Date of Report: 5/31/07

BURNED-AREA REPORT
(Reference FSH 2509.13)

PART I - TYPE OF REQUEST

A. Type of Report

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

B. Type of Action

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

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

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

PART II - BURNED-AREA DESCRIPTION

A. Fire Name: Ham Lake

B. Fire Number: MN-SUF-070090

C. State: MN

D. County: Cook

E. Region: 09

F. Forest: Superior

G. District: Gunflint

H. Fire Incident Job Code: P9DER5

I. Date Fire Started: May 5, 2007

J. Date Fire Contained: 100% as of 5/19/07

K. Suppression Cost: $10,653,250 as of 5/23/07

L. Fire Suppression Damages Repaired with Suppression Funds

Fire line rehab (hand line, hose line and dozer line) by pulling debris back over the line and camouflaging/blackening stumps and cut ends, pulling any helispot or repeater flagging and markers, and dismantling and scattering wooden helicopter landing pads.

M. Watershed Number:

HUC6	HUC_NAME
090300010105	Extortion Creek
090300010102	Chub River
090300010201	Gunflint Lake
090300010202	Granite River
090300010204	Seagull River, Lower
090300010203	Seagull River, Upper
090300010206	Rose Lake

090300010803 Brule River, North Fork - Upper
090300010804 Brule River, North Fork - Lower

N. Total Acres Burned: 75,443 (including Canada);**36,443 acres** (United States)
NFS Acres(29,064)

O. Vegetation Types: Predominantly jack pine, and aspen-birch, with scattered red and white pine in uplands; spruce-fir, lowland conifers, and lowland shrubs

P. Dominant Soils: All soils in the burn area are derived from glacial drift over bedrock. Soils that are shallow to bedrock dominate the area, making up between 60-80% of the soils. Slopes are moderate (10 to 30 %) to steep (20 to 60 %, although typically on the lower end of this range)) over most of the burn area. Soil surface textures are generally loamy tills and sandy outwash. Organic layer depths are highly variable. An organic layer of two to three inches deep would normally occur in ridge top and upper slope positions whereas four to six inch average depths of duff may occur in lower slope positions and wetter areas. Gravels, cobbles and rock fragments make up significant portions of the soil profile in the upland soil groups. Exposed rock and bedrock varies with LTA and slope position but it can be as high as 30%. Soils are generally well-drained. Water movement in the soils is as interflow during the frost free and snow free periods.

Approximately 7 % of the Ham Lake Fire lies within 212La13 - Gabbro Lake Shallow Moraine LTA. Dominant ELT's are: ELT 2, ELT 6, ELT 16, ELT 17 and ELT 18.

Approximately 11% of the Ham Lake Fire lies within 212La14 - Rove Slate Shallow Moraine. Dominant ELT's are: ELT 1, ELT 2, ELT 6, ELT 9, ELT 11, ELT 13, ELT 14, ELT 16, ELT 17 and ELT 18.

Approximately 61% of the Ham Lake Fire lies within 212La21 – Saganaga Lake Formation. Dominant ELT's are: ELT 1, ELT 2, ELT 6, ELT 11, ELT 14, ELT 16, ELT 17 and ELT 18.

Approximately 7% of the Ham Lake Fire lies within 212La22 - Poplar Lake Shallow Ground Moraine. Dominant ELT's are: ELT 6, ELT 11, ELT 16 and ELT 17.

Approximately 15% of the Ham Lake Fire lies within 212La23 Ely - Knife Lake Formation . Dominant ELT's are: ELT 13, ELT 14, ELT 16 and ELT 17.

Q. Geologic Types: The burn area has a variety of rock types that influence topography and soil development within the Vermillion Geomorphic Province. Generally, the burn area is comprised of Saganaga granodiorite intrusives, Knife Lake Group argillite, slate, phyllite, biotite schist, and metagraywacke, Knife Lake Group conglomerate and felsic metavolcanics, metabasalt with some metadiabase rocks, and Duluth Complex tractolite and anorthosite. The area mainly has bedrock outcrops and shallow soils. The most pronounced structure is a fairly well developed set of faults with directions of failure trending to the NW and NE. The faults provide zones of weakness that have been exploited by weathering and glacial erosion, creating lake basins. Large lakes tend to be located at the junctions of faults or groups of faults.

R. Miles of Stream Channels by Order or Class: Lake connector (56.9 mile), wetland connector (10.9 miles), perennial stream (38.5 miles).

S. Transportation System

Trails: 33.7 miles Roads: 30.3 miles

PART III - WATERSHED CONDITION

A. Burn Severity (acres): 10,950 (low) 8,917 (moderate) 920 (high - Includes exposed rock) (Total = 20,787 acres). *Note: the balance acreage within the burned area perimeter is comprised of approximately 7,000 lake acres and approximately 8,650 unburned acres.

B. Water-Repellent Soil (acres): 0

C. Soil Erosion Hazard Rating (acres): N/A
___ (low) ___ (moderate) ___ (high)

D. Erosion Potential: N/A tons/acre

E. Sediment Potential: N/A cubic yards / square mile

*No emergencies were found to be related to watershed and soil conditions, therefore calculation of post-fire erosion and flooding was not conducted for parts III and IV. See Part V and the specialist report for more discussion.

PART IV - HYDROLOGIC DESIGN FACTORS

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

B. Design Chance of Success, (percent): N/A

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

D. Design Storm Duration, (hours): 6

E. Design Storm Magnitude, (inches): 1.6 – 1.8

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

G. Estimated Reduction in Infiltration, (percent): N/A

H. Adjusted Design Flow, (cfs per square mile): N/A

PART V - SUMMARY OF ANALYSIS

A. Describe Critical Values/Resources and Threats:

Background

The Ham Lake Fire burned 36,443 acres of Superior National Forest System Lands in and around the Boundary Water Canoe Area Wilderness. The BWCAW and other surrounding National Forest lands is a mosaic landscape characterized by numerous lakes, separated by areas of uplands interspersed with wetlands, intermittent and perennial stream channels. Much of the area contained downed and dead trees due to a significant wind storm that occurred in the BWCAW on July 4, 1999. While still under investigation, the Ham Lake Fire is currently believed to have been started by an escaped campfire. The fire spread rapidly and was fueled by the dead and downed trees from the July 4, 1999, wind storm.

Vaules At Risk – Emergency Determination

BWCAW Campsites and Developed Campgrounds
The Ham Lake Fire impacted various recreation resources and facilities. Specifically, the fire partially or completely burned over 47 wilderness campsites, portions of three wilderness portages and other trails, portions of the Trails End Campground (including seven sites), and completely burned over the Iron Lake Campground.

In most of the BWCAW, visitors are only permitted to camp in designated campsites with a latrine and fire grate, with no dispersed camping allowed. Visitors can't simply "camp somewhere else" when a site is damaged by wildfire or other natural disasters. Therefore, a post fire emergency exists as visitors may camp in existing sites under unsafe conditions (i.e. hazard trees) or in an unauthorized campsite without proper waste containment.

The Ham Lake Fire also created the following less immediate, but still "emergency" situations: burned over canoe landings (stability concern) and burned vegetation which could contribute to campsite expansion should the site open before vegetation recovery begins. Any site expansion would be unauthorized and pose a threat to wilderness character in the BWCAW.

The Ham Lake Fire burned through the Iron Lake Campground creating public health and safety risks due to the presence of hazard trees and the expectation that some publics may still try to camp there to access the lake.

The Gunflint Ranger District has eliminated hazards and the post fire emergency created by the fire within the Trails End Campground.

NNIS Plants (NNIP)

Field surveys conducted on the Ham Lake Fire focused on disturbed areas such as roadsides, helispots, dozer lines, and areas that experienced moderate to high fire severity. Objectives during field surveys were to detect NNIP infestations if possible and evaluate risk of NNIP invasion in areas disturbed by fire suppression activities and in low to moderate fire severity burn areas. No new NNIP infestation was detected during field surveys because it was too early in the growing season.

Field investigations confirmed the values at risk. Most of the burned area experienced moderate burn intensity. Moderate burn sites did not have lots of exposed soil, but they did have substantial amounts of exposed bedrock. The shallow soils in and around these areas are vulnerable to weed invasion. Very little tree, shrub, forb, or grass canopy remained throughout the burned area, resulting in full sun exposure which invasive plants typically favor. Given the susceptible habitat that exists and the known weed populations in or near the fire perimeter, weed invasion into these burned areas could occur and result in threats to the values at risk.

Nearly all the dozer line sites were visited. These sites should all revegetate on their own without additional seeding. However, because of the disturbed soils on the dozer line and adjacent known weed populations, there is a risk of NNIP establishment that could further degrade the native plant community.

The potential for NNIP to invade burned and disturbed areas in the Ham Lake Fire threaten the values-at-risk described above and constitute an emergency. Left undetected and unchecked, NNIP populations can grow explosively and can eventually: change plant community composition, displace native plants, cause increased erosion, alter hydrologic regimes, alter nutrient cycling, and in some cases alter fire regimes. Taken together, such changes disrupt ecosystem function. The relatively low levels of weed invasion in the Ham Lake Fire area at present further magnify the critical need to act now to prevent NNIP from increasing.

Heritage Resources

Heritage resources evaluated in the Ham Lake BAER assessment include a combination of historic (e.g. timber and mining era artifacts) and prehistoric sites (e.g. spear points and related artifacts). Post-fire conditions affecting heritage resources on the ground vary by the relative cover from site to site and by the burn severity on a site specific basis. Heritage sites associated with the thinnest soil cover and or burn severity are generally most at risk.

The principle risk to heritage values at historic properties within the burn area results from the burn off of the leaf litter and duff layers which in the past has served to protect surface artifacts from the attention of the

visiting public. Use of campsites and portages co-occupied by historic properties in the burned area by the visiting public will result in a threat of public acquisition of artifacts.

Mining Hazards
While evacuating public visitors from the Kekekabic Trail during the Ham Lake Fire, district personnel discovered unexploded ordinances (dynamite) near 1970's vintage exploratory pits. The status of other potential unexploded ordinances is being evaluated (see treatment narrative).

Also, several deep exploratory mining pits were identified as being exposed following the fire and their barrier fences destroyed. These pits are typically around ten feet in diameter, have vertical or near vertical walls, and are filled with water to an unknown depth.

Values not at risk - No Emergency Determination

Water Quality, Runoff, Soil Erosion and Productivity: BAER soil and water specialists assessed (by air and ground) the effects of the fire on soil and watershed conditions by evaluating surface soil conditions (organic layer consumption, soil heating, and water repellency) and determining the extent and level of burn severity.

Current site conditions are such that emergency rehabilitation treatments to protect the soil and water quality from further erosion or site productivity losses are not needed. Soil properties have not been significantly altered. Soils still have moderate to high infiltration rates, organic litter still exists over most soils, and bare soil areas are relatively small and discontinuous. The exposed surfaces are very rough, due to the coarse surface fragments and residual large woody debris. These features will help in breaking up any surface runoff, limiting the chance of rill or gully formation. The many rocks and cobbles will act as small retention areas to trap soil particles dislodged by raindrop impact and surface runoff, limiting the distance of soil movement that is displaced. Neither mass wasting nor delivery of large amounts of sediment to streams or lakes is expected. Though significant losses of total above ground biomass have occurred over much of the area, these should be viewed as short term losses.

Based on observed conditions within the 2005 Alpine Fire and 2006 Cavity Lake Fire, moderate to severely burned areas are recovering well. Within the Alpine Fire there was some evidence of sheet erosion and short distance soil displacement. However, the rough slope characteristics acted to retain the soil on site. The remaining surface organic matter was still present. Vegetation cover varies from 30-50% on the rockier and more severe burned areas, to nearly 100% in deeper soil areas. No rill or gully erosion was detected.

Overall, the affects of the fire on soil and water resources has been mitigated by the combination of moist soil conditions that are typical during the spring, topography (i.e. broken/discontinuous, short and gentle slopes) and the fast moving nature (wind-driven) of the fire, which resulted in a low residence burn time. Additionally, much of the fire burned in a mosaic pattern across the landscape. The final conclusion of the soil and watershed team members is that there is no watershed emergency.

Fisheries Populations, Habitat and Aquatic NNIS: Fish populations, habitat, riparian areas, and wetlands were not considered to be values at risk. It was determined post-fire water quality impacts to nearby surface waters and the possible negative effects to fish populations and habitat was low within both low and moderate burn severity areas. Overall impacts to riparian areas and wetlands were generally considered low to moderate although effects varied among sites. Based upon observations in the Alpine Lake and Cavity Lake burned areas, it was determined that the Ham Lake Fire would have no long-term negative effects to fishery resources.

Roads and Stream Crossings: Road and stream crossing conditions were assessed by watershed and engineering BAER team members on May 18 and 19. Specifically, they looked at the influences of burn severity upstream from road crossings, channel characteristics, and culvert conditions (including size) to assess the potential for culverts becoming plugged and causing washouts following storm runoff. They concluded that areas immediately upstream from road-stream crossings were not burned severely enough to

generate increased runoff or source materials sufficient to plug culverts and that existing culverts were sufficiently sized to handle expected flows and debris.

Wildlife and Sensitive Plant Populations and Habitat:
We have given greatest consideration to the two threatened species, bald eagle and Canada lynx, because of their federal status as threatened species and to our 87 Regional Forester sensitive species. It is our opinion that no plant or wildlife resources, including the threatened or sensitive species, are at risk. In the BWCAW portion of the fire this is because changes to habitat, including those that may negatively impact species in the short term (that is, until species' habitat is reestablished through vegetation succession, anywhere from weeks to decades later), are consistent with the desired conditions for wildlife in a wilderness setting. Outside the BWCAW, Plan direction anticipated natural disturbance caused by fire and promotes (as desired condition) habitats altered by fire and populations that may fluctuate in response. Eagles continue to nest and one new nest was found within the fire perimeter. Canada lynx will continue to use the area and will be able to take advantage of expected increases in snowshoe hare and other small prey animals as burned areas recover. Short term effects will favor species preferring open areas and fruit-eating wildlife species. Based upon observations in the Alpine Lake and Cavity Lake burned areas and the early season for plant growth, it was determined that the Ham Lake Fire would have no long-term negative effects to wildlife and sensitive plant resources. The U.S. Fish and Wildlife Service, through consultation with biologist Susan Oetker, concurred with our determination that no emergency related to threatened or endangered species exists due to the Ham Lake Fire, and no actions are needed. She also concurred that proposed emergency measures for other resources would not adversely affect eagle or lynx.

B. Emergency Treatment Objectives:

Wilderness Campsites and Developed Campgrounds
Objectives include: (1) to protect public health and safety from falling trees or dangerous obstacles in or near campsites, trails/portages and campgrounds, and to limit public access to protect treated or recovering areas; (2) to minimize unacceptable exposure to latrine contents; (3) to inform and/or warn the public of conditions or dangers resulting from the fire, including hazard trees, dangerous obstacles, and burned latrines; and (4) to assure sites that are closed temporarily remain unused and to conduct late season monitoring to determine future site treatments or the need for continued closures.

NNIP
The primary objective is to identify the risk (via presence/absence monitoring) of NNIS invasion to susceptible areas such those with moderate burn intensities, exposed bedrock, south-facing slopes, dozer line, BWCAW campsites, and helispots. If NNIS species are detected, a second objective would be to treat and prevent further expansion. If treated and eradicated in 2007 then monitoring would be proposed for 2008 to assess effectiveness.

Heritage Resources
The objective is to protect heritage sites near campsites for one year to allow vegetation regrowth and soil stabilization in order to visually obscure surface artifacts from BWCAW visitors.

Mining Hazards
The objective is to protect public health and safety by reducing exposure to explosive materials and open pits, and by informing the public of the potential hazards.

C. Probability of Completing Treatment Prior to Damaging Storm or Event:

Land **n/a** % Channel **n/a** % Roads/Trails **n/a** % Protection/Safety **n/a** %

D. Probability of Treatment Success

	Years after Treatment		
	1	3	5
Land	90	90	90
Channel			
Roads/Trails			
Protection/Safety	90	100	100

E. Cost of No-Action (Including Loss): $700,000+

Campsites/Campgrounds
Use of campsites, legal or not, that have safety hazards could likely result in injury or death. This is difficult to put a cost on. However, eventual site work and rehab work needed on newly created unauthorized sites could easily approach **$50,000** in the next year.

NNIP
The cost of eradicating an NNIS infestation could easliy approach 5 times the cost of detection requested in this report or **$150,000.** There is also the cost of the potential loss of wilderness character and ecological function due to a significant infestation of NNIS.

Heritage
Loss of artifacts due to vandalism. **$500,000** (best estimate…loss is irreplaceable)

Mining Hazards
Use of area with hazards could result in injury or death.

F. Cost of Selected Alternative (Including Loss):

Campsite/Campground Safety and Closure Patrol: **$42,020**

- Campsite Safety
  - Crew salary =$19,000
  - Crew per diem =$ 2,820
  - Wilderness Latrines $300/each x 28 =$ 8,400
- Closure Patrol
  - Crew time and per diem, (2 people, 24 days) =$ 7,800
- Iron Lake CG Closure
  - Gate Installation =$ 4,000

NNIP Detection and Eradication: **$ 7,310**

- 40 person days crew time =$ 4,880
- Per diem 30 days =$ 930
- NNIP report =$ 650
- Weed spray contract (2 ac @ $425/ac) =$ 850

Heritage Site Protection:

- costs are incorporated into campsite work above

Mining Hazards: **$ 2,450**

- Explosives Search and Disposal
  - Search done using assessment code.
- Pit Fences

- 10 person days crew time =$ 1,250
- Materials for 5 fences =$ 1,050
- Materials for warning signs =$ 150

Total: **$51,780**

G. Skills Represented on Burned-Area Survey Team:

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

Team Leader: Luke Rutten; lrutten@fs.fed.us; 218-335-8666

Co-Team Leader: Larry Sandoval; lwsandoval@fs.fed.us; 715-276-6333

H. **Treatment Narrative:**

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

Land Treatments:

NNIP:
The objective is to locate and eradicate new populations of NNIP. The inventory would be conducted with seasonal biological technicians who have been trained to identify NNIP. The inventory would focus on the following areas:

- All approximately five miles of fire line
- Three helispots, ICP, and base camp within the fire perimeter
- BWCAW campsites and portages on Saganaga and Granite River within burned area
- Random sampling into moderate severity burn areas

Any NNIP that are found would be record with GPS. New NNIP sites outside the BWCAW would be added to an existing weed spray contract by a contract modification. For the purpose of budgeting, approximately two new acres of weed infestation related to the fire and fire suppression activities outside the BWCAW is anticipated. Inside the BWCAW, any new NNIP sites found would be hand pulled and eradicated. It would be more cost effective to treat these sites now rather than to treat any new sites that may spread from them.

Channel Treatments: N/A

Roads and Trail Treatments: N/A

Protection/Safety Treatments:

Wilderness Campsites and Developed Campgrounds:
Ensuring user safety at BWCAW campsites and Iron Lake campground will include: (1) Campsite closures (temporary and/or long-term) – the sites will be closed via signing (on-site and at entry point) and possible flagging at dangerous locations (i.e.; unmarked latrine hole, hazard trees, etc.) and with wilderness ranger patrolling. When closing a campsite, the objective is to return the area to a natural appearance or to the acceptable campsite standards and to prevent campsite expansion. Canoe landing erosion will be stabilized

with native materials (rock “check dams” and log waterbars) and will be visually unobtrusive. Compacted soil should be tilled to develop an acceptable seedbed for vegetation in areas determined unnecessary for use; (2) There are burned, leaning, and jack-straw trees across the campsites, latrine trails and latrines. Because these trees constitute an urgent significant hazard, removal is necessary. Hazard trees may be cut with a cross cut saw or dispersed via explosives; (3) Latrine placement – replace burned over latrines to accommodate mandatory campsite use for visitors and/or employees using the area to prevent unsanitary conditions contributing to public health and safety issues. New holes may need to be established as burned over holes may collapse; (4) Iron Lake campground will be gated and closed until further notice not allowing camping in any portion; (5) Signing – information and education signs at ranger districts, Forest kiosks, wilderness entry points, local business locations (outfitters, cooperators, etc.); (6) Site patrols - Sites will be patrolled to prevent visitor camping and to track the progression of campsite recovery due to closures to ensure objectives are being met. Patrolling may include photo points, quantitative vegetation data collection, and general ground surveys.

Heritage:
Temporary closure of campsites will help protect sites near those closures. Also, material cleared from sites for ensuring campsite safety will be directed to be placed on nearby heritage sites in order to increase cover of those sites and make them less visible to visitors. Finally, heritage sites located near open campsites and portage trails will be observed in 2007 to determine if the sites are easily visible to visitors and if they are being impacted by vandalism.

Mining Hazards:
The Kekekabic Trail no longer has warning fences around old mining pits due to the fire and must be rebuilt.

To assess the danger of potentially unexploded ordinances, the area surrounding old exploratory mining pits along the Kekekabic Trail was assessed on May 25, 2007 (via air and ground) by Jon Hakala Superior NF explosive technician, other Superior NF personnel, and an explosives contractor. The assessment did not find any remaining explosive material. Therefore, it has been determined that there is no immediate threat to the health and safety of Kekekabic Trail users.

I. **Monitoring Narrative:**

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

See discussion under NNIP and Heritage for discussion of detection and observation work that will occur during first year. If treatments occurs, a detailed monitoring plan will then be submitted for work in year 2.

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

			NFS Lands				Other Lands			All
		Unit	# of		Other	# of	Fed	# of	Non Fed	Total
Line Items	Units	Cost	Units	BAER $	$	units	$	Units	$	$
A. Land Treatments										
Campsite Safety	each	21820	1	$21,820	$0		$0		$0	$21,820
Closure Patrol	each	7800	1	$7,800	$0		$0		$0	$7,800
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Land Treatments				$29,620	$0		$0		$0	$29,620
B. Channel Treatments										
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Channel Treat.				$0	$0		$0		$0	$0
C. Road and Trails										
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Road & Trails				$0	$0		$0		$0	$0
D. Protection/Safety										
Latrines	each	300	28	$8,400	$0		$0		$0	$8,400
Iron Lk CG Closure	each	4000	1	$4,000	$0		$0		$0	$4,000
Mining pit fences	each	490	5	$2,450	$0		$0		$0	$2,450
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Structures				$14,850	$0		$0		$0	$14,850
E. BAER Evaluation										
				---			$0		$0	$0
Insert new items above this line!				---	$0		$0		$0	$0
Subtotal Evaluation				---	$0		$0		$0	$0
F. Monitoring										
NNIP Detect and Erad	each	7310	1	$7,310	$0		$0		$0	$7,310
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Monitoring				$7,310	$0		$0		$0	$7,310
G. Totals				$51,780	$0		**$0**		**$0**	**$51,780**
Previously approved										
Total for this request				**$51,780**						

PART VII - APPROVALS

1. /s/ Pamela E. Brown (for)
JAMES W. SANDERS 5/31/07
Forest Supervisor (signature) Date

2. /s/ Forest L. Starkey (for) 06/04/2007
Regional Forester (signature) Date