USDA Forest Service Date of Report: August 23, 2004
1700

Pot Peak-Si Si Ridge Complex
(Pot Peak, Si Si Ridge and Deep Harbor Fires)

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

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

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

[ ] 3. Final report - following completion of work

PART II - BURNED-AREA DESCRIPTION

A. Fire Name: **Pot Peak-Si Si Ridge Fire Complex** B. Fire Number: WA-OWF 271/WA-525 **(Pot Peak, Si Si Ridge and Deep Harbor Fires)** - Note: no BAER work is being proposed for Si Si Ridge fire.

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

E. Region: **Region 6** F. Forest: **Okanogan & Wenatchee NF's**

G. District: **Chelan Ranger District**

H. Date Fire Started: **6-26-2004** I. Date Fire Controlled: (Currently Pot Peak is 90% contained; and Deep Harbor is 80% contained—8/18/2004)

J. Suppression Cost: **$23,338,226 (8/19/04)**

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

1. Fireline waterbarred (miles) **unknown**
2. Fireline seeded (miles) **None to date**
3. Other (identify) **20 miles road maintenance**

L. Watershed Number: **17020009**

M. NFS Acres Burned: **47,170** Total Acres Burned: **47,170** See App. A, Maps 1-3.
Pot Peak = 17,314 ac.; Deep Harbor =29,314 ac.; Si Si = 280 ac. (8/15/04)

Ownership type: **(All NFS lands)**

( )State ( )BLM (2)PVT ( )

N. Vegetation Types: **Lowest elevations(2000-2500'): bitterbrush/bunchgrass and open ponderosa pine/Douglas-fir forest; middle elevations (2500-4000): Douglas-fir PNV currently supporting closed stands of Douglas-fir and ponderosa pine or lodgepole pine; Upper elevations; subalpine fir PNV with lodgepole pine and Douglas-fir often dominating. 4000-5500'; Highest elevations 5500-8243' subalpine fir, whitebark pine and subalpine larch communities grading to alpine non-forest**

NOTE: 25 % of the fire complex area (70% of the Pot Peak Fire area) was previously burned in 1970 and often supports very young stands with few or no older residual trees).

O. Dominant Soils: **Volcanic ash and pumice over colluvium or glacial till**

P. Geologic Types:

Pot Peak: Predominately massive plutonic rocks surrounded by schist, gneiss and amphibolite grading into migmatite on the east and west. Intruded by granite and granodiorite in places along western and southern fire perimeter.

Deep Harbor: Southeast half: Predominately heterogeneous foliated schist and gneiss, subsidiary quartzite and amphibolite, grading into migmatite in upper Big Creek and Little Big Creek drainages. Northwest half: Units of southeast half are present in places but largely intruded by Bearcat Ridge, Cardinal Peak, and Railroad Creek plutons represented by granite, granodiorite, diorite, tonalite, and gneiss.

Q. Miles of Stream Channels by Class:

I-6.8 **II-3.2** **III-16.4** **IV-15.5**

R. Transportation System:

Trails: **25.8** miles Roads: **37.1** miles

PART III - WATERSHED CONDITION

A. Fire severity (*1) (acres): 24,120 (low) 13,153 (moderate) 7,554 (high)

(*1) *Fire severity figures based on 8/14/04 survey information (47,120 ac. fire area). See App. A, Maps 1 & 2.*

B. Water-Repellent Soil (acres): **0**

C. Soil Erosion Hazard Rating (approx. acres):

781 (low) **3,993** (moderate) **41,854** (high)

D. Erosion Potential: **60** tons/acre (*2)

(*2) *Measured post-fire flood response (convective) from Silica Fire (1980)*

E. Sediment Potential: **11,520** cubic yards / square mile (*3)

(*3) *Assumptions for items D and E:*

1. *Landform sediment delivery and routing efficiency is considered to be approx. 30%-- which would deliver 18 tons/acre or 11,520 cubic yards/sq. mile.*

2. *Field review of a similar watershed and the 1988 Dinkelman Fire Flood response indicate that sediment was delivered from 1,200 to 1,800 acres or 3 square miles. Sediment was collected in 16 large rock check dams, deposited on the Mill Creek Fan, and delivered to the Entiat River. Based upon observed sediment deposition, much more than 30,000 cubic yards were delivered from the debris torrent from 3 sections.*

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period: **5** years

B. Design Chance of Success: **70** percent

C. Equivalent Design Recurrence Interval: **10** years

D. Design Storm Duration: **1.0** hours

E. Design Storm Magnitude: **0.5** inches

F. Design Flow: **50 (*1)** cubic feet/second/square mile

G. Estimated Reduction in Infiltration: **32 (*2)** percent

H. Adjusted Design Flow: **55** cubic feet/second/square mile

(*1*) Design flow assumptions: (a) A short duration, high intensity, convective storm event has been identified as the storm type most likely to cause damage in the burned area. (b) Storm-related flow generated from surface runoff (no significant shallow sub-surface flow).*

(*2) This figure is for the area that would be estimated to have a reduction in infiltration. This is the moderate and high fire severity burned areas, about 32% of the burned area. The estimated weighted reduction in the watershed infiltration (reduction in Infiltration (item G) is an area weighted average for the burned area) is about 12%. Estimated reduction in infiltration in burned area as follows: Low severity (0%), moderate severity (30%) and high severity (50%). Infiltration is reduced due to rain falling on steep slopes with poorly protected soils. The adjusted design flow is rounded up slightly to 40 cfsm.*

PART V - SUMMARY OF ANALYSIS

A. Describe Watershed Emergency:

The following summary describes the conditions that warrant emergency rehabilitation actions. This initial assessment and the resulting prescriptions have been developed utilizing experience gained from previous events in the area, most recently the 1998 North 25 Fire and also the 1994 Tyee Complex.

Water quality in the Lake Chelan sub-basin is critical for many uses including down-lake domestic and agricultural uses, aquatic habitat, recreation use and aesthetics. Lake Chelan is a major recreation destination of national significance. Clean water in Lake Chelan, especially down lake of the general fire area is a major economic driver for the local economy. Commercial and private boat use and personal watercraft use on the lake are high.

Numerous cultural resource sites are located within the Deep Harbor and Pot Peak Fire areas. However, two of the sites (The Big Creek and Graham Harbor Creek CCC Shelters) burned in the Deep Harbor Fire. Few, if any, of the remaining sites are at risk from flooding or erosion for various reasons, including ridgetop location, location outside of alluvial deposit areas, and/or previous fire impacts affecting site integrity. See Cultural Write-up in analysis file.

Most proposed BAER activities are located in areas with low probability for undiscovered cultural resources. Areas that will require additional survey prior to ground disturbance include lakeshore log boom staging areas, any activities proposed for ridgetops or stream channels (few if any), and a small sample of the area proposed for log terracing and/or straw wattles. Seeding, helicopter mulching, and/or possible fertilization areas will not require survey due to lack of impact from the activity and low probability of encountering cultural resources on these steeper sideslopes.

1. **Critical Natural/Cultural Resources (FSM 2523.2 including water quality)**

The steep landforms in the Pot Peak-Si Si Ridge Complex rapidly deliver eroded material to stream channels. Heavy sediment loading in first and second order streams results from surface erosion and ongoing soil creep. Wildfire removes the vegetation resulting in increased erosion rates. For example, soil losses after a post-fire, convective storm that impacted the Silica Fire in 1980 (210 acre fire

immediately adjacent to the Pot Peak Fire) were measured at 60 tons/acre. The 1980 flood caused major damage to downstream diversions and fish habitat in 25 Mile Creek.

Pot Peak Fire (approx. 17,314 ac.): The South Fork of 25 Mile Creek burned previously in 1970 and and subsequent flooding (most recently in 1972 and 1974) was increased following the fires. The adjacent North Fork of Twenty-five Mile Creek burned again in 1998 and is recovering from that fire as well. Soils are non-cohesive pumice and ash and are highly erodible. For example, following the nearby Silica Fire severe erosion was observed. Also, on 7/19/2004 an afternoon rainstorm produced about .2--.3 inches in rainfall in less than half an hour. This storm generated runoff from the fire area that buried the two irrigation intakes in the drainage, covered the downstream (constructed) spawning channel, flushed mud and debris down into Lake Chelan and nearly washed out the Ramona bridge.

Water quality is also important in the South Fork of Twenty-five Mile Creek. The Twenty-Five Mile Creek drainage contains populations of rainbow and Westslope cutthroat trout. Westslope cutthroat are currently on the Regional Foresters Sensitive list. Local residents divert water for domestic and irrigation purposes. In addition, recreation users in the basin have contact with the water for fishing and enjoyment. Previous post-fire flood events in both the North and South Forks of Twenty-Five Mile Creek damaged resources and facilities downstream (1970 fire and 1972 flood event in South Fork; 1980 Silica Fire and 1980 flood events in North Fork). For example, the 8-12-1980 flood in the North Fork of Twenty-five Mile Creek from the Silica Fire severely damaged water diversion facilities and resulted in sedimentation of Kokanee spawning habitat, with 80-100% mortality predicted by the Washington State Game Department.

In addition, some portions of the burned area are at risk to soil productivity losses as a result of noxious weed invasion particularly along the road and trail systems in the Pot Peak fire area. Seed sources exist along roadways in and adjacent to the fire area, as well as the fire camps used for suppression activity. Road widening during the fire suppression work has created a good seedbed for noxious weeds, and the adjacent burned areas are susceptible to noxious weed invasion by the weeds growing in the road prism.

Deep Harbor Fire (approx. 29,314 ac.): Further up Lake Chelan in the Deep Harbor fire area slopes are over-steepened and glacially scoured. Elevations range from 1100' at the lake to over 8200' at Pyramid Peak. All drainages in the fire area drain down steep-gradient stream channels into Lake Chelan. Many areas have been glacially scoured and have shallow, non-cohesive soils and slopes are characterized by large areas of rock outcrops-particularly the slopes that fall directly into Lake Chelan and in the upper parts of drainage basins.

Debris flow avalanches from oversteepened drainages are normal occurrences dumping wood debris into the lake. Surface erosion rates in the burned areas will be exacerbated by the fire, increasing debris flow avalanche occurrences in the next several years. Water quality impacts in Lake Chelan from the Deep Harbor fire are an important consideration.

2. **Threats to Human Life, Safety and Property**

Primary threats to humans are from flooding and debris flow avalanches. The likelihood has been exacerbated from the effects of the fires. The typical debris torrent is a high velocity, channel scouring and depositional event that significantly threatens any facility in its path. During the post-fire (1970 fire) flood in June 1972, lives were threatened in the old Ramona campground (near the present Snowberry campground). This old campground is just downstream from the Pot Peak Fire. Four fatalities occurred in the Preston Creek drainage (approximately 7 miles to the south of the Pot Peak

fire) as a result of a debris torrent. Post-fire flooding from the Silica Fire area (a 210 acre fire in the North Fork Twenty-Five Mile Creek drainage in 1980) resulted in significant facility damage downstream.

Pot Peak Fire (approx. 17,314 ac.):

Within the Twenty-Five Mile Creek drainage, downstream of the burned area, there are three domestic and agricultural water diversions, a significant Kokanee salmon spawning reach and a heavily used Washington State Park with a marina facility. There is a high risk for debris torrents and associated flooding in the drainages within and below the burned areas following the fires. On July 19, 2004 (just as the BAER team began work on the Pot Peak fire) a flood occurred that caused considerable downstream damage to the Twenty-five Mile Creek channel, to the Kokanee spawning area, to the water diversion intakes and threatened campers in the state park.

Deposition on the alluvial fan at the mouth of Twenty-Five Mile Creek threatens both life and facilities including: the artificial Kokanee spawning channel; concrete box culvert under County Road 231; road access to homes, the campsites and marina facility at Twenty-Five Mile Creek State Park.

There are approximately 37 miles of roads and 25 miles of trails in the Pot Peak-Si Si Ridge Complex Fire area with almost all of the fire affected roads and trails in the Pot Peak Fire area. Currently, the road and trail drainage may be inadequate due to the increased runoff following the fire. These roads and trails are at risk for increased water flows from the burned area.

Deep Harbor Fire (approx. 29,314 ac.):

Debris flow avalanches and flooding are also a very serious concern for some of the cabins and campground facilities along the lake shore that are below the Deep Harbor fire area. Of particular concern are the cabin at the mouth of Little Big Creek and the campgrounds at Big, Corral and Graham Harbor Creeks which are located in debris torrent or run-out zones.

Debris accumulation in Lake Chelan is very important. Private and commercial watercraft use is common on the lake where boat speeds of 30-40 miles per hour are common. Consequently, floating wood debris in the lake is a safety issue—particularly in smaller craft where logs are hard to spot, and making collision damage more likely. Personal injury from collisions with logs may also occur. Debris from a recent storm event in Big Creek has already been observed in the lake (8/19/04).

For a more detailed hazard assessment, refer to Appendix D.

B. Emergency Treatment Objectives:

The primary objective of emergency treatment is to establish conditions--on priority treatable areas within the burn--that support long-term, natural recovery by promoting soil-water infiltration, slowing accelerated surface runoff, and reducing both erosion and downslope material delivery. This objective is met by decreasing rain drop impacts to the soil surface and dispersing overland flow to minimize water concentration on surface soils.
Proposed non-structural land treatments are designed to accelerate development of soil cover and improve infiltration through seeding, fertilization, contour wattling and helimulching to slow water runoff.

Proposed structural treatments to roads are intended to reduce accelerated erosion and sedimentation potential from these facilities. They are designed to promote infiltration; reduce surface runoff, water concentration and water velocities; retard the downslope delivery of sediment; and pass woody debris through the main stream channels.

Some noxious weed treatment is proposed to minimize the spread of noxious weeds into the burned area. Monitoring is proposed to determine the effectiveness of noxious weed treatments.

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

Land **80** % Channel **80** % Roads **90** % Other **90** %

D. Probability of Treatment Success

	<----Years after treatment-----> 1	3	5
Land (Summary)			
Fertilization	60%	80%	90%
Erosion Seeding (under helimulch)	70%	30%	10%
Helimulch	80%	60%	10%
Contour wattling	70%	40%	10%
Channel			
Check Dams	10%	0%	0%
Roads/Trails			
Road Drainage	80%	80%	80%
Bridge Removal and Replacement	90%	90%	90%
Trail drainage	80%	80%	80%

E. Cost of No Action (Including Loss): **$18,005,000 SEE Appendix E for Values at Risk**

F. Cost of Selected Alternative (Including Loss): **$7,468,345**

G. Skills Represented on Burned-Area Assessment Team:

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

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C. Treatment Narrative:

The following treatments have been proposed to mitigate the threats to life, safety & property, and to reduce loss of critical natural resources (site productivity and degradation of water quality) as a result of the Pot Peak (PP) and Deep Harbor (DH) Fires.

Overall Goal of Proposed BAER Treatments:

Complete a combination of comprehensive treatments where feasible, to reduce concentrated runoff and effectively reduce the threat of severe flooding from both the Pot Peak and Deep Harbor fire areas which will reduce the threat to human life and safety and property damages to Federal, State, and private lands.

The land and road treatments are for the Pot Peak fire area only and form an integrated package that considered the entire 25 Mile Creek watershed. Treatments in the Deep Harbor portion of the burned area are primarily to prevent or minimize large amounts of woody debris from being spread into Lake Chelan and to reduce public safety threats at campgrounds and recreation residences from debris flows. Additional treatments in the Deep Harbor Fire area are limited by the steep, rocky topography of the burned area. (See App. A map 3)

The Pot Peak Fire area drains into Twenty-five Mile Creek and onto Lake Chelan. The Deep Harbor burned area drains either directly into Lake Chelan or into numerous mostly steep drainages that flow into Lake Chelan.

Land Treatments

NOTE: LAND TREATMENTS ARE PROPOSED FOR THE POT PEAK FIRE ONLY!

Refer to Appendix B and C.

Purpose: Reduce concentrated runoff and sheet erosion on sensitive hillslope soils. Reduce the threat of debris torrents, severe channel scour, and flooding of Federal, State and private lands and into Lake Chelan. Encourage natural vegetation recovery and discourage the rapid spread of noxious weeds.

Treatment #L1: Install straw wattles (1200'/ac.) on slopes where water concentrates and that occur on high severity burn areas, with slopes less than 50% and no significant surface rock or bedrock (250 ac). This treatment would provide immediate slope protection in water concentration areas to reduce rills, gullies and surface erosion, and retain water on site for as long as possible. **Note: Part VI costs for treatment L1 were estimated using per acre values from the BAER website.**

Treatment #L2: Aerial seed (soft white winter wheat-Eltan or similar adapted variety) on moderate severity burn areas (4521 acres) on slopes less than 60% that do not have abundant surface rock. This treatment would provide vegetative cover on the sites with the least amount of current vegetation to retard soil erosion. (**Refer to Appendix B for details).**

Treatment #L3: Apply aerial mulching to high severity burn areas with slopes less than 70% where abundant surface rock is absent. See Appendix C.

Treatment #L4: Apply fertilizer in the spring 2005 to the areas which were seeded in treatment L2. This treatment would increase the vegetative growth of the seeded wheat and decrease the time needed for natives to become re-established on the site. (**Refer to Appendix B for details.)**

Treatment #L5: Release bio-agents (*Larinus minutus*) on about 150 acres. This treatment would minimize the survival of diffuse and spotted knapweed on the burned areas where native vegetation is not providing adequate competition for noxious weeds.

Treatment #L6: Use Wyden agreement to treat private land diffuse and spotted knapweed populations along the beginning .25 mile of road just below national forest system lands on FR 5900. Treatment of private lands would help reduce or eliminate noxious weed seed sources for potential infestation on the burned areas along FR 5900 and for the N. 25 Creek trail and trailhead. Spring and fall treatments would occur for 3 years.

Road and Trail Treatments

Purpose: Prevent concentrated runoff from Forest Service roads in Twenty-five Mile Creek. Prevent road washouts and delivery of sediment to sensitive high gradient west slope cutthroat trout, landlocked Kokanee salmon and downstream private water supplies. The treatments will meet the intent of the NW Forest Plan---road drainage designed to minimize accelerated sedimentation and handle storm flood events while maintaining aquatic connectivity.

NOTE: ROAD & TRAIL TREATMENTS ARE PROPOSED FOR THE POT PEAK FIRE ONLY!

ROADS

Treatment: #R1: Install drivable drain dips (with strawbale or straw wattle check dams at toe of fill slopes) on Roads 8410000 and 8410300 spur road. Straw bales or log structures will be installed below dips to help further disperse runoff water. Check dams will typically be constructed with 4-10 wire wrapped bales anchored with stakes. This treatment would keep water from conentrating and eroding road surfaces. The straw bales/wattles would prevent the diverted road water from forming rill and gullies after the water leaves the road surface. This treatment may require surface gravelling in the disturbed area.

Treatment: #R2: Complete road blading of approximately 16 miles of road to insure proper road surface drainage. This would include occasional outsloping of road prism to insure adequate drainage.

Treatment: #R3: Install grade sags on perennial and intermittent stream crossings on the 8410300 road. Sags will be designed to keep storm flow within the channel area.

Treatment #R4: Remove undersized culvert crossing on perinial creek and construct grade sag on road 8410300. This would help reduce the likelihood of erosion of fill material around the culvert if higher stream flows are too large for the culvert.

Treatment #R5: Install a temporary 70' to 80' *Big R* or *Hamilton* bridge across the South Fork of Twenty-Five Mile Creek on Forest Road 8410000 to provide adequate end area for anticipated increased flows and remove existing timber bridge and associated concrete abuttments of the existing bridge. The Forest will seek funding for a permanant structure. Refer to Appendix F for details

Treatment #R6: Post hazard and closure signs to inform the public of road, trail and campground closures and of the hazardous conditions resulting from the Pot Peak Fire.

TRAILS

Purpose: Implement actions to minimize the potential for concentration of accelerated surface runoff from Forest Service Trails including: 4 miles of the North Fork 25 Mile Creek Trail #1265, 2.75 miles of the Pot Peak Trail #1266, and .5 miles of the Devils Backbone Trail #1448 total 7.25 miles. These treatments are intended to reduce the risk to Forest personnel and the public associated with trail use. As noted in Part V-A above, soils in the burned area are primarily derived from glacial till deposits and degradation of hard crystalline bedrock units. This parent material weathers to bouldery sandy loams. These soils often occur on over-steepened slopes (>60%) and are extremely susceptible to slope raveling following fire.

The fire has removed much of the woody material and duff in the moderate and high intensity burn areas, which will result in hill slope raveling (soil, rock, and logs) that is expected to fill trail tread in many locations. In addition, in some trail sections, the trail shoulder has been supported by shrub and tree roots which were severely burned, resulting in anticipated sloughing of the shoulder. As a result of these fire-related impacts, trail drainage features have been rendered non-functional and the tread condition represents a hazard to both Forest personnel and the public.

Treatment #T1 Improve Trail Drainage: Install drain dips on 7.25 miles of trail to reduce the potential for runoff concentration and accelerated surface erosion from anticipated fire effects. Dips vary from rolling outslope dips to waterbars constructed from peeled and anchored native wood material. This treatment will occur on trail segments within moderate and high intensity burn where the potential for post-fire increases in surface runoff is high.

Treatment #T2 –Log Out Trail: A number of fire-killed trees are falling and blocking trail access. Trail log out will be necessary on 7.25 miles of trail in order to gain access to the sections of trail that need drainage (T1) and tread improvements (T2).

Treatment #T3 – Danger Tree Removal: This treatment will occur primarily on trail segments within high intensity burn where most all of the larger over story tree were killed, this treatment is needed in order to eliminate safety concerns associated with access for installation of other trail treatments.

Structural Treatments

Purpose: Install structural features designed to reduce the threat to life and property from debris slides, flood flows and related hazards for both the Deep Harbor (DH) and Pot Peak (PP) Fires.

Treatment #S1 –Log Booms (DH): Stage log booms in Lake Chelan to be used to capture debris (as needed) from the tributaries in the Deep Harbor Fire area. Floating woody debris has been a major public safety hazard following several flood events (1972 and 1995). Approximately 2160' feet of boom estimated to be needed to create the storage bays. See analysis file for details.

Treatment #S2—Sign and patrol for campground closures (DH)

Treatment #S3—Inspect and clear irrigation intakes of straw mulch (PP)

Treatment #S4—Maintain log booms for 3 years. (DH)

Cultural Surveys

Cultural surveys are done to protect existing cultual resources in the burned area. The surveyer will check all sites where BAER work is planned to be a ground disturbing activity. Sites to be avoided will be marked. Marking will be removed at the completion of the BAER work.

Monitoring

Monitoring will be completed for all BAER treatments. Specifics of these activities will be outlined in the final BAER report. Cost estimates in Part VI are preliminary.

PART VI--Emergency Rehabilitation Treatments and Source of Funds

Selected Alternative 8/20/04			NFS Lands				Other Lands				All
Pot Peak (PP) Deep Harbor (DH)		Unit	# of	WFSU	Other		# of	Fed	# of	Non Fed	Total
Line Items	Units	Cost	Units	SULT $	$		units	$	Units	$	$
A. Land Treatments (All PP)											
#L1 Contour wattles	Ac	$1,350.00	250	$337,500	$0			$0		$0	$337,500
#L2 Aerial Upland Seeding	Ac	$33.00	4521	$149,193	$0			$0		$0	$149,193
#L3 Helimulching	Ac	$1,000.00	1572	$1,572,000							$1,572,000
#L4 Spring Fertilziation	Ac	$61.00	4521	$275,781							$275,781
#L5 Bio-Control Noxious Weeds	Ac	$20.00	150	$3,000	$0			$0		$0	$3,000
#L6 Private Land Work (FR 5900) (Wyden)	Ac	$300.00	8	$2,400			16	$4,800		$0	$7,200
Subtotal Land Treatments				$2,339,874	$0			$0		$0	$2,344,674
Insert new items above this line!											
B. Channel Treatments											
Insert new items above this line!											
Subtotal Channel Treat.				$0	$0			$0		$0	$0
C. Road and Trails (All PP)											
#R1 Install drivable drain dips	ea	$1,000.00	50	$50,000	$0			$0		$0	$50,000
#R2 Road Grading	mi	$500.00	15.5	$7,750	$0						$7,750
#R3 Grade Sag construction	ea	$2,500.00	2	$5,000							$5,000
#R4 Remove undersized culvert	ea	$750.00	1	$750	$0						$750
#R5 Install temporary bridge	ea	$200,000.00	1	$200,000	$0						$200,000
#R6 Post hazard and closure signs				$500							$500
#T1 Trail drainage	mi	$1,000.00	7.25	$7,250							$7,250
#T2 Log Out	mi	$225.00	7.25	$1,631							$1,631
#T3 Hazard Tree Removal	mi	$1,000.00	3	$3,000							$3,000
Subtotal Road & Trails				$275,881	$0			$0		$0	$275,881
D. Structures				$0	$0			$0		$0	$0
#S1 Install &/or Stage Log Booms (DH)	ft	$2,160.00	55	$118,800	$0			$0		$0	$118,800
#S2 Sign & Patrol for Campground Close (DH)				$5,000	$0			$0		$0	$5,000
#S3 Clear straw from irrigation intakes(PP)				$6,000							$6,000
#S4 Log Boom Maintenance (DH)				$25,000							$25,000
Subtotal Structures				$154,800	$0			$0		$0	$154,800
E. BAER Evaluation (PP & DH)				$50,000	$0			$0		$0	$50,000
BAER Cultural Resource Survey				$7,500	$0			$0		$0	$7,500
					$0			$0		$0	$0
Insert new items above this line!				$57,500	$0			$0		$0	$0
Subtotal Evaluation											
F. Monitoring (PP & DH)				$0	$0			$0		$0	$0
Noxious Weed Treatment Monitoring				$30,000	$0			$0		$0	$30,000
Subtotal Monitoring				$30,000	$0			$0		$0	$30,000
G. Totals				**$2,800,555**	**$0**			**$0**			**$2,805,355**

PART VII - APPROVALS

Pot Peak-SiSi Ridge Complex
(Pot Peak and Deep Harbor Fires)

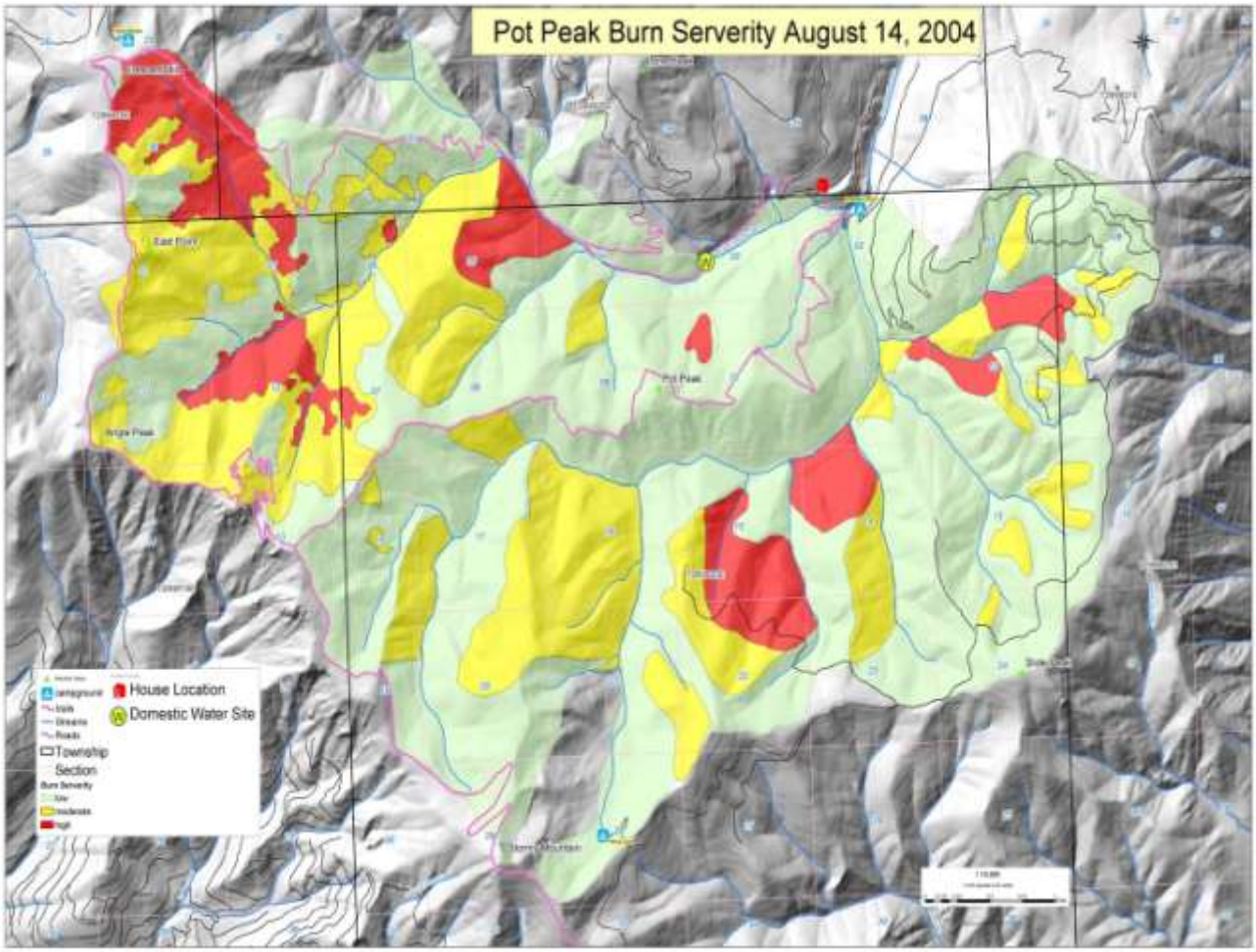
1.

___\s\ *Alan Quan* __for_____ Date: 8/23/2004
James L. Boynton
Forest Supervisor

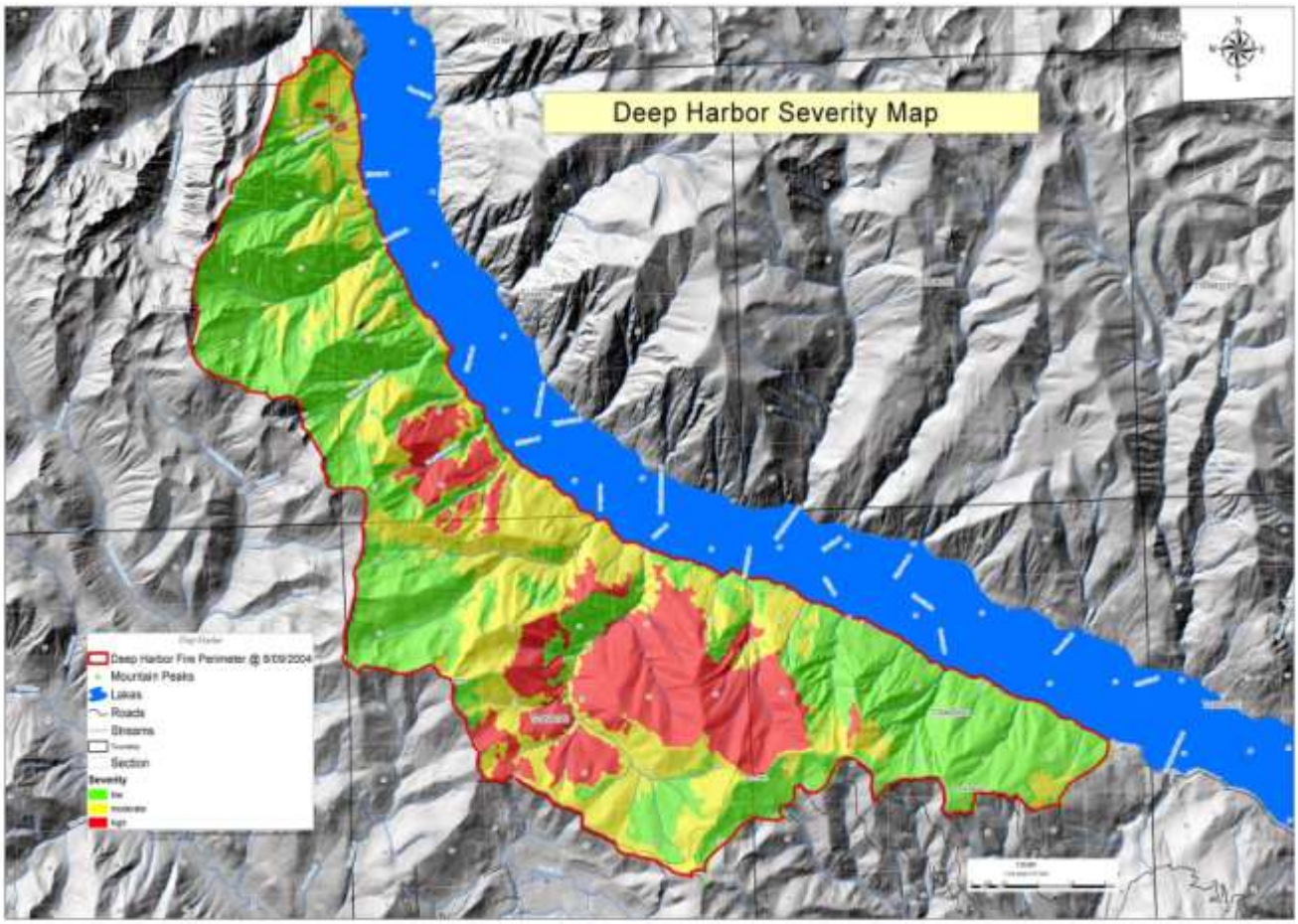
Appendix A

Fire Severity Maps

Map 1



Map 2


Deep Harbor Severity Map
Deep Harbor Fire Perimeter @ 8/09/2004
Mountain Peaks
Lakes
Roads
Streams
Section
Severity

MAP 3

Appendix B

Seeding and Fertilization Rationale
& Specifications
Pot Peak Fire

Use of a single species for Fire erosion control seeding.
Experiences of the Dinkelman Fire of 1988 (53,000 acres) and the Chelan County Fires of 1994 (180,000 ac.) led to the prescription of soft white winter wheat alone. In both projects the wheat germinated better than the other species included in the mixes and did not persist over 3 years. Multiple species seeding has not always worked, although it may attempt to meet an objective like more complete site occupancy due to different species filling different niches--or to add a legume in hopes of adding nitrogen to the site.

The greatest limitation to stand establishment is weather effects on germination. Wheat is a high energy seed which will germinate when other species will not. If the wheat doesn't make it then other species won't either. Also, wheat seed is much easier to apply because it broadcasts very well (as opposed to most grass seeds). Concerning the use of legumes for nitrogen, fall seeding seldom gets much establishment. Legumes do much better when seeded in spring.

Wheat germinated well, maintained itself for 2-3 years and then was gone. Other annual species may create problems (e.g. a weed in disguise). For example, if annual ryegrass were used it might persist longer than desired. Effective perennial species, like orchard grass, timothy, intermediate wheat or pubescent wheat would be effective but would likely be too persistent.

Concerning fertilizer use:

Art Tiedeman (research range ecologist), and Glenn Klock (research soil scientist-retired) addressed the effects of fertilization on seedling establishment and vegetation development on soils and sites essentially identical to the fire area. Although they conceded that their measurement methodology was not sensitive enough to statistically validate the fertilizers efficacy, they and both Phil McColley (forest soil scientist-retired) and Darlene Zabowski (research soil scientist) were adamant that fertilizer use improved vegetation establishment and vigor. They all suggested that fertilizer was the most effective treatment--even more than seeding.

The 50 lbs N/ac prescription being proposed for the Pot Peak Fire was a result of the research work done after the 1970 fires where 50 lbs N of fertilizer containing some Sulfur was recommended. The Dinkelman Fire also used a 50 lbs N prescription. Water quality concerns are important here but are being mitigated by avoiding perennial drainages with fertilizer applications. Fertilizer would be 75% Ammonium Nitrate and 25% Ammonium Sulfate.

Aerial Upland Seed Mix & Fertilization Specifications

Listed below is the seed and fertilizer persciption for the upland aerial erosion control treatments.

The sowing of winter wheat and fertilization should increase vegetation cover and thereby better protect the soil resource from accelerated erosion. This should reduce both sheet and rill erosion and sediment delivery.

Upland Seed and Seeding Specifications

Species	**Seeds/lb PLS**	**Rate (PLS) Lbs/ac**	**Seeds /sq.ft. PLS**	**Cost/lb**	**Total Cost/ac**	**Acres Treated**	**Total Cost**
Soft white Winter Wheat (Eltan)*	13,000	20	6	$.15/lb	$3.00	4521	$13,563
Application Cost (aerial or ground)					$30.00	4521	$135,630
Total		**20**	**6**	**$.15**	**$33.00**	**4521**	**$149,193**

Species*	**Cultivar/Status**	**Attributes**
Soft White Winter Wheat Must be cold & snow mold tolerant	"Eltan" or "Lewjane"; Cold and Snow Mold Tolerant	Non-persistent; rapid upland soil stabilization

FERTILIZER PRESCRIPTION*:

Fertilizer	**Gross lbs/ac**	**N lbs/ac**	**Cost/Ac.**	**Acres Treated**	**Total Cost**
Ammonium Nitrate Sulfate	167	50	**$21/ac**	4521	$94,941
Application Cost			**$40/ac**	4521	$180,840
Total			**$61/ac**	**4521**	**$275,781**

*Use 75% Ammonium Nitrate and 25% Ammonium Sulfate to get a 30-0-0-6 (N,P,K,S) mixture. Apply at the rate shown above. Fertilization should occur in early spring once seeded grasses are established. Fertilizer cost for mix is $268/ton.

Appendix C

POT PEAK-SI SI RIDGE COMPLEX FIRES
NON-STRUCTURAL LAND TREATMENT
ASSESSMENT NARRATIVE

GENERAL

The Pot Peak Fire is approximately 17,000 acres and spans almost from Devil's Backbone on the west margin east to Slide Ridge and from 1998 N. 25 Fire boundary south nearly to Stormy Mountain and Windy Camp. See attached figure. Elevations range from 2000 feet in the 25 Mile Creek drainage to over 6000 feet on slide ridge. The fire is about 6 miles from east to west and 4 miles from north to south.

Slopes are very steep and soils erosive (predominantly pumice and ash from Glacier Peak over till and colluvium and foliated crystalline rock). Re-distribution of pumice and ash has left bedrock exposed on the upper south and west facing slopes and ridges. The area is densely forested with Douglas-fir and ponderosa pine with some subalpine fir and associates at upper elevations. Most of the fire area falls within the Douglas-fir zone. The understory vegetation ranges from bluebunch wheatgrass and bitterbrush on dry lower slopes to stands at middle elevations where pinegrass is the dominant understory species. At elevations between 4000 and 5000' subalpine fir and other high altitude tree associates become common. Upper elevations support subalpine understory species such as white flowered rhododendron, grouse whortleberry and green fescue (on drier sites).

Fire severity was mapped using the criteria listed in the 1995 Fire Rehabilitation Handbook. Mapping was completed from ground surveys, helicopter surveys and rechecking from videos taken of the watershed during the helicopter survey. The fire severity was further checked against LANDSAT images with reflectance classifications to initially characterize fire severity. Approximately 9% of the fire area experienced high severity burn. About 68% was low severity and 24% moderate. Some unburned areas are scattered primarily within the low severity areas. As is characteristic of high severity burned areas, essentially all of the litter was consumed leaving white ash. Essentially no needles or leaves remained in the high severity fire areas. Although most of the above ground parts of the understory plants were consumed, undoubtedly many will re-sprout in time. There was no evidence of water repellant soils, however the rainstorm of 7/19/04 indicates that there is still a significant risk of overland flow and downstream flooding (See Appendix E).

Treatment Narrative

The non-structural treatments include seeding and fertilization of moderate severity burn and helimulching of high severity burn. Some noxious weed bio agent releases are also being proposed.

The treatment on Moderate severity is needed for several reasons. Much of this mapped area is actually a mix of High and moderate but was mapped as moderate. Without some treatment in these areas, the treatment in the high severity areas would not be extensive enough to reduce downstream risk. Moderate severity burn is still devoid of any surviving litter and has little protection from raindrop impact. It is highly likely that first year vegetation cover without successful treatment will be less than 20%. The July 19 flood during our BAER assessment process really emphasized the risk of severe flooding and caused us to re-evaluate the need for treatment on Moderate severity burn.

Poorly consolidated pumice and ash soils and the steep slopes result in extremely erosive slope conditions. The seeding is expected to increase soil vegetation cover to reduce the likelihood of severe accelerated runoff. Tree mortality has drastically reduced evapotranspiration-allowing for the soil profile to fill with water and predisposing the area to rapid surface erosion rates from even moderate precipitation events. On moderate severity burn uplands, erosion control seeding is designed to provide short term (1-2 year) cover of wheat until native species can become re-established.

Spring fertilization using Ammonium Nitrate Sulfate (30-0-0-6) would improve establishment of seeded species for noxious weed competition (which should be covered by suppression restoration). Primary drainageways will be avoided during the fertilizer treatment. Research following the Chelan and Entiat Fires of 1970 indicated that fertilization was important to improve establishment and plant growth. **Refer to Appendix B** for a more in depth discussion of the need for fertilizer use.

Helimulching is being proposed to reduce accelerated runoff from high severity burn areas in the Pot Peak fire. It has proven effective on other fires in the west. Bioagents are being proposed to address potential noxious weed increases from soil disturbance and reduced shading.

Appendix D

Pot Peak-Si Si Ridge Complex
Flood Hazard Assessment

The description of site features and conditions that follow provide a brief documentation of the hazard that exists within the Pot Peak and Deep Harbor Fire areas.

Lake Chelan attracts a tremendous amount of tourism. Twenty-five Mile Creek State Park (below the Pot Peak fire) with overnight camping is extremely popular and is located along an active terrace of 25 Mile creek. Dispersed use also frequently occurs in the lower reaches of Twenty-five Mile Creek. There is almost a 100% probability that a number of people will be along the lower reaches of Twenty-five Mile Creek 100% of the time during July, August and early September. Boating in Lake Chelan, summer use cabin and campgrounds along Lake Chelan in the Deep Harbor fire experience similar usage.

The fire area is in a rain shadow of the Cascade Mountains, within the watershed, annual precipitation ranges from 20-60 inches. Intensive summer convective storms and rain-on-snow events are frequent in this area. Two year-1 hour storms drop about 0.4 inches. A 100 year, one hour storm will drop up to 1.0 inch for a 100 year storm. Both the North and South Forks of 25 Mile Creek drainage and the drainages leading from the Deep Harbor fire are steep highly dissected mountains slopes. Drainage systems are strongly-confined and form very narrow V shaped valleys. These landforms efficiently route and deliver runoff and sediment to stream channels. Examples of soil losses following a post-fire convection storm that impacted the Silica Fire burned area immediately adjacent to the Pot Peak burned area were measured at 60 tons/acre.

Increases in peak flows generated by fire effects could potentially cause major erosional events in the affected watersheds. This includes a high risk for debris torrents whose high velocity, channel scouring/depositional characteristics can threaten any facility or person in its path. There is a pattern of flooding following fires in this area and lives were lost in 1972 due to a debris flow in Preston Creek. Six people narrowly escaped other fire related storms (1972 South Fork Twenty-five Mile Cr. Fire; 1980 Silica Fire; 1988 Dinkelman Fire; 1994 Tyee Fire).

Most upper watershed stream reaches within the Pot Peak – SiSi Ridge Complex show strong evidence of recent stream channel scour with partially vegetated debris slide deposits. Coarse bed load is currently impounded behind large woody debris creating a step pool channel system. Bedrock outcrops in the stream channels restrict channel width. These constrictions also trap sediment and wood debris which ultimately fail especially when new debris, mud and water flows rapidly downstream with tremendous force and with little warning.

A convective precipitation event occurred on July 19th 2004 over portions of the South Fork Watershed. Evidence of sheet erosion coalescing into rivulets was common following this storm in the high and moderate severly burned areas. This translated into a flood on the South Fork. (See photos below). The effects of the flood were increased by debris jams temporarily damming the channel, then releasing the accumulated flow when the unconsolidated dam failed. This flood just barely passed underneath the Ramona Bridge. Based on the Slide Ridge RAWS Station, the total precipitation from this storm was 0.37 inches with maximum intensities of 0.03 inches/hour. Precipitation frequency maps indicate that this was only approximately a 2yr/1hr storm. Given the high frequency of the storm and the size of the flood, there is a concern that there is a heightened risk for debris flows in the South

Twenty-five Mile Subwatershed that could destroy the Ramona Bridge and impact downstream privately owned lands and a State Park. The risk of debris torrents has also been increased for many of the smaller watersheds in the Deep Harbor due to the percentage of high severity burned areas. This could have dire ramifications for a summer use cabin and campgrounds located at the mouths of tributaries draining directly into Lake Chelan.

Third and fourth order streams above the South Fork of Twenty-five Mile Creek crossing on Road 8410 have greater than 100 pieces per mile of large woody debris jack-strawed within channels. Woody debris has been delivered from previous debris slides. Post fire debris failures will likely add 50-100 pieces per mile of channel.

APPENDIX E

VALUES AT RISK
POT PEAK-SI SI RIDGE COMPLEX

Property at risk includes:	Estimated value	
Private Property in 25-Mile Creek 4 Fruit orchards (at risk for losing irrigation water) 3 Water systems for more than 30 homes Marina (boat docks)	$1,500,000	
Two Summer Homes on south shore of Lake Chelan	$551,000	
County Road stream crossing	$250,000	
State Park improvements	$1,500,000	
WA State Spawning Channel	$150,000	
Utility Poles/Lines	$100,000	
Federal Facilities		
Non Lakeshore campgrounds	$44,000	
Snowberry Campground and Ramona Bridge on the South Fork of Twenty-five Mile Creek)	$300,000	
Lake Chelan south shore Campgrounds: (Graham Harbor, Graham Harbor Creek, Corral Cr., Big Cr.	$1,100,000	
Forest Service Roads	$400,000	
Water Quality/Navigation in Lake Chelan	$50,000,000	
Site Productivity of the 25 Mile Cr WS	$1,400,000	
	$57,295,000	**TOTAL**

Appendix F

South Fork 25 Mile Creek
Snowberry Campground Bridge Replacement

Current Situation: Forest Road 8410 crosses the South Fork of Twenty-five Mile Creek just above its confluence with the North Fork of Twenty-five Mile Creek. The existing crossing consists of a low, I-beam bridge with wooden planks. This crossing structure is constructed low over the stream channel, restricting streamflow and has scoured out sediment on the stream bottom under the bridge. The original design for the bridge was to pass a 50 year flood with 3 feet of freeboard to pass debris and mud. On July 19, 2004, about .2 to .3 inches of rain fell in less than an hour creating the conditions shown in Appendix E. Mud and debris flowed down the South Fork of Twenty-five Mile Creek from the burned area. The water and debris were about 1 foot below the bridge underside. According to the Climatological Handbook for the Columbia Basin States: Precipitation Vol 2, a 2-year recurrence 1-hour storm is .4 inches for this area.

The crossing is at risk of failure due to peak snowmelt floods or more likely, high-intensity, convective rainstorm generated floods during the summer. Large woody debris and bedload may accumulate at the bridge constriction during a larger precipitation event and contribute to even greater damage downstream when the debris stopped by the bridge is carried down stream by stronger pulses of water, wood debris and sediment flowing from above. Given the post-fire condition in the drainage, there is a very high probability that the existing bridge crossing will be subject to both flow exceedence and plugging with bedload and woody debris. The existing bridge has the potential to collect a debris jam. Analysis of the 7/19/2004 flood with the HEC-RAS model using collected information on the channel profile, channel cross-sections, elevations of the 7/19 flood levels, and bridge elevations suggests that a ten year flood with mud and wood debris would over top the bridge. A crossing failure would close FR 8410---a primary inter-District access route needed for public use and administrative use of the Twenty-five Mile Creek watershed. Also accelerated sedimentation of aquatic habitat and the potential for additional channel realignment and scour would occur, further threatening facilities and property values in lower Twenty-Five Mile Creek (State Park, artificial spawning channel, two water supply intake locations, and eventually Lake Chelan).

While the BAER team considered a treatment that removed the bridge and the footings to increase the channel capacity at the constriction point to allow water, debris and sediment to pass unabated, the staff of the Chelan Ranger District was not supportive of that approach. The bridge provides important access that the District needs to maintain. The bridge is used by the downstream irrigators who need regular and unimpeded access to their water intake and diversion structures. The bridge is also used by the Washington State Department of Natural Resources to administer their lands in the basin. The bridge is also used by the local radio station KOZI to maintain a repeater that serves the Lake Chelan Valley and surrounding area. KOZI is the emergency broadcast radio station in the Lake Chelan Valley. They continue to be the most important link to get information on natural disasters to the public in the Lake Chelan Valley. The Manson Television District uses the bridge to access their repeater which serves the Lake Chelan Valley. The Okanogan and Wenatchee National Forests use the bridge to access a radio repeater that serves the Chelan Ranger District, including the remote up-lake area of Lake Chelan. The bridge is also used by the Chelan Ranger District to access the eastern and southern areas of the Twenty-five Mile Creek watershed for various resource needs including fire control. Forest visitors also use the bridge to access campgrounds at Ramona Campground and Windy Camp. It is very important to keep a stream crossing in place for all the users that depend on the road.

Proposed Treatment: Replace South Fork Twenty-five Mile Creek bridge (8410 Road) with a temporary bridge.

The preliminary design objectives for this treatment were as follows: (1) maximize end area for water to allow flood debris and sediment to flow pass the bridge and not collect against the bridge, and (2) provide a durable crossing structure. The estimated cost of removing and replacing the temporary bridge is $200,000.