

Indian Fire

Date of Report: January 15, 2003

BURNED-AREA REPORT
(Reference FSH 2509.13)

PART I - TYPE OF REQUEST

A. Type of Report

- ☐ 1. Funding request for estimated WFSU-SULT funds
- ☒ 2. Accomplishment Report
- ☐ 3. No Treatment Recommendation

B. Type of Action

- ☐ 1. Initial Request (Best estimate of funds needed to complete eligible rehabilitation 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: Indian Fire
- B. Fire Number: P37596
- C. State: Arizona
- D. County: Yavapai
- E. Region: 03, Southwest
- F. Forest: Prescott
- G. District: Bradshaw
- H. Date Fire Started: May 15, 2002
- I. Date Fire Controlled: May 18, 2002
- J. Suppression Cost: 2.1 million
- K. Fire Suppression Damages Repaired with Suppression Funds
 - 1. Fireline waterbarred (miles): 6
 - 2. Fireline seeded (miles): 0
 - 3. Other (identify): 0
- L. Watershed Number: 1507010399 1506020284
- M. Total Acres Burned: 1365 acres
NFS Acres(1349) Other Federal () State () Private (16)
- N. Vegetation Types: Ponderosa pine and chaparral
- O. Dominant Soils: Lithic Ustorthents, Lithic Haplustalf, Udic Ustochrepts, Udic Haplustalfs

P. Geologic Types: Decomposed granite

Q. Miles of Stream Channels by Order or Class:
1st Order Streams is 3 Miles

R. Transportation System

Trails: 7 miles Roads: 4.9 miles

PART III - WATERSHED CONDITION

A. Burn Severity (acres): 515 (low) 199 (moderate) 651 (high)

B. Water-Repellent Soil (850 acres)

C. Soil Erosion Hazard Rating (acres):
0 (low) 0 (moderate) 1349 (high)

D. Erosion Potential: 36.36 tons/acre

E. Sediment Potential: 11,921 cubic yards / square mile

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years): 6

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

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

D. Design Storm Duration, (hours): 24

E. Design Storm Magnitude, (inches): 3.6

F. Design Flow, (cubic feet / second/ square mile): 480

G. Estimated Reduction in Infiltration, (percent): 80

H. Adjusted Design Flow, (cfs per square mile): 1100

PART V - SUMMARY OF ANALYSIS

A. Describe Watershed Emergency:

Based on the BAER Team field survey and analysis the following emergencies exist on federal and private lands:

Threat to life and private property:

- Approximately 10-12 mobile homes are directly at risk of increased flooding immediately downstream of a tributary to Granite Creek that has been severely burned. 87 percent of the watershed has burned with moderate or high severity. The existing channel and culverts through the mobile home park experienced

periodic flooding under unburned watershed conditions. The risk of flooding has increased substantially as a result of the extent and severity of the wildfire in the watershed above these homes.

- At least one home is at risk of flooding in the Manzanita Creek watershed. 71 percent of the watershed above the Forest boundary on the tributary to Manzanita Creek on which this home is located has been burned with moderate to high severity. The possibility of other at-risk residences may exist on this tributary.
- Approximately three miles of Arizona State Highway 89 pass along the edge or cross through the interior of the burned area. This heavily used state highway is at risk of flooding and susceptible to falling hazard trees.
- Road crossings within the Ponderosa Park subdivision downstream of the Indian Creek portion of the fire may be at risk from increased peak flows in Indian Creek. 15% of the watershed above this private subdivision burned with moderate to high severity.
- Approximately one square mile (22%) of the Granite Creek watershed has been moderately or severely burned above the city of Prescott. Granite Creek flows through Prescott and has been extensively modified through channelization. Potential exists for increased peak flows from the burned area to increase flooding hazard in Prescott.

Threat to life and federal property:

- On federal lands, several roads are considered to be at risk from additional runoff and sediment expected from accelerated hillslope erosion. Specific roads and trails at risk include the following:
Forest Road 9707V; 97; 97A
Trails: 333, 335, and 365
- Six pit toilets on NFS lands were destroyed by the fire. The open pits pose a safety hazard to the public.
- The Indian Creek campground lies within the burned area. Camp sites within this campground may be at risk from flooding from both increased peak flows in Indian Creek and from burned over tributaries to Indian Creek that flow through the campground. Potential for hazard trees also exists within the campground.
- Dalmation ToadFlax is a noxious weed that existed near or within the burned area. Potential for spread of this weed has increased as a result of the fire.

Threat of soil loss: Severe burn intensity occurred on 850 acres (62%) of the Indian fire creating water repellent soil conditions while removing overstory vegetation, vegetative ground cover, and organic matter. Soils in the severe burn intensity areas are especially sensitive to sheet and rill erosion which could degrade inherent long term soil productivity. These are source areas for increased soil erosion, ash flows, sedimentation and runoff affecting both flood magnitude and water quality. Specific areas at risk include: unnamed tributaries to Granite Creek that flow through the Jack Pines Mobile Home Park, unnamed tributaries to Manzanita Creek, the mainstem of Granite Creek, and the mainstem of Indian Creek.

Threat of water quality deterioration: Sediment yield is expected to increase from areas burned with moderate to high burn severity. Key intermittent streams considered to be at risk from increased sediment yield and ash are Indian Creek, Manzanita Creek, and Granite Creek. Manzanita Creek (a tributary to Granite Creek) and Granite Creek, drain into Watson Lake, a small lake owned by the city of Prescott, which is likely to be impacted ash nutrients and sediment washing off the burned area.

B. Emergency Treatment Objectives:

The objectives of the proposed treatments are to:

- Reduce the potential for damage producing floods and sedimentation to downstream life and property
- Reduce the risk of damage to roads identified as being at risk from increased runoff from burned areas.
- Minimize soil erosion on hillslopes to protect long term soil productivity
- Protect downstream water quality
- Eliminate safety hazards from hazard trees along State Highway 89 and from open pits exposed as a result of burned up pit toilets.
- Reduce the potential for Dalmation ToadFlax to expand within the burned area

C. Probability of Completing Treatment Prior to First Major Damage-Producing Storm:

Land 90 % Channel 90 % Roads 90 % Other 75 %

D. Probability of Treatment Success

	Years after Treatment		
	1	3	5
Land	50	80	80
Channel	70	60	60
Roads	70	60	60
Other			
Hazard Trees	95	95	95
Toilet Hazard	100	100	100

E. Cost of No-Action (Including Loss):_ **\$2,842,500**

F. Cost of Selected Alternative (Including Loss):_ **\$1,233,800**

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

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H. **Treatment Narrative:**

Land Treatments:

Hydromulch

Objective – To protect the soil surface from raindrop impact, minimize soil loss, enhance establishment of vegetation and reduce accelerated runoff in Jack Pine East watershed where immediate ground cover protection is needed for effective erosion control, and where there are threats to downstream life and property.

Methods - Hydromulch will be applied using ground based methods (trucks and ATV) on approximately 150 acres in severely burned slopes (5-40%) in Jack Pine East. No floodplains or stream channels will be treated. Hydromulch will be applied at the rate of one ton per acre.

FINAL REPORT: Approximately 150 acres were hydromulched. The treatment has been very effective. Field observations indicated that soil erosion has been reduced to less than pre-fire amounts. The mulch held up very well during September storms. The actual costs associated with this prescription were below original cost estimates.

Log Erosion Barriers (LEB)

Objective - To reduce length of flow path, thereby encouraging infiltration and reducing the amount of runoff and the potential for overland flow to initiate sheet and rill erosion. Log erosion barriers trap sediments (reduction in sediment delivery) and aid in vegetative recovery.

Methods – On toe slopes ranging from 15 to 40%, where burn severity ranges from moderate to severe, fall trees (6 to 14" dbh) along the contour. Logs are spaced 35 to 40 feet apart. Place the logs in a small trench in contact with the soil surface to minimize the potential for undercutting and piping beneath the logs. 60 acres proposed for treatment in critical areas in Jack Pine West & Jack Pine East that are not accessible to hydromulching and severely burned slopes above Granite Creek.

FINAL REPORT: : Approximately 160 acres were treated with 500-600 log erosion barriers to reduce the length of flow and encourage infiltration, reducing soil erosion. This treatment has been very effective. Many structures filled with sediment following the July and September rains. Fire suppression crews primarily paid out of fire and stationed on the Forest accomplished this work and therefore we accomplished more acres at a cost lower than originally estimated for contracting.

Slashing

Objective – To provide immediate ground cover and improve microhabitat to enhance vegetative recovery. While not as effective as log erosion barriers, slashing provides some reduction of flow path and sediment trapping at lower cost. San Dimas Technology Center has expressed an interest in evaluating the use of a track-mounted, self-feeding chipper to convert slash material into chip mulch. They may use the area where slashing was done to test equipment and effectiveness.

Methods – On accessible areas with slopes ranging from 5-40%, fell burned and dead trees. Some minor limbing and segmenting may be necessary. This treatment will be applied on 200 acres in the Indian Creek watershed and in the Granite Creek watershed along State Highway 89.

FINAL REPORT: Approximately 30 acres were treated using wood chips made from burned trees to reduce soil erosion. This treatment is being conducted by the San Dimas Tech Center. They set up sites to monitor the effectiveness of this treatment compared to pellets and straw mulch. They will be monitoring and publishing the results on the effectiveness of these treatments. We have concerns about the amount of soil disturbance from the chipping equipment and are awaiting the results of their research. Slashing came in slightly higher due to additional on forest costs not originally in the estimate.

Aerial Seeding

Objective – Aerial seeding is intended in moderate and severe burn intensity areas where native plant recovery is too slow for effective erosion control, and where there are threats to downstream life, property, and roads.

Methods - Aerial seeding will be completed with FS helicopter and pilots. Seed will be certified weed-seed free. Sideoats grama will be seeded at 4 lbs/acre (17.5 seeds/sq. ft.); sand dropseed 1 lb/acre (120 seeds/sq.ft.); and sterile annual rye 2 lbs/acre (10.5 seeds/sq. ft.). Areas burned with moderate and high severity are planned for treatment. Approximately 600 acres will be seeded.

FINAL REPORT: Approximately 850 acres were aerial seeded with the specified seed mix. Seed germination is spotty across the burn. We got a good response on treatment areas such as LEBs, mulch and check dams, other areas that didn't get additional treatments the seeding was spotty. The hydromulch did help seedling establishment. This project came in below estimates as the Prescott Helitack Crew along with a Type 2 helicopter stationed on the Forest accomplished this work.

Channel Treatments:

Floatable Debris Removal

Objective – To prevent the potential for debris dams to form in Granite Creek, Indian Creek, unnamed tributaries to Manzanita Creek, and unnamed tributaries to Granite Creek that flow through the Jack Pines Mobile Home Park.

Methods - A watershed specialist will identify debris to be removed from mainstem channels and direct how and where the debris should be removed from these stream channels to allow for the safe passage of anticipated peak flows. During the operation large debris and other material removed from the stream channels should be placed outside the floodplain. Approximately 3 miles of channel will be treated.

FINAL REPORT: Debris was removed from drainages within the burn to allow for passage of peak flows on approximately 15 miles of channel. This treatment was highly effective. We retreated these areas following the early September storms as much new debris had accumulated. This project came in above cost estimates as we had to retreat these areas after a storm.

Strawbale Check Dams

Objective – To promote channel stability by reducing the amount of runoff and the potential for downstream sedimentation. Strawbale check dams promote channel stability by trapping sediments (reduction in sediment delivery) slowing channel runoff and reducing down cutting of stream channels.

Methods – Install check dams in first order drainages above the mobile home park, in tributaries to Manzanita Creek and in tributaries to Granite Creek. Place in watersheds in which burn intensity is moderate or severe and in which watershed area is no greater than 30 acres. Place the check dams within a small trench within the soil surface to minimize the potential for undercutting and piping beneath the dams. Approximately 100 strawbale check dams will be installed.

FINAL REPORT: Approximately 182 check dams were installed on 210 acres. The final costs were higher than originally estimated as we installed additional structures after doing additional field reconnaissance. Monitoring indicates these have been extremely effective in trapping sediment and slowing down the flow of water. Monitoring also indicated we should have located the dams higher on the tributaries. An additional 60 acres were treated with rock grade control structures near Hiway 89 by the Arizona Department of Transportation.

Diversion of Jack Pine Tributary

Objective – To divert flow from a severely burned watershed above the Jack Pines Mobile Home Park around the Park to reduce the risk of flooding.

Methods – Divert the flow of the eastern tributary of the Jack Pine Park onto the Jack Pine road by redesigning existing embankments and ditches and constructing additional channel and embankment features so that flood flows goes into the main stem of Granite Creek at the entrance of the Park.

FINAL REPORT: We initially proposed to divert the flow of a severely burned tributary above the mobile home park to reduce potential flooding. Further investigation and consultation with other agencies resulted in the design and installation of a low water crossing in order to keep water from ponding and possibly breaching the road resulting in increased potential flooding. This treatment was determined to be effective following the early September storms.

Roads Trail Campground Treatments:

Road Maintenance Levels will not be changed by any BAER treatments.

Road Drainage

Objective – To prepare existing Forest Service road drainage features to provide sufficient drainage for increased flows. This includes ditch cleaning, selective berm removal, culvert cleaning at inlets, and to clean floatable debris from culvert catch basins and channels immediately upstream.

Methods – Forest road crews can implement this treatment. Total miles treated are 3.

FINAL REPORT: The Forest road crew improved the drainage, cleaned ditches and cleaned culverts on approximately 3 miles of road in anticipation of increased flows. This treatment has been effective. This treatment came in significantly higher than originally estimated due to more road problems (i.e. poor drainage and additional culverts) than originally estimated. We closed some roads in this area, installed additional water bars, cleaned culverts, and other road maintenance to help reduce erosion and reduce hazards at the low water crossing.

Hazard Tree Mitigation

Objective – To assure the safety for users of Highway 89, County Road 102 and Indian Creek Campground and its associated road within the burn area. It involves the identification and felling of hazard trees. These roads are subject to the Highway Safety Act.

Methods – Hazard trees located along selected portions within areas of concern are felled to assure the safety of road and campground users. Acres treated 15 acres.

FINAL REPORT: Hazard trees were removed along about 1.2 miles of Highway 89 by Forest fire crews. No costs were incurred as the work was done with Forest fire personnel already funded with fire dollars.

Structures:

Exposed Toilet Pits

Objective: - For safety reasons, back fill pits exposed by the fire that consumed six pit toilets.

Methods: Use FS backhoe or Contract back filling of pits.

FINAL REPORT: Six pit toilets were filled in with gravel.

H. Monitoring Narrative:

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

Monitoring will be focused on first year effectiveness of BAER treatments. The question to be answered is did the BAER treatments meet the overall emergency treatment objectives. Monitoring will be funded with BAER funds the first year and then if necessary continued in subsequent years with other sources of funding.

Land Treatments: Measure the effect of slope treatments as a result of implementing aerial seeding, installing log erosion control barriers and hydro mulching of barren soils. Measure changes in soil loss (modeling), and vegetative ground cover. Monitor natural vegetative recovery in severely burned areas to determine the need for further treatments. Establish a series of 20 photo points to visually record the effectiveness of BAER treatments and natural recovery of watershed function.

Channel Treatments: Monitor changes in channel morphology and substrate at established cross sections within critical stream channels. Locate one cross section in the East Fork of Manzanita Creek, one in the Jack Pine East drainage, one in Indian Creek and two in Granite Creek.

Roads: Road patrols may be necessary during the summer monsoon season to monitor the effectiveness of road drainage systems and clear debris from culverts and ditches. Document completion of hazardous tree removal.

Noxious Weeds: Monitor the burned area for the spread of Dalmatian Toadflax. For suspected infestations or invasive plants that might increase, BAER funds may be used to monitor the situation at likely locations. If, through monitoring, a need to treat the invasive plants is determined, an interim BAER request must be submitted. The monitoring of invasive plants with BAER cannot occur beyond the third year. Emergency treatments must occur within the first two years (two full growing seasons after the burn).

FINAL REPORT: We have installed four channel cross sections which will be remeasured periodically. We have conducted several site visits to make observations and qualitative evaluations. Noxious weeds will be surveyed following this summer's growing season.

Part VI – Emergency Rehabilitation Treatments and Source of Funds by Land Ownership

			NFS Lands				Other Lands				All
		Unit	# of	WFSU	Other		# of	Fed	# of	Non Fed	Total
Line Items	Units	Cost	Units	SULT \$	\$		units	\$	Units	\$	\$
A. Land Treatments											
Aerial Seeding	Acres	32	850	\$26,561				\$0		\$0	\$26,561
Hydromulching	Acres	1674	150	\$251,126							\$251,126
LEB	Acres	53	160	\$8,363							\$8,363
Slashing	Acres	1040	30	\$31,181				\$0		\$0	\$31,181
Subtotal Land Treatments				\$317,231				\$0		\$0	\$317,231
B. Channel Treatments											
Debris Removal	miles	472	15	\$7,074				\$0		\$0	\$7,074
Straw Check Dams	each	182	142	\$25,903				\$0		\$0	\$25,903
Flood Warning System	each	5000	1	\$0				\$0		\$0	\$0
Subtotal Channel Treat.				\$32,977				\$0		\$0	\$32,977
C. Roads and Trails											
Road Maintenance	Miles	6754	3	\$20,260				\$0		\$0	\$20,260
Hazard Tree	miles	1125	2	\$0				\$0		\$0	\$0
Diversion	each	25000	1	\$25,000				\$0		\$0	\$25,000
				\$0				\$0		\$0	\$0
Subtotal Road & Trails				\$45,260				\$0		\$0	\$45,260
D. Structures											
Toilet Hazard Removal	Each	100	6	\$600				\$0		\$0	\$600
				\$0				\$0		\$0	\$0
				\$0				\$0		\$0	\$0
Subtotal Structures				\$600				\$0		\$0	\$600
E. BAER Evaluation				\$0				\$0		\$0	\$0
Team	days	25	500	\$20,812				\$0		\$0	\$20,812
Subtotal Assessmen				\$20,812							\$20,812
G. Monitoring Cost	Plan	1	5400	\$0				\$0		\$0	\$0
H. Totals				\$437,692				\$0		\$0	\$437,692

PART VII - APPROVALS

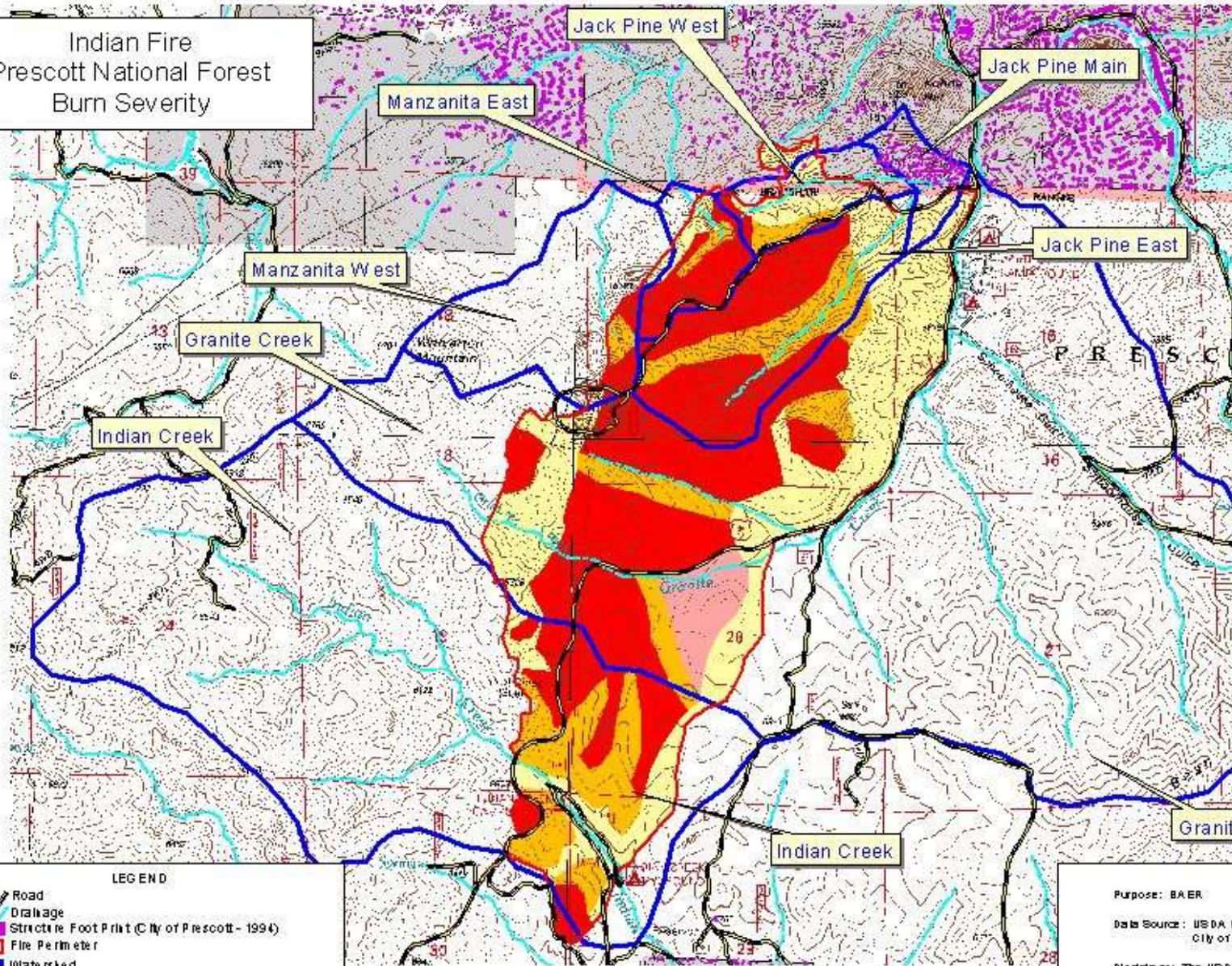
1. /s/ Michael King
Forest Supervisor

1/31/03
Date

2. Regional Forester

Date _____

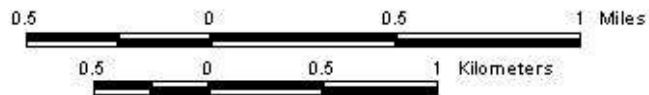
Indian Fire Prescott National Forest Burn Severity



LEGEND

- Road
- Drainage
- Structure Foot Print (City of Prescott - 1994)
- Fire Perimeter
- Watershed
- Fire Intensity**
 - High
 - High-Medium
 - Low
 - Medium
- Land Owner**
 - Private
 - State

UTM Zone 12 N, NAD1983



1:31680

Purpose: BAER

Data Source: USDA
City of Prescott

Disclaimer: The USFS does not use the most current GIS data and products. Forest Service reserves the right to modify, or replace GIS data.

Publisher: Prescott National Forest

Plot Date: May 29, 2000

Plot Name: Watershed