
BAER Report:
Snow-Talon Fire
Lincoln, Montana
9/9/2003

Snow-Talon Fire

Burned Area Emergency Response (BAER) Report

AGENCY/UNIT: U.S. Forest Service
Helena National Forest
Lincoln Ranger District

LOCATION: Lincoln, Montana

DATE: August 12, 2003

PREPARED BY: BAER Team

Submitted By:_____ **Date:**_____
Bo Stuart, BAER Team Leader, USDA Forest Service.

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PART A FIRE LOCATION AND BACKGROUND INFORMATION

Fire Name	Lincoln-Complex	Date Controlled	10/15/00 (estimated)
Fire Number	MT-HNF-075	Jurisdiction	Acres
Agency Unit	USDA Forest Service, Helena National Forest	NFS	34,362
Region	R1	Other Federal	None
State	MT	State	None
County(s)	Lewis and Clark	Private	3,344
Ignition Date/Manner	08/12/2003 Lightning		
Date Contained	10/15/00 (estimated)	TOTAL ACRES	37,706

PART B NATURE OF PLAN

I. Type of Plan (check one box below)

✓	**Short-term Rehabilitation (Complete Parts A, B, C, and H only)**
	Long-term Rehabilitation (Complete all parts)
	Both Long and Short-term Rehabilitation (Complete all Parts)

II. Type of Action (check on box below)

✓	**Initial Submission**
	Updating or Revising the Initial Submission
	Supplying Information for Accomplishment to Date of Work Underway
	Different Phase of Project Plan
	Final Report (To Comply With the Closure of the EFR Account)

PART C REHABILITATION ASSESSMENT

I. Rehabilitation Objectives:

Following are the primary objectives for the Cave Gulch Burned Area Emergency Rehabilitation Plan as described by the Lincoln District Ranger, Helena National Forest.

- Assess overall watershed changes from the fire, especially those that pose substantial risk to human life, property and critical cultural and natural resources. This includes evaluating changes to soil productivity, hydrologic function and watershed response to precipitation events.
- Identify critical soil and watershed areas and issues related to the Snow-Talon Fire based on increased flash flood or debris flow potential, loss of soil resources, loss of vegetation, increased sediment loading in creeks, and prescribe treatments to mitigate impacts and risks.

- Develop maps of watershed burn severity, soil and vegetation loss and areas (as appropriate) to be treated.
- Estimate potential for flooding and /or debris events in Copper Creek and Landers Fork including measures or strategies to monitor, assess and warn of possible flood event. Identify measures to reduce potential flood or debris flow events.
- Assess and identify rehabilitation efforts needed to stabilize and restore watershed function.
- Identify and assess impacts to fisheries from sediment-associated delivery to streams that would detrimentally affect fish populations and stabilization or restoration measures needed to address impacts.
- Assess potential for natural regeneration of vegetation in burned over areas. Assess and identify areas susceptible to spread of noxious weeds. Assess and identify measures to reduce the spread of noxious weeds in critical areas, and throughout the burn area, over a 2 year period.
- Identify monitoring and future assessment or analysis needs.
- Provide assessment of skills and expertise needed to implement BAER plan.

PART D BAER TEAM LEADERSHIP AND TEAM MEMBERS

I. BAER LEADERSHIP TEAM

MEMBER	AGENCY REPRESENTATIVE
Tom Clifford, Forest Supervisor	Helena National Forest, USDA, FS
Amber Kamps, Lincoln District Ranger	Helena National Forest, USDA, FS

II. BAER TEAM MEMBERS

POSITION	TEAM MEMBER	AGENCY / QUALIFICATIONS
Team Leader	Bo Stuart	Forest Hydrologist, Helena National Forest; 26 years experience; BAER training 1992; BAER Team Leader Thompson Creek Fire, Maudlow-Toston fire, Jimtown Fire; B.S. 1974 MSU, M.S. 1976 MSU
Soils Resources	Sue Farley	Soil Scientist, Helena National Forest/Lewis & Clark National Forest, 26 years experience with Forest Service; BAER experience in R1, R4 and R5; B.S. Soil Science, California Polytechnic State University, San Luis Obispo
Silviculture	Jack Kendley	Forest Silviculturist, Helena National Forest; 29 years experience; B.S. Psychology U. of Oregon, B.S. Forestry U.M.; BAER team on Bitterroot
Forestry	Sharon Scott	Supervisory Forester, Helena National Forest, 15 years experience, B.S. Environmental Biology Fort Lewis College 1988.
Ecology	Lois Olsen	Ecologist, Helena National Forest, 25 years experience, B.S. Agriculture Production MSU, Currently in Masters program MSU
Fisheries	Laura Burns	Fisheries Biologist, Lincoln Ranger District, Helena National Forest; 12 years experience, B.S. Forest Resource Management
Wildlife Biologist	Pat Shanley	Wildlife Biologist, Lincoln Ranger District, Helena National Forest; 12 years experience, B.S. Wildlife Resource Management
Engineering	Bill Badgett	Engineering Technician, Helena National Forest, 33 years experience, now retired
Watershed/Photography	Melanie Scott	Hydrologic Technician, Helena National Forest, 19 years experience as Forestry Tech/Peace Corp/Biological Tech/Hydrologic Tech; B.S. Wildlife Biology, U.M. 1984
GIS Support	Chip Fisher	GIS, Helena National Forest, 6 years experience Ecodata field sampling, 8 years experience GIS Modeling and Analysis, B.S. Forestry U.M. 1993, B.S. Computer Science U.M. 2001.

III. RESOURCE ADVISORS

POSITION	TEAM MEMBER	QUALIFICATIONS
Fisheries	Len Walch	Fisheries Biologist, Helena National Forest; 26 years experience; B.S. Biology U. of Maryland 1971; B.S. Fisheries Science U. of Idaho 1976; M.S. Fishery Management CSU 1979
Fisheries	Archie Harper	District Fisheries Biologist, Helena Ranger District, Helena National Forest; 18 years experience; BAER experience Maudlow-Toston and Cave Gulch fires; BS in Fish and Wildlife
Watershed	Jack Kaiser	Hydrologic Technician, Helena National Forest, 14 years experience; B.A. Geography, U.M. 1980
Range	Moe Geary	Range Technician, Lincoln Ranger District, Helena National Forest; 16 years experience, 30 years experience ranching in Helmville Valley
Recreation	Ernie Lundberg	Forester, Lincoln Ranger District, Helena National Forest, XX years experience
Engineering	Charlie McKenna	Forest Engineer, Helena National Forest, 28 years experience; B.S. Civil Engineering, MSU 1980; M.S. Civil Engineering Oregon State University 1990
GIS	Dennis Heffner	Planning Forester, GIS, Helena National Forest; 30 years experience in planning/GIS; B.S. Forestry 1972 U.M.; MPA Public Administration, U. of Washington 1981.
Cultural Resources	Carl Davis	Forest Archaeologist, Helena National Forest. B.A. Anthropology, University of Montana. M.A. Anthropology, University of Pittsburgh.

United States Department of Agriculture | Forest Service | Washington Office | 14th & Independence SW
P.O. Box 96090
Washington, DC 20090-6090

File Code: 2520-3/6520 **Date:** September 17, 2003
Route To:

Subject: Approval of Interim Burned Area Emergency Rehabilitation Funding – Snow Talon Fire, Helena National Forest

To: Regional Foresters, R-1

We have received your September 15, 2003, interim request for Emergency Burned Area Rehabilitation (BAER) funding for the Snow Talon Fire on the Helena National Forest. The standards for approving emergency actions are found in FSM 2523 and FSH 2509.13.

Your interim request is approved for $606,386 in the following categories as described in Part VI of FS-2500-8.

Land Treatments	$106,909
Hazard Tree Removal	170,153
Trails	49,300
Roads and Trails	250,800
BAER Evaluation	23,604
Monitoring	5,620
Total	$606,386

The plan to replace the Copper Creek culvert with a temporary bridge is approved. Further assessment of need for this bridge is approved. Funding for a permanent structure may need to be other than BAER funds. The weed treatment to prevent expansion of existing populations is approved to the extent that current EIS is in place for these treatments.

The BAER team costs are approved to the extent of actual salary, travel, and per diem cost incurred. Administrative personnel working in support of the rehabilitation survey are considered members of the team. Contracting and administration costs of implementing treatments should be reflected in treatment costs.

Interim reports (requests) may be submitted as needed to describe revised cost estimates or needs. If submitting supplemental funding requests, a brief report of accomplishments to date will aid review of the request. If project implementation is incomplete by September 30, 2003, an interim status report is required by December 10, 2003. If submitting supplemental funding requests, a brief report of accomplishments to date will aid review of the request. This report should reflect all costs and accomplishments during FY 2003. Please send a final FS-2500-8 describing treatment units completed and their costs within 60 days after completing the treatments.

/s/ Seona Brown (for):
JAMES T. GLADEN
Director, Watershed, Fish, Wildlife, Air, and Rare Plants

cc: Bruce D Sims, R1

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

File Code: 2520-3/6520 **Date:** September 15, 2003
Route To:

Subject: Approval Request, Burned Area Emergency Rehabilitation Authorization, Snow-Tallon Fire

To: Chief

Enclosed is the initial Burned Area Emergency Rehabilitation Authorization request for the Snow-Tallon Fire on the Helena National Forest. This fire burned a total of 37,706 acres (34,362 on National Forest). The fire burned in rugged terrain and approximately 26,500 acres was mapped as being high severity burn. Post fire adverse impacts to be mitigated include: bull trout habitat, undersized culverts, noxious weeds, hazard trees and trail drainage. The request is for $606,400.

If you have questions please contact Bruce Sims at (406) 329-3447.

/s/ Kathleen A. McAllister for:
BRADLEY E. POWELL
Regional Forester

cc: Meredith M Webster, Bruce D Sims, Bo Stuart

United States Department of Agriculture | **Forest Service** | **Helena National Forest** | **2880 Skyway Drive Helena, MT 59601 406-449-5201**

File Code: 6520/2520-3 **Date:** September 11, 2003
Route To:

Subject: Snow-Talon Burned-Area Report

To: Regional Forester

Enclosed is the initial Burned-Area report for the Snow-Talon Fire on the Helena National Forest.

This fire has burned 37,700 acres to date of which 34,362 acres are National Forest System lands. Most of the fire has been mapped as high severity. Due to the extensiveness and severity of the burn it is expected that flows will increase significantly following storm events with increased overland flow resulting in accelerated soil erosion, debris flows and flooding.

We are proposing $582,800 worth of treatments and monitoring consisting of the following:

- Road treatments – $250,800
- Hazard tree felling - $170,200
- Noxious weed treatment - $106,900
- Trail drainage - $49,300
- Monitoring - $5,600

Assessment costs came to $23,600 bringing the total to $606,400.

If there are any questions please contact Bo Stuart (406.449.5201)

THOMAS J. CLIFFORD
Forest Supervisor

Enclosure

cc: Bruce Sims

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

Date of Report: 9/11/2003

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: Snow-Talon

B. Fire Number: MT-HNF-075

C. State: MT

D. County: Lewis & Clark

E. Region: R1

F. Forest: Helena National Forest

G. District: Lincoln D-4

H. Date Fire Started: 8/12/2003

I. Date Fire Controlled: 10/15/2003 (estimated)

J. Suppression Cost: $ 14,700,000 as of 9/10/2003

K. Fire Suppression Damages Repaired with Suppression Funds
1. Fireline waterbarred (miles): 27.8 – Dozer, 22.3 - Handline
2. Fireline seeded (miles): 27.8 - Dozer
3. Other (identify):

L. Watershed Number: 170102030502, 170202030501, 170102030501A, 170102030501B

M. Total Acres Burned: 37,706
NFS Acres(34,362) Other Federal ( ) State ( ) Private (3344)

N. Vegetation Types: Subalpine fir/beargrass, Subalpine fir/menziesia, Subalpine fir/grouse whortleberry, Subalpine fir/twinflower, Subalpine fir/woodrush, Subalpine fir/bedstraw

O. Dominant Soils: Typic Cryoboralfs, Typic Cryochrepts, Typic Ustochrepts, Andic Cryochrepts, Mollic Cryoboralfs, Lithic Cryoborolls, Typic Cryumbrepts, Lithic Ustochrepts,

P. Geologic Types: Metasedimentary glacial till; Glacial till and moraines; Argillites, siltites and quartzites; Mixed alluvium

Q. Miles of Stream Channels by Order or Class: 14 mi – 4th Order, 12 mi – 3rd Order, 15 mi – 2nd Order, 52 mi – 1st order

R. Transportation System

Trails: 28.8 miles Roads: 59.6 miles

PART III - WATERSHED CONDITION

A. Burn Severity (acres): 4,180 (low) 1,690 (moderate) 26,500 (high) As of 9/5/2003 Fire is still burning in the wilderness and acres will be updated once fire is considered controlled. Additional acres will not affect what is being proposed.

B. Water-Repellent Soil (acres): 5,900 – Moderate, 25,970 – Low,

C. Soil Erosion Hazard Rating (acres):
10,320 (low) 19,000 (moderate) 860 (high)

D. Erosion Potential: 10 - 50 tons/acre

E. Sediment Potential: 550 cubic yards / square mile

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years): 3

B. Design Chance of Success, (percent): 90

C. Equivalent Design Recurrence Interval, (years): 10

D. Design Storm Duration, (hours): 24 also looked at short duration high intensity storms

E. Design Storm Magnitude, (inches): 2.4

F. Design Flow, (cubic feet / second/ square mile): 11

G. Estimated Reduction in Infiltration, (percent): 16

H. Adjusted Design Flow, (cfs per square mile): 15

PART V - SUMMARY OF ANALYSIS

A. Describe Watershed Emergency: The Snow-Talon fire burned National Forest Lands that are heavily used for recreation. The area is a primary access to the Scapegoat Wilderness. The fire burned 37,700 acres to date most of which are on the Helena National Forest. Of the acres that have burned 26,500 acres are mapped as high severity. Slopes average 40 percent with some slopes as steep as 60%. The burn had extensive crown fires and for the most part was stand replacing. Additional mortality is expected in areas

that are rated low severity. This has resulted in reduced soil cover, reduced permeability, and increased runoff and erosion potential. This combination will cause runoff following a storm event to increase significantly, increasing the overland flow available to initiate soil erosion, resulting in sheet or rill erosion and debris flows.

There are 59.6 miles of road and many of the culverts throughout the area are undersized for the anticipated flows. Proper sizing of culverts or temporary removal will be imperative to prevent road segments from washing away with increased flows. Installing drainage on roads will be necessary to minimize sedimentation. Over 20 culverts and two bridges have been identified as at risk from potential storm flow increases. Installing overflow channels for both culverts and bridges will help assure that we do not lose these structures.

Both Copper Creek and the Lander's Fork support bull trout, a species listed as "threatened" under the Endangered Species Act. Both streams have been identified as critical habitat in the proposed designation of critical habitat for the Klamath River and Columbia River distinct population segments of bull trout. Copper Creek is also considered a priority drainage under the Inland Native Fish Species Strategy. Westslope cutthroat trout, a sensitive species, occupy all surveyed drainages within the fire perimeter. Sediment reduction is considered critical for these species. Fish passage is also critical in terms of planning culvert size. Some culverts have had high bedload inlet deposition problems before the fire and this will be exacerbated because of the fire.

The rapid spread of noxious weeds as a result of the fire has caused concern for federal, private landowners within the burned area. The expected spread of noxious weeds will result in a loss of vegetation which will have impacts to wildlife habitat, watershed stability, site productivity, aesthetics, and impacts to threatened, endangered or sensitive plant and animal species. Unless treated the potential long term effects to the forest and riparian ecosystems will be significant.

There are over 26 miles of trail within the burned area that have been affected by the fire. The fire destroyed many of the drainage structures on these trials. Stream and spring flows are expected to increase causing accelerated erosion on these trails. To help alleviate the expected erosion and sediment delivery, drainage structures will be required on these trails. Puncheons have been constructed to protect resources such as wet meadows and help to reduce the amount of sediment that is delivered to streams. These partially burned puncheons no longer provide protection to these resources. In addition, these burnt puncheons present a safety hazard for horses and hikers with a real risk for someone being injured.

Hazard trees also present another danger in the burned area. Copper Creek is a very popular recreation area both summer and winter and the potential is high for hazard trees falling and injuring someone. Hazard tree felling will be imperative to reduce the potential for loss of life along roads that are heavily used, trailheads, trails and the Copper Creek Campground.

B. Emergency Treatment Objectives: The objectives for the proposed treatments include:

- minimizing loss of life through hazard tree felling
- reduce the impacts of the fire to bull trout by reducing sediment delivery from roads and trails
- limit the spread of existing populations of noxious weeds
- reduce the risk of losing bridges by providing over spill protection
- reduce the risk of loss of culverts by either pulling culverts or where pulling is not feasible upsizing to allow for passage of excess water and debris
- provide for overflow protection for culverts that are upsized
- provide for fish passage in culverts that are upsized

- where upsized culverts are not expected to provide for passage of post fire flow and debris (as well as provide fish passage) consider replacement with bridges

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

Land **90** % Channel ___ % Roads **90** % Other **90** %

D. Probability of Treatment Success

	Years after Treatment		
	1	3	5
Land	90	100	100
Channel			
Roads	90	100	100
Other	90	100	100

E. Cost of No-Action (Including Loss): $1,140,000

F. Cost of Selected Alternative (Including Loss): $773,300

G. Skills Represented on Burned-Area Survey Team:

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

Team Leader: Bo Stuart

Email: bstuart@fs.fed.us Phone: (406) 449-5201 ext.245 FAX: 406.449.5436

H. **Treatment Narrative:**

Land Treatments:

Weed treatment will occur on 653 acres. These acres are associated with roads and openings (primarily clearcuts) that have been burnt over. Treatment will occur this fall and next spring to prevent the spread of noxious weeds from existing populations. Infestations are likely to dramatically increase adjacent to existing populations if not treated. The most probable species to spread are butter and eggs, spotted knapweed, dalmation toadflax, thistles, and houndstongue.

No other land treatments are anticipated as the natural understory vegetation is expected to recover within three years.

Channel Treatments: no channel treatments are anticipated at this time.

Roads and Trail Treatments:

Road and culvert work includes installing drain dips (approx 230), removal of culverts and replacement next year with upsized culverts (12), culvert replacement with upsized culverts and overflows (20), culvert removal and replace with bridge (1), ditch cleaning (2.4 miles), installation of small trash racks/sediment basins to protect cross drains (20), rock spillways at two bridges (2), removal of burned bridge at Red Creek crossing. These improvements will be installed on roads 1881, 330, 330-A1, 1832-A2, 771, 330-B1, 1832, 1800, 1883 and 1821. One culvert will be removed and replaced by a bridge. This is necessary due to the large amount of bedload that this stream carries which the fire will only exacerbate. This site has been identified in an ongoing EIS for Copper Creek and fish passage for bull trout is critical here and cannot be accomplished with a culvert. Where feasible, culvert removal with upsizing next summer is preferable to allow for passage of debris and flood flows. While this requires mobilization twice it does protect our investment on these roads during the critical time period. Where culvert removal and waiting cannot be done due to public safety during winter use, culverts will be upsized accordingly to handle flood and debris. Fish passage is critical for bull trout on several of these and a bottomless arch is being proposed for one of the culverts.

Trail work will include installing 285 drainage structures on 26.5 miles of trail, six wooded culverts and 155 feet of puncheon. Drainage structures are necessary to reduce sediment delivery to streams. Replacement of the 155 feet of puncheon is necessary for both drainage and safety reasons. These partially burned puncheons present a real hazard to horse and foot travel.

Hazard Tree Felling: Due to the high recreation traffic this area receives an aggressive hazard tree felling program is being proposed to reduce the risk of loss of human life. Larger trees within one tree length of forest system roads 1882, 330, 1882, and the Copper Creek campground will be felled. Trees that are greater than seven inches, damaged or killed by fire, and pose an immediate threat to public safety or property will be felled. To minimize the risk to fellers, a mechanical feller buncher will be used where possible. Use of feller buncher also reduces costs.

Hazard tree felling will also occur along the 26.5 miles of trail. Due to the historical nature of the mainline trail this will be done by hand. Only those trees that pose an immediate threat to public safety will be felled. Because a feller buncher cannot be used here the cost per acre will increase.

H. **Monitoring Narrative:**

Weed Treatment: Check known weed infestations in the spring of 2004 to assess the effects of fall 2003 treatments – 5 days

Roads: Roads will be assessed mid to late spring 2004 to determine effectiveness of drain dips, upsizing culverts, ditch cleaning, bridge spillways, trash racks/sediment basins. – 5 days

Trails: Trails will be assessed as to whether drainage structures were adequate and whether additional treatment is necessary – 5 days

Hazard Tree Felling: Assess effectiveness of hazard tree felling and whether additional felling is necessary – 5 days

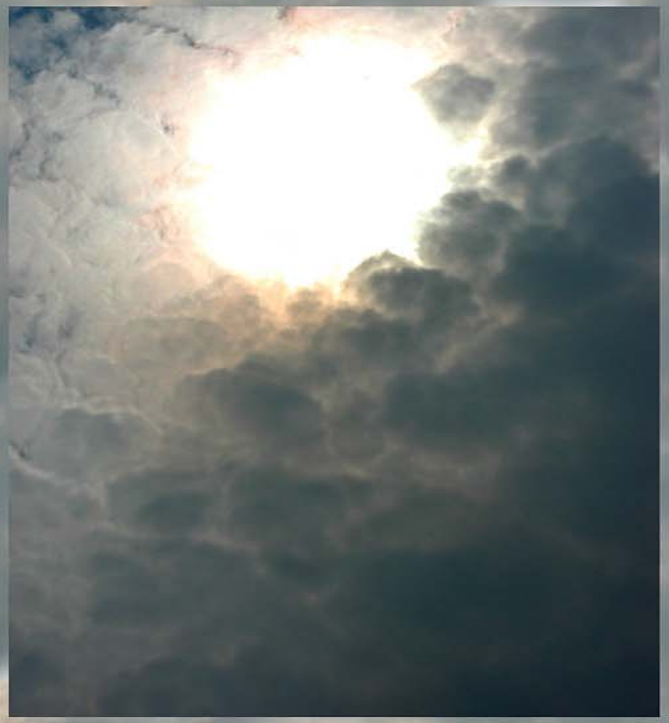
Part VI – Emergency Rehabilitation Treatments and Source of Funds by Land Ownership

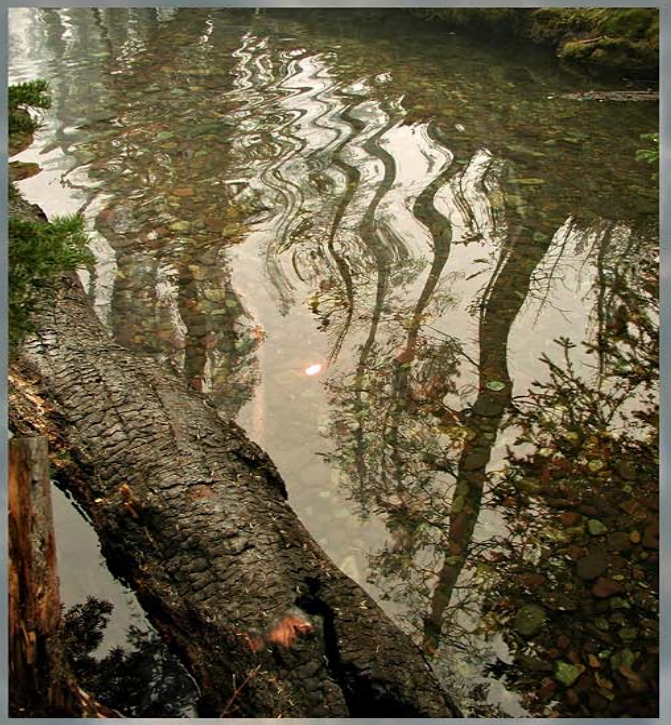
			NFS Lands				Other Lands			All
		Unit	# of	WFSU	Other	# of	Fed	# of	Non Fed	Total
Line Items	Units	Cost	Units	SULT $	$	units	$	Units	$	$
A. Land Treatments										
Noxious weed control	acres	$164	653	$106,909			$0		$0	$106,909
				$0			$0		$0	$0
				$0			$0		$0	$0
				$0			$0		$0	$0
Subtotal Land Treatments				$106,909			$0		$0	$106,909
B. Trails										
Drainage Structures	each	$60	285	$17,100			$0		$0	$17,100
Wooden Culverts	each	$200	6	$1,200			$0		$0	$1,200
Puncheon	ft	$200	155	$31,000			$0		$0	$31,000
				$0			$0		$0	$0
Subtotal Trails				$49,300			$0		$0	$49,300
C. Roads										
Drain Dips	each	$156	231	$36,089			$0		$0	$36,089
Culvert Removal	each	$1,042	12	$12,498			$0		$0	$12,498
Culvert Replacement	each	$3,320	20	$66,397			$0		$0	$66,397
30 foot bridge	each	$31,246	1	$31,246			$0		$0	$31,246
Culvert Overflow	each	$2,604	20	$52,076			$0		$0	$52,076
Rock Spillway	each	$10,415	2	$20,831			$0		$0	$20,831
Bottomless Arch	each	$13,540	1	$13,540			$0		$0	$13,540
Small Trash racks	each	$521	20	$10,415			$0		$0	$10,415
Clean Ditches	miles	$1,042	2.4	$2,500			$0		$0	$2,500
Remove burnt bridge	each	$5,208	1	$5,208			$0		$0	$5,208
Subtotal Roads				$250,800			$0		$0	$250,800
D. Hazard Tree										
Keep Cool Area	acres	$860	6	$5,160			$0		$0	$5,160
Copper Creek	acres	$605	129	$78,059			$0		$0	$78,059
Indian Meadows	acres	$954	32	$30,520			$0		$0	$30,520
Copper Cr. C.G.	acres	$641	5	$3,207			$0		$0	$3,207
Indian Mdws Tr. Head	acres	$641	5	$3,207			$0		$0	$3,207
Trails	miles	$1,887	26.5	$50,000			$0		$0	$50,000
Subtotal Structures				$170,153			$0		$0	$170,153
E. BAER Evaluation										
Team	days	$281	84	$23,604			$0		$0	$23,604
Subtotal Evaluation				$23,604			$0		$0	$23,604
G. Monitoring Cost							$0		$0	$0
Monitoring	days	$281	20	$5,620			$0		$0	$5,620
Subtotal Monitoring				$5,620			$0		$0	$5,620
H. Totals				**$606,386**			**$0**		**$0**	**$606,386**

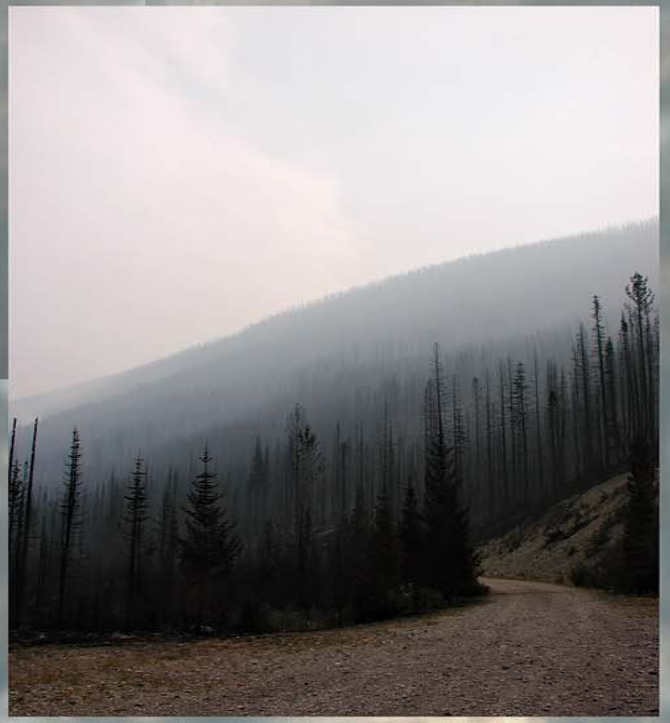
PART VII - APPROVALS

1. _____ _____
Forest Supervisor (signature) Date

2. _____ _____
Regional Forester (signature) Date







SPECIALIST ASSESSMENTS OF BURNED AREA

- Watershed – Sue Farley and Bo Stuart
- Understory Vegetative Response – Lois Olsen and Maureen Geary
- Silvicultural Reconnaissance – Jack Kendley
- Fisheries Report – Laura Burns
- Wildlife – Pat Shanley

Watershed

Report Written by
Sue Farley and Bo Stuart
9-8-2003

WATERSHED BURN SEVERITY MAPPING

Sue Farley completed watershed burn severity mapping for the Snow-Talon Fire, with supporting work from Melanie Scott, Bo Stuart, and Lois Olsen. Burn severity mapping was based on criteria defined in Forest Service Burned Area Emergency Response Handbook, FSH 2509.13, Amendment No. 2509.13-95-7, Section 23.32b. For a summary of these criteria, refer to document titled "Criteria For Assessing Burn Severity" (Appendix).

For watershed burn severity assessment, the criteria for litter consumption and depth or color of ash were given the greatest emphasis. This is because these indicators most closely correspond to soil impacts from fire, and soil effects strongly determine hillslope hydrologic function or response following fire. Water repellency class does influence hillslope hydrologic function. However, this criterion was not given greatest emphasis for assessing watershed burn severity, because soil water repellency is often present before burning.

Preliminary watershed burn severity mapping was completed during helicopter reconnaissance on September 2, 2003. This mapping was field verified through on-the-ground observations conducted on September 2 and 4, 2003. Field verification methods included visual observation, and "toe-point" samples along transects.

Visual observations evaluated presence of soil cover (or litter consumption), color of ash, consumption of plant canopy, and viability of plant root crowns (evidenced by grasses and bear grass already sprouting new green shoots). Visual observations represent qualitative assessment. These observations were made along roads and from hillslope vantage points.

Thirty "toe-point" samples evaluated all indicators of watershed burn severity on three transects, representing low, moderate and high watershed burn severity zones respectively. Transect data is considered quantitative analysis for representative samples. Results for assessing these "toe-point" samples are displayed in spreadsheet titled "Burn Severity Assessment for Snow-Talon Fire" (Appendix).

On September 5, 2003, watershed burn severity mapping was validated by comparison to aerial oblique photographs of the Snow-Talon Fire Area (taken by Melanie Scott during the helicopter reconnaissance). Dennis Heffner and Chip Fisher digitized the hand-drawn, watershed burn severity map into GIS on September 8, 2003.

Results of watershed burn severity mapping are displayed below.

Watershed Burn Severity, Snow-Talon Fire Area
Lincoln Ranger District, Helena National Forest
Severity Mapping by Sue Farley
Acreages Planimetered by Bo Stuart
9/8/2003

Drainage	Drainage Area	Low Burn Severity (acres)	Low Burn Severity (percent area)	Moderate Burn Severity (acres)	Moderate Burn Severity (percent area)	High Burn Severity (acres)	High Burn Severity (percent area)
Copper Crk.	26,068	1,735.9	6.7%	1,608.0	6.2%	16,215.0	62.2%
Copper Crk. Above Snowbank bridge	16,983	1,371.0	8.1%	1,608.0	9.5%	8,346.0	49.1%
Indian Meadows	3,577	1,781.0	49.8%	0.0	0.0%	1,796.0	50.2%
Landers Fork	46,746	641.0	1.4%	80.0	0.2%	8,496.0	18.2%
Snowbank Crk.	4,785	279.8	5.8%	0.0	0.0%	4,318.8	90.3%
Cotter Crk.	789	49.2	6.2%	58.8	7.5%	684.0	86.7%
Total* for entire Snow-Talon Fire Area	32,371.0	4,176.0	12.9%	1,688.0	5.2%	26,507.0	81.9%

*Note: Total Fire Area is not obtained by adding above drainage areas, because some drainages are contained within larger watersheds, and acres would thus be double counted. For example, Cotter Creek drainage is contained within the larger Copper Creek watershed.

SOIL EROSION HAZARD

Landtypes (soils) have been characterized for the non-wilderness portion of Snow-Talon fire area in "Soil Survey of Helena National Forest Area, Montana" (USDA Forest Service and Natural Resource Conservation Service 2001). These soil attributes are summarized in the spreadsheet titled, "Table 1. Landtype Characterization, Snow/Talon Fire" (Appendix).

Surface erosion hazard has been evaluated for each Landtype. This erosion hazard rating is based on individual soil characteristics, such as surface soil texture including rock fragment content, and hillslope gradient. Generally, soils with high rock fragment content and gentle slopes have lower erosion hazards. While, soils with low rock fragment content and steep slopes have higher erosion hazards.

Within Snow-Talon fire area, erosion hazard for the 26,189 acres of non-wilderness, National Forest land is as follows:

- Slight erosion hazard on 4,976 acres, comprising 19% of the area;
- Moderate erosion hazard on 19,033 acres, comprising 73% of the area, and;
- Severe erosion hazard on 861 acres, comprising 3% of the area.

For portions of the Snow-Talon Fire area found within Scapegoat Wilderness, soil types have been mapped. Landtype association characteristics are documented in "Land System Inventory of the Scapegoat and Bob Marshall Wilderness" (USDA Forest Service 1980, page 37), where erosion hazard is rated low on all soil types within wilderness portions of the fire area. A summary of soil types and acres

within wilderness portions of the Snow-Talon fire are found in the spreadsheet titled, "Soil Erosion Hazard, Scapegoat Wilderness Portions of Snow-Talon Fire Area" (Appendix).

Reduction in soil productivity is a risk following fire due to accelerated erosion. This risk is greatest where the erosion hazard is high or severe (USDA Forest Service 1995, page 12). Risk of accelerated erosion is anticipated to be of greatest magnitude within the first year following wildfire, and should diminish in magnitude over the next few years (DeBano et al. 1998, page 183). Accelerated soil erosion will not continue once sufficient plant recovery begins to provide adequate protective soil cover (DeBano et al. 1998, page 172).

It is predicted that native grasses, forbs and shrubs will begin to recover in the fire area within the first year after burning, and should provide adequate protective soil cover by year two following wildfire (refer to "Understory Vegetative Response Report" for Snow-Talon fire BAER). For this reason, no seeding treatments are recommended for BAER.

Also, seeding is not recommended because seeds do not typically germinate and subsequently provide adequate soil cover to prevent erosion until the second or third year following fire (Robichaud et al. 2000, pages 44-45). Therefore, seeding is not typically an effective, or cost efficient, method for reducing erosion risk during that first critical year after burning.

Log erosion barriers can provide some protection against erosion hazards during that first critical year following fire (Robichaud et al. 2000, pages 44-45). However, log erosion barriers are costly as well as time-consuming to install, and can present safety hazards to installation crews when constructed on extremely steep slopes. Log erosion barriers likely cannot provide effective, and cost efficient, erosion control on a watershed scale. For this reason, log erosion barriers should only be considered for installation on limited areas with severe erosion hazard and relatively gentle slopes.

LANDSLIDES

Two existing landslide features have been mapped in Falls Creek. These two units may be in long-term risk for mass failure. Typically, landslide re-activation following wildfire occurs around 4 or 5 years after burning. This re-activation is due to loss of soil strength following decomposition of dead tree roots, and build-up of soil water without tree transpiration. Water pressure in soil pores becomes high enough over time to cause saturated soil to suddenly fail. There is potential for a landslide to dam Falls Creek. Water ponding behind a landslide dam can erode through the dam, and suddenly cause flooding. Falls Creek valley is relatively wide below these two landslides. A wide valley may lessen risk of any slope failure completely damming Falls Creek, because there is ample space for deposition of landslide material before reaching the stream. It is recommended these landslides be periodically monitored as a means of detecting any mass wasting activity that may dam the stream, and subsequently pose flood risk.

SEDIMENT DELIVERY, DEBRIS FLOWS, AND FLOODING HAZARDS

Risk of sediment delivery to streams, debris flows and flooding hazards is evaluated with information derived from burn severity mapping and erosion hazard assessments, as well as computer modeling of watershed response and stream discharge for a range of storm sizes and intensities.

It is anticipated that sediment delivery will greatly increase within drainages that have a high percentage of the drainage area burned, most notably those within the Copper Creek watershed. For the first year following wildfire, sediment delivery may be in the range of 550 tons per square mile per year, or greater

(WATSED 1991, "Coefficients" section, page "Databases" – 80), within these watersheds with high percentage of area burned. As with erosion hazard, high rates of sediment delivery will diminish as vegetation recovers.

Debris flows are defined as a saturated, "moving mass of rock fragments, soil and mud" (Bates and Jackson 1984, page 128). They typically have the consistency of wet cement. Debris flows can move rapidly nonetheless, sometimes as fast as 100 miles per hour. As with high rates of sediment delivery, debris flows are most likely to occur in watersheds with high percentage of area burned. Debris flows are most likely to occur on steeper terrain, and within the first one to two years following burning. As with erosion hazard, risk of debris flows will diminish as vegetation recovers.

It is anticipated that debris flows are likely to occur after wildfire under the following different storm scenarios:

- High intensity, short duration storm events, especially storms with greater than 0.4 inches of rain in less than 15 minutes;
- Long-duration, monsoon-type rains in which soils become saturated, and overland flow occurs with additional rains.

The probability of high intensity, short-duration storm events, with potential for debris flows occurring, ranges from 4% to 10%. Parrett (2003) noted that the maximum recurrence interval for recorded precipitation at USGS rain gages in the Bitterroot was 10-25 years for depths for the 5, 10, 15 and 30 minute durations. The maximum recurrence interval for peak discharges resulting from these precipitation events ranged from 200 to 500 years. If a monsoon storm system develops, there is high likelihood debris flows will occur.

Values at risk from debris flows are primarily located in the upper watershed of Copper Creek. These include fisheries habitat, and forest roads where debris flow channels cross.

Stream flooding is likely to occur following wildfire, especially in mainstem Copper Creek, above the confluence with Landers Fork. It is anticipated that magnitude of stream discharge during flood events may equal the 25 to 500 recurrence interval. Peak stream flow may range from 522 to 1100 cubic feet per second in mainstem Copper Creek, where it enters Landers Fork.

In Landers Fork, the percentage of drainage area burned is relatively low. Therefore, there may be slight increases in peak stream flow, but flood risk in Landers Fork will be less than Copper Creek. Peak stream flows may range from 640 to 1230 cubic feet per second. Below the confluence with Copper Creek, lower Landers Fork will also be at risk for flood flows from Copper Creek.

Values at risk for damage from flooding include Copper Creek campground, road culverts, and possibly private properties downstream. Flood flows have potential to entrain woody debris found within the stream channel or floodplain. This woody material can create debris jams that may pose risk to two bridges in Copper Creek.

Bo Stuart and Melanie Scott surveyed private properties for flooding risk in lower Copper Creek and Landers Fork. In Copper Creek, Bo and Mel documented that most properties were located on an elevated stream terrace, not likely to be at risk for flood damage. In Landers Fork, there are properties located within the stream floodplain that have experienced flooding problems prior to Snow-Talon fire. Existing

problems with flooding at these properties will be exacerbated following wildfire. Below the confluence of Landers Fork and Copper Creek, there is one property on a low terrace that may be at risk from flooding, or at least accelerated bank erosion. However, this one property appears to be uninhabited.

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APPENDIX

CRITERIA FOR ASSESSING BURN SEVERITY

DEGREE OF WATER REPELLENCY*	TIME FOR WATER ABSORPTION
WEAK	Less than 10 seconds
MODERATE	Between 10 and 40 seconds
STRONG	Longer than 40 seconds

*From FSH 2509.13, BAER Handbook, Amendment No. 2509.13-95-7, Section 23.31.

CLASS OF WATER REPELLENCY*	DEPTH AND DEGREE OF WATER REPELLENCY	AERIAL EXTENT OF WATER REPELLENCY
LOW	No strong repellency except at soil surface, and no moderate repellency below 0.5 inches	Repellency is very spotty in occurrence
MEDIUM	Some moderate repellency below 0.5 inches, but no strong repellency below 1 inch	Repellency is moderate in extent
HIGH	Moderate repellency between 3 and 6 inches, or strong repellency below 1 inch	Repellency is uniform in extent

*From FSH 2509.13, BAER Handbook, Amendment No. 2509.13-95-7, Section 23.31.

SITE INDICATOR*	LOW INTENSITY BURN	MODERATE INTENSITY BURN	HIGH INTENSITY BURN
Depth & Color of Ash	No ash present, but sparse charcoal is present	Ash is present but is sparse and dark in color	Ash is deep, sometimes 1-2 inches or more, and is white or red color
Size & Amount of Live Fuel Consumed	Fuels less than 0.25 inch diameter and less than 40% of shrub canopy are consumed	Fuels between 0.25 and 0.75 inch diameter and between 40% and 80% of plant canopy are consumed	Fuels greater than 0.75 inch diameter and greater than 80% of plant canopy are consumed
Litter Consumption	Litter is singed, but there is no charcoal or ash	Litter is charred but there are no ashes	No litter residue remains, only ashes are left on soil surface
Plant Root Crowns	Root crowns of sprouting shrubs and grasses are not damaged	Root crowns of sprouting shrubs and grasses may be lightly burned, but are not consumed	Root crowns of sprouting shrubs and grasses are consumed or heavily damaged
Surface soil minerals are physically altered	No physical alteration of surface soil	No physical alteration of surface soil	Surface soil may be crusted, crystallized, may show color change (typically red or black), or complete loss of soil structure

*From FSH 2509.13, BAER Handbook, Amendment No. 2509.13-95-7, Section 23.32a.

MAPPING BURN SEVERITY ZONES*	EXTENT OF LOW TO MODERATE INTENSITY BURN	EXTENT OF HIGH INTENSITY BURN
LOW SEVERITY ZONE	Up to 100% of the area	None
MODERATE SEVERITY ZONE	Greater than 60%	Less than 40%
HIGH SEVERITY ZONE	Less than 60%	Greater than 40%

*From FSH 2509.13, BAER Handbook, Amendment No. 2509.13-95-7, Section 23.32b.

Burn Severity Assessment for Snow-Talon Fire
Lincoln Ranger District, Helena National Forest
Criteria for Assessment Derived From FSH 2509.13, Section 23.32b
S. Farley
9/5/2003

Transect Number	Sample Point Number	Burn Intensity Indicators						Burn Severity Mapping Zone
		Water Repellency Class	Depth & Color of Ash	Size & Amount of Live Fuels Consumed	Litter Consumption (reciprocal of soil cover)	Damage to Plant Root Crowns	Physical Alteration Of Surface Soil Minerals	
1	1	low	moderate	high	high	moderate	none	
1	2	low	moderate	high	high	moderate	none	
1	3	low	high	high	high	moderate	none	
1	4	low	low	high	high	moderate	none	
1	5	low	low	high	moderate	moderate	none	
1	6	low	moderate	high	high	moderate	none	
1	7	medium	low	high	moderate	moderate	none	
1	8	medium	moderate	high	high	moderate	none	
1	9	low	moderate	high	high	moderate	none	
1	10	low	moderate	high	high	moderate	none	**HIGH**
Note: T1 located in valley bottom, Copper Crk., terrace site was dry, complete consumption of tree canopy.								
2	1	low	low	low	low	low	none	
2	2	low	low	low	low	low	none	
2	3	low	low	low	low	low	none	
2	4	low	low	low	low	low	none	
2	5	low	low	low	low	low	none	
2	6	low	low	low	low	low	none	
2	7	low	low	low	low	low	none	
2	8	low	low	low	low	low	none	
2	9	low	low	low	low	low	none	
2	10	medium	moderate	low	moderate	moderate	none	**LOW**
Note: T2 located near Snowbank Lk. In area with green tree canopy intact.								
3	1	low	low	high	moderate	moderate	none	
3	2	low	low	high	moderate	moderate	none	
3	3	low	moderate	high	high	moderate	none	
3	4	none	low	high	high	moderate	none	
3	5	none	low	high	low	low	none	
3	6	low	high	high	high	moderate	none	
3	7	low	low	high	high	moderate	none	
3	8	medium	low	high	moderate	moderate	none	
3	9	none	moderate	high	high	moderate	none	
3	10	low	moderate	high	high	moderate	none	**MODERATE**
Note: T3 located in valley bottom, Copper Crk., terrace site was moist, complete consumption of tree canopy.								

Table 1. Landtype Characterization*, Snow/Talon Fire
Lincoln Ranger District, Helena National Forest
Information Compiled by Sue Farley
9/3/2003

Landtype Number	Soil Classification	Landform	Geology	Slope Gradient	Topsoil Texture	Surface Erosion Hazard	Acres Affected
49	Typic Cryoboralfs - Mollic Cryoboralfs	Mountain Slopes	argillites, siltites, quartzites	25-50%	CBL	Moderate	1318.4
79	Typic Cryochrepts	Mountain Slopes	argillites, siltites, quartzites	40-60%	CHL loess/ volc. Ash	Moderate	2728.9
490	Argic Cryoborolls - Mollic Cryoboralfs	Mountain Ridges	argillites, siltites, quartzites	10-40%	CHL	Moderate	327.1
790	Typic Cryochrepts - Typic Cryoboralfs	Glaciated Mountain Slopes	Glacial Till from Meta-sedimentary	25-40%	L loess/ volc. Ash	Moderate	5202.8
791	Andic Cyrochrepts	Cirque Basins	Glacial Till from Meta-sedimentary	25-40%	L loess/ volc. Ash	Moderate	672.9
12A	Typic Cryoboralfs	Moraines	glacial till	10-25%	STL	Moderate	3293.3
49B	Typic Cryoboralfs - Typic Cryochrepts	Mountain Slopes	argillites, siltites, quartzites	40-60%	CHL loess/ volc.ash	Moderate	4694.8
59A	Andic Cryochrepts	Mountain Ridges	argilites, siltites, quartzites	10-40%	L loess/ volc. Ash	Moderate	794.7
80	NA	Cirqueland - glacially scoured bedrock	Meta-sedimentary	40-60+%	Bedrock	NA	989.6
91	NA	Extremely Steep Structural Breakland	granite, basalt, Meta-sedimentary	60-90%	Bedrock	NA	300.3
Water	NA	Lakes or Ponds	NA	Flat	NA	NA	29.5
15	Mollic Cryoboralfs	Landslides	limestone, basalt, meta-sedimentary	10-40%	SiCL	Severe	70.5
54	Lithic Cryoborolls	Mountain Ridges Shallow Soils	argillites, siltites, quartzites	10-40%	L	Severe	131.0

69	Typic Cryumbrepts	Mountain Ridges	non-calcareous igneous or metamorphic	10-40%	SL	Severe	9.4
90	Andic Cyrochrepts - Typic Cryoboralfs	Glacial Trough Walls	meta-sedimentary, basalt	60-90%	SiL loess/ volc. Ash	Severe	507.3
39C	Argic Cryoborolls	Mountain Ridges	argillites, siltites, quartzites	10-25%	L	Severe	75.2
49A	Argic Cryoborolls	Mountain Ridges	argillites, siltites, quartzites	10-40%	L	Severe	67.4
39	Typic Ustochrepts	Steep Mountain Slopes	argillites, siltites, quartzites	40-60%	VChSL	Slight	53.2
44	Typic Cryochrepts	Steep Mountain Slopes	argillites, siltites, quartzites	40-60%	VCBL	Slight	929.8
51	Lithic Cryochrepts	Mountain Ridges Shallow Soils	Limestone, calcareous sandstone	10-25%	VGRSiL	Slight	111.4
59	Typic Cryochrepts	Mountain Ridges	argillites, quartzites	10-40%	CHSiL loess/ volc. Ash	Slight	1308.9
87	Typic Ustochrepts	Glacial Trough Walls	meta-sedimentary, basalt	60-90%	VCHL	Slight	156.6
100	Borolls	Flood plains and Terraces	Mixed Alluvium	0-10%	GRSiL-VGRSL	Slight	249.3
392	Typic Ustochrepts - Typic Cryochrepts	Mountain Slopes	argillites, siltites, quartzites	40-60%	VCHL	Slight	2144.6
39B	Lithic Ustochrepts - Typic Ustochrepts	Steep Mountain Slopes Shallow Soils	argillites, siltites, quartzites	40-60%	XGRL	Slight	22.3
Sum of Landtype Acres							26189.2
Wilderness or Private Land Acres not included in this Soil Mapping							5890.7
Total Acres							32079.9

*Information derived from "Soil Survey of Helena National Forest Area, Montana"
(USDA Forest Service and Natural Resources Conservation Service 2001)

Soil Erosion Hazard

Scapegoat Wilderness portion of Snow-Talon Fire Area

Lincoln Ranger District, Helena National Forest

Information Compiled by Sue Farley

9/8/2003

Soil Type	Erosion Hazard*	Sum of ARC_ACRES
5b	Low	146.0
5c	Low	2820.8
5d	Low	348.9
5e	Low	581.0
6-	Low	1843.2
Grand Total		5739.9

*Information derived from "Land System Inventory of the Scapegoat and Bob Marshall Wilderness" (USDA Forest Service 1980)

Understory Vegetative Response Report

Introduction

Approximately 35,000 acres are included in the Snow-Talon fire perimeter. Two major watersheds, Copper Creek and Landers Fork were included in the fire area. In addition, several smaller watersheds were included, primarily Indian Meadows and Keep Cool watersheds. Approximately 3300 acres of private land are inside the fire perimeter, with various levels of wildfire associated with them. The Copper Creek watershed (18,900 acres) had over 90% stand replacement fire, while Landers Fork watershed had less than 50% stand replacement, and around 60% mosaic of small areas of stand replacement and underburned stands.

Approximately 3300 acres are included in the Moose-Wasson fire perimeter, most of which is National Forest land. Two watersheds were included as far as actual burned acreage. The Wasson watershed includes 1450 acres and the Moose watershed includes 1840 acres. As of 9/5/03, approximately 60% of the Wasson watershed had fire in it, dominated by stand replacement burn where over 90% of the tree canopy was consumed. The remainder of the burn was a mosaic of mixed intensity fire where approximately 50% of the tree canopy was consumed. The Moose watershed had some small areas of stand replacement fire where over 90% of the tree canopy was consumed, and mixed intensity burn where about 50% of the tree canopy was consumed.

The two fires have similar vegetative composition, as shown in the following table.

Habitat Type	Fire Area Composition Acres		Fire Area Composition %	
	Snow-Talon	Moose-Wasson	Snow-Talon	Moose-Wasson
Subalpine fir/beargrass *(Abies lasiocarpa/Xerophyllum tenax)*	9282 acres	477 acres	29%	14%
Subalpine fir/menziesia *(Abies lasiocarpa/ Menziesia ferruginea*	6373 acres	672 acres	20%	20%
Douglas-fir/pinegrass (*Pseudotsuga menziesii/Calamagrostis rubescens)*	3199 acres	255 acres	10%	8%
Subalpine fir /grouse whortleberry or blue huckleberry (*Abies lasiocarpa/Vaccinium scoparium* or *V. globulare*)	2998 acres	129 acres	9%	4%
Subalpine fir/twinflower *(Abies lasiocarpa/Linnea borealis)*	2021 acres	1003 acres	6%	30%
Subalpine fir/woodrush *(Abies lasiocarpa/Luzula hitchcockii)*	1873 acres	0 acres	6%	0%
Subalpine fir/bedstraw *(Abies lasiocarpa/Galium triflorum)*	819 acres	85 acres	3%	3%

The Copper Creek and Landers Fork watersheds have extensive riparian areas. The above data is retrieved from the Timber Stand Management Record System. Since the dominant vegetation of these areas is forested, shrub dominated systems have not been broken out. These areas are a mosaic of vegetative types that include alder (*Alnus sinuata*) and various willow (*Salix* spp.), quaking aspen (*Populus tremuloides*), narrowleaf and black cottonwood (*Populus angustifolia and P. trichocarpa)* and sedge (*Carex* spp.) dominated communities. These communities have not been mapped, and acreages are not available.

Conclusions

Understory vegetative response in both fires should be relatively fast and adequate to provide some soil protection by year one. In year one (2004) root systems will be intact and will provide soil holding capacity, but in most areas understory canopy cover will be less than 30%. By year two (2005) many areas will have over 50% understory canopy cover, although the soil surface itself will be bare, as litter and duff have been removed by the wildfire. Grass dominated areas will revegetate quickly to pre-fire cover in year one. Moist area plant species will vigorously sprout and will quickly establish understory canopy cover as well as numerous sprouts from communities dominated by alder (*Alnus sinuata*), willow (*Salix* spp.), quaking aspen (*Populus tremuloides*), narrowleaf and black cottonwood (*Populus angustifolia and P. trichocarpa),* red-osier dogwood (*Cornus stolonifera*) and sedges (*Carex* spp.).

The native plant community will respond quickly in this area, and no seeding of an annual cover crop is recommended to supplement the natural healing process. From an understory vegetation response standpoint, this practice is not necessary. These communities have evolved with natural fire processes and although erosion is bound to occur, the communities will reoccupy the area and provide adequate soil cover in time. There are not reasonable man-made practices that will alter the erosion process on a large scale, or provide better ground cover in this area than will be provided by the native species already present. In some cases seeding an annual sterile hybrid such as cereal rye (*Secale cereale*) would be recommended to provide site specific erosion control in special cases.

All of the habitat types in the fire areas have numerous shrub species that sprout following wildfire. Many understory species, the shrubs, grasses and forbs are adapted to fire and resprout or reseed themselves following fire. The understory species also have extensive root systems that are still in place following fire. Shrub roots near the mineral soil surface i.e. one inch below the surface or less may have been killed by the heat of the fire but below that level most roots are intact (cite). These lower roots will begin to resprout the first growing season following the fire (FEIS, 2003) and by the second year will vigorously resprout. Many grasses are not damaged by fire and will begin growing within the same growing season in which the fire occurs, as is currently happening. The root crowns of many forbs that occupy forested habitat types are also intact following fire, and begin growth soon after fire. Native forbs such as *Geranium bicknellii*, a annual

geranium, proliferate the first growing season following fire as evidenced by the Warm Springs fire of 1988, and the Cave Gulch and Maudlow-Toston fires of 2000 (Olsen personal observation). Conifers are easily killed by fire, and do not resprout. Refer to the report addressing conifer regeneration for more detail.

The subalpine fir/menziesia habitat type may be slower to respond to fir than the other habitat types. This habitat type occupies about 20% of each fire area, respectively. Menziesia (*Menziesia ferruginea*) is a medium sized shrub that may be killed by wildfire depending on fire severity and can be a dominant understory species in this habitat type. The habitat type also includes several species that will survive or colonize the site after fire. These habitats may respond more slowly than others, depending on the amount of menziesia in the understory prior to the fire.

Wildlife use can have an impact on plant survival, if use is heavy immediately following a fire. In large burn areas, however, this is generally plant species specific. Highly palatable species such as aspen, for example, can be severely browsed to the point where they are killed or stunted. Severe impacts are generally limited to riparian vegetation where some of the earliest growth occurs and can be short-lived as more plants resprout or colonize burned areas.

Two research natural areas, Indian Meadows and Red Mountain, have completely or partially burned. No treatment is recommended for these areas.

Noxious weeds occur in various areas throughout both fire areas, although overall the acreage currently infested appears to be fairly low. The most worrisome species are butter and eggs (*Linaria vulgaris*), spotted knapweed (*Centaurea repens*) and Dalmation toadflax (*Linaria dalmatica*). Thistles (*Carduus nutans, Cirsium vulgare*) and houndstongue (*Cynoglossum officinale*) also occur in the area but are less threatening on a large scale than the above species. Infestations are likely to dramatically increase adjacent to existing populations. Chemical treatment with effective herbicides beginning in the fall of 2003 and again in the spring and/or fall of 2004 are being requested. If populations explode and are not controlled using herbicides, one approach for longterm management would be to establish a containment boundary. Inside that boundary biological controls would be the most appropriate longterm control method for the Snow-Talon due to the presence of threatened and endangered species in this area. The boundary itself could be maintained by using herbicides.

Cost Estimates

Snow-Talon:
A total of approximately 900 acres are currently known to contain noxious weeds at levels from light infestation to heavy infestation within the burned area. All the areas were burned over and weed populations are expected to increase dramatically. 368 acres are associated with roads, and 453 acres are included in openings, primarily clearcuts. One assumption used in this analysis is that 60% of the acres in the openings are infested.

640 acres included as treatment acres. Two treatments are requested. Appendix B contains a breakdown of costs by type of chemical used and type of application. The total request for funding is as follows:

Chemical, surfactant and dye:	$ 8,173 * 2 treatments	$16,346
Labor:	$45,280	$90,560
Total for Two Treatments:		$106,906

Moose-Wasson
A total of approximately 117 acres are currently known to contain noxious weeds at levels from light infestation to heavy infestation within the burned area. All the areas were burned over and weed populations are expected to increase dramatically. 14 acres are associated with roads, and 103 acres are included in clearcuts. Two treatments are requested. Appendix B contains a breakdown of costs by type of chemical used and type of application. The total request for funding is as follows:

Chemical, surfactant and dye:	$ 1,057 * 2 treatments	$2,114
Labor:	$ 9,700 * 2 treatments	$19,400
Total for Two Treatments:		$21,514

Total Weed Treatment Request:	**$128,420**

Background

The primary species for the major habitat types are shown in the following table. The species selected are relatively major components of the habitat, and/or have an important fire response. The fire response descriptions are taken from the USDA Region 1 Fire Effects Information System and/or personal observation as noted. For the purposes of this description, ground cover is less than 6 inches tall, low growing is 6 inches to two feet, medium height is 2 feet to five feet, and tall is over five feet.

Subalpine fir/beargrass habitat type: This type occupies 29% of the Snow-Talon fire, and 14% of the Moose-Wasson fire.

Plant Species	Lifeform/Growth Form	Response to Fire
Beargrass (*Xerophyllum tenax)*	Forb, rhizomatous	Survivor, although variable response. Sprouts following fire. Currently some plants are already growing, some appear to be dead (Olsen, personal obs).
White spirea *(Spirea betulifolia)*	Shrub, low growing	Survivor species. Highly resistant to fire-kill. Resprouts from rhizomes.
Grouse whortleberry *(Vaccinium scoparium)*	Shrub, low growing	Initial off-site colonizer for hot fires. Survives low to moderately hot fires.
Blue huckleberry (*Vaccinium globulare)*	Shrub, low growing	Not addressed as a species in FEIS. Similar response to grouse whortleberry (Olsen, personal obs).
Kinnickinnick *(Arctostaphylos uva-ursi)*	Shrub, ground cover, creeping	Survives most fires. Sprouts from root crown or reseeds from on-site seed.
Pinegrass (*Calamagrostis rubescens)*	Grass, rhizomatous	Sprouts following even severe fire.
Elk sedge *(Carex geyeri)*	Grasslike, rhizomatous	Sprouts following even severe fire.

Subalpine fir/menziesia habitat type: This type occupies 20% of the Snow-Talon fire, and 20% of the Moose-Wasson fire.

Plant Species	Lifeform/Growth Form	Response to Fire
Menziesia (*Menziesia ferruginea)*	Shrub, medium height	Susceptible to fire kill. Slow to respond in areas of severe fire. Variable reponse—some research has shown increase in cover in light to moderate burn.
Twinflower (*Linnea borealis)*	Shrub, ground cover, creeping.	Killed. Re-establishes by stolons of survivors or off-site seed
Sitka alder (*Alnus sinuata)*	Shrub, tall	Species not specifically addressed. Other species resprout vigorously in all but severe fire. Personal observation has shown this species to respond similarly (Olsen, personal obs).
White spirea *(Spirea betulifolia)*	Shrub, low growing	Survivor species. Highly resistant to fire-kill. Resprouts from rhizomes.
Grouse whortleberry *(Vaccinium scoparium)*	Shrub, low growing	Initial off-site colonizer for hot fires. Survives low to moderately hot fires.
Blue huckleberry (*Vaccinium globulare)*	Shrub, low growing	Not addressed as a species in FEIS. Similar response to grouse whortleberry (Olsen, personal obs).
Kinnickinnick *(Arctostaphylos uva-ursi)*	Shrub, ground cover, creeping	Survives most fires. Sprouts from root crown or reseeds from on-site seed.
Beargrass (*Xerophyllum tenax)*	Forb, rhizomatous	Survivor, although variable response. Sprouts following fire. Currently some plants are already growing, some appear to be dead (Olsen, personal obs). .

Douglas-fir/pinegrass habitat type: This type occupies 10% of the Snow-Talon fire, and 8% of the Moose-Wasson fire.

Plant Species	Lifeform/Growth Form	Response to Fire
Pinegrass (*Calamagrostis rubescens)*	Grass, rhizomatous	Sprouts following even severe fire.
Elk sedge *(Carex geyeri)*	Grasslike, rhizomatous	Sprouts following even severe fire.
White spirea *(Spirea betulifolia)*	Shrub, low growing	Survivor species. Highly resistant to fire-kill. Resprouts from rhizomes.
Snowberry (*Symphoricarpos albus*)	Shrub, low growing, rhizomatous	Survivor species. Highly resistant to fire-kill. Resprouts from rhizomes.
Oregon grape *(Mahonia repens)*	Shrub, ground cover	Survives all but severe fires. Resprouts or reseeds from onsite seed.
Kinnickinnick *(Arctostaphylos uva-ursi)*	Shrub, ground cover, creeping	Survives most fires. Sprouts from root crown or reseeds from on-site seed.
Common juniper (*Juniperus communis*)	Shrub, low growing (generally)	Killed by fire. Slow to resprout

Subalpine fir/grouse whortleberry or blue huckleberry: These types occupy 9% of the Snow-Talon fire, and 9% of the Moose-Wasson fire.

Plant Species	Lifeform/Growth Form	Response to Fire
Russet buffaloberry (*Shepherdia canadensis*)	Shrub, medium height	Susceptible to fire kill. Slow to respond in areas of severe fire. Variable reponse—some research has shown increase in cover in light to moderate burn.
Common juniper (*Juniperus communis*)	Shrub, low growing (generally)	Killed by fire. Slow to resprout
White spirea *(Spirea betulifolia)*	Shrub, low growing	Survivor species. Highly resistant to fire-kill. Resprouts from rhizomes.
Grouse whortleberry *(Vaccinium scoparium)*	Shrub, low growing	Initial off-site colonizer for hot fires. Survives low to moderately hot fires.
Blue huckleberry (*Vaccinium globulare)*	Shrub, low growing	Not addressed as a species in FEIS. Similar response to grouse whortleberry (Olsen, personal obs).
Dwarf bilberry *(Vaccinium myrtillus)*	Shrub, low growing, rhizomatous	Initial off-site colonizer for hot fires. Survives low to moderately hot fires.
Snowberry (*Symphoricarpos albus*)	Shrub, low growing, rhizomatous	Survivor species. Highly resistant to fire-kill. Resprouts from rhizomes.
Swamp currant (*Ribes lacustre*)	Shrub, medium height	Shallow root systems killed by severe fire. On-site colonizer from seed. Some reports indicate sprouting from root crowns.
Pinegrass (*Calamagrostis rubescens)*	Grass, rhizomatous	Sprouts following even severe fire.
Elk sedge *(Carex geyeri)*	Grasslike, rhizomatous	Sprouts following even severe fire.

Subalpine fir/twinflower habitat type: This type occupies 6% of the Snow-Talon fire, and 30% of the Moose-Wasson fire.

Plant Species	Lifeform/Growth Form	Response to Fire
Twinflower (*Linnea borealis)*	Shrub, ground cover, creeping	Killed. Re-establishes by stolons of survivors or off-site seed
Spirea *(Spirea betulifolia)*	Shrub, low growing, rhizomatous	Survivor species. Highly resistant to fire-kill. Resprouts from rhizomes.
Grouse whortleberry *(Vaccinium scoparium)*	Shrub, low growing, rhizomatous	Initial off-site colonizer for hot fires. Survives low to moderately hot fires.
Blue huckleberry (*Vaccinium globulare)*	Shrub, low growing	Not addressed as a species in FEIS. Similar response to grouse whortleberry (Olsen, personal obs).
Oregon grape *(Mahonia repens)*	Shrub, ground cover	Survives all but severe fires. Resprouts or reseeds from onsite seed.
Kinnickinnick *(Arctostaphylos uva-ursi)*	Shrub, ground cover, creeping	Survives most fires. Sprouts from root crown or reseeds from on-site seed.
Pinegrass (*Calamagrostis rubescens)*	Grass, rhizomatous	Sprouts following even severe fire.
Beargrass (*Xerophyllum tenax)*	Forb, woody rhizomes	Survivor, although variable response. Sprouts following fire. Currently some plants are already growing, some appear to be dead (Olsen, personal obs).

Subalpine fir/woodrush: This type occupies 6% of the Snow-Talon fire, and 0% of the Moose-Wasson fire.

Plant Species	Lifeform/Growth Form	Response to Fire
Menziesia (*Menziesia ferruginea)*	Shrub, medium height	Susceptible to fire kill. Slow to respond in areas of severe fire. Variable reponse—some research has shown increase in cover in light to moderate burn.
Labrador tea (*Ledum glandulosum*)	Shrub, medium height, rhizomatous	Species not specifically addressed in FEIS. *L. groenlandicum* is addressed, and sprouts from underground rhizomes.
White spirea *(Spirea betulifolia)*	Shrub, low growing	Survivor species. Highly resistant to fire-kill. Resprouts from rhizomes.
Grouse whortleberry *(Vaccinium scoparium)*	Shrub, low growing	Initial off-site colonizer for hot fires. Survives low to moderately hot fires.
Blue huckleberry (*Vaccinium globulare)*	Shrub, low growing	Not addressed as a species in FEIS. Similar response to grouse whortleberry (Olsen, personal obs).
Dwarf bilberry *(Vaccinium myrtillus)*	Shrub, low growing, rhizomatous	Initial off-site colonizer for hot fires. Survives low to moderately hot fires.
Woodrush *(Luzula hitchcockii)*	Grasslike, rhizomatous	Sprouts following fire, often increasing in cover.
Elk sedge *(Carex geyeri)*	Grasslike, rhizomatous	Sprouts following even severe fire.

Beargrass (*Xerophyllum tenax)*	Forb, rhizomatous	Survivor, although variable response. Sprouts following fire. Currently some plants are already growing, some appear to be dead (Olsen, personal obs). .

Subalpine fir/bedstraw: This type occupies 3% of the Snow-Talon fire, and 3% of the Moose-Wasson fire.

Plant Species	**Lifeform/Growth Form**	**Response to Fire**
Sitka alder (*Alnus sinuata)*	Shrub, tall	Species not specifically addressed. Other species resprout vigorously in all but severe fire. Personal observation has shown this species to respond similarly (Olsen, personal obs).
White spirea *(Spirea betulifolia)*	Shrub, low growing	Survivor species. Highly resistant to fire-kill. Resprouts from rhizomes.
Snowberry (*Symphoricarpos albus*)	Shrub, low growing, rhizomatous	Survivor species. Highly resistant to fire-kill. Resprouts from rhizomes.
Grouse whortleberry *(Vaccinium scoparium)*	Shrub, low growing	Initial off-site colonizer for hot fires. Survives low to moderately hot fires.
Blue huckleberry (*Vaccinium globulare)*	Shrub, low growing	Not addressed as a species in FEIS. Similar response to grouse whortleberry (Olsen, personal obs).
Twinflower (*Linnea borealis)*	Shrub, ground cover, creeping.	Killed. Re-establishes by stolons of survivors or off-site seed
Pinegrass (*Calamagrostis rubescens)*	Grass, rhizomatous	Sprouts following even severe fire.
Elk sedge *(Carex geyeri)*	Grasslike, rhizomatous	Sprouts following even severe fire.
Beargrass (*Xerophyllum tenax)*	Forb, rhizomatous	Survivor, although variable response. Sprouts following fire. Currently some plants are already growing, some appear to be dead (Olsen, personal obs). .

Prepared by:

/s/ Lois J. Olsen
Lois J. Olsen
Ecologist
9-10-03

/s/ Maureen Geary
Maureen Geary
Range Technician
9-10-03

Appendix A.

Habitat Types for Important Watersheds

Copper Creek Watershed Habitat Types

df_grass	172	1%
df_juniper	163	1%
df_pinegrass	767	4%
df_snowberry	419	2%
rock	1392	7%
saf_alder	339	2%
saf_beargrass	4653	25%
saf_bedstraw	407	2%
saf_bluejoint	277	1%
saf_grousewhort	658	3%
saf_huckleberry	611	3%
saf_menziesia	4918	26%
saf_pinegrass	434	2%
saf_twinflower	1427	8%
saf_woodrush	1815	10%
trees_rock	775	4%
Total	*18,900*	

Landers Fork Watershed Habitat Types

Habitat Type	**Acres**	**Percent**
df_elksedge	6	< 1%
df_grass	6	< 1%
df_pinegrass	1835	24%
grassland	5	< 1%
meadow	100	1%
rock	55	1%
saf_alder	53	1%
saf_beargrass	2873	38%
saf_bedstraw	376	5%
saf_grousewhort	33	< 1%
saf_huckleberry	388	5%
saf_menziesia	932	12%
saf_pinegrass	120	2%
saf_twinflower	139	2%
saf_whitebark	421	5%
saf_woodrush	35	< 1%
trees_rock	172	2%
whitebark	48	1%
whitebark-saf	50	1%
Total Acres	*7660*	

Moose Watershed Habitat Types

Habitat Type	**Acres**	**Percent**
df_grass	4	< 1%
df_huckleberry	19	1%
df_pinegrass	73	4%
df_snowberry	6	< 1%
df_twinflower	249	14%
grassland	3	< 1%
pvt	0	< 1%
rock	7	< 1%
saf_beargrass	285	16%
saf_bedstraw	85	5%
saf_bluejoint	7	< 1%
saf_grousewhort	1	< 1%
saf_huckleberry	98	5%
saf_menziesia	293	16%
saf_twinflower	630	34%
spruce_dry	43	2%
spruce_moist	26	1%
trees_rock	8	< 1%
Total	*1837*	

Wasson Watershed Habitat Types

Habitat Type	Acres	Percent
df_grass	4	< 1%
df_huckleberry	16	1%
df_pinegrass	182	13%
df_snowberry	27	2%
df_twinflower	113	8%
grassland	30	2%
pvt	3	< 1%
saf_beadlily	82	6%
saf_beargrass	192	13%
saf_grousewhort	30	2%
saf_menziesia	379	26%
saf_twinflower	373	26%
spruce_dry	1	< 1%
spruce_moist	15	1%
trees_rock	8	< 1%
Total	*1447*	

References

Fire Effects Information System, http://www.fs.fed.us/database/feis

Hitchcock, C.L. and Cronquist A. 1973. Flora of the Pacific Northwest. University of Washington Press, Seattle WA. 730 pp.

Pfister, Robert D., Kovalchik, Bernard, L., Arno, Stephen F. Forest Habitat Types of Montana. USDA Forest Service. Intermountain Forest and Range Experiment Station. GTR-INT-34.

Timber Stand Management Record System, TSMRS.

Silivicultural Reconnaissance

Jack Kendley
September 8, 2003

Silvicultural reconnaissance of the Snow Talon fire was accomplished during the week of September 1, 2003 with the objective of determining the mortality to area forests from the fire. A secondary objective was to determine if forests in the area could be expected to naturally regenerate after the fire.

Current Situation:

The fire is presently over 38,000 acres in size and is unlined to the North in the Scapegoat Wilderness. Active fire behavior was observed within the fire perimeter during reconnaissance. This fire will burn until a significant change in the weather occurs.

The fire has burned in a variety of Forest Plan allocations including T-1, T-2, T-3, T-4, M-1, N-1, R-1, P-1 and W-1 (reference accompanying map). Prior to the fire, forests supported habitat for the threatened species of bull trout, lynx and grizzly bear.

The fire is burning with stand replacement activity. Copper Creek and Upper Landers drainages burned with extensive crown fires. The Indian Meadows area is burning with a mosaic of torching and underburning, both of which will be generally lethal to the lodgepole pine forests in this area. A map is attached that shows where green forests were observed during the week of September 1st, however, active burning was also observed in some of these areas.

Regeneration Prognosis:

Forests in the area are comprised of mixtures of ponderosa pine, lodgepole pine, Douglas fir Engelmann spruce and subalpine fir and whitebark pine. Most forested areas had a component of lodgepole pine and seed cast from that tree was observed in many areas. It would appear many burned areas will naturally regenerate with lodgepole pine. The attached habitat type group map displays natural regeneration potential. All polygons other than the Douglas fir grass/pinegrass/juniper should naturally regenerate.

Whitebark pine forests were prevalent near Stonewall Mountain. Portions of this area also burned with stand replacement intensity. The creation of these early seral sites may prove beneficial to whitebark pine regeneration as the Clark's nutcracker caches seed and regenerates the whitebark pine forests.

Future Management Concerns:

In some areas Douglas fir has underburned. Additional mortality will probably occur where Douglas fir has been weakened by the fire and is now susceptible to attack by Douglas fir bark beetle. This insect is active within the general area of the fire. Control measures using pheromones may be considered.

Fuel loading was heavy in the Copper Creek area before the fire and many downed fuels were not fully consumed by the burn. Fuel loading in some areas will become extreme when trees killed by the fire contribute to the present downed fuel load. Fuels in these forest types will decompose slowly and may remain heavy for several decades.

Fisheries Report

September 8, 2003
Laura Burns, District Fisheries Biologist

This report discloses the condition of the fisheries that were affected by the Snow-Talon fire. The fire affected the Copper Creek drainage and the Lander's Fork drainage which both support bull trout, a species listed as "threatened" under the Endangered Species Act (ESA). Both Copper Creek and Lander's Fork have been included as critical habitat in the Proposed Designation of Critical Habitat for the Klamath River and Columbia River Distinct Population Segments of Bull Trout (USFWS). Copper Creek is also considered a priority drainage under the Inland Native Fish Species Strategy, which was amended to the Helena National Forest Plan in 1995. Westslope cutthroat trout, a sensitive species, occupy all surveyed drainages within the fire perimeter.

Existing Condition

The Snow-Talon fire is currently uncontrolled, burning 37,000 acres to date, and is not expected to be controlled until there is a season ending event. The following chart is a summary of the streams affected by the fire, the fishery present in the stream, and the estimated severity of the fire in the watershed.

Table 1.

Stream	Fish Species	Approximate % of Drainage with High Burn Severity
Copper Creek	Bull trout, cutthroat trout, whitefish, sculpin	60%
Headwaters Copper Creek	Cutthroat trout, sculpin above FS road #330	
Headwater Copper trib (sec10 north outlet from upper Copper Lake)	Unsampled, suspect cutthroat	
Headwater Copper trib (sec 10 south)	Unsampled, suspect cutthroat	
Cotter Creek	Bull trout, cutthroat trout all below FS road#330	85%

Unamed Copper Creek trib (sec2)	Cutthroat trout downstream natural barrier	
Red Creek	Cutthroat trout downstream natural barrier	
North Fork of Copper Creek	Cutthroat trout present above intermittent reach	
Snowbank Creek	Cutthroat trout present	90%
Lander's Fork	Cutthroat trout, bull trout, brook trout, brown trout, mountain whitefish, sculpin	20%
Indian Meadows Creek	Unsampled, low flows	50%
Fickler Creek	Unsampled, low flows	Low
Baking Power Creek	Unsampled, low flows	Low
Falls Creek	Cutthroat trout	
Byrnes Creek	Unsampled, low flows	100%
Unnamed trib to Landers (sec 24 pvt)	Unsampled	100%
Tom's Gulch	Cutthroat trout	Low
Keep Cool Creek	Cutthroat trout	

The following table is a summary of the lakes affected by the fire, the fishery present in the lake, and the general severity of the fire in drainages flowing to the lake.

Table 2.

Lake	Fish Species	General Burn Severity
Upper Copper Lake	Cutthroat trout	Moderate to high
Lower Copper Lake	Cutthroat trout	Moderate to high
Snowbank Lake	Cutthroat trout (planted & natural reproduction)	High
Silver King Lake (pvt)	Unknown	Low

Fisheries Surveys

Two fishery surveys were completed in Copper Creek in the aftermath of the fire to assess the condition of the fishery. The initial fish survey was completed on August 22, 2003 to roughly differentiate the effects of the fire and the effects of a retardant drop on the fishery in Copper Creek as well as to estimate the magnitude of the loss. A draft follow up report was completed by Len Walch to document the effects of the retardant drop (draft August 27,2003). No reclamation to the retardant affected site is proposed.

Findings:

Table 3.

Location	Burn Intensity	Observed Total Fish Mortality and Size 300 foot Survey
T15NR9Wsec 1 (upstream burned Red Creek road bridge crossing)	High	3 – bull trout (2" to 5") 5 cutthroat (3" to 8") 2- sculpin No live fish observed visually
T15NR9Wsec 1 (downstream burned Red Creek road bridge crossing)	High	4 – bull trout (5") 1 – cutthroat (4") 1 – sculpin No live fish observed visually
T15N R8W sec15 at meander bend near FS road #330	Extreme due to debris loading	20 – bull trout (2" to 7") 11 – cutthroat (2" to 4") No live fish observed visually
T15N R8W sec5nw1/4 (upstream retardant drop)	Moderate to High	10 live cutthroat (YOY to 7") observed visually
T15N R8W sec5nw1/4 (downstream retardant drop)	Moderate to High	7 – cutthroat (3" to 11") No live fish observed visually

A single pass electrofishing survey of five reaches in Copper Creek was completed on September 4, 2003. This survey was conducted to determine fish presence and abundance in reaches with varying levels of burn intensity.

Findings:

Table 4.

Location	Burn Intensity	Fish Species and Size
T15N R8W sec 23 @ ¼ mile south of the burn perimeter	None	10 – cutthroat total alive 5 cutthroat (6+ ") 5 cutthroat (3" to 5") Numerous sculpins alive 1000-foot reach
T15N R8W sec15 at meander bend near FS road #330	Extreme due to debris loading	No live fish or sculpins (19" dead bull trout found) 500-foot reach
T15N R8W sec 4 at Copper Creek Campground	Light to none	12 – bull trout total alive 4 bull trout (< 3") 7 bull trout (3"to 6") 1 bull trout (21") 14 – cutthroat trout total

		alive 3 cutthroat (<3") 7 cutthroat (3" to 6") 4 cutthroat (6" to 9") Numerous sculpins alive 500-foot reach
T15NR9Wsec 1 (downstream burned Red Creek road bridge crossing)	High	4 – cutthroat total alive 3 cutthroat (3" to 6") 1 cutthroat (YOY) 500-foot reach
T15N R8W sec5nw1/4 (500 feet downstream retardant drop)	Moderate to High	7 – cutthroat total alive 2 cutthroat (3" to 6") 5 cutthroat (7" to 11") 4 – bull trout total alive 4 bull trout (3" to 6") 1 sculpin alive 500-foot reach

Conclusions/Recommendations:

In drainages that have been heavily burned fish populations may have been completely eliminated (see Table 1.). However, it does appear that in some of the moderate to highly burned reaches some fish survived. Based on visually observed mortality compared to electrofishing findings one could estimate that in Copper Creek in the vicinity of the confluence of Red and Cotter Creeks approximately 50% fish mortality may have occurred. In some other reaches, for example T15N R8W sec15 at meander bend near FS road #330, mortality was 100% based on visual observations and confirmed by electrofishing.

The most immediate concern for fisheries in the short-term (present to three years) is the high probability of mudflows and extreme sedimentation during rain on snow events during spring runoff or during summer thunderstorms. Drainages most at risk include Copper Creek, Lander's Fork and several tributaries to those drainages. It is expected that in drainages where fish are still present, such as Copper Creek, portions or even all of several year classes of fish may be lost next spring or summer. In successive years the risk for total loss of any given year class in any specific drainage will likely be reduced as the vegetation recovers. Copper Creek and Lander's Fork below Silver King Falls both function as "fluvial" metapopulations both for cutthroat trout and bull trout. Consequently, there are numerous year classes of adults currently in the Blackfoot River that will continue to return and spawn each year. Therefore, the re-colonization of the fishery is almost certainly assured. As the habitat stabilizes and improves over the next 5 to 10 years the survival of the young fish will likely reach or even exceed previous levels. In Lander's Fork upstream from Silver King Falls drainages are connected to upper Lander's Fork and several other tributaries to Lander's Fork all of which support fish populations.

Seeding *- Seeding can help reduce effects during low intensity storm events, but during more intense storms the ground cover provided by grass becomes overwhelmed. Where seeding has taken place on the Helena Forest in 1984, 1988, and 2000 there were still extreme sediment events. Based on the above and discussions with ecology and soils specialists seeding to help reduce the risk of excessive sediment delivery is not currently recommended.*

Culverts *- Many culverts are at a high risk for failure due to enhanced runoff and debris flows. The following table provides a list of suggested culvert upgrades for drainages, which support a fishery and must provide passage. INFISH requires all replacement culverts to provide for the 100-year event. In the short-term removing the culverts and not replacing them for a season would reduce risk for even higher sediment delivery associated with culvert blockage and road failure. Even the 1arger culverts could become blocked and fail during a significant run-off event thereby delivering a large mass of sediment to the stream channel. The highest priority culverts to pull for a season include those located along the head of Copper Creek road #330, a total of five culverts (one a non-fishery).*

Location	**Recommendation**
Headwater Copper trib FS #330 (sec10 north outlet from upper Copper Lake)	Pull for the first season. Replace culvert with bottomless arch culvert
Headwater Copper trib FS #330 (sec 10 south)	Pull for the first season. Replace culvert with bottomless arch culvert
Headwaters Copper Creek FS #330	Pull for the first season. Replace culvert with a preferably a bridge or bottomless arch culvert.
Cotter Creek FS#330	Pull for the first season Replace with baffled culvert
Snowbank Creek FS #330-A1	Evaluate this large bottomless arch culvert.
Snowbank Creek FS#1833	Resize with baffled culvert
Keep Cool Creek FS #1800	Resize with baffled culvert.

If roads are closed or are planned for closure in the future remove the culverts/bridges and re-establish the drainage.

Large Woody Debris (LWD) - Avoid removal of large woody debris from stream channels and associated flood plains. LWD is one of the most important contributors to future habitat and cover for fish populations. Fire is one of the primary causal agents in the recruitment of wood to streams. LWD is also critical for retention and regulation of sediments, which enter streams during runoff. Without LWD for stabilization, sediment-laden waters during peak flows act as an erosive agent that can severely degrade or unravel the channel. This sediment most often will move out through the system leaving little remaining available spawning habitat and can result in major fish kills.

Debris threats to the bridges can be individually identified and coordinated through fisheries personnel to meet the requirements of consultation.

Snowbank Lake Diversion - Provide a low area or overflow channel and armor the diversion to reduce the risk of failure. Provide a trash rack for the culvert at the entrance to the diversion ditch.

Weed Treatment - Document the amount of each chemical in each drainage to meet the requirements of consultation. Do not ford stream channels with equipment to treat weeds. Use backpack sprayers when there is no road access.

Native Fishery Value in Copper Creek

Partial paving, road re-location and culvert upgrade for Copper Creek FS Road #330 (planned prior to fire event)– Total cost =$ 800,000.00

Copper Creek Fishery Survey
August 22, 2003

A survey was conducted in the following reaches in an attempt to roughly differentiate the effects of the fire and the effects of fire suppression activities on the fishery in Copper Creek as well as to estimate the magnitude of the loss. Those present included: Len Walch, Bo Stuart, Melanie Scott and Laura Burns.

T15N R8W section 5 nw ¼ (burned August 13-14)

A small fishless pond located between road 329 and Copper Creek as well as approximately 250 to 300 feet of Copper Creek were hit by retardant during the initial attack phase of the Snow Bank fire on August 14, 2003. A survey of approximately 300 feet upstream from the retardant area found approximately 7 YOY cutthroat trout and 3 juvenile/adult cutthroat alive. No dead fish were found in this reach. Within the retardant affected area and approximately 300 feet downstream there were 7 dead cutthroat total; 4 in the 9" to 11" size class and 3 in the 3" to 4" size class. No live fish were observed in the downstream reach. The water temperature was 47 degrees F at 10:30.

A water drop test determined a high severity rating for the topsoil and a moderate severity 1" below the surface just above the pond. Approximately a mile west above the Cooper Creek road another water drop test revealed a high severity rating for both the topsoil and 1.5" below the surface.

T15NR9W section 1 mid at Red Creek road crossing over Copper Creek (burned August 14 – 16)

A survey approximately 300 feet upstream from the collapsed bridge found 8 dead fish total and 2 dead sculpins; 3 bull trout 2.5", 7" and 5" and 5 cutthroat trout all 3.5" to 8". A survey approximately 300 feet downstream from the bridge revealed 6 dead fish total and 1 sculpin; 4 bull trout all 5" and 1 cutthroat trout 4". No live fish were observed in either reach.

T15N R8W section15 n ¼ mid (burned August 19 – 20)

Copper Creek swings close to road 329 in this area. There is a tremendous amount of large diameter downfall over the creek that burned during the fire. A survey of approximately 300 feet at the meander bend found a total of 31 dead fish; 20 bull trout 3

- 7", 4 - 4" , 4 - 3", 1 – 2", and 8 YOY ; 11 cutthroat trout 7 - 4", 2 - 3" and 2 - 2". No live fish were observed in this reach. The water temperature was 50 degrees F at 13:15.

Most of the dead fish exhibited signs of being fed upon by aquatic insects.

Other thoughts and observations:

The Red Creek bridge burned during the fire and is now collapsed in the Copper Creek channel. Since the bridge was constructed with cresote treated timbers, it will be a priority to remove this material from Copper Creek during reclamation.

Cotter Creek culvert will require removal or the installation of a trash rack. There are four culverts located at the head of Copper creek (one drains a wet area). All of these culverts will need to be reviewed for temporary pulling or reinstallation with larger culverts.

The old south facing harvest units located between Red Creek and North Fork of Copper Creek should be surveyed for culverts in the jammer roads. Any culverts should be removed and the road re-countoured if they are not planned to be open in the future.

Mud/debris slides will occur over the Copper Creek road in the future. Equipment should be available for immediate clearing.

WILDLIFE

Introduction

Prior to the Lincoln Complex fires (Moose-Wasson and Snow-Talon), a wide variety of avian and terrestrial species occupied these habitats. As these fires wind down the respective habitats have undergone a drastic change and the habitat suitability has changed dramatically. The Moose-Wasson Fire burned just under 2,000 acres while the Snow-Talon fire has consumed close to 40,000 acres. The Moose-Wasson fire burned with a relatively slow rate of spread in a more mosaic pattern while the Snow-Talon fire experienced more accelerated runs with greater than 90% consumption of fuels within the fire perimeter. Unburned fuels within the perimeter of the Snow-Talon fire are still experiencing flare-ups which will likely further reduce the amount of unburned habitat before the fire is extinguished.

Due to the relatively low number of acres burned (<2,000) in the Moose-Wasson fire, its burn intensity, patchiness and lower rate of consumption within the fire perimeter, it has been determined through field review by the BAER Team that this burn area does not pose an immediate threat to life, property, or watershed and therefore will not be further addressed in this report.

Existing Condition

The Snow-Talon burn area was dominated by a mix of lodgepole pine, Douglas fir, subalpine fir, and at the higher elevations whitebark pine. Riparian vegetation, aspen, shrubs and grasslands occurred secondary. A wide array of species including, but not limited to: elk, moose, whitetail deer, mule deer, grizzly, black bear, mountain lion, lynx, snowshoe hare, numerous other rodents, grouse, and various other avian species occupied the area. Mountain goats occupy the rocky slopes and ridges at the upper reaches of the drainage from Red Mountain to Stonewall Mountain. Wolverine are also suspected to occupy the upper reaches of the drainage. Grey wolf and bald eagle may occur in the burn area occasionally as transitory migrants.

The Snow-Talon burn area encompasses numerous tributaries and headwater drainages within the watershed. These tributaries serve as a funnel for wildlife migration and facilitate migration of animals between seasonal habitats. Suitable denning habitat for grizzly bear does occur in the upper reaches of the Snow-Talon fire although there are no known den sites. Studies indicate that den site locations are not dependent upon

vegetative cover however, so the potential for bears to den within the burn area still exists.

The Copper Creek drainage contained suitable lynx habitat prior the Snow-Talon fire and supported the highest concentration of lynx on the district. That habitat has been almost entirely consumed by the fire.

Summary

BAER activities are generally expected to benefit wildlife through erosion control and landscape stabilization efforts that help protect and promote natural recovery of burn areas. Recovery of native vegetation is the most desirable for the restoration of wildlife habitat. The current burned condition provides minimal wildlife habitat and will gradually improve with each consecutive year as natural regeneration improves. Lodgepole pine, whitebark pine, riparian, aspen and grassland habitats are anticipated to regenerate well. Douglas fir and subalpine fir habitats are expected to experience slower recovery and will be monitored to determine if additional measures are necessary to stimulate recovery. Some regeneration is already occurring, primarily along stream and riparian corridors where water is more readily available however most of the burn area will not experience any significant regeneration until spring green up and in subsequent years.

The following recommendations are general in nature, perhaps more applicable to suppression efforts than to BAER activities. In considering the effects to life, property, and watershed there are no recommended actions for wildife other than applying the following guidelines during the implementation of other BAER prescriptions.

Recommendations

To the extent possible, minimize creation of permanent and temporary travel ways and machine built firelines that could facilitate increased access by competitors and snowmobiles.

Implement appropriate road closures as soon as possible on any roads opened during fire suppression activities that previously had travel restrictions in place. Closures for these roads should be addressed in fire suppression rehab although additional measures may need to be taken to prevent unauthorized travel.

Implement necessary actions to insure fireline reclamation and to protect firelines from unauthorized vehicle travel.

To the extent possible develop seed mixes that minimize the use of palatable species in those areas with the potential for bear/human conflicts.

Report any grizzly bear/human confrontations.

Implement as much of the work (i.e. culvert removal and/or replacement, road and fireline reclamation, contour falling, and seeding) in the fall to minimize disturbance in the spring when reproduction and emergence are occurring.

Adhere to food storage orders during the course of fire suppression rehab and BAER activities in burn area to minimize the potential for bear/human conflicts

Pat Shanley
District Biologist
Lincoln Ranger District – Helena N.F.

Treatment Specifications

- Hazard Tree Felling
- Trail Treatments
- Road Treatments
- Noxious Weeds

Hazard Tree Removal

General Description of Treatment Method
Trees within one tree length of Forest Service system roads that are; greater than seven inches, damaged or killed by fire, and pose an immediate threat to public safety or property, will be felled. All trees within and adjacent to developed facilities that pose an immediate threat to public safety or property will be removed.

For safety reasons it is recommended wherever possible to utilize a feller/buncher. This method also limits tree breakage and allows for directional placement of trees.

Roads include: the Copper Creek Road – FDR#330, Indian Meadows Road – FDR#1882, Sucker-Keep Cool Road – FDR#1821, Cotter Mine Road – FDR# 330-B1 and Nevada-Ogden Road – FDR#1163.

The developed sites include: Copper Creek Campground, Indian Meadows trailhead, outfitter corrals at the Indian Meadows trailhead and the Indian Meadows Guard Station.

Road Descriptions:

Keep Cool Creek – FDR#1882. Approximately 0.9 miles of road will require hazard tree removal. Tree felling is necessary on the north (uphill) side of the road only. Trees are approximately 50 feet tall, have an average DBH of 8 inches and mostly Lodgepole pine. Mortality is mixed with few remaining live Douglas fir. Treatment consists of approximately 6 acres. A combination of hand felling and feller/buncher will be recommended.

Production Rate Assumptions
1 felling crew can accomplish approximately 1.0 acre a day.
A feller/buncher can fall approximately 5 – 6 acres a day. I estimate that this portion of the road will take approximately 1 day of work for a felling crew and 1 day of work for a feller/buncher.

Cost Development (10 hour days)

PERSONAL/EQUIPMENT	COST/day	EST. TIME	TOTAL
1 felling crew	522.00	1.5	783.00
Feller/buncher	1700.00	1.0	1700.00
Grapple skidder	940.00	1.0	940.00
Mobilization	700.00	1	700.00
Total			4,123.00

Copper Creek Road – FDR#330. Approximately 8.7 miles of road within FS ownership will require hazard tree removal.

M.P. 0.0 – 2.9(Copper Creek Campground) Tree felling is required on both sides of the road for the entire length. Trees are approximately 80 feet tall, average DBH of 13 inches and include a mixture of conifer species including Douglas fir, lodgepole pine, subalpine fir and Engelmann spruce. Most of the trees are dead. The majority of the hazard tree felling along this road segment can be accomplished with a feller/buncher while short segments will require hand felling. Treatment consists of approximately 58 acres, of which, approximately 6 acres will require hand felling.

Production Rate Assumptions
1 felling crew can accomplish approximately 1.0 acre a day.
Feller/buncher can fall approximately 5 acres a day.

Cost Development (10 hour days)

PERSONAL/EQUIPMENT	COST/day	EST. TIME	TOTAL
1 felling crew	522.00	6	3,132.00
Feller/buncher	1700.00	10.4	17,680.00
Grapple skidder	940.00	10.4	9,776.00
Mobilization	700.00	1	700.00
total			31,288.00

M.P. 2.9 – 5.0 (Red Creek) Tree felling is required on both sides of the road for the entire length. Trees are approximately 60 feet tall, average DBH is 10 inches, consisting of primarily lodgepole pine. Mortality appears mixed, however it is expected that most lodgepole pine displaying fire scars will die. The majority of the hazard tree felling along this road segment can be accomplished with a feller/buncher while short segments along the creek will require hand felling. Treatment consists of approximately 31 acres, of which, approximately 10 acres will require hand falling.

Production Rate Assumptions
1 felling crew can accomplish approximately 1.5 acres a day.
Feller/buncher can fall approximately 6 acres a day.

Cost Development (10 hour day)

PERSONAL/EQUIPMENT	COST/day	EST. TIME	TOTAL
1 felling crew	522.00	6.7	3,498.00
Feller/buncher	1700.00	3.5	5950.00
Grapple skidder	940.00	6.0	5,640.00
Mobilization	--	--	--
Total			15,088.00

M.P. 5.0 – 8.7 (gate). Tree felling is required on both sides of the entire length. Tree are approximately 60 feet tall, average DBH of 12 inches, consisting of mostly lodgepole and subalpine fir. The majority of the hazard tree felling along this road segment will require a combination of hand felling and feller buncher. The trees are very scattered. Several segments of road will require no trees to be felled. Treatment consists of approximately 40 acres of which approximately 15 acres will require hand falling.

Production Rate Assumptions
1 felling crew can accomplish approximately 2.0 acres a day.
Feller/buncher can fall approximately 8 acres a day.

Cost Development (10 hour day)

PERSONAL/EQUIPMENT	COST/day	EST. TIME	TOTAL
1 felling crew	522.00	7.5	3,915.00
Feller/buncher	1,700.00	3.0	5,100.00
Grapple skidder	940.00	5.0	4,700.00
Mobilization	--	--	--
Total			13,715.00

Cotter Mine Road – FDR#330-B1. Approximately 2.6 miles of road will require hazard tree removal.

M.P. 0.0 – 1.3 Tree felling is required on both sides of the entire length. Trees are approximately 60 feet tall and average DBH of 10 inches. The trees are very scattered. All trees are dead. Treatment consists of approximately 19 acres. Hand falling is required.

Production Rate Assumptions
1 felling crew can accomplish approximately 2.0 acres a day.

Cost Development (10 hour day)

PERSONAL/EQUIPMENT	COST/day	EST. TIME	TOTAL
1 felling crew	522.00	9.5	4,959.00
Feller/buncher	--	--	--
Grapple skidder	940.00	9.5	8,930.00
Mobilization	--	--	--
Total			13,889.00

M.P. 2.4 – 3.7 Tree felling is required on both sides of the entire length. Trees are approximately 75 feet tall and average DBH of 14 inches. The trees are old, large whitebark pine. All trees are dead. Treatment consists of approximately 23 acres. Hand falling is required.

Production Rate Assumptions
1 felling crew can accomplish approximately 1.0 acre a day.

Cost Development (10 hour day)

PERSONAL/EQUIPMENT	COST/day	EST. TIME	TOTAL
1 felling crew	522.00	23	12,006.00
Feller/buncher	--	--	--
Grapple skidder	940.00	23	21,620.00
Mobilization			
Total			32,626.00

Indian Meadows – FDR#1882. Approximately 2.0 miles of road will require hazard tree removal.

M.P. 0.0 – 1.0 Tree felling is required on both sides of the road for the entire length. Trees are approximately 65 feet tall, average DBH is 13 inches and species composition includes mostly lodgepole pine and Douglas fir. Mortality is mixed. Most of the hazard tree felling along this segment will require hand falling. Treatment consists of approximately 16 acres.

Production Rate Assumptions
1 felling crew can accomplish approximately 1 acre a day.

Cost Development (10 hour day)

PERSONAL/EQUIPMENT	COST/day	EST. TIME	TOTAL
1 felling crew	522.00	16	8,352.00
Feller/buncher	--	--	--
Grapple skidder	940.00	16	15,040.00
Mobilization	--	--	--
Total			23,392.00

M.P. 1.0 – 2.0 Tree felling is required on both sides of the road for the entire length. Trees are approximately 65 feet tall, average DBH is 13 inches and the dominant tree species are mostly lodgepole pine and Douglas fir. Mortality is mixed. Most of the hazard tree felling along this segment can be accomplished with a feller/buncher. Treatment consists of approximately 16 acres.

Production Rate Assumptions
1 feller/buncher can accomplish approximately 6 acres a day.

Cost Development

PERSONAL/EQUIPMENT	COST/day	EST. TIME	TOTAL
1 felling crew	--	--	--
Feller/buncher	1,700.00	2.7	4,590.00
Grapple skidder	940.00	2.7	2,538.00
Mobilization			
Total			7,128.00

Nevada-Ogden Road – FDR#1163. Tree felling is required on the southeast side of the road for approximately 0.2 of a mile. Trees are approximately 6 feet tall, average DBH is 9 inches and species composition is made up of mostly lodgepole pine. Mortality is mixed but all lodgepole pine with bole scorch will die and should be removed. Most of the hazard tree felling along this segment can be accomplished with a feller/buncher. Treatment consists of approximately 1.5 acres. Lowboy access is available to the site.

Production Rate Assumptions
1 feller/buncher can accomplish approximately 6 acre a day.

Cost Development

PERSONAL/EQUIPMENT	COST/day	EST. TIME	TOTAL
1 felling crew	--		
Feller/buncher	1,700	0.3	510.00
Grapple skidder	940.00	0.3	282.00
Mobilization	700	1	700.00
Total			1,492.00

Developed Site description:
Copper Creek Campground. Approximately 4- 5 acres of hazard tree removal is necessary within the campground. All size class trees, as described by the Developed Recreation forester will be removed. This treatment can be accomplished using a feller/buncher.

Production Rate Assumptions
1 day with the feller/buncher

Cost Development (10 hour day)

PERSONAL/EQUIPMENT	COST/day	EST. TIME	TOTAL
1 felling crew			
Feller/buncher	1,700.00	1.0	1,700.00
Grapple skidder	940.00	1.0	940.00
Mobilization			
Total			2,640.00

Indian Meadows Trailhead. Approximately 4- 5 acres of hazard tree removal is necessary within the campground. All size class trees, as described by the Developed Recreation forester will be removed. This treatment can be accomplished using a feller/buncher.

Production Rate Assumptions
1 day with the feller/buncher

Cost Development (10 hour day)

PERSONAL/EQUIPMENT	COST/day	EST. TIME	TOTAL
1 felling crew			
Feller/buncher	1,700	1.0	1,700.00
Grapple skidder	940.00	1.0	940.00
Mobilization	--	--	--
Total			2,640.00

The majority of the hazard trees around the outfitter corrals and Indian Meadows Guard station will be removed with the roadside hazard tree removal.

BAER – Hazard Tree Removal Summary

Summary Treatment Method:

Road Name	Length (miles)	Acres	Method	Cost
Keep Cool	0.9	6	1.0 hand 5.0 machine	4,123.00
Copper Creek	8.7	129	31.0 hand 98.0 machine	60,091.00
Cotter Mine	3.7	42	42.0 hand	41,667.00
Indian Meadows	2.0	32	16.0 hand 16.0 machine	30,520.00
Copper Ck CMPGD	0.2	5	5.0 machine	2,640.00
Indian Meadows	0.2	5	5.0 machine	2,640.00
Nevada Ogden	0.1	1.5	1.5 machine	1492.00
Total		220.5	90 hand 130.5 machine	149,021.00

Summary Treatment Method (hand felling in INFISH buffer):

Road Name	Length (miles)	Acres	Method	Cost
Keep Cool	0.9	6	3.0 hand 3.0 machine	6,197.00
Copper Creek	8.7	129	82.0 hand 47.0 machine	96,028.00

Cotter Mine	3.7	42	42.0 hand	47,515.00
Indian Meadows	2.0	32	16.0 hand 16.0 machine	30,520.00
Copper Ck CMPGD	0.2	5	3.0 machine 2.0 hand	3,774.00
Indian Meadows	0.2	5	4.0 machine 1.0 hand	3,774.00
Nevada Ogden	0.1	1.5	1.5 machine	1492.00
Total		220.5	146 hand 74.5 machine	189,300.00

Trails

There are 7 trails on the Lincoln District that have been affected by the Snow Talon fire. The fire destroyed many of the drainage structures on these trails. Stream and spring flows are expected to increase and deliver increased sediment loads to the streams. There will also be increased resource damage as a result of increased stream/spring flows. To help alleviate the expected resource problems drainage structures are required on these trails. Below is a list of the trails and the structures needed to minimize resource damages. Puncheons are constructed to protect the resources by bridging streams and wet areas to help decrease the amount of sediment that is delivered to streams, thereby maintaining better water quality.

Landers Fork Trail #438: 7 Miles affected by the fire.

80 water diversion structures, native material water bars and/or drain dips.

Lone Mountain Trail #477: 5.5 Miles affected by the fire.

50 water diversion structures, native material water bars and/or drain dips.

1 – 20 ft. puncheon bridge.

Main Line Trail #481: 6 Miles affected by the fire.
45 water diversion structures, native material water bars and/or drain dips.
135 feet of puncheon destroyed.
6 wooden culverts.

Heart Lake Trail #424: 2 Miles affected by the fire.
20water diversion structures, native material water bars and/or drain dips.

Stonewall Snowbank Trail #418: 4 Miles affected by the fire.
50 water diversion structures, native material water bars and/or drain dips.

Copper Lakes Trail #485: 2 Miles affected by the fire.
40water diversion structures, native material water bars and/or drain dips.

Drainage structures: $60.00 each
Puncheon structures. $200.00/foot
Wooden Culverts: $200.00 Ea.

Drainage structures: 285 x $60 = $17,100.00

Puncheon structures:	155 ft x $200 =	$31,000.00
Wooden Culverts:	6 x $200 =	$ 1,200.00
Total		$49,200.00

Stonewall trail is getting some rehab by the fire but will need some more work later, seeding and more trail work and signing. The cost estimate is approximately $5000.00.

Roads

SnowTalon Fire BAER Costs - September 10, 2003						
Item	**Quantity**	**Unit Price**	**Total**	**Remarks**		
Road 1881 & Spurs						
Dips	83	$150	$12,450			
Culvert Removal	3	$1,000	$3,000			
48" culvert	1	$4,000	$4,000			
24" culvert	3	$2,500	$7,500			
Culvert Overflows	4	$2,500	$10,000			
Total			$36,950			
Road 330						
30' Bridge	1	$30,000	$30,000	MP 14.1 Copper Creek		
Rock Spillway	1	$10,000	$10,000	At Snowbank Bridge		
Bottomless Arch	1	$13,000	$13,000	MP 14.15 Above gate		
54" culvert	1	$5,000	$5,000	MP 11.8 Cotter Creek		
36" culvert	2	$3,000	$6,000	MP 13.7 & 15.0		
Sm Trash Racks	20	$500	$10,000			
Culvert Overflows	3	$2,500	$7,500			
Total			$81,500			
Road 330-A1						
Culvert Removal	2	$1,000	$2,000			
24" culverts	2	$2,500	$5,000			
30" culvert	1	$2,750	$2,750			
Dips	10	$150	$1,500			
Clean Ditch	2.4	$1,000	$2,400			
Culvert Overflows	3	$2,500	$7,500			
Total			$21,150			

Road 1832-A2						
42" culvert	1	$3,500	$3,500			
Culvert Overflow	1	$2,500	$2,500			
Total			$6,000			
Road 771						
Remove Bridge	1	$5,000	$5,000	Red Creek Bridge		
Dips	5	$150	$750			
Total			$5,750			
Road 330-B1						
Dips	63	$150	$9,450			
Total			$9,450			
Road 1832						
24" culverts	3	$2,500	$7,500			
36" culvert	1	$3,000	$3,000			
Dips	22	$150	$3,300			
Culvert Overflow	4	$2,500	$10,000			
Culvert Removal	4	$1,000	$4,000			
Total			$27,800			
Road 1800						
60" culvert	1	$5,500	$5,500			
Culvert Overflow	1	$2,500	$2,500			
Rock Spillway	1	$10,000	$10,000	Copper Creek Bridge		
Total			$18,000			
Road 1883						
Culvert Removal	3	$1,000	$3,000			
48" culvert	1	$4,000	$4,000			
36" culvert	2	$3,000	$6,000			
Culvert Overflow	3	$2,500	$7,500			
Dips	48	$150	$7,200			

Total			$27,700			
Road 1821						
48" culvert	1	$4,000	$4,000			
Culvert Overflow	1	$2,500	$2,500			
Total			$6,500			
Contract Prep	15	$250	$3,750			
Contract Admin	25	$250	$6,250			
Grand Total			$250,800			

Weed Treatment

Snow-Talon Fire: Costs for one treatment

Chemicals			
Tordon	$85.00	640.00	$7,253.33
2,4D	$9.50	13.00	$32.93
Surfactant	$8.50	213.00	$362.10
dye	$7.00	75.00	$525.00
Labor		**Used**	
Spray Truck /per hour	$60.00	72.00	$4,320.00
Gaters /per hour	$80.00	272.00	$21,760.00
Tender /per day	$500.00	30.00	$15,000.00
Backpack Sprayer/hr.	$150.00	28.00	$4,200
			$53,453.37

The targeted open or clearcut acres for treatment are as follows:

Upper Copper 108 acres
Snowbank Lake 20 acres
Indian Meadows 85 acres
Lower Copper 147 acres
Keep Cool 93 acres

Cost estimates were based on 60% of the targeted acres for open areas.

Road acres for treatment are as follows:

Copper Creek drainage: 201 acres
Snowbank drainage: 32 acres
Cotter Creek drainage: 28 acres
Red Creek drainage: 16 acres
Indian Meadows: 21 acres
Stonewall to Keep Cool: 70 acres

Cost estimates were based on 100% of the targeted acres for roadsides.

Moose-Wasson Fire: Costs for one treatment

Chemicals			
Tordon	$85.00	76 acres	$861.33
2,4D	$9.50		$0.00
Surfactant	$8.50	103.00	$175.10
dye	$7.00	3.00	$21.00
Labor			
Spray Truck /per hour	$60.00	2.00	$120.00
Gaters /per hour	$80.00	76 acres	$6,080.00
Tender /per day	$500.00	7.00	$3,500.00
Backpack Sprayer			$10,757.43

103 acres of clearcuts

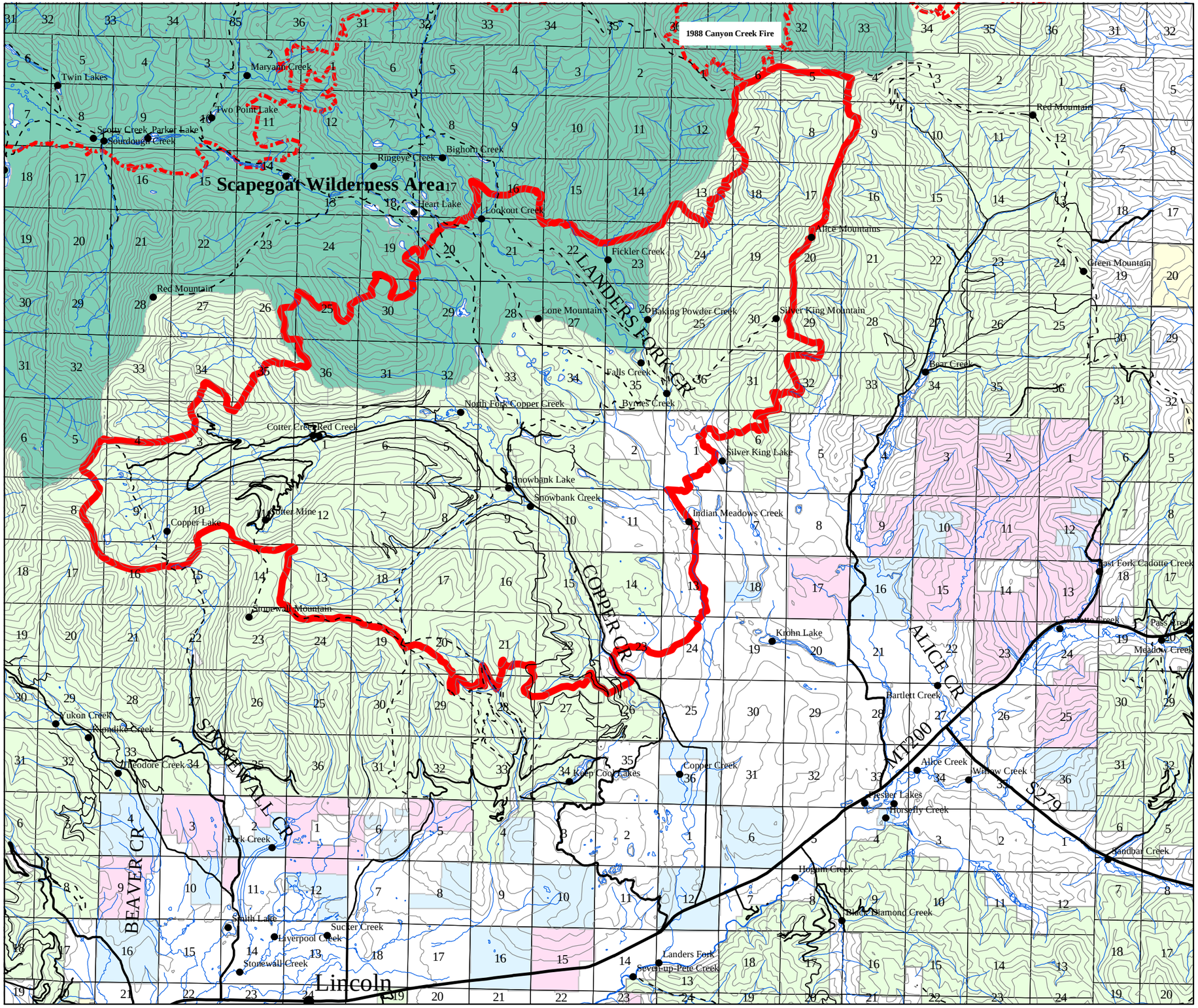
Cost estimates were based on 60% of the targeted acres for clearcuts/openings.

14 acres of roadside

Cost estimates were based on 100% of the targeted acres for roadsides.

FIRE PERIMETER
Map No. 1

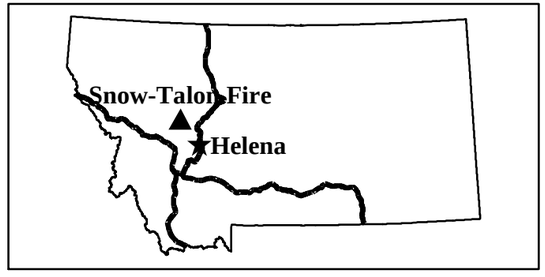
USFS Baer
Emergency Rehabilitation Plan
Snow Talon Fire
Helena National Forest, Montana



- Fire Perimeter 9/08/2003
- Roads
- Streams
- Helena Forest Service
- Scapegoat Wilderness
- BLM
- State
- Plum Creek
- Private
- 1988 Canyon Creek Fire

0 0.5 1 2 3 4 Miles

N

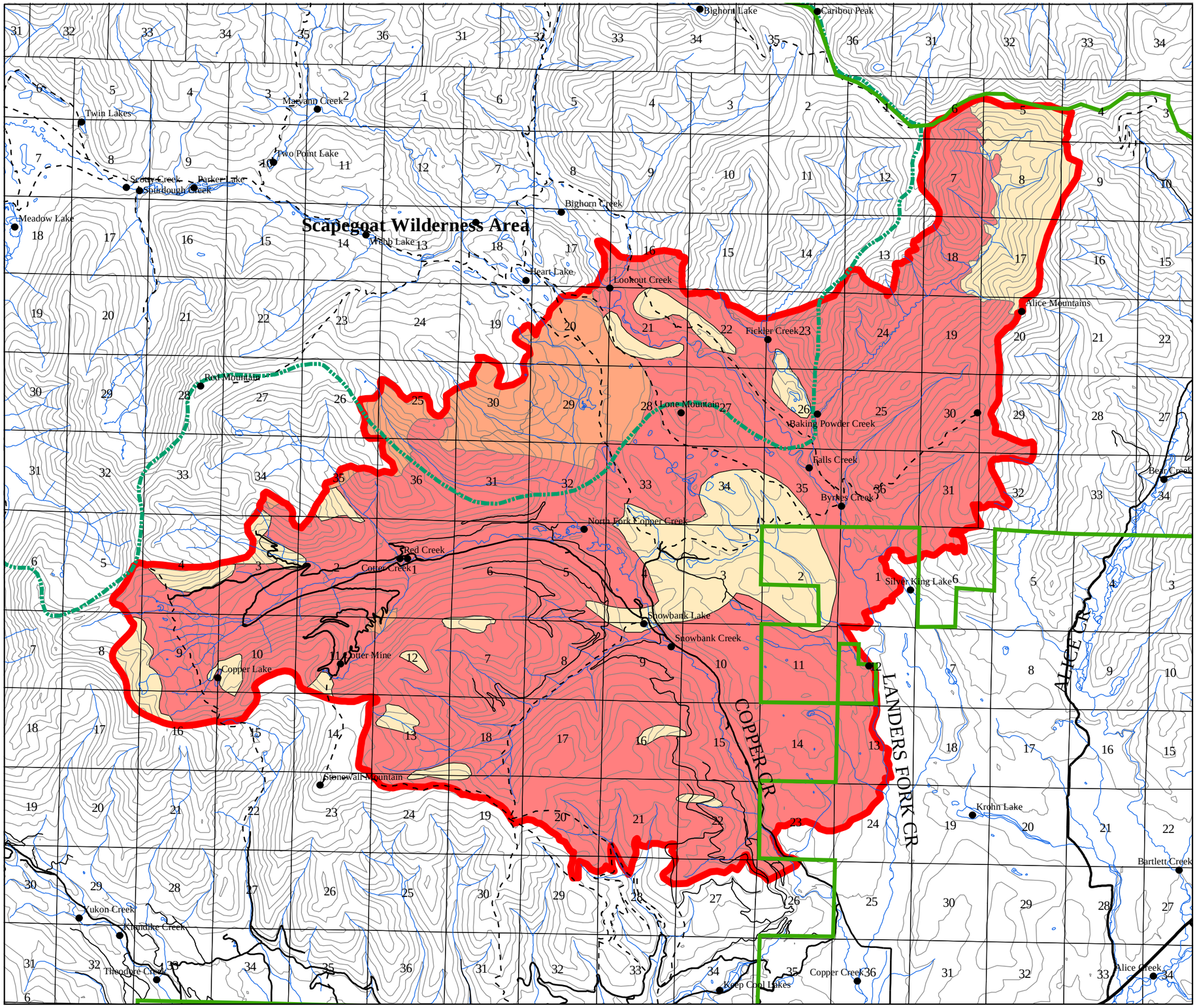


Disclaimer: Source data of varying accuracies, scales, and dates were used for map production. Not all data shown have been field checked or verified, and are provisional for the purposes of display and BAER team planning

Chip Fisher 09/15/2003

BURN SEVERITY
Map No. 2

USFS Baer
Emergency Rehabilitation Plan
Snow Talon Fire
Helena National Forest, Montana



Fire Perimeter 9/08/2003

Helena National Forest Boundary

Scapegoat Wilderness

Roads

Streams

Burn Severity

Low

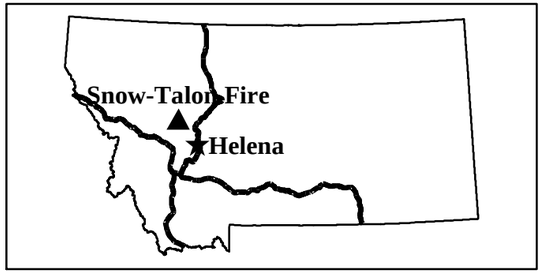
Mod

High

Scale 1: 80,000

0 0.5 1 2 Miles

N



Disclaimer: Source data of varying accuracies, scales, and dates were used for map production. Not all data shown have been field checked or verified, and are provisional for the purposes of display and BAER team planning

Chip Fisher 09/15/2003

LANDTYPES AND SOIL EROSION POTENTIAL
Map No. 3

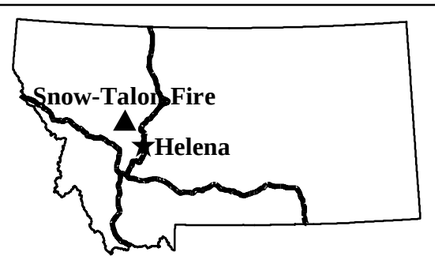
USFS Baer
Emergency Rehabilitation Plan
Snow Talon Fire
Helena National Forest, Montana

Fire Perimeter 9/08/2003
Helena National Forest Boundary
Scapegoat Wilderness
Roads
Streams

Landtypes Grouped By Soil Erosion Potential
Low Erosion Potential
Moderate Erosion Potential
High Erosion Potential
Landslides (High Erosion Potential)
Water
No Landtype Data Available

Scale 1: 80,000
0 0.5 1 2 Miles

N

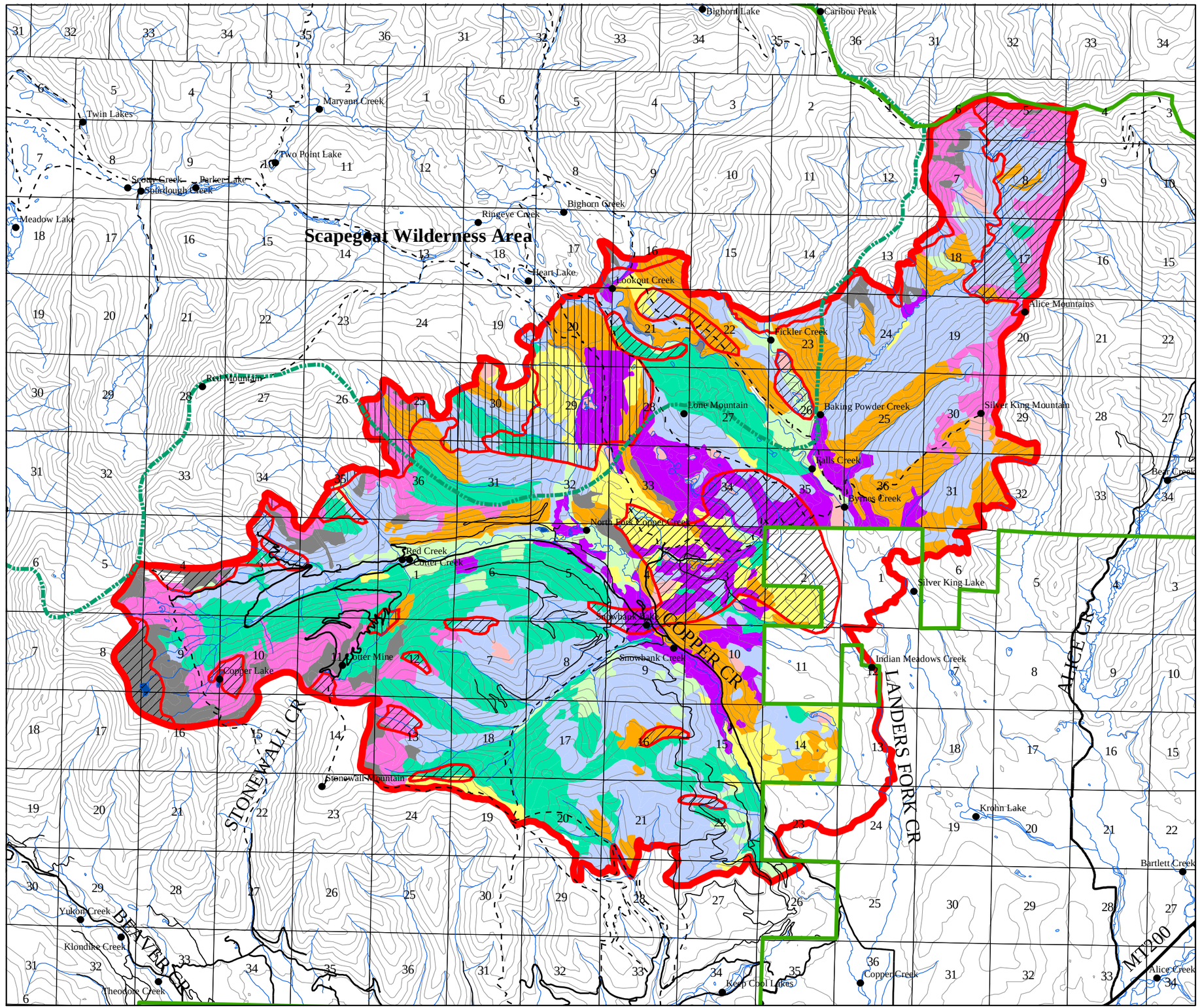


Disclaimer: Source data of varying accuracies, scales, and dates were used for map production. Not all data shown have been field checked or verified, and are provisional for the purposes of display and BAER team planning

Chip Fisher 09/15/2003

VEGETATION HABITAT TYPES AND BURN SEVERITY
Map No. 4

USFS Baer
Emergency Rehabilitation Plan
Snow Talon Fire
Helena National Forest, Montana



- Fire Perimeter 9/08/2003
- Helena National Forest Boundary
- Scapegoat Wilderness
- Roads
- Streams

Vegetation Habitat Type

- Grassland/Meadow
- Subalpine fir/beargrass
- Subalpine fir/menziesia
- Douglas-fir/pinegrass
- Subalpine fir/grouse whort.
- Subalpine fir/twinflower
- Subalpine fir/woodrush
- Subalpine fir/bedstraw
- Water
- Rock/Sparce Vegetation
- private

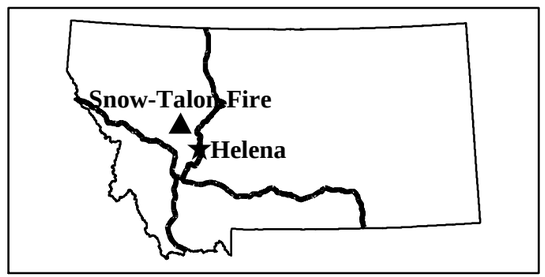
Burn Severity

- Low
- Mod
- High

Scale 1: 80,000

0 0.5 1 2 Miles

N



Disclaimer: Source data of varying accuracies, scales, and dates were used for map production. Not all data shown have been field checked or verified, and are provisional for the purposes of display and BAER team planning

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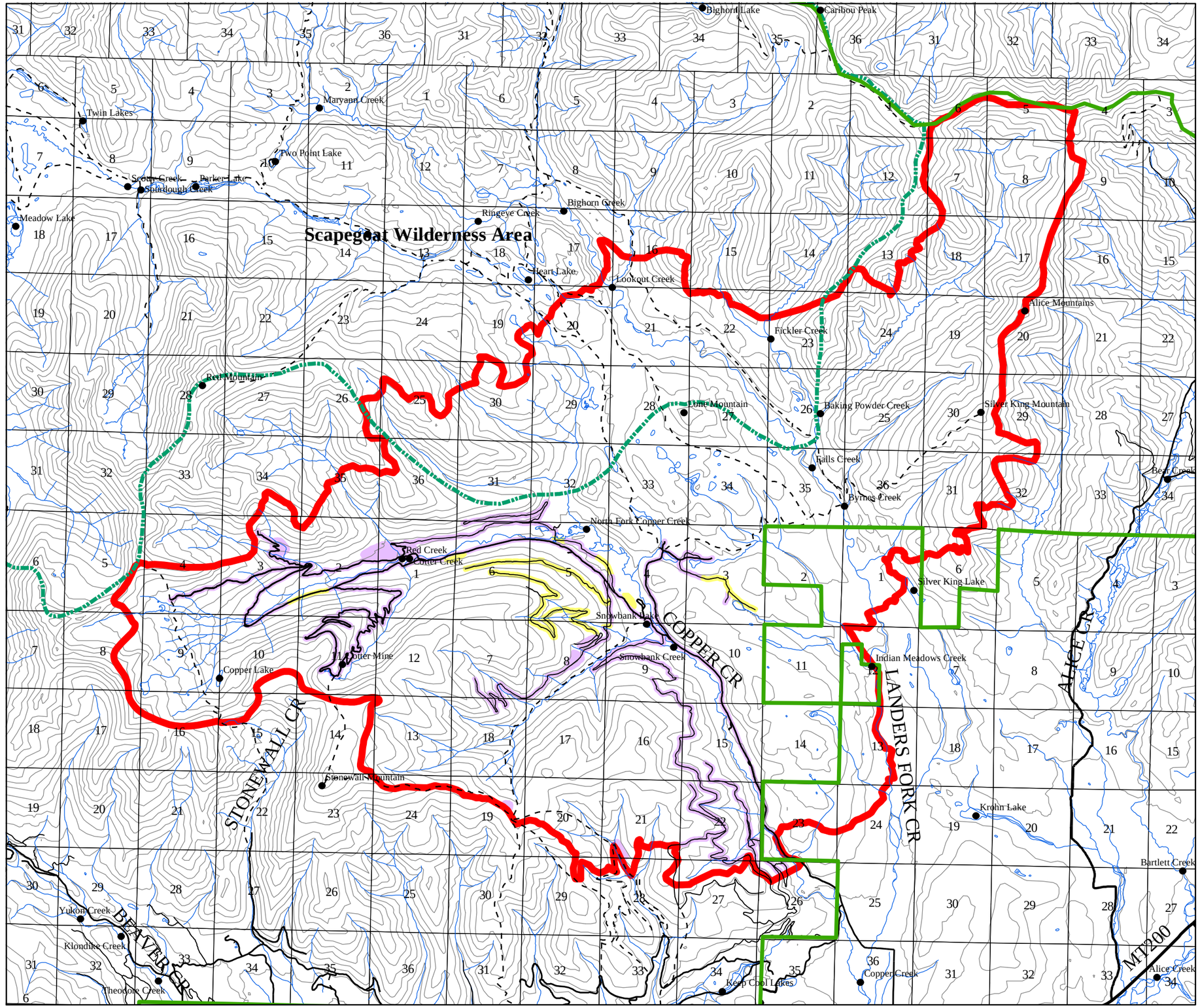
WEED TREATMENT AREAS
Map No. 5

USFS Baer
Emergency Rehabilitation Plan
Snow Talon Fire
Helena National Forest, Montana



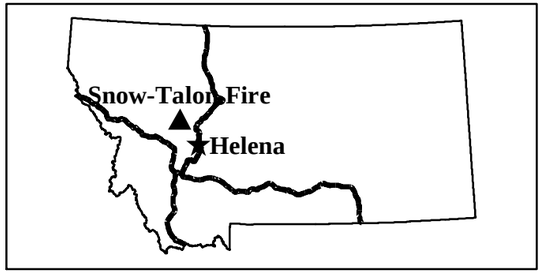
Fire Perimeter 9/08/2003
Helena National Forest Boundary
Scapegoat Wilderness
Roads
Streams

Weed Species Treatment Areas
Spotted Knapweed
Dalmation Toadflax and Butter and Eggs

Scale 1: 80,000

0 0.5 1 2 Miles

N



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Chip Fisher 09/15/2003


Trees Die of Shock!