Nuttall Complex

Burned Area Emergency Response (BAER) Team
Executive Summary

Coronado National Forest
Safford, Arizona

July 20, 2004

BAER Team Executive Summary – NUTTALL COMPLEX

This plan has been prepared in accordance with the policy established in the *Emergency Stabilization-Burned Area Emergency Response (BAER) in Forest Service Manual FSM-2523*. This plan provides recommendations for emergency fire rehabilitation for all lands burned within the fire perimeter inside Coronado National Forest boundaries. Risk assessment has also been done for major values at risk from post-fire effects. The primary objectives of the Nuttall Complex Burned Area Emergency Response (BAER) Plan are:

- To prescribe post-fire mitigation measures necessary to protect human life, property, and critical cultural and natural resources; and
- To promptly mitigate the unacceptable effects of fire and its suppression on lands within and adjacent to the burned area according to management policy and relevant federal, state, and local laws and regulations.

This plan addresses emergency rehabilitation of fire effects. The watershed group assessed potential soil and water changes within the watersheds from the top of the drainages to locations well outside the fire perimeter. Archaeologists inventoried suppression impacts for potential damage to cultural sites as well as initiating a cultural resource damage assessment. The soil scientist and wildlife biologist worked to identify the seeding requirements and seed mix. The wildlife and fisheries biologists assessed threatened and endangered species. The engineers, hydrologists and soil scientists assessed the ability of the forest roads and drainage structures to withstand predicted flood flows and sediment. The GIS specialist and geographer gathered the data layers necessary for the plan, coordinated remote sensing, and completed the applied resource geography needed for the plan's completion.

Background

The Nuttall Fire, located on the Safford Ranger District, Coronado National Forest, began with a lightning strike on June 26, 2004, on a hillside between Nuttall and Carter Canyons in the Pinaleno Mountains (also referred to as "Mt. Graham") south of Safford, Arizona in Graham County. It was reportedly burning in steep, rugged terrain. Values at risk included the Mount Graham International Observatory complex, fourteen summer homes located in Old Columbine, seventy-four summer homes at Turkey Flat, the Arizona Bible School, threatened and endangered species habitat, shrines sacred to Native American tribes, numerous Forest Service recreation areas, and communications facilities and a historic lookout and cabin on Heliograph Peak. Due to the complexities involved, a Type I Incident Management Team (Dan Oltrogge, Incident Commander), was ordered. The Graham County Sheriff's Department and the Incident Management Team developed and coordinated a plan for population and structure protection. State Highway 366 (also known as the Swift Trail), the only ingress/egress to the mountain range, was closed at the Forest Boundary, with all non-firefighting persons eventually being evacuated. No structures were lost. Two structures, a lookout tower and an outbuilding on Heliograph Peak, sustained damage. Communications instrumentation at that location also sustained damage.

Overall, the fire presented many challenges. Due to the complex topography and weather systems passing through the area, shifting winds were common in many locations, which hampered suppression efforts. The forest was in weakened condition resulting from extended drought and a high level of drought and insect mortality. The terrain around the perimeter was extremely steep, (80% to 100% slopes), presenting hazards for firefighters and causing reliance on air resources.

Due to an increase in temperature and winds, and a decrease in relative humidity, on July 2, fire activity increased on the Nuttall Fire, and the nearby Gibson Fire. The Gibson Fire, ignited by lightning on June 22, had shown little activity prior to that point, and had been managed by the Ranger District. On July 2nd, the Incident Management Team assumed responsibility, and both fires were managed jointly as the Nuttall Complex. Fire behavior generally consisted of fire backing down to become seated in canyons, then making uphill runs, resulting in a mosaic of effects on vegetation, although there were periods of very active fire behavior. On several days, major acreage gains were reported.

The fire burned in warm and dry oak woodland, ponderosa pine forest, mixed conifer forest, and spruce-fir forest. Elevations within the fire perimeter range from about 4,500 feet in Marijilda Canyon to 10,720 feet at the apex of Mt. Graham. The burned area is characterized by slopes less than 40 percent at the lower elevations, and greater than 40 percent at the middle and upper elevations, with the exception of the ridgeline in the vicinity of the Mt. Graham International Observatory, on which the slope is less than 40 percent.

Parent material of the mountain range is predominantly igneous in nature, with the predominant geologic material being granite. Due to the steepness of slopes and granite's high level of erodibility, soils in the range erode easily. Fire generally increases erodibility of this soil type.

The final fire size is 29,710 acres as of July 12, 2004. All burned lands are in National Forest ownership, though there are significant state and private lands below the Forest boundary. Parts of Ash Canyon may continue burning if conditions become favorable for more active fire behavior.

Chronology

Ignition: Gibson Fire – 6/22/04
Nuttall Fire – 6/26/04
Fires joined as Nuttall Complex – 7/2/04
Dates of over 1,000-acre gains: July 2, July 4, July 5, and July 9.
Dates of over 5,000-acre gains: July 3, July 6, July 7.
Containment: 95% to date.
BAER team Leader arrives and begins coordination: 7/12/04
BAER team assembled: 7/13/04
BAER team recommendations delivered: 7/19/04

The BAER team conducted an emergency assessment of post-fire resource conditions, using field surveys to identify impacts. The team compiled recommendations for rehabilitation of the affected lands. The findings of that assessment are presented, in part, in this report. On

July 19, 2004, the team presented its findings on burn severity, predicted soil loss, predicted storm runoff, values at risk, and proposed actions to minimize those risks, as well as the likelihood of success of those proposed actions.

Analysis/Values at Risk

Fires are a natural part of ecosystems in the burned area. Soil condition and hydrologic function are important components of healthy ecosystems, and can be affected by wildfires. The BAER team conducted field surveys and used satellite imagery produced by the Remote Sensing Applications Center in Salt Lake City, Utah, to develop severity maps for vegetation, soil and risk of erosion and runoff. From these maps and ground observations, potential flood volumes and flow rates, and soil-loss rates estimates were made. Sub-watersheds were prioritized for treatment, combining the results of analysis with the following values at risk. (*Values at risk* are resources vulnerable to post-fire watershed response, resulting from how the fire changed hydrology or geology. *Values at risk* include threats to human life, property and natural and cultural resources, both onsite and downstream, lost productivity both onsite and instream, and lost control of water onsite, instream and downstream.)

Values at Risk – Nuttall Complex

Note that most of these values are on private land or are private facilities on National Forest land. Our efforts concentrated on evaluating the potential risk to these lands. Treatments are only specified on National Forest lands or Forest resources and facilities.

Wildlife

• Springs and cienegas, and general wildlife habitat
• Riparian corridors
• Threatened and endangered species - Mount Graham red squirrel
• Threatened and endangered species – Mexican spotted owl
• Other species– Wet Canyon talussnail

Hydrologic Features

• Graveyard Wash Retention Dam
• Frye Creek (aka Dave Lee) Retention Dam
• Frye Mesa Reservoir
• Dead Man Canyon Diversion Dam and Aqueduct
• Lebanon Ditch
• Pima Townsite municipal wells (in Cottonwood Wash)
• Smithville Siphon
• Union Canal Siphon
• Stockton Wash Retention Dam
• Sheep Diversion Dam

Settlements

• Thatcher Townsite (flooding and water quality)

• Safford Townsite (flooding and water quality)
• Daly Estates (below Frye Mesa Reservoir)
• Tierra Bonita subdivision in Graveyard Wash
• Discovery Park
• Thunderbird Estates
• Lebanon Estates

Facilities and Roads

• Heliograph Peak Lookout
• Wet Canyon Bridge
• Wet Canyon Picnic Ground
• US 191/Jacobsen Crossing
• US 191/Marijilda Crossing
• US 70/Cottonwood Wash Crossing
• Noon Creek bridge and culvert on Swift Trail road
• Chesley Road – blocked culvert
• Twilight Creek at Swift Trail
• Swift Trail Road Ditch
• Chesley Road – five blocked culverts
• Chesley Road – four blocked culverts
• Trail system in burned area
• Fence at Noon Creek Ridge
• El Paso natural gas line (in Cottonwood)
• Soil Productivity

Cultural-Historic Features

Ash Canyon historic mill site
Ash Canyon Flume
Hawk Peak Site
High Peak Ridge Site
Heliograph Prehistoric Site
Emerald Spring (High Water Cienega)
Bear Wallow Spring
High Peak Cienega
Inception Historic Mill Site
Inception Ranger Station Site
Wet Canyon Bridge historic rockwork
Gibson Canyon Millsite

Ash Canyon Values

• Apache trout
• Pima Townsite(flooding and water quality)
• Cluff Ranch and Ponds
• Columbine summer homes
• Arizona Bible Camp

• Old Columbine Historic Cabins
• Old Columbine Historic Cabin Site and WPA camp

Findings

Vegetation burn intensities were classified as:

- *Low burn intensity* – trees are alive, with green needles. Lower branches may be scorched. Individual trees may be burned. Fine branches on shrubs are scorched but not consumed. Grass and herbaceous plants are burned, but not below the root crown. Patches of unburned plants may exist.
- *Moderate burn intensity* – trees are killed, with red needles. Needles on portions of trees may be consumed. Needles on individual trees and on small pockets of trees may be completely consumed. Leaves and fine branches on shrubs are consumed. Grass and herbaceous plants are burned to the root crown.
- *High burn intensity* – trees are killed. Needles and small branches are entirely consumed. Only the boles may be left on some trees. Leaves, fine branches and coarse branches are consumed. Some shrubs may be entirely consumed. Grass and herbaceous plants are burned to the root crowns.

Approximately 11% of the area experienced a high-intensity vegetation burn, the resulting acreage, approximately 89%, experienced low- to moderate-burn intensities.

The following photographs illustrate values at risk and burn intensity.

High burn severity for vegetation

Moderate burn severity for vegetation

Low severity burn for vegetation

Frye Mesa Reservoir

Frye Creek flowing into Daly Estates

Swift Trail/State Highway 366

Heliograph Peak Lookout Tower

Summary of the Emergency

The Mountain Graham area is a moist and cool "sky island" in an otherwise desert environment. Elevation range is 5500 feet to 10,600 feet. . A main State highway (the Swift Trail Road) is on the eastern periphery of the burned area and may be affected by debris flows. The highway is the sole access to the Mount Graham International Observatory (MGIO), numerous residences, and special uses.

During the summer monsoons season this topographic highland develops intense thunderstorms. Values are at risk from increased stream flows, debris-laden floods, hazard trees, erosion, sloughing, and rolling rocks. Peak stream flows are predicted to increase from two to four times in local areas. Soil erosion is likely to increase by a factor of 500 in areas of blackened forest.

Specific hazards

Potential hazard to life and property by rolling rocks and debris on trails in steep areas of "high" burn intensity.

Potential hazard to the privately-owned Frye Reservoir, Pima well heads, two diversions, and numerous valley structures by increased channel flow and debris from burned watersheds

Potential hazard to the Swift Trail highway, the only access road to the MGIO, electronic sites, camps, and summer homes by increased channel flow blocking culverts and bridges in some areas.

The Swift Trail highway is also a heavily-used road and is an important access resource. Early-alert of potential hazards on the road is essential.

Potential damage to seven cultural and heritage sites in burned areas on the mountain.

Treatments

Funding has been authorized in the amount of $431,828 to assess the emergency situation and perform preventive and mitigative treatments. These treatments are limited by law to National Forest facilities and resources. However, many of the values at risk listed above are privately owned and/or outside National Forest boundaries. About $77,000 of the authorized funding was spent on assessing potential risks to those resources and facilities, but no engineering design or mitigative measures were developed. These risk ratings are based on models that predict potential stormflow and erosion on National Forest lands. They are not designed for project level work or legal uses. Private landholders should obtain competent engineering or scientific help for more specific information.

The following is a summary of treatments recommended for the immediate emergency, on National Forest lands. Treatment areas were prescribed based on the potential for damaging floods, loss of soil productivity, and for the mitigation of loss of life and property. None of

these treatments will prevent increased flooding or other damages as a result of the Nuttall Fire. They are designed to reduce and mitigate potential damages only.

Specific Treatments

Reduce hazard to the public by signing trail closures

Reduce potential overland flow by seeding "high" intensity burned areas above watersheds.

Reduce potential for road blockage and damage by cleaning and installing culverts to better pass storm flow.

Install and maintain a debris storage rack to prevent the Wet Canyon bridge on the Swift Trail highway from damage from debris.

Protect public safety by rebuilding cattle exclosure fence from Swift Trail road.

Institute a storm patrol on the Swift Trail highway to provide the public an early-alert of potential damage from monsoon storms.

Protect cultural and critical wildlife features from burial and erosion.

Protect treatment personnel by removing hazard trees and performing essential trail maintenance.

Protect the trail resource by installing erosion control structures at critical areas.

For further information, please see the Burned Area Reports "NuttalComplexInitial2500-8.doc" and "NuttalComplexSecond2500-8.doc."

Maps

Coronado National Forest Land Ownership and Roads Map
Coronado National Forest Burned Area Map
Coronado National Forest Erosion Hazard Potential Map
Coronado National Forest Watershed and Slope Map
Coronado National Forest Values at Risk Index Map
Coronado National Forest Values at Risk Map 1
Coronado National Forest Values at Risk Map 2
Coronado National Forest Treatment Map