E. FS System Roads (Main Stems, Spurs, and Turnouts)

1. System roads used by fire suppression resources will be returned to their pre-existing conditions.
 - Dirt and gravel roads will be watered and graded to restore and stabilize their surfaces.
 - Berms created along roads during fire suppression will be removed to restore proper drainage.
 - Ditches, side drains, rolling dips, culverts, and other existing road drainage features that were damaged by fire suppression activities will be repaired and or cleaned to functioning condition and established forest service road maintenance standards.
 - Clear accumulated debris from culvert inlets.
 - Restore improved or modified low water crossings to pre-fire conditions. A READ should be present during the implementation of this repair activity.
 - Fall all hazardous trees along roads used by fire personal.
 - Pile or deck trees felled during suppression and hazard mitigation outside of riparian areas.
 - Chip slash and spread chips so they do not impact drainage structures or go into stream courses or wet areas.

McKinney Fire Suppression Repair Plan

2. County roads used by fire suppression resources will be returned to their pre-existing conditions.

- Dirt and gravel roads will be watered and graded to restore and stabilize their surfaces.
- Berms created along roads during fire suppression will be removed to restore proper drainage.
- Ditches, side drains, rolling dips, culverts, and other existing road drainage features that were damaged by fire suppression activities will be repaired and or cleaned to functioning condition and established forest service road maintenance standards.
- Clear accumulated debris from culvert inlets.
- Restore improved or modified low water crossings to pre-fire conditions. A READ should be present during the implementation of this repair activity.
- Fall all hazardous trees along roads used by fire personal.
- Pile or deck trees felled during suppression and hazard mitigation outside of riparian areas.
- Chip slash and spread chips so they do not impact drainage structures or go into stream courses or wet areas.
- Road surfacing well be restored to pre-existing condition.

F. Wetlands and Meadows

1. No work should be implemented in these areas prior to consultation with the READ.
2. Use hand tools to decompact wetland and meadow soils impacted by suppression activity.

G. Water Sources

1. Remove any dams, dikes, or other impoundments that were created for fire suppression efforts.
2. Recontour stream banks damaged by suppression activities as directed by the READ.
3. Clear any accumulated debris from culvert inlets at drafting sites.
4. Clean and/or remove any soil and vegetation impacted by fuel or oil spills.

H. Gates and Fences

1. Repair or replace any gates and fences cut or damaged by fire suppression activities unless no longer needed suppression damaged fences will be removed in lieu of repairs.

I. Garbage and Equipment Removal

1. Fire suppression equipment and supplies, litter, discarded hose, and other material refuse, and all non-necessary flagging will be removed from all areas of fire suppression. Additional flagging and signage will be removed during stage 2.

J. Private Property

1. Damage to state, county, and private land and improvements caused by fire suppression activities will be repaired to the minimum extent needed to immediately correct the damage to prevent

McKinney Fire Suppression Repair Plan

further loss or injury. Additional repairs desired by the state, county, or private landowner are the responsibility of the landowner or through the compensation claim process.

STAGE TWO

A. Fire Lines (Hand and Dozer)

1. For dozer line with excessive slash defined by the READ, pile slash generated during fire line construction outside of riparian areas as it makes sense for ease of burning, and with consideration to future fire-line use.
2. Excavators are preferable to dozers for completing repair of dozer line and should be used if available. If dozers are used, a six-way blade is preferable.
3. Hand clearing of water bar outlets may be needed to ensure proper drainage.
4. If not already completed under stage 1, berms along hand and dozer lines will be pulled back into and spread across the line. A resource advisor should be present during the implementation of this repair activity.
5. Where practical, trenched hand lines will be pulled back to the natural contour of the slope to reduce channeling water erosion.
6. Where accessible by roads and trails, fire lines will be blocked to prevent unauthorized use.
 - For dozer line entry points, construct earthen berms, when possible, in order to prevent vehicular access from roads (Appendix D).
 - For hand line entry points, cover the line with slash to disguise its visual presence as far as practical from its intersection with a road or system trail.
7. Spread certified native weed free seed and certified weed free mulch or wood chips generated by danger tree abatement/ repair on the first 250 feet of dozer lines where they intersect roads and at stream crossings. Prior to implementation, consult with the district or forest botanist to determine which species to use as well as the application rate.

B. Heritage (Archaeological, Cultural, and Historical) Resources

1. Prior to repair work at known heritage sites consult with an assigned archaeologist.
2. An ARCH or heritage consultant will be required to be present during the repairs of heritage resources.
3. At risk sensitive natural and cultural resource areas are flagged using orange and white striped flagging. Site specific damage repair prescriptions will be developed between the Incident Management Team (IMT) and Resource Advisors. Additional ground disturbance should be avoided. Impacted sites will be reported to the Resource Advisors as soon as possible and work in the immediate area will stop until a Resource Advisor can access the damage.
4. Archaeological sites that are damaged by suppression activities will undergo two stages of repairs.
Stage 1 will be repair damage to archaeological sites as prescribed by the REAF archaeologist.

McKinney Fire Suppression Repair Plan

Stage 2 will be to conduct site assessments for all sites discovered and/or damaged as a result of suppression activities and conduct determinations of eligibility to the National Register of Historic Places for sites that were adversely affected.

C. Discrete Suppression Activity Areas (Spike Camps, Drop Points, Staging Areas, Safety Zones, Tanks, Helispots, Sling Sites, etc.)

1. Follow hazmat protocol for fuel or oil spills.
2. If desirable chip piled fuels at identified areas.
3. Seed and mulch areas as appropriate certified weed free seed and mulch. Prior to implementation, consult with the district or forest botanist to determine which species to use as well as the application rate.

E. FS System Roads (Main Stems, Spurs, and Turnouts)

1. Dirt and gravel roads will be watered as needed and graded to restore drainage and stabilize their surfaces.
2. Drainage structures will be cleaned/repared to facilitate full functioning capacity.
3. Berms created along roads during fire suppression should be removed to restore proper drainage.
4. Block access to Maintenance Level 1, user-created (non-system), and decommissioned roads utilized during fire suppression by constructing log-based earthen berms.
5. Fall all danger trees that can fall on roads used by fire personal. (see Danger Tree Abatement Plan)
6. Pile or deck trees felled during suppression and danger tree abatement outside of riparian areas on landings approved by READs.
7. Chip slash and spread chips so they do not impact drainage structures or go into stream courses or wet areas. Chips will not be spread on roadways.

F. System Trails

1. Naturalize trailheads by scattering duff, woody debris, and rocks. Do not scatter any material in parking areas at trailheads.

G. Wetlands and Meadows

1. No work should be implemented in these areas prior to consultation with the READ.
2. Use hand tools to decompact wetland and meadow soils impacted by suppression activity.

H. Water Sources

1. Naturalize areas by scattering duff, woody debris, and rocks as necessary.
2. Spot rocking and hardening of water sources may be necessary for water sources not along rivers.

McKinney Fire Suppression Repair Plan

I. Miscellaneous

1. Remove porta-potties, signage, non-necessary flagging, and any installed structural wrap from all areas of fire suppression.
2. If recreation site vault toilets were used significantly by fire suppression personnel, ensure toilets are pumped. This can be paid for with P code repair funds.

J. Skid Trails and Landings

Skid trails and identified improved landings constructed on the incident to remove danger trees will be repaired to restore soil structure, improve aeration porosity, control erosion, restore drainage patterns and visual quality.

1. **Decompaction:** Rip with teeth of excavator bucket to loosen soil below compacted surface. Rip deeper in the middle of the trail than the inside (uphill) track. This will provide an out sloping profile for the loosened soil
2. **Recontouring:** Place soil material to top of the cut bank and wood chips or mulch (if available)
3. **Erosion Control:** Construct water bars to help ensure slope hydrology has been restored. Water bars can be regularly spaced as well as positioned at obvious swale locations. Water bars are constructed to collect flows and disperse water down slope. See appendix A for information on water bars
4. **Surface Roughness:** Where feasible place slash and coarse woody debris at 60 % ground cover irregularly to prevent erosion at a depth of 4 inches or less.
5. Knock down berms and scatter slash on improved landings when no longer needed.

K. Biomass Material

Danger Tree Abatement Slash Plan

1. Process and deck logs that meet Utilization specifications pursuant to the Tree Abatement Plan: Douglas-fir and other coniferous species over 10" DBH to 8" small end in 10 foot lengths
2. Where practical all species of logs 4"- 8" DBH should be stacked in a separate pile for firewood.
3. Mechanically pile remaining slash (tops and limbs) as compact as possible as described in the Tree Abatement Plan. Cover pile with polyethylene to cover approximately 4' X 4'. Pile locations will be inventoried and communicated to the forest to be burned.

Repair Group Slash Plan –

1. In order of precedence: chip, lop, and scatter mechanically piled slash pursuant to the Tree Abatement Plan.

SLASH TREATMENT SPECIFICATIONS

McKinney Fire Suppression Repair Plan

"Stack"	Logging slash that does not meet Utilization Standards, is greater than four inches diameter (large end), and ten feet or more in length shall be STACKED along and be accessible from the roadside for disposal by Forest Service. Stacks shall not be placed against residual live trees or protected improvements, such as ditches, drainage structures, or on slopes that exceed 65%.
"Machine Pile"	In areas less than 30% slope and where concentrations of slash exceed 60% ground cover and 12" depth, logging slash that does not meet Utilization Standards or "Stack" standards will be limbed and bucked to lengths no greater than 10 feet and machine piled. Machine piles will be piled as compact as possible, reasonably free of soil, and to facilitate burning.
"Chip"	Chip mechanically piled slash and spread to a depth of not more than 4-6inches. Chips will be scattered on landings or skid trails adjacent to Forest Service system roads. Chips will not be located on or in improvements, such as ditches or culverts. Excessive quantities of chips will be dispersed at locations identified on the repair map and spread out to a depth of four inches or less.
"Scatter"	Slash will be lopped and scattered to provide up to 60% ground cover and reduce heavy slash concentrations. Slash will not exceed a depth of 12 inches. Do not scatter slash against residual trees, or on or against protected improvements.

SPECIAL REPAIR CONSIDERATIONS

A. Special Repair Considerations for Heritage Infrastructure

Recreational Infrastructure:

1. **Wood Chipper Cabin** was wrapped in preparation for the McKinney Fire. During repair all structures will be unwrapped. Care should be taken when removing the staples to not further damage the structures. All used wrap, pulled staples, and tape will be completely packed out.

B. Special Repair Considerations for Roads

PLAN TENURE

This fire suppression repair plan is subject to changes and amendments as the situation changes and additional repair needs are identified. Refer to Appendix E for a quantitative summary of repairs and anticipated suppression resource needs, and Appendix F for the most current listing of repair needs.

Appendix A Effective Waterbars

When locating and building water bars, place them the right **distance** apart, at a **diagonal** to the fire line, so that they **divert**, then **discharge**, then **dissipate** the energy of the flowing water. Be sure to make them deep enough so they'll be durable, and that soil does **not block** the water bar outlet.

Recommended spacing for waterbars on firelines.

Fireline slope %	Maximum Distance Apart (feet)
1-5	200
6-20	125
21-40	60
41-60	40
>60	25

Waterbars should be at least 2 pulaski (4-6 inches) widths wide and 12-24 inches high for handlines.

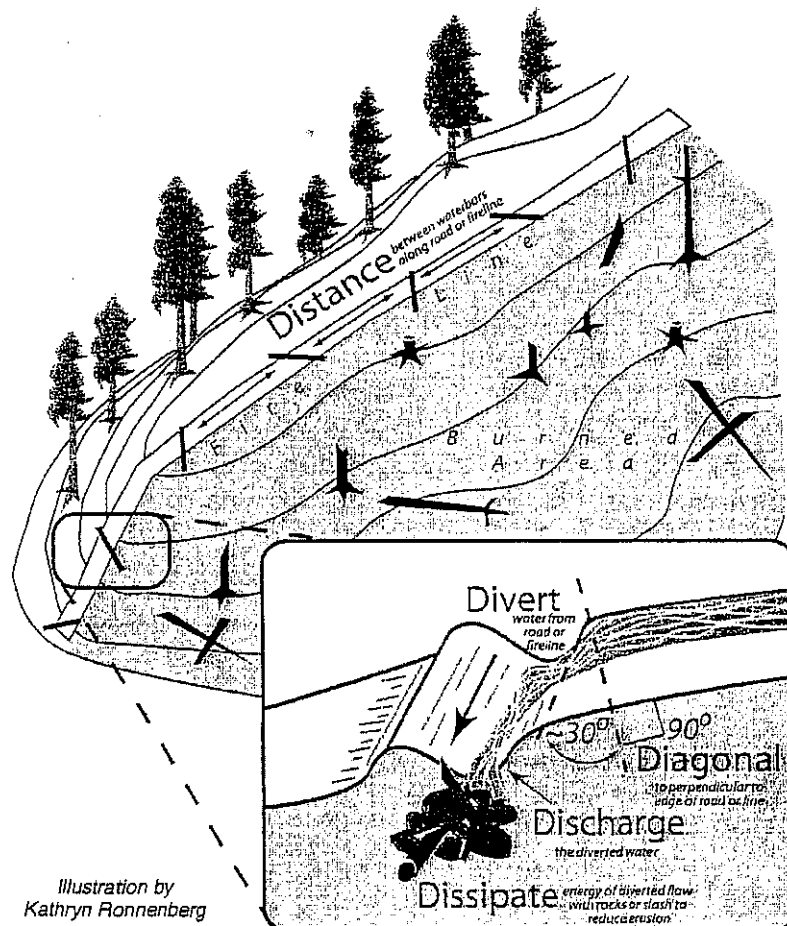
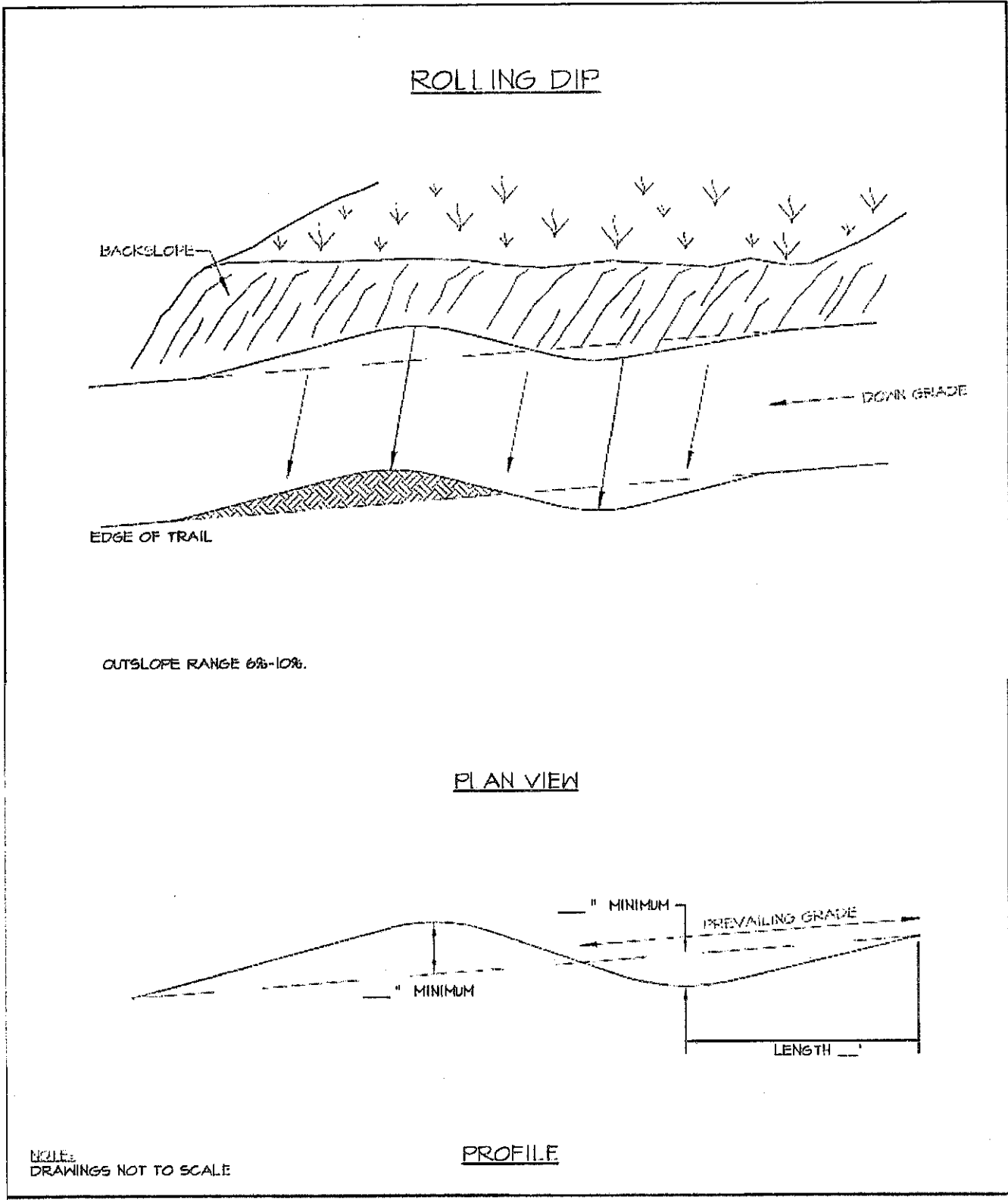


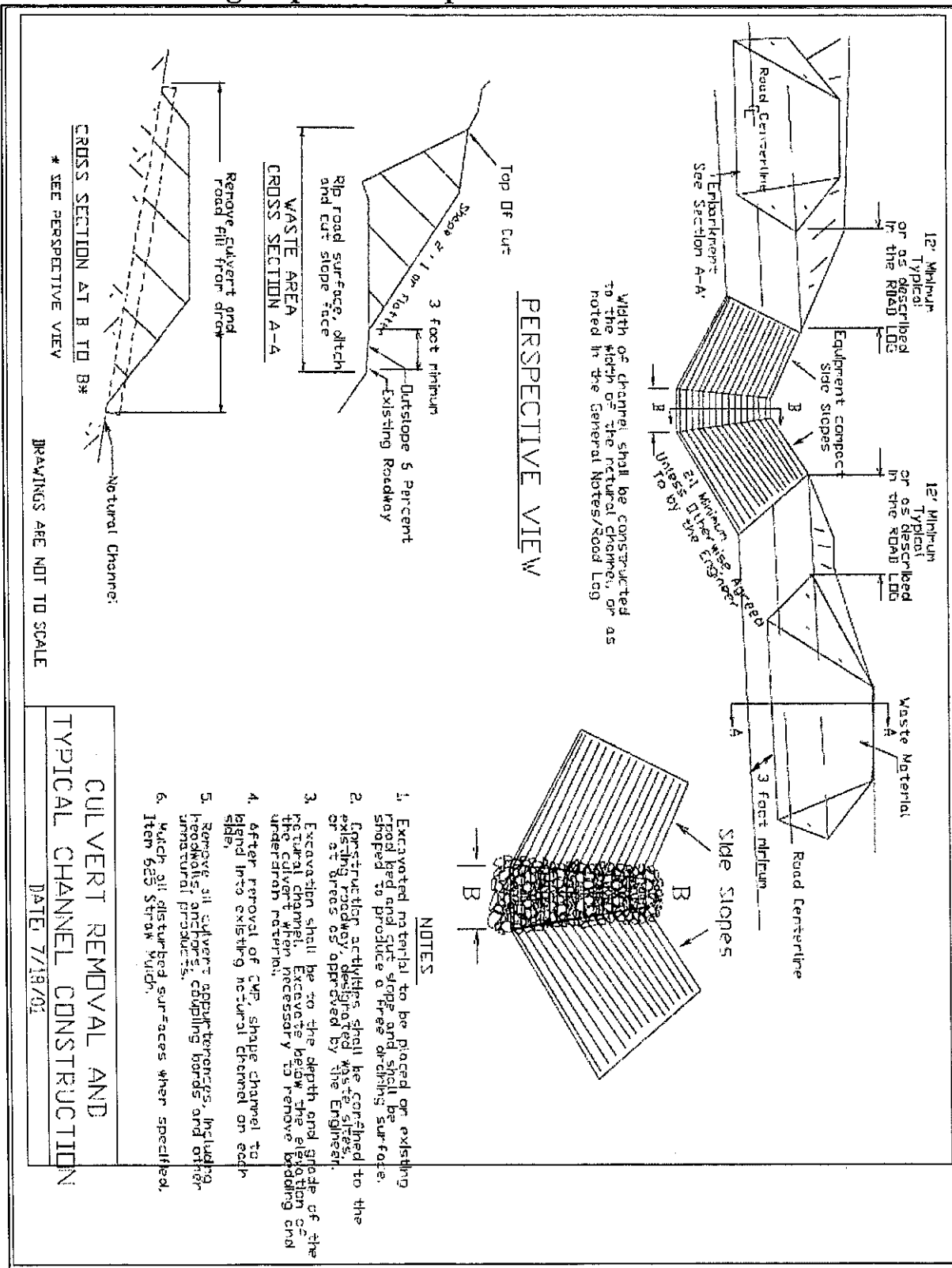
Illustration by
Kathryn Ronnenberg

Appendix B

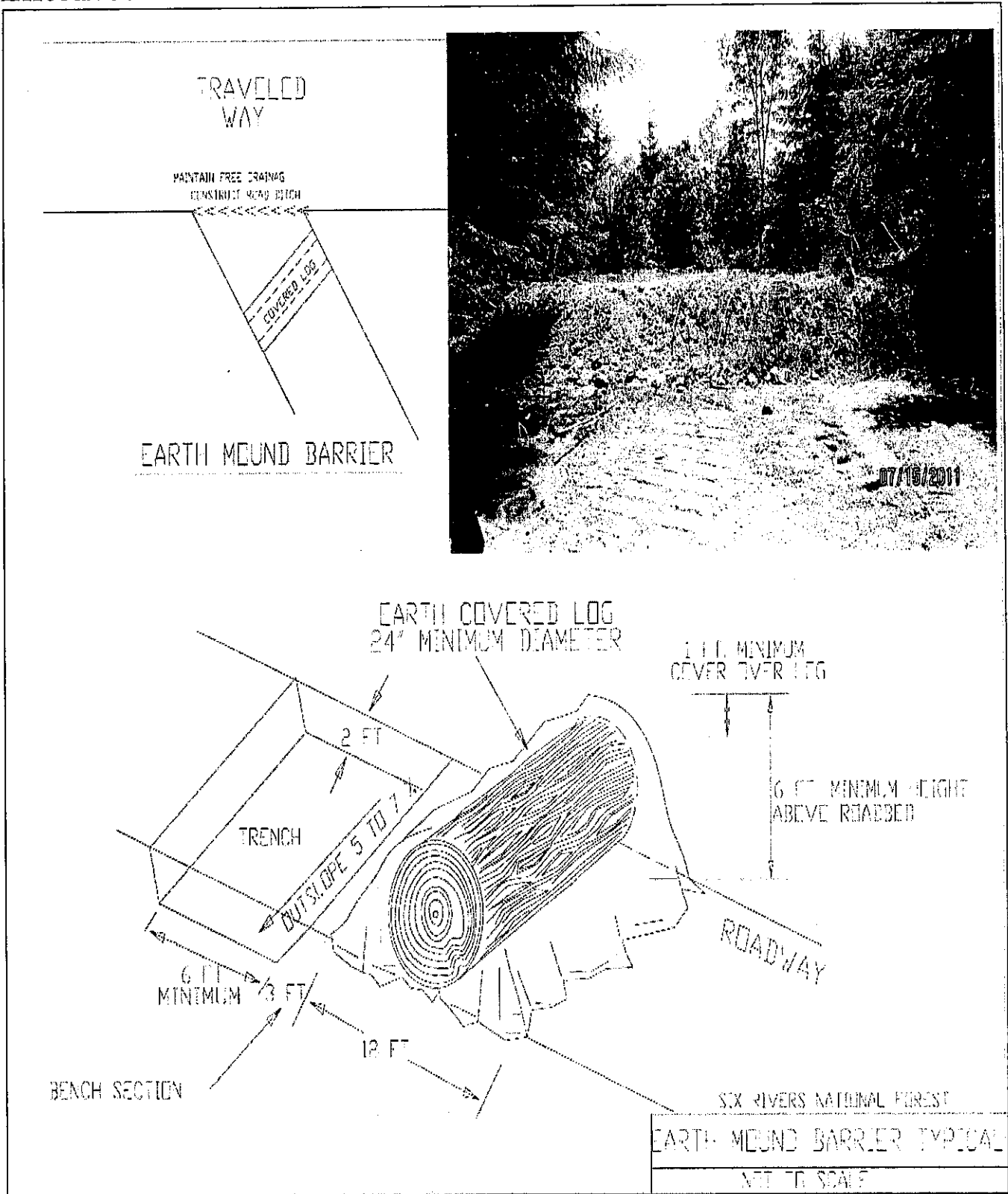
Rolling Dip Example



Appendix C Stream Crossing Repair Example



Appendix D Effective Earthen Berms



Appendix E

**Repair Locations and Descriptions and Summary – Refer to Suppression
Repair Map and Dashboard**

Appendix F

Skid Trail Repair

Goals:

The goal is to improve site nutrient and soil moisture holding capacity (which provides a good substrate for seedling establishment and growth), restore soil structure, improve aeration, prevent erosion, restore drainage patterns, and leave hummocky surface with variable micro-relief which incorporates large woody material.

Summer-Built Trail Rehabilitation

A summer-built trail, which will not be rehabilitated before operations end and winter begins, will require seasonal deactivation to manage water. Waterbars and / or swales need to be constructed to shed water from the trail and prevent erosion.

A winter-built trail, which has a snow layer as part of the fill, will require careful planning in order to have all rehabilitation completed before snow melts. If the snow fill melts, the stability of the trail will be compromised.

PHASES OF REHABILITATION

Site Preparation: Remove large branches and stems before decompaction. No long branches or stems should be left in place during decompaction or recontouring (do not mix branches in with the soil). The stems could intercept and direct subsurface seepage resulting in concentrated flows causing erosion or instability.

Recontouring: Placement of soil material in reverse order – manage nutrient rich top soil to promote soil productivity. Place soil material to top of the cut bank.

Water Management: Construct waterbars to help ensure slope hydrology has been restored. Waterbars can be regularly spaced as well as positioned at obvious swale locations. Waterbars are constructed to collect flows and disperse water down slope. Waterbar spacing will prevent concentrated flows from forming. Outslapped swales or rolling grades constructed along the rehabilitated trail will provide water management benefits similar to those of waterbars.



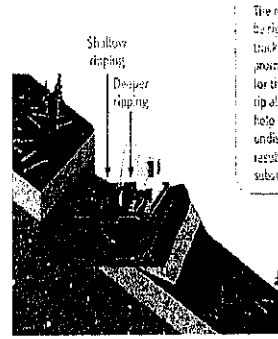
Decompaction: Rip with teeth of excavator bucket to loosen soil below compacted surface. Rip deeper in the middle of the trail than the inside (uphill) track. This will provide an outslapping profile for the loosened soil. The outer (downhill) track will be decompacted during ridgecast retrieval as part of recontouring.

Planting: Tree seedlings provide the growing stock of timber for future forest management. The phases of decompaction and the retrieval of soil during recontouring help with seedling establishment and growth. Large woody debris should not be spread too thick otherwise it would interfere with the planting areas for tree seedlings.

Surface Roughness: The placement of large woody debris over the recontoured surface will help provide microsites more suitable for tree seedling growth; woody debris provides both shade and associated moisture retention. Keep the surface rough and irregular to prevent erosion. The use of large woody debris will aid in preventing rainfall from eroding bare soils.

Decompaction should be done by ripping the trail surface with the teeth of an excavator-mounted bucket. A ripping depth of 10 to 30 cm is easily achieved.

Further spreading of the ripped material can be done with the bucket of the excavator which also will loosen the newly ripped surface material.

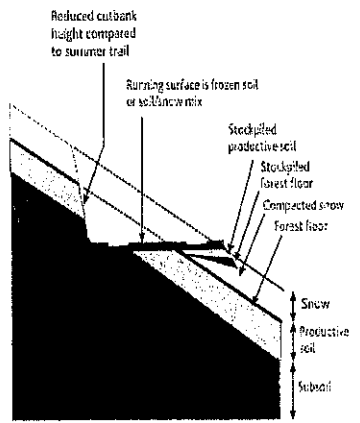


The mud track position should be ripped deeper than the inner track (uphill) position. This will provide an outslapping profile for the loosened soil. The shallow rip along the inner track will also help to prevent slipping into the undisturbed subsoil which could result in watercutting any functioning subsurface drainage.

The outer track location will be decompacted during ridgecast retrieval and the placement of this material during recontouring.

SEASONAL CONSIDERATIONS

- When full rehabilitation of a summer-built trail needs to be suspended due to the onset of winter and frozen conditions, partial deactivation is required to control the water and prevent erosion along the trail network. Waterbars must be constructed along the trail before abandoning the trail network for the winter. Full deactivation can start again once the weather permits, allowing decompaction and recontouring to be completed. Rehabilitating trails concurrent with the completion of a logical unit / area will help to reduce the need to suspend activities.
- Deactivation of a winter constructed trail needs to be completed during the winter and before the snow melts. The snow placed as fill is ponding support to the trail. If the snow melts the width of the trail will be reduced and the sorted soil layers will be compromised. A reduced trail width would not provide the needed trail width or stability for an excavator to rehabilitate the trail.
- During winter recontouring, retrieved material placed along the trail will settle as the snow melts, therefore material should be placed higher to compensate for this settlement.



Appendix H
Suppression Repair Plan
GIS, and Suppression Repair Plan Standards

McKinney Fire Suppression Repair Plan

Software

- All assigned Resource Advisors to the McKinney Fire shall use ArcGIS Field Maps for field suppression repair data collection.

Daily Field Documentation

- Repairs shall be noted and documented in the field for all points and linear features (all suppression repair features identified).
- All Resource Advisors shall sync their data upon returning to camp each field day, in advance of meeting with GISS.
- Only one Suppression Repair Map, provided by GISS and on the table in the READ program area shall be marked by READs in camp each evening, to account for field software glitches that may prevent accurate data collection, or other field software issues.

Suppression Repair Map (Linear Features)

Linear repair features (such as roads, handlines, dozer lines, etc.) will be (numbered and) highlighted in one of four distinct colors.

- **Purple** = Needs Assessment
- **Red** = Repair Needed
- **Orange** = In Progress
- **Yellow** = Completed -Ready for Inspection
- **Green** = Completed – Inspected

Note: For all identified suppression repairs of linear features, the colors will phase until all known suppression efforts have ultimately been delineated as purple, or green (to be certified by the Lead Resource Advisor assigned). The associated number with linear event will correspond with this suppression repair spreadsheet (see below).

Suppression Repair Map (Event Points)

For repair event points, (also numbered on the map as noted above) will be represented by green pentagons embossed with specific white icons, corresponding with specific locations on the map. The map key will reflect the word identifier of each “Field-Maps” standardized icon.

Corresponding Suppression Repair Event Spreadsheet

Additionally, for repair events (linear and nonlinear) a corresponding spreadsheet will be structured as follows:

- Spreadsheet will be organized into four columns.
- Primary sections (pages) of the suppression repair spreadsheet will be first identified by Branch (main header).

McKinney Fire Suppression Repair Plan

- Corresponding Divisions (A, B, C, X, Y...) will be captured under the corresponding Branch headings, as secondary headers.
- Under the corresponding Division, the first column will represent the suppression event (numbered 1 through...).
- The second column will be a brief description of the repair needed.
 - This must correctly match the numbered event in in both the spreadsheet, and on the map.
- The third column in the spreadsheet, associated with any numbered suppression repair event, will represent the status (“needs repair,” “in progress,” “repair completed”).
- The final column to the right of any numbered event will be for the initials of the Lead READ, to be signed upon event completion.

If in the event some resources were not able to be repaired by the end of the incident, identify and document those resources, repairs needed, and the reason (as applicable) to share with the Forest.