Date of Report: 06/21/2012

BURNED-AREA REPORT
(Reference FSH 2509.13)

PART I - TYPE OF REQUEST

A. Type of Report

[X] 1. Funding request for estimated emergency stabilization funds
[X] 2. Accomplishment Report
[ ] 3. No Treatment Recommendation

B. Type of Action

[] 1. Initial Request (Best estimate of funds needed to complete eligible stabilization measures)

[X] 2. Interim Report # 1 .
[ ] Updating the initial funding request based on more accurate site data or design analysis
[ ] Status of accomplishments to date

[ ] 3. Final Report (Following completion of work)

PART II - BURNED-AREA DESCRIPTION

A. Fire Name: Sunflower

B. Fire Number: AZ-KNF-000039

C. State: Arizona

D. County: Maricopa

E. Region: 3

F. Forest:Tonto National Forest

G. Districts: Primarily 03, but also 01 and 06

H. Fire Incident Job Code: P3GUD3

I. Date Fire Started: 05/12/2012

J. Date Fire Contained: Uncontained

K. Suppression Cost: $6,500,000.00

L. Fire Suppression Damages Repaired with Suppression Funds

1. **Fireline waterbarred (miles)**: approximately 0.5 miles of hand line
2. **Fireline seeded (miles):** 0
3. **Other (identify):** Crews have completed sawing and removing woody debris and small trees in 11 miles of stream channels to mitigate potential for debris to form racks and obstruct drainages. Barbed wire fences have been removed from drainageways to prevent debris racks and obstruction of stream channels.

M. Watershed Numbers: 150601050308, 150601050311, 150601050402, 150602030505, 150602030506, 150602030601

N. Total Acres Burned:

[X] NFS Acres 17,618 [ ] Other Federal [ ] State [ ] Private

O. Vegetation Types:

Vegetation Type	Acres in Fire Perimeter
ARIZONA CYPRESS	5,092
CHAPARRAL	5,402
PINYON/JUNIPER/OAK	4,963
PONDEROSA PINE	1,092
MIXED CONIFER	806
SEMI DESERT GRASSLAND	251
RIPARIAN	12
GRAND TOTAL	**17,618**

P. Dominant Soils: Lithic Haplustalfs, Typic Haplustalfs, Lithic Argiustolls, Typic Argiustolls, Listic Ustorthents

Q. Geologic Types: Early proterozoic metavolcanic rocks, early proterozoic metasedimentary rocks, Middle Miocene to Oligocene sedimentary rocks, Late to middle Miocene basaltic rocks.

R. Miles of Stream Channels by Order or Class:

Stream miles by order within Sunflower Fire Perimeter on 05/22/2012

Stream Order	Length (miles)
1	61
2	9
3	6
4	17
Grand Total	93

S. Transportation System

Trails: 18 **miles** **Roads:** 27 **miles**

Trails located within the Sunflower Fire Perimeter on 05/22/2012.

Trail Number	Length (Miles)
23	0.9
244	3.7
260	0.6
344	0.6
45	0.6
46	0.1
47	0.0

Trail Number	Length (Miles)
86	2.8
87	0.3
88	1.7
91	4.3
95	2.4
Grand Total	18.0

Roads located within Sunflower Fire Perimeter on 05/22/2012.

Route Number	Length (Miles)
1678	0.2
1679	0.5
1701	1.1
201	4.0
201A	5.0
2138	0.5
25	3.7
25A	3.2
3462	0.4
3462A	0.2
3463	1.5
3463A	0.2
3464	1.0
3468	0.3
3526	0.7
3527	0.1
3528	0.1
3719	0.0
3720	0.4
3721	0.8
3722	0.8
3723	0.2
393	1.4
627	0.5
	26.9

PART III - WATERSHED CONDITION

A. Burn Severity (acres): 3,832 **(low)** 5,579 **(moderate)** 4,860 **(high)**

B. Water-Repellent Soil (acres): 10,439 - all high and moderate burn severity acres.

C. Soil Erosion Hazard Rating (acres): 0 **(low)** 0 **(moderate)** 16,115 **(high)**

D. Erosion Potential: 27 **tons/acre** - 1st year

E. Sediment Potential: 8,640 **cubic yards/square mile -** 1st year

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years): N/A

B. Design Chance of Success, (percent): N/A

C. Equivalent Design Recurrence Interval, (years): N/A

D. Design Storm Duration, (hours): N/A

E. Design Storm Magnitude, (inches): N/A

F. Design Flow, (cubic feet / second/ square mile): N/A

G. Estimated Reduction in Infiltration, (percent): N/A

H. Adjusted Design Flow, (cfs per square mile): N/A

PART V - SUMMARY OF ANALYSIS

A. Describe Critical Values/Resources and Threats (narrative):
The Sunflower Fire has burned approximately 17,618 acres as of May 30, 2012. The fire has occurred primarily in the headwaters of the Upper Sycamore Creek 6th-level (HUC12) subwatershed (Hydrologic Unit Code 150602030601). The fire has burned approximately one-third (i.e., 13,000 acres out of 39,500 acres) of the subwatershed (Figures 1 and 2). Table 1 lists the approximate acreages burned within each subwatershed based on the most recent BARC4 data acquisition. Approximatey 58 percent of the fire affected area burned at moderate and high severity. A substantial increase in soil erosion, sediment delivery to streamcourses, and peak flows from both summer monsoon thunderstorms and frontal storms is expected. Hyperconcentrated flows of non-cohesive materials (i.e., debris flows) are likely in upper portions of the watershed. Increased sediment loads in stream channels will also increase the scouring capability of flood flows when these sediments are transported in flood water. The fire remains active and is burning to the north in the Deer Creek subwatershed in the ponderosa pine and broadleaf vegetation types.

Table 1. Burn severity acreages within each affected 6th-level subwatershed of the Sunflower Fire based on most recent BARC4 data acquisition on 05/17/2012.

Watershed Name	Code	Acres			
		Unburned	Low	Moderate	High
Upper Sycamore Creek	150602030601	2,228	1,865	2,661	4,872

Watershed Name	Code	Acres			
		Unburned	Low	Moderate	High
South Fork Sheep Creek	150602030505	4	262	276	177
Sheep Creek	150602030506	11	174	143	129
Deer Creek	150601050308	0	52	25	0
Slate Creek	150601050402	0	5	3	0
Hardt Creek-Tonto Creek	150601050311	0	6	0	0
GRAND TOTAL		2,243	2,364	3,108	5,178

Figure 1. Post-fire conditions of Upper Sycamore Creek following Sunflower Fire.

Conditions within the burned area have created a high risk of flooding on National Forest System (NFS) and private lands below the burned area. Occupied homes, outbuildings, and NFS facilities (Sunflower Administrative Site / Work Center) are located in very close proximity to Sycamore Creek, downstream of the fire affected area (Figures 3 through 7).

There is risk of potentially hazardous tailings, waste rock, kiln bricks, and abondoned mine waste containing mercury and other heavy metals to erode from abandoned mine sites into stream channels within the burned area. The Pine Mountain, National, and Oneida Mines are located in the Mazatzal Mining District, also known as the Mercuria Mining District, and were used to extract and process mercury from cinnabar ore via tunnels and open cut mining. Two small tailings piles are located at the National Mine site. These tailings amount to approximately

one third of the volume that existed prior to September 5, 1970 when a 4-day frontal storm caused approximately two thirds of the

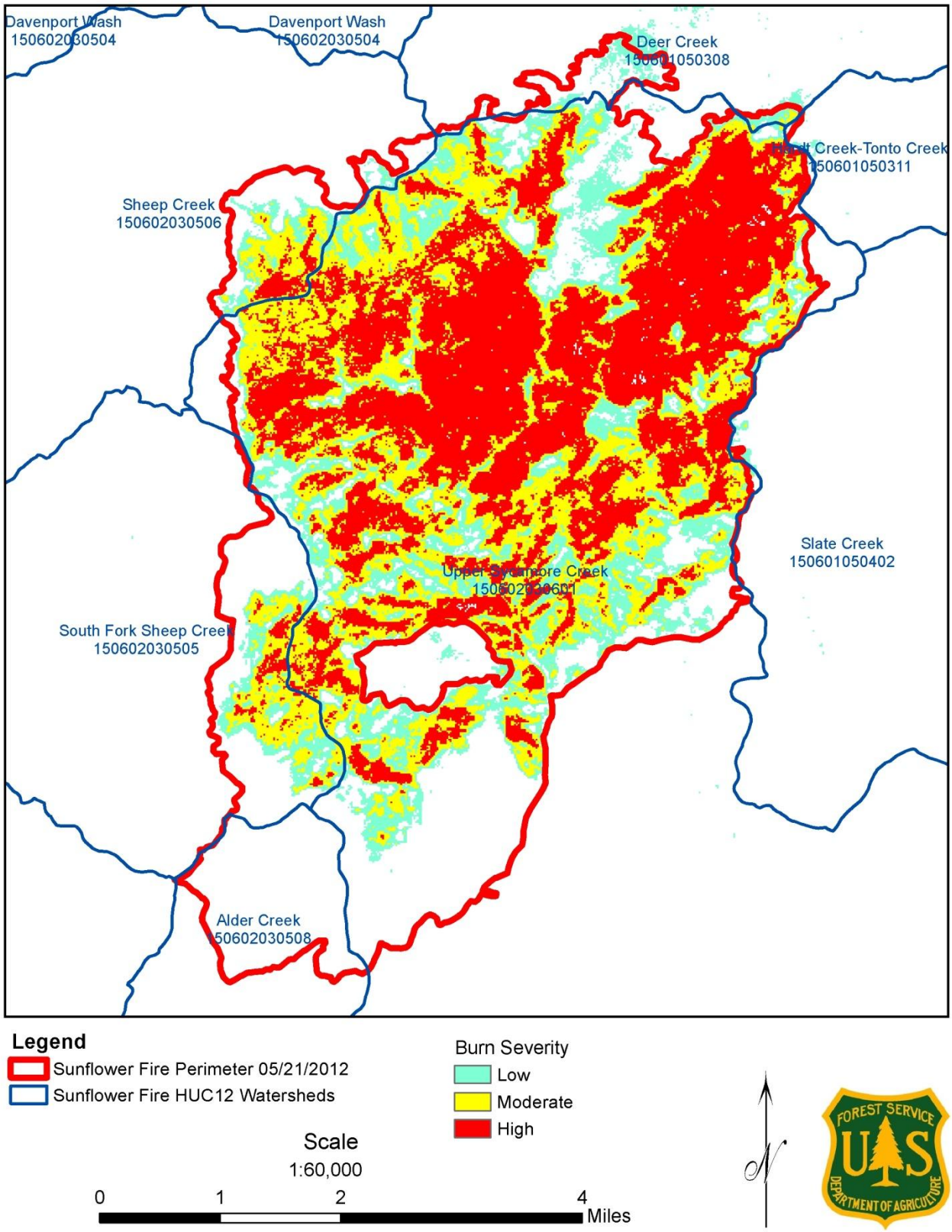

Figure 2. Sunflower Fire in relation to 6th-level (HUC12) subwatersheds and topography.

Figure 3. Private homesite located in close proximity (< 200 feet) to West Fork Sycamore Creek.

Figure 4. Sunflower Administrative Site located within 300 feet of West Fork Sycamore Creek

Figure 5. Sunflower Administrative Site located within 300 feet of West Fork Sycamore Creek. This site has experienced flooding prior to the Sunflower Fire.

Figure 6. Bank stabilization of West Fork Sycamore Creek using rock baskets. Note Sunflower Administrative Site facilities in background.

Figure 7. Private homes located within 100 feet of West Fork Sycamore Creek.

caused most of the original tailings volume to be transported off-site. There are abandoned ore processing facilities that have burned in the fire or are at risk of introducing hazardous materials into streamcourses (Figures 8 through 12).

Approximately 1,000 cubic yards of potentially unstable tailings remain at the Oneida Mine site. These tailings are at risk of being transported off-site in stormwater runoff and into the East Fork of Sycamore Creek and eventually into the Verde River. Reclamation of the Pine Mountain Mine was completed in March of 2012. While stabilization was successful for pre-fire conditions, post-fire conditions have placed stabilization measures at risk of failure.

There is risk of damage to Forest roads and trails from stormwater runoff and erosion within the fire affected areas and below.

Hazards from falling rocks, trees, and limbs exist within the burned area. Hazards to forest visitors from flash floods also exist along roads and trails within and below the burned area. There is potential for visitors to become trapped in interior areas if low-water crossings of streams become flooded.

The potential exists for introduction and spread of invasive or noxious weeds due to fire suppresion efforts and from existing populations within and adjacent to the burned area.

There is potential for debris (woody material, rocks, cobbles, boulders, etc.) to obstruct stream channels and road drainage structures (culverts). In-channel trees, shrubs, pasture fences, woody debris and other materials have the potential to be disloged and transported in flood flows, increasing channel and bank scour and downcutting.

Watershed Response

Hydrologic Response:

The Sunflower Fire vicinity has a bimodal precipitation pattern. The local climate is heavily influenced by the North American monsoon, which delivers approximately fifty percent of Arizona's annual precipitation between the months of July and September. The second precipitation period occurs between November and April, providing about thirty percent of annual precipitation (Sheppard et al. 2002). Based on historic precipitation patterns, it can be expected that high-intensity monsoon storms have a high probability of occurring in the coming weeks. These short duration, high intensity storms are commonly associated with flash flooding and erosion events. These conditions will be exacerbated by the fire, creating hazardous conditions within and downstream of the burned area. Post-fire flows have the potential to be several orders of magnitude greater than pre-fire flow conditions. In order to account for these conditions the fire was divided into sub watersheds or "pour points." These pour points were generally located in areas where values at risk were identified during the assessment process. Pre- and post-fire conditions were modeled using a 25-year peak flow regression equation with R3 BAER data of post-fire peak flows and a regression equation for 100-year flows. Estimated reduction in infiltration was based on the percentage of hydrophobic soil in the burn area.

Soil Erosion Response:

Soil textures range from gravelly loam to extremely cobbly sandy loam. Soils are generally

shallow since geomorphic erosion rates are high, particularly in response to moderate and high severity wildfires. Slopes range from 3 to 5 percent in floodplain areas to as much as 120 percent where rock outcrops and cliff faces occur. Ground cover, which is critical for maintaining soil stability, has been totally consumed in most areas where moderate and high severity wildfire has occurred. Some areas exhibit low burn severity, which is less susceptible to erosion since some of the ground cover is retained. An assessment of burn severity found the overall soil burn severity to be 27 percent low, 40 percent moderate, and 34 percent high. Soils with low burn severity generally retain surface structure and porosity since fine roots remain intact and residual organic matter continues to cover soil surfaces and provide habitat for soil organisms that facilitate recovery of nutrient cycles. These soils generally respond rapidly and in a positive manner following low burn severity as revegetation occurs and soil surfaces regain protective cover. Soils that are subjected to moderate to high soil burn severities typically have evidence of excessive soil heating in isolated patches; these areas usually have long-term soil damage with increased erosion potential. The most severely burned areas generally occur on steep terrain at higher elevations where pre-fire vegetation density and fuels accumulations were higher. Water repellency, or soil hydrophobicity, is present throughout the fire area but was most evident in higher burn severity areas. Moderate burn severities also exhibit soil hydrophobicity. Low burn severities rarely exhibit hydrophobic conditions.

Values at Risk:

The risk matrix below, Exhibit 2 of Interim Directive No. 2520-2010-1, was used to evaluate the Risk Level for each value identified during the Assessment.

Probability of Damage or Loss	**Magnitude of Consequences**		
	Major	Moderate	Minor
	RISK		
Very Likely	**Very High**	**Very High**	**Low**
Likely	**Very High**	**High**	**Low**
Possible	**High**	**Intermediate**	**Low**
Unlikely	**Intermediate**	**Low**	**Very Low**

Human Life and Safety:

Roads/Stream crossings

There are multiple road/stream crossings within and immediately downstream of the burn area. Post-fire flows in Sycamore Creek are predicted to be as high as 10,000 cfs, depending on storm intensity and duration.

Risk Assessment – Threats to users of Forest roads

Probability of Damage or Loss: Possible – There is risk of flash flooding at low water crossings and failure/erosion of roadbeds.

Magnitude of Consequence: Major – possible human safety risk to administrative users and Forest visitors.

Risk Level: High – Treatment considered for threats to human life or safety.

Recommendation: Seasonal closure of roads within the burn area, including gates to control access and warning signs to inform Forest visitors of burn area hazards. Install road hardening measures (remove sediment from inside ditches, clean lead-out ditches, install water diversion structures (waterbars, rolling dips, etc.) above low water crossings and on steep grades) to protect road infrastructure. Initiate storm patrol when monsoon rains arrive and repair damage to road infrastructure as soon as possible after each event to prevent cumulative damage to road infrastructure.

Sunflower Administrative Site/Work Center

The Sunflower Administrative site consists of several Depression-era historic structures located in close proximity to Sycamore Creek

Risk Assessment – Threats to administrative users and visitors of the Administrative Site

Probability of Damage or Loss: Possible – There is risk to human life and safety from flooding

Magnitude of Consequence: Major – possible risk to human life or safety of visitors of the Sunflower Administrative Site.

Risk level – High

Recommendation: Remove in-channel material that has created debris bars and caused a substantial break-out channel to divert water directly to the Sunflower Administrative Site. Install Jersey barriers/K-rails along the road leading to the Sunflower Administrative site. Since flood waters can cross the road that leads into the work center, keep gate closed when Forest personnel are not present at the work center to prevent visitors from potentially becoming trapped behind flood waters.

Primary residences near Sycamore Creek

There are several houses in the community of Sunflower and two ranch properties (Cross F Ranch and Dos S Ranch). Ranch properties include out-buildings, propane tanks, barns, and associated ranching infrastructure within the flood zone of Sycamore Creek. The majority of homes in the Sunflower community are primary residences.

Risk Assessment – Threats to human life and safety of homeowners

Probability of Damage or Loss: Possible to Likely – risk from flooding has greatly increased and there is history of past flooding at the Dos S Ranch and at the Cross-F Ranch and the Old Beeline Highway. Modeled hydrologic response indicates that post-fire flood flows could approach or exceed the flood level that occurred on Sept. 5, 1970.

Magnitude of Consequence: Major – possible risk to human life and safety

Risk Level: Intermediate to Very High – Channel treatments would be effective for improving channel flow and decreasing debris concentrations in channels and potential formation of debris racks during predicted flows, thus helping to prevent bank scour and channel aggradation and floodwaters from exceeding channels and becoming overland flow.

Recommendation: Conduct channel treatments (debris removal, in-channel tree removal, and channel realignment) and coordinate with NRCS Emergency Watershed Protection (EWP) Program personnel and Maricopa County Flood Control District so they can address specific landowner needs. Advise ADWR/ADEM/USGS to consider installation of monitoring stations in upper portions of the Sycamore Creek watershed to detect precipitation intensity and duration that could result in flash flooding potential in downstream areas. Coordinate with interagency personnel on installation of ALERT station and stream gage to detect potential flood flows.

Forest users on trails

Forest Service trails, including a segment of the Arizona Trail, exist within the burn area and there is risk to users from increased runoff and falling debris.

Risk Assessment – Threats to Forest users

Probability of Damage or Loss: Likely – High burn severity

Magnitude of Consequence: Moderate – human safety; potential for trails to wash out.

Risk Level: High

Recommendation: Close trails in the burned area, install closure and warning signs at all trail access points leading into the burned area, remove hazard trees from along trail system prior to implementing stabilization measures.

Mazatzal Mercury Mining District

Pine Mountain, Oneida, National, Cornucopia, and Red Top Mines/Ore processing facilities were locations of cinnabar mining, milling, and processing to extract mercury and other heavy metals. There is potential for contaminated mine waste (burned timbers, sheet metal, steel, asbestos insulation, etc.), tailings, and waste rock, and to be mobilized through post-fire hillslope erosion and/or flooding.

Risk Assessment – Threats to Forest users, downstream landowners, and surface water quality

Probability of Damage or Loss: Possible - high severity burn on steep slopes above mine sites and processing facilities has increased the risk of overland flow and flooding. Processing facilities are located in very close proximity to streamcourses and are at risk of stormwater runon and runoff. Contaminated waste rock and tailings have been transported from these sites in the past during runoff events. Additionally, tailings were washed from other mine sites/processing facilities in floods that resulted from the Willow Fire.

Magnitude of Consequence: Major - Possible transport of hazardous materials to downstream locations, including the Verde River.

Risk Level: High

Recommendation: Stabilization or containment of contaminated processing facilities, mine waste, tailings, and waste rock, is recommended at the National, Pine Mountain, Oneida, and Cornucopia sites.

The Pine Mountain Site was reclaimed/stabilized in March of 2012 through excavation of a repository and deposition of mine tailings and other waste material into the repository. Erosion control/stabilization measures were installed (i.e. straw wattles, mulch and seeding). As a result of the fire, stabilization measures at this site are at risk of failure from overland flow that will create hillslope erosion. Mulching and seeding of burned areas above and surrounding this site should be sufficient to protect this site from fire-caused erosion and sediment delivery to surface waters.

The National Mine Ore Processing Facility was burned during the fire. This abandoned facility includes a large amount of waste and debris (burned and contaminated timbers; steel rotary kiln; condenser system; asbestos insulation, electric motor, contaminated sheet metal; waste rock conveyor system; overturned mine truck, and a small tailings pile (est. <100 cu. yds.) (Figures 8 through 12). The small retort furnace, condenser, storage tank, asbestos insulation, mine truck, sheet metal/steel components, piping, and tailings pile should be removed from the site. The rotary kiln should either be removed from the site or sealed to prevent exposure of contaminated material inside the kiln. The remaining concrete foundation should then be cleaned to remove any contaminated ash or residue.

Figure 8. The National Ore Processing Facility. A large steel storage tank can be seen on the left, with condensers and rotary kiln in the background. A small retort furnace is located on the right above date stamp.

Figure 9. Friable asbestos insulation at condenser inlet above rotary kiln at National Mine Ore Processing Facility. Note burned area above.

Figure 10. Condensers at National Ore Processing Facility.

Figure 11. Rotary kiln at National Mine Ore Processing Facility.

Figure 12. Overturned mine truck and other waste/debris at National Mine Ore Processing Facility.

The Oneida and Red Top sites (Figures 13 and 14) contain small retort furnaces and minimal waste material. Removal of retort furnaces and site stabilization is recommended to mitigate potential contamination of surface waters.

Figure 13. Small retort furnace and waste rock at the Red Top site.

Figure 14. Another view of small retort furnace at Red Top facility. Note burned area above.

Property:

Sunflower Administrative Site/Work Center

The Sunflower Administrative site consists of several Depression era historic structures, including residences, a barn, and a shed that were formerly the Sunflower Ranger Station, also known as the Sycamore Ranger Station. This site is located in Section 6 of T6N, R9E. The site was constructed by the Civilian Conservation Corps in 1935. More recent structures are also found at this location including an amphitheater, a water well, vault toilets, above-ground petroleum storage tanks, propane tanks, and solar power collectors. The site has been affected by flooding prior to the fire.

Risk Assessment – Threats to the Sunflower Administrative Site buildings

Probability of Damage or Loss: Possible. There is risk of flooding of structures

Magnitude of Consequence: Major – potential for significant structural damage.

Risk Level: High

Recommendation: Conduct channel treatments (debris removal, in-channel tree removal, and channel stabilization measures). Install Jersey barriers/K-rails along road leading to Sunflower Administrative site. Place sand bags around critical Forest Service infrastructure including residence, ampitheater, generator house, fuel storage tanks, etc.

Remove barbed wire fences that cross tributaries of Sycamore Creek; remove the gate that is in the large concrete culvert under the Old Beeline Highway near the Cross F Ranch. **Note: Also See Recommendations in the Cultural Resources / Historic Sites Section**

Forest Service roads

FS roads exist primarily in the eastern portion of the burn area and there is a risk to the roads and stream crossings from increased runoff and associated soil erosion, sediment delivery, and debris flows.

Risk Assessment – Threats to Forest Roads

Probablity of Damage or Loss: Likely – multiple crossings and parallel sections in the floodplain

Magnitude of Consequence: Moderate – water could be redirected down road traveled ways causing wash outs and there is a potential for crossings to be damaged or destroyed.

Risk Level: High to Very High – Recommend installation of road hardening and stabilization measures to protect road infrastructure and implement Storm Patrol and Response program as previously discussed.

Forest Service trails

FS trails exist throughout the burned area and there is increased risk of damage to trails from soil erosion and runoff. One of these trails is a segment of the Arizona Trail System. Additionally, there is increased risk of damage to the recovering watersheds in the

Mazatzal Wilderness from unauthorized motor vehicle access due to loss of barriers that previously excluded motorized access to the Wilderness Area.

Risk Assessment – Threats to Forest trail infrastructure and recovering watersheds in the Mazatzal Wilderness

Probablity of Damage or Loss: Likely – Trails are in steep, rugged terran where high severity burn conditions are common. Fire resulted in damage/loss of barriers that previously prevented motorized vehicle access to the Mazatzal Wilderness.

Magnitude of Consequence: Moderate - wash out of trails and damage to the Mazatzal Wilderness from motorized vehicle access.

Risk Level: High

Recommendation: Trail stabilization where there is the potential for soil erosion to damage the trail tread or washout ephemeral stream crossings. Also recommend installation of trail closure signs as previously discussed. Recommend installation of a pipe barricade at the Mormon Grove and Mt. Peely trailheads to exclude motorized access to the Mazatzal Wilderness on motorized vehicles.

Primary residences near Sycamore Creek

There are houses in the Sunflower community that are located in close proximity to Sycamore Creek as well as two ranch homes (Cross F and Dos S) with associated ranching infrastructure Additional infrastructure includes outbuildings, barns, water wells, an above-ground petroleum storage tank, and equipment common to ranching operations such as trailers, trucks, etc.

Risk Assessment – Threats to private property (homes and infrastructure)

Probablity of Damage or Loss: Possible to Likely – risk from flooding greatly increased and there is history of past flooding

Magnitude of Consequence: Moderate – possible innundation of structures and damage to outbuildings and corrals.

Risk Level: Intermediate to Very High – no feasible hillslope treatments (too steep and soils are shallow) to effectively reduce flood flows during first year, channel treatments would be effective for mitigating predicted flood flows.

Recommendation: Coordinate with NRCS Emergency Watershed Protection (EWP) Program personnel and Maricopa County Flood Control District so that they can address specific landowner needs.

NRCS and Maricopa County Flood Control District should advise at-risk landowners to consider obtaining flood insurance as soon as possible to avoid the 30-day waiting period.

Developed Springs (spring boxes and watering troughs)

There are several developed springs on NFS land throughout the burn area. The majority of these developed springs are in, or near, the channels.

Risk Assessment – Threats to watering systems and infrastructure

Probablity of Damage or Loss: Possible – Located in areas of increased risk of sedimentation and flooding

Magnitude of Consequence: Moderate – Sediment could fill develolped spring heads, spring boxes and watering troughs.

Risk Level: Intermediate

Recommendation: monitoring/storm patrol to evaluate post-fire effects to spring infrastructure and future need for mitigation treatments.

Soil Productivity/Watershed Function

The majority of the Sunflower Fire area burned at moderate to high severity. These areas are at elevated risk of soil erosion, sediment and debris transport in stream channels, and degradation of watershed function.

Risk Assessment – Threats to soil productivity and watershed function

Probablity of Damage or Loss: Likely– based on burn severity and lack of potential ground cover.

Magnitude of Consequence: Moderate – erosion hazard is elevated from burn severity and increased post-fire erosion. Grazing on recovering slopes would set back recovery and prolong elevated erosion rates.

Risk Level: High – Aerial seeding has not proven effective in controlling erosion in most of the vegetation types in the Sunflower Fire burned area (i.e., chaparral and Arizona Cypress). Vegetation response is generally moderate to rapid with natural revegetation occurring to levels that effectively reduce soil erosion and sediment delivery to streamcourses within 5 years. An analysis of soil burn severity and slope classes indicates there are approximately 600 acres that could respond positively to mulch application. However, since acreage is minimal and would not result in a substantial beneficial effect at the watershed scale, mulching is not recommended at this time.

Recommendation: Monitor high severity burn areas and consider mulch application on moderate slopes if a vegetative response is not observed after the first year.

Water Quality

The location of the vault toilets and the above-ground fuel storage tanks at the Sunflower Administrative Site makes them susceptible to post-fire flooding. There is the potential to introduce contaminants (fecal matter and petroleum hydrocarbons) into Sycamore Creek. There is also an above-ground fuel storage tank located within 20 feet of Sycamore Creek at the Cross F Ranch.

Mining infrastructure affected by the fire has the potential to introduce mercury and other heavy metals to surface waters.

Risk Assessment – Probability of introducing fecal matter, petroleum hydrocarbons, and hazardous materials into the watershed

Probablity of Damage or Loss: Likely - based on expected flows.

Magnitude of Consequence: Moderate – potential downstream contamination.

Risk Level: High

Recommendation: Stabilize mine tailings, waste rock and other mine and ore processing facility waste. Pump vault toilets and close them and empty above-ground fuel storage tanks to avoid potential contamination of surface water. Recommend that Cross F Ranch consider emptying above-ground fuel storage tank or moving it to an upland location to prevent it from being compromised by expected flood flows. Recommend that Cross F ranch consider moving any floatable ranching equipment away from Sycamore Creek.

Native Plant community

Suppression efforts have the potential to introduce non-native invasive species into the burn area with the potential to adversely affect native plant communities. However, large-scale direct fire suppression was not practiced on the fire, minimizing soil disturbance from fireline construction.

Risk Assessment – Probability of damage or loss of the native plant community

Probablity of Damage or Loss: Possible - Based on burn severity, miles of dozer and hand line, and other suppression activities.

Magnitude of Consequence: Moderate – loss of native plants communities.

Risk Level: Intermediate

Recommendation: Invasive species detection surveys and treatments following monsoon and winter precipitation.

Mexican Spotted Owl Protected Activity Centers and Critical Habitat

The MSO protected activity center (PACs) and Critical Habitat areas burned at low to moderate severity. Mixed conifer habitat within the PACs had previously burned in the Willow Fire of 2004. The fire burned an estimated 8,098 acres of critical habitat of which 74 acres or 0.9% was burned by suppression activities. Out of these 74 acres of critical habitat, it is estimated that a trace may have included what could be considered primary constituent elements of MSO critical habitat. These areas are at low risk from bark beetle invasion.

Risk Assessment – Probability of damage or loss of MSO PAC habitat

Probablity of Damage or Loss: Possible - possible invasion/increase of bark beetle activity in PACs.

Magnitude of Consequence: Moderate - would only impact these PACs.

Risk Level: Low – It is unknown if these PACs are even inhabited by MSO.

Recommendation: None.

Gila topminnow and Desert pupfish

Gila topminnows were transplanted into Walnut Spring on the Mesa Ranger District, Tonto National Forest in 1982. A total of 1,000 individuals were originally stocked and have since expanded to over 4,000 in number. On July 25, 2008, 106 Desert pupfish were stocked into Walnut Spring, however, during three subsequent population surveys, only one pupfish has been detected. Therefore, the Arizona Game and Fish Department has determined that the attempt to establish Desert pupfish has been unsuccessful. Walnut Spring is located more than 0.5 miles from the southwestern boundary of the fire.

Risk Assessment – Probability of damage or loss of Gila topminnow habitat

Probablity of Damage or Loss: Unlikely – Gila topminnow population remains viable in Walnut Spring and the fire is not expected to adversely affect their habitat. Additionally, the fire did not burn in the area around Walnut Spring.

Magnitude of Consequence: Moderate – any adverse effects would be limited to this isolated population

Risk Level: Low – The population remains viable with minimal risk of adverse affects from the fire.

Recommendation: None.

Risk Assessment – Probability of damage or loss of Desert pupfish habitat

Probablity of Damage or Loss: Likely – Desert pupfish population has experienced dramatic decline since introduction into Walnut Spring. Decline of the Desert pupfish in Walnut Spring is not a result of the Sunflower Fire

Magnitude of Consequence: Moderate – any adverse effects would be limited to this isolated population.

Risk Level: Low – The population is not viable for reasons other than the Sunflower Fire and Arizona Game and Fish Department has recognized that the attempt to establish Desert pupfish in Walnut Spring has been unsuccessful.

Recommendation: Continue to monitor Desert pupfish to determine if the fire results in adverse effects to Desert pupfish or their habitat.

Cultural Resources / Historic Sites

Historic Sunflower Administrative Site, which is listed on the National Register of Historic Places

Risk Assessment – Threats to the Sunflower Administrative Site buildings

Probability of Damage or Loss: Possible. There is risk of flooding of structures, contamination or introduction of surface water to the water well, possible flooding of above-ground fuel storage tanks, possible flooding of the vault toilets, and flood water damage to generators and other equipment.

Magnitude of Consequence: Major – potential for significant structural damage.

Risk Level: High

Recommendation:

- Installation of Jersey barriers/K-rails along the road leading to Sunflower Administrative site.
- Empty above-ground fuel storage tanks.
- Pump vault toilets to prevent introduction of fecal matter to stormwater runoff
- Provide protection of the water well by removing the pump, disconnecting electricity, and installing a temporary cap on the well.
- Consider removing solar panels and storing them at an upland location away from flooding risk
- Place sand bags around all structures in the compound including the residence, barn, ampitheater, generator shed, and chlorine treatment system building
- Ensure that the drain in the chlorine treatment system building is functioning properly

B. Emergency Treatment Objectives (narrative):

Reduce risk of flooding by:

- Removing floatable debris from reaches of Sycamore Creek and tributaries above the Sunflower Administrative Site and private lands to prevent debris racks that can redirect flood flows to upland areas or restrict flood flows.
- Restrict livestock grazing within the burned area for a minimum of two growing seasons to allow for watershed recovery.
- Removing gate at outfall of large concrete culverts under the Old Beeline Highway near the Cross-F Ranch to prevent obstruction of culverts.

Reduce potential exposure to safety hazards by:

- Closing some roads and trails until safety hazards have been reduced or eliminated.
- Remove hazard trees and rocks from roads and trails that can not be administratively closed (Remove only those trees that would be hazardous within the next 6 months to 1 year)
- Install signs warning Forest users of safety hazards created by the fire on roads and trails entering the burned area.
- Stabilize/reclaim the Pine Mountain, Oneida, Cornucopia, and National mine sites to prevent tailings and other mining and milling waste from being transported into stream channels. \
- Pump vault toilets and empty fuel storage tanks at Sunflower Administrative Site to prevent contamination of surface waters during flooding.

Protect Forest roads and trails by:

- Improving drainage features on all Level 2 Forest Roads within the burned area.
- Removing hazard trees along trails to protect workers.
- Installing additional erosion control features on trails to help stabilize them

Protect Sunflower Administrative Site by:

- Installing Jersey barriers or K-rails along, implement debris removal from channels

Prevent spread and establishment of noxious weeds

- Detect and remove noxious weeds infestations if found.

C. Probability of Completing Treatment Prior to Damaging Storm or Event:

Land 80**%** **Channel** 90**%** **Roads/Trails** 80**%** **Protection/Safety** 85**%**

D. Probability of Treatment Success

	Years after Treatment		
	1	**3**	**5**
Land	60	65	80
Channel	60	65	70
Roads/Trails	60	70	80
Protection/Safety	60	75	85

E. Cost of No-Action (Including Loss): Critical values would be lost. See critical value list above.

Topsoil in the Sunflower Fire burn area has an estimated commercial value of $25.00 per cu. yd. and estimated weight of 1.6 tons per cu yd. With sediment delivery rates ranging from 21 tons per acre to 36 tons per acre over the next five years, the potential financial value of the loss of soil productivity in commercial terms ranges from $3,445,312 to $5,906,250. The estimated cost to repair flood-damaged Maintenance level 2 roads is $20,000 per mile. If 27 miles of roads require repair due to post-fire effect, the estimated cost is $540,000. Repair of flood-damaged trails could cost as much as $6,000 per mile. Eighteen miles of repair to flood damaged trails could exceed $108,000. If substantial flood damage were to occur to the facilities at the Sunflower Administrative Site, the potential cost of repair or remediation could exceed $5 m. If destroyed by flooding or debris flows, the cost to replace the large concrete culvert under the Old Beeline Highway is estimated at $750,000. The cost of no action to the USFS could therefore easily exceed $12,304,250.

F. Cost of Selected Alternative (Including Loss):

There remains a 40 percent chance that proposed treatments during the first year may not succeed. Total cost of the action alternative plus this 40% chance of failure is $1,099,000.

G. Skills Represented on Burned-Area Survey Team:

[x]	**Hydrology**	**[x]**	**Soils**	**[ ]**	**Geology**	**[x]**	**Range**
[x]	**Forestry**	**[x]**	**Wildlife**	**[x]**	**Fire Mgmt.**	**[x]**	**Engineering**
[x]	**Contracting**	**[x]**	**Ecology**	**[x]**	**Botany**	**[x]**	**Archaeology**
[ ]	**Fisheries**	**[ ]**	**Research**	**[ ]**	**Landscape Arch**	**[x]**	**GIS**

Team Leader: Kit MacDonald

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H. Treatment Narrative:
(Describe the emergency treatments, where and how they will be applied, and what they are intended to do. This information helps to determine qualifying treatments for the appropriate funding authorities. For seeding treatments, include species, application rates and species selection rationale.)

The proposed treatments on National Forest System lands can help to reduce the impacts of the fire, but treatments will not completely mitigate the effects of the fire.

Channel Treatments:

The goal of the stream channel treatments is to selectively remove encroached trees and woody debris to minimize in-stream debris racks or dams, thereby improving channel flow and sediment and debris transport through culverts and any other natural or artficial flow-regulating structures (i.e. under bridges and through areas where channels are naturally constricted). Coarse woody debris in stream channels will be removed from channels or sawn to shorter lengths to allow passage of material through culverts, thus preventing debris racks that can inhibit or divert channel flow.

- Remove floatable debris, brush, and small trees in channels from a total of 8 miles of streamcourses incliding 2 miles of East Fork Sycamore Creek, 2 miles of West Fork Sycamore Creek, 2 miles of Sycamore Creek, and 2 miles of tributaries to Sycamore Creek.
- Remove barbed wire fences that cross stream channels in tributaries to Sycamore Creek
- Remove the gate that prevents livestock passage through the large concrete culverts under the Old Beeline Highway
- Removal of floatable debris has been accomplished by fire crews on approximately 11 miles of tributaries to Sycamore Creek. There are some large debris racks remaining in Sycamore Creek that require machinery for removal. This will be completed using heavy machinery when bank stabilization work is performed.
- Known barbed wire fences that cross tributaries to Sycamore Creek that have the potential to rack debris or be carried away in storm flows have been removed.
- The owner of the Cross F Ranch has been advised of the importance of removing the gate in the large culvert under the Old Beeline Hwy.

Roads and Trails Treatments:

The purpose of these treatments is to increase stability of road prisms and traveled ways by protecting road templates from increased flows and decrease the chances of washing of road surfaces and fill into adjacent drainage structures and streamcourses. Rolling dips,

waterbars, and lead-out ditches will be installed on roads to improve road surface drainage and control stormwater runon and runoff on roads that are to remain open. Inside ditches will be re-established (i.e., reopened where sediments have filled ditches) to prevent stormwater runon.

Due to the potential threat to public safety within the fire area the BAER Assessment Team recommends closure of roads within the fire perimeter to vehicle traffic during the upcoming monsoon season, after which roads should be re-assessed for stability and trafficability. The following minitation measures are recommended:

- Improve drainage features along approximately 15 miles of Maintenance Level 2 roads within the burned area by installing waterbars, cleaning inside ditches and lead-out ditches, and installing rolling grade dips.
- Harden/stabilize the road leading into the Mazatzal Mining District that crosses steel bridge to maintain access to these areas for mine and processing facility stabilization/reclamation..
- Install pipe barriers to prevent ATVs from accessing the Mazatzal Wilderness at the Mormon Grove and Mt. Peeley trailheads.
- Install closure gates at roaded points of access
- Road stabilization treatments were started on Saturday, June 10, 2012. Some roads within the project area have been removed from poposed treatments as roads were already severely eroded and impassible for most vehicles. Uncertainty remains whether some of these roads will remain in the System following implementation of Travel Management Rule. Further assessment is therefore necessary. Road stabilization has been completed on the FS roads 25 and 201.
- Funding requested to complete trail stabilization was not adequate to ensure stabilization of the Arizona Trail. Additional funds are therefore requested to stabilize 6.5 miles of the AZ Trail in moderate and high severity burn areas.

Protection/Safety Treatments:

- Install 9 closure gates on Forest Roads 25, 201, 201A, 492, and 1201.
- Install 16 closure signs on roads and trails that access the burned area, including Forest roads 25, 201, 201A, and 1201 and trail numbers 23, 45, 46, 47, 87, 88, 244, and 344.
- Install hazard warning signs to warn Forest users of hazards created by the fire on Forest roads 25, 201, 201A, and 1201 and trail numbers 23, 45, 46, 47, 87, 88, 244, and 344 entering the burned area or crossing below it.
- Hazard tree removal prior to road and trail treatments to provide a safe working environment for roads and trails crews.
- Five gates have been ordered. There is a need for four additional closure gates. Two of the points of access will require double-gates as opposed to single gates due to road widths at this lcoation. There is a need for four additional standard gates at $3,000 each.
- The need for one Wilderness Area protection barriers was identified. The cost is estimated at $19,750, which can be covered with savings from the sand bag installation at the Sunflower Administrative Site.

Cost breakdown for installation of pipe barrier at the Mormon Grove Trailhead to protect the Mazatzal Wilderness watersheds.

Description	Quantity	Cost Per Unit	Total
Mobilization/Bonds	1	$5,000	$5,500
Metal rail, concrete, end caps, labor, and equipment	450 feet	$25	$11,250
Site preparation	1	$2,000	$2,000
Debris Removal	1	$1,000	$1,000
		Total:	**$19,750**

- Two additional closure signs are required at $525 each.
- Two additional warning signs are required at $120 each.

Treatments to Protect the Sunflower Administrative Site:

The purpose of the treatment is for the protection of government property that would be damaged by floods and debris flows from Sycamore Creek if no action is taken. The treatment consists of the installation of jersey barriers, or K-rails and sandbags and implementing other measures to protect Federal property. Barriers are to be keyed into existing ground beside the road or be placed so that flows cannot travel around the established barriers. The barriers should also be buried a minimum of one foot under ground surface and well-compacted. All barriers shall be connected and interlocked to prevent movement of barrier. Sand bags are to be placed between the jersey barriers and around protected structures to provide for barrier reinforcement and structure protection.

- Installation of Jersey barriers/K-rails along the road leading to Sunflower Administrative site – preferably taller barricades (48”) if available
- Empty above-ground fuel storage tanks
- Pump vault toilets to prevent introduction of fecal matter to stormwater (completed)
- Provide protection of water well by removing pump, disconnecting electricity, and installing a temporary cap on the well.
- Consider removing solar panels and storing them at an upland location away from flooding risk
- Place sand bags around all structures in the compound including residences, barn, ampitheater, generator shed, propane tanks, and chlorine treatment system building
- Ensure that the drain in the chlorine treatment system building is functioning properly
- Jersey barries/K-rails are in place and sand bag installation around structures at the Sunflower Administrative Site is nearly completed. Use of volunteer labor to assist with sand bag installation resulted in a cost savings of $48,500.00

Treatments to Prevent Contamination of Surface Water through Stabilization of Abandoned Mine Sites:

The purpose of this treatment is to prevent material contaminated with mercury from entering surface waters during flooding. The National Mine mercury processing facility contains substantial amounts of mine waste including abandoned infrastructure (a retort furnaces, rotary kiln, condenser, tailings conveyor, contaminated wood framing (partially burned), overturned mine truck, corrugated sheet metal, etc.), waste rock (spoils), and tailings.

The Pine Mountain Mine has been reclaimed and stabilized. However, these stabilization measures are now at risk of failure due to the fire which has consumed vegetation in the reclamantion area.

The National Mine should be stabilized through removal of solid waste, including the condenser since these materials could introduce mercury contamination to surface waters. The tailings pass-through should be sealed to prevent stormwater from entering the hole and washing waste rock/tailings out of the tailings basement and into the stream channel. The small, brick retort furnace should be removed from the site and mercury contaminated brick disposed of properly Finally, the large retort furnace should be sealed on the uphill side to prevent water from entering the retort.

The road to access the National Mine has been re-opened by contractors. Removal of contaminated material at the National Mine ore processing facility has been completed. These materials were placed in an upland depository. Emergency HazMat funding of $125,000 has been received from a separate funding source to address additional cleanup needs. An additional $123,636 is requested to complete HazMat treatments as specified below and in attached maps.

ITEM	DESCRIPTION	MEATHOD OF MEASURE	EST. QTY	PAY UNIT		TOTAL
TASK 1 – Mobilization-Onieda						
	Mobilization	LS	1	LS		**$ 1,600.00**
TASK 2 - Access Road Improvement-Onieda						
	Access Road					**$ 14,800.00**
TASK 3 – Haul Road Improvement to Repository-Onieda						
	Haul Road Improvement	LS	1	LS		**$ 24,600.00**
TASK 4 – Onieda - Haul and Place Tailings and Debris in Repository, Obliterate Temp. Haul Road, Final Repository Cover, , Final Site Cleaning, Drainage Grading and Closure, Seeding, Erosion Control						
	Tailings (1,100 Cubic Yards)	LS	1	LS		**$ 38,400.00**

	Roadway Closures: Temporary Haul Road Closure, grading, drainage	LS	1	LS		**$ 8,220.00**

I. Monitoring Narrative:
(Describe the monitoring needs, what treatments will be monitored, how they will be monitored, and when monitoring will occur. A detailed monitoring plan must be submitted as a separate document to the Regional BAER coordinator.)

Monitor the burned area to evaluate the effectiveness of treatments following 2012 monsoon. Visit areas treated with mulch to determine if treatments are functiong properly. Conduct assessments of roads and trails networks to dertemine conditions and needs for additional stabilization measures or emergency repairs. Evaluate mine sites to determine if are effective at preventing hazardous materials from being transported in stormwater runoff. Determine if closure gates and ATV barriers are effective. Verify that warning and closure signs remain in place and are visible. Monitor for presence of invasive and noxious weeds.

Part VI – Emergency Stabilization Treatments and Source of Funds Interim # 1

			NFS Lands				Other Lands			All
		Unit	# of		Other	# of	Fed	# of	Non Fed	Total
Line Items	Units	Cost	Units	BAER $	$	units	$	Units	$	$
A. Land Treatments										
Pine Mtn.HazMat	Unit	79,826	1	$79,826						$79,826
Oneida HazMat	Unit	43,810	1	$43,810	$43,810					$87,620
Debris Basin Cleaning	Unit	8,000	7	$56,000						$56,000
Insert new items above this line!										
Subtotal Land Treatments				$179,636			$0		$0	$223,446
B. Channel Treatments										
Channel realignment	unit	85,000	1	$85,000			$0		$0	$85,000
Insert new items above this line!										
Subtotal Channel Treat.				$85,000			$0		$0	$85,000
C. Road and Trails										
Waterbars	miles	1,400	15	$21,000			$0		$0	$21,000
Ditch cleaning	miles	1500	15	$22,500			$0		$0	$22,500
Rolling Grade Dips	miles	7,400	8	$59,200			$0		$0	$59,200
Road Blading	miles	1,350	15	$20,250			$0		$0	$20,250
Mining District Road	miles	22,200	2.5	$55,500			$0		$0	$55,500
Pipe Barricade	each	19,500	1	$19,500			$0		$0	$19,500
Trail Stabilization	miles	1,650	15	$24,750			$0		$0	$24,750
Add'l Trail Stabilization	miles	2,600	6.5	$16,900			$0		$0	$16,900
Insert new items above this line!							$0		$0	$0
Subtotal Road & Trails				$239,600			$0		$0	$239,600
D. Protection/Safety										
Closure gates	each	3,000	5	$15,000			$0		$0	$15,000
Closure signs	each	525	12	$6,300						$6,300
Warning signs	each	120	12	$1,440						$1,440
K-Rails	each	300	60	$18,000						$18,000
Sand and Bags	each	3	25,000	$75,000						$75,000
Well, solar, elec., Cl	Lump	2,500	1	$2,500						$2,500
Mine stabilization	Unit	40,000	1	$40,000						$40,000
Add'l Warning Signs	Unit	120	2	$240						$240
Add'l Closure Signs	Unit	525	2	$1,050						$1,050
Savings from Sand Bagging				-$48,500						
Add'l Closure Gates	each	3,000	4	$12,000						$12,000
Insert new items above this line!							$0		$0	$0
Subtotal Structures				$123,030			$0		$0	$171,530
E. BAER Evaluation										
				$0			$0		$0	$0
Insert new items above this line!				---	$0		$0		$0	$0
Subtotal Evaluation				---	$0		$0		$0	$0
F. Monitoring										
Storm Patrol		3,000	10	$30,000	$0		$0		$0	$30,000
Noxious weed detect.	Survey	4,500	2	$9,000						$9,000
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Monitoring				$39,000	$0		$0		$0	$39,000
G. Totals				$666,266	$43,810		**$0**		**$0**	**$758,576**
Previously approved				$495,440						
Total for this request				**$170,826**						

PART VII - APPROVALS

1. /s/ Clay Templin (*for*) 6/25/2012
   Forest Supervisor (signature) Date

2. /s/ C. L. Newman, Jr. 6/26/2012
   Regional Forester (signature) Date