

(Reference FSH 2509.13)

NFS Acres(12,215)    Other Federal ( 380)    State (1,723 )    Private (891)

- O. Vegetation Types: Grassland, Pinyon-Juniper, Chaparral, Desert Brush
- P. Dominant Soils: Lithic Haplustolls, Typic Haplustalfs, Rock Outcrop, Fluventic Haplustepts
- Q. Geologic Types: Granite, various sedimentary rocks including Limestone, Sandstone, Siltstone, Shale, and undifferentiated alluvium
- R. Miles of Stream Channels by Order or Class: 105 NHD miles
- S. Transportation System
- Trails: 0 miles Roads: 1.66 miles closed; 17.8 high clearance; 1.12 passenger car

### **PART III - WATERSHED CONDITION**

- A. Burn Severity (acres): 10,846 (Unburned/Very Low) 4,290 (low) 2 (moderate) 77 (high)
- B. Water-Repellent Soil (acres): ~77
- C. Soil Erosion Hazard Rating (acres):  
952 (low) 5268 (moderate) 5948 (high)
- D. Erosion Potential: .25 tons/acre
- E. Sediment Potential: 113,561 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 Lizard fire is a naturally caused fire that started from a dry lightning strike on Thursday June 7, 2017. It originated 2 miles southeast of the town of Dragoon off of Lizard Lane, in short grass and brushy fuels. On

Friday June 9th the Lizard fire merged with another lightning start, the dragoon fire. From its start, very dry conditions with low relative humidity and three days of red flag wind events contributed to rapid and erratic growth. These conditions brought the fire to 10,500 acres. Ultimately the fire was fighting against prevailing wind patterns, and this allowed firefighters to implement direct suppression tactics. The remaining acres were burned by natural backing and flanking fire as well as hand ignitions to establish control lines through back burning.

### **Soil Burn Severity**

Soil burn severity was assessed through the use of Burned Area Reflectancy Class (BARC) maps and field visits that sampled post burn soil surface characteristics and field mapped soil burn severity. Soil burn severity is used to determine potential post-fire risks to critical values. Soil burn severity identifies post fire impacts to the soil surface which impacts infiltration, run-off and soil loss which collectively impacts watershed response such as post fire flooding and sediment yield.

The majority of the burn severity is comprised of light burn severity and associated with desert shrub. Madrean Encinal woodland ecosystems are also located within the fire perimeter and are generally associated with steep to moderately-steep slopes on northern aspects or concentrated within lower order drainages. The Madrean Encinal woodland burn severity is mostly comprised of low burn severity with some moderate burn severity sites that are non-continuous and located predominantly on very steep slopes at the headwaters of 1st order drainages. Soil hydrophobicity is generally absent with sparse pockets of low hydrophobicity restricted to burnt coarse woody debris or tree stumps. All soils within the fire perimeter are well armored with high rock cover which naturally stabilizes soils and is the primary soil surface component that stabilizes desert shrub soils. Burnt vegetation biomass is intact and is expected to resprout and respond quickly. According to the BARC map, only 76 acres were subjected to high burn severity on very steep slopes near the edge of ridgelines and hilltops. These high burn severity sites most likely have high level of vegetation and vegetative ground cover consumption and are experiencing severe hydrophobicity. However, potential accelerated soil loss is expected to be retarded because of the armoring effect of the extremely high level of surface rock cover, its limited aerial extent, and its remote location limited to the top of the watershed and soil loss routing and deposition would be buffered within the watersheds.

Below is a table comparing pre and post fire soil erosion rates and sediment yield within the entire fire perimeter and selected sub-watersheds impacted by the fire. Modeled results are based on 50 years of precipitation data and display erosion production in the form of sheet erosion.

<b>Modeled Area</b>	<b>Erosion Rate - tons/acre</b>			<b>Sediment Yield - tons</b>		
	<i>Pre-Fire tons/acre</i>	<i>Post-Fire tons/acre</i>	<i>Percent increase from pre-fire to post fire</i>	<i>Pre-Fire total tons</i>	<i>Post-Fire total tons</i>	<i>Percent increase from pre-fire to post fire</i>
Entire fire	.15	.25	67%+	1798	2987	66%
Stronghold Watershed (Barrett-Curlink Spring Wash)	.23	.24	4%+	679	692	2%
Halfmoon (Bishop Camp Residence)	.23	.40	75%	24	42	75%

Overall, average soil loss rates and sediment yield is expected to have a minimal increase from pre to post fire conditions. Post fire erosion rates and sediment yield production increases would be retarded because of the limited burn impacts to the soil characteristics, the armoring effect of high surface rock cover, and the lower precipitation events associated with the area. The Stronghold Watershed post-fire soil loss and sediment yield is very low because the high levels of rock outcrop and the delineation of this watershed has a high proportion of soils that are not located within the fire. These unburnt areas are associated with alluvium fans with high infiltration rates and are stable. The unburnt alluvium fans are expected to filter and buffer the potential post fire impacts of the Stronghold watershed. The Halfmoon watershed post fire soil loss and sediment production

increase from sheet erosion would be marginal because the majority of this watershed is composed of escarpments, rock outcrops, and bedrock.

### **Hydrology**

Peak flows have been estimated for watersheds above values at risk (VAR) identified within and below the burned area. A numerical rainfall runoff model was utilized called Wildcat5. The Wildcat modeling is generally targeted at areas of higher burn severity and areas with hydrophobic soils, as runoff from these areas are expected to be different from the unburned or low burn severity areas. Therefore, smaller basins that burned with a higher severity are expected to display a larger magnitude response compared to a larger basin that contains a mosaic of unburned, low, moderate and higher burn severities. Areas with hydrophobic soils further add to the predicted magnitude of runoff.

Fortunately the Lizard fire does not have significant high severity areas. In addition there are numerous bedrock outcrops that remain essentially unaffected by the fire.

Estimated pre- and post-fire peak flows for the Wildcat 5 models are summarized in the table below. A total of 3 Wildcat 5 runs were completed, a post- and pre-run for each VAR drainage. All VAR modeling runs were completed simulating a 25-year/1-hour storm event. The modeled storms precipitation was 2.1". Post-fire flows predicted by Wildcat5 do not show the high variability in modeled runoff seen in fires with greater burn severity or basin size. Generally, post-fire peak flow increases are attributed to higher burn area acreages and higher burn severity. Because the data in table are derived from a numerical model, the runoff estimates should not be interpreted as absolute values.

#### **1. Wildcat 5 Model Summary for individual VAR drainages**

<b>Subwatershed</b>	<b>VAR</b>	<b>Lat. &amp; Long.</b>	<b>pre-fire peak flow (cfs)</b>	<b>post-fire peak flow (cfs)</b>	<b>Percent Change</b>
Stronghold Canyon East	FR 795 crossing	-109.949 31.95	5,028	5,508	<b>10%</b>
Halfmoon	Baptist Camp/Dam	-109.952 31.957	202	252	<b>25%</b>
Dragoon	Historic Site	-110.02 31.997	617	870	<b>41%</b>

No treatments are recommended for Hydrologic / watershed function critical issue mitigation.

### **Recreation**

The Lizard Fire poses limited risks to recreation values and associated public use, but some precautions should be taken at the Cochise Stronghold. The Cochise Stronghold is a popular historic area within the Douglas Ranger District on the Coronado National Forest. Developed recreation facilities include Cochise Stronghold campground, and two Arizona Rooms with a View cabin rentals—Shaw House and Half Moon Ranch. Private cabins, and bed and breakfasts are also found within Stronghold Canyon. Dispersed recreation opportunities include non-motorized trails (e.g. FST 279), dispersed camping, and multiple rock climbing opportunities. Nearly all recreation opportunities are located outside of the Lizard Fire burn area.

Human safety and values at risk within and around the burned area are limited to a series of climbing routes isolated to Sections 13 and 22 (R23E, T17S). In particular, climbing routes in Section 13 (e.g. Zappa Dome, Owl, Batline Dome) require access via non-system trails and traverse a deep wash (Barret-Curlink Springs wash) that is directly influenced by runoff from the burn area.

### **Roads and Trails**

There are several forest system roads within and around the burn area, but they pose no risks to the public

due to the predominantly low burn severity of the fire. Potential risks to the public are limited to Forest Road 795 where it crosses a wash (Barrett-Curlink Spring Wash) on the east side of the burn perimeter. This road should be signed to warn to the public, “do not cross when flooded.”

There are no system trails impacted by the Lizard Fire. The Stronghold Nature Trail and Forest Trail 279 are the nearest trails to the burned area, but pose no risk to users as their watersheds are outside the burn perimeter. Cross-country travel and use of nonsystem trails associated with accessing climbing routes (section 13) pose the greatest risk to the public as they are subject to potential post-fire flooding below the burn area.

### **Noxious Weed**

Desert grasslands that burned in the Lizard Fire were associated with invasive grasses such as *Pennisetum* species in the grasslands, red brome (*Bromus madritensis*) in the desert shrub and tamarisk (*Tamarix* spp.) in the riparian areas. *Pennisetum* species were introduced in the early 1900's to improve rangelands and erosion control, and now they thrive in the southwest and disturbed areas. Red brome was introduced from the Mediterranean region into the western U.S. in the 1880's and thrives in warm and disturbed areas. Tamarisk was introduced as an ornamental species over 100 years ago, it has a deep root system and outcompetes many native plants. Tamarisk is also fire adaptive, regrows quickly after and can spread many miles away from established infestations during erratic/high velocity winds during/post fire.

The disturbance of the fire crew may have caused the invasive species to spread, the invasive grass seeds may have gotten picked up by the crew member's boots or the tires of their vehicles and deposited in the burned area. If this occurred the invasive species have a higher risk of sprouting in the burned area before native species have a chance to come in once monsoon season starts.

### **Wildlife**

No designated T&E and critical habitat have been identified within the fire perimeter.

### **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/heritage 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

## Values at Risk with high or very high ratings and Risk Matrix Table

Risk Type	Value at Risk	Potential Threats	Ownership	Probability of Damage	Magnitude of Consequence	Risk	Forest Service Treatment Method
Life/Safety	Human life and safety	Debris flows/loose rock	USFS	Likely	Major	Very high	Sign key access points to climbing areas, dispersed camping areas, low water crossings and sign at campground
Natural Resources	Vegetation Recovery	Invasive plants	USFS	likely	major	very high	weed detection/rapid response

### Human Life and Safety

Potential threats to human life and safety were identified in user created climbing areas that exist within the fire perimeter. If people were to find themselves in these areas during or after storm events loose rock and debris flows could result.

The potential increase of flooding risks associated with the Barrett-Curlink Spring Wash could pose a risk to human life and safety at the FSR 795 crossing near county road 84 junction.

### Infrastructure

None

### Soil

Post fire soil loss rates are below tolerable levels and rates would not impact long term soil productivity. Sediment yield production is also within the range of variability and is not expected to harm watershed function and limit stream fluvial transport or processes. Probability of post fire predicted erosion rates and sediment yield occurring within the first year is 0-48%. In accordance with the BAER Risk Assessment – Exhibit 02 (FSM 2523.1), the soil loss Probability of Damage is Unlikely and the Magnitude of Consequences is Minor. Resulting in a final Soil Risk of Very Low.

### Natural Resources

Increase in Noxious Weed Populations: An emergency exists with respect to vegetative recovery as a result of the threat of post-fire weed introduction and spread. The unknowing introduction and dispersal of invasive weeds into areas disturbed by fire suppression has the potential to establish large and persistent weed populations. These weed populations could affect the structure and habitat function of native plant communities within the burn area. It is expected that most native vegetation would recover if weed invasions are minimized.

### Cultural Resources

Assessment is ongoing and will be submitted in a future interim or final report.

### Critical Habitat

None

### B. Emergency Treatment Objectives:

- Provide for Public Safety– Place signs at key access points entering burned area where rock climbing and dispersed camping are likely to occur. Also place signs at low water crossing and campground warning of potential risks post fire. 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.

- Noxious Weeds - Reduce the potential for impaired vegetative recovery and introduction/spread of noxious weeds by conducting detection surveys/rapid response.
- Limit loss of soil productivity –Objective is to decrease rates of runoff water and erosion by conducting invasive species removal.

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

Land 90 Channel - Roads/Trails 90 Protection/Safety 90

D. Probability of Treatment Success

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

E. Cost of No-Action (Including Loss): \$174,540

F. Cost of Selected Alternative (Including Loss): \$148,486

G. Skills Represented on Burned-Area Survey Team:

<input checked="" type="checkbox"/> Hydrology	<input checked="" type="checkbox"/> Soils	<input 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 type="checkbox"/> Contracting	<input checked="" type="checkbox"/> Ecology	<input checked="" 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

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FAX:

Team members

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 Lizard 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 riparian areas, roads, staging areas, safety zones, 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. Detailed weed detection survey guidelines are attached in Appendix A.

#### Weed Detection and Rapid Response Cost

<b>FISCAL YEAR</b>	<b>UNIT</b>	<b>UNIT COST</b>	<b># OF UNITS</b>	<b>COST</b>
<b>2017</b>	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	19	\$1,900
	Summer 2017 IDIQ Rate Riparian and Dozerline Survey	\$350/Mile	25	\$8,750
	Summer 2017 IDIQ Rate by Acre Basis	\$200/Acre	1	\$200
<b>2018</b>	Spring 2018 IDIQ Rate Road Survey	\$125/Mile	19	\$2,375
	Spring 2018 IDIQ Rate Riparian and Dozerline Survey	\$375/Mile	25	\$9,375
	Spring 2018 IDIQ Rate by Acre Basis	\$225/Acre	1	\$225
<b>TOTAL</b>				<b>\$23,885</b>

### **Protection/Safety Treatments:**

#### ***Warning Signs***

Warning signs informing the public of potential hazard trees, unstable soils, and flooding should be placed at strategic locations within the Cochise Stronghold recreation area. Signage and a burn area map should be installed at Cochise Stronghold campground information kiosk, Shaw House, Half Moon Ranch, Forest Road 4810 accessing dispersed camp sites, and at the entrance to Cochise Stronghold on Forest Road 84 (adjacent to the kiosk/interpretive signs). The purpose of these signs is to advise the recreating public, mostly climbers, about hazards within and below the burn area.

#### Warning Sign Cost

<b>Unit</b>	<b>Unit Cost</b>	<b># of Units</b>	<b>Cost</b>
Sign	\$400.00	7	\$2,800
Implementation Crew	GS 9 Daily Rate -	2	\$700
Total			\$3,500





			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										
Noxious Weed	each	23885	1	\$23,885	\$0		\$0		\$0	\$23,885
				\$0	\$0		\$0		\$0	\$0
Subtotal Land Treatments				\$23,885	\$0		\$0		\$0	\$23,885
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
				\$0						
Insert new items above this line!				\$0	\$0		\$0		\$0	\$0
Subtotal Road & Trails				\$0	\$0		\$0		\$0	\$0
D. Protection/Safety										
Hazard/Closure signs	per	500	7	\$3,500	\$0		\$0		\$0	\$3,500
				\$0	\$0		\$0		\$0	\$0
				\$0						
Insert new items above this line!				\$0	\$0		\$0		\$0	\$0
Subtotal Structures				\$3,500	\$0		\$0		\$0	\$3,500
E. BAER Evaluation										
				---	\$25,000		\$0		\$0	\$25,000
Insert new items above this line!				---	\$0		\$0		\$0	\$0
Subtotal Evaluation				---	\$25,000		\$0		\$0	\$25,000
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				\$27,385	\$25,000		\$0		\$0	\$52,385
Previously approved										

## PART VII - APPROVALS

1. /s/ Kerwin S. Dewberry  
Forest Supervisor (signature)

7/17/17  
Date

2. \_\_\_\_\_  
Regional Forester (signature)

\_\_\_\_\_  
Date