United States
Department of
Agriculture

Forest
Service

**Southwestern
Region**

Wallow Fire 2011

Large Scale Event Recovery

Rapid Assessment Team

Watershed Report

Apache-Sitgreaves National Forests

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R3 NEPA Team Hydrologist
Apache-Sitgreaves National Forests, July 29, 2011

Part 1 – Summary of Event

The Wallow Fire started May 29, 2011, at the height of the Apache-Sitgreaves National Forests fire season, a time of year when strong southwest winds and low humidities are prevalent and frequent. The 2011 fire season was intensified by the combination of a lack of 2010-11 winter precipitation, and high loading of fine grass fuels remaining from the previous year. Combine this with forest and range vegetation well outside the historical range of variability for fuel conditions and the stage was set for uncharacteristic fire intensity and severity. The strong winds and extremely low fuel moistures resulted in mainly wind driven fire behavior, with the Wallow Fire making large gains within the first days of its' origin. Highlighting the severe fire conditions this spring, the Wallow fire burned over 535,000 acres in approximately 5 weeks, while during the last 25 years, acres burned on the Apache-Sitgreaves National Forests from both planned and unplanned ignitions totaled 581,000 acres. (Judy Palmer, ASNFs FMO, 2011)

Part 2 – Post-Event Conditions

The 2011 Wallow fire burned 557,686 acres. The post-fire (post-event) conditions have the following land ownership makeup:

ownership	ac	%
ASNF	504423	90.4
NewMexico	16409	2.9
WhtMntApch	12962	2.3
Private	10265	1.8
SanCarlosIR	9118	1.6
StateLandTrst	2850	0.5
Game&Fish	1659	0.3
	557686	100

This report will address watershed conditions using data that can be found in the 2011 Wallow Wildfire BAER Soil Resources Report and the 2011 Wallow Wildfire BAER Hydrology Report that can be found on the Forest Service O-drive. (O:\NFS\ApacheSitgreaves\Program\2500WatershedAirMgmt\2520WatershedProtectionMgmt\SO\2520-3 BAER\WallowBAER\Assessment\Final Resource Reports)

This report also uses GIS data developed by the Wallow Fire BAER team and can be found on the Forest Service T-drive. T:\FS\NFS\ApacheSitgreaves\Project\ALP\WallowFire\GIS\BAER

Field visits to the Wallow fire area were conducted by the BAER hydrology and soil teams for the period June 16 - 30, 2011. Field reconnaissance consisted of aerial inspection via helicopter, on-site inspection of potential values at risk, and field inspections of watershed conditions.

The BAER soil team used a BARC map, TEUI, and the Forest Service Watershed Erosion Prediction Project (FS WEPP) modules to predict post-fire erosion rates. Soils on slopes of over 40 percent, which encompass 48 percent of the burned area, and soils derived from volcanic sediment parent materials have the potential for high erosion rates and potential mass wasting. Other soils of concern are soils with a soil hydrologic group classification of D. They comprise 64 percent of the burned area. Soils in hydrologic group D are typically shallow over bedrock and/or contain a high clay content. These soil characteristics indicate a high potential for runoff. The BAER Soil Resources Repost predicted/modeled a pre-fire erosion rate of 3.6 tons/ac/yr and a post-fire 7.2 tons/ac/yr. A further discussion of soil methodology can be found in the 2011 Wallow Fire BAER Soil Report.

Modeling of watersheds for predicting expected flow increases was accomplished using two runoff predictions models (Wildcat5 and HEC-HMS). Flow post-fire flow with <50% burn ac showed a 200% increase over pre-fire, post-fire flow with >50% moderate & severe burn severity showed a 400% increase over pre-fire. SubHuc6s with greater slopes will produce larger erosion rates and flows than those subHuc6s with lesser slopes. The subHuc6s likely to show greatest response to precipitation events can be easily identified using existing BAER data.

Further discussion concerning models can be found in the 2011 Wallow Fire BAER Hydrology report.

The following table shows the Huc6s (6th-code watershed) with their Huc4 and Huc5 source affected by the Wallow Fire, this data is also displayed as a map in the appendix. The map will show a further delineation based on the following moderate+high severities: low <20%, moderate 20-24%, high 25-34%, very high 35-44%, and extreme >44%

Basin, Watershed, Subwatersheds	Burn Severity (acres)					acres	acres	acres	% high & moderate severity burn
	High	% high severity burn	Moderate	% moderate severity burn	Low	Unburned	Water	Grand Total	
Black River (4)	**43,758**	**17.7%**	**30,001**	**12.2%**	**126,965**	**45,443**	**748**	**246,915**	29.9%
Middle Black River (5)	**4,801**	**8.8%**	**5,749**	**10.5%**	**30,017**	**13,981**		**54,547**	19.3%
Bear Wallow Creek (6)	2,482	**16.3%**	1,895	**12.5%**	5,677	5,159		15,213	28.8%
Pacheta Creek (6)	4	**0.1%**	207	**3.3%**	3,917	2,239		6,366	3.3%
Reservation Creek (6)	102	**2.1%**	432	**8.7%**	3,543	898		4,975	10.7%
Snake Creek-Black River(6)	2,134	**11.4%**	2,294	**12.2%**	10,597	3,710		18,736	23.6%
Yellow Pine Tank-Black River(6)	79	**0.9%**	921	**9.9%**	6,282	1,975		9,258	10.8%
Upper Black River (5)	**38,958**	**20.3%**	**24,252**	**12.6%**	**96,948**	**31,462**	**748**	**192,368**	32.9%
Bear Creek-Black River(6)	5,573	**38.6%**	1,587	**11.0%**	6,440	845		14,445	49.6%
Boneyard Creek (6)	2,488	**18.7%**	2,207	**16.6%**	6,340	2,250		13,285	35.3%
Centerfire Creek (6)	1,604	**9.0%**	2,464	**13.9%**	11,068	2,640		17,776	22.9%
Coyote Creek (6)	3,535	**33.7%**	1,381	**13.1%**	4,088	1,499		10,503	46.8%
East Fork Black River (6)	2,204	**11.9%**	3,436	**18.6%**	10,186	2,641		18,467	30.5%
Fish Creek (6)	7,640	**46.6%**	2,423	**14.8%**	3,821	2,494		16,378	61.4%
Lower Beaver Creek (6)	3,842	**22.9%**	1,250	**7.4%**	9,941	1,777		16,811	30.3%
Lower West Fork Black River (6)	3,989	**23.4%**	1,972	**11.5%**	7,939	3,182		17,083	34.9%
North Fork East Fork Black River (6)	847	**2.9%**	1,831	**6.2%**	18,939	7,024	748	29,388	9.1%
Upper Beaver Creek (6)	4,215	**17.6%**	3,226	**13.5%**	13,631	2,822		23,893	31.1%

Upper West Fork Black River (6)	3,021	**21.1%**	2,475	**17.3%**	4,554	4,289		14,340	38.3%
Little Colorado River Headwaters (4)	**22,345**	**18.3%**	**20,737**	**17.0%**	**51,620**	**27,143**	**191**	**122,036**	35.3%
Canero Creek-Little Colorado River (5)		**0.0%**		**0.0%**	**2**	**9**		**11**	0.0%
Ellis Wiltbank Reservoir (6)		**0.0%**		**0.0%**	2	9		10	0.0%
Coyote Creek (5)	**695**	**27.9%**	**450**	**18.1%**	**424**	**920**		**2,490**	46.0%
Canovas Creek-Coyote Creek (6)	692	**2.1%**	419	**1.3%**	320	849		32466	3%
Pratt Lake (6)	4	**1.9%**	31	**14.8%**	104	71		210	16.7%
Nutrioso Creek (5)	**16,458**	**24.5%**	**11,053**	**16.5%**	**23,573**	**16,026**		**67,109**	41.0%
Auger Creek (6)	2,669	**37.2%**	1,088	**15.2%**	2,225	1,197		7,179	52.3%
Colter Creek (6)	2,367	**25.7%**	1,930	**20.9%**	3,944	984		9,225	46.6%
Dry Lakes-Nutrioso Creek (6)		**0.0%**		**0.0%**	941	2,270		3,210	0.0%
Paddy Creek-Nutrioso Creek (6)	4,245	**31.2%**	2,695	**19.8%**	4,682	1,986		13,608	51.0%
Picnic Creek-Nutrioso Creek (6)	100	**3.1%**	304	**9.6%**	1,241	1,535		3,180	12.7%
Riggs Creek-Nutrioso Creek (6)	3,323	**25.6%**	2,087	**16.1%**	4,294	3,268		12,972	41.7%
Rudd Creek (6)	3,754	**21.2%**	2,949	**16.6%**	6,246	4,786		17,735	37.8%
South Fork Little Colorado River-Little Colorado River (5)	**5,191**	**9.9%**	**9,234**	**17.6%**	**27,621**	**10,189**	**191**	**52,427**	27.5%
East Fork Little Colorado River (6)	1,096	**18.2%**	800	**13.3%**	3,191	946		6,033	31.4%
Fish Creek-Little Colorado River (6)	0	**0.0%**	19	**0.8%**	1,733	771		2,523	0.8%
Grapevine Creek-Little Colorado River (6)	1,169	**12.1%**	1,974	**20.4%**	3,186	3,352		9,681	32.5%
Hall Creek-Little Colorado River (6)	711	**14.2%**	419	**8.4%**	3,464	422		5,016	22.5%
South Fork Little Colorado River (6)	1,586	**9.8%**	4,358	**26.9%**	9,006	1,070	191	16,212	36.7%
Water Canyon Creek (6)	384	**3.8%**	1,204	**11.9%**	5,448	3,078		10,113	15.7%
West Fork Little Colorado River (6)	245	**8.6%**	461	**16.2%**	1,593	549		2,848	24.8%

San Francisco River (4)	**19,053**	**11.6%**	**21,922**	**13.4%**	**74,062**	**48,649**		**163,685**	25.0%
Centerfire Creek-San Francisco River (5)	**5,020**	**10.9%**	**4,464**	**9.7%**	**22,947**	**13,624**		**46,056**	20.6%
Outlet Centerfire Creek (6)	0	**0.0%**	340	**13.0%**	1,456	813		2,609	13.0%
San Francisco River-Luna Lake (6)	3,665	**24.6%**	1,695	**11.4%**	6,009	3,532		14,900	36.0%
Stone Creek-San Francisco River (6)	1,075	**4.7%**	1,857	**8.2%**	12,800	6,969		22,702	12.9%
Trout Creek (6)	280	**4.8%**	573	**9.8%**	2,682	2,310		5,845	14.6%
Lower Blue River (5)	**55**	**2.8%**	**91**	**4.6%**	**100**	**1,741**		**1,987**	7.3%
Oak Creek-Blue River (6)		**0.0%**		**0.0%**		358		358	0.0%
Strayhorse Creek (6)	55	**3.4%**	91	**5.6%**	100	1,384		1,629	9.0%
Upper Blue River (5)	**13,978**	**12.1%**	**17,367**	**15.0%**	**51,015**	**33,283**		**115,643**	27.1%
Campbell Blue Creek (6)	6,637	**20.9%**	5,488	**17.3%**	14,371	5,220		31,716	38.2%
Centerfire Creek-Blue River (6)	22	**0.3%**	184	**2.6%**	2,394	4,584		7,185	2.9%
Coleman Creek (6)	4,616	**38.9%**	1,572	**13.3%**	5,281	391		11,859	52.2%
Dry Blue Creek (6)	297	**8.4%**	289	**8.1%**	2,710	258		3,554	16.5%
Foote Creek (6)	392	**3.4%**	1,172	**10.1%**	4,596	5,446		11,606	13.5%
Grant Creek (6)	293	**2.3%**	1,439	**11.4%**	3,544	7,389		12,664	13.7%
KP Creek (6)	774	**6.5%**	3,399	**28.6%**	6,099	1,632		11,904	35.1%
Raspberry Creek-Blue River (6)	947	**4.4%**	3,813	**17.6%**	10,570	6,362		21,693	21.9%
Steeple Canyon-Blue River (6)	0	**0.0%**	13	**0.4%**	1,450	2,000		3,463	0.4%
Upper Gila River-San Carlos Reservoir (4)	**959**	**6.4%**	**975**	**6.5%**	**4,703**	**8,412**		**15,048**	12.9%
Upper Eagle Creek (5)	**959**	**6.4%**	**975**	**6.5%**	**4,703**	**8,412**		**15,048**	12.9%
Dry Prong Creek (6)	777	**8.2%**	431	**4.6%**	2,315	5,948		9,471	12.8%
East Eagle Creek (6)	182	**3.3%**	544	**9.8%**	2,387	2,464		5,577	13.0%
Grand Total	**86,115**	**15.7%**	**73,634**	**13.4%**	**257,349**	**129,647**	**939**	**547,684**	29.2%

This report recognizes the potential need for changed-condition-assessments which will provide project-level baseline data for the various Forest resource program areas.

Part 3 – Recovery Objectives

Recovery objectives are most effectively delineated by the following timeframes: a) emergency actions, 0-2-yrs, post fire; b) 1-3 year actions; and c) 3-10 year actions.

Emergency actions include those actions that can be initiated with a decision memo or a categorical exclusion. Emergency actions that address occupancy and use of those homes/roads/areas where warnings are needed. Many of these areas have been identified and treatment has begun in all of the rural interface communities (Greer, Eager, Nutrioso, and Alpine) using BAER data/funding/personnel. Other areas will be indentified and treated as ongoing field surveys and storm patrols indentify areas in need of treatment. This report recommends a Hydrology team be funded and deployed to conduct a detailed storm response model to each of the communities (Greer, Eager, Nutrioso, and Alpine). This team at a minimum should include a Forest Service Hydrologist and a Forest Service Rocky Mountain Research Station Hydrologist. Hopefully, this team would also include a USGS representative and a research/state/county/municipality representative. This report recommends that LaSER funds pay for the Rocky Mountain Research Station staff. It is expected this team would require 3-months to produce a representative hydrologic model for each of the 4 communities that would show channel response for a 2, 5, 10, & 25 year precip event. Further each community model effort would include a >50% Huc7 burn model and a <50% Huc7 burn model. This data would be presented in multiple visual formats for each of the communities at public meetings and displayed in public venues.

1-3 year actions would include those actions that require an EA/EIS or changed-condition-assessments. 1-3 year actions should include timber salvage opportunities, channel and upland stabilization. This report recommends the hire of a GS-7/9/11 Hydrologist for a 3-year period. The hydrologist (or a Forest Hydrologist moved into this position and filled by the new hire) would be used for: ongoing implementation and emergency response, NEPA support for salvage and other resource projects, and salvage planning, implementation, changed-condition-assessments, and monitoring. The argument for an additional 3-year term Hydrologist hire is current Forest Hydrologists is needed support for essential program management (water-rights, 4FRI, and WMS).

3-10 year actions will include continued channel & upland stabilization and support for other projects that come on-line. There will continue to be ongoing stabilization and/or repair of forest resources requiring watershed input and support.

PART 4 – Descriptions of Actions

0-2 years

Cost Summary Table, 0-2 years

ID #	Category	Priority (S, H, M, or L)	Potential Action	Unit (Acres, miles, etc.)	# of Units	Current year cost FY 12
1	14	H	seeding	9000 ac	3	$765000
2	14	S	mulch	3900 ac	2	$2,925,000
3	7	H	Riparian planting & channel structures	100 ac	4	$210,000
4	7	H	Bank stabilization	150 units	3	$375,000
5	7	H	Channel restoration	11 miles	4	$660,000
7	23	S	GS-11 FS Hydrologist salary, equip/supplies	1	1/4	$39,945
8	23	S	GS-12 RMRS FS Hydrologist salary	1	1/4	$43,470
9	23	H	Hydrologist equip/supplies	1 year	3	$8200
9	23	H	Watershed monitoring equipment			$53,500
11	6	S	Municipal watershed restoration	1	4	$200,000
12	14	S	GS-7 Helitak	1	1 month	$11390
13	14	S	GS-12 or equivalent mulch COR	1	1 month	$16215
14	23	H	NEPA			$100,000
					total	$4,407,720

Action Description: *Describe the details of the activity or treatment, such as what, where, when, how, how much, etc.* Seed areas identified as needing initial and retreating, 9000 ac x $85/ac = $765,000 Contact T&E program areas for location
Which resource or issue area(s) does it address? Watershed stabilization

How does the action relate to damage or changes caused by the event? *Describe the goal of the activity, why the activity or treatment is proposed, how it meets the recovery objective (as described in Part 3), its purpose, and to what degree it is expected to be effective.* Seeding and re-seeding of those areas identified as needing seed. Seeding success is greatest on gentle slopes (slopes less than 45-degrees).
What are the consequence(s) of not implementing the action? Unseeded & bare soils will produce greater erosion rates
What is the cost of the action? Why is the action reasonable, within policy, and cost effective? *Describe the unit costs and explain why the activity or treatment is worth the investment.* Post fire years 3&4 may not need seeding, monitor for determination, seeding promotes a healthy grass component which improves watershed response. It is cost effective if: 2^{nd} –year seeding response returns the 9000-ac erosion post-fire rate from 7.2 tons/ac/yr to the pre-fire rate of 3.2 tons/ac/yr this would result in: 7.2 – 3.6 = 3.6 ; 3.6 tons/ac x 9000 ac = 32,400 tons less into the watershed drainages. This is a significant reduction in potential erosion.

Action Description: *Describe the details of the activity or treatment, such as what, where, when, how, how much, etc.* Mulch, 3900 ac ($750/ac x 3900 ac = $ 2,925,000) in the post fire year-1, mostly high severity burn area located to critical rural-interface and needy resources. Contact resource areas for excess mulch placement
Which resource or issue area(s) does it address? Soil and upland health
How does the action relate to damage or changes caused by the event? *Describe the goal of the activity, why the activity or treatment is proposed, how it meets the recovery objective (as described in Part 3), its purpose, and to what degree it is expected to be effective.* Mulching can provide CNs ranging from 80 to 50 depending on slope, reduces post-fire peak flows response to precip events
What are the consequence(s) of not implementing the action? Post-fire peak flows remain high & induce erosion without mulch
What is the cost of the action? Why is the action reasonable, within policy, and cost effective? *Describe the unit costs and explain why the activity or treatment is worth the investment.* $750/ac. Mulching reduces post-fire peak flows & stabilizes upland soils

Action Description: *Describe the details of the activity or treatment, such as what, where, when, how, how much, etc.* Riparian planting & channel structures in those areas identified most needed. 100ac/$210,000. Contact T&E program areas for locations
Which resource or issue area(s) does it address? Riparian & flood plain function.
How does the action relate to damage or changes caused by the event? *Describe the goal of the activity, why the activity or treatment is proposed, how it meets the recovery objective (as*

described in Part 3), its purpose, and to what degree it is expected to be effective. These plantings & structures will improve riparian function. Likely 80% success rate if properly located with hydrologic support
What are the consequence(s) of not implementing the action? Flood plain will be less likely to absorb post-fire peak flows
Action Description: Describe the details of the activity or treatment, such as what, where, when, how, how much, etc. Hydrologist; if supplies have not been purchased for the 3-month Hydro detail this will be a one-time cost $300 GPS + $200 camera + $200 hardhart/tape/rod = $700 ; needed for & used for NEPA, salvage, road, watershed, assessment, & monitor support. Also, vehicle needed, $325/mo/($0.35/mi @ 1000mi) = $625/mo 12mo = $625 x 12 = $7500 Year 1 (FY 12) $8200
Which resource or issue area(s) does it address? NEPA, salvage, road, watershed, monitoring, & changed-condition assessment.
How does the action relate to damage or changes caused by the event? Describe the goal of the activity, why the activity or treatment is proposed, how it meets the recovery objective (as described in Part 3), its purpose, and to what degree it is expected to be effective. This equipment is needed to conduct assessment & monitoring. 100% effective.
What are the consequence(s) of not implementing the action? Forest Hydrologists will be unable to give full attention to existing and expected jobs.
What is the cost of the action? Why is the action reasonable, within policy, and cost effective? Describe the unit costs and explain why the activity or treatment is worth the investment. GPS & camera will carry over to existing Forest needs

Action Description: *Describe the details of the activity or treatment, such as what, where, when, how, how much, etc.* Bank stabilization, placing structures that increase stabilization on those reaches indentified by resource specialists. 150 structure units/$375,000 = $2500/unit. Contact T&E program areas for locations
Which resource or issue area(s) does it address? Riparian function
How does the action relate to damage or changes caused by the event? *Describe the goal of the activity, why the activity or treatment is proposed, how it meets the recovery objective (as described in Part 3), its purpose, and to what degree it is expected to be effective.* Properly placed structures will increase riparian resiliency to post-fire flows. If properly located will be 80% effective**.**
What are the consequence(s) of not implementing the action? Channel will down-cut and/or widen making a dysfunctional flood plain and dysfunctional riparian area

What is the cost of the action? Why is the action reasonable, within policy, and cost effective? *Describe the unit costs and explain why the activity or treatment is worth the investment.* 150units/$375,000/year for a 3-year total of $1,125,000. Actions that promote/improve riparian function are needed to withstand the larger post-fire flow regimes.
Action Description: *Describe the details of the activity or treatment, such as what, where, when, how, how much, etc.* Channel stabilization, 11-miles/$660,000 = $60,000/mile. Contact T&E program areas for locations
Which resource or issue area(s) does it address? Flood plain function
How does the action relate to damage or changes caused by the event? *Describe the goal of the activity, why the activity or treatment is proposed, how it meets the recovery objective (as described in Part 3), its purpose, and to what degree it is expected to be effective.* Properly placed structures will increase riparian resiliency to post-fire flows. If properly located will be 80% effective.
What are the consequence(s) of not implementing the action? Channel will down-cut and/or widen making a dysfunctional flood plain dysfunctional riparian area
What is the cost of the action? Why is the action reasonable, within policy, and cost effective? *Describe the unit costs and explain why the activity or treatment is worth the investment.* ASNFs cannot afford to lose any riparian reaches, if placed with hydrologist support the stabilization actions will be very effective and promote riparian health
Action Description: *Describe the details of the activity or treatment, such as what, where, when, how, how much, etc.* GS-11 Forest Service Hydrologist salary needed for 3-months to conduct detailed post-fire flow models for the 4 communities. GS-11 Hydrologist salary $300/day x 90 days = $27,000 ; per diem/lodging = $123 x 90 days = $11,070 ; supplies/equipment = $300 GPS + $200 camera + $200 hardhat/tape/survey rod = $700 ; truck = $625/mo x ($0.35/mi for 1000 mi/mo) x 3 mo = $1875 Total for GS-11 = $39,945
Which resource or issue area(s) does it address? Public safety will be increased given detailed channel response modeling.
How does the action relate to damage or changes caused by the event? *Describe the goal of the activity, why the activity or treatment is proposed, how it meets the recovery objective (as described in Part 3), its purpose, and to what degree it is expected to be effective.* BAER did not have time to produce detailed channel response to post-fire flows for the communities. This effort should at a minimum be teamed with a GS-12 Forest Service Rocky Mountain Research Station staff and hopefully joined by a USGS staff and a

researcher/state/county/municipality staff. Model information will be presented and displayed to each of the communities. This will increase public awareness and safety.
What are the consequence(s) of not implementing the action? Communities will perceive federal lack of ownership in post-fire flows and thereby appear disconnected.

Action Description: *Describe the details of the activity or treatment, such as what, where, when, how, how much, etc.* GS-12 Forest Service Rocky Mountain Research Station Hydrologist salary needed for 3-months to conduct detailed post-fire flow models for the 4 communities. GS-12 Hydrologist salary $360/day x 90 days = $32,400 ; per diem/lodging = $123 x 90 days = $11,070 ; supplies (truck & equipment would be shared with the Hydro) a hardhat would be needed = $100 Total for GS-12 = $43,470
Which resource or issue area(s) does it address? Public safety will be increased given detailed channel response modeling.
How does the action relate to damage or changes caused by the event? *Describe the goal of the activity, why the activity or treatment is proposed, how it meets the recovery objective (as described in Part 3), its purpose, and to what degree it is expected to be effective.* BAER did not have time to produce detailed channel response to post-fire flows for the communities. This effort should at a minimum be teamed with a GS-11 FS Hydrologist and hopefully joined by a USGS staff and a researcher/state/county/municipality staff. Model information will be presented and displayed to each of the communities. This will increase public awareness and safety.
What are the consequence(s) of not implementing the action? Communities will perceive federal lack of ownership in post-fire flows and thereby appear disconnected.
What is the cost of the action? Why is the action reasonable, within policy, and cost effective? *Describe the unit costs and explain why the activity or treatment is worth the investment.* 3-month GS-11 & GS-12 total salary of $83,415 is reasonable to increase public awareness & safety

Action Description: *Describe the details of the activity or treatment, such as what, where, when, how, how much, etc.* GS-12 (or equivalent) mulch COR (BAER implementation) salary needed for 1-month mulching actions. GS-12 COR salary $360/day x 30 days = $10,800 ; per diem/lodging = $123 x 30 days = $3690 ; supplies/equipment hardhat = $100 ; truck = $625/mo x ($0.35/mi for 1000 mi/mo) x 1 mo = $625, travel = $500 x 2 = $1000

Total for GS-11 = $16215
Which resource or issue area(s) does it address? Public safety, storm response flows
How does the action relate to damage or changes caused by the event? *Describe the goal of the activity, why the activity or treatment is proposed, how it meets the recovery objective (as described in Part 3), its purpose, and to what degree it is expected to be effective.* Burned slopes with poor recovery will continue to produce large flows into communities and/or critical resource areas.
What are the consequence(s) of not implementing the action? Communities & rural housing areas will continue to receive big flows in FY 12
What is the cost of the action? Why is the action reasonable, within policy, and cost effective? *Describe the unit costs and explain why the activity or treatment is worth the investment.* The 1-month cost needed to fairly pay an experienced COR/BAER Implementator will produce at least 90% effective implementation.

Action Description: *Describe the details of the activity or treatment, such as what, where, when, how, how much, etc.* GS-7 (or equivalent) Helitak needed for 1-month mulching action. GS-7 salary $220/day x 30 days = $10,800 ; per diem/lodging = $123 x 30 days = $3690 ; supplies/equipment hardhat = $100, travel = $500 x 2 = $1000 Total for GS-7 = $11390
Which resource or issue area(s) does it address? Public safety, storm response flows
How does the action relate to damage or changes caused by the event? *Describe the goal of the activity, why the activity or treatment is proposed, how it meets the recovery objective (as described in Part 3), its purpose, and to what degree it is expected to be effective.* Burned slopes with poor recovery will continue to produce large flows into communities and/or critical resource areas.
What are the consequence(s) of not implementing the action? Communities & rural housing areas will continue to receive big flows in FY 12
What is the cost of the action? Why is the action reasonable, within policy, and cost effective? *Describe the unit costs and explain why the activity or treatment is worth the investment.* The 1-month cost needed to fairly pay an experienced Helitak crew member will produce at least 90% effective implementation.

Action Description: *Describe the details of the activity or treatment, such as what, where, when, how, how much, etc.* Purchase data loggers

loggers, this report uses the Onset HOBO data logger (http://www.onsetcomp.com/products/data-loggers/conductivity-and-salinity) for a budgetary basis: purchase 10-99 units, $647 each + $213 base station + $100 for steel cable and hardware = $960. And, software $82 and a portable reader $500 are needed for the data cards. A total of 50 units is requested as this would cover each of the 50 Huc6s affected by the fire. This report also requests a flow meter (Marsh McBirney) projected to cost $5000 or somewhat less. Total $53,500
Which resource or issue area(s) does it address? Watershed condition
How does the action relate to damage or changes caused by the event? *Describe the goal of the activity, why the activity or treatment is proposed, how it meets the recovery objective (as described in Part 3), its purpose, and to what degree it is expected to be effective.* Temperature assessment/monitoring correlates well to recovery and condition. Turbidity correlates well to upland and riparian soil recovery and condition.
What are the consequence(s) of not implementing the action? Forest will not understand watershed condition or trends. Decisions made without baseline & trend data will not tier to 'best science available'. Forest will lose a unique opportunity to collect watershed condition and health data.
What is the cost of the action? Why is the action reasonable, within policy, and cost effective? *Describe the unit costs and explain why the activity or treatment is worth the investment.* $53,500 used for collection of next 10-years and beyond $5350/yr @ 10-yrs. This is outstanding value for +10-yrs of watershed condition data used throughout the Forest programs.

Action Description: *Describe the details of the activity or treatment, such as what, where, when, how, how much, etc.* Municipal watershed restoration, allocate $50,000 to Greer, Eager, Nutrioso, & Alpine for watershed and waste-water protection, for a total of $200,000. Treatments may include upland soil stabilization, fuels, & channel stabilization. These potential treatments should be determined by both community & Forest specialists.
Which resource or issue area(s) does it address? Community drinking water supply and community sewage effectiveness.
How does the action relate to damage or changes caused by the event? *Describe the goal of the activity, why the activity or treatment is proposed, how it meets the recovery objective (as described in Part 3), its purpose, and to what degree it is expected to be effective.* Forest specialists and community involvement will likely insure effective placement with probable +90% success rate. Monitor and adjust for FY 13 & FY 14.
What are the consequence(s) of not implementing the action? Potential degrading of source drinking water areas and sewage facilities that are breached my affect downstream human health.

What is the cost of the action? Why is the action reasonable, within policy, and cost effective? *Describe the unit costs and explain why the activity or treatment is worth the investment.*
This $50,000 may be very effective in preventing degradation to the source drinking water areas.

1-3 years

Cost Summary Table, 2-3 years, FY 12 budget is located in the 0-2 year table

ID #	Category	Priority (S, H, M, or L)	Potential Action	Unit (Acres, miles, etc.)	# of Units	Year 2 FY 13	Year 3 FY 14
1	14	H	Seeding	9000 ac	3	$765,000	$382,500
2	14	S	Mulch	3900 ac	2	$2,925,000	0
3	7	H	Riparian planting & channel structures	100 ac	4	$210,000	$210,000
4	7	H	Bank stabilization	150 units	3	$375,000	$375,000
5	7	H	Channel restoration	11 miles	4	$660,000	$660,000
6	23	H	NEPA & monitoring			$100,000	$20,000
9	23	H	Hydrologist equip/supplies	1 year	3	$8200	$7500
12	14	S	GS-7 Helitak	1	1 month	$11390	0
13	14	S	GS-12 or equivalent mulch COR	1	1 month	$16215	0
11	6	S	Municipal watershed restoration	1	4	$200,000	$200,000
					total	$5,270,805	$1,855,000

Action Description: *Describe the details of the activity or treatment, such as what, where, when, how, how much, etc.* Seed areas identified as needing initial and retreating. Consult T&E programs for locations Year 2 (FY 13) 9000 ac x $85/ac = $765,000 Year 3 (FY 14) 4500 ac x $85/ac = $382,500
Which resource or issue area(s) does it address? Watershed stabilization
How does the action relate to damage or changes caused by the event? *Describe the goal of the activity, why the activity or treatment is proposed, how it meets the recovery objective (as described in Part 3), its purpose, and to what degree it is expected to be effective.* Seeding and re-seeding of those areas identified as needing seed. Seeding success is greatest on gentle slopes (slopes less than 45-degrees).
What are the consequence(s) of not implementing the action? Unseeded & bare soils will produce greater erosion rates
What is the cost of the action? Why is the action reasonable, within policy, and cost effective? *Describe the unit costs and explain why the activity or treatment is worth the investment.* Post fire years 3&4 may not need seeding, monitor for determination, seeding promotes a healthy grass component which improves watershed response. It is cost effective if: 2^{nd} –year seeding response returns the 9000-ac erosion post-fire rate from 7.2 tons/ac/yr to the pre-fire rate of 3.6 tons/ac/yr this would result in: 7.2 – 3.6 = 3.6 ; 3.6 tons/ac x 9000 ac = 32,400 tons less into the watershed drainages. This is a significant reduction in potential erosion.

Action Description: *Describe the details of the activity or treatment, such as what, where, when, how, how much, etc.* Mulch, Year 2 (FY 13) 3900ac, mostly high severity burn area located to critical rural-interface and needy resources as identified by resource specialists
Which resource or issue area(s) does it address? Soil and upland health
How does the action relate to damage or changes caused by the event? *Describe the goal of the activity, why the activity or treatment is proposed, how it meets the recovery objective (as described in Part 3), its purpose, and to what degree it is expected to be effective.* Mulching can provide CNs ranging from 80 to 50 depending on slope, reduces post-fire peak flows response to precip events
What are the consequence(s) of not implementing the action? Post-fire peak flows remain high & induce erosion without mulch
What is the cost of the action? Why is the action reasonable, within policy, and cost effective? *Describe the unit costs and explain why the activity or treatment is worth the investment.* 3900ac/$2,925,000 = $750/ac. Mulching reduces post-fire peak flows & stabilizes upland soils

Action Description: *Describe the details of the activity or treatment, such as what, where, when, how, how much, etc.* Riparian planting & channel structures in those areas identified most needed. Consult T&E programs for locations Year 2 (FY 13) 100ac/$210,000 Year 3 (FY 14) 100ac/$210,000
Which resource or issue area(s) does it address? Riparian & flood plain function.
How does the action relate to damage or changes caused by the event? *Describe the goal of the activity, why the activity or treatment is proposed, how it meets the recovery objective (as described in Part 3), its purpose, and to what degree it is expected to be effective.* These plantings & structures will improve riparian function. Likely 80% success rate if properly located with hydrologic support
What are the consequence(s) of not implementing the action? Flood plain will be less likely to absorb post-fire peak flows
What is the cost of the action? Why is the action reasonable, within policy, and cost effective? *Describe the unit costs and explain why the activity or treatment is worth the investment.* Riparian areas need additional & improved components to withstand post-fire flows, properly placed plantings and structures will lead to at-least 80% success. Functional riparian reaches are worthy goals.

Action Description: *Describe the details of the activity or treatment, such as what, where, when, how, how much, etc.* Bank stabilization, placing structures that increase stabilization on those reaches indentified by resource specialists. Consult T&E programs for locations Year 2 (FY 13) 150 structure units/$375,000 = $2500/unit Year 3 (FY 14) 150 structure units/$375,000 = $2500/unit
Which resource or issue area(s) does it address? Riparian function
How does the action relate to damage or changes caused by the event? *Describe the goal of the activity, why the activity or treatment is proposed, how it meets the recovery objective (as described in Part 3), its purpose, and to what degree it is expected to be effective.* Properly placed structures will increase riparian resiliency to post-fire flows. If properly located will be 80% effective**.**
What are the consequence(s) of not implementing the action? Channel will down-cut and/or widen making a dysfunctional flood plain and dysfunctional riparian area
What is the cost of the action? Why is the action reasonable, within policy, and cost effective?

Describe the unit costs and explain why the activity or treatment is worth the investment. 150units/$375,000/year for a 3-year total of $1,125,000. Actions that promote/improve riparian function are needed to withstand the larger post-fire flow regimes.

Action Description: *Describe the details of the activity or treatment, such as what, where, when, how, how much, etc.* Channel stabilization, consult T&E programs for locations Year 2 (FY 13) 11-miles/$660,000 = $60,000/mile Year 3 (FY 14) 11-miles/$660,000 = $60,000/mile
Which resource or issue area(s) does it address? Flood plain function
How does the action relate to damage or changes caused by the event? *Describe the goal of the activity, why the activity or treatment is proposed, how it meets the recovery objective (as described in Part 3), its purpose, and to what degree it is expected to be effective.* Properly placed structures will increase riparian resiliency to post-fire flows. If properly located will be 80% effective.
What are the consequence(s) of not implementing the action? Channel will down-cut and/or widen making a dysfunctional flood plain dysfunctional riparian area
What is the cost of the action? Why is the action reasonable, within policy, and cost effective? *Describe the unit costs and explain why the activity or treatment is worth the investment.* ASNFs cannot afford to lose any riparian reaches, if placed with hydrologist support the stabilization actions will be very effective and promote riparian health

Action Description: *Describe the details of the activity or treatment, such as what, where, when, how, how much, etc.* Hydrologist; if supplies have not been purchased for the 3-month Hydro detail this will be a one-time cost $300 GPS + $200 camera + $200 hardhart/tape/rod = $700 ; needed for & used for NEPA, salvage, road, watershed, assessment, & monitor support. Also, vehicle needed, $325/mo/($0.35/mi @ 1000mi) = $625/mo 12mo = $625 x 12 = $7500 Year 2 (FY 13) $8200 Year 3 (FY 14) $7500
Which resource or issue area(s) does it address? NEPA, salvage, road, watershed, monitoring, & changed-condition assessment.
How does the action relate to damage or changes caused by the event? *Describe the goal of the activity, why the activity or treatment is proposed, how it meets the recovery objective (as described in Part 3), its purpose, and to what degree it is expected to be effective.*

This equipment is needed to conduct assessment & monitoring. 100% effective.
What are the consequence(s) of not implementing the action? Forest Hydrologists will be unable to give full attention to existing and expected jobs.
What is the cost of the action? Why is the action reasonable, within policy, and cost effective? *Describe the unit costs and explain why the activity or treatment is worth the investment.* GPS & camera will carry over to existing Forest needs

Action Description: *Describe the details of the activity or treatment, such as what, where, when, how, how much, etc.* NEPA & monitoring Year 2 (FY 13) $100,000 Year 3 (FY 14) $20,000
Which resource or issue area(s) does it address? Potentially allows for Salvage NEPA, other NEPA, and changed-condition assessments.
How does the action relate to damage or changes caused by the event? *Describe the goal of the activity, why the activity or treatment is proposed, how it meets the recovery objective (as described in Part 3), its purpose, and to what degree it is expected to be effective.* A salvage EA/EIS/CE will allow for treatments improving stand health and allowing for community economic gain. Action will be 90% effective in promoting stand health. Changed-condition-assessments will allow for baseline data for use in all resource areas which will improve decision-making concerning all forest-actions.
What are the consequence(s) of not implementing the action? Those remaining lower moderately burned stands will be subject to beetle kill, creating hazardous fuels conditions around existing & planned WUIs. Those stands bordering MSO pac need sufficient buffer to protect remaining MSO pacs.
What is the cost of the action? Why is the action reasonable, within policy, and cost effective? *Describe the unit costs and explain why the activity or treatment is worth the investment.* This NEPA and treatments are needed for WUI health, stand health, and MSO protection.

Action Description: *Describe the details of the activity or treatment, such as what, where, when, how, how much, etc.* GS-12 (or equivalent) mulch COR (BAER implementation) salary needed for 1-month mulching actions. GS-12 COR salary $360/day x 30 days = $10,800 ; per diem/lodging = $123 x 30 days = $3690 ; supplies/equipment hardhat = $100 ; truck = $625/mo x ($0.35/mi for 1000 mi/mo) x 1 mo = $625, travel = $500 x 2 = $1000

Total for GS-12 = $16215
Which resource or issue area(s) does it address? Public safety, storm response flows
How does the action relate to damage or changes caused by the event? *Describe the goal of the activity, why the activity or treatment is proposed, how it meets the recovery objective (as described in Part 3), its purpose, and to what degree it is expected to be effective.* Burned slopes with poor recovery will continue to produce large flows into communities and/or critical resource areas.
What are the consequence(s) of not implementing the action? Communities & rural housing areas will continue to receive big flows in FY 12
What is the cost of the action? Why is the action reasonable, within policy, and cost effective? *Describe the unit costs and explain why the activity or treatment is worth the investment.* The 1-month cost needed to fairly pay an experienced COR/BAER Implementator will produce at least 90% effective implementation.

Action Description: *Describe the details of the activity or treatment, such as what, where, when, how, how much, etc.* GS-7 (or equivalent) Helitak needed for 1-month mulching action. GS-7 salary $220/day x 30 days = $10,800 ; per diem/lodging = $123 x 30 days = $3690 ; supplies/equipment hardhat = $100, travel = $500 x 2 = $1000 Total for GS-7 = $11390
Which resource or issue area(s) does it address? Public safety, storm response flows
How does the action relate to damage or changes caused by the event? *Describe the goal of the activity, why the activity or treatment is proposed, how it meets the recovery objective (as described in Part 3), its purpose, and to what degree it is expected to be effective.* Burned slopes with poor recovery will continue to produce large flows into communities and/or critical resource areas.
What are the consequence(s) of not implementing the action? Communities & rural housing areas will continue to receive big flows in FY 12
What is the cost of the action? Why is the action reasonable, within policy, and cost effective? *Describe the unit costs and explain why the activity or treatment is worth the investment.* The 1-month cost needed to fairly pay an experienced Helitak crew member will produce at least 90% effective implementation.

Action Description: *Describe the details of the activity or treatment, such as what, where, when, how, how much, etc.* Municipal watershed restoration, allocate $50,000 to Greer, Eager, Nutrioso, & Alpine for watershed and waste-water protection, for a total of $200,000. Treatments may include upland soil stabilization, fuels, & channel stabilization. These potential treatments should be determined by both community & Forest specialists.
Which resource or issue area(s) does it address? Community drinking water supply and community sewage effectiveness.
How does the action relate to damage or changes caused by the event? *Describe the goal of the activity, why the activity or treatment is proposed, how it meets the recovery objective (as described in Part 3), its purpose, and to what degree it is expected to be effective.* Forest specialists and community involvement will likely insure effective placement with probable +90% success rate. Monitor and adjust for FY 13 & FY 14.
What are the consequence(s) of not implementing the action? Potential degrading of source drinking water areas and sewage facilities that are breached my affect downstream human health.
What is the cost of the action? Why is the action reasonable, within policy, and cost effective? *Describe the unit costs and explain why the activity or treatment is worth the investment.* This $50,000 may be very effective in preventing degradation to the source drinking water areas.

3-10 years

Cost Summary Table, 3-10 years

ID #	Category	Priority (S, H, M, or L)	Potential Action	Unit (Acres, miles, etc.)	# of Units	Year 4 FY 15	Year 5 FY 16	Year 6 FY 17
3	7	H	Riparian planting & channel structures	100 ac		$210,000	0	0
5	7	H	Channel restoration	11 miles		$660,000	0	0
6	23	H	Monitoring			$20,000	$20,000	$20,000
11	6	S	Municipal watershed restoration	1	4	$200,000		
				total	--->	$1,090,000	$20,000	$20,000

Action Description: *Describe the details of the activity or treatment, such as what, where, when, how, how much, etc.* Riparian planting & channel structures in those areas identified most needed. 100ac/$210,000 Year 4 (FY 15). Consult T&E program areas for locations
Which resource or issue area(s) does it address? Riparian & flood plain function.
How does the action relate to damage or changes caused by the event? *Describe the goal of the activity, why the activity or treatment is proposed, how it meets the recovery objective (as described in Part 3), its purpose, and to what degree it is expected to be effective* These plantings & structures will improve riparian function. Likely 80% success rate if properly located with hydrologic support
What are the consequence(s) of not implementing the action? Flood plain will be less likely to absorb post-fire peak flows
What is the cost of the action? Why is the action reasonable, within policy, and cost effective? *Describe the unit costs and explain why the activity or treatment is worth the investment.* Riparian areas need additional & improved components to withstand post-fire flows, properly placed plantings and structures will lead to at-least 80% success. Functional riparian reaches are worthy goals.

Action Description: *Describe the details of the activity or treatment, such as what, where, when, how, how much, etc.* Channel stabilization, 11-miles/$660,000 = $60,000/mile. Consult T&E program areas for locations Year 4 (FY 15) $660,000
Which resource or issue area(s) does it address? Flood plain function
How does the action relate to damage or changes caused by the event? *Describe the goal of the activity, why the activity or treatment is proposed, how it meets the recovery objective (as described in Part 3), its purpose, and to what degree it is expected to be effective.* Properly placed structures will increase riparian resiliency to post-fire flows. If properly located will be 80% effective.
What are the consequence(s) of not implementing the action? Channel will down-cut and/or widen making a dysfunctional flood plain dysfunctional riparian area
What is the cost of the action? Why is the action reasonable, within policy, and cost effective? *Describe the unit costs and explain why the activity or treatment is worth the investment.* ASNFs cannot afford to lose any riparian reaches, if placed with hydrologist support the stabilization actions will be very effective and promote riparian health

Action Description: *Describe the details of the activity or treatment, such as what, where, when, how, how much, etc.* Monitoring Year 4 (FY 15) $20,000 Monitoring Year 5 (FY 16) $20,000 Monitoring Year 6 (FY 17) $20,000
Which resource or issue area(s) does it address? Allows monitoring and changed-condition assessments.
How does the action relate to damage or changes caused by the event? *Describe the goal of the activity, why the activity or treatment is proposed, how it meets the recovery objective (as described in Part 3), its purpose, and to what degree it is expected to be effective.* Changed-condition-assessments and monitoring will allow for baseline data/monitor data for use in all resource areas which will improve decision-making concerning all forest-actions.
What are the consequence(s) of not implementing the action? A lack of data will prevent resource areas making decisions based on existing conditions and/or trends.
What is the cost of the action? Why is the action reasonable, within policy, and cost effective? *Describe the unit costs and explain why the activity or treatment is worth the investment.* This data is needed to make decisions based on the best science available. Project planning & implementation will be difficult without identifying trends concerning resource condition. The amount of money needed to monitor is proportional, order-of-magnitudes smaller, than the cost of the projects monitored/assessed.

PART 4a – Additional Resource or Safety Concerns

This report has four (4) dispersed recreation maps in PART 8, they show the NE, NW, SE, & SW sections of the fire/HighRisk Huc6/dispersed rec sites. This report advises further Forest discussion/field visits/analysis if needed. The risk to dispersed rec users is great if they find themselves in a drainage feature hydrologically connected to a greater than 20% high/moderate burn severity areas.

Research (Rahel et al. 1996) shows that a 4° C increase in summer temperatures measured after the Hayman Fire reduced fish habitat by 45-63% for more than 5-years (post-fire monitoring temperature monitoring ended after the 5th –year post-fire). Forest discussion should occur concerning the loss of aquatic T&E fish.

Present/existing geomorphic characteristics of river systems emphasize linearity that virtually ignores the effects of confluences within a branching network (Fisher, 1997). Human actions tend to simplify channels, disturbances from fires, floods, & mass wasting may be a long-term benefit because they (disturbances) increase physical (channel) diversity (Benda L. & Miller, D., 2001). Any actions that can help flood-plains re-establish or connect should be discussed.

PART 5 – Monitoring and Research Opportunities

Monitoring and changed-condition-assessments have been addressed in PART 4. This section will further define potential monitoring and assessment needs.

There are potential needs for a changed-condition assessment by the following program areas: Range, Wildlife, Recreations, Engineering, Heritage, and Timber. At this time, it is not known the extent, detail, or timing of those program area needs.

This report recommends turbidity/temperature data-loggers be purchased and deployed as soon as possible. Temperature/turbidity data-loggers will address a broad range of resource data needs. Temperature data will correlate to vegetation recovery of burned areas and turbidity/conductivity data will correlate to soil resource recovery. With temperature/turbidity data, the Forest will be able to provide both current condition and trend analysis to a project affected area.

This will provide the Forest the tools to better meet the intent of the CWA (Clean Water Act 1972/1977, 33 U.S.C. §1251). Temperature/turbidity data will allow the Forest to properly select BMPs (Best Management Practices) whose affect on water quality are regulated by the EPA and State of Arizona ADEQ (Arizona Department of Environmental Quality). In addition, Forest NEPA will have 'best available science' that will improve the Forest's ability to withstand resource litigation.

Many sources and choices are available concerning the cost and procurement for these data loggers, this report uses the Onset HOBO data logger (http://www.onsetcomp.com/products/data-loggers/conductivity-and-salinity) for a budgetary basis: purchase 10-99 units, $647 each + $213 base station + $100 for steel cable and hardware = $960. A total of 50 units is requested as this would cover each of the 50 Huc6s affected by the fire.

The total being $960 x 50 = $48,000 + $418 (data-card reader) + $82 for the software = $48,500

The Forest also has a need for a flow-meter. The current working & dependable flow-meter is used by Forest Hydrologists conducting flow measurements needed to support ongoing water-rights investigations. Another flow-meter is requested for use by the detailer modeling hydrologists, fisheries & wildlife personnel, and the requested GS-11 3-year hire Hydrologist. The approximate cost for a Marsh McBirney is $5000. That makes a total equipment request $53,500

ID #	Category	Priority (S, H, M, or L)	Potential Action	Unit (Acres, miles, etc.)	# of Units	Current year cost FY 12
1	23	H	Baseline & monitoring equipment	Data logger units & software, Marsh McBirnery flow meter	50/1	$53,000

PART 6 – PARTNERS AND FUNDING SOURCES .

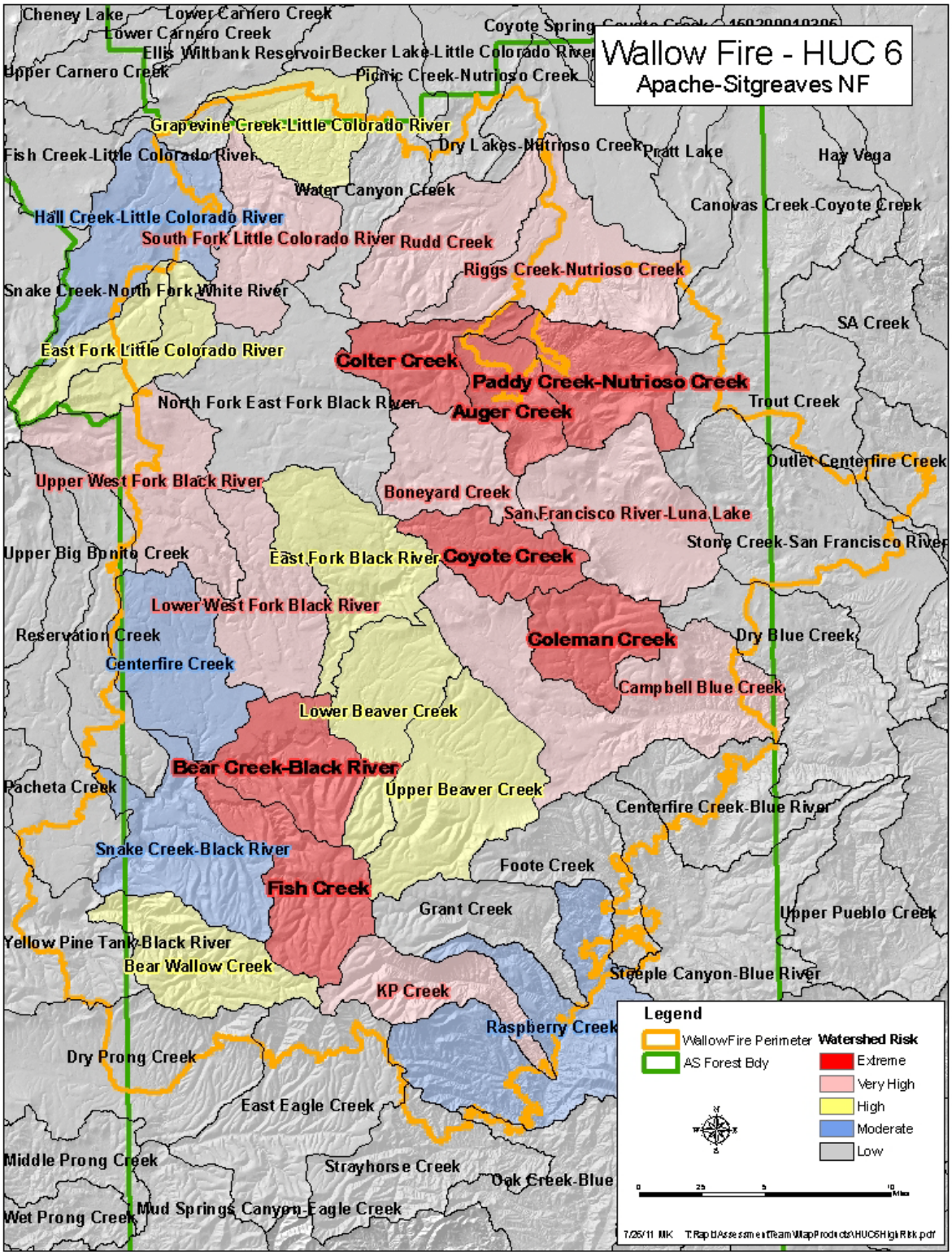
Partner	Contact	Area of Interest	Potential Contribution
Rock Mountain Research Station	Pete Robichaud 208-883-2349 probichaud@fs.fed.us	Post-fire recovery	Shared salary?
Rock Mountain Research Station	Dan Neary 928-556-2176 dneary@fs.fed.us	Post-fire recovery	Shared salary?
US Army Corps of Engineers	Cynthia Palaruan	Upland erosion reduction treatments	Provide funding for upland treatments keeping soil out of reservoirs
Salt River Project	Lee Easter 602-236-5592	Upland erosion reduction treatments	Provide funding for upland treatments keeping soil out of reservoirs

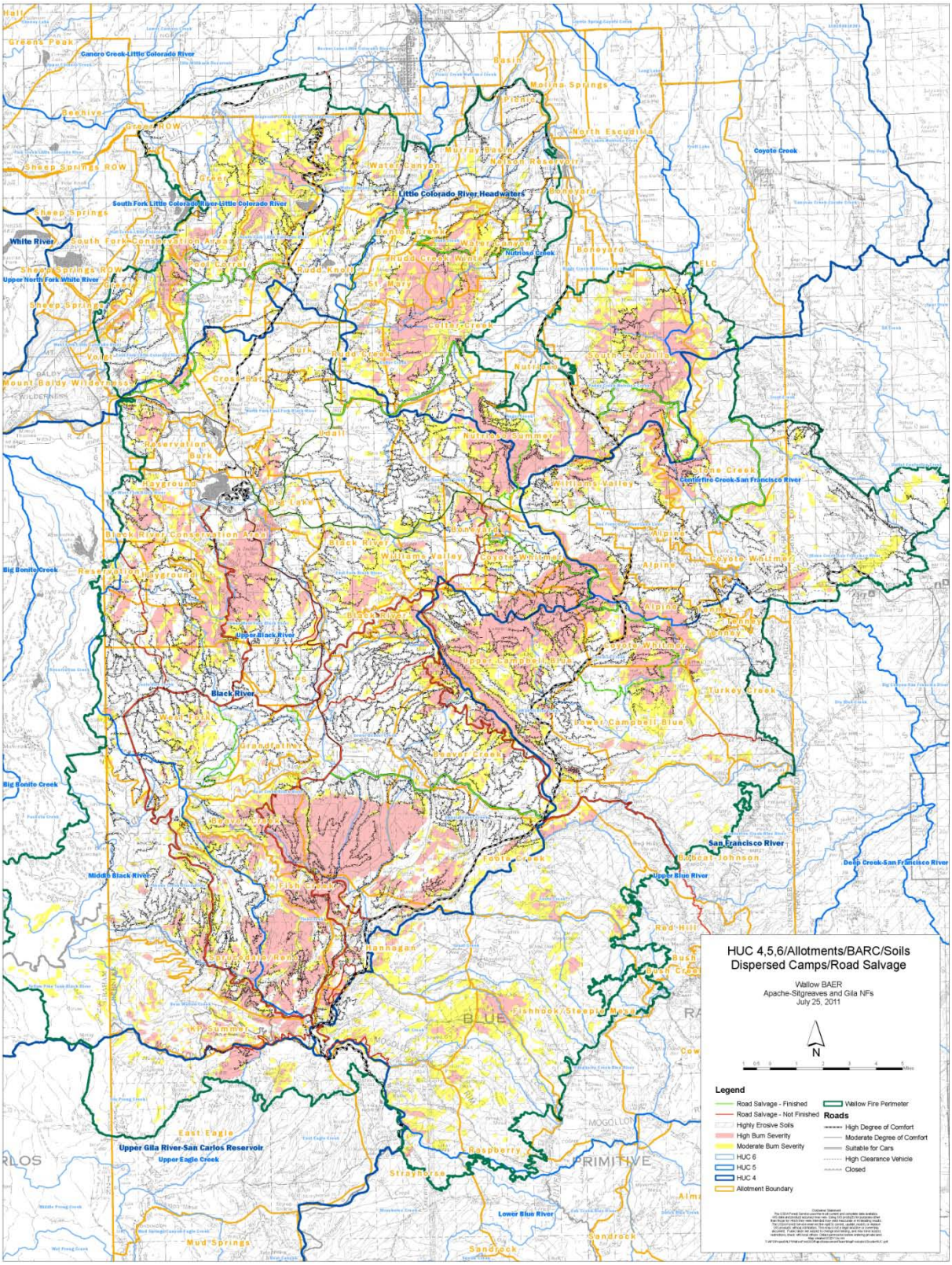
PART 7 – SKILLS AND STAFFING NEEDS

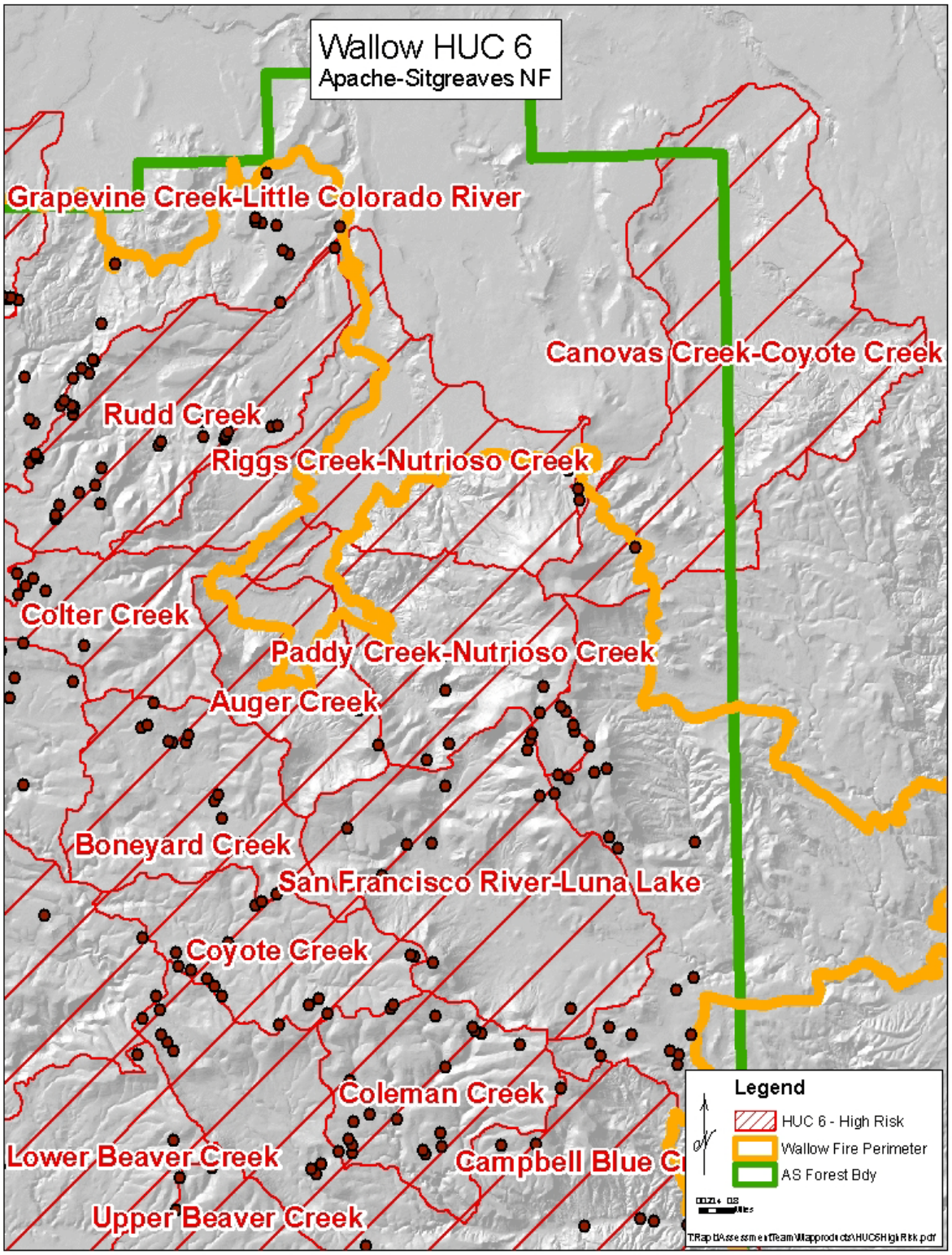
Job Title	Series/Grade	# of Positions Needed	Timeframe Needed
Hydrologist	1315-7/9/11	1	3-years
Hydrologist	1315-11	1/4	3-months
Hydrologist	1315-12	1/4	3-months
GS-7 Helitak		1/12	1-month
GS-12/equivalent	COR-BAER	1/12	1-month

PART 8 – Maps and Data

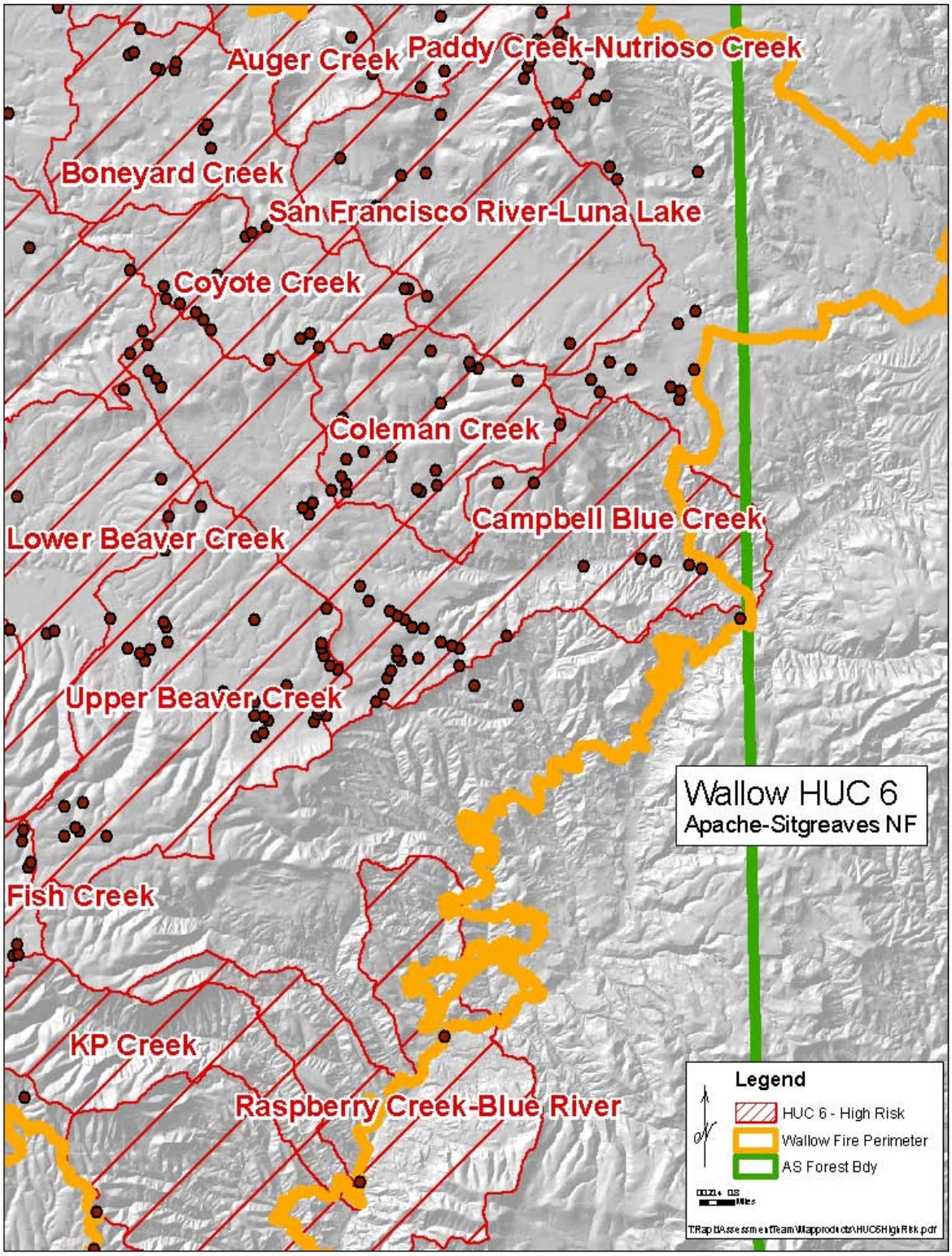
The following map shows the Huc6s (6^{th}-code watershed) affected by the Wallow Fire and is displayed as the map below. The map shows a further delineation based on the following moderate+high severities: low <20%, moderate 20-24%, high 25-34%, very high 35-44%, and extreme >44%


Wallow Fire - HUC 6
Apache-Sitgreaves NF
Cheney Lake
Lower Carnero Creek
Lower Carnero Creek
Ellis Wiltbank Reservoir
Upper Carnero Creek
Becker Lake-Little Colorado River
Picnic Creek-Nutrioso Creek
Coyote Spring
Grapevine Creek-Little Colorado River
Fish Creek-Little Colorado River
Dry Lakes-Nutrioso Creek
Pratt Lake
Hay Vega
Water Canyon Creek
Canovas Creek-Coyote Creek
Hall Creek-Little Colorado River
South Fork Little Colorado River
Rudd Creek
Riggs Creek-Nutrioso Creek
Snake Creek-North Fork White River
SA Creek
East Fork Little Colorado River
Colter Creek
Paddy Creek-Nutrioso Creek
North Fork East Fork Black River
Auger Creek
Trout Creek
Outlet Centerfire Creek
Upper West Fork Black River
Boneyard Creek
San Francisco River-Luna Lake
Stone Creek-San Francisco River
Upper Big Bonito Creek
East Fork Black River
Coyote Creek
Lower West Fork Black River
Reservation Creek
Coleman Creek
Dry Blue Creek
Centerfire Creek
Campbell Blue Creek
Lower Beaver Creek
Bear Creek-Black River
Pacheta Creek
Upper Beaver Creek
Centerfire Creek-Blue River
Snake Creek-Black River
Foote Creek
Fish Creek
Grant Creek
Upper Pueblo Creek
Yellow Pine Tank-Black River
Bear Wallow Creek
Steeple Canyon-Blue River
KP Creek
Raspberry Creek
Dry Prong Creek
East Eagle Creek
Middle Prong Creek
Strayhorse Creek
Oak Creek-Blue
Wet Prong Creek
Mud Springs Canyon-Eagle Creek
Legend
WallowFire Perimeter
AS Forest Bdy
Watershed Risk
Extreme
Very High
High
Moderate
Low
7/26/11 MK T:\RapidAssessmentTeam\MapProducts\HUC6HighRisk.pdf

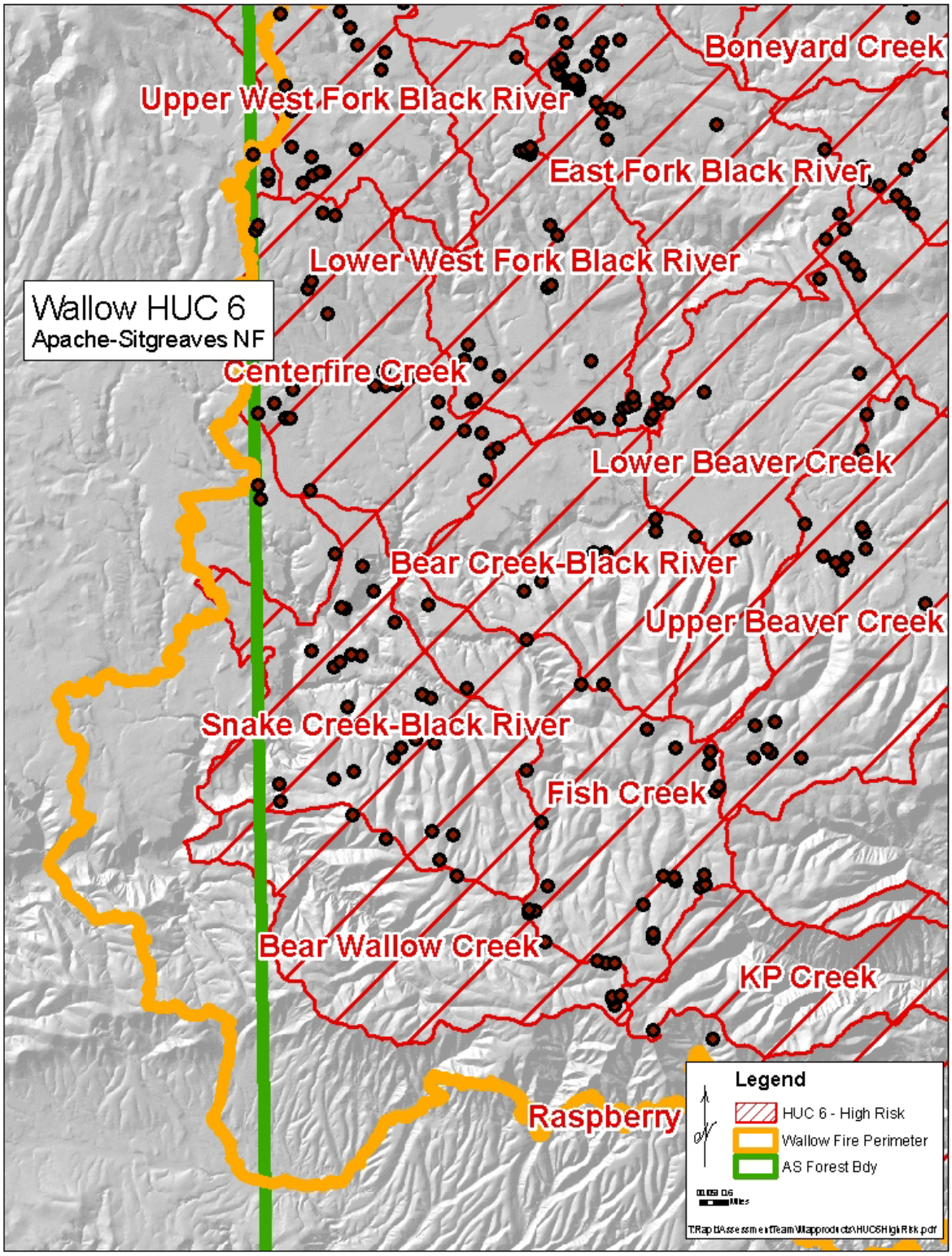

HUC 4,5,6/Allotments/BARC/Soils
Dispersed Camps/Road Salvage
Wallow BAER
Apache-Sitgreaves and Gila NFs
July 25, 2011
N
Legend
Road Salvage - Finished
Road Salvage - Not Finished
Highly Erosive Soils
High Burn Severity
Moderate Burn Severity
HUC 6
HUC 5
HUC 4
Allotment Boundary
Wallow Fire Perimeter
Roads
High Degree of Comfort
Moderate Degree of Comfort
Suitable for Cars
High Clearance Vehicle
Closed
Canero Creek-Little Colorado River
South Fork Little Colorado River-Little Colorado River
Little Colorado River Headwaters
White River
Upper North Fork White River
Coyote Creek
Nutrioso Creek
Coniferino Creek-San Francisco River
Big Bonito Creek
Upper Black River
Black River
Middle Black River
San Francisco River
Deep Creek-San Francisco River
Upper Blue River
Upper Gila River-San Carlos Reservoir
Upper Eagle Creek
Lower Blue River
BLUE
PRIMITIVE


Wallow HUC 6
Apache-Sitgreaves NF
Grapevine Creek-Little Colorado River
Canovas Creek-Coyote Creek
Rudd Creek
Riggs Creek-Nutrioso Creek
Colter Creek
Paddy Creek-Nutrioso Creek
Auger Creek
Boneyard Creek
San Francisco River-Luna Lake
Coyote Creek
Coleman Creek
Lower Beaver Creek
Campbell Blue C
Upper Beaver Creek
Legend
HUC 6 - High Risk
Wallow Fire Perimeter
AS Forest Bdy

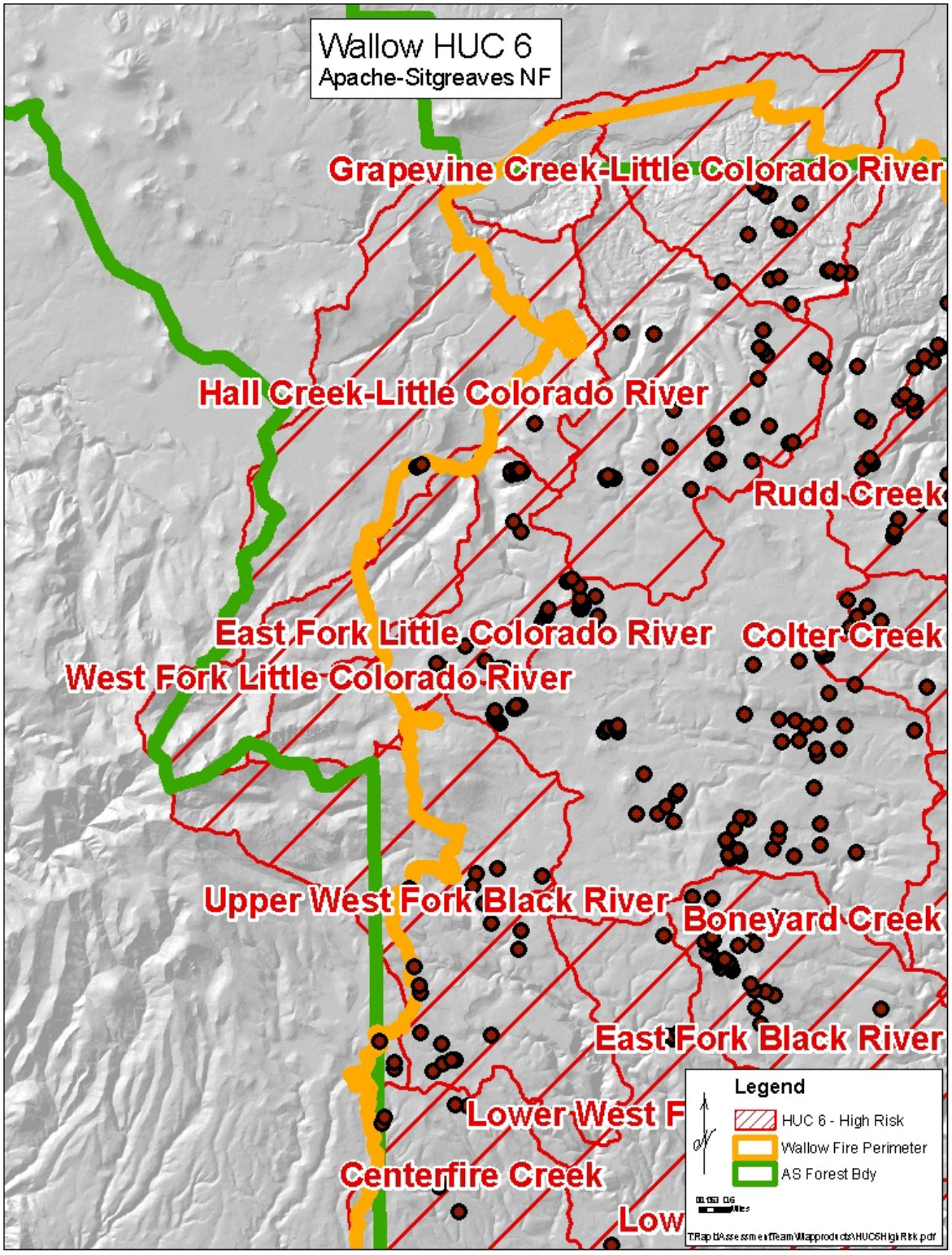
NE fire area


Auger Creek
Paddy Creek-Nutrioso Creek
Boneyard Creek
San Francisco River-Luna Lake
Coyote Creek
Coleman Creek
Campbell Blue Creek
Lower Beaver Creek
Upper Beaver Creek
Fish Creek
KP Creek
Raspberry Creek-Blue River
Wallow HUC 6
Apache-Sitgreaves NF
Legend
HUC 6 - High Risk
Wallow Fire Perimeter
AS Forest Bdy

SE fire area


Boneyard Creek
Upper West Fork Black River
East Fork Black River
Lower West Fork Black River
Wallow HUC 6
Apache-Sitgreaves NF
Centerfire Creek
Lower Beaver Creek
Bear Creek-Black River
Upper Beaver Creek
Snake Creek-Black River
Fish Creek
Bear Wallow Creek
KP Creek
Raspberry
Legend
HUC 6 - High Risk
Wallow Fire Perimeter
AS Forest Bdy

SW fire area


Wallow HUC 6
Apache-Sitgreaves NF
Grapevine Creek-Little Colorado River
Hall Creek-Little Colorado River
Rudd Creek
East Fork Little Colorado River
Colter Creek
West Fork Little Colorado River
Upper West Fork Black River
Boneyard Creek
East Fork Black River
Lower West F
Centerfire Creek
Low
Legend
HUC 6 - High Risk
Wallow Fire Perimeter
AS Forest Bdy

NW fire area