Date of Report: 9/30/2008

YOLLA BOLLY COMPLEX BURNED-AREA REPORT
(Reference FSH 2509.13)

PART I - TYPE OF REQUEST

Vinegar Fire @ West Low Gap with hazard trees in backdrop

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: Yolla Bolly Complex + Trough

B. Fire Number: CA-MNF-2008-663 & CA-SHF-001041

C. State: CA

D. County: Tehama, Trinity

E. Region: 05 Pacific Southwest

F. Forests: 08 MNF / 14 SHF

G. Districts: Covelo, Grindstone / Yolla Bolly

H. Fire Incident Job Code: 0508 P5D85T, 0514 P5D8HC

I. Date Fire Started: 21 Jun 2008

J. Date Fire Contained: 20 Aug 2008

K. Suppression Cost: $16.1 million as of 20 August 2008

L. Fire Suppression Damages Repaired with Suppression Funds

1. **Fireline waterbarred (miles)**: 183 dozer / 35 hand
2. **Fireline seeded (miles):** 0
3. **Other (identify):** Road surface drainage restored to pre-fire function; safety zones

M. Watershed Numbers: 18 01 02 12 01 (South Fk Trinity); 18 01 01 04 01 (Upper Middle Fk Eel); 18 02 01 14 01 (Thomes); 18 02 01 53 04 (South Fk Cottonwood)

N. Acres Burned: 95,324
NFS Acres (94,869) Other Federal (348) Private (107)

Acres Sum	Ownership			
Fire Name	USFS	BLM	Private	Total
Trough	3,684	-	-	3,684
Vinegar	49,981	348	107	50,436
Grouse	7,583	-	-	7,583
Yellow	33,621	-	-	33,621
Total	**94,869**	**348**	**107**	**95,324**

O. Vegetation Types: Conifer, conifer-hardwood, brewer oak, chaparral, montane chaparral.

P. Dominant Soils: Sheetiron, Yolla Bolly, Tallac, Neuns, Deadwood, Goulding, and Hugo.

Q. Geologic Types: Franciscan and South Fork Schist

R. Miles of Stream Channels by Order or Class:

HUC5	Miles per Order				
	Total	**1**	**2**	**3**	**4+**
S Fk Trinity	34.7	21.3	7.1	5.3	1.0
S Fk Cottonwood	370.8	242.1	67.3	32.4	29.1
UMF Eel	351.2	209.6	68.6	34.4	38.5
Thomes	19.4	11.7	4.9	1.7	1.1

S. Transportation System: Trails: 251 miles Roads: 21.7 miles

PART III - WATERSHED CONDITION

A. Burn Severity (acres):

Acres Sum		Soil Burn Severity				
Fire Name	Owner	Unb/VL	Low	Moderate	High	Total
Trough	USFS	864	1,302	1,286	232	3,684
Vinegar	USFS	12,840	25,129	10,775	1,238	49,981
	Other	35	102	287	31	455
Grouse	USFS	2,275	3,575	1,579	154	7,583
Yellow	USFS	11,831	13,375	6,018	2,398	33,621
Total	USFS	27,810	43,380	19,658	4,021	94,869
Total	Other	35	102	287	31	455
Grand Total		**27,845**	**43,483**	**19,945**	**4,052**	**95,324**
Percent		29%	46%	21%	4%	100%

B. Water-Repellent Soil (acres):

Water repellency is not present in significant continuous areas. Some low to moderate repellency was noted in scattered areas of high soil burn severity, but was generally very patchy and not typical of any particular soil types.

C. Soil Erosion Hazard Rating (acres):

Sum of Acres		Erosion Hazard Rating				
Fire Name	Ownership	L	M	H	VH	Total
Trough	USFS	-	2,265	1,419	-	3,684
Vinegar	USFS	77	31,496	14,518	3,890	49,981
	Other	6	235	214	-	455
Grouse	USFS	-	6,016	1,368	199	7,583
Yellow	USFS	233	21,233	6,315	5,841	33,621
Total	USFS	310	61,010	23,620	9,930	94,869
Total	Other	6	235	214	-	455
Grand Total		**316**	**61,245**	**23,833**	**9,930**	**95,324**

D. Erosion & Sediment Delivery Potential:

An average winter has the potential to produce **16** tons per acre of hillslope erosion, ranging from 8 to 24 across the fires as a whole. Erosion potential was modeled using FSWEPP-ERMiT.

	First Year Erosion Potential (tons/ac)		**Second Year Erosion Potential (tons/ac)**	
FIRE_NAME	2-Year Winter	10-Year Winter	2-Year Winter	10-Year Winter
Trough	18.67	46.67	10.49	34.38
Vinegar	15.62	51.86	7.65	36.32
Grouse	13.05	32.26	8.25	25.15
Yellow	13.14	42.62	7.18	30.79
Average	**15.76**	**44.61**	**8.65**	**32.46**

E. Sediment Potential: 1434 cubic yards / square mile

An average winter has the potential to produce **1434** cubic yards per square mile of sediment, ranging from 720 to 2150 across the fires as a whole. Hillslope erosion was determined to have a 19% chance of sediment delivery potential.

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years): 7

B. Design Chance of Success, (percent): 95%

C. Equivalent Design Recurrence Interval, (years): 2 yr

D. Design Storm Duration, (hours): 6 hr

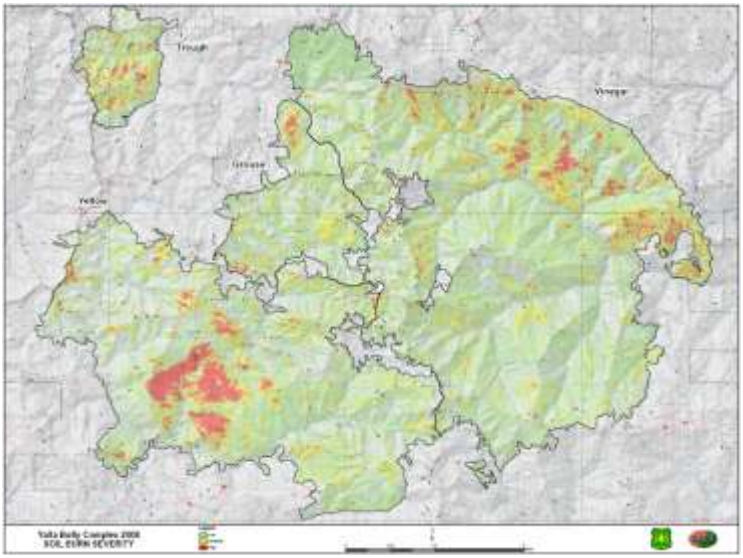
E - H. Design Storm Runoff Predictions:

HUC5	E. Design Storm Magnitude, (inches)	F. Design Flow, (cubic feet / second/ square mile)	G. Estimated Reduction in Infiltration, (percent)	H. Adjusted Design Flow, (cfs per square mile)
S Fk Trinity[1]	2.2	72	5	170
S Fk Cottonwood[2]	2.2	46 (57)	6 (12)	49 (129)
UMF Eel[3]	2.2	45 (52)	6 (11)	48 (59)
Thomes	Not calculated due to small burn acreage and low severity			

PART V - SUMMARY OF ANALYSIS

A. Describe Critical Values/Resources and Threats (narrative):

Background: The Yolla Bolly Complex fires burned 95,324 acres due to 5,000 lighting strikes that ignited 150 fires on June 21th in Tehama, Trinity, and Shasta Counties. The fires started on ridgelines and slowly backed down the ridges over time causing a mosaic burn. The Yolla Bolly Complex assessment area consisted of 94,869 acres of U.S. forestland, 348 acres of BLM and 107 acres of private lands. The Yolla Bolly Complex BAER assessment area includes the Trough, Grouse, Vinegar, and Yellow fires that occurred in Trinity and Tehama County.



[1] For the upper HUC6, which also includes Trough Fire.
[2] At Slides Creek, not including Slides Creek & (Long Gulch – Tomhead Gulch HUC7).
[3] At Fern Point & (Middle Fk Middle Fk Eel HUC6, which contains Uhl HUC7)

Approximately 25% burned at high and moderate soil burn severity (see soil burn severity map above). The rest of the fires were either low or very low soil burn severity. General trends are forested areas that were north or east-facing slopes were nice mosaic under-burns. Forested areas that were south or west-facing slopes burned hotter and had tree mortality of 30-60% with ridges burning hotter (see pics below).

Vinegar Fire East-facing under-burn

Yellow Fire in Middle Eel with hot burned ridgetops

Chaparral areas that were north or east-facing slopes had moderate soil burn severity were patchy. Chaparral areas that were south and west-facing, burned moderately high to high soil burn severity removing almost all vegetation (see pics below).

Trough Fire East-facing mixed timber/brush

Vinegar Fire South-facing brush fields @ Syd Ridge

The Yolla Bolly Complex comprises several fires that burned primarily within the boundaries of the 147,000 acre Yolla Bolly Middle Eel Wilderness[4]. The Trough fire was part of the Lime Complex but due to its proximity next to the Yolla Bolly complex, it is being evaluated with this assessment. Four 5th-field watersheds were affected (Map 1, Appendix A). Overall, burn severities were predominantly low in timber types, and moderate to high in brush types. Most of the burned acreage occurred in Upper Middle Fork Eel River and South Fork Cottonwood Creek HUC5 watersheds. These two also have the three HUC7s with the most concentrated areas of moderate and high severity burns.

[4] Suppression rehab of the Trough Fire, which burned on SHF outside of wilderness, was managed by the Yolla Bolly IMT after it was contained.

In view of the predominance of low severity, we expect there to be only a minor peak flow response, except at the HUC7 scale in those three with the most area of higher severity burn.

The predominance of low severity burn in most areas will minimize increases in surface erosion. Therefore, the sediment response is expected to be dominated by the release of channel-stored sediment due to burning-out of large woody debris in lower order channels. This will be a substantial pulse in the Eel, South Fork of the Trinity River and Cottonwood watersheds, as it represents the backlog of about a century's worth of missed fire-return intervals over about 590 miles of order 1 & 2 streams. There is no cost-effective way to mitigate this pulse.

HUC5-specific Narratives

South Fork Trinity

The Yolla Bolly fires burned about 3% of the South Fk Trinity HUC5 watershed in its uppermost HUC6. About 60% of one HUC7 was burned, at predominantly low severities. No flood threat exists within this HUC7.

Additional areas of the other two HUC7s in this HUC6 were burned by the Trough Fire at higher severities. Trough and Yolla Bolly fires together burned 36% of the HUC6, 12% at moderate to high severity. The reduction in infiltration for the design event is about 5%. There is no post-fire flood threat in this HUC6 resulting from the combined effects of the Yolla Bolly and Trough fires.

Sedimentation effects from the Yolla Bolly fires are expected to be minor, transient and localized during an average storm year. The sediment flux should be well within the natural range of variability, as about 40% of the burned area has burned in the last 20 years. These previous burns liberated backlog of stored channel sediments in those areas, the majority of which have subsequently been transported downstream from the HUC7. There will be some adverse effects on aquatic TESP species within or downstream of this HUC7 due to the burn severities on the Trough Fire and sediments that will be mobilized and moved into the South Fork.

South Fork Cottonwood

About 50% of the HUC5 burned, in the upper end of the watershed. Five HUC7s had greater than 90% of their area burned, but only one[5] of those had more than 25% burned at moderate and high severity. For all five of these HUC7s, 16% of their combined areas burned at moderate and high severity. These five HUC7s comprise a single HUC6, and it's reduction in infiltration for the design event is about 6%. More severe events have both a lower probability of occurring and lower reductions in infiltration. Taken together, these projections indicate there is no threat of a fire-induced flood issuing from the burned area. Therefore downstream values are not threatened by flooding.

Within the burn, the Long Gulch – Tomhead Gulch HUC7 (Map 3 Appendix A) has a 12% reduced infiltration for the design event. This indicates potential for channel disturbance to occur within the HUC7 because of burn-induced peak flow increases. This should be minor and transient.

The burn-induced sediment pulse from this HUC5 should be substantial, as noted under the *General* narrative above. Effects on aquatic habitat include increased turbidity, pool-filling and increased embeddedness of channel substrate. Effects will be most apparent in the higher order, lower gradient channels within and immediately downstream of the burned area.

[5] Long Gulch – Tomhead Gulch (0102) – 29% moderate + high

Upper Middle Fork Eel

About 35% of the HUC5 burned, in the upper end of the watershed. Four HUC7s had greater than 90% of their area burned, and four others had between 45% and 66% burned. However, only one[6] of those had more than 25% burned at moderate and high severity. These eight HUC7s comprise three HUC6s and are the headwaters of the UMF Eel above Fern Point. About 14% of their combined areas burned at moderate and high severity; the reduction in infiltration for the design event is about 6%. More severe events have both a lower probability of occurring and lower reductions in infiltration. Taken together, these projections indicate there is no threat of a fire-induced flood issuing from the burned area. Therefore downstream values are not threatened by fire-induced flooding.

Within the burn, the Uhl HUC7 is the only area of concern. We assessed it's flood threat at the HUC6 level, as it has a 'butterfly' configuration and is the lowermost HUC7 within its HUC6 (Middle Fork Middle Fork Eel – Map 2 Appendix A). The reduction of infiltration for the design event is 11%. This indicates potential for channel disturbance to occur within the HUC7 because of burn-induced peak flow increases. This should be minor and transient.

The burn-induced sediment pulse from this watershed should be substantial, as noted under the *General* narrative above. Effects on aquatic habitat include increased turbidity, pool-filling and increased imbeddedness of channel substrate. Effects will be most apparent in the higher order, lower gradient channels within and immediately downstream of the burned area.

Thomes Creek

The Yolla Bolly fires burned about 2% of the Thomes Creek HUC5 watershed in its uppermost HUC6. About 23% of one HUC7 was burned, at predominantly low severities. No flood threat exists within this HUC7.

Sedimentation effects from the Yolla Bolly fires are expected to be minor, transient and localized. The sediment flux should be well within the natural range of variability, due to the low severity and small portion of the HUC7 that burned. There should be no significant adverse effects on aquatic species within or downstream of this HUC7. No TESP aquatic species are near enough downstream to experience any effects.

Values at Risk:

Aquatic Wilderness Values:

The post fire effects under the design event do not threaten any aquatic wilderness values.

AquaticTESP Species:

	Aquatic TEPS Species Occurrence (P = Present; CH = Critical Habitat)				
	Federal T/E			FS Sensitive	
Affected HUC5	**Chinook Salmon**	**Coho Salmon**	**Steelhead**	**Yellow Legged Frog**	**Western Pond Turtle**
S Fk Trinity	P	P, CH	P	P	
S Fk Cottonwood	P?		P, CH	P	P
UMF Eel			P, CH	P	P
Thomes				P	

[6] Uhl (0103) – 41% moderate + high

TESP aquatic species will only be discussed in detail for the two watersheds which are expected to have noticeable effects on aquatic habitat: SF Cottonwood and UMF Eel. Both watersheds provide Critical Habitat for steelhead listed under the Endangered Species Act within the fire perimeter. Both watersheds have Critical Habitat which is expected to receive a strong sediment pulse.

The UMF Eel summer steelhead run has been found to be genetically distinct from all other steelhead within the Eel River and beyond. Approximately 2 miles of occupied critical habitat lie within a reach of the UMF Eel which burned at mod/high severity burn (Uhl HUC7). This is the reach where fish and habitat are expected to be most affected by sediment pulses.

Chinook salmon are documented to have occurred on the Forests in SF Cottonwood Creek in the past, and are found downstream of the Forests. However it's unclear if they still reach USFS system waters because no salmon surveys have occurred in recent decades.

The sediment pulses will likely have some effect on juvenile and adult fish and critical habitat in the short-term (the next few years). As stated earlier, effects on aquatic habitat include increased turbidity, pool-filling and increased embeddedness of channel substrate. This will likely lead to: lower biomass and diversity of aquatic insects; lowered production of juvenile steelhead; and some reduction of adult steelhead returning to the watersheds in the next 4 to 7 years. However this should not reduce the populations or alter the habitat in the long-term. The sediment pulses lie within the range of variability to be expected in these watersheds.

Threats to Roads (including user safety):

These threats are primarily focused on the effects of increased runoffs on road surfaces and road crossings. There are also threats to user safety caused by the fire. The specific threats include: 1) Concern of pipes plugging or overtopping and washing away fill; 2) Erosion at pipe and dip outlets with no energy dissipaters; 3) Stump holes in road bed and fill slopes; 4) Open cat lines and decommissioned roads that could suffer erosion and pose a safety concern if not closed; 5) Degradation of road surface drainage profile causing runoff to flow down the road; 6) Lower water demand from burned vegetation and increased flows will likely increase seepage onto road surface at existing spring when water table is recharged; 7) Berms and/or through cuts that channel water on road surface with inadequate drainage relief and erosion protection.

Threats to Wilderness Trails:

Mendocino National Forest Trails:

About 4.3 miles of two trails traverse some of the large areas of mod/high severity burn in Uhl HUC7 (Map 4). The existing system of waterbars is inadequate to protect the trail facilities or adjacent hillslopes from erosion damage under the design event: 1) capacity of some of the existing waterbars is not adequate to handle the increased runoff and sediment – some will breach and result in cascading failures; 2) the existing spacing is not adequate to disperse the increased runoff sufficiently to prevent tread erosion and hillslope erosion at waterbar outlets.

Shasta-Trinity National Forest Trails:

About 32 miles of trails within large areas of mod/high severity burn with increased anticipated flow are at risk erosion and failure. The existing system of waterbars and stream crossings are inadequate to protect the trail due to adjacent hillslopes that will suffering erosion damage under the design event:1) capacity of some of the existing waterbars is not adequate to handle the increased runoff and sediment – some will breach and result in cascading failures; 2) the existing spacing is not adequate to disperse the increased runoff sufficiently to prevent tread erosion and hillslope erosion at waterbar outlets; 3) current stream crossings are inadequate to handle expected increased runoff from moderate to high soil burn severity areas; 4) trail treads with stump

burnouts that are in proximity and connectivity to stream crossing are at jeopardy of piping and eroding the trail.

Potential New Noxious Weed Infestations (Mendocino and Shasta-Trinity N.F.):

It is unknown if suppression equipment was washed before being deployed to this fire. Noxious weed detection survey is therefore needed to detect any possible introduction of invasive plants by suppression actions, and to determine need for treatment beyond incidental removal. The survey would be needed at the beginning of 2009 growing season, prior to 1 year anniversary of fire.

Heritage Resources (Mendocino and Shasta-Trinity N.F.):

There is no need for BAER treatments to protect known arch sites from post fire damage. While some sites burned over, none burned hot and a few burned low-moderately.

Private Property: (Mendocino and Shasta-Trinity N.F.):

No private property is threatened by any flood source areas located on NFS lands.

B. Emergency Treatment Objectives (narrative):

Land Treatments:

Prevent ecosystem disruption and high costs of tardy eradication through early detection and eradication of any new infestations of noxious/invasive plants possibly introduced by suppression actions. The equipment came from all over the State and had potential to bring in a variety of noxious weeds. Ecosystem integrity is at risk of being diminished as a result of new weed introductions and weed spread.

Hillslope erosion was identified as a main contributor to threats to water quality and critical fish habitat but due to the lack of treatable areas, mulching was dropped as a treatment.

Road and Trail Treatments:

Improve road drainage to allow water passage and to protect roads within the Trough Fire area. Improve trail crossing drainage and prevent erosion of trails in down-slope areas.

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

Land 90**%** **Channel** NA**%** **Roads/Trails** 90**%** **Protection/Safety** 95**%**

D. Probability of Treatment Success

	Years after Treatment		
	1	**3**	**5**
Land	95%	90%	85%
Channel	NA	NA	NA
Roads/Trails	95%	97%	99%

Protection/Safety	95%	90%	80%

E. Cost of No-Action (Including Loss): $1,500,000

F. Cost of Selected Alternative (Including Loss): $300,000

G. Skills Represented on Burned-Area Survey Team:

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

Team Leaders: Mike Van Dame (Mendocino N.F.) and Brad Rust (Shasta-Trinity N.F.)

Email: mvandame@...	**Phone**: 530.934.1141	**FAX**: 530.934.7384
Email: brust@...	**Phone**: 530.226.2427	**FAX**: 530.226.2485

H. Treatment Narrative:

Land Treatments:

Hillslope mulching was originally proposed as a treatment in the Trough Fire but due to the lack of treatable acres it was dropped. Natural recovery was selected due to: 1) predominance of slopes greater than 60% that burned moderately hot to hot; 2) steeper areas had very gravelly surfaces and lacked water repellency and were moderately deep; 3) hydrologic groups B and C with only moderate runoff ratings.

Potential New Noxious Weed Infestations (Mendocino and Shasta-Trinity N.F.):

Washing of suppression equipment was not initiated until seven weeks after the start of the fire. The extent of washing that was done is unclear. Noxious weed detection survey is therefore needed to detect any possible introduction of invasive plants by suppression actions, and to determine need for treatment beyond incidental removal. The survey would be needed at the beginning of 2009 growing season, prior to 1 year anniversary of fire. After the first year of surveys the need for future surveys will be assessed. A limited amount of seeding and mulching at selected sites is also recommended to diminish the risk of infestation. Conduct spring survey of suppression-disturbed areas to detect if any new infestations of invasive plants were introduced by suppression actions; determine need for treatment beyond incidental removal. Submit interim 2500-8 request, if treatment is needed, prior to 1 year anniversary of fire.

Noxious Weed Infestations Protection (Shasta-Trinity N.F.):

Reestablish a native plant community at highly disturbed sites by sowing native seed. Sow native seed at selected sites. These sites include safety zones and the first 100 feet of dozer lines starting where the dozer lines meet forest roads. Apply weed-free mulch over the seed.

To discourage noxious weed introduction on constructed dozer lines and the interior of fires, intersections of dozer lines and travelable roads should be seeded with native seed and mulched with weed-free straw. Seeding and mulching the first 100 feet of dozer lines where they meet travelable roads should discourage noxious weed introduction, which should discourage spread further down individual dozer lines.

Land Treatments	Units	Unit Cost	# of Units	BAER $
Seeding Dozer Lines and Safety Zones	acres	1200	5.5	$6600
Mulching Dozer Lines and Safety Zones	acres	725	5.5	$3988
Noxious Weed Detection Surveys on Dozer lines	acres	80	130	$10400
TOTAL ALL LINE ITEMS				**$20,988**

Roads and Trail Treatments:

Road Storm-proofing (Shasta-Trinity National Forest – Trough Fire):

The roads generally run along the top of the ridges and there is not much concern with runoff issues effecting the roads, with the exception of the 27N27 road which runs through the middle of the Trough Fire. There are a few drainage crossings along road 27N27 that could be a concern and need to be addressed with critical dips, rolling dips, and rock disapators.

Road Treatments	Units	Unit Cost	# of Units	BAER $
Storm Proofing (rocked critical and rolling dips, and rock dissipaters)	job	32,400	1	$32,400
Strom Patrol (backhoe with operator and hazard tree removal for crew safety)	day	1,800	5	$9,000
TOTAL ALL LINE ITEMS				**$41,400**

Trail Storm-proofing (Mendocino National Forest):

Restore and improve trail drainage on about 4.3 miles of trail within large areas of mod/high severity burn in Uhl HUC7 on the Mendocino National Forest: 1) repair damaged/destroyed log waterbars; 2) improve other existing waterbars to handle expected increased runoff; 3) construct additional waterbars between existing ones to dispersed increased runoff. These trails are the Rock Cabin Trail (11W54), River Trail (11W05), and the Buck Ridge Trail (11W36).

Trail Storm-proofing (Shasta-Trinity National Forest):

Restore and improve trail drainage on about 32 miles of trails within large areas of mod/high severity burn with anticipated increased runoff flows on the Shasta-Trinity National Forest, Yolla Bolly Wilderness: 1) repair damaged/destroyed log waterbars; 2) improve other existing waterbars to handle expected increased runoff; 3) improve stream crossings to handle expected increased runoff; 4) construct additional waterbars between existing ones to disperse increased hillslope runoff; 5) repair trail treads with stump burnouts that have proximity and connectivity to stream crossing that are at jeopardy of piping and eroding the trail. These trails are the Humboldt Trail (9W36), South Fork Cottonwood Trail (9W39), Syd Cabin Trail (9W37), Chicago Camp Trail (10W39), Brooks Trail (10W40), and the Lazyman Butte Trail (9W40).

Cost to Do Trail Treatments	Units	Unit Cost	# of Units	BAER $
CCC Trail Crews Spike (13 person crew for 8 days at 8hrs/day, food and supply costs are included)	spike	18,000	5	$90,000
Hazard Tree Removal for Crew Safety (fallers and blasters plus explosives are included)	mile	1230	32	$39,360
Packing Costs (5 locations for the 5 spike camps)	spike	3,570	5	$17,850
TOTAL ALL LINE ITEMS				**$147,210**

Protection and Safety Treatments:

Closure, Safety, and Warning Signs (Shasta-Trinity National Forest):

Until trail work can be completed and the first winter is passed the wilderness must remained closed for public safety. Closure signs and burn area signs need to be posted to insure the public is aware of the fire emergency and closure.

Burned traffic signs and road signs that were burned need to be replaced for public safety.

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 road and trail monitoring.

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

		NFS Lands					Other Lands			All
		Unit	# of	Shasta-T	# of	Mendo	Fed	# of	Non Fed	Total
Line Items	Units	Cost	Units	BAER $	units	BAER $	$	Units	$	$
A. Land Treatments										
Handmulching	ac	725	5.5	$3,988		$0	$0		$0	$3,988
Grass seeding	ac	1200	5.5	$6,600		$0	$0		$0	$6,600
Nx weed detection	ac	80	60	$4,800	35	$2,800	$0		$0	$7,600
Subtotal Land Treatments				$15,388		$2,800	$0		$0	$18,188
B. Channel Treatments										
none				$0		$0	$0		$0	$0
Subtotal Channel Treat.				$0		$0	$0		$0	$0
C. Road and Trails										
Road stormproofing	job	32400	1	$32,400		$0	$0		$0	$32,400
Road stormpatrol	day	1800	5	$9,000		$0	$0		$0	$9,000
Trail stormproofing	mi	4600	32	$147,200	4.3	$19,780	$0		$0	$166,980
Subtotal Road & Trails				$188,600		$19,780	$0		$0	$208,380
D. Protection/Safety										
Closure/safety signs	ea	175	25	$4,375		$0	$0		$0	$4,375
Subtotal Structures				$4,375		$0	$0		$0	$4,375
E. BAER Evaluation										
Assessment team	ea			---			####		$0	
Subtotal Evaluation				---			####		$0	
F. Monitoring										
Road treatment monit.	ea	1000	1	$1,000		$0	$0		$0	$1,000
Trail monitoring	ea	2000	1	$2,000		$0	$0		$0	$2,000
Subtotal Monitoring				$3,000		$0	$0		$0	$3,000
G. Totals				$211,363		$22,580			**$0**	**$233,943**
Previously approved										
Total for this request				**$211,363**		**$22,580**				

PART VII - APPROVALS

1. *__/s/ Thomas A. Contreras_____* _____
   Mendocino Forest Supervisor (signature) Date

2. */s/ J. Sharon Heywood* 06 Oct 08
   Shasta-Trinity Forest Supervisor (signature) Date

3. */s/ Beth G. Pendleton (for)* *15 Oct 08*
   Regional Forester (signature) Date

APPENDICES: Supporting Information:

Appendix A: Yolla Bolly Complex BAER Team & Maps

Appendix B: Monitoring for Roads and Trails

Appendix C: Vicinity and Ownership Map

Appendix D: Summary of Hydrology Findings

Appendix E: Summary of Geology Findings

Appendix F: Summary of Soils Findings

Appendix G: Summary of Fisheries Findings

Appendix H: Summary of Engineering Findings

Appendix I: Summary of Recreation Findings

Appendix J: Summary of Cultural Resource Findings

Appendix K: Summary of Botany Findings

Appendix L: Summary of Wildlife Findings

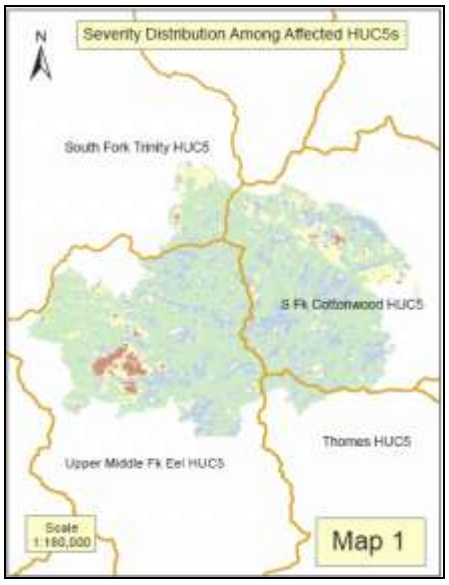
Appendix L: Summary of Cost-Risk Analysis

Appendix M: Summary of Values at Risk and Emergency

Appendix A: Yolla Bolly Complex BAER Team & Maps

Position	Name	Cell Phone	Work Phone
Team Leaders	Brad Rust – USFS Shasta-Trinity	530-917-0434	530-226-2427
	Mike Van Dame - USFS Mendo N.F.	-	530-934-1141
Administration	Amber Pope - USFS Shasta-Trinity	-	530-226-2372
Hydrology	Steve Bachmann – USFS Shasta-T	530-925-1664	530-964-2184
	Mike Van Dame - USFS Mendo N.F.	-	530-934-1141
Soils	Dave Young – USFS R5	530-227-9050	530-226-2545
	Robin Mowery - USFS Mendo N.F.	-	530-934-1152
Geology	Abel Jasso – USFS Shasta-Trinity	-	530-226-2423
Botany	Mike Friend – USFS Plumas N.F.	-	530-836-0114
	Lauren Johnson - USFS Mendo N.F.	-	530-934-1153
Wildlife	Trish Johnson - USFS Shasta-Trinity	530-351-2610	530-226-2315
	Linda Angerer - USFS Mendo N.F.	-	530-934-1146
Fisheries	Donnie Ratcliff - USFS Shasta-Trinity	-	530-242-5551
	Lee Morgan – USFS Mendocino N.F.	-	530-934-1151
Archeology	Mike Dugas – USFS Mendocino N.F.	-	530-934-1267
Engineering	Justin Nettletan – USFS Shasta-T	-	530-226-2333
	Lori Jackson – USFS SFMU	530-598-0421	530-628-1226
Recreation	Ken Graves - USFS Shasta-Trinity	530-524-1167	530-352-4211
	Tricia Christofferson - FS Mendo N.F.	-	530-934-1167
GIS	Lynn Goolsby- USFS	-	209-532-3671

Maps: Hydrologic Units



Maps: Treatment Map

Appendix B: Monitoring for Roads and Trails

Yolla Bolly Complex Fires
Road Effectiveness Monitoring

The 2500-8 report requests funds to monitor the effectiveness of road treatments on Forest Roads in the Trough Fire.

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

2. Measurable Indicators
   - Rills and/or gullies forming on the road
   - Loss of road 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 road and there is extensive loss of road 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.

Road Inspection Checklist

Date:_____ Inspector_____
Time:_____ Forest Road_____

Describe locations reviewed during inspection:_____

Was there road damage?
Was Culvert plugged?_____.
GPS)_____

Describe damage and cost to repair? (GPS)_____

Photo taken of road damage_____

Recommended actions to repair:_____

Yolla Bolly Complex Fires
Trail Effectiveness Monitoring

The 2500-8 report requests funds to monitor the effectiveness of trail treatments on Forest Trails in the Vinegar 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:_____

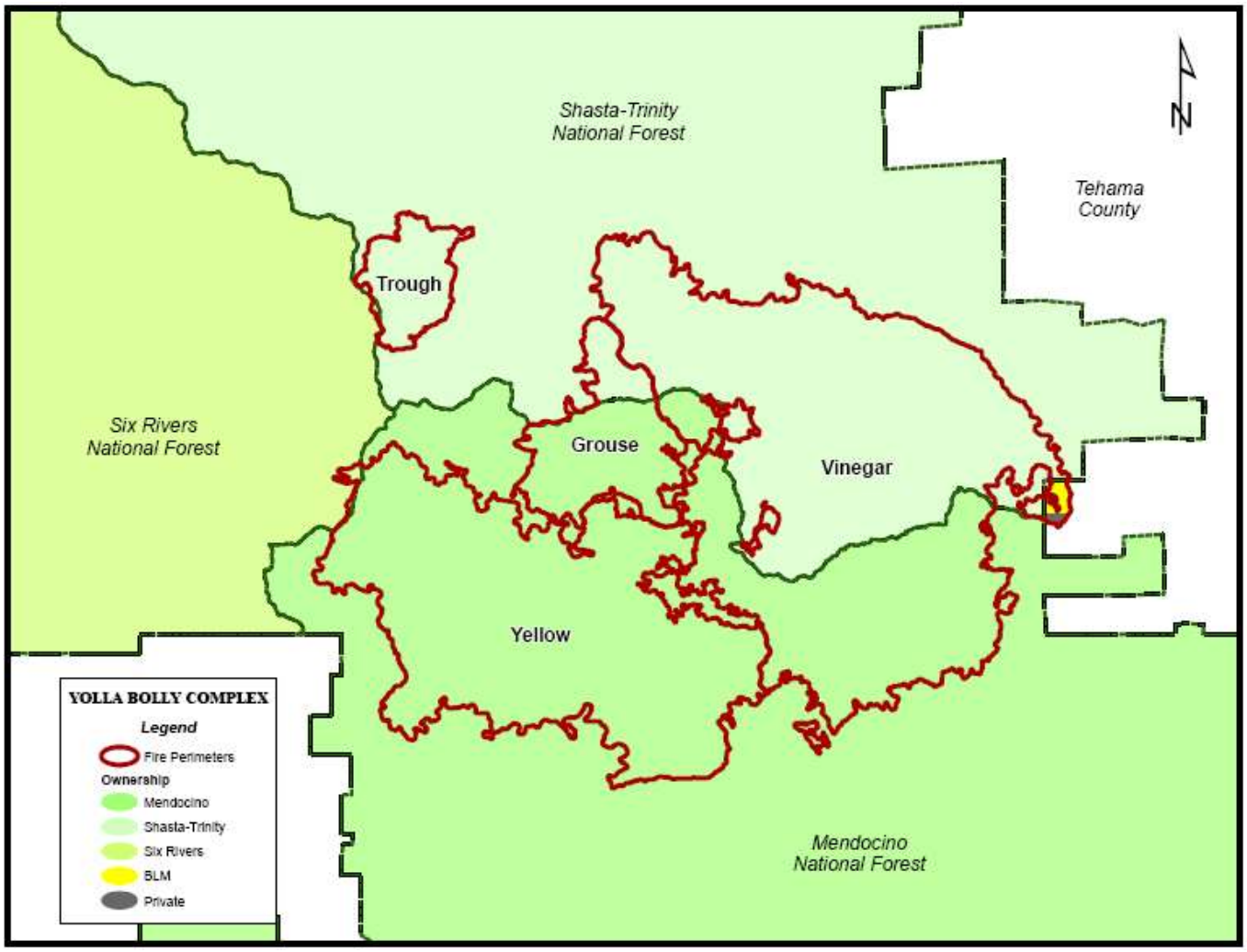
Was there trail damage?
Did the trail crossing fail?_____.
GPS)_____

Describe damage and cost to repair? (GPS)_____

Photo taken of trail damage_____

Recommended actions to repair:_____

Appendix C: Vicinity and Ownership Map



Appendix D: Summary of Hydrology Findings

Hydrology Resource Assessment
Yolla Bolly Complex

Shasta, Trinity, Tehama Counties, California
Shasta-Trinity National Forest

Steve Bachmann (Hydrologist – Shasta-Trinity National Forest)
September 22, 2008

1. Objectives

The objective of this assessment is to evaluate the effects of the Yolla Bolly Complex Fires on watershed hydrologic processes and function including changes in runoff, soil conditions and watershed response to precipitation events. The assessment follows procedures for assessing burned areas as described in Chapter 2520 of the Forest Service Manual.[7] This assessment focuses on fire-induced changes in hydrologic processes and functions that pose a significant threat to human life and property, and critical natural and cultural resources. Values as risk are identified and a determination as to whether or not an emergency condition exists is made for each value. Treatments recommendations are developed for resources where emergency conditions exist.

The Yolla Bolly Complex burned on both the Shasta-Trinity and Mendocino National Forests. The Mendocino National Forest completed a Burn Area Emergency Assessment for the the southern portion of the fire including areas within the South Fork Cottonwood Creek 5th Field Watershed located on the Shasta-Trinity National Forest. This report supplaments the existing assessment for the South Fork of Cottonwood Creek and contributes additional information for the Trough Fire which burned to the west of the Yolla Bolly Complex and was not previously analyzed. This assessment does not cover burn areas located outside of the South Fork Cottonwood Creek Watershed on the Mendocino National Forest.

2. Values At Risk

The BAER team identified several categories of issues, threats and resource concerns for the Yolla Bolla Complex. Because the fire burned mainly within the wilderness and in similarly remote areas there were no values at risk associated with life and property other than potential impacts to some Forest system roads. Values at risk that were identified for the South Fork Cottonwood and South Fork Trinity River areas include the following:

1) Facility structures and homes: The Yolla Bolly Complex Fires burned on mostly USFS ownership that had no structures that were at risk from erosion and flooding.

2) Roads and Trails: Two roads and numerous trails are now at risk due to increased flows from high soil burn severity with undersized culverts and numerous stream crossings.

    a) Trough Fire:
        i) Roads 27N24A and 27N27 are at risk from anticipated increased stream flows from burned hillslopes due to undersized and plugged culverts.

[7] USDA Forest Service, 2004. FSM 2500 – Watershed and Air Management, Chapter 2520 – Watershed Protection and Management, Amendment No.: 2500-2004-1. 44 p.

b) Vinegar Fire:
   i) Trail crossings on trails throughout the Vinegar fire could fail due to moderate to high soil burn severity slopes above and anticipated stream flows.
   ii) Trail stump burn-outs pose extreme safety hazard to foot and horse travelers. These areas also contribute to trail failure due to erosion and sloughing.
   iii) Hazard trees that could fall on hikers throughout the trails in the hot burned areas and areas that have been reburned (Hermit Fire).

3) Threats to Water Quality and Fisheries: With Moderate to high soil burn severity water quality could be compromised due to steep burned soils on many soils that are sandy loam.

   a) Trough Fire:
      i) Burned hillslopes of Rainbow Ridge will experience accelerated erosion and sediments that will affect water quality and listed critical fish habitat for Coho and Steelhead in the upper South Fork of the Trinity River due to its direct proximity to the South Fork.

   b) Vinegar Fire:
      i) Cumulative sediment introduction into the upper South Fork of Cottonwood Creek that will add to the front country fires effects (Noble, Deerlick, Moon, and the Gulch fires).

4) Threats to Soil Productivity/Ecosystem Stability: Areas that have moderate to high soil burn severity are at risk from accelerated erosion and loss of soil stability and soil fertility.

   a) Trough Fire:
      i) Severely burned hillslopes of Rainbow Ridge could experience accelerated erosion that could strip topsoil and decrease soil productivity significantly.

   b) Vinegar Fire:
      i) Severely burned hillslopes of Sanford, Long, and Syd Cabin Ridges could experience accelerated erosion that could strip topsoil and decrease soil productivity significantly.

5) Threats to Wildlife Resources: Burned areas are a loss of habitat and soil productivity and could threaten wildlife viability. No values were at risk for wildlife due to the mosaic nature of the burns. Habitat integrity seemed fine for cover except for the reburn of the Hermit Fire area (west side of the Vinegar Fire).

6) Botany (T&E, noxious weeds): Noxious weed issue due to multi-dozer lines on the perimeter of the fires. These areas are prone to noxious weed spreading and introduction throughout the Trough and Vinegar Fires.

7) The rest of the fires were evaluated by the Mendocino National Forest for values at risk (Yellow and Grouse).

This assessment evaluates how fire-induced changes in hydrologic processes and function could affect the aforementioned resources of concern.

3. Treatment Recommendations for Water Quality and Fisheries Resources

1. Road Treatments

Treatment: Improve road drainage in Trough Fire area. Replace plugged and damaged culverts with functional culverts. Upsize culverts where necessary. Maintain and add drainage

dips to improve road drainage for roads located within or below high severity burn areas. Use storm patrols to monitor undersized pipes located in moderate and high severity burn areas where no culvert upgrades are planned and access can occur safely.

Rationale: The Shasta-Trinity National Forest Land and Resource Management Plan states that all culverts and bridges should be sized to convey the flow of a 100-year flood event and associated bedload and debris. The BAER team identified several roads with undersized and blocked culverts and drainage issues located within and below areas of the complex that burned at moderate and high severity. Treatments were recommended when it was determined that failure of the road drainage systems could adversely affect values at risk including anadromous fisheries, water quality and soil productivity.

2. **Hillslope Treatments –** dropped due to small treatable acres.

   Treatment: Mulch approximately 230 acres of high severity burn areas in the Trough Fire area.

   Rationale: High severity burn areas have the potential to erode and transport large quantities of sediment into stream channels tributary to the South Fork Trinity River. The BAER team identified hillslope mulching needs in areas where they determined that elevated erosion and sedimentation could impact values at risk including anadromous habitat, resident trout habitat, and soil productivity. High severity areas were further stratified by slope to identify the areas that were suitable for mulching (i.e. hillslopes with slopes less than 60%). After further field investigations enough treatable acres were not identified so this treatment was dropped.

4. Monitoring Recommendations

- Monitor the effectiveness of treatments and no treatments to determine overall effectiveness of BAER rehabilitation efforts.

  BAER treatments for the Yolla Bolly Complex have been identified based on the determination that an emergency situation exists for individual or multiple resource values. It is recommended that post-treatment monitoring occur for two purposes:

  a. Determine effectiveness of BAER treatments in controlling sediment and runoff and reducing or eliminating impacts to values at risk within the Trough Fire burn area.
  b. Determine if treatments were identified correctly by assessing the condition of watersheds where no treatments were recommended and comparing the treated and untreated areas. It is recognized that this activity cannot be funded by BAER, however this type of monitoring is needed to improve understanding of how treatments, or no treatments effect watershed functions and values. Improving our understanding of how untreated areas respond to fall and winter storms should also improve our ability to presribe appropriate treatments in the future.

Appendix E: Summary of Geology Findings

Yolla Bolly Fire Complex
Vinegar-Trough Fires
BAER Geologic Assessment
Abel Jasso, Geologist
September, 2008

Geology

The Trough fire complex is located within the Franciscan formation, while the Vinegar fire is found within both the Franciscan and the South Fork Mountain Schist. These formations underlie a wide area along the western and southern boundary of the Shasta-Trinity National Forest. South Fork Mountain itself extends north from Yolla Bolly Mountain to Bennett Peak, a distance of nearly 60 miles. Of the two formations the Franciscan forms the larger areal extent covering most of the area south of Cedar Basin.

The eastern and northeastern contact of the South Fork Mountain Schist marks the boundary between two geomorphic provinces. The Jurassic/Cretaceous South Fork Mountain Schist is the easternmost formation within the Coast Range Geomorphic Province, and lies to the west of the Galice Formation, which is associated with the Western Jurassic Belt of the Klamath Mountain Geomorphic Province. These formations are separated by the regional Coast Range Thrust Fault. Nearly ninety percent of the sixty- mile long eastern slope of South Fork Mountain is occupied by South Fork Mountain Schist.

The Schist consists primarily of tightly folded graphitic, quartz-albite-muscovite-chlorite schist, or mica-schist. These schists are gray to light –brown and exhibit well developed segregation banding which is defined by alternating bands of quartz-albite and chlorite-muscovite-graphite which are aligned with the regional northwest-striking northeast-dipping schistosity.

South Fork Mountain is generally concordant with the structure of the underlying schist. The mica-schist is tightly folded into crenulations which in turn are broadly folded. Few in-place outcrops are found in the area but the overall foliation, as defined by fold axes, strikes northwest with a dip of approximately twenty-five degrees to the east.

The South Fork Mountain Schist *represents the dynamically metamorphosed equivalent of the Franciscan Formation to the west*. The schist structurally overlies moderately metamorphosed Franciscan graywakes and greenstones. The contact between them is lithologically gradational over a distance of 200 to 1000 feet. The schist evidently is the product of high pressures resulting from the Coast Range plate thrusting under the Klamath plate. The schist represents the Franciscan material which was locally dynamically metamorphosed along the thrust fault.

The Franciscan formation (also known as the Franciscan Assemblage includes altered volcanic rocks (greenstones), deep-sea cherts, greywake sandstones, limestones, serpentinites, shales, and high-pressure metamorphic rocks, all of them faulted and mixed.

Existing Mass Wasting Processes

The dominant mass wasting processes are debris flows, slides, and avalanches and rotational/translational landslides (figures 1, 2, 3 and 4 below). The Slides Glade landslide on the Mendocino National Forest is the largest mass wasting feature in the area at approximately 300 acres and two mile long

Debris slides and avalanches are generally confined to the shallow soil or colluvium zone. The basal failure surface commonly corresponds to the bedrock/soil interface and usually is no deeper than a few feet below the surface. There is a complete gradation from debris flow to debris slide to debris avalanche depending on water content, cohesion of material and slope steepness. Generally, debris slides have slump blocks at their head and the slide mass becomes more broken toward the foot of the slope. Movement rates are slow to moderate. In contrast, debris avalanches generally fail quite rapidly, with substantial disaggregation of the slide mass and some liquefying and water entrainment as the mass moves down slope.

Within the study area, debris slides and avalanches occur on slopes generally greater than sixty-five percent, generally along the margins of active drainages. They generally range from 10 to 1,000 cubic yards along second and third-order tributaries. Root support is very important in the stability of debris slide prone slopes. Failure planes are frequently shallow and well above the rooting depth of common forest vegetation. Therefore fire activity which destroys vegetation can be detrimental especially three to five years after the event as roots begin to decay.

Fire can have a significant effect on the occurrence of debris flows through disturbance of debris slide prone slopes leading to the increased occurrence of debris avalanches, increased peak discharges, culvert failures, and fill failures.

A valley inner gorge is defined as the unbroken slope adjacent to a stream channel which has a slope gradient of sixty-five percent or greater. Debris sliding and avalanching which are the dominant mass wasting processes in this zone are both the result of recent oversteepening of the valley inner gorge zone from stream incision and secondly the result of activation of rotational-translational slides which toe out in the inner gorge. Many active slides are present in this zone which, although occupying a minor portion of the total watershed area, contributes vast quantities of sediment to the rivers to the South Fork of Cottonwood Creek and Trinity River.

A tributary inner gorge is similar to the main inner gorge zone except on a smaller scale. Nearly all tributary streams within the study area have inner gorges. Debris slides and avalanches triggered by stream incision are primarily responsible for the formation of this zone. Additionally, debris torrents have contributed to the scouring of channels and undercutting of the channel banks.

The long-term effect of wildfire is often a decrease in slope stability. Tree mortality on steep slopes can lead to accelerated creep rates and increases in mass wasting. This is due to wetter conditions on these slopes due to lessened evapotranspiration and a loss of root strength from stump root decay. Healthy tree roots may increase soil shear strength two to four times and greatly increase slope stability by providing a continuous long fiber adhesive binder to the entire slope soil mass. Roots can also penetrate a shallow soil to reach into fractures and joints in bedrock, thereby anchoring the soil mass. This strengthening mechanism is lost within three to five years after timber is harvested.

The cumulative impact of wildfire on a particular area depends on slope, aspect, geology, soils, rainfall, and severity of burn. The net effect on long-term productivity in the more stable areas is probably minor, while in other areas the result can be a significant long-term decrease in site productivity.

Appendix F: Summary of Soils Findings (pending)

Appendix G: Summary of Fisheries Findings

BURNED AREA EMERGENCY RESPONSE
YOLLA BOLLY FIRES
FISHERIES SUMMARY

Prepared by: Donald Ratcliff – USDA Forest Service
Fisheries Biologist, Shasta-Trinity National Forest
22 September 2008

Trough Fire (Upper South Fork Trinity River Watershed)

Following the 1964 flood in the South Fork Trinity River, fish populations declined severely and continue to remain below pre-flood levels. The continued high rates of erosion and sedimentation are considered a major contributor to the depressed anadromous fish runs in the river basin. The SFTR has one of the highest sediment loads in northern California. The high sediment loads have been attributed to unstable geology, management activities, and storm activity. In 1994, the SFTR was added to the Clean Water Act §303(d) list for sediment impairment triggering the development of a Total Maximum Daily Load (TMDL) threshold for sediment that was completed in 1998. Anadromous fish currently found in the SFTR include Southern Oregon/Northern California Coast (SONCC) coho salmon (*Oncorhynchus kisutch*), spring-run Upper Klamath/Trinity River Chinook salmon (*O. tshawytscha*), fall-run Upper Trinity River Chinook salmon (*O. tshawytscha*), and Klamath Mountain Province Steelhead (*O. mykiss*). SONCC coho salmon are listed as threatened under the Endangered Species Act.

The Upper South Fork Trinity River watershed is designated SONCC coho salmon Critical Habitat and provides vital over-summer habitat for spring-run Chinook salmon and summer Steelhead. The primary area of emergency concern identified is the unnamed tributary watershed that lies between Rainbow and Trough ridges. This watershed is tributary to Schell Mountain Creek, which is then confluent with the South Fork Trinity River. Several areas of moderate to high severity burn were indentified along the minor tributaries and hillslopes that lie south of the tributary creek and north of Rainbow Ridge. We also observed steep slopes and historic hillslope instabiltity. This section shows a high potential to deliver sediment directly to the unnamed tributary creek, Shell Mountain Creek and eventually the South Fork Trinity River.

Straw mulching treatment areas were identified in the moderate and high burn severity areas north of Rainbow Ridge and south of the main unnamed tributary to Shell Mountain Creek (as described above). This treatment was developed by the soils specialist and fisheries concerns were incorporated into the design. It is recommended that all areas of appropriate slope that burned at moderate and high severity be treated. Treating these areas will address the majority of fine sediment source material. Erosion along untreatable steeper slopes is expected to occur, but will have a much lower impact to fish and aquatic resources as these areas consist of larger rock and limited fine sediments. After further examination treatable acres were not enough to warrant expenditures.

Yolla Bolly Wilderness Fires (South Fork Cottonwood Creek Watershed)

Based on field review and assessment, no immediate fisheries related treatments are proposed in this area. It is however recommended, that trail/stream intersections within the Yolla Bolly Wilderness be assessed and treated as needed to reduce the amount of sediment entering drainages.

Appendix H: Summary of Engineering Findings

BAER
Burned Area Emergency Response
Engineering Report

Justin Nettleton - USDA Forest Service.
Civil Engineer, Shasta-Trinity National Forests

Objectives: Evaluate the effect of the Yolla Bolly Complex fires on the Forest's infrastructure and the possible damage to the infrastructure, forest resources, and surrounding watershed due to increased runoff from burned slopes.

Issues: The issues of concern include current damage and the potential of damage caused by increased runoff. Engineering concerns include culvert blockage and failure, erosion of road surface and road bed, and road damage that poses a safety threat.

Observations:
A). Background information: The majority of the fire lies within the wilderness. The fire boundary encloses approximately 16.5 miles of forest roads with the majority of those roads are in the Trough fire area. Overall the roads are in decent shape but do not have adequate drainage structures to handle the increased runoff expected from the fire damage.

B). Reconnaissance Method: All reconnaissance was completed by vehicle and foot access. Areas of high/moderate burn severity and specific values were the priority for field survey.

C). Findings/Description of Emergency: The roads generally run along the top of the ridges and there is not much concern with runoff issues effecting the roads, with the exception of the 27N27 road which runs through the middle of the trough fire. There are a few drainage crossings along that road that could be a concern. Other concerns that where seen on the roads surveyed include:

- Concern of pipes plugging or overtopping and washing away fill (Figures 1 & 2).
- Erosion at pipe and dip outlets with no energy dissipaters (Figure 3).
- Stump holes in road bed and fill slopes (Figure 4 & 5).
- Open cat lines and decommissioned roads that could suffer erosion and pose a safety concern if not closed.
- Degradation of road surface drainage profile causing runoff to flow down the road.
- Lower water demand from burned vegetation and increased flows will likely increase seepage onto road surface at existing spring when water table is recharged (Figure 6).
- Berms and/or through cuts that channel water on road surface with inadequate drainage relief and erosion protection.

Treatment recommendations:
A). Management treatments:

27N27

- Construct rocked critical dip to accommodate overtopping and protect the road fills-5 ($13,500)
- Rock dissipater for outlets of shot gunned culverts- 3 ($2,400)

- Repair stump holes-6 ($1,800)
- Construct rocked rolling dip at spring location. ($1,200)
- Construct rolling dip above and/or below bermed sections-3. ($1,500)
- Note: Mobilization cost estimated at ~ $12,000.

27N27 and 27N02

- Storm Patrol including 1 day of snag removal for safety of patrol person, 5 days

of patrol, and 2.5 days of a backhoe and operator to fix any problems the patrol could not do with hand tools ($9,000)

B). Monitoring: Monitoring or storm patrol of roads the first 1-3 years after fire.

C). National Fire plan proposals, long term project proposals: Closure of roads in proposed areas for resource protection and to reduce damage to road surfaces during wet weather periods. Decommissioning segments of roadways to trails, that are no longer needed for administrative access or that have a high probability to contribute large amounts of sediment deposits into tributaries. Further evaluation and replacement of undersized culverts.

Consultations: Members of the BAER Assessment Team and regional engineering personal.

References: Best Management Practices booklet by the USDA Forest Service. (Author unknown at this time)

Appendix I: Summary of Recreation Findings

YOLLA BOLLA TRAILS BAER WORK 2008

US FOREST SERVICE MISSION

CARING FOR THE LAND
SERVING THE PEOPLE

A BRIEF HISTORY – the Yolla Bolla Wilderness is one of the oldest wilderness areas in California. From the beginning and before, the Yolla Bolla has been a stock oriented wilderness with as much stock use as hiker use.

From 1920 until 1987 there were no large fire areas in the wilderness.
In 1987 there were a number of fires in the wilderness. All were caught while still small, except the *Lazyman* and *Slides* Fires which were about 4,000 acres each.
In 1988 the *Hermit* Fire burned 10,000 acres, of which perhaps half was in the wilderness (in the Cedar Basin area).
There were two more fires in that same burned area in the 1990's – the *Rock* Fire and the *Rock 2* Fire.

In June of this year, after three light rainfall years in the Yolla Bolla - and the driest march and April on record - plus lots of wind all year …. A large lightning bust happened and started numerous fires in the wilderness area, and throughout the state. The lack of hand crews (only one hand crew on all the Yolla Bolla fires for weeks) led to numerous fires burning together and ultimately burning 90,000 acres of a 147,000 acre wilderness.

Thanks to a late season snow storm, a cool late spring, and an inversion layer that held most of the time over the fire, it was not a catastrophic fire. But due to the dryness of the last few years plus this one, the fire almost completely consumed old stumps and downed logs - but left lots of standing snags. Some, like those in the cedar basin area, have been through three to four fires. Others, this is their first.

As fire in the wilderness is a natural thing, the fire area in general is as it should be, and the public is taking the risk when they go off of the trails.

The trail system and the impacts of the fire on, and along it, are another thing.

There are two areas of concern regarding the trails system; public and employee safety, and the trail investment value. There are three major aspects that are impacting both safety and infrastructure - snags along the trail, burned out stump holes along the trail tread, and burned out water crossings.

As you can see in the pictures there are very dangerous snags along the trails, which create an ever present danger to whom ever is using or working on the trail below them.
Second, many stump holes have burned out completely, as much as 5 and 6 feet back under the trailbed. These are a hidden trap for hikers or horsemen to fall through, possibly breaking a leg - or worse. Third, the burned out stream crossings. This is the safety aspect.

As for the trail investment part - with winter coming on we are going to see these stump holes blow out and take the trail tread with them.

The fallen snags across the trails and blown out trail segments will make stock users and hikers alike go around these obstacles. This will increase the public's exposure to danger, and increase the soil

disturbance - which in turn will increase the erosion of these areas (hikers and horseman trying to navigate steep side hills and fallen snags outside of the trail corridor).

If a trail value is $20,000 to $30,000 per mile, and we have 60 miles of trail at risk, then we have 1.2 to 1.8 million dollars of trail system at risk. If we get one person killed because we left this hazard and did not make an attempt to fix it – we would be at risk, potentially in the multi-millions by a good lawyer--- let alone the fact that we killed someone because we walked away and left this situation.

THE FIX --- fall hazard snags along the trail corridor that will fall across the trail – leave the ones that will fall away from the trail. This will leave a more natural look and cost less money. Fix all stump holes that are dangerously close to, or under the trail tread. This would involve filling in the holes and stabilizing the tread on the outside.
Repair all fire damaged water crossings.

OPTIONS --- Fire crews with falling capabilities --- cost $6 - $9,000 plus / day.
Use pack strings to move crews in and out and supply them = 1/3 the cost of helicopters; and is more wilderness oriented. Also helps to re establish and define trail tread through burned areas.

PROBLEM--- fire crews may be on fires until season closes, or could get pulled in the middle of the project to go to fires. This option leaves cut stumps – and would need a blaster to take down the really bad trees.

Blaster and ccc crews --- ccc crews cost $18,000 dollars per 8 day spike (13 person crew) and this includes all food, camp gear, tools, and transportation = $2250 dollars per day. The forest blaster would cost about $500 dollars per day plus explosives – this would leave a more natural look along the trail.

COST BREAKDOWN

CCC crews – 10 spikes (8 days) x $18,000 per spike = $180,000
Blasting costs --- two blasters and explosives = $30,000
Falling costs for big trees = $10,000
Packing costs = $30,000

TOTAL – $250,000 dollars

HOW = packers will pack all crews and materials in to centrally located camps, and crews will work out of these in all directions. Then packers will move crews on to the next location. Blasters and fallers will work together, with some ccc crew assistance, to get snags on the ground and naturalize them. CCC crews will follow, removing logs across the trail and repairing burned out stump holes and water crossings.

The Yolla Bolla wilderness area is a rugged remote area. travel to the campsites will vary from trailhead camps at West Low Gap and Tomhead (which require 4 hours driving time), to backcountry camps at Lazyman, Chicago Camp, Frying Pan and Burnt Camp (which will require a 6-8 hour hike on top of the drive time listed, to arrive at base camp).

Camps at North Yolla Bolla, Saunders, Hawk Camp and Bear Creek would have 3-5 hour hikes to base camp. Forest Service packers would move in camps, supply, and move camps on to the next spot.

RESULTS = trails will be returned to safe and stable condition with the smallest amount possible, in terms of dollars spent.

As this fire will result in a major increase of use to this area by hunters (who are mainly stock users), this will also reduce our risk of public injury and resulting litigation.

WILDERNESS ACT 1964 --- STATEMENT OF POLICY

"FOR THIS PURPOSE THERE IS HEREBY ESTABLISHED A NATIONAL WILDERNESS PRESERVATION SYSTEM TO BE COMPOSED OF FEDERALLY OWNED AREAS DESIGNATED BY CONGRESS AS ' WILDERNESS AREAS', AND THESE SHALL BE ADMINISTERD FOR THE USE AND ENJOYMENT OF THE AMERICAN PEOPLE IN SUCH A MANNER AS WILL LEAVE THEM UNIMPAIRED FOR FUTURE USE AND ENJOYMENT AS WILDERNESS, AND SO PROVIDE FOR THE PROTECTION OF THESE AREAS"

KEN GRAVES
SEPT 22 2008

Appendix I: Summary of Cultural Resource Findings

HERITAGE RESOUCES MANAGEMENT ASSESSMENT FOR THE YOLLA BOLLY WILDFIRE (MNF-61-2008)

September 18, 2008

MENDOCINO NATIONAL FOREST

Description of Emergency:

On the morning of Saturday, June 21, 2008, a series of lightning strikes ignited several fires in northern California. The complex included several separate fires; some of which ended up burning together. The individual fires covered within this complex include the Iron, Grouse, Vinegar, Harvey, Slides, Boswell, Sugarloaf, Thomes, Burnout, Johnson, Sunflower, Rattlesnake, Soldier, Gilead, Yellow, Jacket, Camp, and Wash fires. Being that most of the fire activity on our forest was in the Yolla Bolly Wilderness, most control lines were put in by hand crews in stead of tractors. The fire includes lands managed by Shasta Trinity and Six Rivers National Forests as well as Mendocino National Forest. This report documents efforts to protect archaeological properties on Mendocino National Forest alone.

As of August 11, 2008 the fire had consumed approximately 86,000 acres. The fire burned primarily through the mixed conifer zone but also covered some chaparral and oak woodland vegetation zones. Much of the fire intensity was low as much of the Yolla Bolly Mountains have bare soil and rocky crags precluding fire ignition. Many of the smaller fires were never really staffed; however, the several fires within the Yolla Bolly Wilderness burned together, leaving three large fires in the complex: The Grouse, Yellow and Vinegar fires (see Map 1). These fires are primarily within the Wrights Ridge and Solomon Peak 7.5' quadrangles. They occupy numerous sections of land within Townships 25N and 26N and Ranges 9W-12W (Maps 2a-e).

The purpose of this report is to document efforts to protect and document cultural resources from both fire suppression activities (ie. fire line construction, safety zones, drop points, helipads, etc.) and from the effects of the fire itself. Fire effects on cultural resources are generally documented separately in the Burned Area Emergency Response (BAER) report. Both suppression and BAER assessments are documented in this report.

Heritage Resource BAER Assessment:

Based on the fire intensity maps (BARC) and the vulnerability of each site in the burned areas, it was decided that BAER treatments for cultural resources were unnecessary. The only potentially vulnerable site, the Flournoy Cabin remains, was inspected on a low level flight and found to be unburned.

There is one area between Upper Glade Camp and the Haynes Delight area where the Georges Trail crosses through a very hot portion of the fire. Proposed rehab treatments to the trail could potentially damage un-recorded archaeological remains. This area contains some potentially sensitive archaeological ground. It is recommended that a two-person archaeological crew survey that stretch of trail (approx. two miles) for cultural resources prior to implementation of trail water barring.

Recommendations:

The effects described above have likely resulted in the loss of information, and therefore, a loss of archaeological values that potentially could have contributed to the NHRP significance for many of these resources. However, none of these resources appeared to be eminently threatened by further

degradation due to erosion, storm runoff, debris flows, or a heightened risk of looting and/or unauthorized recreational access. Therefore, MNF Heritage Resource Management relays the following recommendations for the purposes of BAER assessment:

1) No BAER treatments are proposed for heritage resources within or directly adjacent to the Yolla Bolly Complex fires.

2) Locations where non-heritage related treatments are proposed will require review by MNF Heritage Resource Management prior to implementation. Heritage survey and site protection measures may also be required for proposed BAER treatment areas prior to implementation.

Compliance with Item No. 2 will ensure that any proposed BAER treatments within or adjacent to the Yolla Bolly Complex fires will have no effect on heritage resources.

Michael Dugas
Grindstone District Archaeologist
Sept 18, 2008

Appendix K: Summary of Botany Findings

BAER Specialist Report

Botany (Sensitive Plants, Threatened and Endangered Species and Noxious Weeds)
Fire Name: Yolla Bolly Complex
Month and Year: September 2008
Author(s) Name and Home Unit Name: Mike Friend, Plumas N.F., Beckwourth R.D.

I. RESOURCE CONDITION ASSESSMENT

A. Resource Setting:

This report addresses the portions of theYolla Bolly Complex that occurred on the Shasta-Trinity NF. Those portions of the complex that occurred on the Mendocino NF have been addressed by separate BAER team.

1. Sensitive Plants. There are six Sensitive Plant species known to occur within the areas affected by the Yolla Bolly Complex Fire. One of these, the clustered lady's slipper is also a Survey and Manage species.

2. Threatened and Endangered Species. There are no Threatened or Endangered plant species known to occur in the affected area.

3. Noxious Weeds. There are three species of noxious weeds rated by the California Department of Food and Agriculture (CDFA) known to occur in the affected area: Canada thistle (*Cirsium arvense*), bull thistle (*Cirsium vulgare*) and spotted knapweed (*Centaurea maculata*). All of these known occurrences are located outside of the fire perimeter but are along roads that access the fire area. They are considered to be a threat due to the possibility of their spread into the newly disturbed fire area. Areas disturbed by fire and dozers are highly susceptible to noxious weed invasion because competing native vegetation is removed.

   There is one known occurrence of the CDFA A-rated noxious weed, spotted knapweed along the Wild Mad road (forest road 30) which was used by suppression vehicles accessing the Trough and Vinegar Fires. Other noxious weeds likely to infest the fire area or the surrounding forest include star-thistle (*Centaurea solstitialis*), cheatgrass (*Bromus tectorum*), mullein (*Verbascum thapsus*). Cheatgrass is found in small amounts within the fire area. It is well documented that cheatgrass populations increase in area and density following fire. This species is not managed by the Shasta-Trinity National Forest because of its abundance in northern California and the lack of practical and effective treatment methods.

   A weed washing station was ordered on August 11. Prior to that date dozers had not been washed and may have brought weeds into the area. There is a potential for noxious weeds to be brought in and infest newly disturbed areas. Approximately 43 miles of dozer lines were constructed in the Yolla Bolly Complex.

II. EMERGENCY DETERMINATION

A. Sensitive Plants. There is no emergency for Sensitive Plants as a direct result of the fire. Only one species, the clustered lady's slipper (*Cypripedium fasciculatum*), is known from the burned area.

B. Threatened and Endangered Species. There are no Threatened or Endangered plant species known to occur in the affected area.

C. Noxious Weeds.
Value at Risk: Ecosystem Stability of Native Plant Communities, Wilderness, Late Successional Reserves
Priority Threats: Dozer line construction and noxious weed introduction
There is an emergency for noxious weeds. The fire created conditions conducive to the spread of the noxious weeds known to be within and adjacent to the fire area. Suppression activities have likely vectored noxious weed seed from one or more locations. Heavy equipment was not cleaned prior to coming to the National Forest during suppression activities until several weeks into the suppression effort. The equipment came from all over the State and had potential to bring in a variety of noxious weeds. Ecosystem integrity is at risk of being diminished as a result of new weed introductions and weed spread.

III. TREATMENTS TO MITIGATE THE EMERGENCY

A. Treatment Type

1.Surveys
The first 200 feet of dozer lines from their intersections with navigable roads should be surveyed in 2009. Survey the area around the known occurrence of clustered lady's slipper. Survey along Syd Cabin ridge to determine if the species of *Cynoglossum* species found there is the invasive hound's tongue.

2. Seeding and Mulching Treatments
Roadways are the primary conduit of noxious weed introduction as weed seeds and plant parts are carried on the tires and underbellies of vehicles. Noxious weeds are typically introduced closest to the road and spread along disturbed or suitable habitat if left unchecked. To discourage noxious weed introduction on constructed dozer lines and the interior of fires, intersections of dozer lines and travelable roads should be seeded with native seed and mulched with weed-free straw. Seeding and mulching the first 100 feet of dozer lines where they meet travelable roads should discourage noxious weed introduction, which should discourage spread further down individual dozer lines.

B. Treatment Objective. Detect new infestations while small enough to effectively eradicate and prevent the long-term establishment of new infestations. Eradicate new infestations to prevent the spread of noxious weeds beyond new detection sites. Prevent vectoring of weeds along roads. Protect Sensitive Plants and their habitats from the adverse effects of noxious weed infestations. Revegetate areas at high risk of noxious weed invasion with native species. Protect the native plant community in this relatively weed-free wilderness area.

C. Treatment Description. Conduct detection surveys in summer of 2009. Hand pull or dig all noxious weeds found if possible. Bag and properly dispose of seed heads. If any infestations are too large to pull at the time of discovery, request supplemental funding to return to the site with adequate resources to effectively control the invasives. Map inventory and control actions

and document in appropriate databases (NRIS, FACTS). Determine the need for further surveys to be done in 2010.

Survey Table

Fire Name	Miles of Dozer Line	Number of Dozer Line/Road Intersections	Dozer Line to Survey (First 1000 ft @ intersections)
Trough	unknown	14	280,000 sq ft = 6.4 acres
Vinegar	unkown	17	340,000 sq ft = 7.8 acres
TOTAL	43	31	620,000 sq ft = 14 ac.

Implement seeding and mulching in fall of 2008. Use native seed mix provided by Shasta-Trinity NF seed cache. Seeding the first 100 feet of all dozer lines that intersect with roads should be sufficient in most cases to discourage noxious weed introductions and encourage native plant species establishment. Weed-free mulch will facilitate native seed germination and growth and will suppress non-native seed germination.

Seeding and Mulching Table

Fire Name	Number of Dozer Line/Road Intersections	Treatment total @ **100** ft/ intersection	Safety Zone seeding treatment	TOTAL Acres
Trough	14	1400 ft = .7 ac.	2 acres	2.7
Vinegar	17	1700 ft = .8	2 acres	2.8
TOTAL	**31**	**3100 ft = 1.5 ac.**	**4 acres**	**5.5**

D. Treatment Cost.

Land Treatments	**Units**	**Unit Cost**	**# of Units**	**BAER $**
Seeding Dozer Lines and Safety Zones	acres	1200	5.5	$6600
Mulching Dozer Lines and Safety Zones	acres	725	5.5	$3988
TOTAL				**$10,588**
Monitoring				
Noxious Weed Detection Surveys on Dozer lines	Acres	80	14	1120
Noxious Weed Detection Surveys at Sefety Zones	Acres	80	4	320
TOTAL ALL LINE ITEMS				**$12,028**

Appendix L: Summary of Wildlife Findings

BAER SURVEY - WILDLIFE SPECIALIST REPORT

Resource Specialty: **Wildlife**

Fire Name: Yolla Bolla Complex (Vinegar and Trough Fires)
Month and Year: September 2008
Prepared by: Trish Johnson, Wildlife Biologist, Shasta-Trinity National Forest

I. Potential Values at Risk

Overview

The Yolla-Bolla Complex consists of several fires that burned primarily within the Upper Middle Fork Eel River and the South Fork Cottonwood Creek watersheds of the Yolla Bolla Wilderness in the south east portion of the Shasta-Trinity NF. The fires started during a lightning storm on June 21, 2008 and burned with varying intensity approximately 90,000 acres (34,200 acres on the Shasta-Trinity NF and 54,520 acres on the Mendocino NF). Elevations within the fire perimeter range from 3000 to 6500 feet. Habitat types within these areas include red fir and mixed-conifer timber in the upper elevations and hardwood/chapparal-manzanita brush habitat in the lower elevations.

Federally Endangered and Threatened and Forest Service Sensitive Species (TES)

Habitat exists for one Federally listed species and 17 Forest Service Sensitive species (as derived from the most recent Regional Forester's Sensitive Species list for Region 5 issued in April of 2004).
The following list includes those species for which habitat exists within the fire perimeter:

Federally listed as *Threatened*

- Northern spotted owl (*Strix occidentalis caurina*)

Federally listed as *Candidate*

- Pacific fisher (*Martes pennanti pacifica*); also a FS Sensitive species

Forest Service *Sensitive*

Mammals

- Pacific fisher (Martes pennanti pacifica)
- American marten (*Martes americana*)
- California wolverine (*Gulo gulo luteus*)
- pallid bat (*Antrozous pallidus*)
- Townsend's big-eared bat (*Corynorhinus townsendii*)
- western red bat (*Lasiurus blossevillii*)

Birds

- northern goshawk (*Accipiter gentilis*)

Reptiles

- northwestern pond turtle (*Clemmys marmorata marmorata*)

Amphibians

- Cascade frog (*Rana cascadae*)
- foothill yellow-legged frog (*Rana boylii*)

Invertebrates

- Shasta sideband snail (*Monadenia troglodytes troglodytes*)
- Wintu sideband snail (*Monadenia troglodytes wintu*)
- Shasta chaparral snail (*Trilobopsis roperi*)
- Tehama chaparral snail (*Trilobopsis tehamana*)
- Pressley hesperian snail (*Vespericola pressleyi*)
- Shasta hesperian snail (*Vespericola Shasta*)

II. Resource Condition Assessment

A. Resource Setting

The Vinegar and Trough fires impacted suitable habitat for the species listed above. Because these fires burned within a designated Wilderness Area, historical surveys have not been conducted in the area, and consequently very little baseline presence/absence data exists for these species. General statements as to the effects to these species and their habitats are made by using the presence of suitable habitat as a proxy for species presence/absence.

B. Findings

1. Resource Condition Resulting from the Fire

In general, these fires tended to burn in a mosaic pattern that left pockets of more severely burned areas within the areas that had been drier, more sparsely forested and brushy. Forested areas with higher canopy closure burned with less severity, resulting in “pockets” where the canopy is opened up but the surrounding stand is relatively intact. Forested areas where burn-out activities were conducted tended to burn much hotter, and consequently resulted in the destruction of the entire forest canopy. The remaining stands have not yet recovered their vegetative cover, but will eventually consist of early seral vegetation with the gradual re-introduction of coniferous species.

2. Consequences of the fire on values at risk

In general, remaining habitat will consist of openings of early seral vegetation with available cover within functional distances. The dramatic “green up” in many areas has much of the burned area already showing signs of use by multiple species. Upon field visits, sightings were made of the standard groups of species generally found within burned areas post-fire including; western bluebirds, acorn, hairy and white-headed woodpeckers, deer, nuthatches, black bear (sign) and western fence lizards.

In areas that burned with particular severity, mortality or injury may have occurred. However, it is unlikely that any detrimental, population-level effects occurred as a result of these fires, due largely to the generally slow-moving, mosaic nature of the burn pattern. Initial concerns were for a widespread loss of cover and forage leading to fragmentation. However, upon field review of the moderately and severely burned areas of these fires, it was determined that very few severely burned areas were large enough to render them unsuitable for use, due to a lack of cover, by most terrestrial and avian species.

The creeks and riparian areas within the burn area have the potential for increased debris flow, erosion and sedimentation as a result of the fire burning in adjacent hillsides during the rainy season. Some of the suitable habitat for the reptile and amphibian species associated with riparian habitat will have a temporary loss of thermal cover due to the loss of shrubs and herbaceous vegetation in the area. This may cause a temporary displacement of individuals and possible impacts into next year's neotropical migratory birds' nesting season. However, field reviews have indicated that riparian vegetation, particularly willow, has already begun to grow back within the burned areas. This will aid in the recovery of the riparian community and alleviate impacts from a loss of cover.

There is a general preponderance of snags throughout much of the burned area. Therefore, removal of snags within safety zones for trail and creek rehabilitation work is not a concern for species that rely on snag habitat. In addition, trees that were not immediately burned and killed, may have been exposed to enough heat, that damage to the root systems and/or cambium layer was sufficient to cause eventual mortality. This snag recruitment will likely occur over multiple seasons and will ensure an abundance of future snags.

III. Emergency Determination

No rehabilitation treatment emergency exists pertaining to the Federally listed or Forest Service Sensitive species or their habitats described above.

IV. Treatments to Mitigate the Emergency

Recommended treatments based on assessments by geologists, hydrologists and soil scientists for the area are sufficient to the biological resources described above. Removal of snags within safety zones for trail and creek rehabilitation work is not a concern for the TES species present in the area.

V. References

Agee, James K. 1993. Fire Ecology of Pacific Northwest Forests. 1st ed.Island Press.

Brown, R.T., J.K. Agee, and J.F. Franklin. 2004. Forest Restoration and Fire: Principles in the Context of Place. Conservation Biology. 18: 903-912.

California Natural Diversity Database. 2006. RareFind 3, Version 3.1. Sacramento, CA: California Department of Fish and Game.

Gray, A.N. and J.F. Franklin. 1997. Effects of multiple fires on the structure of southwestern Washington forests. Northwest Science: vol 71.

Landram, Mike and Ray Hermit. 1996. Forest Structure and Fire Hazard. Seventeenth Forest Vegetation Management Conference. (no. 17) p. 104-113.

Rosenberg, K.V. and M.G. Raphael. 1986. Effects of forest fragmentation on vertebrates in Douglas-fir forests. In: Verner, J., Morrison M.L., C. Ralph (eds). *Wildlife 2000: Modeling habitat relationships of terrestrial vertebrates.* Madison, Wisconsin: Univ. of Wisconsin Press. p 263-72.

USDA Forest Service. 1995. Land and Resource Management Plan for the Shasta-Trinity National Forest.

USDA, Forest Service. 1998. Regional Forester's Sensitive Species List. Pacific Southwest Region. Revised 2004.

USDA Forest Service. 2001. Record of decision and standards and guidelines for amendments to the survey and manage, protection buffer, and other mitigation measures standards and guidelines. Portland, OR. January 2001.

USDI Fish and Wildlife Service. 2008. Revised Recovery Plan for the Northern Spotted Owl. Final Draft. Portland, Oregon: U.S. Department of the Interior. 2 Volumes.

Zielinski, W.J., R.L.Treux, , F.V. Schlexer, K.N. Schmidt and R.H. Barrett. 2004. Home range characteristics of fishers in California. Journal of Mammology (85)649-657.

Zielinski, W.J., R.L. Truex, G. Schmidt, R. Schlexer, K.N. Schmidt, and R.H. Barrett. 2004a. Resting habitat selection by fishers in California. Journal of Wildlife Management (68)475-492.

Appendix L: Summary of Cost-Risk Analysis

Yolla Bolly Complex Benefit Cost Analysis:

Total benefits of resource:

Resource	Value $
roads	$300,000
wilderness trails	$750,000
native plants	$300,000
archelogical sites	$80,000
water quality	$100,000
aquatics/fisheries	$500,000
soil productivity	$25,000
public safety	$100,000

Proability of loss without and with treatments:

Resource	Proability loss no treatments:	Proability loss w/ treatments:	Reduction in proability of loss
roads	80%	10%	70%
wilderness trails	90%	30%	60%
native plants	70%	25%	45%
archelogical sites	50%	25%	25%
water quality	75%	50%	25%
aquatics/fisheries	70%	50%	20%
soil productivity	85%	35%	50%
public safety	85%	15%	70%

Total cost of treatments:

A. Land Treatments							
Handmulching	ac	725	5.5	$3,988		$0	$3,988
Grass seeding	ac	1200	5.5	$6,600		$0	$6,600
Nx weed detection	ac	80	60	$4,800	70	$5,600	$10,400
Subtotal Land Treatments				$15,388		$5,600	**$20,988**
B. Channel Treatments							
none				$0		$0	$0
Subtotal Channel Treat.				$0		$0	**$0**
C. Road and Trails							
Road stormproofing	job	32400	1	$32,400		$0	$32,400
Road stormpatrol	day	1800	5	$9,000		$0	$9,000
Trail stormproofing	mi	4600	32	$147,200	4.3	$19,780	$166,980
Trail storm patrol	mi	950		$0	3	$2,850	$2,850
Subtotal Road & Trails				$188,600		$22,630	**$211,230**
D. Protection/Safety							
Closure/safety signs	ea	175	25	$4,375		$0	$4,375
Subtotal Structures				$4,375		$0	**$4,375**
E. BAER Evaluation							
Assessment team	ea			$35,000			$35,000
Subtotal Evaluation				$35,000			**$35,000**
F. Monitoring							
Road treatment monit.	ea	1000	1	$1,000		$0	$1,000
Trail monitoring	ea	2000	1	$2,000		$0	$2,000
				$3,000		$0	**$3,000**
							$274,593

Benefit of treatments:

Resource	Value $	Reduction in proability of loss
roads	$300,000	70%
wilderness trails	$750,000	60%
native plants	$300,000	45%
archelogical sites	$80,000	25%
water quality	$100,000	25%
aquatics/fisheries	$500,000	20%
soil productivity	$25,000	50%
public safety	$100,000	70%

Benefit/cost ratio:

Resource	Benefit of treatment	Treatment Cost	B/C ratio	Justified
roads	$210,000	$42,300	5.0	yes
wilderness trails	$450,000	$170,000	2.6	yes
native plants	$135,000	$21,000	6.4	yes
public safety	$70,000	$4,375	16.0	yes
water quality	$25,000	$252,000	0.1	no
aquatics/fisheries	$100,000	$252,000	0.4	no
soil productivity	$12,500	$252,000	0.0	no

Appendix M: Summary of Values at Risk and Emergency (Shasta-Trinity N.F.)

Value at Risk	Emergency U%(yes/no)T%			Reason	Treatment
Trough Fire:					
Rainbow R, soil erosion	75	M	35	Burned hillslopes	Helimulching possibility*
Rainbow R, mass wasting	100	Y	70	Burned hillslopes	Helimulching possibility*
Fish habitat -S. Fork Trinity	70	M	50	Burned hillslopes	Helimulching possibility*
27N24A culverts	-	N	-	Undersized culverts	None
27N27 culverts	60	Y	10	Undersized culverts	Critical dips
27N27 road-fill burnouts	80	Y	10	Burned out stumps - fill	Fill and compact
Trough Ridge heritage site	50	N	25	Burned – has cover	Adequate cover – natural recov.
Big Hunter heritage site	50	N	25	Burned – has cover	Adequate cover – natural recov.
Noxious weed det. survey	70	Y	30	Weed invasion detect.	Detection survey
Fireline – road cx treat.	75	Y	25	Weed invasion potent.	Seed and mulch
Vinegar Fire:					
Trail Erosion	85	Y	30	Hillslope erosion	Trail water-bars
Trail crossings	90	Y	30	Increased streamflows	Armor streamcrossings
Trail burn-outs	95	Y	25	Risk to travelers	Fill burnouts
Hazard trees	90	Y	30	Risk to travelers	Fall hazard trees
1 cultural site W. Low Gap	80	M	15	Exposed sites	Cover with mulch
1 cultural site Chicago C.	80	M	15	Exposed sites	Cover with mulch
Noxious weed det. survey	70	Y	30	Weed invasion detect.	Detection survey
Fireline – road cx treat.	75	Y	25	Weed invasion potent.	Seed and mulch
U% - untreated; T% - treated; Where Y = yes, M = maybe, and N = no, * = treatable acres were too low to justify cost					