

**DEPARTMENT OF THE INTERIOR
BURNED AREA EMERGENCY REHABILITATION TEAM**

AUGUST 2001 FIRE COMPLEX

FOREST AND WOODLANDS RESOURCE ASSESSMENT

I. OBJECTIVES

- **Evaluate and assess fire and suppression impacts to forest and woodland resources and identify values at risk associated with losses.**
- **Determine rehabilitation and monitoring needs supported by specifications to aid in soil stability and protect forest and woodland values.**

II. ISSUES

- **Reforestation of woodland species to restore forest cover within severely burned areas.**
- **Potential loss of aspen and woodland cover types from fire effects and land management practices.**

III. OBSERVATIONS

A. Background

Fire History

The August 2001 complex consisted of 13 fires, of 259,165 acres, which occurred between 7/25/2001 to 8/17/01 on the Elko District. For a complete history of these fires, refer to the Operations Assessment portion of this plan.

The forest and woodlands assessment will only deal with 6 fires that had an impact to forest and woodland types. These fires include Tabor Creek, Stag, Mile Marker 367, Coyote, Buffalo, and North Delano.

B. Vegetation

The major woodland species within the fire areas include Pinyon pine (*Pinus monophylla*), Utah juniper (*Juniperus osteosperma*), Curlleaf mountain mahogany (*Cercocarpus ledifolius*), and Antelope bitterbrush (*Purshia tridentata*).

Aspen (*Populus tremuloides*) is the only significant commercial forest species of concern. Remnant stands of aspen appear widely scattered throughout the district

in relatively small stands, some as small as 1/4 acre. Very few relic populations still exist along stream courses and around springs and seeps. **Aspen communities support an array of other species and have the highest biodiversity of any upland forest type in the West.**

Fires have consumed over 1000 acres of aspen communities on the Elko District since 1999.

The pinyon-juniper cover type was found on all aspects and at elevations generally below 7,500 feet. Aspen was generally encountered above 6,400 feet. Occasional aspen clones were encountered at lower elevations in draw bottoms, associated with springs and stream courses.

Current estimate indicate that 58,000 acres of Pinyon-juniper woodlands existed in the Sulpher Springs Management Unit (Sadler Fire) prior to 1980. From 1980 to 1998 it is estimated that 15,500 acres had been lost to wildfires (Ritter, Baer Plan 1999). Add to this the 16,830 acres lost during the Sadler fire (1999), and it is obvious that a serious loss of woodland acres occurs on the district. Historical declines on the Battle Mountain district were unavailable; however, 21,433 acres lost on the Antelope and Trail Canyon fires of 1999 indicate that loss of these habitat types is widespread in Northern Nevada, and that efforts should be made to maintain these species on their native range. According to assessments of fire damage on fires that occurred in 2000, over 7000 acres of Pinyon-Juniper woodland burned.

Earlier in 2001, a Fire Complex in July burned 450 acres of Woodland in the Pequop Mountains.

Table 1, lists acres of Forest and Woodland vegetation compiled from the Field Office vegetation database, field observations from Resource advisor's, and observations made from aerial and ground reconnaissance by the BAER Forester and Elko Field Office Resource staff.

Table 1. Acres of Forest and Woodland Vegetation within Fire perimeters- August 2001

Fire Name	Aspen	Pinyon-Juniper	Mountain Mahogany	Mountain Shrub
Tabor Creek	151			24
Stag	156			
Mile Marker 367		501 (Pinyon)	45	
North Delano		8,823 (Juniper)		

Coyote	320			12
Buffalo	20			
TOTAL ACRES	647	9347	45	36

C. Management Direction

Management direction is outlined in the Resource Management Plans for the Elko Field Office and also Normal Fire Rehabilitation Plans (NFRP's). Specific objectives are:

- Manage suitable forested lands for optimum production of woodland products on a sustained-yield basis while protecting sensitive values.
- Maintain where necessary for management those routes currently servicing pinyon-juniper harvest areas.
- Open pinyon pine ranges that have good or excellent crops of pine nuts to pine nut collecting.
- Seedlings of native shrubs or trees may be planted as an EFR measure to restore forest productivity.
- Rejuvenate deteriorating aspen stands.

The primary concern expressed during the Team assessment process was the general decline in acreage of both aspen and woodlands on the landscape due not only to fire loss, but other land management practices as well.

Without active rehabilitation and restoration, efforts to maintain and reintroduce these species within the Elko Field Area will be limited.

This report will emphasize on the reforestation of these species, as a primary goal of the Field area effected. In addition, this plan will emphasize the monitoring of aspen regeneration, with exclusion of livestock, to recruit new age classes of this species.

D. Tree Damage/Mortality

The following fires contained Aspen as a component of the vegetation:

Tabor Creek

This fire was not observed by the BAER Forester and results of damage are recorded by the Resource Advisor. Most of the aspen vegetation occurs on private

land and received a mosaic to high severity burn.

Stag

There were 35 stands of aspen mapped within the burn perimeter which received mortality ranging from no mortality to stand replacement, with the majority being greater than 75 %. Larger stands contained some green trees within the center that may have been insulated from heat. Some aspen leaves are still intact or are beginning to curl within some of the stands that received lower burn intensities, however, most stands received 75- 100% mortality. Some of the secondary roads that provide access to the public contain potential hazard trees (burned aspen) for vehicles or people on foot.

Coyote

The aspen stands on this fire were found in Beaver Creek, Little Beaver Creek, Toro Canyon, and Barber canyon. Most of the aspen in the upper portions of these watersheds were not heavily impacted and appear to have light underburn or no burn impact. However, the mid to lower portions of these canyons received moderate to severe burn intensities. These vegetation communities included willows along the streamside, that were heavily burned.

Buffalo

The aspen stands impacted on this fire were located in Frazer Creek, which received 80-90 percent mortality in the lower portion of the creek included with high mortality of willows. A small stand also is found near Scrapper springs, which received moderate mortality. Another aspen stand complex is found on Castle ridge and received moderate mortality, but reports from the Resource advisor indicate that hot underburning occurred.

A listing of Aspen stands for monitoring, further examination or management, will be available for the District Forester and found in the Appendix.

Woodland species:

Mile Marker 367 Fire

The majority of the mortality in the woodlands appears to be the result of a wind driven crown fire that raced through the canopy. There is also evidence of some prolonged fire resonance time as indicated by ash patterns, that suggest that some heavy contiguous ground fuel existed pre-burn. Most of this fire experienced 100% mortality with no needles or foliage remaining. From ground reconnaissance, approximately ten percent of the burned area standing dead trees contain some residual needle mass, indicating the wind driven fire event. In areas where burned foliage is still present, the needles are red to blackened and brittle, indicating dead crowns. The results are that the woodland species in these severely burned areas have been eliminated from the landscape. Some woodland areas experienced lower fire intensity and mosaic patterns of unburned or partial burned landscapes. These remnant stands will survive and should regenerate naturally. Additional mortality will continue to occur for several years as a result of fire induced stress and loss of photosynthetic capability. Stressed trees also

encourage mortality from numerous insect and disease pathogens.

North Delano Fire

aerial The assessment of mortality on this fire was gathered by the resource Advisor and reconnaissance by digital photography. This stand of juniper and perennial grass, received moderate to mosaic burn patterns and the juniper canopy was left intact with green trees with some pockets of stand replacement. There should be adequate green tree retention for future seed source and forage production should improve.

E. Harvest and Fuels Treatment History

The majority of the burned areas have little history of harvest treatments, with limited harvesting of small amounts of woodland products such as fuelwood, posts and Christmas trees.

The past history of fire suppression, limited forest management, and ecological conditions has allowed many stands to reach high stocking densities and maturity, which contributed to the fire intensity.

IV. Reconnaissance Methodology and Results

Burn area assessment consisted of both aerial and ground reconnaissance and mapping. Due to poor access and limited flight time, many areas received limited inventory by the BAER forester. Only those fires that were known to have a significant impact to the forest and woodlands were surveyed. Other information provided by various resource advisors attached to the Field Office EFR Team was used as a source for treatment specification development.

A. Forest Mortality

Levels of fire mortality in woodland areas can generally be categorized as moderate(with less than 30% of the stems killed), mosaic burn (with up to 80% of the stems killed) and stand replacement (> 80% mortality).

The Mile Marker 367 fire, in the Pequot Mountains, sustained a stand replacement fire due to fuel moisture, steep terrain, high winds, low humidity, and stand density over

236 (range of 90 -440) stems per acre.

Pre-fire inventory data on the Mile Marker 367 fire showed an average of 10 cords and 43 posts per acre. Expanding upon these figures, a conservative estimate of volume lost due to fire indicates more than 5000 cords of fire wood and 21543 posts. Approximately, 80%, of Mile Marker 367 fire is inoperable due to slope. The North Delano fire sustained a moderate to mosaic burn with many green canopies present from aerial reconnaissance. Pre-fire inventory data indicates that these stands of Utah juniper contain an average of 225 trees per acre (range of 110 to 440 trees per acre). The average volume of standing trees is 6.8 cords per acre and 85 posts per acre. Expanding upon these figures, an estimate of volume lost due to fire mortality would be about ten percent of the total acreage or 6000 cords of firewood and about 75000 posts.

Table 2. Woodland Volumes and Fire Mortality

Fire name	Acres of Woodland	Standing Volume: cords per acre	Trees per acre (average from District Inventory Plots)	Volume loss: from fire mortality
Mile Marker 367	501	10 cords per acre	236 (range of 90 to 440)	10 cords per acre or 5000 cords total (100%)
North Delano	8,823	6.8 cords per acre	225 (range of 110-440)	6000 cords (10%)

B. Potential Reforestation

Reforestation acreage is based primarily on the ability of the local districts to handle reforestation related contracting activities, as there is certainly more area, based on previous fires, that requires reforestation than the local resources can handle (if given 10 years to complete). For example potential reforestation acreage on Mile Marker 367 is 50 acres. Stocking density by species is listed in Tables 3.

Table 3. Planting acreage by species and trees per acre.

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SPECIES	ACRES	Trees / Acre
Pinyon pine	50	300
Curlleaf mountain	50	75
Antelope Bitterbrush	Interplant with Above Species 75 per acre	

C. Potential Salvage

Some, approximately 20 percent, of the burned area will be opened to the public to harvest usable products. Boundaries will be established on some areas by BLM staff.

D. Forest Health

Aspen stands that were burned will actually benefit from the effects of the fire. The aspen is expected to sprout rapidly and rejuvenate the clones that remain. During the development of this text, it was documented that aspen suckers were already appearing on the Stag Fire. The pre fire condition of these clones contained decadent mature trees that were dying out through natural succession. Post-fire sprouting will return these areas to their early seral stage and create multi-aged and multi-storied stands. Some of these areas can be expected to expand in size over the pre-fire acreage.

Woodland species, that experience stand replacement however will experience just the opposite effect. The intensity of the fire has effectively removed extensive areas of tree cover and all associated seed sources. Without management intervention through reforestation, these areas will experience a type conversion within the foreseeable future, from trees to grass and shrub species. It is imperative that a seed source be reintroduced into as many of these areas as possible to enhance regeneration to woodland cover types. Long term benefits of

this action will include, restoring wildlife habitat by providing cover and browse species. Tree cover will break up contiguous fuels and may limit the potential for future catastrophic fires. The planting of pinyon pine will provide a future source of pinyon nut for collection by Native Americans in addition to the general public. Native Americans have expressed the concern that this crop may have been removed by fire, at public meetings and individually, to the BLM staff on numerous occasions.

V. RECOMMENDATIONS

A. Specification Related Treatments

Contour Tree Falling (On the Mile Marker 367 Fire) #1 F-1

Because the Mile marker 367 fire burned within a small steep watershed and standing dead trees are available, Contour felled logs for detaining runoff will be necessary to reduce water velocity, break up concentrated flows, and induce hydraulic roughness to the burned watershed.

The following activities can be accomplished by using EFR funds as outlined in the specifications section of this plan.

Fencing of burned aspen stands , # 2, F-2

Fencing of selected aspen stands that received stand replacement fire (see Map Index, Treatment Section for location) will allow the aspen stands to regenerate naturally and become fully established without undue pressure from livestock grazing. Proposed fencing of aspen stands will include the Stag, Buffalo, and the Tabor Fires . Those stands that are not fenced should also be monitored, and grazing restrictions or additional fencing implemented, if necessary, to give these stands a chance to regenerate.

Reforestation of suitable severely burned sites, # 3, F-3

It is proposed that 50 acres on the Mile Marker 367 fire in the Elko Field Area be reforested with woodland species including Pinyon pine, Curleaf mountain mahogany and Antelope bitterbrush. This acreage represent's ten percent of the acreage that was exposed to stand replacement fire. Seed collection should occur as soon as possible as a local seed source is preferable to improve the chances of survival. An existing seed source of Pinyon is not currently available at this time, therefore planting of 2-0 stock (acceptable size root system for outplanting)would not be available for planting until 2004 or 2005, depending on seed quality and sowing dates. Mountain mahogany and bitter brush seed is planted as a 1-0 stock and could be planted in the year following sowing also dependent on seed source availability. All seed should be grown at the U.S. Forest Service Placerville Nursery in California.

Planting should either be contracted with NDF conservation crews or with commercial planting contracts on a competitive bid process or a combination of both. This will allow for the reforestation of as much of the area as possible during the time constraints associated with the use of EFR dollars and tree planting season "window."

Planting on high productivity sites and in the most severely burned areas should receive the highest priority. This will allow for the reintroduction of a future seed source throughout the effected areas and speed up the reintroduction of the native cover type. Stocking density should be approximately 300 trees per acre (TPA). A spacing guide is not being recommended as specific micro sites should be utilized to increase the potential for seedling success. Pinyon initially requires shade to become established. It should be planted next to stumps, trees or debris to increase its survival potential. Planting units will generally range from 5 to 25 acres in size. Larger blocks may be prescribed during the lay out process.

Efforts should emphasize the treatment of high site productivity areas, with good access, that were exposed to stand replacement fire. This will improve the chances for successful regeneration. Areas that received low to moderate intensity (mosaic) burns and areas with unburned green islands have the ability to assist in providing a seed source for future natural regeneration. Areas with poor regeneration potential should not be considered.

B. Specification Related Monitoring

The following rehabilitation-related monitoring may be accomplished through the use of EFR funds.

Monitoring #4, F-4

A percentage of aspen stands, with random sampling, on the Stag, Buffalo, Tabor and Coyote fires should be monitored annually for at least 3 years or until the average stem height is 7 feet. This can be accommodated within this plan through the fall of 2004. At that time other funding sources will need to be found to continue this study. Monitoring should insure that a minimum of 850 TPA be established in the sapling size class. These trees should be single stemmed and disease free. Stand exam procedures will be established by the District Forester to assess the elements of data collection.

If sufficient numbers of acceptable quality seedlings to provide ingrowth to sapling size are not found to be on the sites, additional measures should be considered (such as restricting grazing or fencing additional stands). Deferring livestock use in the pastures that contained burned aspen, until the regeneration attains an average stem height of 7 feet, is the preferred regeneration method.

The majority of the monitoring proposed for woodland plantations is scheduled to

take place in the third year, after planting operations have been completed. Approximately 50 acres of pinyon is scheduled for planting in FY 3. Mountain mahogany and bitterbrush planting may take place in the second and third years of this plan.

Minimum acceptable standards of surviving TPA will need to be established by local district staff based on previous reforestation efforts. The key browse species i.e., bitterbrush should not exceed 25% of current years growth from livestock grazing or 50% combined use of wildlife and livestock as measured following winter use by big game (refer to RMP-ROD guidelines).

C. Non-Specification Related Management

The following recommendations are not related to plan specifications but should be considered. These can not be accomplished through EFR funding.

Salvage of fire killed trees

Harvest operations should take advantage of fire killed species of commercial size and quality, to be utilized for wood products. Scorched or damaged trees with at least 1/3 live crown should not be harvested as they have the potential to survive and provide a local seed source for natural regeneration. The slash that results from this operation will provide a microsite for future natural and artificial regeneration. Slash left on site will also retard the flow of water and soil movement and help to minimize soil erosion.

Continued reforestation

Failed plantations and other areas that are type converted to grass and shrub land should be considered as candidates for a continuing reforestation program on the districts. A continued effort on the part of management will be required to insure that woodland cover types will remain a viable component of the local ecosystem. Alternative funding sources will need to be located to conduct these projects.

VI. CONSULTATIONS

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