

BURNED-AREA REPORT
(Reference FSH 2509.13)**PART I - TYPE OF REQUEST****A. Type of Report**

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

B. Type of Action

1. Initial Request (Best estimate of funds needed to complete eligible stabilization measures)
 2. Interim Report # 1
 Updating the initial funding request based on more accurate site data or design analysis
 Status of accomplishments to date

NOTE: An initial funding request was approved on July 3, 2013 for funds to treat areas associated with 3,317 burned acres primarily on the northern end of the Doce Fire burned area, where the most critical values at risk were located and immediate stabilization was needed prior monsoon rains.

This interim report is requesting funding for emergency treatments located in the remaining watersheds within the burned area. New text added below since the initial request appears in green.

3. Final Report (Following completion of work)

PART II - BURNED-AREA DESCRIPTION

- | | |
|--|-----------------------------------|
| A. Fire Name: Doce Fire | B. Fire Number: AZ-PNF-130497 |
| C. State: Arizona | D. County: Yavapai |
| E. Region: 3 | F. Forest: Prescott |
| G. District: Bradshaw | H. Fire Incident Job Code: P3HK5X |
| I. Date Fire Started: 6/18/13 | J. Date Fire Contained: 7/10/13 |
| K. Suppression Cost: \$7,234,122 | |
| L. Fire Suppression Damages Repaired with Suppression Funds
To date, the following suppression rehab has been completed with suppression funds:
1. Dozer Line Rehab: 8 miles
2. Hand Line Rehab: 14 miles | |

3. Drop Point / Safety Zone Rehab: 5 acres

M. Watershed Number:

6th code watersheds affected by the Doce Fire:

Number	Name
150302030108	Upper Skull Valley Wash
150302030102	Tonto Wash
150602010708	Long Canyon
150602010710	Mint Wash

N. Total Acres Burned: 6,767

All (100%) of the Doce fire was within the Proclaimed Forest Boundary.

35 acres (~0.5%) was on private land and 6,732 acres (~99.5%) was on National Forest System land.

The initial request focused on an assessment area of 3,317 acres in the northern segment plus an additional 591 acres for the Water Tank watershed above Iron Springs Road.

This request incorporates the balance of the burned area in the above referenced watersheds (approximately 2,859 acres).

O. Vegetation Types: Chaparral, piñon-juniper, ponderosa pine

P. Dominant Soils: Lithic Haplustalfs

Q. Geologic Types: Granite

R. Miles of Stream Channels by Order or Class:

Hydrologic Routes inside Doce Fire Perimeter by Class

NAME	MILES
Mint Wash (intermittent)	0.99
Tonto Wash (ephemeral)	1.66
Long Canyon (ephemeral)	1.81
Other ephemeral	21.37

S. Transportation System

Miles of road impacted: 1.5

Miles of trail impacted: 15.5

PART III - WATERSHED CONDITION

The initial request included high priority watersheds that comprised 3,317 acres, or approximately 50%, of the total burned area. The values presented below include all burned acres within the Doce fire perimeter, including acres from the initial request.

A. Burn Severity (acres):

Low/Unburned	Moderate	High
1569	4190	1008

Total 6,767

The attached map packet includes a detailed soil burn severity map.

B. Water-Repellent Soil (acres): 5,198

C. Soil Erosion Hazard Rating (acres):

Slight 188

Moderate 3378

Severe 3201

TOTAL 6,767

D. Erosion Potential: 11.4 tons/acre

E. Sediment Potential: 26,977 cubic yards/square mile (*based on the northern end of the burned area*)

PART IV - HYDROLOGIC DESIGN FACTORS

(based on the northern end of the burned area)

A. Estimated Vegetative Recovery Period, (years): 3-5

B. Design Chance of Success, (percent): 80

C. Equivalent Design Recurrence Interval, (years): 25

D. Design Storm Duration, (hours): 1

E. Design Storm Magnitude, (inches): 2.09

F. Design Flow, (cubic feet / second/ square mile): 859

G. Estimated Reduction in Infiltration, (percent): 41%

H. Adjusted Design Flow, (cfs per square mile): 2502

PART V - SUMMARY OF ANALYSIS

A. Describe Critical Values/Resources and Threats:

Background

The Doce Fire is a human caused fire that originated near Doce Pit, a popular dispersed recreational shooting area just off Iron Springs Road. Doce Pit area also provides access to one motorized and one non-motorized system trails. The wind-driven fire spotted across Iron Springs Road, a two-lane paved county road, and spread quickly north and east up into Granite Mountain Wilderness. Once it topped Granite Mountain, the fire dropped down the far side toward developed private lands containing many homes and other structures. The rate of spread was unexpected, even to veteran fire specialists, especially as the fire travelled downslope. By the end of the first day, the fire had already encompassed approximately 5,000 acres.

For the next three days, the fire continued to spread mostly along its firefighting efforts helped reduce the forward spread. Even as the fire continued to be quite active, Burned Area Reflectancy Class (BARC) mapping

was ordered and the Prescott NF BAER team began reviewing photos and other information and evaluating ground conditions in the area to develop a final burn severity map.

The initial BAER effort focused primarily on the northern end of the fire where risks to critical values were greatest. The potential for flooding, debris flows, and downcutting of channels on the north end of the burn area poses a threat to critical resource values as well as private development below the drainages. The additions included in this interim report focus on the emergency restoration needs in the balance of the burned area.

Land values at risk included in this interim report are Forest Service roads and trails, heritage resources, and native plant communities. Critical resource values at risk included in the initial request include soil productivity, hydrologic function, habitat for sensitive wildlife species (lowland leopard frog, Arizona toad, longfin dace).

Human safety and property values at risk within the northern portion of the burn include at least 17 developed private parcels adjacent to the forest at the base of Granite Mountain where potential for flooding and debris flow is greatest. People and domestic animals, homes and other buildings, fences, and access routes (roads/bridges) are at risk.

Human safety and property values at risk within the balance of the burned area include risks to recreational trail users in Granite Basin and Granite Mountain Wilderness and risks to road users where there is threat of flooding and washouts on Forest Road 9271A.

In addition to threats along the northern portion of the fire, there is also a small segment along the southern edge where fire jumped Iron Springs Road that poses an immediate threat to the drainages along and under the roadbed. Sediment loads could easily clog drainage ditches and culverts as well as a 7' by 7' concrete box culvert that also serves as a motorized trail underpass. This could cause flooding across the road and down the drainage.

Multi-agency coordination to date includes Arizona Division of Emergency Management, Yavapai Flood Control District, NRCS Emergency Watershed Program, National Weather Service, Yavapai County Emergency Service, in addition to fire departments and Yavapai County Fire District. These agencies have identified the northernmost section of the burned area as the greatest concern for life and property.

1. Protection/Safety

On the northern end of the burn with drainages to Mint Wash, the potential for flash floods, debris flows, and channel downcutting adjacent to roads and private lands could put public roads and residents and their property at risk. Potential overtopping of flood plains and terraces during flood events could also compromise exit routes and create hazards or impassable conditions.

Trails in Burned Area

The Doce Fire impacted several recreation resources on the Prescott National Forest (PNF). It burned nearly half of the Granite Mountain Wilderness, a dominant landmark in the Prescott Basin that is the most frequently visited wilderness area on the Forest. The neighboring Granite Mountain recreation area is one of the most popular recreation areas on the Forest due to the complex of recreation sites that provide scenic views and easy access to Granite Mountain. Primary recreation activities in the Granite Mountain Wilderness consists of wilderness-based trail use by equestrians and hikers. Mountain biking is popular on a handful of trails outside the wilderness. Although the complex of sites did not burn, there is potential risk to public safety

on a number of system trails that originate within the Recreation Area and travel either through burned areas or areas subjected to potential postfire flooding below the burn area.

Another trail that poses a risk to users is Forest Service Trail # 619 which is accessed through Alto Pit. Alto Pit Campground and OHV Day Use Area is a bit further down Iron Springs Road from Granite Basin and is the most popular motorized recreation area on the Forest. Similarly. It also was not directly impacted by fire, but contains the trailheads for trails that provide access to burned areas located outside the wilderness. Additionally, Trails 619 and 620 leaving Alto Pit OHV Area provide critical access to the remainder of the forest for OHV enthusiasts.

Forest Road 9271A

Forest Road 9271A, also known as the Doce Road, poses a potential risk to the safety of road users (including a rock quarry permittee) due to risk of road failure as a result of post fire runoff events and the fact that the road culverts are undersized and/or no longer functional. The road is critical to maintain the viability of the quarry operation and loss would cause an economic burden to the permittee. Post-fire flows at FR9271A are predicted to be 173% greater than pre-fire flows for a 25 year, 1-hour rainfall event. Because of the increased flooding and debris flow potential, the road is at risk for washout and embankment failure which would put road users at risk.

Although the road is currently under a soft closure, the quarry operator needs access and public intrusions into the closed area have already been documented. A substantial closure in the form of a locked gate is needed to enforce the closure to this frequently visited area. A locked gate will provide fair weather access for administrative uses and to the permittee, whose only access is by FR 9271A, while preventing unauthorized access. Installation of rolling dips would also protect the road from washouts that could threaten the safety of road users including the permittee.

2. Roads and Trails

Because of its proximity to the city of Prescott, Granite Mountain Wilderness is the most heavily visited wilderness area in the Prescott NF. There are several developed recreation facilities at the base of Granite Mountain and many trails leading into the wilderness area. Most of the area is currently under a closure order due to the fire. The closure is expected to remain in effect until the area can safely be reopened to the public. Risks from erosion, flooding, and debris flows include the potential for hazard trees to fall across trails and channel water and potential to impact wilderness values and Granite Mountain's 10-Year Wilderness Stewardship Challenge score.

3. Lands

Soil Productivity

Due to dry conditions and organic matter associated with chaparral species, the unburned/pre-fire soil hydrophobicity is low to moderate. The majority of the soils within the fire perimeter were subjected to moderate burn severity (62%). These areas have some mosaic of rock outcrop causing non-continuous burn. Moderate burn severity included nearly complete consumption of vegetation with primarily overstory vegetation wholly consumed, soil structure has minimal alteration due to soil heating, and soils display high hydrophobicity with minimal depth.

The majority of the watersheds within the northern portion of the fire were subjected to moderate soil burn severity (2,101 acres). Post fire risk to soil productivity is "low to intermediate" in these areas because erosion rates are expected to increase but not expected to exceed tolerable levels. Therefore no treatments were proposed for areas with moderate burn severity.

Approximately 15% of the burned area was subject to high burn severity. High burn severity is generally associated with deep alluvium deposits and a southerly aspect. Characteristics of high burn severity include full consumption of overstory fuels and vegetative ground cover, grey ash prominent in a mosaic pattern, high hydrophobicity within 1/8 to 1/4-inch depth, and moderate hydrophobicity up to a 1-inch depth.

In the northern area where the watersheds drain to Mint Wash, high soil burn severity areas are mostly associated with deep alluvium/colluvial deposits along ephemeral drainages. These soils are more productive and have a high water holding capacity due to greater soil depth. Because of the alluvium formation from decomposed granite parent material, these soils are erosive and susceptible to high levels of soil loss and gullying that can negatively impact productivity and influence drainage flow parameters. Soil modeling suggests areas of high soil burn severity are “likely” to exceed tolerable soil loss rates, which could result in a “very high” risk magnitude of consequence to soil long-term productivity. The 255 acres of high burn severity in the northern portion were evaluated for emergency treatment due to potential damage to soil productivity and downstream resources.

Low burn severity occurred on 23% of the burned area. Areas exhibiting low soil burn severity exist where overstory and understory fuels are mostly intact and, where exposed to fire, the herbaceous crown was not fully consumed and vegetative ground cover has been minimally consumed. Post fire erosion rates are expected to increase minimally in these locations.

Approximately 782 acres of low burn severity are associated with the northern portion of the fire and pose a “low” risk of soil productivity impairment. Therefore no treatments are proposed for those 782 acres with low burn severity.

Hydrologic Function

Water Resources: The Doce fire occurred in watersheds of Granite Mountain, which are characterized by very steep side slopes and steep to average stream gradients. Soils are generally shallow with high surface rock content and significant inclusions of rock outcrop. Surface geology is characterized by intrusive igneous rocks (primarily granites). As a consequence of the above factors, surface runoff rates are naturally high and stream flows are hydrologically flashy in these watersheds. Conversely, soil and geology characteristics lead to low infiltration rates and reduced groundwater storage, which in turn has resulted in a general lack of perennial streams with well-developed riparian vegetation.

The Doce fire burned moderately hot in a high percentage of the area (77%) sustaining moderate to high soil burn severity. Field reconnaissance indicated that most of the moderate and high severity acres exhibited hydrophobicity to some degree. This hydrophobic condition further retards infiltration resulting in even higher levels of runoff. In addition, High-moderate burn severity acres exhibit complete consumption of vegetative ground cover and canopy, and grey-white ash. However, the increase in runoff may not be as significant as would be expected in severely burned forests with deeper soils where pre-burn infiltration is higher.

Stream channel stability in the area of the fire is generally good due to the generally confined, rock armored, nature of the stream beds. Stream stability in the alluvial valleys is lower due to finer materials and land cover conditions. Sediment transport and subsequent deposition through the system is expected to be more prevalent than stream bed degradation (down cutting).

Water Quality: The most immediate impacts on water quality from the fire will be related to ash washed into the stream channels from adjacent burned slopes. Ash is quickly mobilized by summer rains, and tends to be rapidly conveyed through the stream network. Impacts of the ash are generally short term but can be severe to aquatic life where the ephemeral or intermittent stream channels that cross the burned area. Ash entering waterbodies would likely lower the pH, and change the ionic balance of stream chemistry, which in turn is

likely to result in fish kills (where fish are present). There is little that can be done to effectively prevent the ash input to the surface waters. Once the ash is flushed out of the system, probably within a year's time, the stream chemistry is likely to improve naturally.

Of longer term concern are the accelerated levels of sedimentation that will occur in streams crossing the burned area. Streams in the burned area are primarily ephemeral and intermittent in nature. Sediment transport capacities of the streams should allow rapid redistribution of sediments conveyed to the channels after a few years of normal storm events. The principal impacts of the increased sedimentation therefore would be related to a short term potential to plug any inadequately sized culverts.

In the burned area northeasterly of Granite Mountain, stream channel stability in the wilderness area where the headwaters are located is generally good due to the mostly confined, rock-armored nature of the stream beds. However, the receiving drainage of Mint Wash is a finer grained, highly unstable channel. This area is associated with habitat for sensitive species as well as private lands containing homes and other structures. Sediment transport and subsequent deposition through the system is expected to be more prevalent than stream bed degradation (down cutting).

Also in the northern segment, several sub-watersheds with down-gradient values at risk are approved for post-fire seeding and straw mulching. The two watersheds with the largest treatment areas (Bowl and Rattlesnake) were modeled to estimate the potential reduction in peak runoff values. Treatments in these two sub-basins are expected to have a modest but immediate effect on peak flow, slowing runoff to Mint Wash by 224 cfs (10.5 % reduction). In the burned area southerly of Granite Mountain one watershed (Water Tank) with down-gradient values at risk are approved for post-fire seeding and straw mulching.

In addition to the initial reduction in peak runoff, longer-term benefits to the watershed include preservation of streambed and bank soils. These soils are critical for maintaining bank storage and pre-fire shallow groundwater conditions and ecological function. Maintaining these hydraulic conditions will also accelerate natural restoration of vegetation, and streamflow patterns, thus protecting sensitive species and private properties below the affected areas. Not treating these watersheds would result in a flashier hydraulic system with greater risk to downstream sensitive species and private property.

(See hydrology/soils report for further analysis details)

Soil Loss and Hydrology Analysis Results by Watershed

Sub-Watershed	Critical Values at Risk	Modeled Peak Flow % Change*	Modeled Total Storm Runoff Volume % Change	Modeled Sediment Yield % Change	% of Watershed Subjected to High-Moderate Soil Burn Severity
Bowl	Soil productivity, hydrologic function, public safety on FS Trail 308, downstream sensitive habitat, & downstream communities	↑191%	↑144%	↑557%	75%
Lizard	Soil productivity, hydrologic function, downstream public safety on FS Trails 308 & 400, downstream sensitive habitat, & downstream communities	↑138%	↑102%	↑431%	41%

North Slope	Soil productivity, hydrologic function, downstream public safety on FS Trails 308 & 400, downstream sensitive habitat, & downstream communities	↑192%	↑147%	↑678%	80%
Rattlesnake	Soil productivity, hydrologic function, downstream public safety on FS Trails 308 & 400, downstream sensitive habitat, & downstream communities	↑172%	↑131%	↑778%	91%
Rock	Soil productivity, hydrologic function, downstream public safety on FS Trails 308 & 400, downstream sensitive habitat, & downstream communities	↑85%	↑66%	↑356%	34%
West is East	Downstream public safety on FS Trail 308, downstream sensitive habitat, & downstream communities	↑85%	↑67%	↑276%	32%
Water Tank	Soil productivity, hydrologic function, Doce Pit Rd (FR9271A), County Road 10 (non-FS), downstream FS Trails 624 and 264.	↑73%	↑58%	↑181%	41%
Blair Pass	Forest Roads 9713F and 9470U, FS trails 671 and 1959.	↑57%	↑34%	↑390%	18%
Buckman Flat	Forest Road 9713F, FS trails 620 and downstream 621.	↑68%	↑50%	↑375%	31%
Little Granite	Forest Road 9713F, downstream private property	↑127%	↑103%	↑241%	49%
Sheep Canyon	Forest Road 9713F, downstream private property	↑54%	↑42%	↑262%	30%
Granite Mountain	Downstream FS trail 345	↑79%	↑67%	↑135%	45%
GYC**	FS Trails 261, 40, & 349.	↑58%	↑48%	↑350%	15%

*Model outputs are based on a 25-yr/1hr storm event.

** This watershed is a union of the Granite Basin Lake, Yavapai, and Clark Spring watersheds within the Mint Wash 6th Code watershed.

NOTE: See discussion for each critical value at risk in following narrative sections. See Hydrologist/Soils report for detailed projected soil loss based on FS WEPP and peak flow based on Wildcat Hydrologic model outputs.

Geologic Hazards

The loss of vegetative cover and root support on potentially unstable slopes within the burned area has increased the potential for shallow slope movements such as rock slides, debris flows, and debris avalanches. Debris flows displace rock and soil which rapidly moves down slope, often following existing channels. These debris flows and avalanches travel far distances from their points of origin and can be very destructive due to the size and types of material incorporated into the flow.

The likelihood of debris flow after a wildfire is dependent on the duration and intensity of rainfall events after the fire. Intense summer monsoonal storms are typical for Northern Arizona and occur from July through September and, if they are of sufficient intensity and duration, could initiate debris landslides, debris flows, rock falls, and rock slides.

Debris flow modeling for sub-basins of the Doce Fire was performed using the methods of Canon et al., 2010. Assistance in the mechanics and use of the models was provided by Ann Youberg, Research Geologist at Arizona Geologic Survey, Tucson (Personal Communication, June 21, 2013). Models A and B from the Cannon et al. paper were run and the results averaged to determine the overall probability of a debris flow in the sub-basins analyzed. The potential mean volume of material deposited by a debris flow at the outlet of a recently burned sub-basin was estimated using the multivariate regression model given in the paper. Data sources for the model runs included the burn severity mapping for the Doce Fire, soil parameters from the STATSGO database and storm intensity and precipitation values from the NOA Atlas Precipitation Frequency Data Server.

In the northern end of the burn, the tributary channels into Mint Wash are capable of carrying large bedload materials during intense storm events. Flood flows from tributary streams could accumulate and enter Mint Wash resulting in undercutting the wash and eroding stream banks or overtopping the channel in places.

Summary of Landslide Risk, Debris Flow Probability and Debris Flow Volume for the Doce Fire

Landslide Risk

Within the Doce Fire area, landslide risk is mostly moderate within the areas burned at high to moderate severity. This is because slope gradients as obtained from the 10m DEMs show a low acreage of slopes greater than 50%. Landslide risk would be more elevated if the mountain slopes were steeper.

Debris Flow Risk

Bowl, North Slope, and Rattlesnake sub-basins have the most area burned at high-moderate severity and Bowl and North Slope have greater than 50% of their area with slopes steeper than 30% and therefore would be expected to have the potential for debris flows.

The debris flow model predicts that Rattlesnake has the highest probability of debris flow generation and all three sub-basins Rattlesnake, Bowl and North Slope have greater than a 50% probability of producing post-fire debris flows for all three storms modeled (1-hour/ 5-year, 10-year, and 25-year storm events).

Debris Flow Volume

Bowl and Blair Pass have the highest estimated debris flow volume calculated in the range of 50,000 to 100,000 cubic meters of rock and sediment based on a Storm 2 (1-hour/10-year) type of event. This is because these sub-basins are the largest in area and have the most and longest stream channels that could contribute sediment to the pour point. Seven other basins have volumes estimated in the range of 10,000 to 50,000 cubic meters and include Little Granite, Sheep Canyon, Buckman Flat, Granite Basin Lake, Granite Mountain, Clark Spring and Rattlesnake.

Combined Debris Flow and Volume Hazard

Rattlesnake and Bowl have the highest combined relative hazard of debris flows and estimated debris flow volume of material. North Slope was ranked High-Moderate because of its probability of debris flow generation of 68%, third highest of all sub-basins. Granite Mountain, Little Granite, Blair Pass, Clark Spring, Buckman Flat, Granite Basin Lake, and Sheep Canyon have a moderate combined hazard ranking due to their potential for generating large volumes of debris flow material versus a lower debris flow potential.

Wildlife

A review of the threatened, endangered, and sensitive (TE&S) Wildlife, Fish, and Rare Plants (WFRP) species for the Prescott NF shows that no federally listed species or critical habitats occur within the fire area. Four Regional Forester sensitive species whose habitats occur within the affected area of the fire include the peregrine falcon, lowland leopard frog, Arizona toad, and longfin dace.

The Forest Service sensitive peregrine falcon nests on the cliff face of Granite Mountain. The vegetation and riparian corridors surrounding the cliff face serves as foraging habitat for the nesting peregrines. The breeding season for the peregrine is from February 1 through July 15 each season.

The three sensitive aquatic species associated with Mint Creek have limited populations or occurrences within the Mint Creek drainage. Field surveys have identified Mint Wash as suitable habitat for lowland leopard frogs. Arizona toads might occur in Mint Wash and native fish could include longfin dace.

No Forest Service sensitive plants were detected during the botanical survey by Mark Baker (2003) in the Granite Mountain Wilderness and nearby areas.

The fire footprint is within 1 mile of a Mexican spotted owl (MSO) critical habitat polygon (no protected or restricted habitat) and 2 miles of a MSO protected activity center (PAC). However, no MSO or MSO habitat components occur within or near the fire area.

Gila chub critical habitat occurs off-forest approximately 10 miles downstream of the fire area in Williamson Valley Wash.

Probability of Damage or Loss:

Peregrine falcon: Considering that peregrine nesting habitat occurs on the vertical portion of the Granite Mountain cliff face which is not particularly susceptible to soil movement or other influences, there is an unlikely probability of damage or loss of peregrine nesting habitat within one to three years from the Doce Fire. Peregrine foraging habitat is resilient and will be primarily associated with passerine bird habitat within the Mint Wash riparian corridor as well as other surrounding riparian corridors. Peregrines at Granite Mountain may also use nearby neighborhood bird feeders for foraging. Therefore there is an unlikely probability of damage or loss of peregrine foraging habitat within one to three years from the Doce Fire.

Mint Creek Aquatic Species: For the lowland leopard frog, Arizona toad, and longfin dace, the probability of damage or loss of habitat in Mint Wash is about 95%, or very likely to occur from sediment and ash washing down from the area of the fire to the aquatic habitat.

Gila chub critical habitat: A Gila Chub population and designated critical habitat (CH) lies about 10 miles downstream of the fire area in Williamson Valley Wash on private lands. Impacts from the fire will vary based on extent and intensity of rain events on the burned area. Indirect fire effects are expected to include increased runoff from the watershed with sediment and ash flows into the drainages. Sediment transported from the fire area in rain events would be expected to deposit along the stream channel and not have a large

sediment load into occupied habitat due to the 10 miles of stream course to the site and the low gradient characteristic of Mint Wash and Williamson Valley Wash. Sediment loads from the fire are unlikely to impact the Gila chub population and PCE (primary constituent elements) of CH. Because ash would tend to stay on the top of the water, it could be possible for ash material be transported to the site of the Gila chub and CH. Ash material tends to flush out with the initial rain events and quickly move through the stream system.

Magnitude of Consequences:

Peregrine falcon: For the peregrine falcon habitat within the fire area, the magnitude of the consequences is minor as it is limited to a single territory for the species.

Mint Creek Aquatic Species: For the lowland leopard frog, Arizona toad, and longfin dace, the magnitude of consequences to habitat in Mint Creek is major given that the effects are expected to last for years within what is already limited habitat for all three species. These impacts would be localized but could be significant from the species' perspective.

Gila chub critical habitat: With over 10 miles of stream course through private property between the fire area and the Gila chub (GC) CH, the magnitude of the consequences to the population and PCE of GC CH would be minor due to the buffering effects of the private property and the actions therein.

Heritage Resources

An archival review and a field inspection of heritage resources within and adjacent to the Doce Fire indicate that a total of 30 previously recorded and three previously unrecorded heritage properties lie within and adjacent to the Doce Fire area. During field inspection, six of the 30 previously recorded sites were not relocated, leaving 24 previously recorded sites and three new sites recorded during suppression and mop-up of the Doce Fire.

None of the 24 sites that were relocated are listed on the National Register of Historic Places (NRHP). Twelve of the heritage sites have been previously recommended and are possibly eligible to the National Register. Twelve other sites are currently unevaluated but will be treated as possibly eligible until a formal determination of eligibility is made. One site has been previously determined ineligible to the National Register in consultation with the Arizona State Historic Preservation Office (SHPO).

All thirty previously recorded and the three newly recorded heritage sites have been previously recommended as possibly eligible to the National Register of Historic Places or, if unevaluated, will be managed as possibly eligible until a determination of eligibility is made. Of these 33 sites, 10 have a likely level of probability of damage or loss with moderate level of magnitude of consequences for a high level risk for these heritage properties. It is recommended that these 10 sites be monitored through the next year.

Eight heritage sites have an unlikely probability of damage or loss with a low magnitude of consequences for a low level of risk. Six sites were not relocated during field inspection and assessment of heritage sites on the Doce fire. Nine sites were not inspected or assessed due to unsafe post-fire field conditions. It is recommended that these nine sites also be assessed and monitored for damage within the next year.

Native Plant Communities at Risk from Noxious Weeds

Suppression efforts are likely to have spread non-native invasive species within the burned area. Dalmatian toadflax and salt cedar are found at Granite Basin Lake and along trail #345 adjacent to Mint Wash. The burned area had salt cedar present in drainages west of Little Granite Mountain before the fire. This species will sprout in response to fire and can colonize bare soil after fire and flooding. Additionally, a known

population of scotch thistle exists within the burned area along Doce Road near the fire's point of origin. These species have the potential to impact native plant communities in uplands and riparian areas.

Post-fire Treatments Not Using BAER Funds:

In addition to the above described critical values at risk for which this BAER funding request is being made, other post-fire efforts are underway for which there is no request for BAER funding. Two of these efforts are described below.

Granite Basin Dam

Situated in Mint Wash, with a watershed drainage area of about 4.7 square miles, Forest Service owned Granite Basin Dam is classified as a high-hazard potential facility (JF Sato and Associates, *Hazard Potential Classification and Inundation Study Granite Basin Dam*) due to the recreation trails along and crossing the downstream drainage of Mint Wash. Granite Basin Lake sits behind the dam and is a popular recreational lake with a boat launch and trailhead and with four day use areas and a campground nearby. Several deferred maintenance items concerning the dam are recommended to be implemented to assure proper operation while the watershed stabilizes over the next few years. Sediment has accumulated around the lake and behind a gabion wall in the drainage above the lake. In addition, extensive vegetation had grown below the dam that would impede the flow of water discharged from the dam. This vegetation has already been cleared as recommended.

The projected increase of storm water flows to Granite Lake as a result of the Doce fire burned area within the watershed is estimated to be approximately 467 cubic feet per second (CFS). The design spillway capacity of the Granite Basin Dam is 8000 CFS. Thus, an increase of 467 CFS over the dam is not significant. Therefore, the post-fire watershed hydrology does not pose an imminent threat to the stability of the structure, providing the dam is operated in accordance with the Operations & Maintenance manual.

The Forest plans to have a 3rd party assist in the removal of sediment that has built up in the last decade behind the upper gabion wall and in the lake's beach area. Removal of the sediment will help restore lake capacity and attenuate some of the in-coming peak storm flow rates. The funds utilized in the oversight and administration of these two operations would be through Forest funds so cost of the work is not add to this BAER funding request.

Public Safety

Yavapai County employees have installed meteorological stations to alert systems outside of the wilderness and within the area of flooding concern to inform the public about possible high intensity rainfall events that might produce floods and debris flows. No BAER funding is requested for this installation.

Risk Assessment

BAER Risk Assessment Table

PROBABILITY OF DAMAGE OR LOSS	MAGNITUDE OF CONSEQUENCES		
	Major	Moderate	Minor
Loss of life or injury to humans; substantial property damage; irreversible damage to critical natural or cultural resources.	Injury or illness to humans; moderate property damage; damage to critical natural or cultural resources resulting in considerable or long term effects		Property damage is limited in economic value and/or to few investments; damage to natural or cultural resources resulting in minimal, recoverable or localized effects
	RISK		
Very Likely (>90%)	Very High		Low
Likely (>50% - <90%)	Very High		Low
Possible (>10% - <50%)	High	Intermediate	Low
Unlikely (<10%)	Intermediate	Low	Very Low

Using the BAER Risk Assessment Table, the following assessments are made.

	Probability	Magnitude	Risk	BAER EMERGENCY?
Protection/Safety				
Private Property	Likely	Major	Very High	Yes. At least 17 developed parcels on private lands are within the flood plain in close proximity to drainages where debris flows and flooding could damage structures and access roads.
Iron Springs Road	Likely	Moderate	High	Yes. Flooding and drainages clogged with debris could make the road dangerous or impassable.
FR 9271A (Doce Road)	Likely	Moderate	High	Yes. Post-fire flows could cause embankment failure and washouts, endangering road users including the operator of a commercial materials quarry.
Non-Motorized and Motorized Trail Access	Likely	Major	Very High	Yes. There is an immediate need to effectively close trail access points into the fire area where many of the burned trail segments cross slopes that have been fully burned and pose a risk to trail users.
Lands				
Soils (northern end plus Water Tank watershed)	Likely	Major	Very High	Yes. High burn severity areas associated with Northern end of fire and in Water Tank watershed require treatments to minimize erosion.

	Probability	Magnitude	Risk	BAER EMERGENCY?
Hydrologic Function (northern end plus Water Tank watershed)	Likely	Major	Very High	Yes. Lack of ground cover and hydrophobic soils would lead to loss of infiltration and water storage and increased runoff.
Wildlife <i>Peregrine Falcon</i>	Unlikely	Minor	Very Low	No. The combination of unlikely probability of damage or loss and a minor magnitude of consequences result in a very low risk assessment for peregrines
Mint Wash Aquatic Species	Very Likely	Major	Very High	Yes. For the three aquatic species associated with Mint Creek riparian habitat, the very likely probability of damage and the major magnitude of consequences would result in a high risk assessment for these resources.
Gila Chub	Unlikely	Minor	Very Low	No. For the Gila chub critical habitat, the combination of unlikely sediment and minor consequences would have a low to very low risk for the Gila chub CH PCE.
Native Plant Community/Noxious Weed Detection	Likely	Major	Very High	Yes. Based on proximity to known weed locations, fire severity, and likelihood of runoff/overland flow, spreading of weeds to new locations would greatly increase probability of damage or loss of the native plant community.
Heritage Resources	Possible	Moderate	Intermediate	Yes. Some are at risk due to burn severity and potential flooding.

B. Emergency Treatment Objectives:

- Promote natural recovery.
- Protect sensitive wildlife habitat for lowland leopard frog, Arizona toad, and longfin dace.
- Minimize the loss of wilderness and ecological values.
- Reduce the risk to human life, safety, and property.
- Mitigate effects of changed post-fire watershed response on long-term soil productivity and hydrologic function.
- Minimize potential threats to human life and safety by maintaining a temporary closure until after the monsoon season of 2013 at a minimum, potentially longer. The length of closure will be dependent upon prevalence of hazardous conditions through time.
- Minimize longer term threats to life and safety by maintaining warning and closure signs describing risks associated with traveling on trails within a burn area (e.g. falling rocks, trees, unstable slopes, etc.).
- Minimize potential impacts to native plant communities from the spread of noxious invasive weeds.
- Minimize potential impacts to heritage resources from post fire events.

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

Land 80 % Channel N/A % Roads/Trails 90 % Protection/Safety 80 %

Note: The probability of completing treatment for roads and trails prior to damaging storm event is higher because Yavapai County Road Department has initiated work within their right-of-way .

D. Probability of Treatment Success

		Years after Treatment		
		1	3	5
Land	70	80	90	
Channel	N/A	N/A	N/A	
Roads	80	90	90	
Protection/Safety	55	70	80	

Cost of No Action Alternative (Including Loss)

\$6,517,487

Cost of No Action Alternative (Including Loss) includes **Total Loss or Failures**. Probability of failure is 20%. Total Loss or Failure includes home and structure value potentially impacted downstream along Mint Wash, total soil loss cost associated with soil productivity treatment areas without treatment, cost of restoring heritage sites if post fire treatment not occur, Doce road restoration cost if road fails without treatment, and economic loss to quarry operator if unable to access during closure.

Cost of Selected Treatment (Including Loss)

\$1,765,661

Cost of Selected Alternative (Including Loss) includes **Treatment Cost** added to **Loss with Treatment** multiplied by 80% probability of success and **Total Loss or Failures** (as identified in *Cost of No Action Alternative*) and Total Treatment cost multiplied by 20% probability of failure. Loss with Treatment includes the elevated treated erosion rates versus the pre-fire erosion rates.

G. Skills Represented on Burned-Area Survey Team:

- | | | | |
|---|--|---|---|
| <input checked="" type="checkbox"/> Hydrology | <input checked="" type="checkbox"/> Soils | <input checked="" type="checkbox"/> Geology | <input checked="" type="checkbox"/> Range |
| <input type="checkbox"/> Forestry | <input checked="" type="checkbox"/> Wildlife | <input type="checkbox"/> Fire Mgmt. | <input checked="" type="checkbox"/> Engineering |
| <input checked="" type="checkbox"/> Contracting | <input checked="" type="checkbox"/> Ecology | <input type="checkbox"/> Botany | <input checked="" type="checkbox"/> Archaeology |
| <input type="checkbox"/> Fisheries | <input type="checkbox"/> Research | <input type="checkbox"/> Landscape Arch | <input checked="" type="checkbox"/> GIS |

Team Leader: David Moore
Email: dmoore05@fs.fed.us Phone: 928.713.9028

H. Treatment Narrative:

Note: The following narrative was for the initial request which has been approved.

The previously approved treatment is to seed and mulch areas on the northern end of the fire, primarily in the Rattlesnake and Bowl sub-watersheds within the Granite Mountain Wilderness, and in portions of the Water Tank watershed above Iron Springs Road outside of the wilderness. The seeding and mulch treatment is intended to provide immediate ground cover and increase the probability of seed propagation to alleviate

accelerated runoff and provide stability. In addition, this treatment will assist in protecting downstream resources.

Areas targeted for treatment are those that were subjected to high burn severity and have deep productive soils in alluvium/colluvium granite parent material primarily affiliated in depositional zones and along drainages. Treatment of these areas focuses on soils most vulnerable to productivity loss on slopes <30 degrees that would provide the highest watershed ecological services of water storage, cation filtration, and nutrient sinks. Treatment of these areas will provide filter strips to retard overland flow, promote infiltration of uphill run-on, and provide overall stability. These treatments are intended to reduce negative impacts to critical resource values on the forest.

Previously approved treatment areas and acres include:

Delineated sub-watershed	Arial Seed/Mulch (Acres)	Hand Seed/Mulch (Acres)
Bowl	58.1	
Lizard	10.6	
North Slope	10.3	
Rattlesnake	98.9	
Rock	3.0	
Water Tank		46
Total Acres	181	46

Straw mulch will be applied at a rate of 2 tons per acre with an objective for ground cover of 1 inch thickness. The higher rate of mulch application is proposed because of the inherent instability of the granitic alluvium/colluvium parent material. On past BAER treatments on the Prescott NF on granitic parent material and on areas with 55% slope gradient, the higher rate of mulching has been very successful for soil stabilization and promoting seed propagation. This type of treatment was effectively used on the Indian Fire in 2002, the Lane 2 Fire in 2010, and the Gladiator Fire in 2012. The seed mix will consist of a high percentage of a non-persistent cover crop to provide quick propagation for cover and root growth to promote soil structure recovery. A perennial graminoid component will also be seeded to provide subsequent year ground cover.

Proposed seed mixture includes:

Sideoats grama	<i>Bouteloua curtipendula</i>	4 pls/acre
Barley	<i>Hordeum vulgare</i>	10 pls/acre
Western wheatgrass	<i>Pascopyrum smithii</i>	2 pls/acre
Sand dropseed*	<i>Sporobolus cryptandrus</i>	1 pls/acre

Several sub-watersheds with down-gradient values at risk are proposed for post-fire seeding and straw mulch. These treatments are expected to have a modest immediate effect to slow runoff to Mint Wash. The two watersheds with the largest treatment areas were modeled to estimate the potential reduction in peak runoff values. These results indicate an approximate 10.5 % reduction in peak flow for these watersheds, or approximately 100 CFS per modeled watershed. In addition to the initial reduction in peak runoff, longer-term benefits to the watershed include preservation streambed and adjacent bank soils critical for maintaining bank storage and pre-fire shallow groundwater conditions. Maintaining these hydraulic conditions will accelerate natural restoration of vegetation and streamflow patterns.

Note: The following narrative is for this interim request to cover the balance of the post-fire emergency needs.

The primary proposed treatment is to close the area surrounding the Doce Fire burned area to public access. The closure encompasses approximately 21,940 acres and extends beyond the actual burned area in order to close access routes at trailheads rather than partway down travel routes. This will entail installing signs at trailheads informing people that the trails are closed and why, installing gates at one road and two trails to prevent illegal entry, and monitoring installations. Additional treatments include installing water bars and/or dips on Forest Road 9271A (Doce Road), noxious weed detection in the burn area, and monitoring of heritage sites for damage.

Areas targeted for BAER treatment include:

Burned Area Trails

The Forest proposes to purchase and install 30 closure signs and 30 "burned area ahead" warning signs, plus two gates and six laminate maps to help maintain the closure. The gates would be installed at Forest Service trail # 671, a non-motorized trail east of Long Canyon (which is a location that is difficult to monitor), and on motorized trail # 619 (which provides access into the burned area from the Alto Pit campground and day use area). Forest employees will monitor this closure one day per week through September 30th 2013. FS personnel will document sign status and replace and reinforce any needed notices or signs and help enforce compliance.

Forest Road 9271A

Treatments on Forest Road 9271A (Doce Road) for threats to human life or safety and protection of property include road closure to the public, a gate to control access, and installation of warning signs. It is also proposed to construct rolling dips along the roadway to pass water in the event of culvert failure. Sections of an old railroad grade with 15-20 foot embankments act as detention basins up-drainage from FR9271A. It is proposed to construct "spillway" dips on sections of the old railroad grade to control overtopping and reduce likelihood of embankment failure. The gate would be installed at the entry point to the Doce Road which would be locked but accessible to the commercial materials pit operator who has a special use permit for mineral materials extraction in the Doce Pit area.

Heritage Resources 7/15/2013—This activity was not approved

Nineteen heritage sites are proposed for monitoring over the next year because they are or may be at some risk for damage or loss from storm events. Ten of these are considered to have likely potential for damage, and nine have not yet been evaluated. Personnel and time will be allocated for the evaluation of these heritage sites to detect signs of instability, degradation, or damage from flooding, erosion, and/or debris flows.

Native Plant Communities

Post-fire weed detection efforts within the Doce Fire should be directed towards either known populations that were within the fire perimeter, or known populations near fire control lines or staging areas that may spread into adjacent burned areas because of removal of the native vegetation. There are three inventoried tamarisk locations within the burned area: one near Cedar Spring at the eastern edge of the wilderness along trail #41 (T15N, R3W, Sec. 32); one near an un-named drainage north of trail #39 about ½-mile west of the wilderness (T14N, R3W, Sec. 4); and one along trail #37 west of Little Granite Mountain at the edge of the wilderness (T14N, R3W, Sec. 9). There is a Scotch thistle population at Doce Pit near the fire's origin that should be surveyed for spread (T 14N, R3W, Sec. 17). Known noxious weed populations near fire control lines and staging areas are found along trail #345 adjacent to Mint Wash (Dalmatian toadflax, tamarisk) and near Granite Basin Lake (Dalmatian toadflax, Siberian elm, Scotch thistle).

Priority for weed detection surveys should be Doce Pit, trail #345, followed by the known tamarisk locations near trails #41, #39, and #37. Surveys should be conducted in the late summer or early fall after the summer rains and again in April or May of next year. It is anticipated to take 4 days during each of these survey periods. The surveys will be conducted by qualified Forest Service personnel. Based on the results of the surveys, weed treatments may be implemented in the spring or fall of 2014. Treatment of noxious weeds is addressed in the *Final Environmental Impact Statement for Integrated Treatment of Noxious or Invasive Weeds, Coconino, Kaibab, and Prescott National Forests within Coconino, Gila, Mohave, and Yavapai Counties, Arizona*.

The attached map packet includes a map depicting the locations of all treatments for the Doce Fire BAER Assessment including previously approved treatments.

Evaluation of Risks to Critical Values Following Treatments

The following treatments were approved in the initial request

	Probability	Magnitude	Risk	Treatment	Comments
Human Life and Safety					
Private Property	Likely	Moderate	High	Seed and mulch	The 17 developed private parcels are in close proximity to drainages where debris flows and flooding could damage structures and access roads. Treatments would reduce the risk somewhat.
Iron Springs Road	Possible	Moderate	Intermediate	Seed and mulch	Treatments would reduce risks from flooding and debris flows which could make the road dangerous or impassable.
Natural Resources					
Soil	Possible	Minor	Low	Seed and mulch	Mulch/seed treatment decreases probability and magnitude of soil loss below tolerable soil loss resulting in a "Low" risk to soil productivity impairment
Hydrologic Function	Likely	Moderate	High	Seed and mulch	Treatments would help restore ground cover and improve infiltration and water storage, and reduce runoff.
Wildlife					
Peregrine Falcon	Unlikely	Minor	Low	Seed and mulch	Treatments prescribed for other resources in the surrounding area will reduce the already low risk to peregrine falcon.
Mint Wash Aquatic	Possible	Moderate	Intermediate	Seed and mulch	Treatments prescribed for other resources in the burn area will reduce the risk to the aquatic species in Mint Creek. Ash is still likely to affect the habitat in the short term, but the amount of

	Probability	Magnitude	Risk	Treatment	Comments
					sediment over the longer term should be greatly reduced.
Gila Chub	Unlikely	Minor	Very Low	Seed and mulch	Treatments prescribed for other resources in the burn area will reduce the already low risk to Gila Chub.

The following treatments are proposed under this request

	Probability	Magnitude	Risk	Treatment	Comments
Human Life and Safety					
FSR 9271A (Doce Rd)	Possible	Moderate	Intermediate	Limit public access. Install rolling dips	Rolling dips on the system road embankments and drainage dips on decommissioned road embankments will provide controlled relief in the event of culvert failures.
Granite Mountain Trails Access	Unlikely	Major	Intermediate	Closure, signage, compliance monitoring	Closure, signage, and compliance monitoring of access to trails in the burned area reduces risk to trail users.
Natural Resources					
Native Plant Communities	Unlikely	Moderate	Low	Weed detection	Monitoring provides opportunities to identify needs for preventative actions.
Heritage Resources	Unlikely	Moderate	Low	Detection of impending damage	Monitoring provides opportunities to identify needs for preventative actions.

I. Monitoring

Seed and Mulching: Qualitative monitoring will entail evaluating the spatial coverage of mulch primarily during the monsoon season to assist in anticipating projected effectiveness in minimizing accelerated overland flow and provide soil stabilization. In addition, monitoring will evaluate seeding success, soil stability, and downstream resource impacts. Efforts will be made to conduct monitoring with partner agencies (i.e. Yavapai County and NRCS).

Burned Area Closure: Forest employees will monitor the burned area closure one day per week through September 30th 2013. Forest Service personnel will document sign status and replace and reinforce anything that is needed, and will help enforce compliance.

Forest Road 9271A: Road condition monitoring will be conducted using force account and contract road maintenance personnel.

Granite Mountain Area Trails: Trail condition monitoring will be conducted using force account and any needed repairs will be accomplished using force account.

Part VI – Emergency Stabilization Treatments and Source of Funds

Line Items	Units	NFS Lads			Other	Other Lads			All	
		Unit	# of Units	BAER \$		# of units	Fed \$	# of Units	NonFed \$	Total \$
		Cost	\$	\$		\$	\$	\$	\$	\$
A. Land Treatments										
Aerial seed	acres	\$100	181	\$18,100	\$0		\$0		\$0	\$18,100
Aerial mulch	acres	\$1,700	181	\$307,700	\$0		\$0		\$0	\$307,700
Hard seed	acres	\$100	46	\$4,600	\$0		\$0		\$0	\$4,600
Hard Mulch	acres	\$1,500	46	\$69,000	\$0					
Heritage Sites	days	\$300	15	\$4,500						
Weed Detect/treat	days	\$300	16	\$4,800	\$0		\$0		\$0	\$4,800
Subtotal Land Treatments				\$404,200	\$0		\$0		\$0	\$335,200
B. Channel Treatments										
Inset new items above this line!				\$0	\$0		\$0		\$0	\$0
Subtotal Channel Treat.				\$0	\$0		\$0		\$0	\$0
C. Road and rails*										
Inset new items above this line!				\$0	\$0					
Subtotal Road & Trails				\$0	\$0					
D. Protection/Safety										
Closure Signs & map	ea	\$100	30	\$3,150	\$0		\$0		\$0	\$1,500
Caution Signs	ea	\$50	30	\$1,500	\$0		\$0		\$0	\$1,200
Trail Gates	ea	\$600	2	\$1,200	\$0		\$0		\$0	\$3,700
Road Dips/Water Bars	Job	\$16,050	1	\$16,050	\$0		\$0		\$0	\$9,550
Road Gate	ea	\$3,700	1	\$3,700	\$0					
Inset new items above this line!				\$25,600	\$0					
Subtotal Structures							\$0		\$0	\$0
E. BAER Evaluation										
Inset new items above this line!				---			\$0		\$0	\$0
Subtotal Evaluation							\$0		\$0	\$0
F. Monitoring										
Area Closure	days	\$300	24	\$7,200	\$0		\$0		\$0	\$7,200
Inset new items above this line!				\$7,200	\$0					
Subtotal Monitoring							\$0		\$0	\$351,950
G. Totals										
Previously approved				\$437,000	\$0					
Total for this request				\$399,400						
				\$37,600						

* Providing safe road access will also help protect the roads from damage.

PART VII - APPROVALS

1. /S/ Thomas A. Torres
Acting Forest Supervisor

7/11/2003
Date

2. John J. Lyne
Regional Forester (signature)

7/17/13
Date