USDA-FOREST SERVICE FS-2500-8 (6/06)

Date of Report: 7/24/17

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
[ ] 2. Accomplishment Report
[ ] 3. No Treatment Recommendation

B. Type of Action

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

[ ] 2. Interim Report #____
[ ] 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: Burro

B. Fire Number: AZ-CNF-000618

C. State: AZ

D. County: Pima

E. Region: 3

F. Forest: Coronado National Forest

G. District: Santa Catalina

H. Fire Incident Job Code: P3 K3J1

I. Date Fire Started: June 30th, 2017

J. Date Fire Contained: July 18th, 2017

K. Suppression Cost: $8,948,444

L. Fire Suppression Damages Repaired with Suppression Funds
1. Fireline waterbarred (miles): Unknown
2. Fireline seeded (miles): 0
3. Other (identify): Unknown

M. Watershed Number: Edgar Canyon(150502030501)(4,077ac.), Agua Caliente Wash (150503020302)(3,667 ac.), Soza Canyon (150502030302)(1,754 ac.), Bullock Canyon (150502030304)(7,971 ac.), Bear Creek (150503020304)(137 ac.), Buehman Canyon (150502030306)(9,255 ac.) and Upper Tanque Verde Creek (150503020301)(384 ac.)

N. Total Acres Burned: 27,245
NFS Acres (26,086 ac.) Other Federal (N/A) State (237 ac.) Private (922 ac.)

O. Vegetation Types: Cottonwood Willow Riparian Forest (498 ac.), Desert Communities (6,244 ac.), Dry Mixed Conifer (11 ac.), Interior Chaparral (406 ac.), Madrean Encinal Woodland (11,039 ac.), Madrean Pine-Oak Woodland (552 ac.), Montane Willow Riparian Forest (80 ac.) and Semi-Desert Grassland (7,245 ac.)

P. Dominant Soils: Lithic Torriorthents, Typic Ustochrepts, Lithic Ustochrepts, Aridic Ustochrepts, Aridic Haplustalfs and Typic Haplustalfs

Q. Geologic Types: Granite and Conglomerate

R. Miles of Stream Channels by Order or Class: Perennial = 1.3, Intermittent = 5.9, Ephemeral = 141.3

S. Transportation System

Trails: 5.0 miles Roads:18.8 miles

PART III - WATERSHED CONDITION

A. Burn Severity (acres): 22,106 (81%) (low) 3,088 (11%) (moderate) 47 (<0.5%) (high)

B. Water-Repellent Soil (acres): 2,364

C. Soil Erosion Hazard Rating (acres):
0 (low) 23,893 (moderate) 2,170 (high)

D. Erosion Potential: 10.3 tons/acre

E. Sediment Potential: 565 cubic yards / square mile

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years): 1-3

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): 2.07

F. Design Flow, (cubic feet / second/ square mile): 575

G. Estimated Reduction in Infiltration, (percent): 22%

H. Adjusted Design Flow, (cfs per square mile): 699

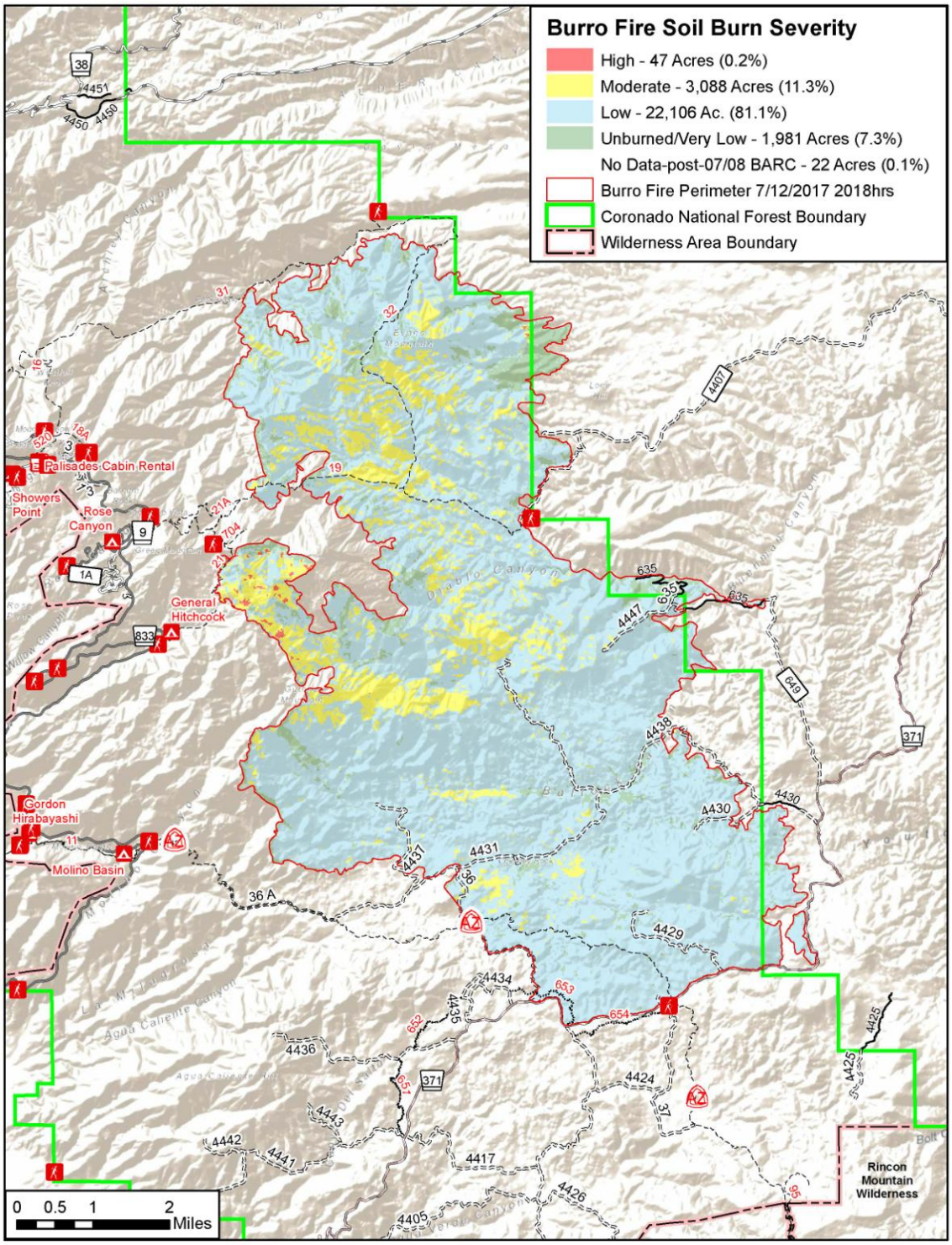
PART V - SUMMARY OF ANALYSIS

A. Describe Critical Values/Resources and Threats:

The Burro Fire started on June 30th, 2017 near the Burro Basin area northeast of Guthrie Mountain. As of July 18th, 2017 the cause of the fire is still under investigation. Due to dry, windy conditions during the onset of the fire, transition from the district to a Type 1 Incident Management Team occurred quickly as fire spread was relatively rapid in the direction of the Guthrie Mountain peak. The fire spread also in a northeast, east, and southeast direction toward the Reddington Pass area before monsoon rains dampened fire activity considerably during the week of July 2nd through the 8th and into the early part of the following week. At that

point the fire transitioned to Type 3 team and then back to the district on Thursday, July 13th. The fire was called 100% contained as of July 18th.

A Burned Area Reflectance Classification (BARC) image was obtained and a map produced of the Burro Fire on July 13th. Soil burn severity was assessed from July 14th to the 16th through the use of the BARC map and field visits that sampled post-burn soil surface, vegetation, and ground cover characteristics to verify BARC burn severity classification and make adjustments to burn severity where needed to produce a final soil burn severity map product. Soil burn severity is used to determine potential post-fire risks to critical values. It identifies post fire impacts to the soil surface which implicates infiltration, run-off, and soil loss which collectively impacts watershed response in terms of post-fire flooding and sediment yield.



Critical Values Identified

Critical Values identified (FSM 2523.1 Exhibit 01) during the BAER assessment are: Human life and safety, property, natural resources and cultural resources. The BAER team evaluated the risk to those critical values using the BAER Risk Assessment (FSM 23235.1 Exhibit 02):

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**

Risk to Human Life and Safety

The General Hitchcock, Chihuahuan Pine, and Cypress campgrounds as well the Middle Bear Canyon Trailhead area off of the Mt. Lemmon Highway were identified as areas of potential risk to human life and safety. The headwaters of Bear Creek was one of the more intensely burned locations throughout the fire. Although it included only a very small amount of high severity surrounded by mostly moderate severity, it is only approximately a mile to a mile and a half downstream to the campgrounds and trailhead area. The probability of damage or loss is possible and the magnitude of consequence is major which rates risk as High for these values.

The Green Mountain Trail burned high/moderate severity across approximately a 1/8 to ¼ section of the trail within the fire. This particular section is in a ponderosa pine/oak vegetation type where hazard trees within proximity of this section of trail are a concern for human life and safety. The probability of damage or loss is possible and the magnitude of consequence is major which rates risk as High.

The Bellota Ranch is a location on NFS land that has privately owned structures on it. It was identified as an area of potential risk to human life and safety due to the possibility of increased flows into a drainage that runs within close proximity to the structures through the property area. While the majority of the headwaters within this particular watershed that burned are a mosaic of low and moderate, it is still a considerably portion of the watershed (approximately 4 to 5 sq. miles) drainage network that feeds into the reach that runs through the property area. The probability of damage or loss is unlikely and the magnitude of consequence is major which rates risk as Intermediate.

There are also some private residences which lie just off the forest boundary in the Buehman Canyon area that were considered as potential risk locations for human life and safety. Like the Bellota Ranch location, while the vast majority of the contributing watershed burned predominantly low burn severity with some locations of moderate at the headwaters, it warranted consideration based on the relatively large extent of burn in the upper portion of the watershed. We were informed by the land owner, however, that the residences are situated in the uplands above the floodplain. The probability of damage or loss is unlikely and the magnitude of consequence is major which rates risk as Intermediate.

Any access point into the burned area whether it be on a trail or road poses a potential risk to human life and safety due to the possibility of post-fire hazards, regardless of burn severity. The probability of damage or loss is possible and the magnitude of consequence is major which rates the risk as High.

Risk to Property and Some Risk to Human Safety

In addition to the consideration of potential risk to life and safety associated with the Bellota Ranch, the risk to the property infrastructure is a concern as well. While it could be that the increase in flows and the associated hazards pose an unlikely probability of risk to human life and safety, it made sense to evaluate the potential risk to the property value at stake as well. It was concluded that the probability of damage or loss is possible and the magnitude of consequence is minor which rates the risk as Low as only one or two structures may be at risk.

Approximately a 4 to 5 mile section of the Arizona Scenic Trail occurs through the southeastern portion of the burned area. Across multiple trail sections within this particular area of the trail, 6 inch by 6 inch wood posts were used as trail stabilization features. During the fire, a number of these wood posts were completely consumed exposing re-bar that was used to keep the wood posts in place. The loss of these posts presents some risk to the trail itself via destabilization concerns, but also presents some risk of injury to hikers with the re-bar in it's current state where the posts were burned. Ultimately it was decided that the probability of damage or loss is possible and the magnitude of consequence is moderate which rates risk as Intermediate.

After consulting with forest Engineering personnel, there are no concerns regarding any NFS roads surrounding or contained within the burned area. This is due to the relatively remote location in which this fire burned as well as the relatively low burn severity across the fire as a whole. The Reddington Pass road is maintained by Pima County so the Burn Severity information for the fire was shared with them. There are also no bridges that are of concern under FS jurisdiction. The probability of damage or loss is unlikely and the magnitude of consequence is moderate which rates risk as Low.

Risk to Natural Resources

Soil Productivity and Hydrologic Function – There is a high probability that increased levels of soil erosion and sediment delivery can be expected in locations of high burn severity as well as some areas of moderate. Soil erosion modeling for high and moderate severity showed an increase in soil loss approximately 10 times greater than that of pre-fire conditions. However, the extent of these impacts across the fire as a whole to long-term soil productivity are minimal when you consider burn severity class extent. While high severity fire locations do experience impacts to site productivity in the long-term from soil loss via loss of vegetative canopy / ground cover and strong soil hydrophobicity in some cases, only 47 acres of high severity occurred on the fire which makes up less than 0.5 percent of the entire burn area. About 11 percent of the fire burned moderate while the remaining 89 percent was low and unburned. Low and unburned areas generally exhibit soil loss rates very similar to that of pre-fire conditions.

It was observed and documented during the soil burn severity fieldwork that while the vegetation burn intensity was moderate to high in areas that were BARC classified as moderate severity, the soil burn severity was relatively low as soils exhibited none or slight hydrophobicity, soil structural integrity and roots remained intact, and vegetative ground cover was still present in the form of existing vegetation basal area and remaining effective litter that was not entirely consumed by the fire. Some monsoonal precipitation had also occurred while soil burn severity fieldwork was being conducted and it was noted on several occasions within moderate severity that grass was already starting to come back. In addition to vegetative recovery already occurring, high rock content at the soil surface was documented on most sites (including high severity burned areas) which provides armoring against soil loss.

It is anticipated that there will be some impact to the hydrologic function within portions of watersheds that were burned during the fire. Changes in timing, magnitude, and volume of flows is possible which can induce scouring and downcutting of channels. This has the potential to reduce flow access to floodplains which can concentrate flood flows in potentially deeper, narrower channels that could be prone to bank erosion and generation of additional sediment that would be carried downstream. However, it is important to keep in context the extent by burn severity class for this fire as well as the location of high/moderate burn areas when evaluating impacts to hydrologic function within a given watershed. Less than 0.5 percent of high severity burn occurred on this fire and that is distributed across the headwaters of multiple watersheds. So, that is even a smaller contributing area of high severity burn by watershed that was impacted by the burn. Approximately 11 percent of the burn was moderate severity and, like the high severity class, that severity is primarily located at and distributed across the heads of multiple watersheds. These conditions occur across a very small extent of

each of the burned watersheds and there are many acres of low to unburned conditions directly below that are unlikely to see much impact from a hydrologic response perspective across the watershed as a result of the fire. For these reasons, the probability of damage or loss to soil productivity / hydrologic function is likely but the magnitude of consequence is minor due to the small extent of high and moderate burn severity areas which rates risk as Low.

Threatened and Endangered Species – The primary animal species identified that could be potentially impacted by the burn include the Mexican Spotted Owl (MSO) and the Yellow-billed Cuckoo. As of now, no threatened or endangered plant species have been identified that may have been impacted by the fire.

A very small portion of MSO habitat area burned, but the extent is minimal across that entire habitat area. The Yellow-billed Cuckoo's habitat is primarily associated with riparian areas and overall it appears from a burn severity standpoint that the fire had very minimal, if any impact in these locations. The probability of damage or loss is unlikely and the magnitude of consequence is minor which rates risk as Very Low.

Invasive / Noxious Weeds – There is the possibility that invasives and/or noxious weed species could have been dispersed around fire camps, along routes providing access to the burned area, or on lands immediately adjacent to or on NFS land where fire crews were implementing treatments to reduce risk to structures such as building hand or dozer line for suppression. There is a risk that invasive weed species such as buffelgrass or cheatgrass could be introducted into the burned area from one or more of these sources. The probability of damage or loss to native plant communities is likely and the magnitude of consequence is moderate which rates the risk as High.

Risk to Cultural Resources

After consulting with the Forest Archaeologist, there are approximately 5 to 10 sites that occur within the burned area and the majority of them are in low and unburned areas. Some field investigation and assessment is still required by the archaeologists to verify this. At this point in time the possibility of damage or loss is unlikely and the magnitude of consequence is minor which rates the risk as Very Low.

Critical Values Identified with Very High or High Risk

- Human life and safety risk associated with the General Hitchcock, Chihuahuan Pine, and Cypress Campgrounds as well the the Middle Bear Canyon Trailhead Area.
- Human life and safety risk associated with any NF visitors that access the burned area on a trail or road.
- Native plant communities due to the potential risk of invasive or noxious weed spread as a result of the fire or fire suppression activities in or around the burned area.
- The 1/8 to ¼ section of the Green Mountain Trail that burned high/moderate severity within a ponderosa pine/oak vegetation type.

Critical Values Identified with Intermediate Risk

- Human life and safety risk identified with the privately owned structures at the Bellota Ranch property.
Human life and safety risk identified with the private residences in the Buehman Canyon area just off NFS land.
- The post fire trail condition on the Arizona Scenic Trail is potentially an injury hazard due to the existing exposure of re-bar in the ground that remains after the consumption of the trail stabilization wood posts. Erosion is now a risk to the trail. Although this critical value can be supported by BAER efforts, existing forest resources are proposed to abate these risks (existing agreements for trail work with trail associations, etc). The constraints of obligating funds by pursuing new agreements or contracts is the limiting factor for utilizing BAER funding for implementation.

Summary Table of Values at Risk with High or Very High Ratings

Risk Type	Value at Risk	Potential Threats	Owner-ship	Probability of Damage	Magnitude of Consequence	Risk	Forest Service Treatment Method

Life/Safety	Human life and safety	Debris flows/loose rock/slides	USFS	Possible	Major	High	Sign access points to campgrounds, trailheads, and any other trail/road access into the burned area
Natural Resources	Native plant communities	Invasive / Noxious Weeds	USFS	Likely	Moderate	High	Weed detection/rapid response

B. Emergency Treatment Objectives:

- Provide for Public Safety– Place signs at key trail and road access points entering burned area and at locations downstream of the burned area at high risk of post-fire hazards to human life and safety including the General Hitchcock campground, Chihuahuan Pine campground, Cypress campground and the Middle Bear Canyon Trailhead Area. Ensure communication of potential post fire values at risk has occurred: Burned Area Map, Report, and shapefiles have been shared with the National Weather Service and Local County Government including Flood Control District.

- Invasive and Noxious Weeds - Reduce the potential for impaired native vegetative recovery and introduction / spread of invasive or noxious weeds by conducting detection surveys/rapid response.

- AZ Trail - Remove trail hazards. Stabilize trail to minimize erosion.

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

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

D. Probability of Treatment Success

	Years after Treatment		
	1	3	5
Land	90%	80%	N/A
Channel	-	-	-
Roads/Trails		-	-
Protection/Safety	90%	90%	

E. Cost of No-Action (Including Loss): $200,000

F. Cost of Selected Alternative (Including Loss): $150,000

G. Skills Represented on Burned-Area Survey Team:

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

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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.)

Land Treatments:

Noxious Weed Detection and Rapid Response

Weed detection surveys and rapid response eradication treatments are to determine whether ground disturbing activities related to the Burro Incident and the fire itself have resulted in new or the expansion of existing noxious weed infestations. Due to roads, recreational activity, and handline in the fire it is expected that new and expanding weed infestations will proliferate in and along these vectors if left unchecked. Surveys and rapid response eradication treatments will begin in 2017 during the flowering periods of weed species. Monitoring for annual and perennial invasive species that establish with summer rains should be accomplished during mid-late summer and early fall of 2017. For species that establish with winter rains, monitoring should occur during the late spring and early summer of 2018. Completion of surveys in roads, and known invasive plant populations would be the first priority. The second survey priorities would be along handlines and drop points. Surveys of the general habitats in the burned area would be the lowest priority. Noxious Weed Early Detection and Rapid Response Plan is attached as a separate document.

Cost For One Year of Weed Detection and Rapid Response Surveys

FISCAL YEAR	**UNIT**	**UNIT COST**	**# OF UNITS**	**COST**
2017	GS-12 Invasive Spp Coordinator	$400/Day	2	$800
	GS-11 Range Staff/COR	$330/Day	2	$660
	Summer 2017 IDIQ Rate Road Survey	$100/Mile	6	$600
	Summer 2017 IDIQ Rate Dozerline and Handline Survey	$350/Mile	0	$0
	Summer 2017 IDIQ Rate by Acre Basis	$200/Acre	2	$400
2018	Spring 2018 IDIQ Rate Road Survey	$125/Mile	6	$750
	Spring 2018 IDIQ Rate Dozerline and Handline Survey	$375/Mile	0	$0
	Spring 2018 IDIQ Rate by Acre Basis	$225/Acre	2	$450
TOTAL				**$3,660**

Channel Treatments: N/A

Roads and Trail Treatments: NA

Protection/Safety Treatments:

Warning Signs

Warning signs informing the public of potential hazard trees, unstable soils, flooding, and debris flows should be placed at strategic locations within the General Hitchcock, Chihuahuan Pine, and Cypress campground

locations as well as the trailhead for the Middle Bear Canyon Trail. Signs should also be placed at other key road and trail access points to the burned area such as any roads entering the burned area off of the Reddington Pass road. The purpose of these signs is to advise the recreating public about hazards within and below the burned area.

Warning Sign Cost

Unit	Unit Cost	# of Units	Cost
Trail Warning Sign	$150	11	$1,650
Road Warning Sign	$250	2	$500
Implementation Crew	$350 per day	3	$1,050
Total			$3,200

I. **Monitoring Narrative:**

Weed Detection and Rapid Response monitoring plan is included. No other monitoring is proposed.

Part VI – Emergency Stabilization Treatments and Source of Funds **Inital**

			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										
Weed Detection /				$0	$0		$0		$0	$0
Rapid Response				$0	$0		$0		$0	$0
Survey	Each	3,660	1	$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Land Treatments				$0	$0		$0		$0	$0
B. Channel Treatments										
				$0	$0		$0		$0	$0
				$0	$0		$0		$0	$0
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Channel Treat.				$0	$0		$0		$0	$0
C. Road and Trails										
				$0	$0		$0		$0	$0
				$0	$0		$0		$0	$0
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Road & Trails				$0	$0		$0		$0	$0
D. Protection/Safety										
Hazard Signs	Lump	$3,200	1	$3,200	$0		$0		$0	$3,200
				$0						$0
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Structures				$3,200	$0		$0		$0	$3,200
E. BAER Evaluation										
	Lump	$20K			$0					
				---	$0		$0		$0	$0
Insert new items above this line!				---	$0		$0		$0	$0
Subtotal Evaluation				---	$0		$0		$0	$0
F. Monitoring										
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Monitoring				$0	$0		$0		$0	$0
G. Totals				$3,200	$0		**$0**		**$0**	**$3,200**
Previously approved										

PART VII - APPROVALS

1. _____ _____
Forest Supervisor (signature) Date

2. _____ _____
Regional Forester (signature) Date