United States Department of Agriculture | **Forest Service** | **Northern Region** | **200 E. Broadway, P.O. Box 7669, Missoula, MT 59807**

File Code: 6520/2520-3 **Date:** September 14, 2000
Route To:

Subject: Crooked Fire, Burned Area Emergency Rehabilitation (BAER)

To: Forest Supervisor, Clearwater National Forest

Enclosed is the approved Initial Burned Area Rehabilitation (BAER) for the Crooked Fire. You are authorized to spend up to $81,715 for the assessment, land treatment and monitoring activities shown in Part VI of the report. Your monitoring request has been adjusted to limit expenses to those watersheds receiving treatment. In addition, only one year of monitoring can be approved at this time. For out year monitoring needs, you must resubmit a Final Accomplishment Report (FS-2500-8) request that builds on results and needs based on previous monitoring.

The job code for this action is SULT. Please provide me with your FS 2500-8, describing actual costs and accomplishments, within 60 days of project completion. Based on your monitoring schedule, a monitoring report is due by November 1, 2001. Contact Bruce Sims (406-329-3447) if you have any questions.

/s/ Kathleen A. McAllister

KATHLEEN A. MCALLISTER
Deputy Regional Forester

Enclosure

fsfiles/unit/wwfrp/2500/2520-protection management/crooked_baer_approval_janet lulmer:janet:091300
I concur:
I concur:

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

Date of Report: September 11, 2000

BURNED-AREA REPORT
(Reference FSH 2509.13)

PART I - TYPE OF REQUEST

A. Type of Report

[X] 1. Funding request for estimated WFSU-SULT funds
[ ] 2. Accomplishment Report
[ ] 3. No Treatment Recommendation

B. Type of Action

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

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

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

PART II - BURNED-AREA DESCRIPTION

A. Fire Name: Crooked

B. Fire Number: P18502

C. State: Idaho

D. County: Idaho

E. Region: One

F. Forest: Clearwater

G. District: Lochsa Ranger District

H. Date Fire Started: July 28, 2000

I. Date Fire Contained: September 6, 2000 at 1800

J. Suppression Cost: $5,200,000

K. Fire Suppression Damages Repaired with Suppression Funds
1. Fireline water barred (miles): 8.6 Miles. This includes 4.5 miles of handline water barred and 4.1 miles of dozer line obliterated.
2. Fireline seeded (miles): 4.1 Miles.
3. Other (identify):

L. Watershed Number: 170603033910 (17060303391070, 17060303391080)

M. Total Acres Burned: 4,892

NFS Acres (2,592)[1] Other Federal (81)[2] State ( ) Private (2,219)[3]

N. Vegetation Types: Western White Pine (0.4%), Western Larch (3.8%), Douglas Fir (26.7%), Grand Fir (6.1%), Lodgepole Pine (22.3%), Sub-Alpine Fir (34.9%), Ponderosa Pine (0.3%), Mountain Hemlock and Sub-Alpine Fir (1.4%), Non-forested (4.1%).

O. Dominant Soils: Soils in the fire area are shallow to moderately deep. Textures are generally loams and sandy loams in the fine-earth fraction with many soils being skeletal (loamy-skeletal, sandy-skeletal) due to frost-churning weathering processes and shallow depths. Upper elevation areas were covered by a glacial icecap during the late Pleistocene period. This resulted in the deposition of unsorted glacial materials in numerous locations. Dominant parent materials are Idaho Batholith granitics, Belt Series sedimentary rocks, and Border Zone metamorphosed rocks. The Mazama volcanic ash layer is uncharacteristically absent in most of the fire area, occurring only as a shallow (up to 6" thick) layer in the northern portion of the fire on frost-churned ridge landforms. It is surmised that the ash layer has eroded after previous wildfires and subsequent storm events. Temperature regimes are frigid in the lower elevations, stream bottoms, and warm aspects (south and west) and cryic at higher elevations and cool aspects (north and east). Moisture regimes range from xeric on dry, breakland landforms to udic on gentler landforms with deeper soils. Mineralogy is mixed. Dominant subgroups are Typic Cryochrepts and Typic Dystrochrepts. Soil erosional hazards range from low to high, dependent primarily on geology and landform. Steep landforms result in high to very high sediment delivery efficiencies across much of the area. (See attached landtype map that contains landform, geologic parent material, soil, and vegetation classification units).

P. Geologic Types: Geology is a mixture of Idaho Batholith granitics, Border Zone metamorphic rocks (Wallace Formation), and Belt Series quartzites (Mount Shields Formation). Glacial deposits are present at higher elevations as is a shallow (up to 6" thick) layer of Mazama volcanic ash. The ash layer is absent or mixed over the remainder of the area with rocky soils to the surface.

Q. Miles of Stream Channels by Order or Class: Class One (Fish bearing streams) = 9.9 Miles. Class Two (Non-fish bearing perennial streams) = 14.7 Miles. Total = 24.6 Miles.

R. Transportation System:

Miles of Trails and Roads

	Trails	Roads	Total
NFS	0.34 Miles	13.07 Miles	13 Miles
Private	0.0 Miles	20.79 Miles	21 Miles
Total	0.34 Miles	33.86 Miles	34 Miles

PART III - WATERSHED CONDITION

A. Burn Severity (acres): (See attached map)

Low: 2,555 (52.2%) Moderate: 2,183 (44.6%) High: 154 (3.1%)

[1] Clearwater National Forest, Idaho
[2] Lolo National Forest, Montana
[3] Plum Creek Timber Company. 2,180 acres in Idaho and 39 acres in Montana.

Burn Intensity by Ownership - %

Watershed	Ownership	Low Intensity %	Moderate Intensity %	High Intensity %
Crooked Fork[4]	Forest Service	65.0	33.2	1.8
	Plum Creek	36.9	58.4	4.7
Haskell Creek	Forest Service	88.2	11.5	0.3
	Plum Creek	51.3	48.5	0.2
Rock Creek	Forest Service	59.0	41.0	0.0
	Plum Creek	30.1	65.5	4.4

B. Water-Repellent Soil (acres): 882 Acres (18.0%)

C. Soil Erosion Hazard Rating: (See attached maps)

Mass Wasting Potential 41.7%(low) 42.7% (moderate) 15.5%(high)

Burn Intensity (%) by Mass Wasting Potential Class

Mass Wasting Class	Low Burn Intensity %	Mod. BurnIntensity %	High Burn Intensity %
Low (41.7% of area)	66.0	33.7	0.3
Moderate (42.7% of area)	26.2	66.8	7.0
High (15.5% of area)	88.0	11.7	0.3

Debris Avalanche Potential 49.8%(low) 39.0%(moderate) 11.2%(high)

Burn Intensity (%) by Debris Avalanche Potential Class

Debris Avalanche Class	Low Burn Intensity %	Mod. Burn Intensity %	High Burn Intensity %
Low (49.8% of area)	68.0	31.7	0.3
Moderate (39.0% of area)	46.6	49.3	4.1
High (11.2% of area)	3.0	84.3	12.7

Surface Erosion Potential 56.1%(low) 11.2% (moderate) 32.8%(high)

Burn Intensity (%) by Surface Erosion Potential Class

Surface Erosion Class	Low Burn Intensity %	Mod. Burn Intensity %	High Burn Intensity %
Low (56.1% of area)	48.3	48.8	2.9
Moderate (11.2% of area)	3.0	84.3	12.7
High (32.8% of area)	76.3	23.3	0.4

Sediment Delivery Efficiency 17.9%(low) 31.5% (moderate) 28.0%(high) 22.6%(very high)

[4] Entire Crooked Fire

Burn Intensity (%) by Sediment Delivery Efficiency Class

Sediment Delivery Class	Low Burn Intensity %	Mod. Burn Intensity %	High Burn Intensity %
Low (17.9% of area)	81.1	18.9	0.0
Moderate (31.5% of area)	61.5	38	0.5
High (28.0% of area)	18.8	73.3	7.9
Very High (22.6% of area)	58.6	37.9	3.5

D. Erosion Potential: 0.18 tons/acre[5]

E. Sediment Potential: 134 cubic yards / square mile[6]

[5] WATBAL for Lower Crooked Fork. Post fire produces 56.4 t/mi^2/yr = 112.9 t/mi^2/two years = 0.18 t/acre/two years.
[6] WATBAL for Lower Crooked Fork. Post fire produces 112.9 t/mi^2/two years x 1.19 yd^3/t = 134.4 yds^3/mi^2.

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years):

The effects of the Crooked Fire on recovery of vegetation within its boundaries will vary primarily by the intensity of the burning that took place and the available seed sources. The intensity of the burning has been influenced by both slope and aspect and the resulting vegetative cover (fuel) present when the fire burned.

Low intensity Burn Areas: In areas where the burn intensity was non-existent to low, recovery would be expected to occur within one growing season. Vegetative Recovery is considered be any vegetation which providing more than 80% cover which effectively intercepts rainfall and provides an extensive root mass as defined on page II-26 of the Clearwater National Forest Plan. These low intensity burn areas are expected to maintain adequate live tree stocking levels in most cases. Perennial grasses, forbs, and shrubs generally will resprout after low intensity burns and a duff/litter layer will reform within several years. Tree planting would be planned for some areas (> 3 acres) where fire has removed over 80% of the live tree cover. All areas requiring tree planting will have trees established and free to grow within five growing seasons. Vegetative recovery will vary from 0 to 5 years.

Moderate Intensity Burn Areas: In areas where the burn intensity was moderate up to 80% or more of the trees are expected to die as a direct result of the fire. Continuing mortality should be expected for up to ten years due to root scarring, insect attack, and increased susceptibility to the pathogenic effects of native root diseases. Tree planting will occur on all areas of National Forest Land and on all private land that do not meet minimum stocking levels as set forth in the Idaho Forest Practices Act (Title 38, Chapter, Idaho Code). All areas requiring tree planting will have trees established and free to grow within five growing seasons. Vegetative recovery will vary from 3-15 years. Some of the larger areas that burned at moderate intensity are a long distance from many of the needed seed sources. This will slow the recovery time. Existing seed, stored deeper in the soil, should provide some vegetation regeneration in these areas

High Intensity Burn Areas: In areas where the burn intensity was high nearly all of the trees were killed or are expected to die as a direct result of the fire. Tree planting will occur on all areas of National Forest Land. Tree planting will also be required on all private land to meet minimum stocking levels as set forth in the Idaho Forest Practices Act (Title 38, Chapter, Idaho Code). All areas requiring tree planting will have trees established and free to grow within five growing seasons. Vegetative recovery will vary from 3-20 years. Some of the larger areas burned at high intensity are surrounded by medium intensity burn areas and a long distance from many of the needed seed sources which will slow the recovery time. The heat produced in the high intensity burning in these areas has destroyed much of the existing seed stored in the soil.

One portion of high intensity burn in Section 30, 39 acres is in a location that was determined by field review to have a very high hazard for landslides. Tree mortality has significantly increased the probability of landslides due to the loss of root strength and curtailed evapotranspiration, which removes excess water from the soil. Consequently, the fire has increased the likelihood of mass wasting in this location. To reduce the mass wasting hazard, the establishment of a new stand of trees via planting will have the greatest likelihood of success. As the new stand develops a new root mat will develop stabilizing the site and evapotranspiration will increase as the trees grow. Within 15 to 20 years, the landslide hazard should be reduced to pre-burn levels.

Vegetative Recovery Period - Years

Burn Intensity	Total Acres	Acres on National Forest	Private Land Acres	Reforestation Period	Vegetative Recovery Period *

None to Low	2,555	1,738	819	0-5 years	**0-5 years**
Medium	2,183	887	1,296	3-5 years	**3-15 years**
High	154	48	104	3-5 years	**3-20 years**
Total	4,892	2,673	2,219		

*Vegetative Recovery is considered be any vegetation which provide >80% cover which effectively intercept rainfall and provides an extensive root mass.

B. Design Chance of Success, (percent): 80%

C. Equivalent Design Recurrence Interval, (years): 25 Year

D. Design Storm Duration, (hours): 24 Hours

E. Design Storm Magnitude, (inches): 3.40 Inches

F. Design Flow, (cubic feet / second/ square mile): 27.8 cfsm[7]

G. Estimated Reduction in Infiltration, (percent): 20%

H. Adjusted Design Flow, (cfs per square mile): 40.5 cfsm[8]

PART V - SUMMARY OF ANALYSIS

A. Describe Watershed Emergency:

The Crooked Fire burned 4,892 acres in the Crooked Fork Creek watershed. Major burned tributaries include Haskell Creek (1,748 acres-mostly low to moderate intensity burn) and Rock Creek (1,343 acres-mostly moderate to high intensity burn). Ownership within the burn is 2,673 acres NFS (54.6%) and 2,219 acres of Plum Creek Timber Company land (45.4%). There is no residential property within the burned area.

The watersheds are important for both timber production and watershed management so soil productivity is a critical component of this report. Haskell and Rock creeks are occupied by westslope cutthroat trout and are open to steelhead trout and bull trout. Westslope cutthroat trout, steelhead trout, bull trout, and chinook salmon occupy crooked Fork Creek. This is a very important spawning and rearing stream for these species. Steelhead and bull trout are listed as threatened under ESA. Spawning chinook salmon were observed within the fire boundary.

A total of 154 acres (3.2%) burned at high intensity. These areas generally had high to extreme hydrophobic conditions. Moderate intensity burn covered 2,183 acres (44.6%). These burned areas generally developed minor hydrophobic conditions. Low intensity burn areas covered 2,555 acres or 52.2% of the fire area.

Haskell Creek had mostly a low to moderate intensity burn. Using the WATBAL model, we have determined that sediment production will increase from 48% to 104% over natural in the Haskell Creek watershed as a result of the fire. We also estimate that peak flow will increase from 8% to 16% over natural. Based on the burn intensity and the expected sediment production and increase in peak flows, it is our judgment that treatments in the Haskell Creek watershed are not necessary to maintain soil productivity

[7] Snake River Adjudication data and USGS Magnitude and Frequency of Instantaneous Peak Flow at Gaging Stations in Idaho. 11.31 cfsm bank full flow at the Crooked Fork gage x 2.46 (ratio of Q25 to Q1.5) = 27.82 cfsm.

[8] 3.40" = 91.34 cfsm of rain (25 year storm for 24 hours). Runoff from the design storm is 27.82 cfsm so infiltration is 63.6 cfsm. If infiltration were decreased by 20%, it would be 50.88 cfsm and therefore 40.54 cfsm of runoff.

and downstream water quality. Peak flow and sediment increases will remain within the channels dynamic equilibrium. We do not expect significant impacts to the fisheries resources in Haskell Creek.

Rock Creek had mostly a moderate to high intensity burn. Using the WATBAL model, we have determined that sediment production will increase from 31% to 295% over natural in the Rock Creek watershed as a result of the fire. We also estimate that peak flow will increase from 5% to 20% over natural. Based on the burn intensity and the expected sediment production and increase in peak flows, it is our judgment that treatments are needed in the Rock Creek watershed to maintain soil productivity and downstream water quality. Without treatments, peak flow and sediment increases will most likely exceed dynamic equilibrium and therefore, impacts upon the fisheries resources are expected.[9]

Crooked Fork Creek is a large, energy surplus and sediment deficient stream. The channel and streambanks are inherently stable. Using the WATBAL model, we have determined that sediment production will increase from 7% to 22% over natural in the Crooked Fork Creek watershed (at mouth). We also estimate that peak flow will increase from 2% to 3% over natural. Peak flow and sediment increases from surface erosion in the moderate and high intensity burned areas will not alter conditions in the channel. However, mass wasting events generated by the fire could negatively alter the channel, thus impacting chinook salmon, steelhead trout, bull trout, and westslope cutthroat trout. Emergency treatments in the Crooked Fork Creek watershed and tributaries, where the risk of mass wasting has been increased as a result of the fire is a critical need.

B. Emergency Treatment Objectives:

The emergency treatment objectives will be to maintain soil productivity and downstream water quality to protect the high value fisheries described above. Specifically, we are concerned with the potential for:

1) Flooding in Rock Creek;
2) Loss of soil productivity, surface erosion, and sediment delivery in Rock Creek; and
3) Mass wasting in the tributaries of the Crooked Fork watershed and associated sediment delivery to Crooked Fork Creek.

Treatments designed to reduce the risk of the potential adverse effects of the fire include:

1) Removal of the culvert at Rock Creek and Forest Road 5659 to reduce the downstream effects of flooding;
2) Contour felling of timber in the Rock Creek watershed to maintain soil productivity, and decrease surface erosion, and sediment delivery to Rock Creek; and
3) Planting of trees and contour felling of timber in the high intensity burn areas of the Crooked Fork watershed where the risk of mass wasting is high.

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

Parts of the land treatments include planting trees to reduce the mass wasting hazard. Generally mass wasting events occur on a frequency of once every twenty years. The sooner trees can be planted, the less risk we have of the design storm event producing mass wasting. The trees should be planted in the spring of 2001. There is a 50 percent probability of a fall sediment producing event. The other possible scenario would be a spring snowmelt sediment producing event. If the sediment producing event occurred this fall,

[9] The geomorphic threshold for the Rock Creek watershed is estimated at 185% sediment production over natural. Post fire sediment production is estimated by WATBAL to be 295% over natural.

we may not have the contour felling complete. If it were to occur next spring, most likely, the contour felling would be complete. The land treatment probability is based upon this analysis.

Land **60** % Channel **n/a** % Roads **90** % Other **n/a** %

D. Probability of Treatment Success

Probability of Treatment Success – Years After Treatment

	Years after Treatment		
	1 Year	3 Years	5 Years
Land	\\	\\	\\
Tree Planting[1]	0	20	40
Contour Falling	60	80	80
Channel	\\	\\	\\
N/A			
Roads	\\	\\	\\
Culvert Removal	90	90	90
Other	\\	\\	\\
N/A			

[1] Tree Planting is recommended to reduce the risk of mass wasting. Generally, on the Clearwater National Forest, storm events that produce mass wasting occur on a frequency of once every twenty years.

E. Cost of No-Action (Including Loss): $209,186 (See Appendix A)

F. Cost of Selected Alternative (Including Loss): $103,882 (See Appendix A)

G. Skills Represented on Burned-Area Survey Team:

[X[10]] Hydrology	[X[11]] Soils	[ ] Geology	[ ] Range
[X[12]] Forestry	[X[13]] Wildlife	[ ] Fire Mgmt.	[X[14]] Engineering
[ ] Contracting	[X[15]] Ecology	[ ] Botany	[X[16]] Archaeology
[X[17]] Fisheries	[ ] Research	[ ] Landscape Arch	[X[18]] GIS

Team Leader: Richard M. Jones

Email: rmjones@fs.fed.us Phone: (208) 476-8274 FAX: (208) 476-8329

H. **Treatment Narrative:**

[10] Jed Simon, Lochsa Ranger District Hydrologist
[11] Jim Mital, Forest Soil Scientist/Ecologist.
[12] John Weston, Lochsa Ranger District Silviculturist.
[13] Dan Davis, Forest Wildlife Biologist.
[14] Dean Roach, Road Maintenance Engineer.
[15] Jim Mital, Forest Ecologist/Soil Scientist.
[16] An Archaeologist was not on the team but will examine the proposed treatment areas prior to implementation.
[17] Pat Murphy, Forest Fisheries Biologist and Karen Smith, Lochsa Ranger District Fisheries Biologist.
[18] Donna Bonzagni, Lochsa Ranger District GIS Specialist.

(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:

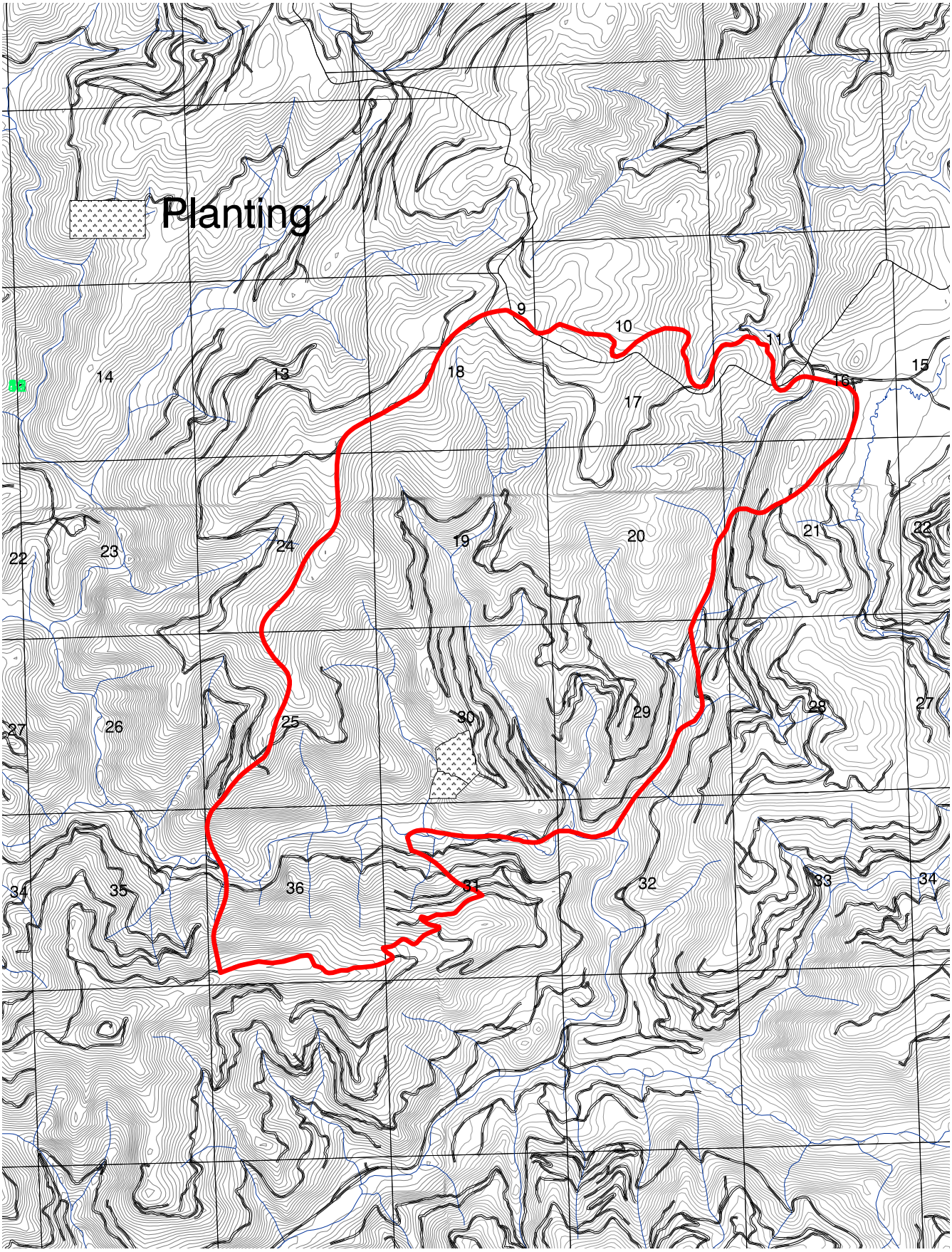
Tree Planting: It is estimated that 2,335 acres will require tree planting within the perimeter of the Crooked Fire. Approximately 935 acres occur on National Forest Land with the remaining 1,400 acres on Plum Creek Timber Lands. Approximately 39 acres of this planting is needed to protect soil and watershed resource values on areas prone to mass wasting where burn intensity was high. All these acres are on National Forest Land. Planting will be done with seedlings of a species typically found on the various habitat types present. Tree spacing will vary from 7' x 7' (889 trees/acre) to 8'x 8' (680 trees/acre) on National Forest Land while Plum Creek timber would likely plant at 15' x 15' spacing to meet the 200 tree/acre minimum for seedlings required by the Idaho Forest Practices Act.

Tree planting on National Forest Land needed to meet National Forest Management Act and/or Idaho Forest Practices Act requirements would be financed by congressionally appropriated money. Needed planting on Plum Creek Timber Lands would be funded by Plum Creek Timber Company. Planting on National Forest Lands needed for watershed protection would be funded with Emergency Watershed Rehabilitation Funds (WFSU). Planting needed to protect watershed values on Plum Creek Timberland within the Crooked Fire may be eligible for Emergency Watershed Protection Funds.

Contour felling of trees is recommend to act as sediment traps in areas close to streams (100 to 400 feet slope distance). Approximately 30 trees per acre between 8 and 14 inches diameter are recommended for contour felling. This would provide approximately 1,500 linear feet/acre of tree bole on the ground to act as sediment traps. Larger diameter trees should be left standing in high intensity burn areas to provide valuable snag habitat and a long-term source of woody material for nutrient cycling. These larger trees will also help keep the fallen trees in place on these extremely steep hillsides. Contour falling of trees is planned on 259 acres to protect watershed values within the Crooked Fire perimeter. Falling of trees should be done prior to tree planting. Funding sources for contour falling of trees would be the same as listed above for planting needed to protect watershed values.

Watershed Treatments Proposed By Ownership – Acres and Costs

	Planting Total (Acres)	Planting for Watershed Protection Only (Acres)	Watershed Protection Planting Cost/Acre (total cost)	Contour Falling for Watershed Protection (Acres)	Contour Falling Cost/Acre
National Forest Land	935	39	$600/acre ($23,400)	145	$300/Acre $43,500
Plum Creek Timber Land	1,400	0	$300/acre ($0)	114	$300/Acre $34,200
Total	2,335	39	$23,400	259	$77,700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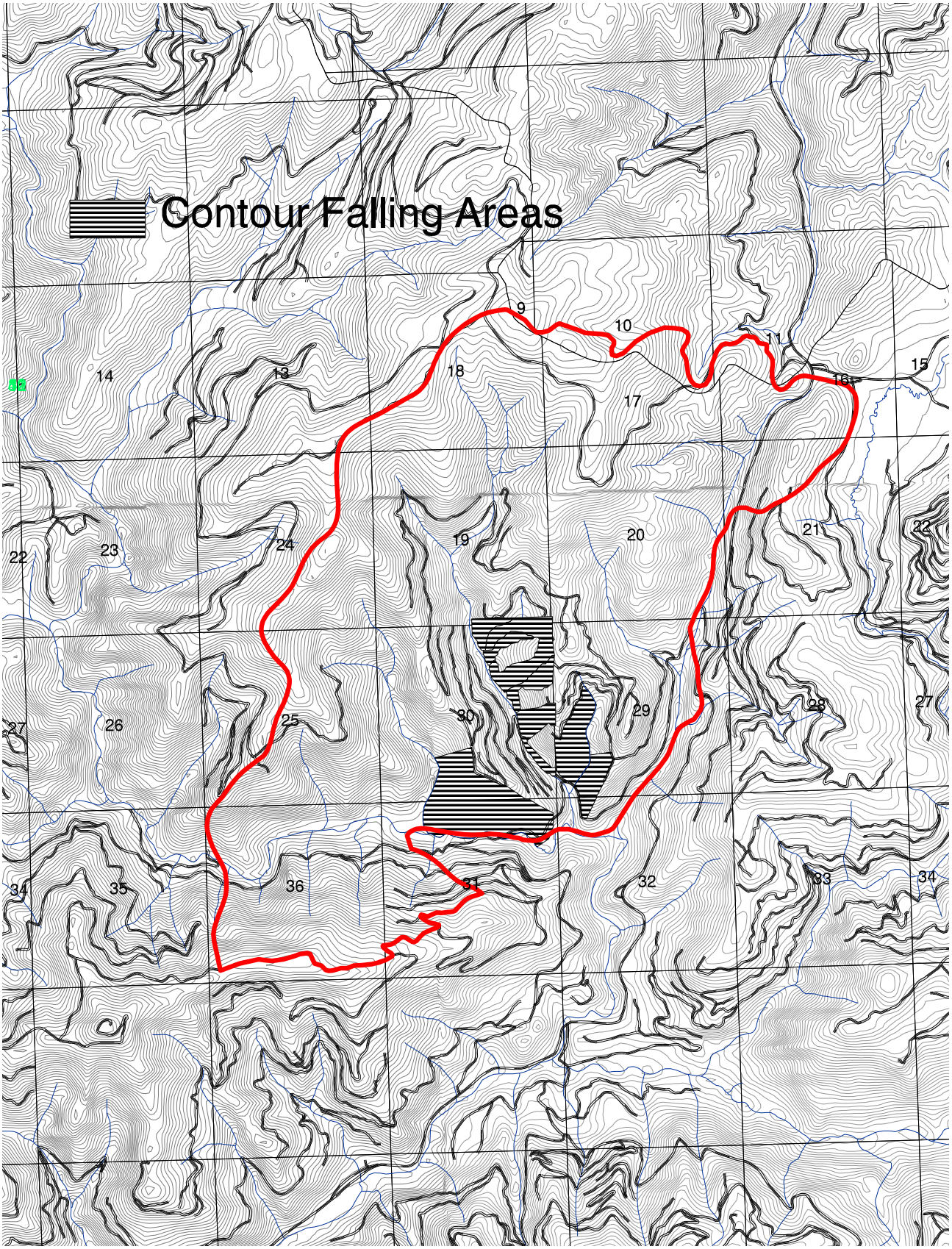
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Channel Treatments:

None

Roads and Trail Treatments:

Removal of culvert at Rock Creek and Road 5659. The Rock Creek watershed is 1,343 acres. There is currently a five foot culvert under Road 5659 that is undersized. This culvert overtopped in the 1995-1996 flood event. The moderate to high intensity fire over much of the Rock Creek watershed will increase peak flows to 20% over natural and thus increase the risk of culvert and fill failure. If the culvert overtops and the road fill fails, there would be a great impacts to westslope cutthroat fisheries in Rock Creek and steelhead trout, spring chinook salmon, and bull trout less than a half-mile downstream in Crooked Fork Creek. Removal of the culvert and road fill would eliminate this risk and thus the risk of potential damage to fisheries as a result of the fire and subsequent peak flow increases. The estimated cost of culvert removal is $5,000.

Structures:

None

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.)

Crooked Fire - Post-fire Burn Area Emergency Rehabilitation Monitoring Plan

Background: From July 28 to September 6, 2000, the Crooked Fire burned in various intensities along a 2.7-mile reach of Crooked Fork Creek within the upper Lochsa River subbasin. The fire perimeter included the entire Rock Creek drainage and nearly 55 percent of the Haskell Creek drainage; the only two fish bearing tributaries of Crooked Fork Creek within the burn area. Recent fish population surveys have documented steelhead trout and bull trout (both threatened species under ESA) within the fire perimeter portion of Crooked Fork Creek. Spring chinook salmon and westslope cutthroat trout also spawn and rear in Crooked Fork Creek. Westslope cutthroat trout was the dominant salmonid documented in Rock and Haskell creeks. However, bull trout were observed in lower Haskell Creek and steelhead trout have the potential to migrate upstream in either stream.

In 1994, the mainstem Crooked Fork Creek was surveyed to determine if riparian, channel morphology and instream characteristics changed from previous surveys conducted in the late 1970's. Similar surveys were conducted on Haskell and Rock creeks in 1996. The surveys were conducted via a contractor that documented the results in two reports. The reports noted that the streams reaches of Crooked Fork Creek have very low amounts of large woody debris and limited pools (fair quality), which can be contributed to the large size of the stream and higher stream energy. However, the substrate conditions and bank stability ratings were rated as excellent. The major spring chinook spawning area for the mainstem Crooked Fork Creek is located within the fire perimeter; Idaho Department of Fish and Game has been monitoring spawning success since the 1960's. While the mainstem Crooked Fork Creek within the fire perimeter provides good to excellent spawning habitat for spring chinook salmon and steelhead trout, high quality winter rearing habitat was determined to be limited due to the lack of high quality pools and large woody debris.

The survey results for the Haskell Creek and Rock Creek drainages indicated that both streams have good levels of large woody debris. The presence of wood reflects the fair (Rock Creek) to good (Haskell Creek) pool quality ratings. Average bank stability ratings were observed to be excellent in both streams.

Substrate conditions were rated as fair to poor in both streams due to excessive fine sediment. While substrate conditions are most likely a function of previous development (roads and timber harvest) in both drainages, the majority of the sediment within the Haskell Creek drainage may be the result of winter sanding operations along US Highway 12.

The impacts of the fire on the aquatic resources are expected to be moderate in Rock Creek and the unnamed Crooked Fork tributary, and low in Haskell Creek. The BAER team conducted onsite reviews of the fire area during August 15-17 and again on August 25, after the majority of the burning occurred within the fire perimeter. Due to fire danger, neither Rock or Haskell creeks were walked, however, observations from numerous vantage points indicated that the fire burned within the riparian area (300 feet either side) throughout the Rock Creek and Haskell Creek drainages. The majority of the burn areas within the riparian zone (especially within the Haskell Creek drainage) was of low intensity and appears to have minimal effects on riparian shade. Riparian vegetation showed relatively higher impacts in the Rock Creek drainage and along the unnamed tributary west of Rock Creek. Immediate and long-term increases in large woody debris levels are expected in these streams. Due to the higher burn intensities within the Rock Creek and unnamed tributary drainages, higher amounts of fire-induced sediments are expected during next spring's runoff event (and possibly this fall dependent upon rainfall intensity).

The impacts of the fire on the aquatic resources along Crooked Fork Creek are expected to be minimal. Dick Jones, Forest Hydrologist and Pat Murphy, Forest Fish Biologist walked the segment of Crooked Fork Creek from Shotgun Creek (upstream of the fire perimeter) to Haskell Creek on August 17, 2000 to assess any existing or potential impacts to Crooked Fork Creek. Within the fire perimeter, the burn area was within the riparian zone (300 feet) along the entire north stream bank. The burn area along the south stream bank was smaller in length and only affected the riparian zone in localized areas. Although most of the 2.7 miles of riparian zone was affected (at least along one stream bank), the fire only burned vegetation to the stream edge for approximately 700 feet (about two percent of the total riparian area). Impacts to streamside shade were mostly limited to these areas. Increased levels of large woody debris due to fire and fire suppression actions were evident as over 30 trees were observed in the stream. Immediate and long-term increases in large woody debris levels are expected along Crooked Fork Creek, especially along the areas the fire burned within 100 feet of the stream. The benefits derived from the additional large woody debris are dependent on the size of the wood and the large hydraulic forces during spring runoff. Due to the large stream size and stream flows, effects of erosion along Crooked Fork Creek or within the tributaries are expected to non-measurable in Crooked Fork Creek.

Proposed Activities:

(1) Monitor riparian and stream conditions via a resurvey of fish bearing streams within the fire area to determine how conditions have changed from the most recent surveys conducted in1994 and 1996. The resurvey would provide information regarding the effectiveness of various erosion abatement projects implemented under the emergency fire rehabilitation. In addition, the surveys will help determine if expected results have been achieved through the decision to not implement emergency treatments. Surveys will be conducted during the summer of 2002 after the fire area has undergone two spring runoff events and one complete summer growing season. Approximately 10 miles of stream is proposed for the survey: Rock Creek drainage – 3.4 miles and Crooked Fork Creek – 2.7 miles. Estimated cost is $11,000.

(2) Monitor sediment movement into streams and resultant changes in substrate conditions via (1) resurveying permanent substrate monitoring transects and (2) establishing additional substrate monitoring transects. Substrate conditions would be documented via standardized methods (Wolman pebble counts and cobble embeddedness measurements) at monitoring transects in lower reaches of Haskell Creek, Rock Creek and the unnamed tributary of Crooked Fork Creek (West of

Rock Creek). Transects in Haskell Creek and Rock Creek have been previously established during the 1996 stream survey and would be measured again prior to the fall rains. Proposed transects in the unnamed tributary as well as transects at two sites along Crooked Fork Creek (downstream of Rock Creek and Haskell Creek) would be established and completed prior to the fall rains. All sites would be re-measured during August-September 2001 and 2002. Estimated cost for the five sites (15 transects) is $10,000.

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

Line Items	Units	Unit Cost	# of Units	WFSU SULT $	Other $	# of units	Fed $	# of Units	Non Fed $	Total $
A. Land Treatments										
Tree planting	Acres	600	39	$23,400			$0	0	$0	$23,400
Contour felling	Acres	300	99	$29,700			$0	114	$34,200	$63,900
				$0			$0		$0	$0
				$0			$0		$0	$0
Subtotal Land Treatments				$53,100			$0		$34,200	$87,300
B. Channel Treatments										
None		0	0	$0			$0		$0	$0
				$0			$0		$0	$0
Subtotal Channel Treat.				$0			$0		$0	$0
C. Road and Trails										
Culvert Removal	Each	5000	1	$5,000			$0		$0	$5,000
				$0			$0		$0	$0
				$0			$0		$0	$0
				$0			$0		$0	$0
Subtotal Road & Trails				$5,000			$0		$0	$5,000
D. Structures										
None				$0			$0		$0	$0
				$0			$0		$0	$0
				$0			$0		$0	$0
				$0			$0		$0	$0
Subtotal Structures				$0			$0		$0	$0
E. BAER Evaluation										
Personnel Costs		18000	1	$18,000			$0		$0	$18,000
Per Diem		315	1	$315			$0		$0	$315
Vehicle Use		300	1	$300			$0		$0	$300
G. Monitoring Plan	Each	5000	1	$5,000			$0		$0	$5,000
H. Totals				**$81,715**			**$0**		**$34,200**	**$115,915**

PART VII - APPROVALS

1. /s/ James L. Caswell — 9/11/00
   Forest Supervisor (signature) — Date

2. /s/ Kathleen A. McAllister — 9/14/00
   Regional Forester (signature) — Date