BURNED-AREA REPORT
(Reference FSH 2509.13, Report FS-2500-8)

PART I - TYPE OF REQUEST

A. Type of Report

[**X**] 1. Funding Request for Estimated FFF-FW22 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 and design analysis
[] Status of accomplishments to date

[] 3. Final report - following completion of work

PART II - BURNED-AREA DESCRIPTION

A. Fire Name: **Bailey Fire** B. Fire Number: **P64247**

C. State: **Washington** D. County: **Okanogan**

E. Region: **Region 6** F. Forest: **Okanogan-Wenatchee NFs**

G. District: **Tonasket Ranger District**

H. Date Fire Started: **8-13-2001** I. Date Fire Controlled: **9-10-2001**
J. Suppression Cost**: $4,950,000 estimated (9/3/2001)****

* Containment @ 1800 on 8/31/2001
**Projected Final Cost = $5,500,000

K. Fire Suppression Damages Repaired with FFFS-PF12 Funds *:

1. Fireline waterbarred (miles) **9**
2. Fireline seeded (miles) **9**
3. Other (safety zones, drop points) **9 acres**

*Work to be done as equipment is available. Seeding to be done by October, 2001.

L. Watershed Number: **170200417 WF Sanpoil River**

M. NFS Acres Burned **2792** Total Acres Burned**: 3209** **

Ownership type: NFS **lands 2792 ac. , Colville Indian Reservation lands 417 ac.**

( )State ( )BLM ( )PVT (X) Colville Reservation Lands

** Projected final size

N. Vegetation Types: **Douglas-fir plant associations are abundant on the southerly exposures. Subalpine fir and larch are common at the higher elevations. See Table I in Appendix E for more detailed descriptions**

O. Dominant Soils: **Buhrig, Cassal, Manley, Mineral, Nevine, Stepstone and Torboy. These are all deep, volcanic ash soils over glacial till. The Chumstick is a shallow soil over bedrock formed in glacial till.**

P. Geologic Types: **Igneous granitics on uplands, glacial till and outwash in valleys; Landforms are glacially scoured from continental glaciation.**

Q. Miles of Stream Channels by Class:

I- 0 **II- 0** **III-0.1** **IV- 5.2**

R. Transportation System:

Trails: **0** miles Roads: **13.5** miles

PART III - WATERSHED CONDITION

A. Fire Intensity (*1) (acres): **2702** (low-**84**%), **502** (moderate-**16**%), **0** (high-**0**%)

(*1) Fire intensity figures based on 8/30/01 and 9/01/01 survey information. Low and moderate intensity burn areas contains pockets of small-unburned areas.

B. Water-Repellent Soil (acres): **None observed following random sampling of soils within fire perimeter in both the Bailey Creek and Lost Creek drainages**.

C. Soil Erosion Hazard Rating (acres):

2150 (low) **935** (moderate) **75** (high)

D. Erosion Potential: **2.0** tons/acre

E. Sediment Potential: **1260** cubic yards / square mile (*4)

(*4) Assumptions for items D and E:
The erosion and sediment figures listed above reflect the contribution from overland flow from sheet, rill and gully erosion and also the potential from some small debris slides in the Bailey Creek headlands. The Erosion Potential is estimated to be **2.0 Tons/Acre** and Sediment Potential is **1,260 cubic yards/Square Mile**.

The fire area occurs predominately in Scoured Glaciated Mountain Slopes Landtype Association. These are moderately relief mountain slopes that have smooth convex ridges. Continental glaciation was the common land forming process and also served as major melt water drainage during continental recessional periods. This drainage is moderately subdued with rounded ridge tops. Slopes range from five percent in the lower valleys to 60 Percent in the headlands of the Bailey Creek drainage. Natural landform sediment delivery and routing efficiency is considered low. Runoff is routed fairly slowly into low order channels.

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period: 3 years

B. Design Chance of Success: 75 percent

C. Equivalent Design Recurrence Interval: 10 years

D. Design Storm Duration: 1 hour

E. Design Storm Magnitude: 0.8 inches

F. Design Flow: **16** cubic feet/second/square mile

G. Estimated Reduction in Infiltration: 0 percent

H. Adjusted Design Flow **16** * cubic feet/second/square mile

* Based on no reduction in infiltration.

PART V - SUMMARY OF ANALYSIS

A. Describe Watershed Emergency:

The Bailey Fire area and potentially impacted areas downstream exhibit many important characteristics that were considered in determining the proposed course of action. The following summary describes the conditions that warrant emergency rehabilitation actions.

1. ***Loss of Site Productivity*** -

The major risk to site productivity loss in the burned area is noxious weed invasions on disturbed soils. Roads opened for fire control access and tractor fire lines serve as beachheads for noxious weeds to rapidly increase. Weed seed sources exist along roadways, staging areas, adjacent to the fire area, as well as at the fire camp. New invaders in the general area include Orange and Yellow hawkweed, scotch and musk thistle. Diffuse and spotted knapweed are also found in the vicinity of the fire. These noxious weeds have the potential to crowd out most native and desirable non-native plants. Weed management is critical to help preserve the productivity and character of this area.

The natural inherent soil productivity is moderate to high in the burned area. Soils are derived from volcanic ash over glacial till. Soils generally have very fine sand to coarse silty soil textures in the surface layers and are underlain by gravelly, sandy soils. Soil depths are relatively deep. Soil moisture is limited in some years due to low summer precipitation. Even so, the volcanic ash has a high water holding capacity and high fertility making some of these sites quite productive. Glacial erosional and glacial fluvial processes have had a major role in soil occurrence in the landscape. Along with continental weather characteristics, the overall site productivity is moderate to high for the fire area. The fire will not have a significant effect on inherent soil productivity.

The loss of some of the vegetation in the moderate intensity burn areas should not alter conditions for surface erosion. These conditions and the amount and distribution of moderate and low burn intensity make it unlikely that seeding and or fertilization would significantly reduce erosion. As a result, broadcast seeding was not selected as an alternative because of the low likelihood of reduction in soil erosion or natural vegetative recovery.

The greatest potential for soil erosion to occur on the fire is associated with the dozer lines constructed around and in the fire perimeter and along the road system use within and around the fire. Fire suppression rehabilitation will include water barring tractor fire lines and providing adequate drainage to reduce the soil erosion potential. Seeding for erosion control along the road system and dozer lines will provide a potential source of vegetation on these disturbed sites that will aid in reducing soil erosion in the long term. Soil erosion potential within the fire perimeter is not considered high because of the more subdued landscape and moderate steepness of the slopes. In addition, a large number of partially burned logs were still left on the ground after the fire will provide some soil erosion protection to the site. Because the moderately burned portions of the fire have numerous logs left on site, no additional logs (bio-logs, log terraces, waddles, etc.) are recommended for this site.

B). 2. ***Loss of Water Quality –***

Water quality in the West Fork of the Sanpoil River drainage is critical for domestic, agricultural, down stream potential aquatic habitat for a Threatened and Endangered species (bull trout), and recreation use.

Water quality parameters most affected by this fire are water temperature and sediment loads. The fire reduced the cover over short reaches of Bailey Creek. Water temperatures will potentially rise. Mid to late July is normally the period when stream water temperature is the highest for the year. The riparian shrubs along Bailey Creek are expected to rapidly re-grow over the next year and provide cover to help keep water temperatures at pre-fire levels. The medium intensity burn killed most over story trees, leaving only snags. These snags provide a little shade, and pre-fire conditions shade from conifers is 10 to 50 years away.

Stream sediment loads in Bailey Creek is expected to slightly increase as soil erosion occurs. Fine sediment is expected to be the major type of sediment. Most material will stay in channel. The Lost Creek tributary below the burned area is in fair condition down to Lost Creek and would provide additional stream sediment storage when the sediment eventually moves downstream from the burned area. The intermittent tributaries draining into Lost Creek were burned, but retained structural wood which still provides shade and cover. The plants will loose their leaves this winter, but should leaf-out next spring and provide a pre-fire shade condition, so no changes in stream temperature or sediment contributions are expected in the main fork of Lost Creek as a result of this fire.

Water temperatures are not likely to increase significantly to degrade current fish habitat or other downstream water uses. Steam sediment is not expected to degrade fish habitat below the burned area. However, there is likely to be a very limited amount of fine sediments that will move through the West Fork of the Sanpoil River system.

3. ***Threats to Human Life and Property –***

Values at risk include roads, and potential cultural sites. Appendix D lists Values at Risk from a major flood. Some of these developments are already in the existing flood plains and are already at risk to flood damage.

Substantial flooding along the West Fork of the Sanpoil main stem is not common, and significant effects to downstream values are infrequent. The annual peak flow is normally related to rapid spring snowmelt (the largest flood over the past 60 years was during the normal spring time snow melt, but was added to by rain-on-snow conditions). Winter-time rain-on-snow events are rare and are not likely to be the peak stream flow of the year.

B. Emergency Treatment Objectives:

A primary objective of emergency treatment is to establish conditions within the burn that support long-term, natural recovery while reducing short-term negative impacts. The application of the BAER treatments should assist natural recovery and minimize both on-site and downstream damage to values at risk. Here, the non-structural land treatments proposed are designed to help maintain site productivity and ecosystem function by inhibiting weed establishment and spread. This is done by using a cultural practice (grass seeding) to provide competition for weeds and by chemical and manual weed control.

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	**50%**	**85%**	**85%**
Channel	**%**	**%**	**%**
Roads	**%**	**%**	**%**
Other	**%**	**%**	**%**

E. Cost of No Action (Including Loss): **$150,500**

F. Cost of Selected Alternative (Including Loss): **$76,173**

G. Skills Represented on Burned-Area Survey Team:

[X] Hydrology	[X] Soils	[] Geology	[] Range
[] Timber	[] Wildlife	[] Fire Mgmt.	[X] Engineering
[] Contracting	[X] Ecology	[] Research	[X] Archaeology
[] Recreation/Wilderness		[X] Fish Biologist	

Team Leader: **\s\ Mel Bennett and Ken Radek**

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H. Treatment Narrative:

The following treatments have been proposed to mitigate the threats to life & property, and to reduce loss of site productivity and degradation of water quality as a result of the Bailey Fire.

Overall Goal of Proposed BAER Treatments: The treatments will reduce noxious weed effects on site productivity and ecosystem diversity in the area and enhance natural vegetative recovery of the riparian areas.

Land Treatments

Purpose: (1) Reduce noxious weed re-establishment and infestation in the burned area by seeding or manual control along the roads or accessible fire lines where fire has destroyed the vegetative cover, and in areas allowed by NEPA, chemical treatment, to reduce existing weed infestations. Treatments are intended to maintain ecosystem health by encouraging natural vegetation recovery and protect facilities.

Treatment -Manage noxious weeds along the roads in the Bailey Mountain Fire perimeter in the medium intensity burned area (see Appendix C). Seeding would be used along the main roads, with chemical treatments in NEPA covered sites in the Bailey Mountain fire burned area.

BAER Evaluation

BAER Survey and Implementation Plan. Supports completion of BAER survey and development of the Bailey BAER Implementation Plan

BAER Treatment Monitoring: This section addresses the monitoring of BAER treatments only (i.e. funded by BAER). The primary treatment effectiveness issues with the Bailey Fire are the establishment of grass cover to reduce the spread of noxious weeds and the effectiveness of herbicide treatments. Currently noxious weeds are along the roads. With fire disturbance to existing vegetation cover and BAER road treatments, there is a real concern with the spread of noxious weeds. The team proposes monitoring along roads and known noxious weed infestations for three years for evidence of noxious weed spread in the medium intensity burn areas.

	Part VI - Emergency Rehabilitation Treatments and Source of Funds					
		by Land Ownership			1/	
		Burned Area Emergency Rehabilitation				
No.	LINE ITEMS	UNITS	NUMBER OF UNITS	UNIT COST	WFSU-FW22 AMOUNT	OTHER 2/ FUNDING
	A. LAND TREATMENTS					
L1	Hand Seed, Pull, Spot Spray, noxious weed sites along road work areas (2 Yrs for control work)	Ac	25	255	6375	
	B. CHANNEL TREATMENTS					
	C. ROADS/TRAILS					
	D. OTHER					
	E. BAER EVAL./ADMIN.					
	BAER Survey & Implementation Plan				16,900	
	BAER Land Treatment Monitoring (Weed occurrence)	Years	3	1500	4,500	
	BAER Cultural Surveys				1,000	
	Repair Boundary Fence between Colville Indian Reservation and National Forest system lands					6,000
	F. TOTAL				28,775	6,000
	1/ All NF System lands - No other ownerships involved					
	2/ Other FS funding sources					

PART VII - APPROVALS

BAILEY FIRE

/s/ Sonny J. O'Neal

1. _____
Forest Supervisor Date: 9-11-2001

2. _____
Regional Forester Date: _____

Appendix A

Bailey Fire

Noxious Weed Management

(Includes seeding, manual and chemical control)

Summary of Noxious Weed Management Costs

Item/Species	Cost per Unit	Units Treated	Cost Per Season	Total Cost for 3 years
Administration noxious weed treatments (2001-02)	$1,000/year	All projects below	$1,000	$2,000
Application of seeding for noxious weed control	$50/ac	10 acres	$500	$500
Seed for Noxious Weed Control seeding	$50/acre	10 acres	$500	$500
Chemical Control 1 application in 2001 plus follow-up in spring of 2002	$150/ac yr1 $ 75/ac yr2	15	$2250 $1125	$3375
Total Treatment				$6,375
Seed Treatment Effectiveness Monitoring (2001-2003)		25 acres	$1500	$4500

WEED TREATMENT SEED SPECIFICATIONS

Species For Noxious Weed Treatment	Seeds/lb	Seeding Rate lbs/acre	Seeds/ Ft2/acre	Cost/lb	Cost/Acre
Noxious Weed Treatment					
Sheep Fescue *Festuca ovina*	680,000	2.5	39	$1.50	$3.75
Pubescent Wheatgrass *Agropyron trichophorum* **Elytrigia intermedia*	90,000	5.0	10.3		
Streambank Wheatgrass *Agropyron riparium* **Elymus lanceolatus*	170,000	2.5	9.7	$3.00	$7.50
Hard Fescue *Festuca ovina duriuscula*	125,000-160,000	2.5	7.7		
Smooth Brome *Bromus inermis*	150,000	2.5	8.6		
Seed Totals @ 15.0 acres		**15**	**75.3**	**$3.33**	**$50.00**

All seeding rates are for certified seed. If certified seed is not available and use non-certified seed only if it is at least 90% pure and has 90% germination. ACCEPT NO SEED WITH ANY NOXIOUS WEED CONTENT

Appendix B

Seeding Rationale
Bailey Fire

On the Bailey Fire, the seeding treatment will be used as a cultural method to reduce noxious weed invasion and spread. This seeding treatment will use competitive domestic grasses on areas adjacent to disturbed roads used in the suppression of the Bailey Fire.

Use of grass seeding to suppress Noxious weeds:

Noxious weeds are a concern in the fire area. The introduction and spread of noxious weeds can reduce the diversity and abundance of native vegetation, forage, diversity and quality of wildlife habitat, increase erosion and decrease water quality (ICBMP 1997). Wildfire and road treatments increase the potential for weed introduction and spread by removing vegetation the litter layer and "A" soil horizon, creating an ideal seedbed for noxious weeds. Noxious weeds inhibit natural stand development and reduce natural biological diversity. Weeds may also inhibit re-establishment of native plants including trees. A number of weeds are established in the area and without treatment, may increase as a result of the open stand conditions. Seeding adjacent to known weed populations should help to reduce their susceptibility to invasion. It is well documented that vegetated sites are more resistant to weed invasion than sites devoid of vegetal cover. Shelley at Montana State is a strong supporter of revegetation as a means to inhibit weed invasion. Larson and McInnes (1989) found that some grasses were particularly effective at inhibiting encroachment of diffuse knapweed. Perennial domestic grass species are proposed and should occupy disturbed sites that are at risk from nearby noxious weeds.

Rod Clausnitzer
Plant Ecologist

Appendix C
BAILEY FIRE
NON-STRUCTURAL LAND TREATMENT
ASSESSMENT NARRATIVE

GENERAL

Fire is a natural component of the landscape. The Bailey Fire is approximately 3200 acres and falls within the West Fork of the Sanpoil River watershed. The fire burned less than 1% of the Sanpoil River watershed.

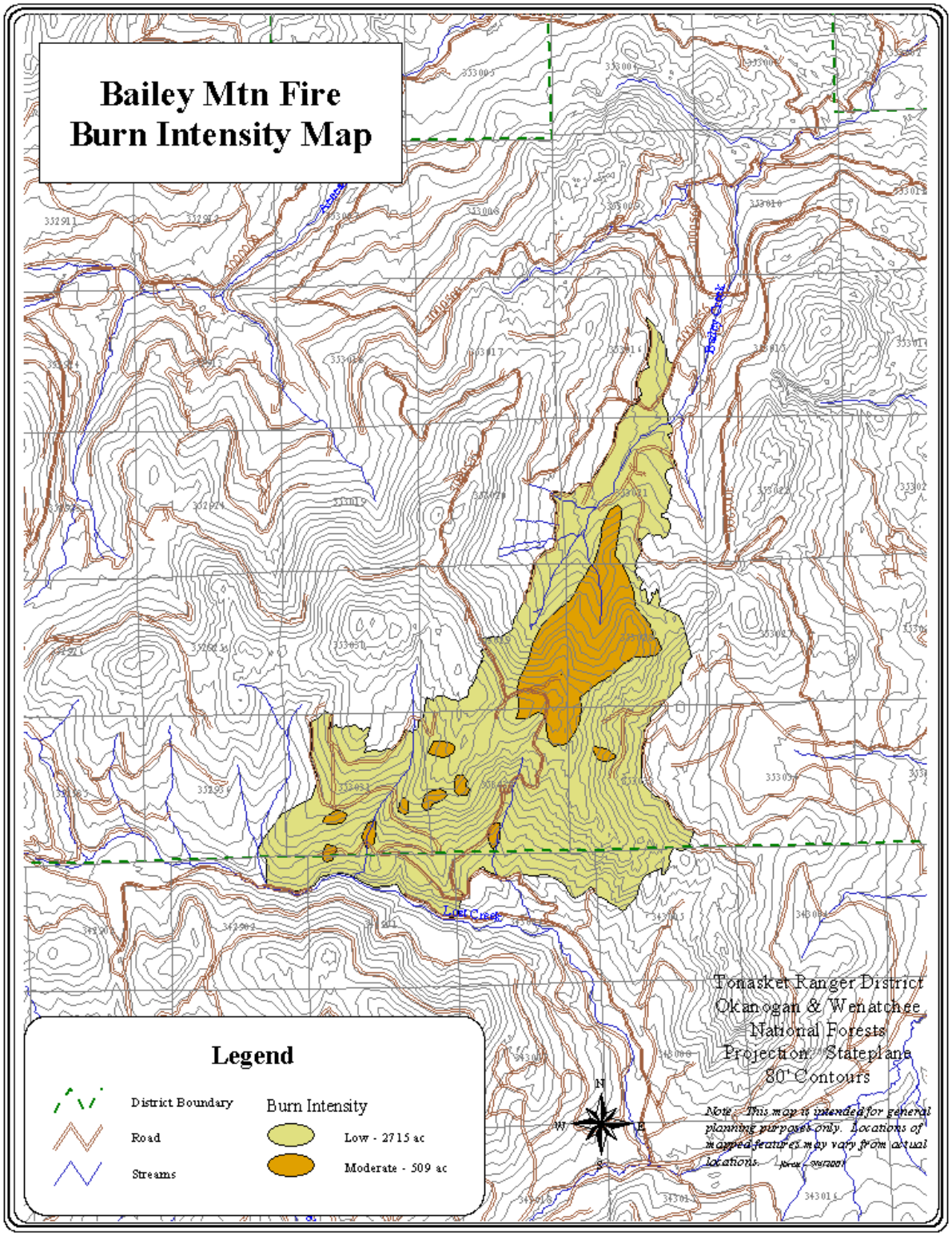
Slopes are relatively gentle and soils stable. Volcanic ash covers nearly the whole area. The area is forested with Western larch, Douglas-fir, ponderosa pine and lodgepole pine, spruce and subalpine fir. Most of the fire area falls within the Douglas-fir zone. Drier sites fall within the Douglas-fir and ponderosa pine zones and support understory species such as pinegrass or snowberry. As moisture and elevation increases, subalpine fir becomes the climax dominant species and the understory includes grouse whortleberry and low huckleberry.

Fire intensity was mapped using the criteria listed in the 1995 Fire Rehabilitation Handbook. Fire Intensity is estimated by rating site factors including the depth and color of ash, the size and amount of live fuel consumed, the litter consumption, the survival of plant root crowns and the amount of soil crusting. Mapping was completed through helicopter surveys follow-up by ground surveys. Approximately 16% of the fire area had a moderate intensity burn (see attached map in Appendix C). The remainder was low intensity with a small amount of unburned area within the fire perimeter. Most roots examined are intact and appeared to survive the burn. Most will re-sprout. Some sprouting is already occurring from shrubs along Bailey Creek or other drainage ways.

Fire Intensity (acres): **502** (low-16%) **2707** (moderate-84%) **0** (high) –See Attached Map

Treatment Narrative

The non-structural treatments include noxious weed competition seeding adjacent to the road system. There will also be manual and herbicidal control of existing weeds along the used roads where NEPA is already completed for the use of chemicals.


Bailey Mtn Fire
Burn Intensity Map
Legend
District Boundary
Road
Streams
Burn Intensity
Low - 2715 ac
Moderate - 509 ac
Tonasket Ranger District
Okanogan & Wenatchee
National Forests
Projection: Stateplane
80' Contours
Note: This map is intended for general planning purposes only. Locations of mapped features may vary from actual locations.
Bailey Creek
Lost Creek

Appendix D

Values at Risk

The values at risk from the burned area include the area from the burned area down the West Fork of the Sanpoil River to Winthrop.

Values at Risk	Number	Value each	Total Value	Risk from Fire*	Location
Ecosystem Diversity	3200 ac	$200	$640,000	Moderate	On-site
Property Values	502 ac	$500	$251,000	Low	On-site
AUM's	126 aum	$ 10	$ 1,260	Moderate	On-site
TOTAL ALL			**$892,260**		

*Risk from fire is: the likelihood that changes in soil and water conditions as a result of the fire would affect the values at risk either in the fire area or downstream.

There is an inherent risk to the downstream structures and resources every year from flooding or low flow. A low rating indicates the BAER team does not believe there will be an increase in that risk to those values as a result of the Bailey fire.

Appendix E
Vegetation Conditions: Bailey Fire

Introduction

The Bailey Fire is approximately 3,209 acres. It includes 2,792 acres of the Tonasket Ranger District, Okanogan-Wenatchee National Forests and 417 acres of the Colville Indian Reservation in the southern portion of the fire. Within the fire, elevations range from about 3,700 feet along the northern boundary to 4,100 feet on the eastern ridgetops, and 3,900 feet in the Lost Creek drainage on the southern fire perimeter to 5,500 feet on the southeast flanks of Bailey Mountain on the western boundary. The landscape drains either to Lost Creek on southerly exposures or to the north in the Bailey Creek basin. Fire severity was mixed over this varied landscape with low severity fires occurring generally on the southern exposures and moderate severity fires on the northern portion of the Bailey Fire. This fire behavior was apparently related to the plant associations extant in the area and the resulting fuel types. About 502 acres were classified as a moderate intensity fire with the remaining 2,707 acres identified as a low intensity fire or unburned category.

Vegetation

Vegetation Pattern

Douglas-fir plant associations are abundant on the southerly exposures with subalpine fir associations occurring on the northerly aspects, higher elevations, or cold, moist drainages within the Douglas-fir zone. Plant associations observed in the area and the classification of Plant Association Groups (PAGs) are displayed in the table below. Acres and percentage area of the Bailey Fire are estimated from Geographic Information System (GIS) PAG layers and Bailey Fire layers. (See attached map.)

Table 1. Plant Associations occurring within the Bailey Fire and Estimated Area in Acres and Percent.

PAG NAME	PAG CODE	PLANT ASSOCIATIONS	ACRES	% AREA
Douglas-fir Warm, Dry Shrub/Grass	1401	Ponderosa pine-Douglas-fir/Bluebunch wheatgrass, Douglas-fir/Mountain snowberry	482	15
Douglas-fir Cool, Dry Shrub/Grass	1402 1403	Douglas-fir/Pinegrass, Douglas-fir/Bearberry/ Pinegrass, Douglas-fir/Boxwood/Pinegrass, Douglas-fir/Shiny-leaf spirea/Pinegrass, Douglas-fir/Shiny-leaf spirea	1668	52
Douglas-fir Warm, Mesic Shrub	1404	Douglas-fir/Ninebark, Douglas-fir/Common snowberry	24	1
Douglas-fir Cool, Mesic Shrub	1405	Douglas-fir/Dwarf huckleberry	292	9
Subalpine fir Cold, Dry Shrub	2502	Subalpine fir/Grouse whortleberry, Subalpine fir/Grouse whortleberry/Pinegrass	555	17
Subalpine fir	2503	Subalpine fir/Twinflower, Subalpine fir/Big	166	5

Cold, Mesic Shrub/Herb		huckleberry, Subalpine fir/Dwarf huckleberry		
Subalpine fir Cool, Wet Shrub/Herb	2507	Subalpine fir/Bunchberry dogwood, Subalpine fir/False bugbane	22	1
Riparian		Mountain alder, Sitka alder, Aspen, Black Cottonwood, Engelmann spruce, or Subalpine fir Series		
TOTAL			3209	100

Riparian Vegetation

Riparian bottomlands are found in the mainstem and tributaries of both Lost Creek and Bailey Creek. Hardwood tree and shrub types as well as conifer plant associations occur in very narrow to narrow valley bottoms (1 to 100 feet across) with low to very steep valley gradients (1 to 8+ %). Valley bottoms adjacent to these stream reaches are generally dominated by Engelmann spruce, subalpine fir, quaking aspen, black cottonwood, red-osier dogwood, mountain alder, or Sitka alder plant associations. Moist- and wet-site forbs are abundant in the understory. The steeper gradients create more linear streams with banks dominated by Sitka or mountain alder or wet-site herbs. Douglas-fir, lodgepole pine, Engelmann spruce, or subalpine fir plant communities dominate associated terraces. Here understory shrub layers consist of the tall shrubs: Douglas maple, serviceberry, ninebark, oceanspray, Sitka alder, Scouler willow, or chokecherry; or the low shrubs: snowberry, spirea, pachistima, dwarf huckleberry, big huckleberry, grouse whortleberry, or buffaloberry,

Upland Vegetation

Conifer vegetation on xeric sites (due to aspect or shallow soils) is dominated by ponderosa pine and Douglas-fir. Understory shrub vegetation is comprised principally of pachistima, serviceberry, bearberry, Scouler willow, chokecherry, mountain snowberry, or spirea. Pinegrass is the dominant grass with beardless bluebunch wheatgrass occurring on the warmest, driest sites. Plant associations most typical of these areas are: PIPO-PSME/AGSP, PSME/SYOR, PSME/ARUV/CARU, PSME/PAMY/
CARU, PSME/SPBE/CARU, PSME/CARU, and PSME/SPBE. These drier sites comprise over half of the Bailey fire (67%). Where conditions become more mesic (toe slopes, draws, or deeper soils), snowberry or ninebark may dominate the understory with Douglas maple or oceanspray associated. These plant associations, PSME/SYAL and PSME/PHMA, are relatively rare within the fire boundary and comprise only 1% of the area. Douglas-fir communities transitional to subalpine fir plant associations represent the PSME/VACA plant association (9% of the area) with dwarf huckleberry common in the understory.

Near upper elevation ridgetops and on drier sites within the Bailey Creek basin, vegetation grades into Subalpine fir Cool, Dry Shrub PAGs. ABLA2/VASC and ABLA2/VASC/CARU will occur in these portions of the landscape. Many of these stands are sub-climax stands dominated by lodgepole pine and/or western larch. Grouse whortleberry and pinegrass likely typify the understory vegetation on these drier slopes. These subalpine uplands comprise about 17% of the burned area. The Subalpine fir Cold, Mesic PAG is best represented here by vegetation in the ABLA2/LIBOL, ABLA2/VAME, and ABLA2/VACA plant associations. Twinflower, big huckleberry, dwarf huckleberry, chimophila, honeysuckle, spirea, and prickly currant are common understory species in these types. These sites are found on mesic benches, toe slopes, and stream terraces within the Bailey Creek basin or mesic draws of Lost Creek tributaries on the south slopes. These plant associations occur on only 5% of the area. These areas support a mix of seral western larch, lodgepole pine, and Douglas-fir along with late seral-climax Engelmann spruce and subalpine fir. Approximately 1% of the area supports vegetation representing the Subalpine fir Cool, Wet Shrub/Herb PAG. These types were observed at streamside and toe slope locations within the burned area. The indicator plants, bunchberry dogwood and false bugbane, were well represented on these wet forested sites.

Vegetation Recovery Process

While understory vegetation of these forested stands was burned, most of these species will resprout readily and become a part of the vegetation recovery process. Fire seres will be initiated that include elements from: 1) the soil seedbank (e.g., russet buffaloberry and Ross sedge); 2) resprouts (e.g., the herbaceous pinegrass as well as the shrubs, huckleberry and pachistima); and, 3) off-site colonizers (e.g., the wind-blown seed of Scouler willow). The composition and subsequent development of these post-fire stands will depend on pre-fire stand structure and composition, severity of the burn, the character of adjacent undisturbed vegetation as a source of propagules, scale of the burn, and chance events. Initial communities are often a result of "what got there firstest with the mostest". Eventual successional development of many sites with similar biotic potentials will often converge on a recognizable stable plant association.

Recovery of vegetation cover in the understory may occur within 3 - 5 years in all but the most severely burned sites. High intensity burns affect the chemical and physical properties of soils as well as the biotic community – and these changes may prolong a seral stage for decades (e.g., shrub stages in forested environments). However, on the Bailey Fire, the most severe fire effects observed were of moderate severity and vegetation recovery should proceed without interruption. The sole exception to this expectation will be the effects of recurrent and continuous grazing by domestic livestock. A period of time (3-5 years) for plants to become established in the absence of grazing is critical to successful rehabilitation of the area.

Recommendations

Most of the area burned with a low intensity fire. Conditions on moderately burned areas were variable. There were sites within the moderately burned areas with needle litter present (although partially burned). Down woody debris (DWD) was generally not burned completely by the fire. However, there were small pockets of high intensity burn where concentrations of DWD burned, but these were uncommon on the landscape. Since most species will respond favorably to the fire (see vegetation recovery process above), seeding to aid the reestablishment of plant communities in the Bailey Fire is unnecessary. Natural processes will result in the initiation of plant cover this fall and the successional process will result in the establishment of plant communities across the landscape.

Botany TES Species

Sensitive Species Management

The northern portion of the fire overlaps part of the Bailout Analysis Area; sensitive plant surveys were done in 1999 and 2000. A review of the Bailout analysis file showed that no sensitive plants were discovered by field surveys within the fire boundary. However, Bailey Creek is still considered good potential habitat for a few sensitive plant species on the district. Potential habitat occurs on the southern portion of the fire as well, but field surveys have not been conducted there at this time.

Recommendations

Seeding or planting in the burn area to protect potential TES plant habitat is unnecessary. Most of these areas were unburned or burned with low intensity and natural processes will lead to the reestablishment of plant communities within these areas. While there may be some runoff, sedimentation will have little impact on potential sensitive plant habitat. Noxious weed species have a potential to become established in some of

these disturbed areas and negatively impact the value of sensitive plant habitat. Preventive measures to limit noxious weed spread from extant populations may be appropriate.

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Okanogan-Wenatchee NFs
9/4/01

Larry Loftis
District Botanist
Tonasket Ranger District
Okanogan-Wenatchee NFs
9/4/01

Appendix F
BAILEY FIRE BAER REPORT FOR NOXIOUS WEEDS

Introduction

Most noxious weeds are early seral species, taking advantage of soil disturbance to colonize. When a seed source is available, noxious weeds can establish themselves following a disturbance in one or two seasons. Failure to control noxious weeds causes a net loss in desirable species and a substantial increase in noxious weed plants.

Diffuse knapweed (*Centuarea diffusa*), Canada thistle (*Cirsium arvense*), sulfur cinquefoil (*Potentilla recta*) and St. John's wort (*Hypericum perforatum*) exist presently inside and outside the Bailey fire area (see attached map). Past integrated weed management including hand pulling and chemical treatment of noxious weeds has occurred along roads within the northern portion of the Bailey fire area. Approximately 240 acres in the Lyman Lake- Bailey Mtn. Area have been treated for noxious weeds in the last five years. Of these acres, approximately 125 fall within the fire perimeter. Additionally, there has been ongoing weed spraying in the Dugout, Sneed and Cox Meadows areas.

Bailey Fire Disturbances and Impacts of Weeds

Roads throughout the Bailey fire area were used extensively during suppression activities. Some roads have been widened, with a substantial increase in disturbance, while others have a substantial amount of disturbance from repeated, heavy traffic. Along with this, viable noxious weed seeds have likely been spread along these roads and tractor fire lines from fire related traffic. Native vegetation has been burned and soils have been disturbed bordering roads and control lines within the fire area. These disturbed soils are niches and seedbeds for noxious weed seeds. Because seed can be spread by animals and, to a lesser extent, by wind, noxious weed seeds can become established in the burned areas adjacent to disturbed roads and fire lines.

On the south end of the Bailey fire, meadows are severely infested with Canada thistle. This area **is not** covered by an EA that would allow treatment of noxious weeds with herbicides. Cattle grazing have kept most plants (90%) from going to seed, but I speculate that it has caused an increase in vegetative spread. Pulling thistle seed heads this fall would not be effective on the remaining 10% of the plants. The reasons for this are: 1) numerous seeds have already been dispersed and pulling heads can stimulate vegetative root spread in rhizomatous weed species; 2) because the pappus of Canada thistle seeds does not remain firmly attached to the seed, dispersal from wind is not considered to be a major factor in spread (Sheley & Petroff, 1999); 3) the majority of weed spread has already occurred when dozers bladed control lines through the meadows, dragging root fragments and seeds to other disturbed sites; these cat lines will be seeded for erosion control anyway; soil disturbance in these meadows except for the cat lines is minimal; and 4) resources are not available to pick seed heads in a timely manner -- by the time workers are available to pick the heads, remaining seeds will have been dispersed already.

Potential invaders to the burn area are orange hawkweed (*Hieracium aurantiacum*) and yellow hawkweed (*H. pratense*), scotch thistle (*Onopordum acanthium*), and musk thistle (*Carduus nutans*). These species are known to occur within the vicinity and can easily invade the fire area by wind blown seed.

Table 1. Existing noxious weeds and potential invaders, responses to fire, and associated impacts from infestation.

SPECIES	*RESPONSE TO FIRE*	*WEED IMPACTS*
Diffuse knapweed **Centaurea diffusa**	***Individual plants can resprout following intense fire. Fire may damage residual desirable grasses while stimulating knapweed populations. Fire can remove knapweed plant debris to allow for greater efficacy of herbicide treatment. ****	***This species is allelopathic. ***** ***Diffuse knapweed reduces biodiversity, increases soil erosion, reduces land value, increases land management costs, decreases wildlife and livestock forage, and threatens Natural Area Preserves. However, there is evidence that this species can provide high quality wildlife forage during winter and early spring and can be grazed by sheep while plants are still green. Can be spread by wind and vehicles.****
Sulfur cinquefoil **Potentilla recta**	***The temporary removal of herbaceous biomass and litter following a fire can provide new, and more favorable locations for the establishment of seedlings by providing a substrate with more available light and nutrients. ** Early successional species in forestlands – requires open canopy to establish. ****	***Sulfur cinquefoil can establish on disturbed ground in most habitats including early successional forest communities. This plant species has the ability to dominate sites within a short timeframe following infestation. Identification of plant is problematic and control hinges on successful identification of quickly expanding populations. Livestock grazing can accelerate shift in plant community dominance to sulfur cinquefoil.****
St. John's wort **Hypericum perforatum**	***Burning can increase established populations through germination of seeds and vegetative regrowth from fire resistant root crowns and lateral buds. Seedlings are not strong competitors and fire removes competitive plants and diminishes nutrient levels that are used by native vegetation. ****	***St. John's wort displaces desirable plants with subsequent impacts to plant biodiversity. There are negative impacts to both wildlife and livestock carrying capacities of wildlands. Plant may poison livestock. ****
Canada thistle **Cirsium arvense**	***Favors severely burned areas devoid of other plant growth and with high nutrient content. ** Reproduces from deep-rooted rhizomes (200***	***Potential to reduce crop yields by 100%.*** A single seedling can rapidly grow into large clone. Canada thistle can decrease forage production by displacing***

	plants/meter) unaffected by fire intensity. * ***Seed dormancy allows survival up to 22 years deep within soil. ****	***desirable species. (Impacts on plant diversity.) Mechanical soil disturbance can lead to development of new plants from root fragments.****
Orange hawkweed and Yellow hawkweed **Hieracium aurantiacum** ***and*** **H. pratense**	***Both hawkweeds sprout readily from rhizomes and stolons. * & *** Yellow hawkweed sprouts also from adventitious buds.*** ***Both reproduce by seed. * Seed can easily colonize burned areas. **	***High potential for loss of native plant biodiversity in impacted areas. Possible allelopathic affects. Infestation can increase quickly through vegetative reproduction. Ground disturbance by machinery and cattle can spread infestation. Fertilizer may shift competitive ability to healthy grass component in meadows. ****
Musk thistle and Scotch thistle **Carduus nutans** ***and*** **Onopordum acanthium**	***No specific fire data but both species establish well on bare areas. Both species have phytochrome-mediated response for seed germination, while Scotch thistle also has water-soluble germination inhibitor.***	***Reduction in forage yield of up to 100%. Once established, very competitive with herbaceous plants.*** Acts as physical barrier or fence. Musk thistle is allelopathic.****

Sheley and Petroff, 1999
****Bushey, 1995***
*****Royer and Dickinson, 1999***

Noxious weeds affect the structure and function of ecological systems in various ways, from nutrient cycling to plant species displacement, to altered activity patterns of animals. Economically, many noxious weeds reduce the value of land and net returns by increasing operating costs or decreasing total returns or both. The impacts have far-reaching economic effects. For example, in Montana where spotted knapweed could potentially invade 33 million acres of rangeland, it is estimated that direct and secondary annual economic impacts could exceed $42 million. This equates to supporting 518 jobs in the state. It has also been noted that land infested with leafy spurge dropped in value from as much as $125.00 per acre in 1975 to $40.00 per acre in 1991.

Recommendations

Seeding

Currently, noxious weeds occupy only a small portion of the fire area (about 25 acres or less than 1%). Seeding the burn area with competitive, desirable grasses can prevent the encroachment of noxious weeds and decrease the net loss of the historical ecosystem. Competitive grasses utilize nutrients and water needed by noxious weeds to become established. It is recommended that 50-foot strips on both sides of disturbed roads and tractor fire lines be broadcast seeded with the noxious weed control seed mix. This should occur within the moderately burned area where: 1) bare soil dominates the surface features as the litter and duff layers were burned; 2) existing vegetation (both above and below ground) was consumed by the fire; or 3) mechanical disturbance led to soil displacement and churning. Seeding for fire suppression disturbance will likely occur in conjunction with seeding of these buffers.

WEED TREATMENT SEED SPECIFICATIONS

Species For Noxious Weed Treatment	Seeds/lb	Seeding Rate lbs/acre	Seeds/ Ft2/acre	Cost/lb	Cost/Acre
Noxious Weed Treatment					
Sheep Fescue *Festuca ovina*	680,000	2.5	39		
Pubescent Wheatgrass *Agropyron trichophorum* **Elytrigia intermedia*	90,000	5.0	10.3		
Streambank Wheatgrass *Agropyron riparium* **Elymus lanceolatus*	170,000	2.5	9.7		
Hard Fescue **Festuca ovina duriuscula**	125,000-160,000	2.5	7.7		
Smooth Brome **Bromus inermis**	150,000	2.5	8.6		
Seed Totals @ 15.0 acres		**15**	**75.3**		**$50.00**

All seeding rates are for certified seed. If certified seed is not available and you MUST use non-certified seed only if it is at least 90% pure and has 90% germination. ACCEPT NO SEED WITH ANY NOXIOUS WEED CONTENT

Chemical and Manual Treatment

It is also recommended that we treat actively growing noxious weeds with herbicides inside the burned area where NEPA has been completed. Where noxious weeds exist on sites that have not been analyzed for Integrated Weed Management, hand pulling of plants or use of a weed eater are options to prevent seed production and dispersal. The at-risk areas of the fire would need to be examined three times per growing season in order to find plants that may have been missed or germinate at later dates.

Monitoring

Because early detection can minimize spread and control costs, sites seeded for noxious weed control should be monitored for three years under BAER funding to determine the effectiveness of seeding competitive grasses. District funding could support monitoring of these sites after three years. Seeds of most noxious weeds present in the area can remain viable from three to 15 years. When a seed source is available, noxious weeds generally establish themselves following a disturbance in one or two seasons. Field observations have indicated that germination has occurred as late as three years following disturbance. Monitoring would involve repetitive sampling or examination to determine weed frequency and density. Systematic survey sites would be established (with a random start element) and observations would be made three times per year. The first survey would occur in the spring, the second would occur in early summer and the last in early fall. At each survey, individual plants would be hand removed or sprayed. Plants with viable seed would be bagged and either burned or disposed in a landfill.

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References

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