USDA Forest Service Date of Report: October 5, 2007

DOMKE LAKE FIRE
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: **Domke Lake** B. Fire Number: **WA-OWF-000434 (P code = P6DVD0)**

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

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

G. District: **Chelan Ranger District**

H. Date Fire Started: **8/5/2007** I. Date Fire Controlled: **Unknown****

J. Suppression Cost: **$ 11 Million**

** Containment: 10/31/2007 estimated fire season ending precipitation event

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

1. Fireline waterbarred (miles) **0 miles ****
2. Fireline seeded (miles) **0 miles**
3. Other (identify) **Spike camps, base camps, trails used for suppression access or fire lines & safety zones****

** Domke Lake Fire suppression-rehabilitation guidelines provided.

L. Watershed Number: **17-02-00-09-02 (Lake Chelan)**

M. NFS Acres Burned: **12,145** Total Acres Burned**: 12,150**

Ownership type: **Nearly All National Forest system lands. Burn acres estimated from 9/17/2007 ICS 209 Report.**

(0)State (0)BLM **(5)PVT**

N. Vegetation Types: **: Low elevations: Mostly Douglas-fir and Ponderosa Pine Series (no real PIPO series, just PIPO as a component of other series); Mid elevations: mixed conifer/Douglas-fir series; Upper elevations: Subalpine Fir Series—mostly PICO dominated**

O. Dominant Soils: **Relatively shallow soils with a surface layer of volcanic ash/pumice over coarse textured subsoils; subsurface soils have more than 25% profile rock larger than 2 inches in diameter; some deep coarse textured stony soils on debris fans and lateral glacial till deposits**

P. Geologic Types: **igneous units (Granidiorite) and metamorphic units (Gneiss): landforms are oversteepened glacial troughs developed from alpine glaciation; with small debris fans occurring at the mouth of the streams.**

Q. Miles of Stream Channels by Class:

I or II-6 miles **III-7.2 miles** **IV- 15 miles**

R. Transportation System:

Trails: **10.3** miles Roads: **1** miles

PART III - WATERSHED CONDITION

A. Fire Severity* (acres): (low-85%) **10,200** (moderate 4%) **530** (high-11%) **1,290**

***Burn intensity and fire size (12,150 acres) was identified from 9/5/2007 and 9/16/2007 LANDSAT images and a 9/7/2007 helicopter over-flight. Additional burned area fire severity will be low due to shorter burning periods and likelihood of fire continuing to burn at higher elevations. See Burn Severity map in Appendix A. According to 9/18/07 ICS report, 12,200 acres have burned.**

B. Water-Repellent Soil (acres): **little observed, however volcanic ash has non wettable characteristics when dry.**

C. Soil Erosion Hazard Rating (acres):

3,110 (low) **1,870** (Moderate) **7,220** (high) **

**Private structures are located on the Railroad Creek alluvial fan on slopes under 20% with relatively low surface erosion rates. The higher elevation watersheds are steep with approximately 50% of the watersheds exceeding 60 percent slopes. These upper watersheds have high runoff rates, and unprotected soils have a high erosion hazard. All of these subwatersheds are lands administered by the Okanogan and Wenatchee NFs.

D. Erosion Potential: **161** tons/acre

E. Sediment Potential**:** **41,280** cubic yards / square mile

Assumptions for Erosion and Sediment Potential: The erosion and sediment figures include contributions from recurring debris slides that deposit relatively coarse sediment directly into stream channels. These shallow from rapid slides which are a natural hydrologic process of these glacial trough landforms. This suspended and bedload sediment has been and continues to be transported and deposited into Domke Lake and Lake Chelan forming alluvial fans at the mouth of each subwatershed.

Debris slides trigger episodic pulses of sediment delivery. These slides occur following dramatic changes in vegetation due to landscape level fires or from intense early summer thunder storms and rain-on-snow events that occur in late fall and into the winter (see Part IV). Based upon local slide history, fire induced watershed impairments will elevate the risk of debris slides for at least the next 5 years. The Domke Lake Fire will have a significant effect of increasing the frequency of debris slides in Burn Creek, Emerald Park Creek and Bear Creek. The figures above reflect the contribution of delivered sediment from these debris slides over the design frequency (10 years). These figures are considered conservative based upon recent fire induced debris slide occurrence and stream scour of alluvial fans.

The burned area occurs predominately on glacial troughs or glacial headlands that carried melt water drainage during continental and alpine glaciation and the drainages are steep and rocky, especially the upper reaches of the larger streams. Natural landform sediment delivery and routing efficiency (80-90%) is high but episodic. Runoff is flashy and routed through a series of parallel low order channels that form a dense network of tributary streams. The major source of sediment is from debris slides from tributary streams or debris chutes. These slides deposit debris directly into the main channels and some material may reach Railroad Creek, Bear Creek, and Domke Creek. This delivered sediment contributes to alluvial fans or flood plains along each stream. Over the centuries, a considerable amount of suspended and bedload sediment has been carried downstream. This is especially true of the Lucerne alluvial fan, where there are numerous old channels from past floods. Due to the depth of Lake Chelan, debris entering the lake is submerged and has not formed extensive deltas into the lake. Larger rocks and wood debris have accumulated on the Railroad Creek alluvial fan during large runoff events which maintains or enlarges the alluvial fan.

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period: **5** years understory, 30 years overstory

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

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

D. Design Storm Duration: **0.5** hours

E. Design Storm Magnitude: **0.6** inches

F. Design Flow: **28.0 (*1)** cubic feet/second/square mile

G. Estimated Reduction in Infiltration: **5 to 10% (*2)** percent

H. Adjusted Design Flow: **31 (*3)** cubic feet/second/square mile

Footnotes
(*1) Design flow assumptions: (a) A short duration, high intensity, convective storm is the storm type most likely to cause damage in or below the burned area.. (b) Selected a 10 yr RI, 30 minute event--similar to those that have impacted other burns in this area (Pot Peak, Deep Harbor, and North 25).

(*2) Estimated reduced infiltration in the Domke Lake Fire: Low severity (0%), moderate severity (20%) and high severity (40%). Estimated reduction of infiltration is due to non-wettable conditions from dry, volcanic ash soils.

(*3) Adjusted Design Flow varies widely based on contributing area. Adjusted design flow for Railroad Creek is 31 csm.

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 with experience gained from previous events in the area, most recently the 2004 Deep Harbor Fire, 2004 Pot Peak Fire, 2002 Deer Point, 2001 Rex Creek Fire and 1998 North 25 Fire

Erosional process rates are increased by the fire, so stream sedimentation will increase and affect water quality. Water quality in the Lake Chelan and Domke Lake 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. Domke Lake is an important recreation destination of regional importance. Clients are from cities such as Seattle, Portland, Spokane and Boise.

Large trees, smaller wood and other debris are rolling from the northeast side of Domke Mountain into Lake Chelan. The material presents a clear danger to commercial and private boat use and personal watercraft use on the lake. The increased danger here is that larger wood now occurs below the burned area. Recent wildfires along both shores of Lake Chelan also presented this hazard, but entry points into Lake Chelan were normally in well defined streams or debris chutes, and the most serious hazards were mitigated with log booms designed to capture and hold debris so it would not be a navigation hazard on Lake Chelan. Debris from the Domke Lake Fire burned areas occurs across the entire slope, so it can not be feasibly contained. There is also a single private residence along Lake Chelan that is at risk of being hit by rolling wood and rock debris.

Burned areas within the fire created sites where noxious weed re-infestation and introduction are likely because ground cover is gone. Noxious weeds are also on the unburned portion of the Lucerne fan and are a seed source for infestation on the burned areas.

The Lucerne LSR represents the only remaining functional Spotted Owl habitat in the LSRs of the Chelan Basin, and this LSR was burned in the fire. This LSR did support nesting owls prior to the fire. Although this is not Designated Critical Habitat (DCH) it does represent extremely important habitat to maintain in the Chelan Basin. The DCH that was present in the Basin was all destroyed in the N 25 fire of 1998 and the Pot Peak Fire of 2004.

This is a culturally rich area. Both historic and pre-historic sites near Lake Chelan and Domke Lake are at risk of loss or damage.

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

Water quality--The steep landforms in the Domke Lake Fire have the potential to deliver eroded material to Domke Lake, Railroad Creek or Lake Chelan. Increased sediment loading in low order streams results from surface erosion and ongoing soil creep. Where vegetation is heavier, wildfire destroyed the litter increasing erosion rates. The Domke Lake Complex fire contains over-steepened and glacially scoured slopes along Lake Chelan, Domke Lake or Railroad Creek. Many areas have been glacially scoured and have glacial till, non-cohesive soils plastered on the slopes. Slopes are characterized by large areas of rock outcrops, especially the headlands of the larger streams.

Debris flow avalanches occur on steep slopes, especially in the headlands of the larger drainages. These are normal but are accelerated by fire and carry wood and rock debris down slope. Surface erosion rates in the burned areas increase following the fire, increasing potential debris flow avalanche occurrences in the next several years. Water quality (stream sedimentation) decreases during and after the debris flows. The additional sediment moves into Lake Chelan and affects water quality for hours to days.

Water quality in the Lake Chelan sub-basin is critical for many uses including municipal/domestic supply, agricultural uses, aquatic habitat, recreation and aesthetics. Lake Chelan is a major recreation destination of national significance. In the Domke Lake fire area, Railroad Creek, Domke Creek and Emerald Park Creek drainages are the sources of water for domestic water supply systems including private land along the lakeshore and Railroad Creek fan. Domke Lake provides domestic water for one resident, as well as resort visitors and campers at the Forest Service campgrounds along the lake. Railroad Creek and Domke Lake also contain important populations of rainbow and cutthroat trout.

The water quality parameter most affected by this fire is sediment loading. Stream sediment loading in burned steep first order tributaries is expected to increase from increased surface erosion and accelerated dry raveling and rill erosion leading to increased debris slide activity. Ash, fine sediment and woody debris will collect in these ephemeral streams. Delivery and transport of this debris will increase during snowmelt runoff and in response to storm events. Episodic delivery of larger bed materials and woody debris will be associated with precipitation driven debris slide-debris torrents. Increased sediment loading in Railroad Creek and Bear Creek is expected to persist for at least the next two to three years after the fire.

In some situations water quality may be negatively affected following wildfire. Neary, et al. (2005) summarized that the preponderance of changes in water quality were driven by the fire severity. Large areas of high severity fires had the most affect, while mostly low severity fires had the least influence on water quality. The Domke Lake Fire had about 10% high severity burned areas and about 85% of low severity burned areas, and although slopes are steep throughout the burned areas, water quality degradation is not expected as a result of the fire. The waters of Railroad Creek are already contaminated by flowing though the old mine tailings at the Holden mine. Contamination is the highest near the tailings and lowest at the mouth of Railroad Creek.

T & E Habitat--The Domke Lake Fire burned 31% of the Lucerne Late-Successional Reserve. This LSR was the last unburned LSR within the Chelan Drainage. All of the Slide Peak LSR burned in the Tyee Fire (1994), all of the Chelan side of the Shady Pass LSR burned in the N25 (1998), Pot Peak and Deep Harbor Fires (2004), and all of the Chelan side of the Sawtooth LSR burned in the Rex Creek Fire (2001). Most of these fires burned with high severity in the late-successional habitat and currently the majority of the late-successional habitat that remains in LSRs on the district is located in the Lucerne LSR. This is the only LSR with potential to retain its late-successional habitat function in the near future.

Additionally, the only Designated Critical Habitat (WA-4) for the Northern Spotted Owl (a threatened species under the Endangered Species act) on the Chelan Ranger District burned in the N25 and Pot Peak Fires. One pair of owls currently maintain their presence just outside the Designated Critical Habitat in a small portion of the area that burned with low severity in the valley bottom. Suitable habitat within the DCH itself was almost completely removed by earlier fires, and the habitat unit is no longer functional, and is unlikely to regain late-successional habitat features in less than 100 years. So, although there is no DCH in the Lucerne LSR, it retains the only large patch of suitable habitat remaining in designated LSRs on the Chelan Ranger District. Prior to the fire, at least one nesting pair, one female with young, and one single resident male were known to reside in this area, a high number given that the majority of the area is not surveyable.

Retention of this remaining habitat is clearly of utmost importance for spotted owls within the Chelan Drainage. When Critical Habitat was originally designated by the US Fish and Wildlife Service, retention of spotted owl habitat within the Chelan Drainage was deemed "essential (to maintain) breeding habitat connectivity between WA-5 (Entiat) and the Okanogan National Forest , and is important for range-wide distribution of owl habitat within the eastern edge of the range" (Tehan, USFWS 1991) . Loss of the WA-4 Critical Habitat Unit again underscores the importance of retaining as much late-successional habitat in the Lucerne LSR as possible, especially as it is currently occupied habitat.

Many of the large trees within the burned portion of the Lucerne LSR have survived the fire but are currently at high risk of lethal post-fire insect attack. Protection of this LSR from post-fire insect related mortality of the surviving large trees will allow for retention of large old growth trees that provide critical perching and nesting structures for both spotted owls and other species of concern such as bald eagles (also known to occur in the area), and will enable recovery of required complex forest structure decades earlier than would occur if these trees died due to post fire insect attack. Retention of these trees will allow this habitat to continue to fill its role as a critical fire refuge for all species dependent on late-successional habitat, which is a critical need in the Chelan Basin due to the landscape level effects of recent fires. Bark beetle anti-aggregant pheromones have been used successfully to protect large old growth Douglas-fir in similar burned areas on the Chelan Ranger District and elsewhere (Mehmel 2007, Gillette et al 2005/6, Ross et al 2001). The treatments are known to be effective in the year of application (repelling the first post-fire flush of insect attack), though effectiveness increases with followup treatments in years 2 and 3. The pheromone proposed is *3-methylcyclohex-2-en-1-one* (MCH).

Retention of these large trees will also have the side benefit of protecting soils and retaining scenic values in an area where recreation is of high value to the local economy.

Guidance related to protection of "vital habitat for species at risk (threatened and endangered species and other species for which viability is a concern)" is currently available on the BAER website. Habitat protection work to prevent long-term permanent impairment to habitat that is important to the conservation of species at risk is a valid BAER treatment. An objective of burned area emergency rehabilitation is to "alleviate emergency conditions following wildfires… to prevent permanent impairment of ecosystem structure and function" (FSM 2523.02, #2, 05/25/2000). Additionally, to qualify for emergency stabilization funding, treatments must achieve treatment objectives within 2 years (FSM 2323.51).

Cultural Resources--There are numerous cultural sites near Domke Lake and on the Lucerne alluvial fan, including many uninventoried structures and related buildings. An area of particular concern is located on the east side of Domke Lake where the original ***Gordon Stuart*** homestead site was burned over, but the original fireplace is still intact and cultural debris have been exposed by the fire. Other uninventoried sites include the Lucerne Incline Railway near the Lightning Ridge spot fire, the Lucerne hydroelectric plant located just above the Lucerne Bridge on Forest Road 8301, the Domke Lake Fish Hatchery, the Domke Mountain Lookout, the Domke Lake Resort, several mine adits (within the fire area or flood zone), railroad and flume grades, and numerous historic debris scatters. The Lucerne Bar (potential flood zone) supports an eligible prehistoric site that has not been fully investigated. Approximately 40 structures (cabins and outbuildings) built in the 1930's

and 1940's are present on the Lucerne alluvial fan. These structures are at a higher risk of flooding coming from the burned area. Most roads and trails in the area, including several railroad grades constructed to access the Holden Mine, were built in the period between 1896 and 1940, and are themselves historic features, also at some risk from post-fire flooding and/or erosion. There are also 6 US Forest Service campgrounds and the Lucerne Guard Station (National Historic Register property) located inside or just below the burned area. See Cultural Write-up in analysis file for further details.

Loss of Site Productivity--The inherent soil productivity is low for the Domke Lake Complex. Residual soils are derived from glacial tills from hard crystalline igneous and metamorphic bedrock. These rock types typically weather into coarse "sandy soils" with a low nutrient capitol and low ability to hold nutrients. These coarse glacial-till soils are covered with volcanic ash of varying thickness depending on past erosion. Soil moisture is particularly limiting on westerly and southerly exposures throughout the fire area. Surface erosion is naturally higher on these sites, and is the source of sediment in ephemeral drainage ways.

Besides high erosion rates of unprotected soil, another threat to site productivity and wilderness values is the presence of the noxious weeds including diffuse knapweed and St. Johnswort within the burned area. Low site productivity on disturbed sites encourages additional noxious weed infestations. Burned over soils are at risk for increased populations of noxious weeds because the seeds are often present and fire removes other plant competition, while making the site more harsh (lack of cover means higher surface soil temperatures), so native plants trying to reestablish after the fire are not able to survive the harsh site conditions. Soil productivity losses are at risk in portions of the burned area from noxious weed invasion particularly on the Lucerne Bar and along the Holden road. Seed sources exist along roadways in and adjacent to the fire area, as well as the fire camp.

Glacier Peak Wilderness—6850 acres of burned area in the Domke Lake Fire are inside the Glacier Peak Wilderness. 4.5 Miles of trails are in the Wilderness. BAER treatments should only prevent unnatural loss of the wilderness resource or to protect life, property and other resource values outside of wilderness; and that normally hand tools and equipment should be used to install treatments. FSH 2509.13 recommends design treatments to be temporary, short-lived actions that use native materials for structural measures

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

Boat Safety--Primary threats to humans are from large wood sliding and rolling off the northeast side of Domke Mountain into Lake Chelan which interferes with safe navigation of Lake Chelan in the vicinity and down lake of the burned area. A cabin on private land along Lake Chelan at the base of Domke Mountain is also at risk of being hit by rolling wood or rock debris.

Flooding Lucerne Alluvial Fan--Flooding, resulting from debris failure from burned tributaries which plug Railroad Creek, may damage the cabins and small homes and cultural resources on the Railroad Creek alluvial fan. The likelihood of a flood in Railroad Creek caused by a debris dam from side drainages with a significant area in high or moderate severity burned condition is increased. The typical debris torrent is a high velocity, channel scouring and depositional event that significantly threatens any facility in its path.

The tributary subwatersheds are extremely steep, rocky, glacial trough landforms which are at severe risk for debris slides. Large woody material, in upper debris chutes and stream channels, will become incorporated in the debris slides. Due to the fire, a large number of trees are expected to be wind thrown and add to the debris. This debris would substantially increase the scouring energy of each slide and increase the amount of debris to Railroad Creek. Post fire debris slides are expected to accelerate scour rate in upper watershed channels to deliver additional debris into lower stream reaches. This added debris will eventually go downstream onto the alluvial fans. The debris can also accumulate in Railroad Creek at the mouth of each tributary or at other collection points along the channel. Under extreme circumstances the debris jams can back up flow in Railroad Creek, until the debris dam fails, sending a flood surge downstream onto the Lucerne alluvial fan. Depending on how the debris settles out, Railroad Creek or the other streams can be diverted across their floodways into

old channels or cut a new channel. Relocated stream flow may cause property damage.

Fire severity in ***Burn Creek*** was high in most of the upper one-half of the basin. The lower portion of Burn Creek burned with a low fire severity. The slope draining directly into Railroad Creek and adjacent to Burn Creek also had high severity burned areas, about 1-2 miles above Lucerne. The upper basin of Burn Creek shows evidence of past debris avalanches. Debris flows may get to Railroad Creek but the alluvial fan at the mouth of Burn Creek is limited and does not have the extent as the Railroad Creek alluvial fan at Lucerne. If a large amount of debris came out of Burn Creek to Railroad Creek, it is not likely to impound the flow of both Burn Creek and Railroad Creek. Surface erosion on the burned area will be higher, but the low burn severity areas in Burn Creek between Railroad Creek and the burned area will buffer most or all of the increased eroded soil to the creek.

B. Emergency Treatment Objectives:

The primary objectives of emergency treatments are to:

Protect habitat for T & E species (Spotted Owls) by establishing conditions that promote live tree survival. Large trees, in particular, are an important component of the habitat. Protect LSR habitat (for Spotted Owls) by protecting residual trees from insect attack, and subsequent post-fire mortality.

Minimize the spread of noxious weeds into the burned area by treating extant populations.

Reduce accelerated erosion and sedimentation potential from trails and protect the trails from damage by implementing structural treatments. Treatments are designed to redistribute surface runoff, water concentration and water velocities; and retard the down slope delivery of sediment. As part of trail work, hazard tree abatement will need to occur along the trail system.

Protect human safety and property damage from boat collisions with large wood in Lake Chelan by sweeping debris in the spring. Currently logs and or large woody debris are rolling off the northeast slopes of Domke Mountain into Lake Chelan.

Protect cultural resources during ground disturbing activities of trail water bar construction or cleaning of existing water bar outflows and protect the cultural site at the east side of Domke Lake.

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

Land **70 %** Channel/Riparian NA % Trails **90 %** MCH Treatment NA

D. Probability of Treatment Success

	<----Years after treatment----->		
	1	3	5
Land	70%	70%	70%
Channel	%	%	%
Roads/Trails	90%	90%	90%
Other (MCH)	90%	70%	70%

E. Cost of No Action (Including Loss): **$1,968,500**

F. Cost of Selected Alternative (Including Loss): **$1,341,650**

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**

Phone: **(509) 826-3164** Electronic Address: **mwbennett@fs.fed.us**

H. Treatment Narrative:

Overall Goal of Proposed BAER Treatments: To complete a combination of comprehensive treatments to reduce hazards from floating woody debris in Lake Chelan; protect trail infrastructure to the extant hiking trails in the fire area; remove hazard trees along trails (especially at work sites); maintain Spotted Owl habitat by protecting large old growth trees in the LSR; and reduce noxious weed effects to site productivity in the area and enhance natural vegetative recovery by completing noxious weed treatments in the fire area.

Most proposed BAER activities are located in areas with low probability to disturb undiscovered cultural resources, or the activities themselves are unlikely to disturb such resources. Cultural resources located on the Lucerne Bar are at some risk of disturbance due to post-fire flooding.

Land Treatments

Purpose - Upland Treatments: Retain large trees to provide large tree structure and canopy closure to greatly speed the long term recovery of the habitat and reduce the post-fire potential for site productivity loss through weed infestations.

Treatment #L1 Apply anti-aggregating pheromones (MCH) to areas outside of wilderness where post fire insect attack is likely to result in loss of large diameter trees (See Appendix D for Map). Conduct work in late-successional reserve habitat (suitable spotted owl habitat) where retention of the large trees is critical to the survival of spotted owls in the area, and to the long term recovery of the habitat. The treatment locations are shown in Appendix D. Target large-diameter Douglas-fir, though if pheromones become available to protect other species (e.g. ponderosa pine), they would be considered. Apply treatments by hand (packets of pheromones stapled to trees) along Domke Lake. Treatment would be effective the first year, but follow-up treatments in years 2 and 3 would offer protection throughout the period of post-fire vulnerability (See Appendix D for histogram).

Purpose – Noxious Weed Control Treatments: Treatments are intended to maintain ecosystem health by encouraging natural vegetation recovery. Three years of treatment will be necessary and would include herbicide use. Interim BAER reports will be submitted for 2008 – 2009.

Treatment # L2-Survey: Invasive Plant populations. This treatment provides for fall and spring surveys of invasive plant populations to identify weed populations and validate the areas of treatment for #L-3 and #L-4.

Treatment #L3-Manual Control of Noxious Weeds: Early spring control of known and newly discovered populations of diffuse knapweed by hand pulling or grubbing. Follow this work by hand seeding. Seed competitive species to fill open niches created by weed removal.

Treatment #L4- Chemical Control of Noxious Weeds:: Use approved chemical herbicides to treat Diffuse Knapweed and St. Johnswort as approved in the Wenatchee NF (1998) Integrated Noxious Weed Management EA . About two miles of Forest Road 8301 and two acres of the Lucerne alluvial fan will be treated. Seed local bluebunch wheatgrass or other native species in the areas treated for weeds.

Trail Treatments

Purpose: Implement actions to minimize the potential for concentration of accelerated surface runoff from Forest Service trails on Domke Mountain and up Emerald Park Creek to protect the trail structure and protect Emerald Park Creek from sedimentation from the Emerald Park Creek trail. The treatments also would promote a safe working environment for the work crews improving trail drainage.

The fire removed woody material and duff in the moderate and high severity burn areas, which will result in hill-slope runoff that would fill trail tread with runoff in many locations. In addition, in some trail sections, the trail shoulder which was supported by shrub and tree roots which now are severely burned, is sloughing off the trail shoulder. As a result of these fire-related impacts, trail drainage features are ineffective and the trail tread is at high risk to be lost to erosion.

Treatment #T1 Improve Trail Drainage: Install drain dips on 4.0 miles of trail on Domke Mountain (Trail 1280.1 and the Emerald Park Creek trail (Trail 1230) inside the fire boundary to reduce the potential for runoff concentration and accelerated surface erosion from anticipated fire effects. Dips will vary from rolling outslope dips to waterbars constructed from peeled and anchored native wood material. This treatment will occur primarily on trail segments within moderate and high severity burn where the potential for post-fire increases in surface runoff is high.

Treatment #T2 – Improve Trail Tread: Improve 1.0 mile of trail tread that has been degraded by the fire. Remove slough and debris that has reduced or eliminated the trail tread and reconstruct the trail width providing additional trail tread. This treatment eliminates safety concerns of access for installation of approved trail treatments.

Treatment #T3 –Log Out Trail: A number of fire-killed trees are falling and blocking trail access. Trail log out will be necessary on 8.0 miles of trail to gain access to the sections of trail that need drainage (T1) and tread improvements (T2). Taking down hazard trees which are an imminent danger to working crews are included in Protection/Safety (below).

Structural Treatments

Purpose: Install structural features designed to reduce the threat to life and property from debris slides, flood flows and related hazards.

Treatment #S1 –Collect large wood debris from Lake Chelan near and just down stream of Domke Mountain with log booms and or barge-mounted excavators. Pinning large wood against the shore may also work,

eventually removing the large wood and debris to a location where the material would be removed and transported to a stable location. Floating woody debris has been a major public safety hazard following several flood events in Lake Chelan and its major tributaries. (1972, 1995, 2003, 2007).

Protection/Safety Treatments:

Purpose: The objective of this treatment is to implement actions to minimize the risk to BAER personnel and the public from hazard trees.

Treatment #PS1 – Hazard Tree (Trails): This treatment will occur primarily on trail segments where most all of the larger over story trees were killed, this treatment is needed in order to eliminate safety concerns associated with access for installation of other trail treatments.

Treatment#PS2 – Public Safety and Awareness: Hold a public meeting at Chelan about the fire'-caused hazards which affects public safety and develop public information materials and mailings.

BAER Evaluation

BAER Cultural Resource Survey: Surveys by the Forest Archeologist will be required prior to the implementation of the ground disturbing BAER treatments.

Treatment #CR1—Cultural surveys: Survey sites prior to ground disturbing activities to determine if cultural resources are present. Protect any known cultural sites from BAER ground disturbing activities.

Treatment #CR2—Cultural Site Protection: Protect cultural site (original Stuart homestead site) at the east side of Domke Lake from expected high surface erosion and burying of cultural artifacts.

Monitoring

Implementation 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 for monitoring are preliminary. Implementation and effectiveness monitoring of Cultural Treatments are included as a line item in Part VI. Noxious Weed Monitoring is also included as a separate itemized treatment and the costs are displayed on Part VI. Implementation monitoring of other treatments will be done as treatments occur and the costs have been included as part of the treatment costs. Effectiveness monitoring of pheromones treatments (MCH) will be completed with cooperation of the Wenatchee Forest Sciences Lab (Connie Mehmel).

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

	10/5/2007			NFS Lands			Other Lands			All
			Unit	# of	WFSU	# of	Fed	# of	Non Fed	Total
Tmt #	Line Items	Units	Cost	Units	SULT $	units	$	Units	$	$
	A. Land Treatments									
	1) Upland Treatments									
L-1	MCH Flakes (ground applic)	Ac	$ 105	500	$52,500					$52,500
	2) Noxious Weed Control									
L-2	Survey Plant Populations	Ac	$ 70	32	$2,240					$2,240
L-3	Manual Control	Ac	$ 300	10	$3,000					$3,000
L-4	Chemical Control	Ac	$ 150	22	$3,300					$3,300
	Subtotal Land Treatments				$61,040					$61,040
	B. Channel - Riparian Treatments									
	none									
	Subtotal Channel - Rip. Treat.				$0					$0
	C. Trail Treatments									
T-1	Improve Trail Dainage	Mi	$ 5,000	4	$20,000					$20,000
T-2	Improve Trail Tread	Mi	$ 2,500	4	$10,000					$10,000
T-3	Log Out Trail	Mi	$ 1,500	4	$6,000					$6,000
	Subtotal Road & Trails				$36,000					$36,000
	D. Structures									
S-1	Sweep Large Wood from Lake Chelan	Ea			$75,000					$75,000
	Subtotal Structures				$75,000					$75,000
	E. Protection/Safety									
PS-1	Hazzard Tree Trails	Ea			$3,000					$3,000
PS-2	Public Safety/Awareness	Ea			$4,000					$4,000
	Subtotal Protedction/Safety				$7,000					$7,000
	F. BAER Cul Res Survey									
CR-1	Cultural Surveys	EA	$ 7,500	1	$7,500					$7,500
CR-2	Protect Cultural Site	EA	$ 5,700	1	$5,700					$5,700
	Subtotal Cultural Survey/Protection				$13,200					$13,200
	BAER Survey				$8,500					$8,500
	G. BAER Monitoring				$8,000					$8,000
	MCH Effectiveness				$5,000					$5,000
	Noxious Weeds (App. C)				$3,000					$3,000
	H. Totals				**$208,740**					**$208,740**

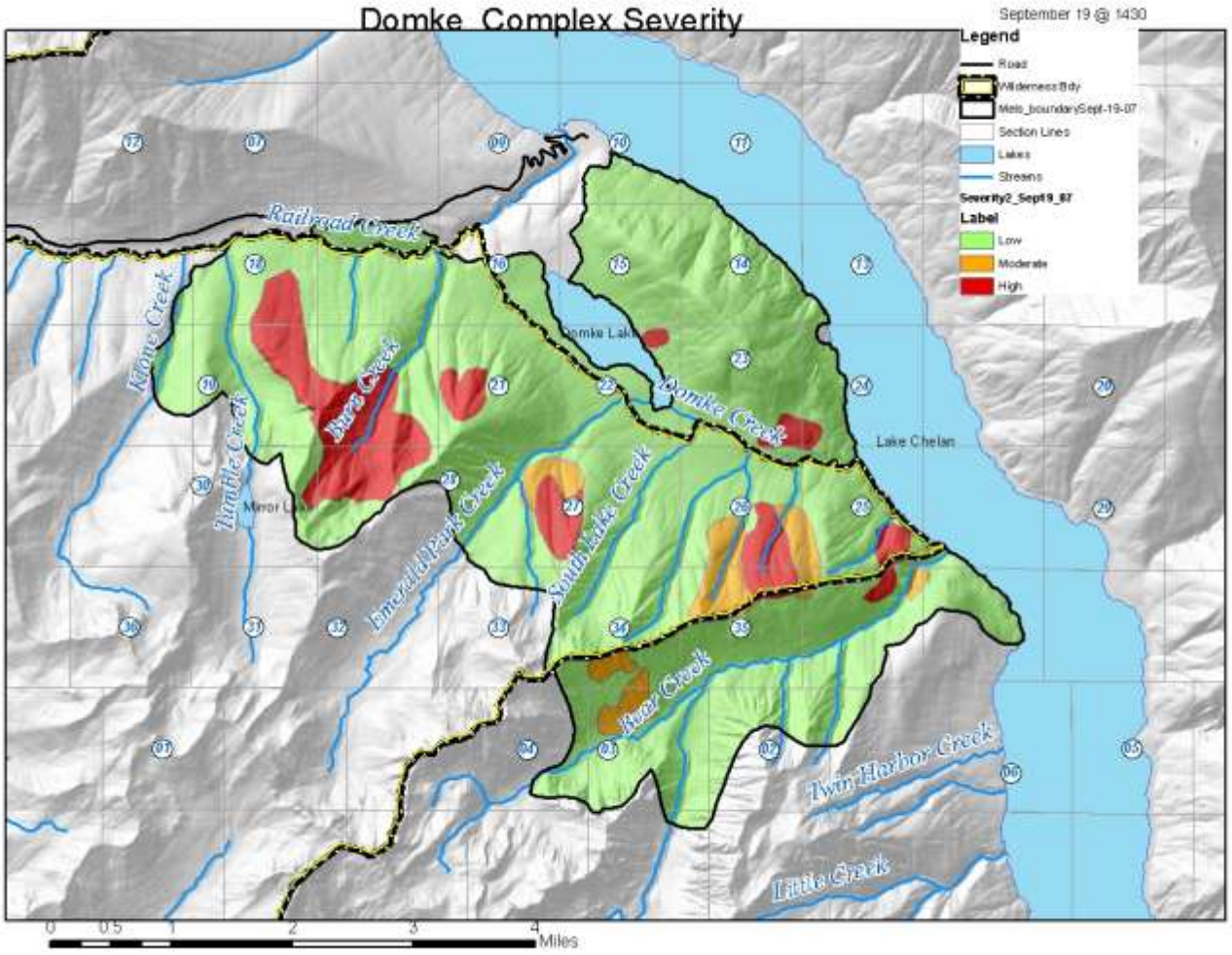
PART VII - APPROVALS

DOMKE LAKE FIRE

Recommended by:

/s/ *Karen R. Mollander*
for
REBECCA LOCKETT HEATH
Forest Supervisor Date: September 26, 2007

Appendix A
Domke Lake Fire
Burn Severity



Appendix B

Domke Lake Fire
Values at Risk
918/2007

Values at Risk--The values at risk include the Lucerne cabins, roads and Railroad Creek Bridge on the Railroad Creek alluvial fan, campgrounds, trails, and cultural resources. Due to the natural attraction of Lake Chelan, cabin owners and campers will continue to use these facilities following the Domke Lake Fire. The small amount of private land and most of the campground is located on the alluvial fan.

The risk for potential damage to the Boat Club cabins on the alluvial fan at Lucerne occurs because the current channel for Railroad Creek and the dry channel east of the current channel (with the PVC pipe serving domestic water to the cabins) seem to be the lowest elevations and are the likely locations for normal flood waters.

Debris flow avalanches and flooding are a serious concern for some of the cabins and campground facilities along the Lake Chelan and Domke Lake shore that are below the Domke Lake fire area. Floating debris in Lake Chelan is a safety concern for private and commercial watercraft where boat speeds of 30-40 miles per hour occur. 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.

Floating woody debris coming from burned areas in the Lake is a public safety hazard. During the Domke Lake fire burned woody debris has rolled off the northeast side of Domke Mountain into Lake Chelan causing safety concerns for commercial and private boaters. Safe navigation is very important because access to the upper end of Lake Chelan is primarily by boat. Hundreds or thousands of boat trips are made annually through these waters. Most of this material from this year has already floated down lake from the burned area or remaining woody debris and logs are floating close in to the shore and are not a boating hazard where they currently are positioned. Next spring, however, more woody debris will roll into Lake Chelan as more trees fall over the winter, creating significant navigation hazards to commercial and private boaters. Booms will not work at this site because there are no centralized paths for logs and debris coming off the slope. Log boom sweeping next spring may reduce large woody debris and the possibility of accidents involving private boating in Lake Chelan below the Domke Lake Fire.

The following values at risk were estimated. Estimates of structures at risk are limited to only those facilities located in high hazard positions (e.g., cabins on alluvial fans with highest risk of flooding).

1) **Cabins**
- 5 @ $25K **$125,000**

2) **Water Intake** 1 @ $15K ea **$15,000**
- Domke Cabins

3) Private Home 1 @ $100K **$100,000**

4) **Recreation facilities:** **$40,000**
- 1 Campground (Lucerne)

5) **Roads:** Estimated value @$100K/mile **$300,000**
- 1 mile
- 1 Bridge @ $200K

6) **Trails:** Estimated value of 40K/mile

- **8 miles** **$320,000**

7) **Cultural Resource properties:** **$350,000**

- Lucerne Bar Buildings
- Old Hydro Plant/Intake from Railroad Creek
- Domke Lake Gordon Stuart Homestead site
- Lucerne Guard Station

8) **Fish habitat:** **$7,500**

- Recreational fishery in Lower Railroad Creek

9) **Other Resources**: **$2,500,000**

- Lucerne LSR
- T & E species,--Spotted Owl Habitat
- Wilderness Aesthetics
- Risk to soil productivity from noxious weed invasion
- Loss of native plant diversity
- Wildlife habitat

10) **Safe Navigation in Lake Chelan** **$5,000,000**

Total:	**$8,757,500**

Monitoring Proposals

Domke Lake BAER Monitoring
Noxious Weeds in 2007 BAER Treated Road and Alluvial Fan Work

Background: Noxious weeds are an increasing problem on national forest system lands. Prevention is an important part of the noxious weed management strategy. Activities that may influence the spread of noxious weeds need to be evaluated as to their effect on noxious weed populations. Disturbed areas along roads have traditionally been a considerable part of the problem for the establishment and continuation of noxious weeds. Also areas disturbed by fire are also susceptible to invasive weed spread.

Problem: After wildfire, sites are devoid of vegetation and have harsh conditions which favor the establishment of noxious weeds. Weeds may have been present before the fire, and disturbed areas have a bank of noxious weed seeds which are likely to flourish after the sites are exposed by fire. The applied non-native seed was determined to come from *Certified* wheat seed producers, but still may contain other species, including *farm weeds*.

Objective: Determine if noxious weeds are present in the Domke Lake Fire, specifically in the burned areas and along the disturbed portions of Forest Road 8301. If noxious weeds are present, treatment would follow approved practices and procedures for this area.

Past Work: Past noxious weed inventories have been completed for some roads in the Domke Lake Fire area, although not all areas have been recently inventoried.

Collected Data: The number and species of known noxious weed plants will be collected in the 2007 Domke Lake Fire burned areas. Data will be adjusted for known past infestations of noxious weeds.

Sampling Locations: All disturbed road areas and burned areas on the Lucerne Fan within the boundaries of the Domke Lake Fire will be visited. Sites are on roads.

Sampling Procedure: To be developed with the Wenatchee Forest Sciences Lab.

Sampling Frequency: Data will be collected in July 2008 and July 2009. Sites will be visited each year.

Data Analysis: Numbers of noxious weeds found will be arrayed and located for future treatments.

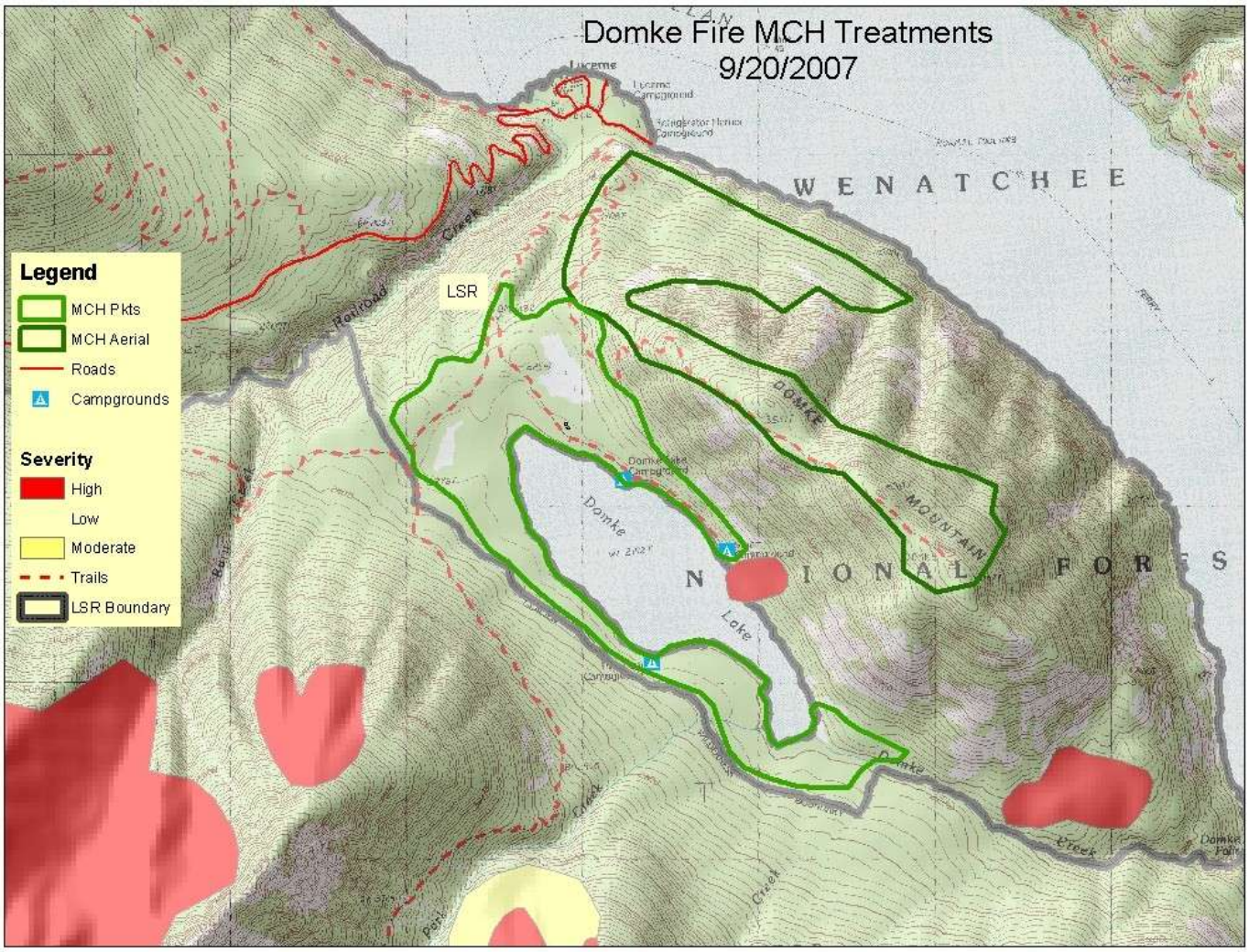
Quality Control: to be established with the Forest Sciences Lab.

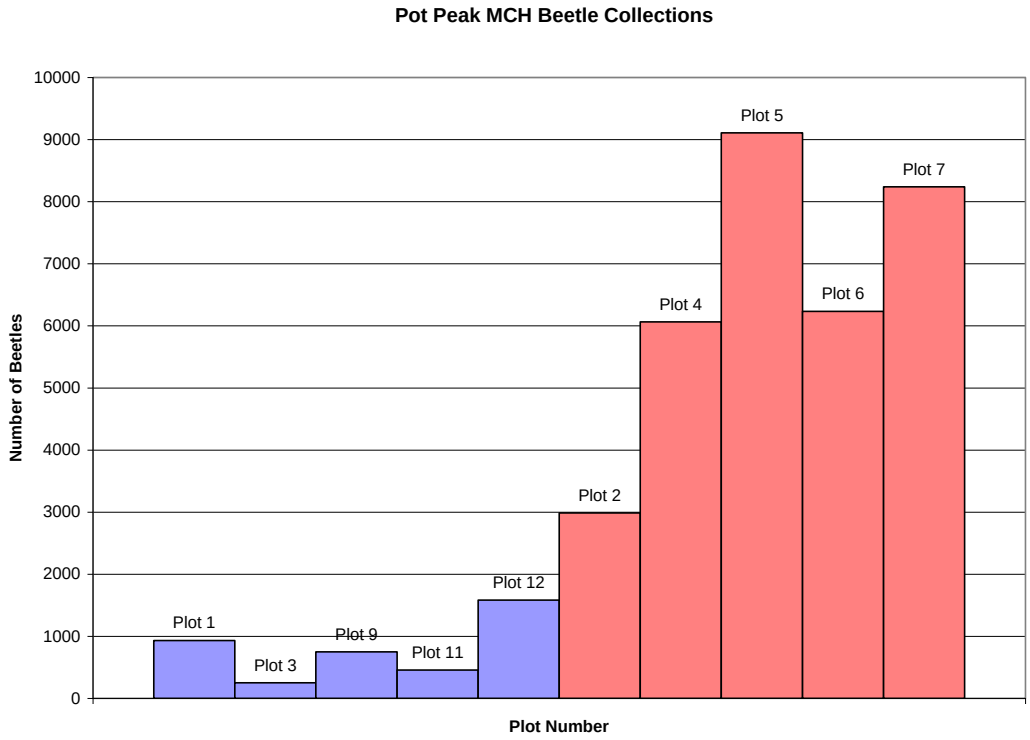
Responsibility for Monitoring: The Chelan RD Botanist will be responsible for monitoring.

Report Completion, Location and Responsibility: The report will be completed by the Chelan RD Botanist in the fall of 2009, with in interim report completed by September, 2008. The report will be located at the Chelan Ranger District, with a copy in the Okanogan and Wenatchee NFs HQ Domke Lake BAER project file. Additionally, any known noxious weed populations located from this monitoring will be stored in the NRIS Terra module as part of the noxious weed data base for the Okanogan and Wenatchee NFs.

Appendix D

MCH Treatment Areas





The above chart shows the relative success of keeping bark beetles from attacking trees within the Pot Peak/Sisi Ridge wildfire complex (Mehmel, 2006). The MCH treated plots (blue bars) had a much lower number of beetles in the burned stands, compared to untreated stands(pink bars). It appears the difference is 2 to 5 times more beetles in the untreated stands. MCH appears to be effective at keeping beetles out of stands. This implies fewer beetles' means fewer trees will be killed by beetles, so the trees survive longer and contribute to the LSR and Spotted Owl habitat (Gillette et al., 2007)

Appendix E

References and Literature Cited

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