

United States
Department of
Agriculture

Forest
Service

**Southwestern
Region**



Wallow Wildfire LaSER Report

Range Resources and Noxious and Non-Native Invasive Plants

Apache-Sitgreaves National Forests

Submitted by: **Nancy L. Walls**
Natural Resources Staff Officer
Prescott National Forest

September 1, 2011

Table of Contents

Table of Contents.....	i
Overview.....	1
Post Fire Conditions Range Resouces	2
Post Fire Conditions Noxious and Non-Native Invasive Plants	6
Recovery Goals and Objectives.....	7
Description of Action Recommendations Range Resources	8
Range Monitoring and Research Opportunities	17
Description of Action Recommendations Noxious and Non-Native Plants	20
References and Data Sets.....	24

OVERVIEW:

This document responds to the Large Scale Recovery program (or LaSER) report to identify needed assessment and recovery actions after the Wallow Fire that burned on the Apache-Sitgreaves National Forests. The fire caused substantial impacts to the natural resources and infrastructure over three Districts and 45 Range Allotments. The LaSER Report used the assessment guides outlined in the Draft Policy to identify those areas for assessment as part of the rapid assessment process. The objective of the report is to identify post fire damage and recommended prioritized recovery treatment needs for range resources and noxious and non-native invasive plants, providing the basis for a post fire recovery plan.

The Wallow Fire ignited on May 29th, 2011 within the Bear Wallow Wilderness Area located along the southern boundary of the Alpine Ranger District. The fire quickly spread, burning into the San Carlos and Fort Apache Reservations, and a portion of the Quemado RD on the Gila National Forest. Containment was declared on July 8th, 2011 burning approximately 535,000 acres on all lands. Most of the fire occurred on National Forest System lands, covering approximately 501,652 acres. The fire occurred in 50 6th level hydrologic unit code watersheds (HUC), nine 5th level hydrologic unit code (HUC) watersheds, in the headwaters of the Little Colorado, Upper San Francisco and Black River watersheds. There were approximately 514 miles of perennial stream impacted directly, as well as over 1200 miles of intermittent and ephemeral channels. Numerous facilities and other infrastructure were damaged, including range fences and water systems. Vegetation types that were burned include ponderosa pine, mixed conifer, spruce-fir, piñon-juniper, mountain grasslands and riparian. Approximately 17 percent of the fire was classified as having high soil burn severity, 14 percent moderate soil burn severity, 47 percent low soil burn severity, and 22 percent within the fire perimeter was unburned (Data as of June 24, 2011 BARC map).

The Forest initiated the BAER Coordination Group, which was developed to help formulate values at risk, to facilitate sharing of information, and to provide early warning to communities and individuals of the upcoming risk of flooding projected due to the large amount of high soil burn severity and flow modeling. The BAER team leader for range and noxious and invasive species was Mitchel R. White, Ph.D., Ecologist, Supervisor's Office, Apache-Sitgreaves National Forests. Other team members included Curtis Chee, Rangeland Management Specialist, Springerville Ranger District (RD), Apache-Sitgreaves National Forests, David Dorum, Habitat Program Manager, Region 1, Arizona Game and Fish Department, Andrew Habgood, Rangeland Management Specialist, Black Mesa RD, Apache-Sitgreaves National Forests, and Denise VanKeuren, Rangeland and Noxious Weed Program Manager, Supervisor's Office, Apache-Sitgreaves National Forests. Information contained in the BAER report for range and weed resources represented the starting point for the LaSER Assessment. Additional support and information was provided by extended team members of the Rapid Assessment Team, including Judith Dyess on Range Monitoring and Research and Allen White on Invasive Plants, Southwest Region, Regional Office.

THE PURPOSE OF THE REPORT IS TO:

- Provide a context of change in circumstances for consideration of potential future actions that may be taken to address the effects of the Wallow Fire
- Facilitate program and budget development by recommending priorities for management actions
- Suggest considerations and opportunities to protect and maintain physical and biological resources
- Recommend assessment and research opportunities

POST FIRE CONDITIONS RANGE RESOURCES:

The Apache National Forest portion of the A-SNFs contains 79 grazing allotments; 28, 22, and 29 on the Alpine, Clifton, and Springerville RDs, respectively. The Wallow Fire burned over all or portions of 45 allotments and two conservation areas, damaging fences, water systems, other range improvements, and vegetation resources. Twenty seven allotments were burned on the Alpine Ranger District, two on the Clifton District, and sixteen allotments and two conservation areas on the Springerville District. Of the 45 allotments affected by the fire, fifteen allotments had 10 percent or less of their acreage in the moderate and high severity burn acreage, ten allotments had 10 to 25% of their acreage within the moderate and high severity burn acreage, and the remaining allotments had 25 to 64% of their acreage within the moderate and high severity burn areas. Five of the top six allotments with the greatest proportion (>50% of allotment) of moderate and high severity burn acreage are on the Alpine District (Alpine, Upper Campbell Blue, Fish Creek, South Escudilla, and Nutrioso Summer). The remaining allotment with the greatest proportion of moderate and high severity burn acreage is on the Springerville District (St. Mary).

Grazing allotments/pastures burned during the Wallow Fire by burn severity

Allotment	Number of pastures	High Severity Burn Acres	Moderate Severity Burn Acres	Low Severity Burn Acres	Unburned Acres	Total Acres
Alpine	6 pastures	3,303	966	2,534	1,244	8,047
Beaver Creek	5 pastures	4,589	3,453	10,273	442	18,756
Benton Creek	3 pastures	6	83	442	336	867
Big Lake	2 pastures	394	354	1,763	692	3,204
Black River	4 pastures	1,076	2,530	7,849	3,068	14,524
Bobcat Johnson	7 pastures	40	235	4,678	19,778	24,731
Boneyard	4 pastures	901	533	2,539	1,599	5,573
Burk	4 pastures	28	155	4,133	1,328	5,652

Allotment	Number of pastures	High Severity Burn Acres	Moderate Severity Burn Acres	Low Severity Burn Acres	Unburned Acres	Total Acres
Colter Creek	6 pastures	3,305	1,827	4,340	7,711	17,182
Coyote-Whitmer	6 pastures	2,573	1,390	6,150	4,646	14,759
Cross Bar	5 pastures	607	1,617	7,043	1,535	10,856
East Eagle	10 pastures	1,017	849	3,748	31,417	37,031
ELC	13 pastures	464	883	2,159	27,615	31,120
Fish Creek	2 pastures	2,468	890	1,657	564	5,579
Fishhook/ Steeple Mesa	3 pastures	621	1,883	5,310	16,740	24,554
Foote Creek	11 pastures	3,884	3,001	12,007	5,892	24,784
Grandfather	2 pastures	43	141	2,503	554	3,241
Greer	8 pastures	972	2,177	5,773	2,528	11,449
Hannagan	2 pastures	1,003	1,431	3,512	4,643	10,589
Hayground	7 pastures	483	554	1,550	1,398	3,984
KP Summer	3 pastures	2,157	4,336	10,145	4,391	21,030
Lower Campbell Blue	4 pastures	1,664	2,226	8,191	1,512	13,593
Murray Basin	5 pastures	-0-	235	1,524	2,486	4,245
Nutrioso Summer	5 pastures	5,506	2,934	5,914	1,204	15,558
Picnic	3 pastures	-0-	-0-	478	2,773	3,250
Pool Corral	5 pastures	2,418	4,106	7,505	859	15,027
PS	3 pastures	6	104	2,732	943	3,786
Raspberry	5 pastures	625	1,870	5,040	16,582	24,116
Red Hill	3 pastures	8	21	108	7,296	7,432
Reservation	5 pastures	538	523	2,366	2,390	5,817
Rudd Creek	4 pastures	405	846	1,963	830	4,044
Rudd Knoll	6 pastures	106	633	5,186	1,531	7,456
South Escudilla	2 pastures	5,553	3,606	4,876	2,778	16,812
Sprucedale- Reno	15 pastures	13,115	4,652	22,368	7,946	48,081
St. Mary	2 pastures	1,185	560	946	508	3,199
Stone Creek	4 pastures	1,534	574	3,987	2,815	8,910

Allotment	Number of pastures	High Severity Burn Acres	Moderate Severity Burn Acres	Low Severity Burn Acres	Unburned Acres	Total Acres
Strayhorse	2 pastures	275	1,354	3,179	21,036	25,844
Tenney	3 pastures	-0-	33	154	118	305
Turkey Creek	3 pastures	208	382	3,358	6,904	10,853
Udall	5 pastures	308	462	7,593	2,438	10,801
Upper Campbell Blue	5 pastures	8,300	3,901	6,292	664	19,157
Voigt	4 pastures	328	451	3,150	1,790	5,719
Water Canyon	8 pastures	811	1,654	3,986	6,657	13,108
West Fork	7 pastures	629	2,364	13,415	2,648	19,055
Williams Valley	4 pastures	2,025	1,987	5,160	4,492	13,664
Total	236 pastures	83,713	69,290	228,866	249,895	632,703

Due to the scale of the fire event, initial assessments of range improvements following the fire focused mainly on stock water ponds. These improvements were not directly affected by the fire, however are expected to fill with sediment and ash as a result of overland flows and post fire flooding. Other range improvements damaged in the fire include trick tanks, fences, corrals, troughs, spring developments, well developments and pipelines are projected below.

Range Improvements within the burned area of the Wallow Fire by burn severity.

Range improvement	Miles/Number within High Burn Severity	Miles/Number within Moderate Burn Severity	Miles/Number within Low Burn Severity	Unburned
Boundary and Interior Fences	140 Miles	138 Miles	526 Miles	314 Miles
Exclosure Fence	½ Mile	1 Miles	10 Miles	3 Miles
Pipeline	-0-	½ Mile	5 Miles	8 Miles
Stock Water Tanks	27 each	27 each	167 each	56 each
Spring Developments	9 each	7 each	40 each	32 each
Corral	-0-	1 each	-0-	2 each
Pit Tank	2 each	19 each	45 each	41 each
Trough	9 each	9 each	49 each	41 each
Water Well	1 each	-0-	2 each	2 each

Range improvement	Miles/Number within High Burn Severity	Miles/Number within Moderate Burn Severity	Miles/Number within Low Burn Severity	Unburned
Well/Windmill	-0-	-0-	1 each	3 each
Total	140.5 miles 48 Structures	139.5 miles 63 Structures	541 miles 304 Structures	325 miles 177 Structures

Forest GIS records indicate approximately 280 miles of fence line, 36 structural corrals and water developments, and 75 stock water ponds were within the moderate and high severity burn areas on the affected allotments. The majority of range improvements were within low severity burn and unburned areas of the fire. Repairs, reconstruction and maintenance of range improvements need to be scheduled for completion prior to livestock reentering a pasture.

Range vegetation will also be affected to varying degrees by fire severity. In areas of high severity, most vegetation (including grasses, forbs, and shrubs) was consumed, including the duff layer. In areas of low fire severity, herbaceous plants should recover quickly given the right moisture conditions and where sufficient litter is in place to provide adequate soil protection. Other areas within allotments and pastures exist as unburned islands within the fire perimeter. In general, areas of low fire severity should recover rapidly and allow for livestock grazing within a relatively short timeframe. Low severity acreage areas of the Wallow Fire are also at lower risk for damage to range improvements, and should move toward meeting goals and objectives without significant actions.

The areas of moderate and high severity fire will take longer to recover. Recovery within high severity burn acreage will be benefited to some degree from the emergency stabilization seeding. Seeding of native perennials in these areas will further promote vegetation establishment. In areas of moderate burn severity varying amounts of residual stubble and litter may exist. Vegetation recovery is expected to be variable and dependent on residual stubble and remaining litter. Site specific monitoring will help determine when livestock can return to pastures within the moderate and high severity burn areas of the fire, but may in some cases, exceed more than one growing season, depending on the rate of post fire forage development and recovery. Grazing permit holders need to be consulted and invited to be involved in the monitoring and decision making process for individual grazing allotments.

There is significant impact to permittees and livestock operations via the large amount of work which needs to be completed to repair and reconstruct range improvements and secondly, areas within the moderate and high severity burn acreage may not be available for livestock use short-term in order to provide for stabilization and recovery of soil and vegetative resources.

Allotments will need to be assessed on an individual basis to determine appropriate pastures, management, and timing for reinstating livestock grazing. Allotment management plans will need to be reassessed for the most significantly affected allotments.

POST FIRE CONDITIONS NOXIOUS AND NON-NATIVE INVASIVE PLANTS

Per information contained and derived from the Noxious and Non-Native Plants BAER Report, pre-fire surveys in the Wallow Fire perimeter indicate the area contained between 5,100 to 6,800 acres of noxious and non-native invasive plants. There was potential for at least 28 Arizona noxious plants and 23 non-native invasive plants to occur within the area. The risk of noxious and non-native plant establishment in the low severity burn areas may be low because native vegetation will likely re-establish quickly, re-occupying resources prior new invasive establishment. However, potential still exists for new invasive populations in these areas due to spread as a result of fire suppression activities. Low severity burn areas are identified in the range vegetation section.

Weed data for existing populations in the fire area

SPECIES	LOCATIONS
Mullein	Throughout the fire area, mostly along roads and old burn pile sites
Musk thistle	Numerous sites, mostly along roads in the northern portion of the fire area
Dalmation toadflax	Along highway 191 North of Campbell Blue Creek crossing and at the 180/191 – Dry Valley road turnoff in Nutrioso.
Saltcedar	Along the Blue River, south of Grant Creek and scattered individuals in lower tributaries to the Blue River
Siberian elm	Isolated trees along U.S. Highway 180/191 between Eagar and Alpine
Bull thistle	Throughout the fire area, mostly along roads
Canada thistle	Forest Road 37, within Upper Campbell Blue Allotment
Whitetop	Murray Basin Trailhead
Leafy spurge	Blue River terraces near Marks’ private land, and in Water Canyon
Jointed goatgrass	Apline and Luna Lake area
Cheatgrass	Mostly along roads in the northern portion of the fire area
Oxeye daisy	Small populations scattered along US Highway 191 from Alpine to Hannagan Meadow and within two elk exclosures at Nelson Reservoir

Moderate to high severity burn sites are projected to be areas most vulnerable to expansion of existing populations and invasion of new exotic species due to removal of the litter layer, exposed soils, and reduction in canopy cover and shading. In areas of high severity burn, native herbaceous seed banks may have also been compromised, requiring an extended timeframe for native perennial species to become reestablished. Noxious and non native species have the

potential to establish at a much faster rate, further impacting emerging natives. Forbs and grasses were also decreased in areas of ground disturbance from suppression efforts, leaving these areas vulnerable to new weed infestation.

Fire suppression resources may have been a vector for introduction of new exotics into the burn area, and/or spread of existing populations. Suppression resources came from many areas throughout the western United States, many having weed infestations on their home units. No or limited provisions were in place on the fire to wash or otherwise remove weed seeds from equipment prior to use on the fire line. Rehabilitation actions implemented to address values at risk, hazards and recommendations for emergency stabilization treatments post-fire event were designed with mitigation measures to reduce the potential for introduction of new exotics into the treatment areas. Likely populations of new species will occur in the months and years following the fire. Areas where soil was disturbed during suppression efforts, where people and equipment worked, and equipment was parked are within high risk categories for new invasives. In addition, resources may have come in contact with existing weed populations during suppression activities, spreading existing weeds into new areas within the fire perimeter.

Keeping new or expanding weed populations from becoming established is a high priority across ownership boundaries, including federal, state, tribal and private lands. Prevention and treatment of invasive populations prior to these populations becoming established and expanded is a key point in restoring desired native vegetation within the burn area and reducing long-term cost of containment, control and eradication. An aggressive monitoring and treatment program is needed to deal with noxious and non-native invasive plants. This effort is expected to be a short, mid, and long-term process.

RECOVERY GOALS AND OBJECTIVES:

The recovery objectives for range, noxious and non-native invasive plants were provided to the Rapid Assessment Team by the Forest Leadership Team as part of the in-briefing process. The objectives identify short term emergency mitigation to be performed and long term recovery efforts to be planned.

Goal: Reopen Grazing Allotments

1. Infrastructure Assessments

- Inventory and assess range developments for damage as a result of the Wallow Fire, including fire suppression activities, and impacts from any potential flooding which occurs as a result of effects of the fire. Range developments include allotment boundary fences, pasture fences, stock water ponds, spring developments and drinkers, windmills, troughs, pipelines, corrals, etc. Make recommendations for repair, removal, reconstruction, or relocation.

2. Vegetation Condition Assessments

- Inventory and assess range vegetation response to the fire to facilitate restocking;

taking into consideration site potential, ecological condition, presence of desirable vegetation, noxious and invasive plants, livestock management programs, and burn severity within the allotment/pasture.

Goal: Compliance with the Forest Land and Resource Management Plan and the Allotment Management Plans

1. Section 18 Reviews

- Continue livestock grazing activities consistent with allotment management plans and NEPA decisions. Complete livestock non-use agreements for resource protection measures as necessary. Conduct Section 18 Reviews of existing NEPA decisions for grazing allotments affected by the Wallow Fire in response to potential change in circumstances that have occurred as a result of the fire.

Goal: Noxious and Non-Native Invasive Plant Mitigation

1. Monitoring and treatment of noxious and non-native invasive plants

- Monitor for weed infestations in response to the potential for existing population expansion based on effects of the fire, suppression activities, and BAER treatments; taking into consideration areas of disturbance from suppression activities, rehabilitation activities, natural weed distribution points and patterns such as roads, trails, and areas of disturbance.

2. Treat new and existing populations of noxious and non-native plants

- Treat located weed infestations as indicated in the 2008 Decision Notice for the Implementation of the Apache-Sitgreaves National Forests Integrated Forestwide Noxious or Invasive Weed Management Program.
- Implement sanitation procedures to preclude seed of noxious and non-native invasive plants from entering burned areas. Sanitation procedures should also be implemented for any long-term restoration actions.

DESCRIPTION OF ACTION RECOMMENDATIONS RANGE RESOURCES:

Recovery activities and/or treatments by resource and issue area are presented below, including any associated change in condition assessments recommended to inform decision making processes.

Action Recommendation #1 for Range Resources:

1. Action: Condition Assessment and Replacement of Range Improvements

2. Action Description:

Prioritize condition assessments of range improvements on an allotment and pasture basis, responsive to management needs of the allotment for livestock reentry. Pastures and associated range improvements within unburned and low severity burn areas of the fire should be the focus for initial assessments. Improvements in these areas are expected to be the least impacted by fire; in many cases requiring maintenance and repair rather than reconstruction. These allotments and pastures are also anticipated to be areas where livestock grazing will be reinstated first, following deferrals post fire. All pasture fences and allotment boundary fences will need

to be assessed, maintained, and/or reconstructed in order to properly manage and contain permitted livestock. However, focusing initial assessment in areas where the earliest potential exists for livestock entry will help facilitate restocking in the shortest timeframe.

Additional Considerations:

- During reconstruction efforts, fences should be cleared of standing dead trees for approximately 50 feet within the burn areas, or at a sufficient distance to protect fences from falling snags. Hazard trees should also be cleared around water developments.
- Constructed fences should be built to Forest Service standards and guidelines.
- Priority should be given to National Forest boundary fences in order to address unauthorized livestock issues from lands of adjacent ownership. Survey and/or resurvey of boundary lines may be needed in some areas.
- Old, damaged and unusable materials such as metal posts and wire should be removed as part of the reconstruction process.
- Stock water ponds were generally not directly affected by the fire, however are expected to fill with sediment and ash as a result of overland flows and post fire flooding. It may be necessary to clean sediment and ash from ponds more than once until upland areas stabilize.
- Priority should be given to cleaning tanks in the following 6th code HUC Watersheds that drain into high value native fishery resources, including (see action items for wildlife, fish and rare plants):
 - South Fork Little Colorado River
 - Rudd Creek
 - Riggs Creek - Nutrioso Creek
 - Colter Creek
 - Paddy Creek – Nutrioso Creek
 - Auger Creek
 - San Francisco River – Luna Lake
 - Coleman Creek
 - Fish Creek
- Cultural resource surveys and biological surveys are expected to be needed as part of most reconstruction activities.
- Give consideration to areas where temporary fences may be constructed to mitigate sensitive resources, such as riparian areas, and which would allow for restocking of pastures.
- Fences and watergaps associated with drainages and crossings may require repeated maintenance and/or reconstruction as a result of debris flows and flooding.

Opportunities:

- Opportunities may exist in some areas where fences and water developments may be reconfigured to address resource issues in a more efficient and effective manner, and where realignment may open previously unavailable areas to livestock access. Reconfiguration of developments may be subject to NEPA analysis and consultation.
- Opportunities also exist to develop research on changes in water flow associated with springs as a result of change in vegetative structure.
- Further opportunities exist to work with partners, other agencies, and permittees to remove old fences, assess condition of existing improvements, and/or to cost share reconstruction of new improvements.

Timeframe:

- Years 0-2: Complete condition assessments of range improvements within pastures and allotments where reconstruction will help facilitate restocking in the shortest timeframe. Begin reconstruction of range improvements.
- Years 1-3: Continue reconstruction of range improvements within pastures and allotments based on basic management needs for livestock reentry. Continue condition assessments.
- Years 3-10: Complete condition assessments and reconstruction of range improvements through year 5.

3. Which resource issue area(s) does it address? Re-opening Range Allotments
4. How does the action relate to damage or changes caused by the event?

The Wallow Fire burned all or portions of 45 grazing allotments. Forest GIS records indicate approximately 280 miles of fence line, 16 spring developments, 75 stock water ponds were within the moderate and high severity burn acreages of the affected allotments. An additional 541 miles of fence line, 40 spring developments, 212 stock water ponds and 3 well/windmill structures were within the low severity burn acreages of the affected allotments. Assessment, repairs and replacement of range improvements will help facilitate reopening allotments for livestock grazing.

5. What are the consequence(s) of not implementing the action?

Structural range developments maintain and support grazing management (including water developments, livestock handling facilities and fences) and contribute to meeting objectives contained in the land and resource management plan and the allotment management plan.

6. What is the cost of the action?

Estimated labor, equipment, & materials for assessment of damaged improvements

Category	Description	Cost
Personnel	Grade @ Cost/Day X # Days = Costs	
	Project Manager(s) (Training, Orientation, Direction/Oversight/Agreements/ Contracts) 2 GS-11 PFT @ average 150 days/yr Field Technician(s): 4 GS-5/7 Seasonal @ \$200/day average 480 days/yr = (range/biological/archaeological field work and surveys)	\$96,000
Equipment	Item @ Cost/Each X Quantity = Cost	
	3 Trucks @ 4 Months, @ \$325/Month FOR) and (\$.035/mile @ 1,500 miles/yr) =	\$6,300
Materials & Supplies	Item @ Cost/Each X Quantity = Cost	
	3 GPS Units @ \$300/ea = \$900 3 Digital Cameras @ \$300/ea = \$900 3 Sets PPE @ \$150/ea = \$450	\$2,250
Total		\$104,550

Cost Assumptions:

- Projecting costs of initial survey will be highest the first and second year following the fire and will be conducted within allotments and pastures based on basic management needs for livestock reentry.
- Multiple trips to construction sites for construction and contract administration.
- Biological and cultural resource surveys as part of reconstruction and maintenance activities.
- Permittee and partner involvement in surveys and assessments to reduce cost.

Projected long-term range development repair and reconstruction costs as a result of the fire

Item	Amount	Unit Cost \$	Total Cost \$	Notes
Fence	415 miles	\$3.20/ft or \$16,896/mi	\$7,016,064.00	Standard barbed, 4 strands, bottom wire smooth. Rough country- > 15% slopes or < 15% slopes with shallow soils
Tree removal along fence lines	300 miles	\$1,000/mile	\$300,000.00	Clear standing dead trees for 50 feet or more along fence lines in the moderate, high & some of the low severity burn areas
Fence removal	280 miles	\$8,000 mile	\$2,240,000.00	Fence removal in the moderate and high severity burn areas.
Spring development	58 springs	\$1,313 ea	\$76,154.00	

Item	Amount	Unit Cost \$	Total Cost \$	Notes
Trough	30 troughs	\$1.40/gal or \$350.00 ea	\$10,500.00	Prefabricated 250 gallon capacity troughs
Trick tank/ Tanks/ water developments	3 tanks	\$5,000 ea	\$15,000.00	Pond sealing or lining with flexible membrane/tank replacement
Well/Windmills	2 structures	\$6,000 ea	\$12,000.00	Well/windmill repair/replacement
Corral	44 corrals	\$3,500 ea	\$154,000.00	Standard barbed/smooth wire fence to gather and control livestock
Stock water pond cleanout	384 ponds	\$170.00/yd ³ (average 34 yd ³ ea) or \$5,780 ea	\$2,219,520.00	Tank cleaning of an average 34 cubic yards per tank. One entry for all tanks within the fire perimeter
Stock water pond sediment removal	288 ponds	\$170.00/yd ³ (average 34 yd ³ ea) or \$5,780 ea	\$1,115,540.00 (-\$549,100.00)	Tank cleaning a second time for additional sediment capture within extreme, very high, and high 6 th code HUC Watersheds at risk from fire effects
Stock water pond sediment capture and removal	95 ponds	\$170.00?yd ³ (average 34 yd ³ ea) or \$5,780 ea	(\$549,100.00)	Tank cleaning a 3 rd time for sediment capture and ash removal within 6 th code HUC Watersheds associated with high priority fisheries resources
TOTAL			\$13,158,778.00	

Cost Assumptions:

- Projecting 25% of fences and structural developments were lost or damaged by the fire in low severity burn areas.
- Fences within burn areas should be cleared of standing dead trees at a sufficient distance to protect fences from falling snags.
- Costs associated with fence removal will vary by terrain, but may be up to half of the construction cost.
- Projecting 1 corral per allotment lost or damaged.
- Projecting stock water ponds (pit tanks, stock water tanks) and their landscape position in relation to values at risk within extreme, very high, and high priority 6th code HUC's for cleanout of ash and sediment from runoff. Cleaning intervals of twice to three times to reduce ash and sediment transport to stream portions of these watersheds. Half of projected cost for this action is included in the Wildlife/Fish Report and not reflected in the cost total above.

Action Recommendation #2 for Range Resources:

1. Action: Assessment of Rangeland Vegetation Condition
2. Action Description:

The period of non-use by livestock which may be necessary after a fire varies considerably with vegetative composition, site specific conditions, resource conflicts, and burn severity.

Allotments will need to be assessed on an individual basis to determine appropriate pastures, management, and timing for reinstating livestock grazing. Management options which can be taken for permitted livestock include stocking within pastures of low severity burn and unburned acreage and/or relocation of livestock to other available allotments and pastures until areas most significantly affected by the fire have available capacity. Other management options to be considered when developing annual operating plans include changing class of livestock, adjusting stocking rates, and changing the length and frequency of livestock use.

Rangeland vegetation condition and ecological status assessments inside the burn area will need to be accomplished as allotments and/or pastures are re-opened to livestock grazing activities. Criteria for determination of when conditions are ready to reopen grazing activities should be based on soil cover by live plant and litter, perennial forage production, plant vigor, species diversity consistent with site potential, and considerations for any noxious/invasive plants which may have established as a result of the fire. Assessments on vegetation should be prioritized by pasture boundaries and burn severity in order to determine when conditions are suitable for livestock authorizations.

Vegetation within unburned and low severity burn areas should be the first priority for assessment. Low severity burn areas are characterized by incomplete consumption of both canopy and ground fuels and contain adequate effective ground cover to protect the site from accelerated levels of soil erosion. Low severity burn areas are expected to be the least impacted by fire, in most cases requiring the least amount of time for herbaceous growth and recovery and which would allow for livestock reentry in the shortest timeframe. Rapid assessments in low severity burn areas should take into consideration ground cover to provide for soil resources, vigor and health of established plants, and allow for seed production in key forage species.

Vegetation conditions within high severity burn areas are expected to be the most significantly impacted by fire. High severity burn areas are characterized by complete consumption of both canopy and ground fuels resulting in ash 1 to 3 inches thick and minimal effective ground cover. Natural re-establishment of herbaceous cover may take multiple years to reach pre-burn cover conditions in areas most significantly impacted by fire. Areas of high burn severity were aeri ally seeded to provide for re-establishment of vegetative ground cover. The seed mix for the Wallow Fire is comprised mainly of fast-growing cereal grain, which provides for quick re-establishment of cover, along with a small percentage of native seeds to assist in the recovery of native species. This treatment is intended to provide vegetative ground cover fairly quickly to reduce the amount

of erosion within the burned area, especially within the mixed conifer sites which lack a pre-burn herbaceous seed source. The treatment was implemented to increase site productivity and assist in minimizing detrimental effects of the burn to watershed condition.

Vegetation condition within the moderate burn severity areas are expected to be the most variable in recovery timeframe and may require livestock deferment to allow for plant establishment and recovery. Moderate burn severity areas are characterized by partial consumption of both canopy and ground fuels. Needle cast from scorched trees is expected to provide some protection for soils from surface runoff and erosion. However, vegetative recovery in these areas may take significantly longer to achieve than low severity burn areas. Criteria for consideration in restocking within areas of predominantly moderate and high severity burn should include effective litter cover, fair soil condition, mid-seral similarity as defined by the Terrestrial Ecosystem Survey of the Apache-Sitgreaves National Forest, 100 lbs dry weight equivalent forage production/acre or greater, and seventy-five percent of expected natural basal vegetation.

Additional Considerations:

- Where pastures contain a matrix of multiple severity burn acres, use site specific conditions to determine availability for stocking. Even though areas within the pasture may still be recovering from the fire, the pasture may be stocked. Take into consideration the condition and percentage of usable forage in relation to high and moderate severity burn areas and the potential for livestock to impact these areas.
- Some areas within moderate and high severity acres are planned for additional seeding and mulch treatments which is expected to aid in recovery.
- Attention should be given to potential impacts to riparian areas and other sensitive areas. Assess the need for mitigation measures, such as site specific fencing and reconfiguration of range improvements; may be subject to NEPA analysis, cultural resource surveys, and consultation.

Opportunities:

- Opportunities may exist for research on restocking criteria and coordination of all research activities associated with resource responses to effects of the fire.
 - Multiple Indicator Monitoring of Stream Channels and Streamside Vegetation transects will likely be re-read in 2012 with the National Riparian Service Team. These transects were established prior to the Wallow Fire.
 - Opportunities may exist in some areas where allotments/pastures were not being grazed, for various reasons, prior to the Wallow Fire. These areas may be opened to livestock access, depending on reasons for deferment and subject to possible NEPA analysis and consultation.
- Alpine RD Raspberry Allotment (Oak Canyon pasture)
- Fish Creek Allotment

- Hannagan Allotment
 - KP Summer Allotment
 - Sprucedale-Reno Allotment (Double Cienega, Conklin, Snake, Perry Spring, Cat, & Black River pastures)
 - West Fork Allotment (Northwest, Middle west, and South pastures)
 - Lower Campbell Blue Allotment
 - Black River Allotment
 - Nutrioso Summer Allotment (Auger and Miller pastures)
- Springerville RD Big Lake Allotment
- Udall Allotment (Exclosure #4 and Exclosure #3 pastures)

Timeframe:

- Years 0-2: Complete condition assessments on pastures and associated range improvements within unburned and low severity burn areas.
- Years 1-3: Continue condition assessments, including areas and pastures most significantly impacted by fire.
- Years 3-10: Complete condition assessments.

3. Which resource issue area(s) does it address? Re-opening Range Allotments
4. How does the action relate to damage or changes caused by the event?

The Wallow Fire burned all or portions of 45 grazing allotments. Range vegetation will be affected to varying degrees by pasture and allotment, depending on fire severity. All areas will require assessment of vegetation condition in order to facilitate re-opening allotments.

5. What are the consequence(s) of not implementing the action?

The period of non-use by livestock after a fire varies considerably with vegetative composition, site conditions, resource conflicts, and burn severity. Rangeland vegetation condition and ecological status assessments inside the burn area need to be accomplished as allotments and/or pastures are re-opened to livestock grazing activities.

6. What is the cost of the action?

Labor and equipment for vegetation condition assessments

Category	Description	Cost
Personnel	Grade @ Cost/Day X # Days = Costs	\$78,000
	Project Manager(s) (Training, Orientation, Direction/ Oversight/ Assessment) 3 GS-11 PFT @ average 90 days/yr Field Technician(s): GS-7/9 PFT @ \$260/day average 300 days/yr	

	= \$78,000	
Equipment	Item @ Cost/Each X Quantity = Cost	\$17,200
	4 Trucks @ 3 Months, @ \$325/Month FOR) and (\$.035/mile @ 1,000 miles/yr)	
Total		\$95,200

Action Recommendation #3 for Range Resources:

1. Action: Section 18 Reviews of NEPA Analyses and Decisions for Allotment Management Plans and Permit Administration
2. Action Description:

In the event that resource conditions on the most significantly affected allotments are so altered that livestock management practices, as outlined in existing Allotment Management Plans, can no longer be implemented; the allotment should be scheduled for additional NEPA analysis. Taking into consideration the Forest Range NEPA workload, these allotments should be added to the NEPA schedule prepared under the Rescissions Act.

Where changed circumstances as a result of the fire are not as apparent, review existing NEPA analysis and associated decisions for currently permitted livestock grazing activities. Document the results of the review in a supplemental information report, including conclusions of the review on whether or not a corrective action, supplemental documentation, or revision is needed. If no additional consultation or revision is needed, document the process. If the review concludes that supplementation is necessary, complete and update the record. If revision is necessary, the allotment should be scheduled for additional NEPA analysis by adding the allotment to the NEPA schedule prepared under the Rescissions Act.

Livestock non-use related to resource protection measures as a result of loss of forage and range improvements due to the fire should be documented in a resource protection non-use agreement. If at least 90 percent of permitted livestock numbers are not going to be placed on the allotment, complete a Memorandum of Understanding (MOU) between the Forest and the Permittee. The MOU is required if the need for non-use will continue for more than 1-2 years in order to protect the interest of the permittee and agency. Document the need for non-use; include additional information on anticipated NEPA analysis, ongoing actions for reconstruction of range improvements, and anticipated timeframes for restocking.

Timeframe:

- Years 0-2: No Action on Section 18 Reviews; complete nonuse agreements for range protection and development.
- Years 1-3: Conduct Section 18 Reviews of allotments with changed conditions.
- Years 3-10: Determine NEPA priorities and amend the Forest NEPA Rescissions Act Schedule.

3. Which resource issue area(s) does it address? Continued Livestock Grazing
4. How does the action relate to damage or changes caused by the event?

Change in Permit administration as a result of loss of range improvements and forage due to the fire. Continue grazing activities consistent with existing NEPA decisions. Determine if supplementation, correction, or revision of NEPA analysis is needed due to a change in circumstances related to the environmental effects of fire.

5. What are the consequence(s) of not implementing the action?

Requirements in compliance with terms and conditions of permits and FSH1909.15, Chapter 10 Section 18.1

6. What is the cost of the action?

Labor costs of Section 18 Reviews

Category	Description	Cost
Personnel	Grade @ Day X # Days = Costs	
	ID Team Leader (Facilitation/Documentation) 1 GS-12 @ average 3 days/allotment/20 allotments Program Manager(s) (Assessment/Documentation/Team Participation) 4 GS-11 @ average 3 days/allotment/20 allotments Program Manager(s) (Consultation) 2GS-11 PFT @ 1 day/allotment 20 allotments	
Total		

The Forest projected cost of establishing an ID Team and conducting Section 18 Reviews is \$5,000 per allotment. An estimated 15 to 20 allotments will require a review process at varying scales for a total project cost of up to \$100,000. Opportunities exist to batch allotment reviews where issues and conditions are similar in order to reduce projected costs.

RANGE MONITORING AND RESEARCH OPPORTUNITIES:

Monitoring and research opportunities recommended for natural recovery processes, effectiveness of treatments, and/or opportunities for research, or needed administrative studies identified to provide essential information related to damage and changes in resources caused by the fire are listed below.

Action Recommendation #4 for Range Resources:

1. Action Description: Ground truth and use the Common Non-Forested Vegetation Sampling Procedures Draft Field Guide Protocol to meet range vegetation monitoring objectives for reopening allotments.

2. How will the activity provide essential information related to damage or changes caused by the event? The combination of methods in the draft protocol can provide data to assess vegetation response post fire as well as data for trend monitoring. The draft protocol has the potential to suffice for monitoring of post fire rangeland vegetation responses and rangeland management actions as well as providing data needed to operate the PHYGROW vegetation model and BRASS-G burning Risk Advisory Support System for Grasslands in support of the fuels program. The draft protocol combines various monitoring methods used to capture information on a variety of attributes such as ground cover, plant frequency, dry-weight-rank, production estimates, woody species characterization, and optional canopy cover by species using mid-scale vegetation and landsat imagery to determine when to go to the field. The draft protocol is a remote analysis tool to answer the critical questions related to rangeland resources: 1) to what extent is ground cover meeting and/or moving towards pre-fire condition? 2) to what extent is post fire production meeting and/or moving towards pre-fire production in pastures/allotments? There is a correlation with herbaceous trends, pace-transect data, and other range related transect data, however there is not a direct crosswalk between the two methodologies. The draft protocol will not alleviate the need for field data collection to verify the imagery, but may significantly reduce the need to conduct individual site visits and field sampling within each pasture for each allotment in the burn area to assess vegetation condition in order to authorize livestock entry.

3. What are the consequences(s) of not implementing the activity? Traditional approach to assessments of vegetation condition, field work, transects and data collections within each pasture (within the low and moderate burn severity areas) by a rangeland specialist to collect and interpret data in order to authorize livestock entry.

4. What is the cost of the activity?

Labor, equipment, materials of CNVSP Inventory/Assessment

Category	Description	Cost
Personnel	Grade @ Cost/Day X # Days = Costs	
	Project Manager(s) Modeling and Program Oversight 1 GS-11/12 PFT @ 350/day average 20 days per yr = \$7,000 Rangeland/Fuels Specialists (Training, Orientation, Data Collection) 2 GS-11 PFT @ \$300/day average ½ day(s) per TEU Unit = \$17,400 Field Technician(s): GS-5/7/9 PFT @ \$200/day average 2 days per TES Unit = \$23,200	\$47,600
Equipment	Item @ Cost/Each X Quantity = Cost	
	2 Trucks @ 4 Months, @ \$325/Month FOR) and (\$.035/mile @ 1,500 miles/yr) =	\$5,400
Materials & Supplies	Item @ Cost/Each X Quantity = Cost	
	2 Tablets \$5,000	\$11,650

	2 GPS Units @ \$300/ea = \$600 2 Digital Cameras @ \$300/ea = \$600 2 Sets PPE @ \$150/ea = \$300 Misc. materials and supplies \$500	
Total		\$65,000

5. What is the source of funding? The draft protocol provides potential program benefits to Rangeland Management (NFRG), Range Vegetation (NFVW), and Fuels (WFHF).
6. Who will carry out the activity? District, Forest, and Regional employees.

Action Recommendation #5 for Range Resources:

1. Action Description: Wallow Fire Response Project.
2. How will the activity provide essential information related to damage or changes caused by the event? The project will include an assessment of post-wildfire forage response in montane grasslands on the Apache-Sitgreaves National Forest. Macro-plots will be located around previously established Parker 3-Step monitoring locations, primarily in the montane grassland vegetation type. These locations were chosen because of the availability of baseline data. It is anticipated that the locations will be selected on the Greer Allotment (Fish Creek Pasture, Railroad Pasture), Voight Allotment (New Pasture), 26 Bar Allotment in the School Knoll pasture, Burke Allotment in the SU pasture and the Hayground Allotment. Additional sites may be selected in the Ponderosa Pine type. The project will largely characterize the forage response post fire on the montaine grasslands, but will also likely look at ponderosa pine areas.

Each monitoring location will be established as a 300ft x 100-200ft macro-plot marked by two steel posts which define the baseline. The long spines of the T-posts indicate transect direction, which are perpendicular to the baseline that runs between the T-posts. Post A is designated as the post on the left-hand side at the 0.00 m mark when standing on the baseline and facing the direction transects are run. The juxtaposition of the Parker 3-Step transects will determine the exact dimensions of the macro-plots. Attributes to be measured include: residual biomass, plant mortality, foliar cover, canopy cover, plant frequency, standing biomass, and soil cover including: basal cover, litter and gravel/rock.

The use of high resolution landscape (Gigapan) photography, for use as quantitative measurements and qualitative assessments for fire response monitoring application and education will likely be explored as well.

3. What are the consequences(s) of not implementing the activity? Limited forest ability to respond to questions and concerns associated with post fire forage response in grassland communities.
4. The project is being initiated during the summer of 2011 and data will likely be collected for a period of 3-5 years. This project is being conducted as part of the Cost-Reimbursable Agreement with the University of Arizona, so there is no direct cost of the ongoing project to the Forest.

5. What is the source of funding? Cost Reimbursable Agreement with the University of Arizona.
6. Who will carry out the activity? Regional employees and University of Arizona employees.

DESCRIPTION OF ACTION RECOMMENDATIONS NOXIOUS AND NON-NATIVE PLANTS:

Action Recommendation #1 for Noxious and Non-Native Plants:

1. Action: Noxious and Non-Native Plant Monitoring
2. Action Description:

Complete development of a noxious and non-native plant monitoring and treatment plan based on fire suppression, rehabilitation, and fire effects associated with the Wallow Fire. Direct effects of the Wallow Fire which reduced tree canopy and ground cover, along with direct effects of suppression and rehabilitation actions, all have the potential to result in conditions favorable for the introduction and rapid expansion of existing and new noxious and invasive plant populations. Long-term rehabilitation treatments for weed infestation consists of annual weed surveys in areas described below and treatment of any weed populations found.

Considerations for priority noxious and invasive plant survey and monitoring should, at a minimum, include:

- Survey and monitor areas of direct fire suppression and rehabilitation activities, such as fire camps, staging areas, spike camps, dozer lines, and vehicle concentration areas.
- Sample surveys inspecting post-fire roads, parking areas, trails.
- Inspecting areas where restoration activities are likely to occur, including recreation sites and range facilities.
- Inspecting areas within the fire perimeter associated with any known locations of weed populations.
- Sample survey of seeded areas in the first 150 feet adjacent to roadways that bisect the seeded areas.
- Sample surveys of the Black River, Blue River, Luna Lake and Hannagan for potential non native invasive aquatic species.
- Adding contract specifications for prevention of additional introduction and spread of weeds.

Additional Considerations:

- Sample surveys should be designed to inspect strategic areas representative of locations where new populations are expected to occur such as near roads and constructed features.
- Personnel performing surveys should be trained in identification of noxious and non native invasive plants.
- All collected data and documentation regarding species location, population expansion, and new site records should be entered into Forest databases.
- Routes and timing of surveys should be recorded to prevent overlap.

Opportunities:

- Opportunities exist to partner with local weed groups and working with volunteers to conduct monitoring and reduce costs.

Timeframe:

- Years 0-2: Surveys should be conducted biannually the first full year following the fire, one each post growing season and early summer (September/June), and annually thereafter.
- Years 1-3: At least three years, and possibly up to five years, of long-term monitoring will be needed.
- Years 3-10: Completed long-term monitoring through year 5.

3. Which resource issue area(s) does it address? Spread of noxious and invasive plants monitoring
4. How does the action relate to damage or changes caused by the event?

Keeping new or expanding weed populations from becoming established is a high priority across ownership boundaries, including federal, state, tribal and private lands. Monitoring and survey of known weed populations and field identification and location of new populations in order to prioritize treatment actions is a key point in restoring desired native vegetation within the burn area and reducing long-term costs of containment, control and eradication.

5. What are the consequence(s) of not implementing the action?

Limited ability to treat new infestations; increased costs of treatment and resource restoration as infestations increase in scope and extent.

6. What is the cost of the action?

Labor, equipment, materials of invasive plant monitoring/survey

Category	Description	Cost
Personnel	Grade @ Cost/Day X # Days = Costs	
	Project Manager(s) (Training, Orientation, Direction/Oversight/Data Entry) 1 GS-7/9 PFT @ 30 days/yr Field Technician(s): 2 GS-3 Seasonal @ \$100/day average 60 days/yr = \$12,000 ea	\$24,000
Equipment	Item @ Cost/Each X Quantity = Cost	
	2 Trucks @ 2 Months, @ \$325/Month FOR) and (\$.035/mile @ 1,000 miles/yr)	\$2,700
Materials & Supplies	Item @ Cost/Each X Quantity = Cost	
	2 GPS Units @ \$300/ea = \$600 2 Digital Cameras @ \$300/ea = \$600 2 Sets PPE @ \$150/ea = \$300	\$2,100

Monitoring Acres	Survey approximately 41,500 acres annually	
Total		\$28,800

Action Recommendation #2 for Noxious and Non-Native Plants:

1. Action: Noxious and Non-Native Plant Treatments and Preventative Measures
2. Action Description:

Following actions to survey and map weed infestations at strategic locations throughout the fire area, treat populations of located and identified noxious and non-native plant infestations as indicated in the Decision Notice for the 2008 Environmental Analysis for Implementation of the Apache-Sitgreaves National Forests Integrated Forestwide Noxious or Invasive Weed Management Program. Where feasible, non-native plant species should be controlled, including removal of species using approved integrated pest and management methods as suggested in the EA. Plants in seed must be bagged and removed off site and appropriately disposed of. Herbicides and treatment methods should be selected by management unit in accordance with the Forest Weed EA.

If reseeded in burned areas is to continue on moderate severity burn areas, then appropriate sanitation measures should be or continue to be implemented. For weed-free seed, there should be a specification that seed should be tested for purity and germination rates. Before accepting delivery of seed shipment, the contractor should provide written evidence that the seed conforms to the purity and germination requirements in the specification. All seed should have no less than 80% germination and 90% purity. Inert matter should be less than 10%. Seed should have been tested within the last 120 days and contain no noxious weed species.

Additional Considerations:

- Personnel performing treatments should be qualified in herbicide application and should also be trained in identification of noxious and non-native invasive plants.
- Consider amending the Forestwide Weed EA to use biological control methods for weed treatments.
- Ensure that all materials introduced for purposes of restoration such as hay, straw, mulch, gravel, and seed meet requirements to be weed free.
- Ensure that all vehicles used from outside areas undergo washing and inspection to remove transported seed or other propagative materials of noxious and non-native invasive plants.
- Ensure that all contracts issued include language for appropriate sanitation to prevent introduction of seed from noxious and non-native invasive plants.

Timeframe:

- Years 0-2: Implement preventative sanitation measures to minimize additional infestations. Treat located weed populations as surveys are completed.
- Years 1-3: Treat located weed populations as surveys are complete and populations located.
- Years 3-10: Complete long term treatments through year 5.

3. Which resource issue area(s) does it address? Spread of noxious and non-native invasive plant species

4. How does the action relate to damage or changes caused by the event?

Keeping new or expanding weed populations from becoming established is a high priority across ownership boundaries. Prevention and treatment of invasive populations prior to these populations becoming established and expanded is a key point in restoring desired native vegetation within the burn area and reducing long term cost of containment, control and eradication.

5. What are the consequence(s) of not implementing the action?

Left untreated, the spread of noxious and non-native invasive plants will result in increased costs of treatment and resource restoration as populations increase in scope and extent.

6. What is the cost of the action?

Labor, equipment, materials of invasive plant treatments

Category	Description	Cost
Personnel	Grade @ Cost/Day X # Days = Costs	
	Project Manager(s) (State Certified Applicator) 1 GS-7/9 PFT @ 60 days/yr Field Technician(s): 2 GS-3 Seasonal @ \$100/day average 60 days/yr = \$12,000	\$12,000
Equipment	Item @ Cost/Month and/or Cost/Mile = Cost	
	2 Trucks @ 2 Months, @ \$325/Month FOR) and (\$.035/mile @ 1,000 miles/yr)	\$2,000
Materials & Supplies	Item @ Cost/Each X Quantity = Cost	
	Herbicides to be selected by management unit in accordance with the Forestwide EA \$2,000 2 Backpack sprayers @ \$100/ea = \$200 2 Sets PPE @ \$150/ea = \$300	\$2,500
Total		\$16,500
Acres Chemically Treated	Item @ Cost/Acre X Quantity = Contract Cost Treat estimated 6,000 acres/year @ \$65.00 acre	\$390,000

Assumptions:

- Not all acres identified for survey will need to be treated; this figure is based on an estimate of weed establishment on approximate 1.2% of the burn area.
- Arizona Department of Transportation will treat weeds along the highway right-of-way.

REFERENCES AND DATA:

Wallow Wildfire BAER Resource Reports; Hydrology, Soils, Range, Noxious and Non Native Invasive Plants, July 2011

Apache-Sitgreaves National Forest Resource Safeguards - Watershed Stability and Recovery through Soil Stabilization and Recovery & Vegetation Regeneration and Recovery, as Amended October 22, 2010

Apache Sitgreaves National Forests Integrated Forestwide Noxious or Invasive Weed Management Program, 2008

Noxious and Invasive Non-Native Plants Known to Occur or Potentially Occurring on the Apache-Sitgreaves National Forest, 2008

Common Non-forested Vegetation Sampling Procedures Draft Field Guide, April 2011

GIS layers used; Wallow Fire Burn Perimeter, Soil Burn Severity BARC Image, Vegetation Condition (RAVG) Image Map of the Wallow Fire, Allotments/Pasture Boundaries, Streams and Riparian Areas, Range Improvements, 6th Code HUC Watersheds within the Wallow Fire, 6th Code HUC Watersheds at Risk within the Wallow Fire, NFS Landline Boundary within the Wallow Fire.

All spreadsheet data used in the report can be found at:

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All maps generated and used in this report can be found at:

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