USDA-FOREST SERVICE

FS-2500-8 (7/08)
Date of Report:8/5/09

BACKBONE FIRE BURNED-AREA REPORT
(Reference FSH 2509.13)

PART I - TYPE OF REQUEST

Backbone Fire looking into Soldier Ck. watershed above Paul Gibson Cave and trail 6E01

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: Backbone Fire

B. Fire Number: CA-SRF-1131

C. State: CA

D. County: Trinity

E. Region: 5

F. Forest: Six Rivers & Shasta-Trinity

G. District: LTMU(Six Rivers), TRMU(Shasta-T)

H. Fire Incident Job Code: P5EOVS

I. Date Fire Started: 7/1/2009

J. Date Fire Contained: 7/24/2009

K. Suppression Cost: $20 million

L. Fire Suppression Damages Repaired with Suppression Funds
1. Fireline waterbarred (miles):15
2. Fireline seeded (miles):0
3. Other (identify):0

M. Watershed Number: Eightmile Ck (18010211100101), Virgin Ck (18010211100102), Upper Horse Linto Ck. (18010211120301)

Part 2N, Acres Burned:

Sum of Acres		Fire Name		
Watershed	Forest	Backbone	Red Spot	Total
Nordheimer Creek	KNF		7	7
Eightmile Creek	SHF	605	1070	1675
Virgin Creek	SHF		50	50
Soldier Creek	SHF	2669		2669
Sixmile Creek	SHF	110		110
Red Cap Creek	SRF	91	2	93
Tish Tang Creek	SRF	38		38
Horse Linto Creek	SRF	1677		1677
Grand Total		5190	1129	**6318**

Part 2O, Vegetation Types:

Previous mixed conifer and true fir forest, after a 1999 stand-replacement fire (Megram fire); burned regrowth was oak and shrubs, and young conifer regen.

Part 2P, Dominant soils:

Dystric Xerochrepts, Lithic Xerorthents, Wapal and Maymen Families

Q. Geologic Types: Ironside Mountain Batholith and Hayfork Terrane mdetasediments

R. Miles of Stream Channels by Order or Class: 5 miles perennial ,8 miles intermittent; 15 miles ephemeral

S. Transportation System:

Trails: 10 miles Roads: 0 miles

PART III - WATERSHED CONDITION

Part 3A, Burn Severity:

Sum of Acres	Soil Burn Severity				
FireName	Unb/VL	Low	Mod	High	Total
Backbone	1861	1254	1800	275	5190
Red Spot	271	283	551	24	1129
Grand Total	2131	1536	2352	299	6318

Percentage	Soil Burn Severity				
FireName	Unb/VL	Low	Mod	High	Total
Backbone	29%	20%	28%	4%	82%
Red Spot	4%	4%	9%	0%	18%
Grand Total	34%	24%	37%	5%	100%

Part 3B, Water Repellent Soils:

Water repellency is present in the moderate and high soil burn severity classes, approx. 2500 acres, but extremely patchy in occurrence. Where it occurs, the repellent layer is from 1 to 4 inches thick, moderate to severe, and 20-30% continuity. No generalizations for occurrence were determinable.

Part 3C, Soil Erosion Hazard Rating:

Sum of Acres	Erosion Hazard Rating			
FireName	Mod	High	Very High	Total
Backbone	942	2987	1261	5190
Red Spot	8	590	531	1129
Grand Total	950	3577	1791	6318

Percentage	Erosion Hazard Rating			
FireName	Mod	High	Very High	Total
Backbone	15%	47%	20%	82%
Red Spot	0%	9%	8%	18%
Grand Total	15%	57%	28%	100%

Part 3D, Erosion Potential:

Total fire area: 56 tons per acre (range 28-84) for a 10 year event, 22 tons per acre (11-33) for a 2 year (average) event. Background erosion potential is rather high at approximately 5 tons per acre.

Part 3E, Sediment Potential:

Nearly 100% of erosion potential, due to steep linear slopes and steep stream gradients.

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years): 10

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

C. Equivalent Design Recurrence Interval, (years): 10

D. Design Storm Duration, (hours): 24hr

E. Design Storm Magnitude, (inches): 7.0

F. Design Flow, (cubic feet / second/ square mile): 336

G. Estimated Reduction in Infiltration, (percent): 23%

H. Adjusted Design Flow, (cfs per square mile): 438

PART V - SUMMARY OF ANALYSIS

A. Describe Critical Values/Resources and Threats:

Background: The Backbone Fire was caused by lighting and started on Wednesday, July 1, 2009, eight miles north of Denny, California in Trinity County within the Trinity Alps Wilderness. The Backbone Fire burned a total of 6,324 acres (4,534 acres Shasta-Trinity & 1,783 acres Six Rivers & 7 acres Klamath NF) on steep rocky mountainsides with mixed burn intensities. Approximately 50% burned at high and moderate soil burn severity (see soil burn severity map below). The rest of the fires were either low or very low soil burn severity.

General trends were the areas where the Megram fire burned in 1999 and had high brush component were burned moderate to high soil severity.

Photos below are included in the original 2500-8 request and on record, but deleted here to reduce file size for correspondence database.

Backbone - Soldier Ck. east-facing slopes Megram Fire reburn

Red Spot - Southeast-facing slopes Megram Fire reburn

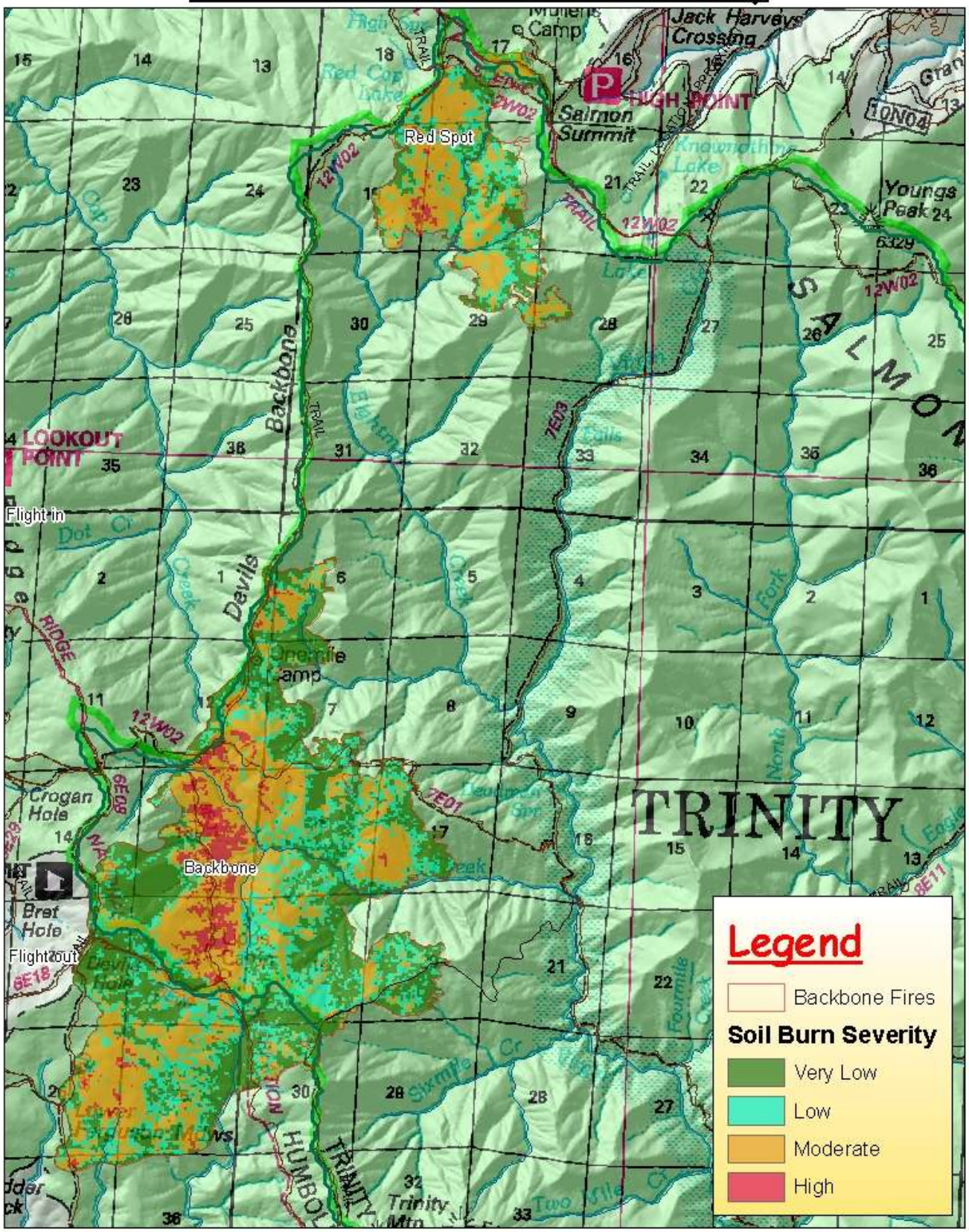
Forested areas burned by the Megram with low burn severity and re-burned now were low to very low soil burn severity.

Backbone – E. Horse Linto Ck. low intensity Megram reburn

Backbone – E. Horse Linto Ck. low to moderate reburn

Backbone Fire Final Soil Burn Severity Map:

Backbone Fires Soil Burn Severity



Values at Risk:

1) ***Trails****:* Three trails are now at risk due to increased likelihood of debris flows and dry ravel from high soil burn severity.

   a) Trail 6E01 at risk from anticipated increased debris flows and dry ravel from severely burned hillslopes.

   b) Trail 7E01 and 6E08 are at risk from dry ravel threatening to cover the trails.

2) ***Threats to Water Quality and Fisheries****:* With moderate to high soil burn severity, water quality could be compromised and spawning habitat for Spring Chinook and Steelhead trout along due to steep burned soils and sediment loading.

   a) Sediments will flow into Middle Eightmile Creek from Soldier Creek that could affect domestic water users in the community of Denny.

   b) Severely burned hillslopes will experience accelerated erosion and sediments that could affect fish habitat for Spring Chinook Salmon and Steelhead in the upper Eightmile Creek due to inputs from Soldier Creek burned hillslopes (Backbone) and upper Eightmile Creek (Redspot).

3) ***Threats to Soil Productivity/Ecosystem Stability****:* Areas that have moderate to high soil burn severity are at risk from accelerated erosion affecting stream bank stability, and debris flow potential.

   a) Severely burned hillslopes of Soldier and upper Eightmile Creeks could experience accelerated erosion that could strip topsoil and decrease soil productivity significantly for large areas previously burned by the Megram Fire of 1999.

4) ***Threats to Cultural Resources***: With loss of cover and possible erosion due to the fires, cultural resources are now exposed and are vulnerable to vandalism. The Horse Mountain area near Trinity Summit is burned and artifacts are exposed.

5) ***Threats to Wildlife Resources***: Burned areas are a loss of habitat and soil productivity and could threaten wildlife viability. Lack of cave access for bat habitat if Paul Gibson cave entrance is blocked with sediment.

6) ***Threats to Cave Resources***: Paul Gibson cave located at the confluence of the north and south branch of Soldier creek is threatened by debris flows that could block a very significant cave on the Shasta-Trinity for its size, diversity of formations and cave habitat (bats, etc).

7) ***Botany (noxious weeds)*****:** Noxious weed issues due to multi-helicopter landings on the perimeter of the fire in the wilderness. These areas are prone to noxious weed spreading and introduction due to staging areas where cargo nets could have had contact with adjacent areas of yellow star thistle.

B. Emergency Treatment Objectives: To allow safe passage of water to protect Forest Service infrastructures and watersheds from accelerated sheet and rill erosion. To protect fish habitat and cave resources from degregration. To protect watersheds from the spread of noxious weeds and cultural site vandalisn.

Risk determination is dependent on the design storm selected and downstream values at risk. By using an above average storm (10-year event) emergency planning measures can be designed to mitigate and minumize anticipated risks. Using a 10-year design storm the values at risk can be evaluated to determine if an emergency exists. The Emergency Determination Matrix displayed below shows if an emergency exists, probability of failure if untreated or treated, and treatment proposed to mitigate the emergency.

Backbone Fire Values @ Risk Emergency Determination Matrix

Value at Risk	Emergency U%(yes/no)T%			Reason	Treatment
Wilderness trails	95	Y	-	Dry ravel & crossing	Natural recovery
Soldier Ck., soil erosion	95	Y	-	Hot Burned hillslopes	Natural recovery
Soldier Ck., mass wasting	75	Y	-	Burned hillslopes	Natural recovery
Fish habitat – New River	40	M	-	Eroded fine sediments	Natural recovery
Water quality - Denny	70	M	-	Eroded fine sediments	Natural recovery
Paul Gibson Cave	85	Y	20	Plugging entrance	Rock deflection barrier
Cultural sites exposed	80	Y	10	Lack of cover	Restore cover
Noxious weeds	80	M	10	Firelines and helispots	Detection survey
Wildlife and bats	40	M	15	Loss of habitat	Natural recovery
U = untreated; T = treated; Where Y = yes, M = maybe, and N = no					

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

Land **95** % Channel **-** % Trails **-** % Protection/Safety **95** %

D. Probability of Treatment Success

	Years after Treatment		
	1	3	5
Land	95%	80%	70%
Channel	-	-	-
Trails	-	-	-
Protection/Safety	90%	95%	95%

E. Cost of No-Action (Including Loss): $400,000

F. Cost of Selected Alternative (Including Loss): $116,860

G. Skills Represented on Burned-Area Survey Team:

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

Team Leader: Brad Rust

Email: brust@fs.fed.us Phone: 530-226-2427 FAX: 530-226-2485

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.)

Land Treatments: Noxious weed detection surveys, and hazard tree removal are the selected treatments.

Noxious weed detection survey on firelines for introduced weeds due to suppression will consist of detection, handpulling and bagging. Areas found to be too large for bagging will be treated by hired handpulling crews.

Hazard tree removal for crew to safely go into and out of Paul Gibson Cave deflection barrier work site.

Channel Treatments: none

Trail Treatments: none

Protection/Safety Treatments: Burned area signing and trail closure signs. Paul Gibson Cave entrance defection barrier.

Posting of areas burned will alert the public to potential dangers of falling trees and rolling rocks. Trail closure signs will protect the public from areas where trails (6E01, 6E08, 7E01) are covered with dry ravel, downed trees, and debris flows.

Paul Gibson Cave entrance deflection barrier will be built with onsite boulders and stones to protect the low lying cave entrance from being blocked with debris flow material. The rock deflection barrier will deflect flow material away from the cave entrance allowing them to pass downstream.

Paul Gibson cave entrance deflection barrier treatment is subject to a cave entrance assessment trip to evaluate current status of the cave, the likelyhood of blockage, and the proposed treatment effectiveness. The cave entrance will be GPSed along with a bat assessment to determine the potential habitat and the resources at risk. This trip will be charged to BAER assessment job code H5BAER, 0520.

I. Monitoring Narrative:

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

See Appendix B below for cave and trail monitoring.

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

Click red icons for	NFS Lands					Other Lands				All
Line Items	**Units**	**Unit Cost**	**# of Units**	**BAER $**	**Other $**	**# of Units**	**Fed $**	**# of Unit**	**Non Fed**	**Total $**
A. Land Treatments										
NX Weed Det. Su	mi	$5,560	2	$11,120			$0		$0	$11,120
Hazard Trees	mi	$950	3	$2,850			$0		$0	$2,850
Subtotal Land Treatments				**$13,970**	$0		$0		$0	**$13,970**
B. Channel Treatments - none										
				$0			$0		$0	$0
				$0			$0		$0	$0
Subtotal Channel Treatments				$0	$0		$0		$0	$0
C. Road and Trails - none										
Subtotal Road & Trails				$0	$0		$0		$0	$0
D. Protection/Safety										
Warning Signs	ea	$130	8	$1,040			$0		$0	$1,040
Closure Signs	ea	$100	4	$400			$0		$0	$400
Deflection Barrier	ea	$5,000	1	$5,000			$0		$0	$5,000
Subtotal Protection				**$6,440**	$0		$0		$0	**$6,440**
E. BAER Evaluation										
Assessment Tear	---	---	---	---	$20,427	---		---		$20,427
PGC DB assess	---	---	---	---	$3,000	---		---		$6,000
Subtotal Evaluation				---	$23,427	---	$0	---	$0	**$26,427**
F. Monitoring										
Trail Monitoring	ea	$1,000	1	$1,000						
Cave Monitoring	ea	$2,000	1	$2,000			$0		$0	$2,000
Subtotal Monitoring				**$3,000**	$0		$0		$0	**$3,000**
G. Totals				**$23,410**	**$23,427**		**$0**		**$0**	**$49,837**
Previously approved						Comments: PGC DB assess = Paul Gibson cave deflection barrier				
Total for this request				**$23,410**						

PART VII - APPROVALS

1. */s/ J. Sharon Heywood*
   Forest Supervisor SHF (signature) Date

2. */s/ Nancy J. Gibson, for* *08/06/09*
   Forest Supervisor SRF (signature) Date

3. /s/ Beth G. Pendleton (for) 08/11/09
   Regional Forester (signature) Date

APPENDICES: Supporting Information:

Appendix A: Backbone Fire BAER Team

Appendix B: Monitoring for Cave Trail Damage

Appendix C: Vicinity and Ownership Map

Appendix D: Summary of Cost-Risk Analysis

Appendix A: Backbone Fire BAER Team:

NAME	UNIT	FUNCTION	CELL PHONE	OFFICE PHONE
Brad Rust	Shasta-Trinity N.F.	Team Leader	530-917-0434	530-226-2427
Fred Levitan	Shasta-Trinity N.F.	Hydrologist	916-708-0272	530-226-2428
Dave Young	North Province N.F.	Area Soil Scientist	530-227-9050	530-226-2545
Joe Blanchard	Klamath N.F.	Soil Scientist	203-241-7340	530-841-4591
Abel Jasso	Shasta-Trinity N.F.	Geologist	-	530-226-2423
Susan Erwin	Shasta-Trinity N.F.	Botanist	-	530-623-1753
Lois Shoemaker	Shasta-Trinity N.F.	Fire Ecologist	530-351-2610	530-226-2315
Mark Arnold*	Shasta-Trinity N.F.	Archeologist	760-920-1464	530-226-2339
Kent Romney	Shasta-Trinity N.F.	Public Information	541-292-6019	530-226-2495
* consulted only				

Appendix B: Monitoring Protocols:

Backbone Fire
Cave Monitoring

The 2500-8 report requests funds to monitor the effectiveness of no hillslope treatments on Paul Gibson Cave.

1. Monitoring Questions
   - Is the hillslope above the cave stable and recovering?
   - Is there concentrating runoff leading to unacceptable off-site consequences to the cave?

2. Measurable Indicators
   - Cave habitat damaged by outside sediment contamination
   - Loss of cave access and habitat for bats

3. Data Collection Techniques
   - Photo documentation of site
   - Inspection Checklist (attached)

4. Analysis, evaluation, and reporting techniques

   - Monitoring will be conducted after major winter storms. If the monitoring shows the cave has extensive damage to the entrance an interim report will be submitted asking for additional treatment funds. A several page report would be completed after the site visit. The report would include photographs and a recommendation on whether additional treatments are necessary.

Cave Inspection Checklist

Date: _____ Inspector _____
Time: _____ Forest Cave _____

Describe locations reviewed during inspection: _____

_____

_____

Was there cave damage? _____

Was cave plugged? _____

GPS _____

Describe damage and cost to repair cave? (GPS) _____

Photos taken of cave damage _____

Recommended actions to repair cave entrance:
_____

Backbone Fire
Trail Effectiveness Monitoring

The 2500-8 report requests funds to monitor the effectiveness of trail treatments on forest trails in the Backbone Fire.

1. Monitoring Questions
   - Is the trail tread stable?
   - Is the trail leading to concentrating runoff leading to unacceptable off-site consequences?

2. Measurable Indicators
   - Rills and/or gullies forming on the trail
   - Loss of trail bed

3. Data Collection Techniques
   - Photo documentation of site
   - Inspection Checklist (attached)

4. Analysis, evaluation, and reporting techniques

   - Monitoring will be conducted after storm events. If the monitoring shows the treatment to be ineffective at stabilizing trail and there is extensive loss of trail bed or infrastructure an interim report will be submitted. A several page report would be completed after the site visit. The report would include photographs and a recommendation on whether additional treatments are necessary.

Trail Inspection Checklist

Date: _____ Inspector _____
Time: _____ Forest Trail _____

Describe locations reviewed during inspection:_____

Was there trail damage?
Did the trail crossing fail?_____.
GPS)_____

Describe damage and cost to repair? (GPS)_____

Photo taken of trail damage_____

Recommended actions to repair:_____

Appendix C: Vicinity Map:

Appendix D: Summary of Cost-Risk Analysis:

Backbone Fire Benefit Cost Analysis:

Total benefits of resource:

Resource	Value $
trails	$100,000
PG cave	$250,000
wildlife & bats	$100,000
arch sites	$50,000
native plants	$50,000
water quality	$100,000
aquatics/fisheries	$400,000
eco-stab/soil productivity	$60,000
public safety	$500,000

Proability of loss without and with treatments:

Resource	Proability loss no treatments:	Proability loss w/ treatments:	Reduction in proability of loss
trails	90%	0%	90%
PG cave	70%	20%	50%
wildlife & bats	70%	20%	50%
arch sites	70%	10%	60%
native plants	60%	10%	50%
water quality	40%	0%	40%
aquatics/fisheries	40%	0%	40%
eco-stab/soil productivity	80%	0%	80%
public safety	90%	5%	85%

Total cost of treatments:

Click red icons for	NFS Lands					Other Lands				All
Line Items	Units	Unit Cost	# of Units	BAER $	Other $	# of Units	Fed $	# of Unit	Non Fed	Total $
						Click to Insert new line item below cursor				
A. Land Treatments										
NX Weed Det. Su	mi	$5,560	2	$11,120			$0		$0	$11,120
Hazard Trees	mi	$950	3	$2,850			$0		$0	$2,850
Subtotal Land Treatments				**$13,970**	$0		$0		$0	**$13,970**
B. Channel Treatments - none										
				$0			$0		$0	$0
				$0			$0		$0	$0
Subtotal Channel Treatments				$0	$0		$0		$0	$0
C. Road and Trails - none										
Subtotal Road & Trails				$0	$0		$0		$0	$0
D. Protection/Safety										
Warning Signs	ea	$130	8	$1,040			$0		$0	$1,040
Closure Signs	ea	$100	4	$400			$0		$0	$400
Deflection Barrier	ea	$5,000	1	$5,000			$0		$0	$5,000
Subtotal Protection				**$6,440**	$0		$0		$0	**$6,440**
E. BAER Evaluation										
Assessment Tean	---	---	---	---	$20,427	---		---		$20,427
PGC DB assess	---	---	---	---	$3,000	---		---		$6,000
Subtotal Evaluation				---	$23,427	---	$0	---	$0	**$26,427**
F. Monitoring										
Trail Monitoring	ea	$1,000	1	$1,000						
Cave Monitoring	ea	$2,000	1	$2,000			$0		$0	$2,000
Subtotal Monitoring				**$3,000**	$0		$0		$0	**$3,000**
G. Totals				**$23,410**	**$23,427**		**$0**		**$0**	**$49,837**
Previously approved						Comments: PGC DB assess = Paul Gibson cave deflection barrier				
Total for this request				**$23,410**						

Resource	Value $	Reduction in proability of loss
trails	$100,000	90%
PG cave	$250,000	50%
wildlife & bats	$100,000	50%
arch sites	$50,000	60%
native plants	$50,000	50%
water quality	$100,000	40%
aquatics/fisheries	$400,000	40%
eco-stab/soil productivity	$60,000	80%
public safety	$500,000	85%

Benefit/cost ratio:

Resource	Benefit of treatment	Treatment Cost	B/C ratio	Justified
trails	$90,000	$1,500	60.0	yes
PG cave	$125,000	$8,000	15.6	yes
wildlife & bats	$50,000	$8,000	6.3	yes
arch sites	$30,000	$400	75.0	yes
native plants	$25,000	$11,120	2.2	yes
water quality	$40,000	$0		
aquatics/fisheries	$160,000	$0		
eco-stab/soil productivity	$48,000	$0		
public safety	$425,000	$1,500	283.3	yes