Edited T.Clifford for corrections 10/11/07

USDA-FOREST SERVICE **FS-2500-8 (7/00)**

Date of Report: October 9, 2007

BURNED-AREA REPORT
(Reference FSH 2509.13)

PART I - TYPE OF REQUEST

A. Type of Report

[X] **1. Funding request for estimated emergency stabilization funds**
[ ] 2. Accomplishment Report
[ ] 3. No Treatment Recommendation

B. Type of Action

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

[ ] 2. Interim Report

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

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

PART II - BURNED-AREA DESCRIPTION

A. Fire Name: Cascade Complex - North End

B. Fire Number: ID-BOF-000635 DR27

C. State: ID

D. County: Valley

E. Region: 4

F. Forest: Boise

G. District: Cascade

H. Fire Incident Job Code: DR27

I. Date Fire Started: 7/17/07 @ 1700 hrs.

J. Date Fire Contained: Not to date

K. Suppression Cost: $50,000,000 to date

L. Fire Suppression Damages Repaired with Suppression Funds:
1. Fireline waterbarred (miles): 5.1
2. Fireline seeded (miles): 5.1
3. Other (identify): 4.5 miles of Dozer line and 2.4 miles of fuel break

M. Watershed Number: 1706020508 (Indian Creek), 1706020803 (Johnson Creek), 1706020804 (Lower East Fork SF Salmon), 1706020802 (Upper East Fork SF Salmon), 1706020507 (Pistol Creek), 1706020801 (Upper South Fork Salmon River)

N. Total Acres Burned: NFS Acres (57,619) Other Federal () State (640) Private (126)

O. Vegetation Types: Potential Vegetation Group (PVG) 10 – Persistent Lodgepole Pine, PVG 7 – Warm Dry Subalpine Fir, PVG 4 – Cool Dry Douglas-fir, Non-forest, PVG 6 – Cool Moist Grand Fir, PVG 2 – Warm Dry Douglas-fir, Moist Ponderosa Pine, PVG 11 – High Elevation Subalpine Fir

P. Dominant Soils: Typic Cryorthents, sandy-skeletal mixed; Typic Cryumbrepts, sandy-skeletal, mixed; Typic Cryumbrepts, loam-skeletal, mixed; Typic Cryorthents, loamy-skeletal, mixed, non-acidic; Lithic Cryorthents, loamy-skeletal, mixed, non-acidic; Typic Cryothents, loam-skeletal, mixed, non-acidic, shallow.

Q. Geologic Types: Strongly glaciated and cryoplanated lands landforms derived from Idaho Batholith granite.

R. Miles of Stream Channels by Order or Class: Total streams = 169 miles.

S. Transportation System:
Trails: 35.3 miles Roads:56 miles

PART III - WATERSHED CONDITION

A. Burn Severity (acres): 17,100 (low) 23,055 (moderate) 14,700 (high)

B. Water-Repellent Soil (acres): 20,739

C. Soil Erosion Hazard Rating (acres): 5,558 (low) 21,682 (moderate) 31,144 (high)

D. Erosion Potential: 6-14 tons/acre

E. Sediment Potential: 14,586 cubic yards / square mile

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years): 5 to 10 years

B. Design Chance of Success, (percent): 50%

C. Equivalent Design Recurrence Interval, (years): 2, 5, and 10

D. Design Storm Duration, (hours): 1 hour

E. Design Storm Magnitude, (inches):

- 2 yr event - 0.4 per hour
- 5 yr event - 0.6 per hour
- 10 yr event - 0.7 per hour

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

G. Estimated Reduction in Infiltration, (percent): 33%

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

	Design Flow (cfs per square mile)[1]					
Drainages	Pre-fire			Post-fire		
	2 Year	5 Year	10 Year	2 Year	5 Year	10 Year
Bear Creek	87	120	144	155	695	1397
Moose Creek	14	20	25	< 1	5	11
Riordan Creek Tributary	14	20	24	67	194	336
Ice Hole A	1	2	3	< 1	18	46
Ice Hole B	1	2	3	4.3	24	50
Wardenhoff 410U	9	12	15	4.2	26	57

[1]. Design flow based on: Pre-fire = snowmelt runoff – Idaho Stream Stats USGS (Berenbrock 2002); Post-fire 1 hour thunderstorm rainfall (FERGI USDA Forest Service Research (Luce et al 2004).

PART V - SUMMARY OF ANALYSIS

Following is a description of Critical Values/Resources and Threats (For further information see the Cascade Complex - South End Burned Area Emergency Stabilization Plan created by the BAER Team - Clifford):

A. Describe Critical Values/Resources Threats

Several resource values were assessed including: long-term soil productivity, water quality beneficial uses and associated aquatic habitat for T&E fish species, homes and recreational cabins, irrigation ditches, mining related facilities, domestic water supplies, campgrounds, roads, trails, culverts, bridges, power lines, and buried utility lines were assessed as to their upstream/upslope hazard and associated potential risk from post-wildfire watershed conditions. Field investigations and subsequent analyses/models were used to determine their post-wildfire hazard and associated risk from potential debris flows, flooding, soil erosion and accelerated sedimentation.

A sequential evaluation process assessed the post-fire watershed conditions starting at the hillslopes and moving downslope or down the stream channels to determine potential hazards and associated risks to the various resource values. First the hillslope and stream channel burn severities were identified and mapped. A debris flow initiation and transport map was developed that is based on inherent soil-hydrologic characteristics. Based on the findings of the burn severities, the post-fire watershed stream flows were modeled and combined with the debris flow map to assist with determining the potential hazard and associated risk to the aforementioned resource values. Further field investigations of these resource values were conducted to determine if they were at risk from the post-fire induced hazards.

The soil erosion rates will increase with amounts varying based on burn severity and characteristics of individual landtypes. There are several areas that have an increased hazard of rill and gully erosion, sheet flooding, flash flooding and debris flows. Erosion rates may reach or exceed soil loss tolerances in the 2 to 8 years following the fire. Unacceptable soil loss is dependent on several factors including burn severity, inherent soil characteristics, steepness of hillslopes, and climatic triggers. Long-term productivity may be negatively affected on steep hillslopes with high burn severities that experience high intensity rainfall from thunderstorms. At a minimum there will be a substantial increase in sedimentation to the drainages within the Cascade North Complex. There is a direct relationship of higher sedimentation associated with adjacent areas of high burn severities on steep hillslopes. Dry soil ravel has been extensive on these areas. Numerous small debris flows resulting in several small alluvial fans (<1 cubic yard/flow) have already resulted from the low intensity rainfall. Sedimentation will increase dramatically depending on increasing rainfall intensities and initiation of debris torrents. In the short-term it is very likely that there will be negative effects to aquatic habitat within the analysis area due to increased sediment delivery from severely burned areas and increased temperatures from a reduction in stream channel shading. In the long-term, effects will be largely dependant on the climatic triggers and the spatial coverage of these storms that may occur over the next 3 to 5 years. There is a high risk of

increased sediment delivery and increased stream temperatures to the 303(d) listed waterbodies in the South Fork Salmon River Subbasin. These effects may have a negative effect on the recent improving sediment trends being monitored for the SF Salmon River TMDL.

A comprehensive assessment of post-fire erosion, sedimentation, debris torrent and aquatic habitat for the affected bull trout meta-population was completed to identify potential and value-added emergency stabilization treatment areas. As a result, three areas (1,779 acres) were identified for aerial straw mulching to reduce soil erosion and sediment delivery to occupied bull trout spawning and rearing habitat in the upper Riordan Creek drainage.

There are no post-fire hazards and therefore no risks to any of the homes and other structures in the town site of Yellow Pine and at Antimony Camp. There are low hazards and low risks to the other homes, recreational residences, and irrigation ditches along the Johnson Creek road. The Antimony Mill site was evaluated and was found to have a low hazard from a debris flow path located above the mill site. Based on discussions with Boise National Forest and IDEQ mineral specialists there are no known hazardous substances remaining at this mill site as the site was cleaned up several years ago and therefore not threat to the water quality of Johnson Creek. Based on these findings no emergency stabilization treatments are recommended.

The public water supply for the town of Yellow Pine is not affected by post-fire watershed conditions associated with the Cascade North Complex, as the fire effects are located downstream of the water supply intake. Other adjacent wildfires may have an effect on this public water supply system. Other individual domestic water systems (non-public regulated) located on tributaries to Johnson Creek were identified as having a very small hazard and associated very low risk from the effects of sediment and ash. Based on these findings no emergency stabilization treatments are recommended.

The Ice Hole campground is the only campground that has a low hazard and low risk from a debris flow within this assessment area. The hazard is low and hazard signing is the only emergency stabilization treatment recommended. The field investigation of the power poles and buried utility lines did not identify any direct hazard from debris flows or floods. The buried utility lines have the potential to be further buried by debris flows. The utility lines where they span in the bridges in closed conduit are at a low risk from high post-fire flood flows impacting the bridges. No debris flows are anticipated to affect any of the bridges. However increased streamflow may transport woody material that stack up behind bridges

There are several roads, culverts, and recreational trails that are at a high and moderate risk from post-fire runoff and debris flows. A few bridges are at a low risk of high stream runoff transporting woody material downstream that may pile up behind the bridges. There is a low hazard and associated low risk with debris flows blocking the Johnson Creek road (FR#413) and the EFSF road (FH#48). The emergency stabilization treatments are identified in the engineering, fisheries, and recreation assessments.

Fisheries - The Cascade Complex Fire burned through the Riparian Conservation Areas (RCAs) on nearly all streams within the fire perimeter. There are approximately 23.8 mi2 of RCAs within the analysis area and 18.7 mi2 of RCAs within the fire perimeter. High burn severity affected 4.2 mi2 (22%) of RCAs, an additional 7.6 mi2 (41%) burned with moderate severity, and low severity burns occurred on 5.5 mi2 (29%). Approximately 1.4 mi2 (8%) of the RCA within the perimeter of the fire remains unburned. The RCA burn severity was roughly proportional the fire area as a whole.

There are approximately 26.5 miles of designated critical habitat for chinook salmon and steelhead within the analysis area. Populations of chinook salmon and steelhead have been documented in Johnson Creek. The analysis area includes the reach of Johnson Creek between Icehole Campground and Twin Bridges, which is a key spawning area. However, most of this spawning area is not within the fire perimeter.

Populations of bull trout were documented in Trapper Creek and Riordan Creek within the analysis area prior to the Cascade Complex Fire. There are approximately 11.2 miles of occupied bull trout spawning and early rearing habitat within the analysis area.

Westslope cutthroat trout exhibit two primary life history strategies in Johnson Creek. Fluvial stocks occupy larger mainstem habitats and spawn in smaller tributaries. Resident forms inhabit smaller

tributaries and headwater areas for their entire lives. There are at least 59 miles of fish-bearing (westslope cutthroat trout) streams within the Cascade Complex Fire – North End.

Moderate to high intensity burns within RCAs have significantly reduced stream shade throughout the analysis area. Increased exposure to solar radiation is expected to result in elevated stream temperatures (FAE). These changes will vary by stream, depending on the remaining riparian canopy, topographic shading, aspect, channel width-to-depth ratio, discharge, and other variables. To the extent they are able, bull trout, chinook salmon, steelhead, and westslope cutthroat trout within the burned area may disperse to avoid increasing water temperature. However, the Cascade Complex Fire burned over all other occupied and unoccupied-suitable bull trout habitats in the S.F. Salmon River subbasin within the Boise N.F. except Curtis Creek, which is not connected habitat due to AOP barriers. Therefore, suitable and accessible dispersal habitat for bull trout is extremely limited.

Moderate to high severity burns are expected to result in accelerated soil erosion and sediment delivery to surface waters within and downstream of the Cascade Complex Fire perimeter, especially within focus drainages identified in the Soil and Watershed Assessment. Increased soil erosion and sediment delivery is expected to result in elevated fine sediment in stream substrates (FAE). These changes will vary by stream, depending on the soil cover, the length, gradient and roughness of the burned slopes, and the timing and intensity of precipitation events. Sediment will be stored to some degree in the tributary channels and delivered to mainstem channels over time. The total volume of sediment stored behind obstructions will vary between subwatersheds and years in response to changes in bankfull channel width and annual peak flow rates, respectively (Megahan 1982). Elevated fine sediments reduce both salmonid egg survival and their macroinvertebrate prey base (Spence et. al. 1996). To the extent they are able, bull trout, chinook salmon, steelhead, and westslope cutthroat trout within and downstream from the burned area may disperse to avoid increasing fine sediments. However, the Cascade Complex Fire burned over all other occupied and unoccupied-suitable bull trout habitats in the S.F. Salmon River subbasin within the Boise N.F. except Curtis Creek, which is not connected habitat due to AOP barriers. Therefore, suitable and accessible dispersal habitat for bull trout is extremely limited.

Wildlife - Multiple bear sightings occurred throughout the Cascade Complex Fire during fire suppression and during the South End BAER Assessment. The frequency of bear sightings and locations of those sightings indicated that bears were roaming more than usual for this time of year. The lack of a quality berry crop this summer due to drought in addition to the large loss of habitat for bears within the analysis area will likely cause bears to seek alternative food sources, including campgrounds and dispersed camping sites, lodges, summer cabins and other human gathering spots. Reports of bears entering summer cabins and the North Shore Lodge in the Warm Lake area, an outfitter's tent structure, in the Stolle Meadows area, and an incident at the Johnson Creek Guard Station where a bear entered the cabin while the occupants were still inside further supports the rationale that bears will be going to more extreme measures to find food sources.

Engineering – The reconnaissance of the roads during the field investigations found several issues pertaining to emergency stabilization and an issue each for fire suppression rehabilitation and management recommendations. The issues associated with the findings requiring emergency stabilization included burned warning signs, road drainage problems (i.e. plugged culverts, filled in catchment basins and ditches, ruts in the road, etc.), and undersized culverts having a high potential of delivering large amount of sediment to streams containing critical fish habitat. The result of these field investigations identified threats to public safety and deterioration of water quality through possible road failures.

Most of the issues are typical of what is found on or above roads within the burned areas. These issues pertaining to most of the roads are a result of the roads template and location. To further elaborate, the roads template is insloped and the alignment is constructed on steep mountain terrain which crosses steep side 'V' channels. Roads that are insloped and not maintained eventually have their catchment basins and ditches filled in from sediment that is washed down from normal storm events and spring runoff. The 'V' shape channels contain channel bottoms and side slopes with grades ranging 50º to 75º. These steep grades are able to deliver high erosive runoffs which can carry large amounts of sediment and debris in a short time span. With the landscape now burned, the runoff flows will be greater in intensity and more debris is available for transport above these crossings.

Many roads cross over tributaries that contain critical fish habitat and directly empty into Johnson Creek. Loss of infrastructure is a threat to Forest Service investment, public safety, and designated critical habitat. The road along Johnson Creek (FS 413) is a major tavel route in the summer.

Recreation – There was 1 administrative site, 42 miles of system trail, and 5 trail bridges within the analysis area. Several miles of motorized and non-motorized trails are in the assessment area and damaged by the fire. Damages includes 4 of the 5 bridges and many trail information signs. The trail drainage and tread damage was not designed to process the changed runoff and flow estimates originally and the expectation of increased flows will ovewhelm these drainage facilities. There are also future risks to recreation investments, including remaining bridge structure, toilets, feeding troughs, trail structure, retaining walls, and other minor investments important to future use and maintenance of the recreation system. These investments are threatened by hazard trees, erosion, and future flooding.

Cultural Resources--Field assessments were conducted on September 29-30 of the twenty-eight (28) significant or unevaluated sites located within the Cascade Complex northern analysis area. Ten (10) of these sites were located outside the fire boundary and received no fire treatments and no adverse effects. This includes the archaeological sites south of Wapiti Ranch and north of the Twin Bridges Campground area along Johnson Creek. Also Included are two sites located in the Trapper Flats area along Thunder Mountain Road. There are no recommendations for these ten (10) sites.

Eighteen (18) sites were located within the fire boundary and the analysis area. Of these eighteen (18) sites, eleven (11) sites were unburned or otherwise not impacted, three (3) sites were substantially impacted by this fire, and four (4) sites were not examined due to difficult access, weather, and the unlikelihood that they would require any BAER treatments.

Three historic sites were adversely impacted. These sites include the Meadow Creek Lookout, Thunder Mountain Road Way Station, and Snowshoe Cabin. One prehistoric site was burned but suffered to adverse impacts from suppression activities.

This report does not address any Traditional Cultural Properties (TCPs) that may be of importance to Nez Perce Tribe, Shoshone-Bannock Tribes, or Shoshone-Paiute Tribes. Consultation with the tribes would be necessary to identify this type of cultural resource. This report only addresses prehistoric and historic archaeological sites. Currently, no prehistoric sites are known to have been adversely impacted by this fire.

Noxious Weeds – This portion of the Cascade Ranger District is still relatively weed free, especially compared to the southern half of the Boise Forest. Documented weed infestations within the analysis area are limited to spotted knapweed. However, populations of rush skeletonweed, Canada thistle, musk thistle, oxeye daisy, and sulfur cinquefoil have been documented on major travel corridors into the area from the west, southwest, south and southeast, as well as in the Gold Fork area. Canada thistle and bull thistle have been observed during botanical surveys in the Johnson Creek drainage. District personnel report spotted knapweed and toadflax in the Icehole Campground area.

Given the presence of noxious weeds within the analysis area and along travel routes used by suppression forces, the introduction of noxious weeds into the analysis area likely occurred during suppression activities. In addition, given the fire-induced loss of vegetative ground cover, populations of noxious weeds previously existing within the analysis area are likely to expand.

C. Emergency Treatment Objectives:

The primary objectives of the Cascade Complex Fire – North End Burned Area Emergency Stabilization Plan were:

- To insure the BAER team's personal safety and provide for public safety during our assignment.
- To coordinate with the NRCS, State, and County on private lands, if appropriate
- To assess the risk to human life and property and/or natural or cultural resources from impaired watershed conditions and to recommend appropriate stabilization actions to protect the following values:
    - Residences and Ranches:
        - Private residences and ranches of Johnson Creek and

- Public and Domestic Water Supplies:
- Water Transmission Facilities:
  - Any known spring developments or irrigation diversions and/or ditches.
- Power Transmission Facilities:
  - Determine risk to public safety and protect future loss of power transmission facilities from erosion or flooding.
- Roads and Bridges:
  - Johnson Creek Road,
  - Other major or minor routes as identified.
- Campgrounds, Trails, and other Recreation Facilities:
  - Multiple trails,
  - Administrative sites,
  - Recreational infrastructure.
- Mine and CERCLA Sites:
  - Antimony Mine and/or mill site
  - Other mining sites as identified
- Threatened Chinook salmon, Steelhead, and Bull Trout and their habitat from natural events.
- Increased infestations of noxious weeds
- Significant historic and cultural sites

The BAER assessment evaluated the above objectives for possible mitigation using an array of treatment options and/or actions allowable by Department of Agriculture (USDA) policy. A list of issues specific to the Cascade Complex – North End is listed below. Treatments will be designed specifically to mitigate the following list of issues:

- Chinook salmon and steelhead spawning habitat degradation from hillslope erosion and increased sediment delivery to Johnson Creek and tributaries. Populations of spring/summer chinook salmon and steelhead and their designated critical habitat occur within and downstream of the fire perimeter. The Cascade Complex Fire burned during the timeframe that chinook salmon and steelhead were spawning and their eggs were incubating in streams within and immediately adjacent to the fire. The increased runoff and associated floatable debris may also negatively affect the weir and trap location along the mainstem of Johnson Creek. This facility is used by the Nez Perce Tribe for chinook salmon collection and research.
- Two local populations of bull trout (federally listed – threatened) occur within the analysis area. The fire burned adjacent to spawning and early rearing habitat for documented local populations of bull trout in Riordan Creek and Trapper Creek. The Cascade Complex Fire occurred during the timeframe that adult fluvial and resident bull trout were spawning within the fire perimeter.
- Johnson Creek and several natural lakes provide a popular recreational fishery for native and non-native fish species. Post-fire effects may impact habitat and water quality that supports this fishery.
- Trail drainage and tread stability is no longer adequate due to expected increases in overland flow and the loss of stabilizing vegetation.
- Potential post-fire loss of bridges associated with the loss of vegetation, inadequate drainage, rock slides, flooding, or mass failures.
- Potential for loss or damage to recreation facilities improvements associated with hazard trees or unstable slopes.
- Damage or loss of recreation improvements such as trail bridges, safety signs, retaining walls, and boardwalks.
- Threats to public safety in trailheads, campgrounds, along trails, and near burned structures.
- Post-fire damage to roads, culverts, and bridges by the threat to plug, overtop, or washed away more frequently than experienced when the watershed was in its pre-fire condition.
- Other risks to public safety as a result of the potential increased post-fire runoff.

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

Land **75** % Channel **NA** % Roads **75** %

D. Probability of Treatment Success

Treatment	Years after Treatment		
	1	3	5
Land	70	80	90
Channel			
Roads	85	---	70
Monitoring	90	90	90
Protection/Safety	100	90	85

E. Cost of No-Action (Including Loss): $7,184,000

F. Cost of Selected Alternative (Including Loss): $3,419,718

G. Skills Represented on Burned-Area Survey Team:

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

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H.Treatment Narrative:

Lands Treatment:

#6 - Aerial Straw Mulch to Prevent Unacceptable Degradation of Critical Habitat
Description

Apply agricultural straw mulch to the ground surface by helicopter (and spread with hand crews as necessary) to achieve a continuous cover of uniform thickness, as specified below, to replace ground cover consumed by the fire. Ground cover is needed to maintain soil moisture, accelerate recovery of native vegetation, and to protect any seed remaining onsite. In addition, the organic mulch will protect soil from solar heating and drying, thereby improving the ability of seeds to germinate.

The proposed mulching treatments are located in watersheds identified as high priority for restoration in the Boise National Forest Land and Resource Management Plan Aquatic Conservation Strategy (LRMP-ACS). Additionally, the streams are tributary to the South Fork Salmon River which is a 303(d) listed waterbody due to sediment impacts and has a TMDL (Total Maximum Daily Load) implementation plan in place.

The mulching treatments are predicted to lower the estimated soil erosion and subsequent sediment delivery to the streams by about 1/2. Mulching will also reduce downstream peak flows by absorbing and slowly releasing overland runoff which is likely to be increased due to reduced soil cover and hydrophobic soil conditions. Mulching treatments in the headwaters of the streams can protect a much larger downstream area from cumulative runoff and sedimentation.

Location and Description of Treatment Sites

- Treat areas in designated units with “High” and “Moderate” soil burn severity that are less than 60% slope.
- Refer to treatment map.

Specifications

- Straw application rate: Apply mulch to achieve a continuous cover of uniform thickness over 70% of treatment area at a depth of less than 2.0 inches. Application rate will be approximately 1.0 ton/acre (2,000 pounds). This is about 0.25 inches or 3 straw shafts deep. Aerial application may not achieve desired ground cover, therefore ground crews may also be needed to spread straw clumps by hand in select locations in each treatment unit.
- Straw must conform to Idaho or State Department of Agriculture (ISDA), Certified Noxious Weed Free Standards for Noxious Weed Free Forage and Straw (NWFFS). Straw shaft length will not exceed 12 inches. Suitable straw includes barley, rice, and wheat grasses.
- The straw must be applied dry (less than 12 percent internal moisture content) to ensure proper dispersal during aerial applications. The Forest Service will randomly test bales using a moisture probe.

Purpose

This treatment is intended to achieve three sequential objectives:

1. Improve conditions to protect soil productivity by replacing ground cover burned in the fire. Replacing ground cover will: a) decrease erosion by interrupting raindrop impact and surface soil detachment; and b) increase hillslope obstructions to decrease slope lengths which mitigate accelerated overland flow, thereby decreasing sediment delivery. Mulching also helps to protect the native seedbed and retain moisture on the burned slopes to facilitate vegetative recovery of the treatment areas.

2. Decrease overland flow and erosion from high soil burn severity areas upslope of trails, which can intercept surface runoff and result in damage and/or loss of the trail infrastructure and compound effects to downstream values by incorporating fill and routing of runoff down trail tread.

3. Decrease sedimentation from burned areas and trails upslope of streams that provide important spawning and rearing habitat for bull trout, a federally listed aquatic species.

The forest vegetation conditions, the aquatic habitat and strength of the fish populations are not within the historical range of variability. This is the situation for the watersheds within and adjacent to the Cascade Complex – North End. A high percentage of the forest vegetation is functioning at risk due to exclusion of fire as identified in the Forest Plan for the Boise National Forest, Management Area 21 – Lower Johnson Creek. Therefore the watersheds are at risk for uncharacteristically large and severe wildfires. The Johnson Creek drainage is a major tributary of the South Fork of the Salmon River. The South Fork of the Salmon River was the first river to have a non-point source TMDL developed by the USEPA and IDEQ for sediment in the United States. This was developed in 1991 and continues to be in effect. The aquatic habitat and associated fish populations have and continue to be affected by historical anthropogenic activities (e.g. mining, logging, roads, and culverts) that impact spawning and rearing habitat and pose numerous migration barriers for fish passage.

The purpose of the mulching treatment is to reduce the delivery of sediment from severely burned hillslopes to avoid exceedence of the 20% fine sediment threshold required for bull trout incubation. The mulching treatments were determined to be the minimum necessary to prevent unacceptable loss of occupied critical habitat in Riordan Creek and Trapper Creek, as defined in FSM 2523.2.2.C. Based on pre-fire monitoring data, the headwaters of these two streams (immediately downslope from the treatment units) provide critical spawning and rearing habitat to the highest density populations of bull trout found on the Boise N.F. The Cascade Complex Fire burned over all other occupied and unoccupied-suitable bull trout habitats in the S.F. Salmon River subbasin within the Boise N.F. except Curtis Creek that, due to AOP barriers, is not connected habitat. The only spawning and rearing habitat for the Riordan Creek bull trout population is upstream from Riordan Lake. Riordan Lake does not mitigate the unacceptable loss of critical habitat, because the stream reaches downstream from the lake are too warm for bull trout spawning and rearing. Continuous pre-fire stream temperature monitoring demonstrates that the 7-day mean maximum water temperature in Riordan Creek below the lake exceeds 15ºC for more than 30 days a year. The only spawning and rearing habitat for the Trapper Creek bull trout population is in the upper two-thirds of the subwatershed. The lower reaches of Trapper Creek regularly exceed bull trout spawning and rearing thermal tolerance, similar to lower Riordan Creek.

Channel Treatments:

NONE IDENTIFIED

Roads and Trail Treatments:

#1 - Road Drainage Reconstruction

Description

The roads listed below were found to have issues with their drainage system due to the expected increase in flows. The minimal treatments required to remedy these issues are:

Location and Description of Treatment Sites

The roads listed below were found to have or will have road drainage issues and at a minimum will require all or part of the treatments listed in specifications. This treatment is to improve road templates and drainage in order to accommodate the expected increase in overland flow. A number of treatments would be implemented, depending on the original road design. These treatments would be applied to sections of the road most likely to receive greater runoff, such as below burned slopes of moderate to high severity.

FR #413(Valley County)
Ditch Cleaning: 5 Miles
Remove/Replace Culverts: 4 Each
Culvert Cleaning: 20 Each

FR 416W
Road Surface Reshaping: 2.2 Miles
Waterbars – 50 Each

FR 410
Culvert Cleaning: 15 Each
Drain Dips: 1

FR 447
Culvert Cleaning: 12 Each
Ditch Cleaning: 3.1 Miles

The treatments listed for each road are those treatments found during the initial survey and are not all inclusive to these sites. These treatments should be used to stabilize other locations discovered during implementation.

Specifications

1. Drain Dips (with or without armor) – Roadway dips modify the road drainage by altering the template and allowing surface flows to run off the road to prevent any excessive erosion of the surface. The armor consisting of rip rap is placed where runoff could possibly cause erosion to the road surface and fillslope.
2. Waterbars – Purpose and function is similar to rolling drain dips except the length of the structure is more abrupt and is recommended for roads that do not receive any or very little traffic.
3. Overside Drains – Where steep fillslopes exist, overside drains help in preventing erosion of the fillslope by directing the flow toward a flatter grade or over surfaces with low erosion potential.
4. Trash Racks – The debris rack is a barrier in front of the culvert inlet or across the stream channel prior to the culvert which is used to prevent debris from plugging the culvert.
5. Culvert Cleaning – The cleanout of catchment-basins below the inlet of the culvert is done to capture the sediment transported from the channel or ditch. Capturing the sediment will help in preventing the culvert inlet from being partially plugged or completely buried.
6. Ditch Cleaning – The cleanout of drainage ditch is required to remove any debris that may deflect the flow out of the ditch and also to ensure the flow reaches the outflow structure.
7. Culvert Removal/Replacement – Culverts determined to be undersized and at risk of causing the runoff to overtop the road are removed to prevent excessive erosion to the roadway and fillslopes and replaced with larger culverts able to handle the increased flows.
8. Road Template Reshaping – Road surfaces that channel water down the roadway need to be reshaped to shed the increased flows quickly before additional road surface erosion occurs. This will be accomplished through a combination of insloping, outsloping, and removals of berms to drain water off the road surface.

Purpose

Protect road infrastructure and minimize sediment delivery into the watersheds that run into Johnson Creek its tributaries that contain listed fish species and the critical habitat that supports those species.

#2 - Stream Crossing Removals

Description

Four stream crossings with culverts were identified as being undersized due to the expected increase in flows from the burned watersheds above the crossings. These culverts will be removed and the excavated hole will be laid back to match the surrounding stream banks in order to pass the increased flows that are anticipated from future storm events. In addition, the 2 crossing sites on NFSR 413I2 will be turned into armored fords as there is still a need for access over these crossings. These 2 crossings lie on private land.

Location and Description of Treatment Sites
The following table lists those culverts that are to be removed. The crossings listed are on perennial streams.
Culvert Removal Locations:

NFSR 410 at Wardenhoff Creek No. 2	NFSR 410 at Wardenhoff Creek No. 1
NFSR 413I2 at Unnamed tributary south of Falls Creek	NFSR 413I2 at Falls Creek

Specifications
Removal of culverts shall include setting up traffic control, excavating and removing the existing culvert from Forest Service lands, hauling away excavated material to an approved waste site, and where indicated, laying the road prism back so that it matches the slopes of the stream bank.

Replacement of culverts shall be per the design and specifications written for each site. Contract specifications shall conform to Forest Service Supplements and the designated sections in the *FP03-Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects*.

Purpose
The purpose of this treatment is to reduce the risk of pipe failure and the associated sediment delivery (from road and fillslope failure) to designated chinook salmon and steelhead critical habitat and occupied bull trout habitat. This treatment will also provide better protection against loss of infrastructure investment.

Since road access to the locations where the 2 culverts are to be removed on the 410 is currently blocked by the loss of the Ditch Creek bridge, there is no reason to propose their replacement as part of this ES specification since both storm patrols to check for damage and accessibility by a backhoe to repair damage aren't possible.

The 2 culvert locations on NFSR 413I2 are at the bottom of heavily burned watersheds. The crossings are in close proximity to Johnson Creek and critical Chinook Salmon spawning habitat. Loss of these crossings would generate an unacceptable pulse of sediment directly into Johnson Creek.

#7 - Trail Tread Rehabilitation
Description
Trail tread stabilization on approximately 20.5 miles of trail/road. Many of the trails in the burned area have been de-stabilized due to the removal of brush, roots and logs. Trail drainage is also inadequate in areas burned from moderate to high severity. The stabilization will include a portion of a historical trail/road #440, which has high significant value on the district.

Location and Description of Treatment Sites
The following trails have been affected- Caton Lake #4093, Meadow Creek #4073, Buck Creek#4090, Bear/Riordan #4074, Riordan Lake #4097,Summit #4088, and 10.5 miles of historical trail/road #440.

Specifications

1. Identify areas of high severity burn and construct tread retention structures
2. Remove hazards such as stump holes, ditching, and sloughing.
3. Identify areas on historical trail/road #440 that need erosion control.

Purpose

These treatments would prevent unacceptable erosion, minimize degradation to water quality and protect bull trout habitat and salmon spawning redds. This treatment would reduce loss of recreation investments and protect historical trail/road values.

#8 - Trail Bridges Removal and Barriers

Description

The fire burned the ten identified bridges, making the trails very unsafe for the general public. Most damaged trail bridges are located in the Stolle Meadows area where the Cascade Ranger District has its highest concentration of trail users.

The district does not feel that a closure on these trails would keep the mass amount of recreational public and local residents off the trails. The treatment would include the removal of hazard trees located around the bridge sites, removal of seven native bridges and barrier placement on non-native bridges that were damaged by the fire.

Location and Description of Treatment Sites

The following five different trails have the bridges located on them- Tyndall Trail, Vulcan Trail, Yellow Jacket Trail, Caton Lake, and the Riordan Lake. (see treatment map)

Specifications

- Native bridges and all materials not consumed by the fire (logs, spikes, straps, and treated lumber) will be removed by hand labor.
- Non-native bridges (metal) will be barriered from travel by installing a metal barrier that is attached to each side of each bridge where possible with a reflectorized sign identifying hazards. At sites that the barrier cannot be directly attached to the bridge, the barrier will be installed as close to the bridge as possible using post holes on either side of the trail tread with the same reflectorized sign identifying hazards.
- All bridges burned (fully or partially) that are located on the trails identified above will be part of this treatment.

Purpose

The purpose of this treatment is to prevent debris jamming potential, decrease the potential for the streamflow to erode adjacent trail tread because it is flowing around the left over structure, and therefore, decrease unnecessary sediment delivery to critical habitat and beneficial uses.

#11 - Trail Drainage Rehabilitation

Description

Many of the trails in the burned area have been de-stabilized due to the removal of brush, roots and logs. Trail drainage is also inadequate in areas burned from moderate to high severity. In these areas, water bars and tread rehab would be used to correct the deficiencies.

Reconstruct fire effected trail tread for each trail. Install water-bars depending on steepness of trail. Identify areas of high severity burn and construct tread retention structures. Seed and mulch sections of trails identified by hydrologist. Trail work is on approximately 47 miles of trail.

Location and Description of Treatment Sites

The following trails have been affected- Caton Lake #4093, Caton Creek #4096, Rainbow Lake #4094, Bear/Riordan #4074, Meadow Creek #4073 and Buck Creek #4090, Riordan Lake #4097.

Specifications
According to USFS Trails Handbook 2309.18. Installation should be designed to last no more than 3 years. Permanent structures are not part of this treatment.

1. Install water-bars depending on steepness of trail (18 per mile) in areas of moderate or high severity.
a. Install waterbars in sections of trail that have continuous gradient for a length of greater than 50 feet and are either insloped (cupped) or show evidence of routing water (rills, gullies).
2. Construct tread retention structures where necessary and downslope, stabilizing vegetation has been consumed.
3. Reconstruct fire damaged trail tread for each affected trail.
4. Clean existing water bars.

Purpose
These treatments would prevent unacceptable erosion and loss of trail investment, minimize degradation to water quality and protect bull trout habitat and salmon spawning beds.
To ensure drainage structures is sufficient to divert water effectively given increased runoff and increased sediment movement.
To protect property and high value watershed values such as T&E species spawning and rearing habitat.

Protection/ Safety Treatments:

#3 - Road Warning Signs

Description
This treatment is for the installation burned area warning signs. Burned area signs consist of a warning to the public identifying of the possible dangers associated with a burned area. It shall contain language specifying of items to be aware of when entering a burn area such as falling trees and limbs, rolling rocks, and flash floods.

Location and Description of Treatment Sites
Burned Area Signs - These signs shall be installed at all entries into the fire perimeter. The location of these signs shall be along roads. All signs will be placed facing the direction of travel entering the burn area. Refer to map for specific locations.

Sign Locations:
1. Place three (3) signs at the intersection of NFSR 413, NFSR 412, and Forest Hwy 48.
2. Place one sign (1) at the intersection of NFSR 410, and NFSR 413.
3. Place one sign (1) at the intersection of NFSR 416W, and NFSR 413
4. Place one sign (1) at the intersection of NFSR 440, and NFSR 413

Specifications
Burned Area warning signs along the roads shall measure, at a minimum, 4 feet by 4 feet and consist of 0.08" aluminum, sheeted in high intensity orange with black letters. The BURNED AREA lettering shall be a minimum of 5 inches in height and all remaining lettering shall be a minimum of 3.5 inches in height.

Purpose
The purpose of the Burned Area signs is to warn the public of potential hazards resulting from the effects of the fire, such as rolling rocks, falling trees, road washouts, and flash floods.

#5 - Meadow Creek Lookout Outhouse Pit Safety Mitigation

Description

The Meadow Creek Fire Lookout outhouse pit was exposed due to the outhouse structure burning down. The outhouse pit is a large pit lined with rocks. The Meadow Creek Lookout itself was treated with fire retardant and fire resistant wrap and suffered no adverse effects. Meadow Creek Lookout is a significant historic site that is eligible for inclusion on the National Register of Historic Places. This treatment will mitigate the open-pit, safety hazard by filling the pit with on-site material.

Location and Description of Treatment Sites
Meadow Creek Lookout is located on a peak 8844 feet above sea level. It is on the border of Boise's Cascade Ranger District and Payette's Big Creek Ranger District (River of No Return Wilderness). The lookout can be reached via FS road #440, which cuts off of FS road #412, east of the Stibnite mine.

Specifications
The MCL Outhouse pit will need to be filled in with rock or dirt from the surrounding area. There are two locations in which fill material may be obtained. One location is from behind the outhouse pit on the west side. The other location is the parking area and access road to the east of the outhouse. The stone lined path leading from the lookout to the storage shed and to the outhouse should be left intact. This path lies in a northwest to southeasterly direction.

Purpose
Treatment is designed to eliminate risks to public safety posed by the large, open, stone lined pit and the contents within.

#9 - Hazard Tree Removal

Description
Hazard trees pose a threat to work areas and recreation infrastructure.

The Cascade Complex fire burned on all of the north side of the Cascade Ranger District system trails, making the trails vulnerable to erosion and resulting in sediment delivery into streams. Many treatments have been proposed to help these problems on the district. All treatments will involve personnel working under or around hazard trees. This treatment will clear the work areas of those hazards while working in identified, approved trail treatment areas.

Infrastructure is also at risk of damage from burned and/or damaged trees as a result of the fire. This treatment will remove those trees that pose an immediate threat to investments previously made by the district.

Location and Description of Treatment Sites
Work areas around trails and recreation infrastructures on the north side of the Cascade fire complex. Work areas include trail bridges, trailheads, and identified BAER trail treatment areas.

Specifications
1. Flag hazard trees on identified recreation work areas
2. Flag hazard trees posing a threat to trailhead and/or trail bridge infrastructure.

Purpose
The purpose of this treatment is to provide a safe working environment during the implementation of BAER treatments. It is also to protect previous investments from damage due to the changed condition created by the fire.

#10 - Trail Safety Signs

Description
The Cascade Complex Fire burned a number of safety and informational trail signs. The warning signs will identify the types of hazards to watch for on each trail. Without these trail safety and information signs, the public will not know that they are entering or leaving a fire area. This treatment will place hazard warning signs and information signs at trailheads and campgrounds.

Location and Description of Treatment Sites
Throughout the north side of Cascade Complex – North End. Refer to the treatment map.

Specifications
1. 6 (12" x 18") Country Classic Signs.
2. 12 (4"x4"x8') Pressure treated
3. 6 (14"x 14") carsonite
4. 40 carsonite
5. 40 stickers for carsonite posts.

Locations are identified as any site on a trail that comes from an unburned area into the perimeter of the Cascade Complex Fire (identified on a treatment map).

Purpose
The purpose of the informational warning signs is to inform the public to be aware of new hazards in the area due to the burned conditions.

I. Monitoring Narrative:

#4 - Patrols for Storm Induced Road Hazards

Description
Roads within the Cascade Complex Fire contain drainage structures that cross streams located in watersheds that have a high to moderate burn severity. These streams now have the potential for increased runoff and debris flows. These increases in flows pose a threat to the existing crossings which may result in plugging culverts or exceeding their maximum flow capacity. If these flows plug drainage structures the result could be massive erosion and debris torrents further down the drainage due to the failure of the fill slope. Also, there is an immediate and future threat to travelers along these roads within the burned area due to the increased potential for rolling and falling rock from burned slopes and increased potential for flash floods and mudflows. With the loss of vegetation normal storm frequencies and magnitudes can more easily initiate rill and gully erosion on the slopes and it is likely that this runoff will cover the roads or cause washouts. These events make for hazardous access along steep slopes and put the safety of users at risk. The patrols are used to identify those road problems such as plugged culverts and washed out roads and to clear, clean, and/or block those roads that are or have received damage. The storm patrollers shall have access to at least a backhoe and dump truck that can be used when a drainage culvert is plugged or soon to be plugged and to repair any road receiving severe surface erosion. Due to the presence of several bridges in the Johnson Creek drainage and the potential for floating debris to cause damage to those structures, the patrols will monitor the movement of large woody debris and make a determination of whether or not the material should be removed before it contacts bridge piers or abutments.

Location and Description of Treatment Sites
The patrols should first focus on those roads that receive the most traffic and are of more value to the transportation system. In order of preference, these roads include #413 (from #579 to #412), #474 (from #579 to Forest Boundary) #410 (from #413 to the Ditch creek bridge), and all other roads within the fire perimeter.
Develop a communication protocol and response plan in conjunction with Valley County to deal with storm events and resultant damage. Since Johnson Creek is the primary summer

access to Yellow Pine and recreation sites, there is an elevated probability that storm events will trap and/or injure travelers. Due to lack of consistently reliable 2-way radio communications in the canyon bottom, the plan needs to assess and identify locations that will serve as solid link points back to the Cascade District and Valley County Sheriff offices.

Specifications

1. FS personnel will direct the work. Immediately upon receiving heavy rain and Spring snowmelt the FS will send out patrols to the roads identified in section 'B' to identify road hazard conditions – obstructions such as rocks, sediment, washouts – and plugged culverts so the problems can be corrected before they worsen or jeopardize motor vehicle users.
2. The road patrols shall bring in heavy equipment necessary to mechanically remove any obstructions from the roads and culvert inlets and catch basins where necessary.
3. All excess material and debris removed from the drainage system shall be placed outside of bank-full channel where it cannot re-enter stream channels.

Purpose

The purpose of the monitoring is to evaluate the condition of roads and determine therir effectivesness in protecting the road prism and infrastructure investment. Patrols would evaulate situations and determine their threat to the road or road infrastructure. Examples of an immediate threat would include plugged culverts, flow overtopping the road prism, debris jams at bridge or crossing locations, and gully niche formations in road fillslope. Work would be completed to respond to the threat only if determined to be immediate and large enough to damage the road prism or infrastructure. Engineering and District personnel will survey the roads within the fire perimeter after high-intensity summer thunderstorms in 2008, 2009 and 2010 and Spring 2008 and 2009 snow-melt. Survey will inspect road surface condition, ditch erosion, and culverts/inlet basins for capacity to accommodate runoff flows.

#12 - Noxious Weed Monitoring and Treatment

Description

Monitor known weed populations and all areas used during suppression efforts. If weed spread occurs, treat as necessary. Treat and monitor noxious weed infestations on FS lands (2,048 acres) associated with suppression activities and BAER treatments. Private lands may be treated under Challenge Cost Share Agreement with local CWA. Suppression activities impacted about 249 acres and BAER treatments are to be applied (aerial mulch) on about 1,779 acres. The monitoring of the BAER treatment area will be completed by using stratified sampling and will initially focus efforts on the straw staging areas (20 acres) and sampling within the treatment polygons (15 acres). A total of 284 acres would be monitored initially.

Location and Description of Treatment Sites

All roads within Cascade Complex - North End used for fire suppression (51 miles) should be monitored for new noxious weed infestations. All trails within Cascade Complex - North End with motorized travel routes receiving highest priority (35 miles). All handline, dozerline, helibases, helispots, drop points, heliwater spots, spike camps, lookouts, dip sites, repeaters, staging areas, Johnson Creek Airstrip, and/or weather stations. Include area proposed for aerial mulch treatment.

The known locations include spotted knapweed and toadflax near Ice Hole Campground; Canada thistle and bull thistle near the beginning of the Old Thunder Mountain Road (#440) on Johnson Creek.

Specifications

1. Select herbicide, application rate, and application timing based on specific weed being treated, and access to the location of the infestation. Comply with FSM2081 and State noxious weed requirements regarding noxious weed treatment timing and rates.

2. Consideration for TES (listed species) habitat and sensitivity when selecting appropriate herbicide.

Purpose
Reduce the potential for establishment of new noxious weed infestations in highly susceptible burned areas, prevent spread of existing infestations, and prevent increase in weed density in existing infestations.

Other Treatment monitoring:
#1 Road Drainage Reconstruction will be monitored using the storm patrol treatment.
#2 Stream Crossing Removal/Replacement will be monitored using the storm patrols as well as evaluated as to whether the design ws effective in protecting the road infrastructure while still providing aquatic organism passage.
#3 District personnel while working in the areas of these signs shall monitor their effectiveness by observing if they are still installed while they are needed.
#5 Patrols for Storm-Induced Road Hazards is meant to monitor the functionality of road drainage.
#6 Visually inspect randomly selected mulch treatment units for proper application rate and uniform thickness during/immediately after treatment. In each unit, measure percent ground cover using a 100ft pace transect method once after treatment, and again in the spring of 2008.
#7 Trails will be inspected throughout the year after implementation to monitor the effectiveness of water run-off and the trail tread condition.
#11 The reroute and water structures will be inspected throughout the year after implementation to monitor the effectiveness of water run-off and the trail tread condition.
#12 Noxious Weed Monitoring and Treatment will be re-evaluated in 2nd and 3rd years, as needed to prevent new infestations from spreading.

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

			NFS Lands			Other Lands				All
		Unit	# of		Other	# of	Fed	# of	Non Fed	Total
Line Items	Units	Cost	Units	BAER $	$	units	$	Units	$	$
A. Land Treatments										
Aerial Straw Mulch	acre	1,211	1,779	$2,154,369	$0		$0		$0	$2,154,369
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Land Treatments				$2,154,369	$0		$0		$0	$2,154,369
B. Channel Treatments										
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Channel Treat.				$0	$0		$0		$0	$0
C. Road and Trails										
Road Drainage Rec	miles	3151	22	$69,315	$0	0	$0		$0	$69,315
Stream Crossing R	lumpsu	36,636	1	$36,636	$0		$0		$0	$36,636
Trail Tread Rehabil	miles	2001	20.5	$41,014	$0					$41,014
Trail Drainage Reh	waterb	63	756	$47,477	$0		$0		$0	$47,477
Trail Bridges Remo	bridge	729	7	$5,105	$0		$0		$0	$5,105
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Road & Trails				$199,547	$0		$0		$0	$199,547
D. Protection/Safety										
Trail Safety Signs	each	90	52	$4,661	$0	0	$0		$0	$4,661
Road Warning Sign	each	392	6	$2,354	$0		$0		$0	$2,354
Hazard Tree Remo	lumpsu	4649	1	$4,649	$0		$0		$0	$4,649
MCL Outhouse Saf	site	1238	1	$1,238	$0		$0		$0	$1,238
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Structures				$12,901	$0		$0		$0	$12,901
E. BAER Evaluation										
Team Assessment	day	10000	7	$70,000			$0		$0	$0
Insert new items above this line!				---	$0		$0		$0	$0
Subtotal Evaluation				$70,000	$0		$0		$0	$0
F. Monitoring										
Noxious Weed Mon	acre	5.86	284	$1,664	$0	128	###		$0	$2,414
Patrols for Storm-In	day	1837.5	4	$7,350	$0		$0		$0	$7,350
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Monitoring				$9,014	$0		$0		$0	$7,350
G. Totals				$2,375,831	$0		**$0**		**$0**	**$2,374,167**
Previously approved										
Total for this request				**$2,375,831**						

PART VII - APPROVALS

1.	/s/Richard A. Smith	10-09-2007
	Forest Supervisor (signature)	Date
2.		
	Regional Forester (signature)	Date