Date of Report: 11/01/2017

BURNED-AREA REPORT
(Reference FSH 2509.13)

PART I - TYPE OF REQUEST

A. Type of Report

[X] 1. Funding request for estimated WFSU-SULT funds
[ ] 2. Accomplishment Report
[ ] 3. No Treatment Recommendation

B. Type of Action

[] 1. Initial Request (Best estimate of funds needed to complete eligible rehabilitation measures)

[X] 2. Interim Report
[X] Updating the initial funding request based on more accurate site data or design analysis
[ ] Status of accomplishments to date

[ ] 3. Final Report (Following completion of work)

PART II - BURNED-AREA DESCRIPTION

A. Fire Name:Quinn

B. Fire Number: NV-HTF-020239

C. State: NV

D. County: Humboldt

E. Region:04

F. Forest: 17

G. District: Santa Rosa

H. Date Fire Started: 08/01/2017

I. Date Fire Controlled: 08/03/2017 2000

J. Suppression Cost: $2,200,000

K. Fire Suppression Damages Repaired with Suppression Funds
1. Fireline waterbarred (miles): none to date
2. Fireline seeded (miles): none to date
3. Other (identify):

L. Watershed Number: 160402010301

M. Total Acres Burned:
NFS Acres(3631) Other Federal ( ) State ( ) Private ( )

N. Vegetation Types: Great Basin Big Sage, grass, Mahogany

O. Dominant Soils:Cleavage-Tusel-Anawalt association and Ninemile-Softscrabble-Sumine association
Cleavage- loamy-skeletal, mixed, fridgid Lithic Argixerolls
Tusel- Loamy-Skeletal, mixed Argic Pachic Cryoborolls
Anawalt- Clayey, montmorillonitic, frigid Lithic Xerollic Haplargids
Ninemile- Clayey, montmorillonitic, frigid Lithic Argixerolls

Softscrabble- Loamy-skeletal, mixed, frigid Pachic Argixerolls
Sumine- Loamy-skeletal, mixed, frigid Aridic Argixerolls

P. Geologic Types: Rhyolitic and dacitic volcanic rocks

Q. Miles of Stream Channels by Order or Class: 9.87 intermittant; 5.6 perrenial

R. Transportation System

Trails: 0 miles Roads: 4.34 miles

PART III - WATERSHED CONDITION

A. Burn Severity (acres): 749 (low) 2372 (moderate) 149 (high)

B. Water-Repellent Soil (acres): 250 moderate repellency (10% of moderate and high severity fire area based on sampling)

C. Soil Erosion Hazard Rating (acres):
2236.5 (low) 1397.7 (moderate) 0 (high)
Wind erosion hazard class is 8

D. Erosion Potential: .25 tons/acre

E. Sediment Potential: .0004 cubic yards / square mile

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years): 1-3yrs

B. Design Chance of Success, (percent): 90

C. Equivalent Design Recurrence Interval, (years): 5

D. Design Storm Duration, (hours): 3.3

E. Design Storm Magnitude, (inches): 1.14

F. Design Flow, (cubic feet / second/ square mile): .1350

G. Estimated Reduction in Infiltration, (percent): 10

H. Adjusted Design Flow, (cfs per square mile): .1485

PART V - SUMMARY OF ANALYSIS

A. Describe Watershed Emergency:

The Quinn Fire burned 3631 acres of priority sage grouse habitat. The fire area and adjacent ridges are considered a benchmark locale for the ecotype correlations. As such there were very high quality native plant communities in the fire area. Due to the moderate burn severity all of the sage brush was consumed except for the last few inches of the main stems. All of the grasses and forbs were consumed including the root crowns of the grasses. The majority of the duff and vegetative matter was also consumed. This level of vegetative matter consumption means that the seed bank has been severily impacted by the fire. To add to the concern the fire area access was along forest and county roads that have known populations of highly invasive weeds such as

cheat grass, medusa head and several species of non-native thistle. There was no weed wash provided for the responsing mechanical equipment so any number of additional species may have been introduced to the area inadvertently by the first responders. Due to the highly wind erosive nature of the soils, the potential exists to easily exceed the annual soil loss tolerance for the soil. Unfortunatly the fire area is subject to high winds and a high per acre occurance of dust devils that were removing any residual ground cover during the assessment phase.

In order to address the emergency the forest is proposing to seed the upper slopes of the fire area that were burned to either moderate or high severity. The included map is the seeding units based on ground seeding which excludes areas over 30% slope. For aerial application, if approved, the units will be made less complex (ie small unburned areas and steep areas will be seeded). Additionally the forest is proposing to repair the pasture fence that protects approximatly two thirds of the fire area and install temorary fence around the portion of the fire that spilled into a second pasture in order to allow the treatment areas to recover with out permitted grazing for two growing seasons as indicated in the Forest Plan.

Please see below for a risk rating of the two identified values at risk. The risk ratings were determined based on 2523.1 Exhibit 02.

B. Color Scheme Legend	
	Risk Level
	Very High
	High
	Intermediate (Where Treatments Are Recommended)

Value At Risk	Value Life (L), Property, (P), Resources (R)	Probability of Damage or Loss	Magnitude of Consequences	Risk	Discussion
Native plant community where invasive species or noxious weeds are absent or present in only minor amounts	**R**	Very Likely	Major	Very High	Adjacent fire areas in the same drainage have come back as predominantly invasive annuals. The vehicle access into the area passed through stands of medusa head as well as other invasive species
Soil Productivity	R	Likely	Moderate	High	The soils in the fire area are highly susceptible to wind erosion (class 8), the predicted wind erosion rates exceed the productivity loss rates (T value) for the soils.

B. Emergency Treatment Objectives: The objective of the proposed treatments is to maintain a productive mix of native species that will provide habitat for the native plant species that occur in the area. The native plant communities provide nessecary habitat for high profile species such as sage grouse and pygmy rabbits. Repairing the fencing in the area will enable the forest to exclude the permitted cattle from the area in order to privide for a two (2) growing season recovery period to allow the native species time and opportunity to become well rooted, recover their productivity and anchor the soil against wind erosion.

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

Land **85** % Channel **NA** % Roads **NA** % Other **NA** %

D. Probability of Treatment Success

	Years after Treatment		
	1	3	5
Land	90	95	95
Channel	NA	NA	NA
Roads	NA	NA	NA
Other	NA	NA	NA

E. Cost of No-Action (Including Loss): It is difficult to put a monitary value on the loss of 3631 acres of Priority Sage Grouse Habitat as well as prime grazing area. Without the proposed BAER treatment, is is expected that non-native/ invasive annual grasses and thistles will spread through the burned area, decreasing the quality of the habitat for sage grouse and decrease the value of forage production. A rough estimate of future costs related to non-BAER treatment is:

- ~~Aerial herbicide application EIS $ 100,000 (Glover, personal communication)~~
- ~~Pre emergent and post emergant herbicide applications $ 820,000 for both~~
- Reseeding the treated area $374,700 seed + $63,000 for aircraft + dragging accessable areas $15,000= $ 452,700
- ~~Repair burned out fence $57,000 (COTR, fencing, mileage, per diem)~~

~~Total measureable costs: $ 1,429,700~~

Unmeasurable items: soil productivity, forage production due to lost soil productivity for wildlife and livestock.

F. Cost of Selected Alternative (Including Loss): $243,849

G. Skills Represented on Burned-Area Survey Team: **A**= adjunct, consulted but not ordered

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

Team Leader: Robin Wignall

Email: rjwignall@fs.fed.us Phone: 775-778-6122 FAX: none

H. **Treatment Narrative:**

(Describe the emergency treatments, where and how they will be applied, and what they are intended to do. This information helps to determine qualifying treatments for the appropriate funding authorities. For seeding treatments, include species, application rates and species selection rationale.)

Land Treatments: aerial seeding 1158 acres with atv harrow for increased success rate and seed retention on site.

Initial update to acres proposed for treatment. Approximately 700 acres are proposed for aerial seeding that will also be used to monitoring effectiveness of native seed treatments at reaching emergency objectives of reducing invasive species following fire. Approximately 500 acres of the burn area will be used as non seeded control areas to compare against seeded areas.

The assessment team considered several alternatives to the propsoed action including:

- Staw mulch- this was not carried forward due to the excessive and disruptive winds that would remove the mulch from the site.
- Woodstrand mulch- not available on site, would have to be trucked in with potential introduction of additional weeds, forest pests and pathogyns.
- Wood staw- would double or triple the cost of the proposed action but would hold up to the winds. Is pest and pathogyn free. Not carried forward due to cost.
- Seeding with ground based equipment. There are too many rocks in the soil for the range drill to be effective (have free access through a partner) and not receive signifigant damage to the equipment. Atv based spreaders are the proposed backup method of treatment. Salary $40,000 including team leader; materials and supplies including two atv drags, atv repairs and fuel= $10,000; perdiem $24,534 (for three people) for a total cost of $74,534 (58 days @ 20 acres a day)
- A sterile cereal grain seeding was considered however, the district has had limted success with these species germinating. They were most recently applied to the Tom Basin fire on this district with no detectable germanination occuring dispite good germinability tests. Additionally there are commercial grain fields upwind that could cause the grain to persist due to reverting to pure type through fertilization. Having the plant persist on site would be against regional native plant use policy. Due to this suite of concerns this alternative was not carried forward.

Aerial seeding utilizing the regional IDIQ contract. ***This alternative is the prefered alterantive due to it being more expedicious and reducing the hazard exposure to employees from 58 days in the atv application alternative to 28 days in this alternative.*** **Seeding prices this season have been ranging from 40-67$/acre or $46,320- 77,586; 5days of COR=$2,000; materials and supplies including two atv drags, atv repairs and fuel= $10,000, harrowing salary $20,000; perdiem $11,844 (3ppl for 28 days @ 40 acres/day) total cost $90,164-** $121,430

Line Item	Unit Cost	Total
Aerial contract	40-67$/acre	$46,320-77,586
Atv harrows, atv repairs, fuel		$10,000
Salary WG 5 x2	28 days @ 40acres/day	$14,132
Salary team lead and atv opr	23 days	$ 9,200
COR salary	5 days	$ 2,000
Vehicle mileage	$ .60 per mile x 4400 miles	$ 2,640
Per diem	3ppl x 28days	$11,844
	Total Cost	**$96,136-127,402**

In both seeding instances the following seed mix is proposed:

Species	lbs./acre	acres	total lbs. needed	Granite Seed Company (estimated price/bulk #)	Granite Seed Company seed cost	Granite Seed Company seed cost/acre
Basin big sagebrush (*Artemisia tridentata ssp. tridentata*)	0.5	1158	579	32.00	18528	16
Bluebunch Wheatgrass (*Pseudoroegneria spicata)*	3	1158	3474	7.00	24318	21
Great basin wildrye (*Leymus cinereus*) v. Magnar	1	1158	1158	10.00	11580	10
Sandberg bluegrass (*Poa secunda ssp. sandbergii*) vns	3	1158	3474	8.00	27792	24
Canadian milkvetch *(Astragalus canadensis)*	.5	1158	579	55.00	31845	27.50
Flax (*Linum lewisii*)	0.5	1158	579	10.00	5790	5.00
Western yarrow (*Achillea millefolium var. occidentalis*) v. Yakima	0.08	1158	92.65	40.00	3706	3.20
Rocky Mountain Bee Plant *(Cleome serrulata)*	0.5	1158	579	40.00	23160	20
Total	10.08	1158	11,672.65	N/A	146,719	126.70

This specific seed mix was chosen because the majority occurred on the site before the fire and for their following individual attributes. The following species discussions were derived in large part from the USDA plant database:

Basin Big Sagebrush ***Artemisia tridentata Nutt. ssp. tridentata*** - Because of its wide range of adaptation and ease of establishment, big sagebrush can be a very important species for use in re-vegetation efforts. Seedlings are able to compete with grasses and forbs as well as other shrubs allowing it to be used as a component of a wide range of seed mixes. The deep tap root and shallow, diffuse root systems of this species make it especially effective at stabilizing disturbed soils. Additionally, big sagebrush traps large amounts of snow in, and around, the canopy of individual plants which aids in water infiltration in the early spring.

Bluebunch Wheatgrass ***Pseudoroegneria spicata ssp. spicata*** - Bluebunch wheatgrass is very drought resistant, persistent and adapted to stabilization of disturbed soils. It is very compatible with slower developing native species, such as thickspike wheatgrass. Its drought tolerance, combined with extensive root systems and good seedling vigor, make this species ideal for reclamation in areas receiving 10 to 20 inches annual precipitation. 'Secar' competes well in areas as low as 8 inches annual rainfall. It is very fire tolerant and establishes fairly quickly for a native grass.

Great Basin Wildrye ***Leymus cinereus*** - Basin wildrye is well adapted to stabilizing disturbed soils and has been used for disturbed area stabilization, mine reclamation and fire rehabilitation. It has a deep fibrous root system extending to depths of 200 cm (63 in) in undisturbed soils with a lateral root spread

of up to 100 cm. The drought tolerance of basin wildrye, combined with fibrous root system and fair seedling vigor, make it desirable for reclamation in areas receiving 8 to 20 inches annual precipitation.

Sandberg bluegrass ***Poa secunda* (syn. *P. sandbergii)*** – Sandberg's bluegrass is a pioneer species, one of the first grasses to colonize on disturbed sites. It is small in stature, early to establish, and quick to mature. It is also a "self-seeder" and often produces viable seeds within the first growing season.

Canadian milkvetch ***Astagalus canadensis L.***—Canadian Milkvetch is noted for its erosion control, nitrogen fixing and wildlife habitat benefits. It has a short persistnace period of 3-5 years before dieing out. It has a mid height stature that will povide restablishment of ground cover in addition to a rhyzomitous growth habit that stabilizes soil.

Flax ***Linum lewisii*** - All flax species are noted for their value in mixes for erosion control and beautification values. Due to the semi-evergreen nature of the species, flax can also be used as a fire suppressant species in green strip plantings. Most ecotypes do well on infertile, disturbed soils. They have excellent cold winter and drought tolerance. They are fire resistant since leaves and stems stay green with relatively high moisture content during most of the fire season. The semi-woody, fibrous root systems make this species ideal for erosion control.

Western Yarrow ***Achillea millefolium var. occidentalis*** - Western yarrow is highly variable and displays wide ecological amplitude to diurnal temperature, altitude, latitude, and climatic conditions. Western yarrow initiates growth in early spring and is an early successional species that readily establishes on disturbed sites, and thrives in droughty conditions. These characteristics often allow it to compete well against invasive species.

Rocky Mountian Bee Plant ***Cleome serrulata*** – Rocky Mountain Beeplant is a self-seeding annual that establishes early in the spring. It is most often found on recently disturbed soils where it's rapidly developing root systems help stabilize soils. This species does well on medium to coarse soils on dry upland sites. It performs well for two to three years after a disturbance and persists in the seedbed for many years as a plant community recovers.

In order to reduce the cost of the seed mix, while retaining the variable water year success potential of the proposed mix, the forest is proposing to use the following alternative seed mix:

Species	lbs./acre	acres	total lbs. needed	Granite Seed Company (estimated price/bulk #)	Granite Seed Company seed cost	Granite Seed Company seed cost/acre
Bluebunch Wheatgrass (*Pseudoroegneria spicata)*	3.5	1158	4053	7.00	28371	24.5
Great basin wildrye (*Leymus cinereus*) v. Magnar	1	1158	1158	10.00	11580	10
Sandberg bluegrass (*Poa secunda ssp. sandbergii*) vns	3	1158	3474	8.00	27792	24
Canadian milkvetch *(Astragalus canadensis)*	.5	1158	579	55.00	31845	27.50
Flax (*Linum lewisii*)	0.5	1158	579	10.00	5790	5.00
Western yarrow (*Achillea millefolium var. occidentalis*) v. Yakima	0.08	1158	92.65	40.00	3706	3.20

Species	lbs./acre	acres	total lbs. needed	Granite Seed Company (estimated price/bulk #)	Granite Seed Company seed cost	Granite Seed Company seed cost/acre
Rocky Mountain Bee Plant *(Cleome serrulata)*	0.5	1158	579	40.00	23160	20
Total	10.08	1158	11,672.65	N/A	132,244	114.2

Due to the paired treatments being proposed for monitoring the total acres to be seeded with this mix have been reduced resulting in the following table:

Species	lbs./acre	acres	total lbs. needed	Granite Seed Company (estimated price/bulk #)	Granite Seed Company seed cost	Granite Seed Company seed cost/acre
Bluebunch Wheatgrass (*Pseudoroegneria spicata)*	3.5	347	1214.5	7.00	8501.5	24.5
Great basin wildrye (*Leymus cinereus*) v. Magnar	1	347	347	10.00	3470	10
Sandberg bluegrass (*Poa secunda ssp. sandbergii*) vns	3	347	1041	8.00	8324	24
Canadian milkvetch *(Astragalus canadensis)*	0.5	347	173.5	55.00	9542.5	27.5
Flax (*Linum lewisii*)	0.5	347	173.5	10.00	1735	5
Western yarrow (*Achillea millefolium var. occidentalis*) v. Yakima	0.08	347	27.76	40.00	1110.4	3.2
Rocky Mountain Bee Plant *(Cleome serrulata)*	0.5	347	173.5	40.00	6940	20
Total	10.08	347	3150.76	N/A	39,623.4	114.2

This specific seed mix was chosen because the majority occurred on the site before the fire *demonstrating their sutability to the area* and for their following individual attributes. These species discussions were derived in large part from the USDA plant database:

Bluebunch Wheatgrass ***Pseudoroegneria spicata ssp. spicata*** - Bluebunch wheatgrass is very drought resistant, persistent and adapted to stabilization of disturbed soils. It is very compatible with slower developing native species, such as thickspike wheatgrass. Its drought tolerance, combined with extensive root systems and good seedling vigor, make this species ideal for reclamation in areas receiving 10 to 20 inches annual precipitation. 'Secar' competes well in areas as low as 8 inches annual rainfall. It is very fire tolerant and establishes fairly quickly for a native grass.

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Rocky Mountian Bee Plant ***Cleome serrulata*** – Rocky Mountain Beeplant is a self-seeding annual that establishes early in the spring. It is most often found on recently disturbed soils where it's rapidly developing root systems help stabilize soils. This species does well on medium to coarse soils on dry upland sites. It performs well for two to three years after a disturbance and persists in the seedbed for many years as a plant community recovers. *This species was retained in the mix as it has demonstrated very high success on the district of becoming established in the first growing season no matter the draught status of the season.*

The forest was encouraged to find partners to supply more species diversity for the seed mix.

The forest proposes to use this B-mix in order to test effectiveness of commervially available varieties effectiveness on the Santa Rosa Ranger District.

Species	lbs./acre	acres	total lbs. needed	Granite Seed Company (estimated price/bulk #)	Granite Seed Company seed cost	Granite Seed Company seed cost/acre
Bluebunch Wheatgrass (*Pseudoroegneria spicata)*	0.5	354	177	7.00	1239	3.5
Great basin wildrye (*Leymus cinereus*) v. Magnar	0.5	354	177	10.00	1770	5
Snake River Wheatgrass (*Elymus wawawaiensis*)	3.75	354	1327.5	7.00	9292.50	26.25
"Sherman" Big Bluegrass (*Poa sucunda ssp ampla*)	3.75	354	1327.5	9.50	12611.25	35.625

Species	lbs./acre	acres	total lbs. needed	Granite Seed Company (estimated price/bulk #)	Granite Seed Company seed cost	Granite Seed Company seed cost/acre
Canadian milkvetch *(Astragalus canadensis)*	0.5	354	177	55.00	9735	27.5
Flax (*Linum lewisii*)	0.5	354	177	10.00	1770	5
Western yarrow (*Achillea millefolium var. occidentalis*) v. Yakima	0.08	354	28.32	40.00	1132.80	3.2
Rocky Mountain Bee Plant *(Cleome serrulata)*	0.5	354	177	40.00	7080	20
Total	10.08	354	3568.32	N/A	44,630.55	128.08

The two new species in this mix are discussed below (same reference source):
Snake River Wheatgrass ***Elymus wawawaiensis:*** adapted to stabilizing disturbed soils this plant is drought resistant and develops persistnant stands. It is compatable with sloper developing perennial species. Its drought tolerance, extensive root system and good seedling vigor contribute to this species being being classified as ideal for reclamation in areas receiving 10-20 inches of annual precipitation.

Sherman Big bluegrass ***Poa secunda spp ampla:*** is a conservation plant developed by the USDA NRCS. Sherman begins growth in the early spring as many as 4 weeks before crested wheatgrass. Naturally occuring on upland sites receiving 9-20 inches of annual precipitation this variety is identified as being well suted to critical area stabilization and reclamation. It is indicated as a good self seeder and being resistant to adverse impacts from late summer fires. Once established Sherman cometes well with cheatgrass.

In addition to the seed mixes outlined above the forest requests the following additional seed be purchased for application as part of the treatments applied to the paired plots being monitored.

The forest is proposing 12 plots, 3 per treatment unit (see map for proposed locations).

- Each unit is 100 or more feet away from the road to eliminate influence from the road.
- Each point represents a paired quarter acre plot (one quarter acre per plot for a total of 3 acres of testing)
- Each plot will have the following treatments applied as an over treatment to the initial seed mix
    - Crested (10pls/ac)
    - Triticale (10pls/ac)
    - Double seeding rate with the seed mix applied to the larger unit that the plot is located in (one each for a total of two plots)
    - Annual native forb (5pls/ac) -helianthus annuus
    - No additional treatment

species	Seeding rate (pls/ac)	Total quantity needed (pls)	Price/pls	Total cost
Crested	10	30	4	120
triticale	10	30	2	60
Native mix (A-mix)	10	30	11.33	339.88
B-Mix	10	30	12.7	381
Annual native Forb	5	15	20	300
	total	150		1200.88

Why helianthus annuus- a vigerous annual that is successful on sites with 12-60 inches of annual precipitation. This species is moderatly drought tolerant and performs well in all soil textures. Exhibits a large growth and establishment in the first growing season after seeding. It establishes a large root network that has a deep tap root to bring up soil nutrients from below the surface that are then incorperated into the surface upon sinesance.

Line Item	Unit Cost	Total
Botany Support	$400/day x 10 days	$4,000

Noxious Weed Early Detection Rapid Response (EDRR) to protect BAER values Soil Productivity and Hydrologic Function: EDRR will concentrate on determining if the weed sites are establishing and determine if extra treatments are necessary. No effort will be made to EDRR existing weed infestation areas but surveys will be conducted to determine if these sites are expanding. The data gathered from this EDRR will be used to determine if and what treatment will be needed. During the course of this EDRR survey the district will be notified of any areas that need additonal actions and a summary report will be developed at the end of the summer.

The work would be completed by multiple trips to the fire area totaling 11 days of time, but totalling up to 20 visits to determine phenology and monitor effectiveness of treatments applied by others. The mileage includes the atvs for the crew to access the area as well as the milage to travel to the site from the office. The fire area is a 120 minute oneway drive from the closest office.

No weeds were detected in the fire area but there were multiple species noted adjacent to and along the access routes to the fire area.

Line Item	Unit Cost	Total
Salaries two GS 4	$135 per day x 2 x 11 days	$2,970
District plant specialist	$350 per day x 5 days	$1,750
GIS/FACTS specialist	$321 per day x 5 days	$1,605
Vehicle mileage	$ .60 per mile x 4400 miles	$2,640
Implementation team leader	$400 per day x 1 day	$ 400
	Total Cost	**$9,365**

Channel Treatments: NA

Roads and Trail Treatments: NA

Structures:
The following treatment was considered but removed from the application. The forest has been encouraged to attempt to locate alternative funding to complete this aspect of the needed work.

Repalcement of 20 h braces and damaged wire along 4 miles of fence and installing temporary solar powered elctric fence around the portion of the fire that is in an adjacent pasture.

The assessment team looked at several alternatives to the proposed action including:

- a range rider. Cost= 100$/day x 6weeks=4500 x2yrs=$9000. Both the Winecup Gamble and Maggie Creek Ranches were contacted for prices- they both indicated that it was difficult to find folks for this kind of work but that this was the going salary). Additional costs of hiring and supervising this person or placing the money in an agreement so that the permittee can hire the person come into play.

- Contracting out the fence repair and building a 4 wire temporary fence: estimates received ranged from $2.50 to $3.00 per foot = $52,800 to $63,400. An additional 400/day x2weeks for a COR would be nessecary for a total cost of $56,800 to $67,400

Repairing h braces and limited sections of wire and installing a temporary electric fence with on forest staff.

Line Item	Unit Cost	Total
Supplies	$17, 277	$17,277
Salary WG 5x2	16 days	$8,075
Per diem	$141 x16 x2	$4,512
Team leader	$400 per day x 2days	$800
	Total Cost	**$30,664**

H. **Monitoring Narrative:**

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

A level 2 monitoring plan will be submitted as an interim request by December 31 2017. This monitoring plan will include monitoring the effectiveness of native plant seeding at reducing the invasion of non native species following fire. The monitoirng will include sampling of vegetation each year for 3 years in both seeded an non seeded areas. The monitoring will also be used to assist in developing appropriate BAER emergency objectives including estimates of vegetation cover to be called a successful emergency treatment. Cost will be approximately $5-10K per year. Funding will be reqeusted in years 2 and 3 following a report of previous years results.

The monitoring will be coordinated with Rocky Mountain Research Station, R4 Regional Office and the Humboldt-Toiyabe NF.

Monitoring is planned to occur in low, wyoming and mountain big sage pre fire plant community areas.

Update October 26, 2017.
Two BAER treatment effectiveness monitoring plans are being submitted for approval with this Interim 1 Request. The plans are included in detail below. These monitoring plans are following FSM ID-2520-2017-1 direction for level 2 monitoring of BAER treatments. The seeding of native and non-native plants following fire to prevent invasive plants and to protect soil productivity from wind erosion on non-forested sagebrush ecosystems has few studies available to identify effectiveness of the treatment. These monitoring projects on the Quinn fire will assist in determining if these types of seedings meet emergency objectives, identify measures and objectives for reducing post fire threats, and provide valuable initial permanent study areas that other program funding will continue to measure for 5-15 years following BAER. These longer term measurements will assist in determining the long term effects BAER emergency seeding treatments.

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

			NFS Lands				Other Lands				All
		Unit	# of	WFSU	Other	# of	Fed	# of	Non Fed	Total
Line Items	Units	Cost	Units	SULT $	$	units	$	Units	$	$
A. Land Treatments										
aerial seeding	acres	83	700	$58,100			$0		$0	$58,100
native seed mix	acres	114.2	347	$39,627			$0		$0	$39,627
b-mix seed	acres	128.08	354	$45,340			$0		$0	$45,340
specialy seeds	lump	1200.9	1	$1,201			$0		$0	$1,201
botany support	days	400	10	$4,000			$0		$0	$4,000
edrr	each	9365	1	$9,365			$0		$0	$9,365
				$0			$0		$0	$0
Subtotal Land Treatments				$157,634			$0		$0	$157,634
B. Channel Treatments										
				$0			$0		$0	$0
Subtotal Channel Treat.				$0			$0		$0	$0
C. Road and Trails										
				$0			$0		$0	$0
				$0			$0		$0	$0
Subtotal Road & Trails				$0			$0		$0	$0
D. Structures										
removed	each		1	$0			$0		$0	$0
Subtotal Structures				$0			$0		$0	$0
E. BAER Evaluation										
salary	days	400	11	$4,400			$0		$0	$4,400
perdiem	days	141	10	$1,410			$0		$0	$1,410
mileage	miles	0.32	920	$294						$294
G. Monitoring Cost				$0			$0		$0	$0
Year 1 Monitoring Win	Plan	14616	1	$14,616						
Year 1 Monitoring Invasive Plar		10600	1	$10,600						
Subtotal Monitoring				$25,216						$25,216
H. Totals				**$182,850**			**$0**		**$0**	**$188,954**
Previously Approved				**$147,265**						
Total for This Request				**$35,585**						

PART VII - APPROVALS

1. _____ _____
Forest Supervisor (signature) Date

2. _____ _____
Regional Forester (signature) Date

MONITORING PROJECT #1

MONITORING PROPOSAL 10

October 2017

Effects of Post-fire Seeding to Reduce Wind Erosion, 2017 Quinn Fire

P. Robichaud

Justification

High and moderate severity rangeland fires generally remove most sagebrush, grasses, forbs and organic layers leaving the soils susceptible to wind erosion. While much attention has been given to determining appropriate strategies to control post-fire erosion from hydrologic processes, treatments specific to addressing the consequences of wind erosion (aeolian sediment transport) have received markedly less consideration. Wind erosion plays a major role in burned landscapes as a result of lower threshold velocities needed to transport sediment. The loss of soil and surface organic material negatively impacts nutrient availability and water-holding capacity. Increases in dust flux measured after wildfires can persist for a few years until vegetation is reestablished. Wagenbrenner et al. (2013) studied wind erosion immediately following the 2010 Jefferson Fire in a desert sagebrush and grass ecosystem in southeastern Idaho. Several major wind erosion events were measured with the largest wind erosion event occurred two months after the fire and produced 1495 kg m^{-1} of horizontal sediment transport within the first 2 m above the soil surface, had a maximum PM_{10} vertical flux of 100 mg m^{-2} s^{-1}, and generated a large dust plume that was visible in satellite imagery. The peak PM_{10} concentration measured on-site at a height of 2 m in the downwind portion of the burned area was 690 mg m^{-3}. These results indicate that wildfire can convert a relatively stable landscape into one that is a substantial dust source. Few studies have focused on mitigating wind erosion via land management treatments after wildfires. Robichaud et al. (2017) found that mulch treatments (wheat and chopped wheat straw) significantly reduced sediment loss in a wind tunnel experiment. Tackifier treatments reduced sediment loss when applied to bare soil and when compounded with various mulch treatments, particularly at the high wind speed (18 m s^{-1}). This suggests that wind erosion treatments should be tailored to anticipated wind events with consideration for local topography. Miller et al. (2012) investigated the effect of seeding perennial plants on wind erosion in Utah after the 2007 Milford Flat Fire and found that decreases in sediment flux observed three years after the fire were primarily attributed to the establishment of exotic plants and not intentionally seeded perennials.

Objectives

The goal is to compare native seeding treatment effectiveness on ground cover changes and its subsequent effect on reducing wind erosion on the Quinn Fire. The specific objectives of this monitoring are to: 1) determine if seeding with a native seed mix changes the species composition (i.e. reduce invasives), 2) determine if wind erosion is altered by the seeding treatment.

Anticipated Management Implications

Quantification of the effects of seeding mitigation treatment on wind erosion will allow for determining the efficacy of the native seeding treatment for future rangeland fire areas where wind erosion is projected to be a concern. Therefore, this information on treatment effectiveness would be valuable to managers facing similar circumstances including seeding treatments, invasive species, and wind erosion. Peer-reviewed publications, station publications, presentations at regional and national professional meetings, post-fire management webinars as well as informal communications to land managers are proposed products.

Methods

This study will use established methods to measure aeolian sediment transport (see Wagenbrenner, 2013). Two horizontal transects will be established, one in the burned area (no seed) and one in the burned area with seed treatment. Horizontal sediment flux will be measured at three to eight locations along a 50 to 400-m transect normal to the prevailing wind direction using BSNE passive sediment collectors with inlets at 5, 10, 20, 55, and 100 cm above the soil surface. Sediment will be collected from BSNE collectors every two weeks or as needed and dried and weighed to determine sediment mass fluxes.

If possible, PM_{10} vertical flux will be measured at two locations along this same transect using E-Sampler Particulate

Sensors (MetOne Instruments, Grants Pass, OR). Real-time (5-min average) PM_{10} concentrations will be monitored at 2 and 5-m heights at each location. Mean wind, temperature and turbulence will be monitored with a CSAT3 sonic anemometer (Campbell Scientific, Logan, UT) operated at 10 Hz at a height of 5 m. Hourly relative humidity, solar radiation, precipitation, soil temperature, and soil moisture will also recorded throughout the study period. Other measurements include: cover (surface cover, recovery), soil bulk density and texture, water repellency, and rainfall amount and intensity. The effectiveness of the native seeding treatment will be monitored for three years.

Monitoring budget/study duration

Installation of BSNEs and wind instruments could happen in late October 2017. After installation, the site would need to be serviced every two weeks or as needed to download data, check batteries, cleanout BSNE sediment traps, and perform ground cover counts. The equipment will be maintained through the fall until snow arrives. Depending on winter access, the equipment will be periodical visited in the winter. We have been informed seeding is planned for this area in November. We will continue monitoring until emissions decrease to background levels; this will likely happen the following two growing seasons when the vegetation begins to recover on site. All sediment samples will be processed at the Forestry Sciences Laboratory in Moscow. Annual progress reports will be written.

Monitoring Costs: Rocky Mountain Research Station-Moscow

	Year 1 (FY 2018)	Year 2 (FY 2019)	Year 3 (FY2020)
Site locating, equipment installation (2 personnel 1 week)	3200		
Travel/ per diem/vehicles for installation	1800		
Travel/per diem/ vehicles for maintenance	1000	2400	2400
Batteries/ repairs	600	400	
Monthly site visit and data downloads (2 personnel)	2800	4800	4800
Removal of equipment/instruments end of project			1400
Data Analysis ($700/wk)	1800	1800	1800
Report writing (700/wk)	1400	1400	2100
Sub totals	12,600	10,800	12,500
RMRS station overhead 16%	2016	1728	2000
Proposed Monitoring Costs	**$14,616**	**$12,528**	**$14,500**

Collaboration Needs

Humboldt-Toiyabe National Forest/Rocky Mountain Research Station Research cooperation is needed to accomplish these monitoring objectives. Pete Robichaud, Rocky Mountain Research Station-Moscow will be the main point of contact for research. Matt Germino, USGS Boise may assist with instrument installation and field data collection.

Project Contacts

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Robin Wignall Humboldt-Toiyabe National Forest Mountain City Ranger District 2035 Last Change Road Elko, Nevada 775 778 6122 office rjwignall@fs.fed.us	Matt Germino US Geological Survey Great Basin Landscape Conservation Cooperative Boise, Idaho 208 426 3353 office, 208 221 4638 mobile mgermino@usgs.gov

MONITORING PROJECT #2

Effects of Post-fire Seeding to Reduce Invasive Plants and Protect Native Plant Communities, 2017 Quinn Fire

Justification

Rangeland fires often provide post conditions that are favorable for noxious and invasive plant species. Fire can remove native trees, brush, grasses, forbs and surface soil organic layers. Soil chemistry and physical properties are often altered favoring early seral species. Most noxious and other invasive plants are early seral species that can readily move into burn areas and outcompete native vegetation recovery. A short window of opportunity exists to prevent or limit noxious and invasive species from moving into burn areas especially where the unwanted species are near the burn areas. Various treatments have been used to prevent non-native unwanted plants from moving into burn areas. The treatment types vary by the type of species that are to be controlled. Herbicides, bio control with insects, bacteria or fungi, mechanical, and competitive vegetative (seeding or planting) treatments are often used immediately after a fire.

The use of competitive plants through seeding or planting has been used in many areas following fire to limit unwanted non-native plants from increasing in burn areas. Results are mixed as to the success of seeding at limiting unwanted non-native plants in burn areas as often there are not well defined measures of success. The post fire Burned Area Emergency Response (BAER) program includes policy that allows for consideration of protection of native or naturalized plant communities from post fire events. The post fire event or threat that may be considered is noxious and other invasive plant species. The BAER program requires any treatments to be proven effective, implemented within 1 year, and proven successful during the emergency period which is considered short term or less than 1 year from fire containment.

Seeding has been a treatment that has been used recently to prevent noxious and other invasive plants from populating or threating the ability of native plant ecosystems to recover following fire. One of the primary invasive plant threats post fire in the Great Basin is cheat grass (*Bromus tectorum*). Seeding of native and some desirable nonnative species has been used to prevent the encroachment or domination of the burn areas by cheat grass. There are very few treatments monitored to determine the effectiveness of native and nonnative species mixes in limiting cheat grass during the emergency period and beyond (1-10 years). Even when seeding is used, many treatments do not identify a quantitative measure of success, such as, 20% less cover of cheat grass by year 2 with seeding compared to non seeded.

This monitoring study is to compare seeded and non seeded post fire areas to determine if there is an effect of seeding at reducing the cover of noxious and invasive plant species. In particular the study will look at the ability of native seed mix at limiting the amount of cheat grass cover following fire. The study is to also help derive measures of success to determine if treatments are successful. These are to help set future treatment recommendations based on anticipated post fire conditions and potential for treatment to change condition.

The study will focus on the ability of seeding to meet emergency objectives within the emergency period. The monitoring is expected to occur over a 3 year period. The sites that area established will be monitoring over a 5-10 year period with other program funds.

Objectives

1. To determine the effectiveness of native plant aerial broadcast seeding at reducing the threat of noxious and invasive plants to native plant recovery following fire in sagebrush ecosystems.
2. To develop measures of success for seeding to help determine if seeding treatments are cost effective at reaching protection objectives.

Anticipated Management Implications

Quantification of the effects of seeding mitigation treatments on the threats of noxious and invasive plants will allow for determining the efficacy of the native seeding treatment for future rangeland fire areas where non native plants are projected to be a concern. Therefore, this information on treatment effectiveness would be valuable to managers facing similar circumstances including seeding treatments and invasive species. Peer-reviewed publications, station publications, presentations at regional and national professional meetings, post-fire management webinars as well as informal communications to land managers are proposed products.

Design

Seed will be aerial applied in the moderate to high burn severity areas. The seed will be distributed to three general pre fire plant community types within the moderate and high burn severity areas. The pre fire community types are low sage, Wyoming sage and mountain big sage. Approximately 200 acres of each community type will be aerial seeded with the species identified in the below at the rates shown. Adjacent to each seeded area there will be a similar unseeded moderate to high burn severity area of 100-200 acres of each pre fire vegetation type to be used for control plots.

Species	**lbs./acre**
Bluebunch Wheatgrass (*Pseudoroegneria spicata)*	3.5
Great basin wildrye (*Leymus cinereus*) v. Magnar	1
Sandberg bluegrass (*Poa secunda ssp. sandbergii*) vns	3
Canadian milkvetch *(Astragalus canadensis)*	.5
Flax (*Linum lewisii*)	0.5
Western yarrow (*Achillea millefolium var. occidentalis*) v. Yakima	0.08
Rocky Mountain Bee Plant *(Cleome serrulata)*	0.5
Total	10.08

Methods

This study will use established methods to measure vegetation cover and composition. Plots will be established in pre fire vegetative communities of low sage, Wyoming sage, and mountain big sage in both seeded and unseeded areas. Vegetation plots will be replicated at 3 locations within the seeded and unseeded pre fire vegetation community types. The vegetation will be collected using Region 4 Range Handbook Nested Frequency protocols (R4 Handbook FSH 2209.21). Species composition, cover and abundance will be collected according to the nested frequency protocols. Ground cover will also be collected according to the protocol.

Vegetation sampling will occur approximately late July/early August in 2018, 2019, and 2020. Summaries of each years sampling will be provided before a request for the next years funding. All plots will be permanently marked for future sampling by the USFS or other interested parties.

Monitoring budget/study duration

Installation of the vegetation plots will occur in November/December of 2017 or in spring of 2018. Sampling of vegetation plots is expected to require 2 weeks each year with a 2 person crew. Establishment of the plots is expected to require 2 days with a 2 person crew. After installation, the vegetation plots will include data collection each year for 3 years in late July or early August.

Monitoring Costs: Rocky Mountain Research Station-Moscow

	Year 1 (FY 2018)	Year 2 (FY 2019)	Year 3 (FY2020)

Site locating, equipment installation (2 personnel 3 days week)	1500		
Travel/ per diem/vehicles for installation	500		
Materials	200		
Site visit for data collection	4400	4400	4400
Per diem for data collection	2000	2000	2000
Data Analysis ($700/wk)	1000	1000	1000
Report writing (700/wk)	1000	1000	1000
Proposed Monitoring Costs	**$10,600**	**$8,400**	**$8,400**

Collaboration Needs

Region 4 Regional Office, Humboldt-Toiyabe National Forest, and Rocky Mountain Research Station Research cooperation is needed to accomplish these monitoring objectives. Francis Kilkenny, Rocky Mountain Research Station-Boise Aquatic Sciences Lab will be the main point of contact for research. Jeff Bruggink and John Proctor, Region 4 Regional Office are primary FS contacts for the project.

Project Contacts

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