

Fern Lake Fire

Emergency Stabilization Plan and Burned Area Rehabilitation Plan

UNIT: Rocky Mountain National Park (National Park Service)

LOCATION: Estes Park, Colorado

DATE: February 21, 2012

PREPARED BY: Nathan Williamson, Fire Ecologist and Charlie Reynar, Fire/Fuels Technician,
Rocky Mountain National Park

Reviewed By: Ben Bobowski
Ben Bobowski, Chief of Resource Stewardship

Submitted By: Vaughn L. Baker
Vaughn L. Baker, Superintendent

FIRE LOCATION AND BACKGROUND INFORMATION

Fire Name	Fern Lake Fire
Fire Number	CO-RMP-000975
Agency Unit	Rocky Mountain National Park
Region	Intermountain Region
State	Colorado
County(s)	Larimer
Ignition Date/Cause	October 9, 2012 Human caused
Date Contained	Uncontained as of February 21, 2013
Jurisdiction	National Park Service
Acres	3,498

EXECUTIVE SUMMARY

This combined Emergency Stabilization and Burned Area Rehabilitation plan addresses the post-fire response to impacts resulting from the Fern Lake Fire that burned on Rocky Mountain National Park lands in Larimer County, Colorado. Lands addressed in this plan are administered by the U.S. Department of Interior (DOI), National Park Service (NPS). The Plan was prepared in accordance with the *Department of the Interior Departmental Manual, Part 620: Wildland Fire Management, Chapter 3: Burned Area Emergency Stabilization and Rehabilitation DM 620 Part 3: Burned Area Emergency Stabilization and Rehabilitation, Reference Manual-18, the Interagency Burned Area Emergency Response Guidebook, and the Interagency Burned Area Rehabilitation Guidebook*, and the draft *Interagency Burned Area Rehabilitation Guidebook*.

A Burned Area Emergency Response (BAER) Team conducted an analysis of fire effects using aerial and ground reconnaissance methods throughout the fire area, plus knowledge of the area from previous work. The watershed specialists assessed and mapped the overall fire impacts on watershed conditions and developed a soil burn severity map (see initial Soil and Water Resource Damage Assessment in Appendix B and Resource Advisor Report in Appendix C). The vegetation specialists assessed the impacts of the fire and associated suppression activity on vegetation resources, including mapping noxious invasive weed populations and fire-induced vegetation mortality (e.g. willow and aspen). The cultural resources specialist will assess the impacts of the fire and associated suppression activity on known cultural sites to determine if these sites require emergency stabilization or protective treatments to prevent further damage or loss. The wildlife biologists will assess the impacts of the fire and associated suppression activity on Federally Threatened and Endangered (T&E) species and Species of Management Concern as well as impacts to the elk winter range keystone species (aspen and willow). The Geographic Information System (GIS) specialist gathered data layers necessary for the BAER Plan, coordinated GIS activities, and produced maps for analysis.

The resource assessments produced by these specialists are contained in this plan and individual treatment activities that have been identified in the resource assessments are located in the treatment specifications (Part E and Part F) sections and summarized in Table 1.

Appendix D contains a list of the National Environmental Policy Act (NEPA) environmental compliance documentation that exists in the park to allow for BAER and BAR treatments. All proposed actions are either categorically excluded from NEPA or are covered in existing land management plans with approved decision documents. The park's 2006 Vegetation Restoration Management Plan did not go through NEPA compliance but provides best management practices for vegetation restoration that are listed in other park management plans as mitigation measures.

TABLE 1 - SUMMARY OF TREATMENT COSTS FY2013 Through FY2016				
Assessment Area	TREATMENT	ES	BAR	COSTS
Vegetation	BAER/ES Exotic Plant Treatment	X		\$ 28,762
Vegetation	BAR Exotic Plant Treatment		X	\$ 56,338
Vegetation	BAER/ES Limber Pine Assessment	X		\$ 1,707
Vegetation	BAR Limber Pine Restoration		X	\$ 22,540
Vegetation	BAER/ES Construct fence to protect willow seed source	X		\$ 76,595
Vegetation	BAR Rehabilitate willow in existing fences		X	\$ 69,552
T/E	ES - Greenback Cutthroat Trout Assessment	X		\$ 30,587
T/E	ES - Boreal Toad Disease Assessment	X		\$ 850
T/E	BAR - Greenback Cutthroat Trout Assessment		X	\$ 55,530
T/E	BAR - Boreal Toad Disease Assessment		X	\$ 2,550
Cultural	Condition Assessments/Arch Sites		X	\$6,602
Watershed/Soils	Watershed and Soils - signs/info	X		\$ 12,537
Facilities	B1-24-5 Wuh Creek Multi-use Bridge		X	\$ 76,512
Facilities	B1-24-6 Multi-use Bridge		X	\$ 32,707
Facilities	Backcountry Sign		X	\$ 428
Facilities	Multi-tiered historic rock retaining walls		X	\$ 9,570
Facilities	Outside retaining structures		X	\$ 29,865
Facilities	Cub Creek Campsite		X	\$ 10,060
Facilities	Kailey Pumphouse		X	\$ 5,266
	Emergency Stabilization Total Costs		ES	\$ 151,039
	BAR Total Costs		BAR	\$ 377,519
TOTAL COSTS				\$ 528,557

Team Organization

Position	Team Member	Affiliation	Discipline
	Danny Basch	NPS	Facilities
	Jim Bromberg	NPS	Exotic Vegetation
	Carl Chambers	USFS	Hydrology
	Jim Cheatham	NPS	Exotic Vegetation
	Jeff Connor	NPS	Natural Resources
	Dave Hammond	NPS	GIS
	Therese Johnson	NPS	Native Vegetation
	Mike Lewelling	NPS	Fire Management
	John Mack	NPS	Natural Resources
	Paul McLaughlin	NPS	Hydrology
	Charlie Reynar	NPS	Project Co-Lead
	Eric Schroder	USFS	Soils
	Kevin Soviak	NPS	Trails
	Karen Waddell	NPS	Cultural Resources
	Mary Kay Watry	NPS	Wildlife
	Nate Williamson	NPS	Project Co-Lead

Statement of Need

The Fern Lake Fire has been assessed by the BAER Team and it was determined that there were significant impacts to park facilities and trails, potential impacts to human life and safety, and potential impacts to natural and cultural resources. Therefore the primary objectives of this plan are:

Emergency Stabilization Objectives

- Determine the need for emergency treatments to minimize threats to life or property (including unique and immediately threatened cultural and natural resources) resulting from the effects of the Fern Lake fire.
- Prescribe and implement necessary treatments to minimize threats to life or property resulting from the effects of the Fern Lake fire.

Burned Area Rehabilitation Objectives

- Evaluate actual and potential long-term post-wildfire impacts to critical cultural and natural resources, identifying those areas unlikely to recover naturally from severe wildfire damage.
- Develop and implement cost-effective plans to emulate historical or pre-wildfire ecosystem structure, function, diversity, and dynamics consistent with approved land management plans, or if that is infeasible, to restore or establish the integrity of a stable ecosystem in which native species are well represented.
- Repair or replace wildfire damaged minor facilities.

Fern Lake Fire Background

The Fern Lake Fire (Figure 1) started in Rocky Mountain National Park on Tuesday, October 9, 2012, from an illegal backcountry campfire. The fire started in steep and rugged Forest Canyon. Firefighters from across the country battled the fire for two months. On the night of November 30, and the early morning of December 1, strong winds pushed the fire more than three miles in thirty-five minutes, prompting evacuation orders. Through careful planning and rapid action, firefighters successfully prevented the fire from progressing across Bear Lake Road and leaving the park. While the fire was making a run through Moraine Park, firefighters successfully burned out around the Bear Lake Road in the face of 70 mph winds. In addition, two engine crews successfully suppressed several spot fires within the Kaley Cottage Cabins on the south side of Moraine Park. These two efforts stopped the fire from jumping the Bear Lake Road and burning into the Highway 66 corridor where homes and businesses were threatened. Previously completed hazard fuels projects were instrumental in stopping the fire from jumping the road.

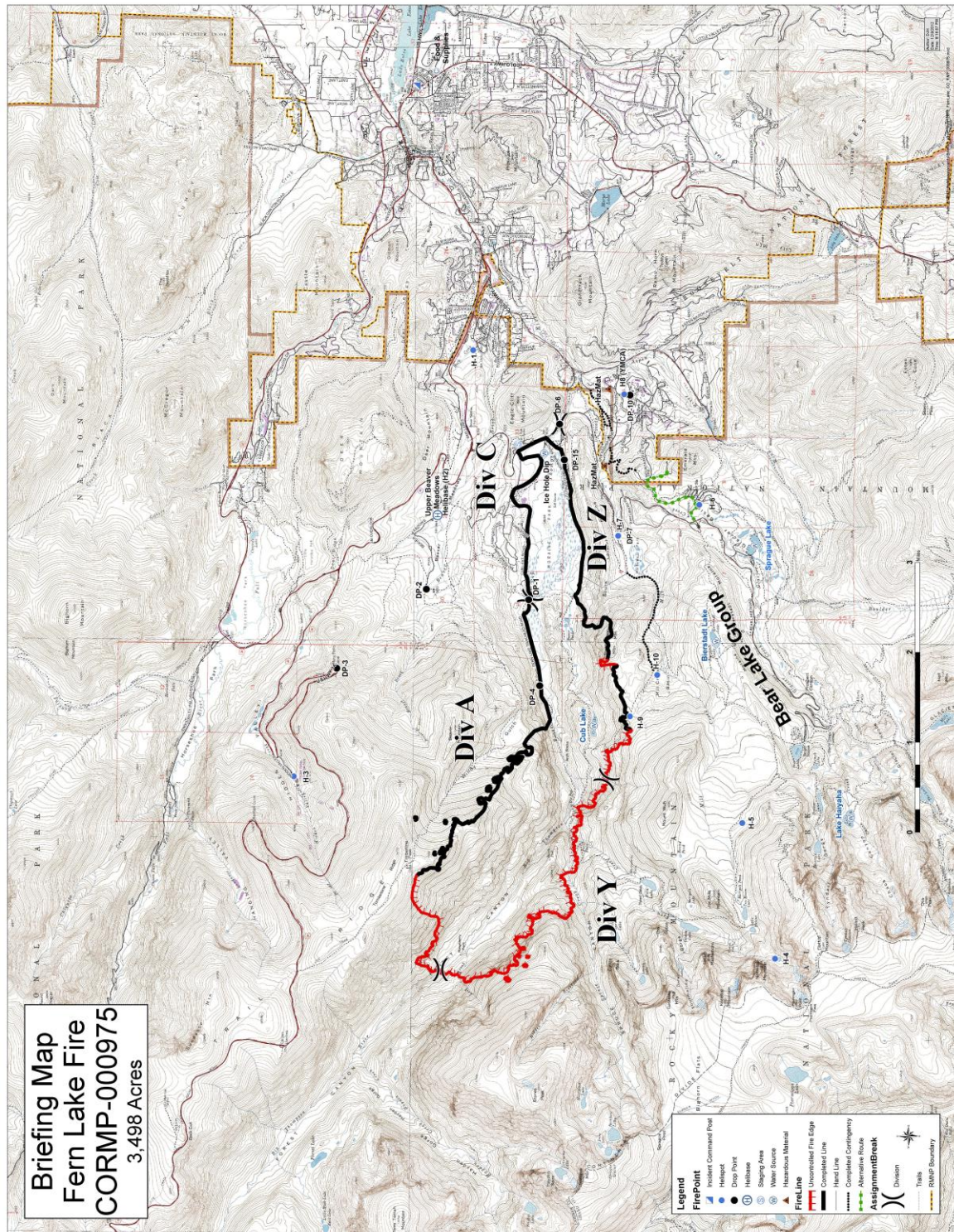
A national Type 1 Incident Management Team was brought in by park officials on Sunday, December 2. At the peak of operations, over 600 firefighters were aided by up to six helicopters, two airtankers, and twenty engines. The Type 1 IMT was released from the fire with 88% containment. As of December 12, the fire has cost over \$6 million. The nearly 3,500 acre blaze was temporarily halted by an early December snowstorm. This high-elevation winter fire is unprecedented in park history.

Largely inaccessible, Forest Canyon had been untouched by fire for at least 800 years. A long-term drought had left fuels tinder-dry in a dead and down fuel layer that in some areas exceeds twenty feet deep. Mountain pine beetles had killed half the trees in the canyon, with every compromised tree posing a hazard for firefighters. The typically windy conditions in the canyon only increased the danger. There was limited opportunity to fight the fire directly because of high winds, steep terrain, and beetle-killed trees. The high winds impacted both air operations and safety of firefighters. Firefighter safety was, as always, the park's number one priority.

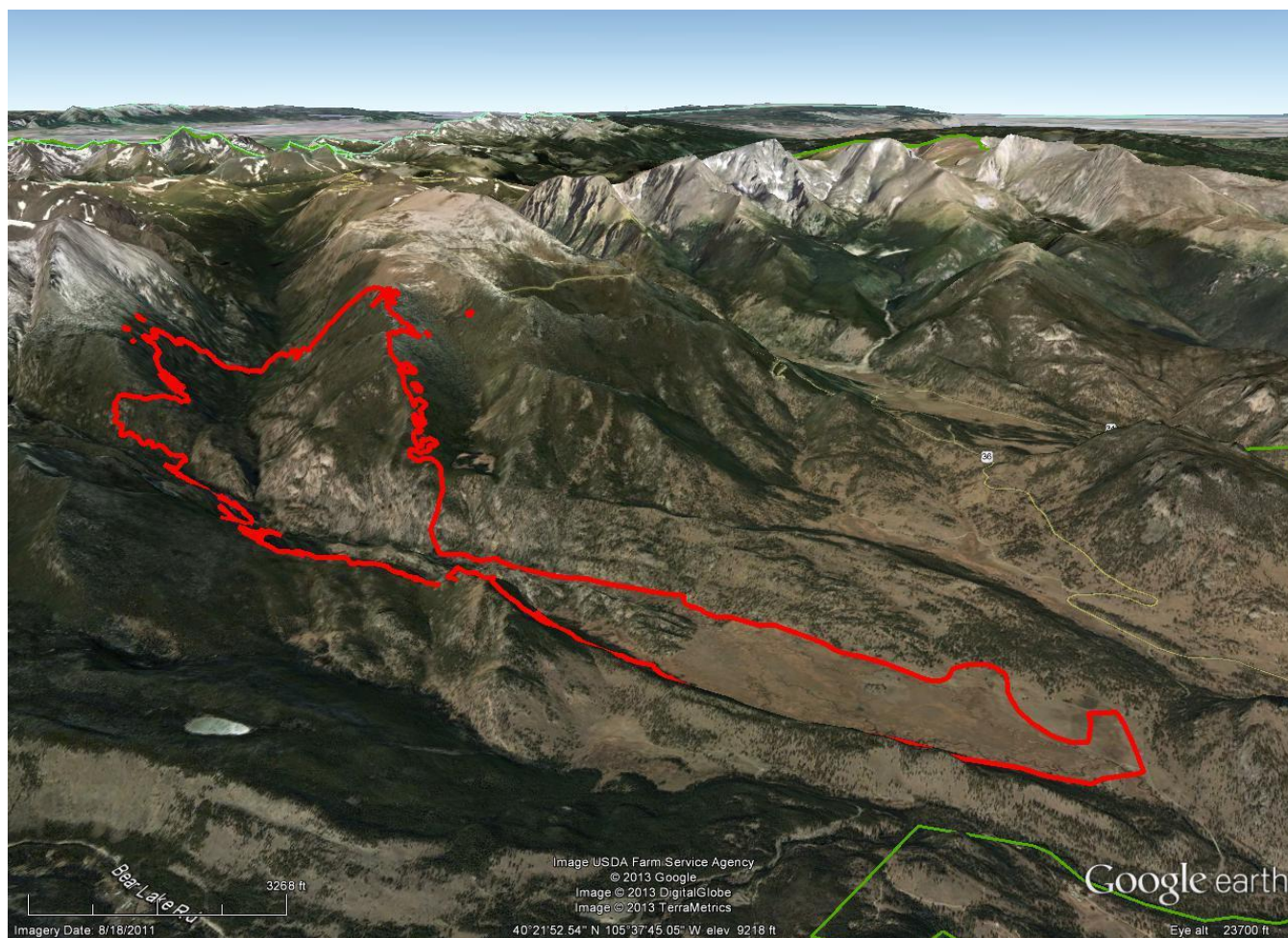
November was the driest November in more than one hundred years in the park combined with 2012 being the warmest on record in the United States. A combination of extremely dry deep forest fuels, high winds, and difficult access contributed to the fire's rapid growth in December. Although mid-December brought approximately a foot of snow to the fire, managers were still suppressing hot spots that were safe to access as recently as January 11. Little smoke has been seen since that time and the fire has not grown in size since early December. Although unlikely, managers are preparing and planning for the potential of the fire surviving the winter. Long-term weather outlooks through the end of April are calling for continued above average temperatures and below average precipitation for north central Colorado.



Fern Lake fire, October 23, 2012



RESOURCE ASSESSMENTS



VEGETATION RESOURCE ASSESSMENT

Vegetation Objectives: Emergency Stabilization & Rehabilitation

- ES: To prevent the unacceptable degradation of vegetation conditions resulting from the Fern Lake fire
- BAR: Evaluate post-fire vegetation impacts, identify areas unlikely to recover naturally, implement treatments to restore a healthy, stable ecosystem that emulates pre-fire structure, function, diversity and dynamics.

Emergency stabilization and rehabilitation treatments are proposed for exotic plant control, limber pine, and willow. Treatments will be reviewed by park management through the park's project proposal and clearance process that will include a Minimum Requirements Analysis for actions proposed in wilderness.

Issues

- Short- and long-term impacts of the fire on plant communities and vegetative resources
- Re-establishment of vegetation on areas disturbed by the fire
- Impacts to willow habitat in identified key willow areas
- Impacts to limber pine
- Potential for the establishment and/or spread of noxious and invasive species

Exotic Plants

Monitoring and mapping of exotic plant infestations is proposed to determine the scale of emergency treatment needed, and herbicide and mechanical treatment will be implemented to control exotic plant infestations. Monitoring and mapping would be accomplished by seasonal staff walking routes within the burned area to collect GPS information on exotic plant infested areas. Monitoring would enable staff to identify and quickly treat new "spot fires" of invasive plants up the canyon and to comprehensively treat invasive plants throughout the Moraine Park meadow. Exotic plant treatment would be implemented by seasonal staff using mechanical methods and applying herbicide to infested areas using backpack and UTV spray systems. Current research in the park shows a high efficacy for herbicide treatments. Planning and compliance for treatments are covered by the park's Invasive Exotic Plant Management Plan Environmental Assessment.

As seen on the exotic plant map of the burned area (Figure 2), at least 550 acres of the burned area was infested with exotic plants prior to the fire. The Resource Advisor Report (Appendix C) contains high risk areas for exotic plant invasion post fire including: 4 miles of fire line, trails used for fire crews access, and two helispots. Areas with high burn severity also posed a high risk of exotic plant invasion. Due to the presence of infested areas pre-fire, exotic plants are likely to respond positively to the fire by increasing densities and areas infested in Moraine Park, Cub lake area, Forest Canyon and other high risk areas within the fire perimeter. Newly infested areas within the fire perimeter are unlikely to recover naturally from exotic plants due to the invasive nature of the plant species, climate change, excess atmospheric nitrogen deposition, and the disturbance caused by the fire. The fire connected pre-fire infested areas with the alpine tundra which increases the risk of exotic plants moving further into the park and upward in elevation to the tundra. Fragile alpine tundra encompasses one-third of Rocky Mountain National Park, one of the largest examples of alpine tundra ecosystems protected in the contiguous United States. The burned area presents an immediate threat of exotic plant invasion to this

unique resource, which contributes to the significance of the park. Exotic plant species capable of invading this high elevation area include Canada thistle (*Cirsium arvense*), common mullien (*Verbascum thapsus*), cheatgrass (*Bromus tectorum*), and yellow toadflax (*Linaria vulgaris*). Each of these species has infested other high elevation park areas between 9,500 and 11,800 feet. Implementation of treatments would help to restore a healthy, stable ecosystem that emulates pre-fire structure, function, diversity and dynamics.

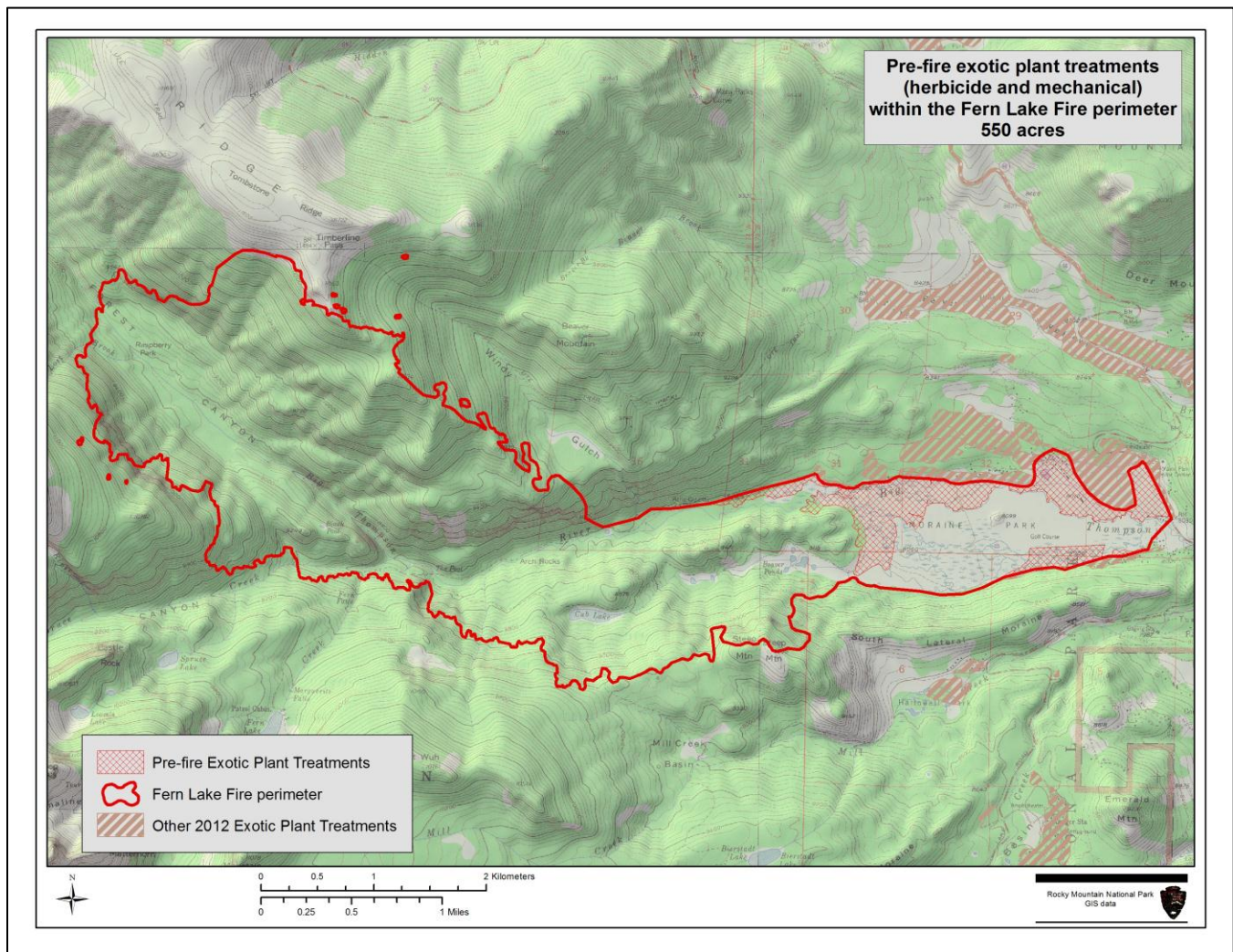


Figure 2. Pre-Fire Exotic Treatments within the Fern Lake Fire Perimeter

Limber Pine

Limber pine (*Pinus flexilis*) is a species of management concern in Rocky Mountain National Park. Emergency assessment of the fire's impact to 190 acres of limber pine (Figure 3) within the fire perimeter is proposed to determine the treatment needed to restore these areas. Limber pine greenhouse propagation and planting is proposed for BAR. Limber pines within the park are threatened by the ongoing mountain pine beetle outbreak and white pine blister rust (recently discovered in the park), to the extent that extirpation within the park is possible. Current research shows that limber pine stands near the burn area carry one of the highest levels of the R gene (near 30%) that provides resistance to the blister rust. 190 acres of this stand was burned to varying degrees within the fire. Monitoring, seed

collection, greenhouse propagation, and planting within the 190 acres of limber pine within the fire perimeter is proposed. These treatments would further evaluate fire impacts, identify areas unlikely to recover naturally from fire impacts, and restore pre-fire structure and function of this species of concern. Guidance for these treatments is provided in the park's Vegetation Restoration Management Plan. Due to limber pine's slow growth rate and pressures from pine bark beetles and blister rust, fire impacted areas of limber pine are unlikely to recover naturally.

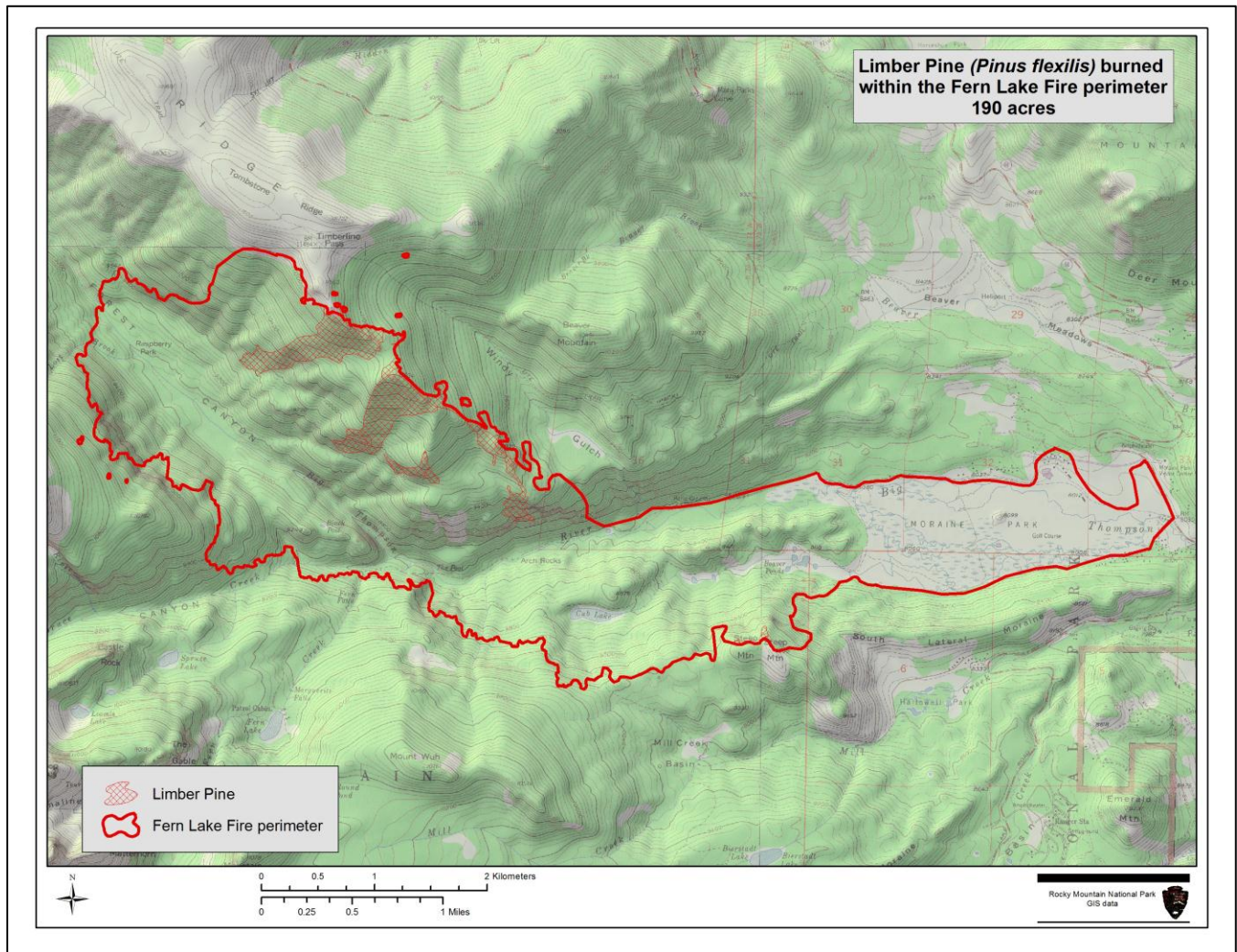


Figure 3. Limber Pine Burned Within the Fern Lake Fire Perimeter

Willow

The Fern Lake fire burned through critical willow habitat in Moraine Park. The area inside four out of five fences that were constructed in Moraine Park as an important part of implementing the park's Elk and Vegetation Management Plan (EVMP) were extensively burned by the fire. The objective of the fences is to protect over-browsed willow from elk browsing for a 10-20 year time period to begin restoring a natural range of variation in vegetation conditions on degraded elk range. This includes increasing cover and height of existing willow so that they provide suitable habitat for diverse plant and animal species. Existing willow inside these fences were severely burned during the fire and it is not clear to what extent these shrubs will survive and re-sprout from root crowns that may still be alive. In

addition, the primary seed source for establishing new willow plants was also burned by the fire. This seed source was not fenced because these healthy willows are in a location that is wetter and received less elk use, so no fences were needed. The fire burned nearly all of the willow that would have provided seed and it is not clear to what extent these shrubs will survive and re-sprout from root crowns that may still be alive. It is expected that any unfenced willow that survive and re-sprout will be subject to elk browsing, which will likely kill these plants, leaving very limited or no remaining seed source.

Emergency stabilization is needed to prevent unacceptable degradation to critical willow habitat. We propose to construct an elk exclosure fence to protect up to 14 acres in the area that supported the primary concentration of seed producing willow in Moraine Park. The area of seed producing willow, overlaid with contour lines (Figure 4) indicates the density of seed dispersal as determined by prior research (Cooper et al. 2003). Tight contour lines indicate areas with the best seed dispersal, while wide lines indicate area with little to no seed dispersal. The proposed fence would be located in the area in the northwest part of Moraine Park that previously provided the seed source for all of Moraine Park (Figure 4). Monitoring would be conducted by surveying the area in spring and mid-summer to determine the extent of survival and re-sprouting, and determine the area and fence configuration that would best protect potential seed producing willow. A scope of work would be developed and a private company would be contracted to construct an elk-proof exclosure using the same design that was used for the existing fences. Six monitoring plots would be established to document initial conditions and summer growth. Emergency stabilization funding would also be used to conduct surveys to determine the location and magnitude of treatments needed to establish a minimum density of willow inside existing fences to allow long-term restoration.

Burned area rehabilitation is needed to evaluate the fire impacts on critical willow habitat inside existing fences, identify areas unlikely to recover naturally, and implement techniques to establish a minimum density of willow to provide a basis for long-term restoration. An increase in willow density to replace dead plants would require willow reproduction, which could occur via both sexual and asexual means. Sexual reproduction is accomplished through production and successful germination and establishment of seeds. This would require cutting stems from unburned willow while viable seeds are present in catkins (several days each spring), manually dispersing the seeds in burned areas with suitable substrate, and keeping the soil moist for 4-8 weeks until seeds germinate and produce viable seedlings. Increasing willow density asexually would require taking willow cuttings from healthy willow and planting these cuttings, which would then give rise to new shoots that become new plants. To rehabilitate willow inside fences to a density adequate to support future progress toward willow restoration, we would hire seasonal staff in 2013–15 to implement techniques to establish new willow plants from both seeds and cuttings. Staff would select sites with appropriate substrate inside fences, monitor catkin development in spring to determine when to cut seed producing stems, manually disperse seed and use backpack sprayers to keep soil moist as needed depending on the amount of natural precipitation that is received, cut willow stakes from healthy willow and plant them in selected locations. Plots would be established to monitor success (establishment, growth and survival of seedlings; growth and survival of cuttings) and refine treatments as needed.

Riparian willow habitats are among the rarest in the park representing less than 4% of the landscape (Turchi et al. 1994). Willow communities support a disproportionately high number of animal and plant species in comparison to other habitat types in the Rocky Mountains (Baker et al. 2005, Connor 1993, Simonson et al. 2001, Turchi et al. 1994). Therefore the degradation of these habitats is of great concern for an interrelated decline in abundance, distribution, and diversity of other animal species which depend

upon these habitats in the park. The wildlife species most affected by the loss of riparian habitats include beaver, songbirds, and butterflies, all important watchable wildlife species.

As part of the park's Elk and Vegetation Management Plan, approximately 167 acres of critical willow habitat on the elk winter range that had been severely degraded by over-browsing were fenced between 2008 and 2012 in order to allow restoration of these sensitive areas. Nearly half of this total fenced area on the winter range occurs within the burned area in Moraine Park. It is apparent from BARC maps for the Fern Lake fire, that areas inside the fences were burned more extensively than areas outside, presumably due to the accumulation of fine fuels that developed in the time since the fences were installed. Initial field surveys suggest willow mortality will be significant in burned areas, however some plants are expected to survive and re-sprout from roots that remain intact. It is expected that elk browsing will quickly destroy any unprotected plants that re-sprout, as elk will be attracted to new growth and when that growth is removed by browsing, the root systems will not be able to persist without photosynthesis. It is critical that some burned, unfenced willow in areas that support seed producing plants be protected to maintain a seed source for long-term restoration in future years. It is also expected that in the absence of management action to aid willow re-establishment inside existing fenced areas that the density of any surviving plants will not be adequate to support long-term restoration in these areas. Without implementation of techniques to support willow re-establishment we risk replacing critical willow habitat with grasslands, and severely compromising the restoration value of our significant investment in fencing.

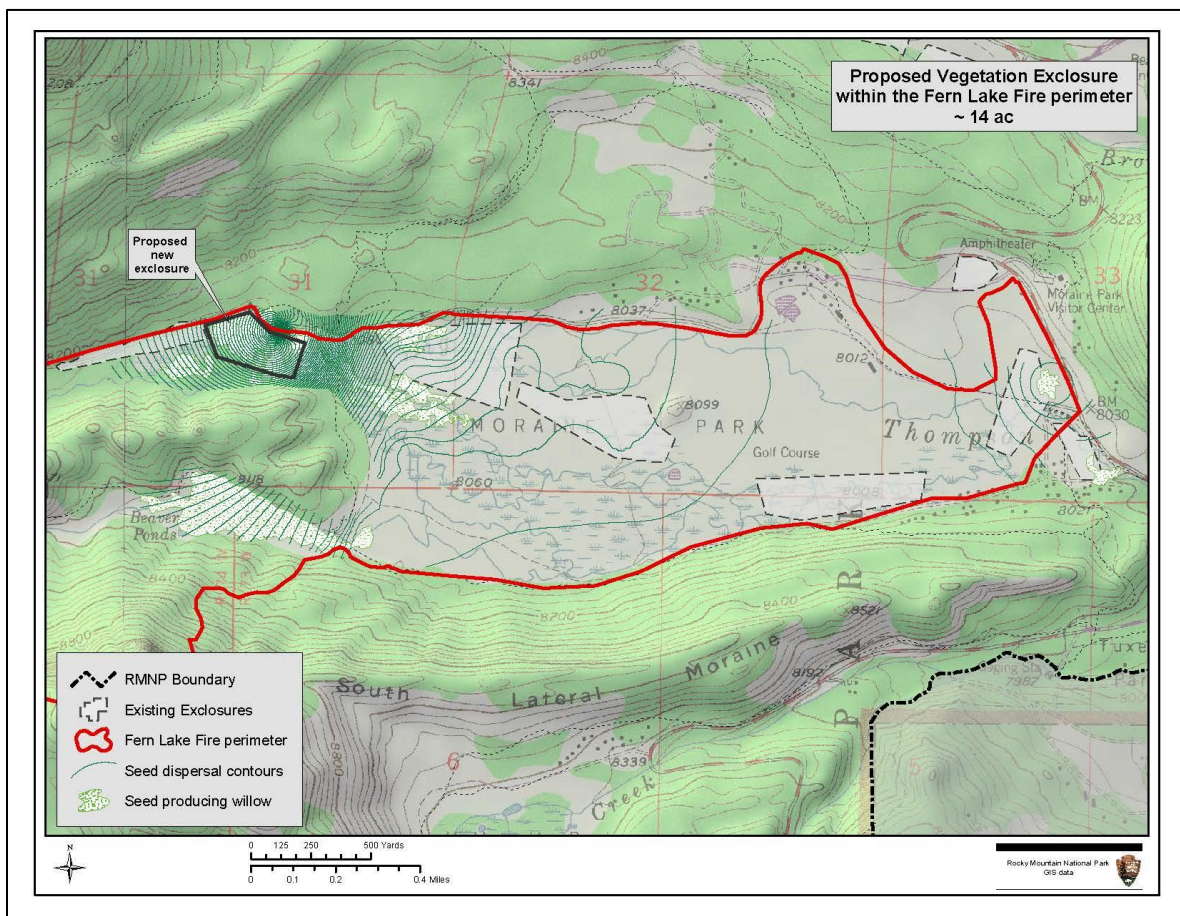


Figure 4. Proposed Vegetation Exclusion Within the Fern Lake Fire Perimeter

References

- Baker, B.W., D. Cooper, C. Westbrook, K. Czarnowski, T. Johnson, and R. Monello. 2005. Declining beaver populations in Rocky Mountain National Park. Rocky Mountain National Park, CO.
- Connor, J. 1993. Neotropical migrant bird survey for Rocky Mountain National Park. Rocky Mountain National Park, CO.
- Cooper, D.J., J. Dickens, and E. Gage. 2003. Constraints on, and opportunities for, riparian willow establishment, Rocky Mountain National Park, Colorado. Final Research Report, Colorado State University, Fort Collins, CO.
- Simonson, S.E., P.A. Opler, T.J. Stohlgren, and G.W. Chong. 2001. Rapid assessment of butterfly diversity in a montane landscape. *Biodiversity and Conservation* 10:1369-1386.
- Turchi, G.M., P.L. Kennedy, D. Urban, and D. Hein. 1994. Bird species richness in relation to isolation of aspen habitats. *Wilson Bulletin* 107:463-474.

PART E - SUMMARY OF ACTIVITIES AND COSTS (Vegetation Resource)

LINE ITEM NUMBER	SPECIFICATION NUMBER	TITLE	UNIT	UNIT COST	NUMBER OF UNITS	WORK AGENT	COSTS
1	FLV-1	BAER/ES Exotic Plant Treatment	0	#DIV/0!	0	F	\$ 28,762
2	FLV-2	BAR Exotic Plant Treatment	0	#DIV/0!	0	F	\$ 56,338
3	FLV-3	BAER/ES Limber Pine Assessment	0	#DIV/0!	0	F	\$ 1,707
4	FLV-4	BAR Limber Pine Restoration	0	#DIV/0!	0	F	\$ 22,540
5	FLV-5	BAER/ES Construct fence to protect willow seed source	acres	\$ 5,471	14	F	\$ 76,595
6	FLV-6	BAR Rehabilitate willow in existing fences	acres	\$ 5,796	12	0	\$ 69,552
7							
8							
9							
10							
11							
12							
13							
14							
15							
TOTAL COSTS							\$ 255,494

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

PART F - INDIVIDUAL SPECIFICATION

TREATMENT/ACTIVITY NAME	BAER/ES Exotic Plant Treatment	PART E SPECIFICATION #	FLV-1
NFPORS TREATMENT CATEGORY*		FISCAL YEAR(S) (list each year):	2013
NFPORS TREATMENT TYPE *		WUI? Y / N	Y
IMPACTED COMMUNITIES AT RISK	Moraine Park/ Forest Canyon	IMPACTED T&E SPECIES	Unknown
		FUNDING SOURCE (ES, BAR, OTHER)	ES

* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

WORK TO BE DONE (describe or attach exact specifications of work to be done):

Number and Describe Each Task:

A. **General Description:** Emergency monitoring and control of exotic species in Forest Canyon and Moraine Park following the Fern Lake Fire

B. **Location/(Suitable Sites):** Forest Canyon, Cub Lake area, Moraine Park

C. **Design/Construction Specifications:** NA

D. **Purpose of Treatment Specifications:** Invasive exotic plants were present in Moraine Park prior to the fire. However, healthy native vegetation prevented rapid spread and invasion of these species throughout the meadow and beyond. With the propagule pressure of exotic species in Moraine Park and the lack of native vegetation ground cover, we expect to see an explosion of invasive species both in the meadow and up the canyon. Monitoring will be necessary to quickly treat initial "spot fires" of invasive plants up the canyon and to accurately treat invasive plants throughout the Moraine Park meadow.

E. **Treatment Effectiveness Monitoring Proposed:** Initial monitoring will determine where invasive populations are present and will help focus efforts to control exotic invasive plants.

LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hour X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST / ITEM
FY13 GS9 supervisor @ \$32.34/hr x 10 hours x 16 days (planning and supervision)	\$5,174.40
FY13 GS6 crew lead @\$19.42/hr x 10 hours x 16 days of exotic plant control	\$3,107.20
FY13 GS6 crew lead @\$19.42/hr x 10 hours x 6 days of mapping and monitoring	\$1,165.20
FY13 GS5 crew members @\$17.43/hr x 10 hours x 2 people x 16 days of exotic plant control	\$5,577.60
FY13 GS5 crew member @\$17.43/hr x 10 hours x 6 days of mapping and monitoring	\$1,045.80
FY13 GS4 crew members @ \$15.58/hr x 10 hours x 2 people x 13 days of exotic plant control	\$4,050.80
FY13 GS3 crew member @ \$13.88/hr x 10 hours x 13 days of exotic plant control	\$1,804.40
TOTAL PERSONNEL SERVICE COST	\$21,925.40
EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note: Purchases require written justification that demonstrates cost benefits over leasing or renting.	COST / ITEM
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	\$ -

MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	COST / ITEM
Plateau herbicide @ \$167.50/gal x 10 gal	\$ 1,675
Milestone herbicide @ \$83/qt. x 20 qts	\$ 1,660
Spreader 90 surfactant @ \$12/ gal x 5 gal	\$ 60
Hi-Lite liquid dye @ \$44/gal x 18 gals	\$ 792
Herbicide shipping costs	\$ 200
Utility Terrain Vehicle maintenance @ avg. \$25/day x 10 days	\$ 250
TOTAL MATERIALS AND SUPPLY COST	\$ 4,637
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):	COST / ITEM
FY13 two vehicles @100/day x 16 days for exotic plant control	\$ 1,600
FY13 two vehicles @100/day x 6 days for exotic plant control	\$ 600
TOTAL TRAVEL COST	\$ 2,200
CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):	COST / ITEM
TOTAL CONTRACT COST	\$ -

SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION DATE (M/D/YYYY)	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISHMENTS	PLANNED COST
FY 13			F		#DIV/0!		\$28,762.40
FY					#DIV/0!		\$ -
FY					#DIV/0!		\$ -
FY					#DIV/0!		
TOTAL					#DIV/0!	0	\$28,762.40

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	P, M, T
3. Estimate supported by cost guides from independent sources or other federal agencies.	
4. Estimates based upon government wage rates and material cost.	P, M
5. No cost estimate required - cost charged to Fire Suppression Account.	

P = Personnel Services, E = Equipment M = Materials/Supplies, T = Travel, C = Contract, F = Suppression

RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT

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TOTAL COST BY JURISDICTION

JURISDICTION	UNITS TREATED	COST
Rocky Mountain National Park		
	TOTAL COST	\$ 28,762.40

PART F - INDIVIDUAL SPECIFICATION

TREATMENT/ACTIVITY NAME	BAR Exotic Plant Treatment	PART E SPECIFICATION #	FLV-2
NFPORS TREATMENT CATEGORY*		FISCAL YEAR(S) (list each year):	2013, 2014, 2015
NFPORS TREATMENT TYPE *		WUI? Y / N	Y
IMPACTED COMMUNITIES AT RISK	Moraine Park/ Forest Canyon	IMPACTED T&E SPECIES	Unknown
		FUNDING SOURCE (ES, BAR, OTHER)	BAR

* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

WORK TO BE DONE (describe or attach exact specifications of work to be done):

Number and Describe Each Task:
A. General Description: Monitoring and control of exotic species in Forest Canyon and Moraine Park following the Fern Lake Fire B. Location/(Suitable Sites): Forest Canyon, Cub Lake area, Moraine Park C. Design/Construction Specifications: NA D. Purpose of Treatment Specifications: Invasive exotic plants were present in Moraine Park prior to the fire. However, healthy native vegetation prevented rapid spread and invasion of these species throughout the meadow and beyond. With the propagule pressure of exotic species in Moraine Park and the lack of native vegetation ground cover, we expect to see an explosion of invasive species both in the meadow and up the canyon. Monitoring will be necessary to quickly treat initial "spot fires" of invasive plants up the canyon and to accurately treat invasive plants throughout the Moraine Park meadow. E. Treatment Effectiveness Monitoring Proposed: Initial monitoring will determine where invasive populations are present and will help focus efforts to control exotic invasive plants.

LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST / ITEM
FY14, 15 GS9 supervisor @\$32.34/hr x 10 hours x 16 days of exotic plant control x 2 years	\$10,348.80
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FY15 GS5 crew members @\$17.43/hr x 10 hours x 2 people x 16 days of exotic plant control	\$5,577.60
FY14 GS5 crew member @\$17.43/hr x 10 hours x 6 days of mapping and monitoring	\$1,045.80
FY15 GS5 crew member @\$17.43/hr x 10 hours x 6 days of mapping and monitoring	\$1,045.80
FY14 GS4 crew members @ \$15.58/hr x 10 hours x 2 people x 13 days of exotic plant control	\$4,050.80
FY15 GS4 crew members @ \$15.58/hr x 10 hours x 2 people x 13 days of exotic plant control	\$4,050.80
FY14 GS3 crew member @ \$13.88/hr x 10 hours x 13 days of exotic plant control	\$1,804.40
FY15 GS3 crew member @ \$13.88/hr x 10 hours x 13 days of exotic plant control	\$1,804.40
TOTAL PERSONNEL SERVICE COST	\$ 43,851
EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note: Purchases require written justification that demonstrates cost benefits over leasing or renting.	COST / ITEM
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	\$ -
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	COST / ITEM
Plateau herbicide @ \$167.50/gal x 10 gal	\$ 1,675
Milestone herbicide @ \$83/qt. x 20 qts	\$ 1,660
Spreader 90 surfactant @ \$12/ gal x 5 gal	\$ 60
Hi-Lite liquid dye @ \$44/gal x 18 gals	\$ 792
Herbicide shipping costs	\$ 200
Utility Terrain Vehicle maintenance @ avg. \$25/day x 10 days x 3 years (FY14,15)	\$ 500
TOTAL MATERIALS AND SUPPLY COST	\$ 4,887
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):	COST / ITEM
FY14, 15 two vehicles @100/day x 16 days for exotic plant control	\$ 6,400
FY14, 15 one vehicle @100/day x 6 days for exotic plant control	\$ 1,200
TOTAL TRAVEL COST	\$ 7,600

CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):	COST / ITEM
TOTAL CONTRACT COST	\$ -

SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION DATE (M/D/YYYY)	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISHMENTS	PLANNED COST
FY14					#DIV/0!		\$ 30,362
FY15					#DIV/0!		\$ 25,975
					#DIV/0!		
TOTAL					#DIV/0!	0	\$ 56,338

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	P, M, T
3. Estimate supported by cost guides from independent sources or other federal agencies.	
4. Estimates based upon government wage rates and material cost.	P, M
5. No cost estimate required - cost charged to Fire Suppression Account.	

P = Personnel Services, E = Equipment M = Materials/Supplies, T = Travel, C = Contract, F = Suppression

RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT

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TOTAL COST BY JURISDICTION

JURISDICTION	UNITS TREATED	COST
Rocky Mountain National Park		\$ 56,338
	TOTAL COST	\$ 56,338

PART F - INDIVIDUAL SPECIFICATION

TREATMENT/ACTIVITY NAME	BAER/ES Limber Pine Assessment	PART E SPECIFICATION #	FLV-3
NFPORS TREATMENT CATEGORY*		FISCAL YEAR(S) (list each year):	2013
NFPORS TREATMENT TYPE *		WUI? Y / N	Y
IMPACTED COMMUNITIES AT RISK	Forest Canyon/ Cub Lake area	IMPACTED T&E SPECIES	Unknown
		FUNDING SOURCE (ES, BAR, OTHER)	ES

* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

WORK TO BE DONE (describe or attach exact specifications of work to be done):

Number and Describe Each Task: A. General Description: Limber pine is a species of special concern in Rocky Mountain National Park. Approximately 190 acres of Limber pine dominated communities fall within the Fern Lake Fire perimeter. Limber pine stands near the burn area are known to carry one of the highest levels of the R gene (near 30%), which provides increased resistance to white pine blister rust, a disease that has the potential to wipe out this tree species. Emergency assessment of the impacts of these Limber pine stands is necessary to determine the health of these stands and additional restoration needs. B. Location/(Suitable Sites): Forest Canyon/ Cub Lake area C. Design/Construction Specifications: D. Purpose of Treatment Specifications: The purpose of this assessment is to determine the health of Limber pine stands and determine future restoration needs. E. Treatment Effectiveness Monitoring Proposed: The proposed treatment is monitoring of the potentially burned Limber pine stands.
--

LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST / ITEM
FY13 GS9 @ \$32.34/hr x 10 hours x 3 days (planning and supervision)	\$970.20
FY13 GS6 crew lead @ \$19.42/hr x 10 hours x 2 days	\$388.40
FY13 GS5 crew member @ \$17.43/hr x 10 hours x 2 days	\$348.60
TOTAL PERSONNEL SERVICE COST	\$1,707.20

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	P, M, T
3. Estimate supported by cost guides from independent sources or other federal agencies.	
4. Estimates based upon government wage rates and material cost.	P, M
5. No cost estimate required - cost charged to Fire Suppression Account.	

P = Personnel Services, E = Equipment M = Materials/Supplies, T = Travel, C = Contract, F = Suppression

RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT

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TOTAL COST BY JURISDICTION

JURISDICTION	UNITS TREATED	COST
Rocky Mountain National Park		\$ 1,707
TOTAL COST		\$ 1,707

PART F - INDIVIDUAL SPECIFICATION

TREATMENT/ACTIVITY NAME	BAR Limber Pine Restoration	PART E SPECIFICATION #	FLV-4
NFPORS TREATMENT CATEGORY*		FISCAL YEAR(S) (list each year):	2013, 2014, 2015
NFPORS TREATMENT TYPE *		WUI? Y / N	Y
IMPACTED COMMUNITIES AT RISK	Forest Canyon/ Cub Lake area	IMPACTED T&E SPECIES	Unknown
B		FUNDING SOURCE (ES, BAR, OTHER)	BAR

* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

WORK TO BE DONE (describe or attach exact specifications of work to be done):

Number and Describe Each Task:
A. General Description: Limber pine is a species of special concern in Rocky Mountain National Park. Approximately 190 acres of Limber pine dominated communities fall within the Fern Lake Fire perimeter. Limber pine stands near the burn area are known to carry one of the highest levels of the R gene (near 30%), which provides increased resistance to white pine blister rust, a disease that has the potential to wipe out this tree species. Restoration of this species is necessary to insure its future success in the park. B. Location/(Suitable Sites): Forest Canyon/ Cub Lake area C. Design/Construction Specifications: 1. Plant to rehab damaged Limber pine stands with existing 600-800 park greenhouse seedlings and additional 600 seedlings from Colorado State Forest Service 2. Collect Limber pine seeds 3. Propagate additional Limber pine seedlings in park greenhouse D. Purpose of Treatment Specifications: Limber pine seedlings will be planted on site to rehab damaged Limber pine stands E. Treatment Effectiveness Monitoring Proposed: Limber pine stands will be monitored for success of stand rehab

LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST / ITEM
FY13, 14, 15 GS9 supervisor @ \$32.34/hr x 10 hours x 6 days x 3 years (planning and supervision)	\$5,821
FY13, 14, 15 GS6 crew lead @ \$19.42/hr x 10 hours x 4 days x 3 years (planting)	\$ 2,330
FY13, 14, 15 GS5 crew members @ \$17.43/hr x 10 hours x 4 days x 3 years x 3 ppl (planting)	\$ 6,275
FY13, 14, 15 GS4 crew members @ \$15.58/hr x 10 hours x 4 days x 3 years x 2 ppl (planting)	\$ 3,739
FY13 GS6 crew lead @ \$19.42/hr x 10 hours (cone collection)	\$ 194
FY13 GS5 crew member @ \$17.43/hr x 10 hours (cone collection)	\$ 174
FY14 GS5 crew member @ \$17.43/hr x 8 hours x 20 days (Limber pine greenhouse propagation)	\$ 2,789
FY14, 15 GS6 crew lead @ 19.42/hr x 10 hours x 2 years (monitoring of planting sites)	\$ 388
FY14, 15 GS5 crew member @ \$17.43/hr x 10 hours x 2 years (monitoring of planting sites)	\$ 349
TOTAL PERSONNEL SERVICE COST	\$22,060

MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	COST / ITEM
potting soil @ \$20/bag x 24 bags	\$ 480
TOTAL MATERIALS AND SUPPLY COST	\$ 480
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):	COST / ITEM
TOTAL TRAVEL COST	\$ -
CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):	COST / ITEM
TOTAL CONTRACT COST	\$ -

SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION DATE (M/D/YYYY)	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISHMENTS	PLANNED COST
FY 13					#DIV/0!		\$ 6,424
FY 14					#DIV/0!		\$ 9,692
FY 15					#DIV/0!		\$ 6,424
FY					#DIV/0!		
TOTAL					#DIV/0!	0	\$ 22,540

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	P, M, T
3. Estimate supported by cost guides from independent sources or other federal agencies.	
4. Estimates based upon government wage rates and material cost.	P, M
5. No cost estimate required - cost charged to Fire Suppression Account.	

P = Personnel Services, E = Equipment M = Materials/Supplies, T = Travel, C = Contract, F = Suppression

RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT

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TOTAL COST BY JURISDICTION

JURISDICTION	UNITS TREATED	COST
Rocky Mountain National Park		\$ 22,540
TOTAL COST		\$ 22,540

PART F - INDIVIDUAL SPECIFICATION

TREATMENT/ACTIVITY NAME	BAER/ES Construct fence to protect willow seed source	PART E SPECIFICATION #	FLV-5
NFPORS TREATMENT CATEGORY*		FISCAL YEAR(S) (list each year):	2013, 2014
NFPORS TREATMENT TYPE *		WUI? Y / N	N
IMPACTED COMMUNITIES AT RISK		IMPACTED T&E SPECIES	N/A
		FUNDING SOURCE (ES, BAR, OTHER)	ES

* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

WORK TO BE DONE (describe or attach exact specifications of work to be done):

Number and Describe Each Task:

- A. General Description: Construct a fence to exclude elk from an approximately 14 acre area to protect sprouting willow plants
- B. Location/(Suitable Sites): Moraine Park, west of the Cub Lake trailhead
- C. Design/Construction Specifications: The fence design will be the same as that used for existing woven wire elk enclosure fences. The top height will be 76", with heavy H-braces at corners and river crossings, and line boss to T-post ratio of 1:6.
- D. Purpose of Treatment Specifications: The fence will protect re-sprouting willow from elk browsing. This will allow these plants to survive and grow as needed to provide a seed source for long term willow restoration in Moraine Park.
- E. Treatment Effectiveness Monitoring Proposed: Survey fence sites to evaluate willow survival; establish monitoring plots to determine the extent of willow sprouting and initial growth in new enclosure fence .

LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hour X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST / ITEM
FY13 GS-11 Biologist (current part-time employee) @ \$38.38/hour X 48 hours for site survey, scope of work development, contractor selection	\$ 1,842
FY 13/14 GS-11 Biologist @ 38.38/hour X 80 hours as COR on fence contract	\$ 3,070
FY13/14 GS-5 Bio-techs @ \$16.10/hour X 148 hours to survey fence sites and establish plots to monitor willow survival, sprouting, and growth in the new enclosure site.	\$ 2,383

TOTAL PERSONNEL SERVICE COST	\$ 7,295
EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note: Purchases require written justification that demonstrates cost benefits over leasing or renting.	COST / ITEM
None - available at park	
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	\$ -
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	COST / ITEM
None - available at park	
TOTAL MATERIALS AND SUPPLY COST	\$ -
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):	COST / ITEM
None	
TOTAL TRAVEL COST	\$ -
CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):	COST / ITEM
FY 13 Contract to construct 3300 linear feet of fence @ \$21/linear foot to protect an approximately 14 acre area	\$ 69,300
TOTAL CONTRACT COST	\$ 69,300

SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION DATE (M/D/YYYY)	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISHMENTS	PLANNED COST
FY13-14	04/15/13	11/30/13	F	acres	\$ 5,471	14	\$76,595
FY__							
FY__							
FY__							
TOTAL					\$ 5,471	14	\$ 76,595

Work Agent: **C**=Coop Agreement, **F**=Force Account, **G**=Grantee, **P**=Permittees, **S**=Service Contract, **T**=Timber Sales Purchaser, **V**=Volunteer

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	C
3. Estimate supported by cost guides from independent sources or other federal agencies.	
4. Estimates based upon government wage rates and material cost.	P
5. No cost estimate required - cost charged to Fire Suppression Account.	

P = Personnel Services, **E** = Equipment **M** = Materials/Supplies, **T** = Travel, **C** = Contract, **F** = Suppression

RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT

Willow assessment and map of Moraine Park showing seed production and dispersal, existing fence locations and proposed new fence location.
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TOTAL COST BY JURISDICTION

JURISDICTION	UNITS TREATED	COST
NPS Rocky Mountain National Park	14	\$ 76,595
TOTAL COST		\$ 76,595

PART F - INDIVIDUAL SPECIFICATION

TREATMENT/ACTIVITY NAME	BAR Rehabilitate willow in existing fence	PART E SPECIFICATION #	FLV-6
NFPORS TREATMENT CATEGORY*		FISCAL YEAR(S) (list each year):	2013, 2014, 2015
NFPORS TREATMENT TYPE *		WUI? Y / N	N
IMPACTED COMMUNITIES AT RISK		IMPACTED T&E SPECIES	N/A
		FUNDING SOURCE (ES, BAR, OTHER)	BAR

* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

WORK TO BE DONE (describe or attach exact specifications of work to be done):

Number and Describe Each Task:
A. General Description: Use a combination of cutting/planting willow stakes and cutting stems/distributing seed to achieve a minimum density of live willow needed to permit long-term restoration inside four existing elk enclosure fences. B. Location/(Suitable Sites): Moraine Park C. Design/Construction Specifications: Cuttings will be collected from unburned willow in adjacent meadows, soaked overnight and planted inside fences in areas with adequate substrate and water tables during late spring/early summer. Willow twigs with catkins (seed) in adjacent unburned meadows will be monitored to identify suitable seed stage, cut and distributed during spring. D. Purpose of Treatment Specifications: Re-establish an adequate density of living willow to permit long term recovery. E. Treatment Effectiveness Monitoring Proposed: Establish plots and monitor 24 plots in existing enclosure sites to determine seedling establishment, and survival/growth of seedlings, burned willow and newly planted willow stakes.

LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hour X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST / ITEM
FY13 GS-5 Bio-techs @ \$16.10/hour X 320 hours to establish monitoring and treatment plots, cut willow stems and disperse seeds.	\$ 5,152
FY13 GS-7 Term Biologist @ \$21.46/hour X 120 hours for supervision and oversight of monitoring and seed collection/dispersal.	\$ 2,575
FY13 GS-11 Biologist (current part-time employee) @ \$38.38/hour X 80 hours for treatment/monitoring design and data analysis.	\$ 3,070
FY14 GS-5 Bio-techs @ \$16.10/hour X 580 hours to monitor plots and expand treatment areas, cut willow stems and disperse seeds.	\$ 9,338
FY14 GS-7 Biologist @ \$21.46/hour X 160 hours for supervision and oversight of monitoring and seed collection/dispersal.	\$ 3,434
FY14 GS-11 Biologist (current part-time employee) @ \$38.38/hour X 120 hours to develop scope of work/cooperative agreement and provide oversight for willow stake collection/planting and data analysis.	\$ 4,606
FY15 GS-5 Bio-techs @ \$16.10/hour X 580 hours to monitor plots and expand treatment areas, cut willow stems and disperse seeds.	\$ 9,338
FY15 GS-7 Biologist @ \$21.46/hour X 160 hours for supervision and oversight of monitoring and seed collection/dispersal.	\$ 3,434
FY15 GS-11 Biologist (current part-time employee) @ \$38.38/hour X 120 hours to develop scope of work/cooperative agreement and provide oversight for willow stake collection/planting and data analysis.	\$ 4,606
TOTAL PERSONNEL SERVICE COST	\$ 45,552
EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note: Purchases require written justification that demonstrates cost benefits over leasing or renting.	COST / ITEM
None - available at park	
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	\$ -
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	COST / ITEM
None - available at park	
TOTAL MATERIALS AND SUPPLY COST	\$ -

TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):	COST / ITEM
None	
TOTAL TRAVEL COST	\$ -
CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):	COST / ITEM
FY14 agreement with Wildland Restoration Volunteers to collect and plant willow stakes	\$ 12,000
FY15 agreement with Wildland Restoration Volunteers to collect and plant willow stakes	\$ 12,000
TOTAL CONTRACT COST	\$ 24,000

SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION DATE (M/D/YYYY)	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISHMENTS	PLANNED COST
FY 13	05/15/13	09/30/13		acres		2	\$ 10,796
FY 14	01/05/14	09/30/14		acres		5	\$ 29,378
FY 15	01/05/15	09/30/15		acres		5	\$ 29,378
FY							
TOTAL					\$ 5,796	12	\$ 69,552

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	C
3. Estimate supported by cost guides from independent sources or other federal agencies.	
4. Estimates based upon government wage rates and material cost.	P
5. No cost estimate required - cost charged to Fire Suppression Account.	

P = Personnel Services, E = Equipment M = Materials/Supplies, T = Travel, C = Contract, F = Suppression

RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT

Willow assessment and map of Moraine Park showing existing fences.

TOTAL COST BY JURISDICTION

JURISDICTION	UNITS TREATED	COST
Rocky Mountain National Park	12	\$ 69,552
TOTAL COST		\$ 69,552

THREATENED AND ENDANGERED SPECIES RESOURCE ASSESSMENT

Objectives

- Determine if the Fern Lake Fire has impacted Threatened and Endangered species (T&E)
- Assess the potential for future changes in T&E habitat as a result of the fire.

Issue

Three federally listed T&E species or species that are currently under review could have been affected or may be affected by the Fern Lake Fire. They are the Greenback Cutthroat Trout (*Oncorhynchus clarki stomias*; threatened), the Boreal Toad (*Anaxyrus boreas boreas*; under review with 90-day finding of substantial) and the White-Tailed Ptarmigan (*Lagopus leucura*; under review with a 90-day finding of substantial).

Greenback Cutthroat Trout

Issue: A population of federally threatened greenback cutthroat trout occurs within the burn area. The lower extent of this population is approximately 0.2 miles above the confluence of the Big Thomson River with Spruce Creek and extends 7.25 miles up the Big Thompson River. Two miles or approximately 28% of the population extent is located within the burn area. We anticipate that the fire may have reduced or completely eliminated greenback from this stretch of river. Additionally, the fire and its ongoing effects may change stream and bank habitat (Dunham et al. 2003). Trout are very sensitive to changes in habitat and post-fire effects may take place subtly over several years. Recording changes in habitat parameters may help explain observed fish distribution or whether stream restoration is needed. Our prescribed treatments will address the following concerns, 1) document changes to the population and distribution of greenback in the burn area, and 2) determine changes to stream morphology.

Treatment One: Determine post burn distribution of greenback and monitor changes over time.

1. Electrofishing surveys at four stations will be used to determine changes in population structure and distribution. In 2013, stations will be electrofished twice, once as soon as it is safe and feasible to do so in the early season and once in the fall. The first survey will serve as our “baseline” survey for immediate post-fire conditions. Migration of fish may have occurred during or immediately after intense burning episodes due to changes in water temperature and quality. Our baseline survey will be able to detect these changes as it is unlikely that trout movement will occur between the end of intensive fire activity in late-November/early December 2012 and the first survey in May 2013. If fish did move, and depending on where they move, then natural recolonization may occur. The four sections will also be electrofished after runoff in 2014, 2015 and 2016 to document ongoing changes in fish distribution. Work will be performed through an Interagency Agreement with the USFWS who has expertise in backcountry electrofishing techniques and estimating population parameters. The four stations will be as follows:
 - a. A control station upstream outside of the burn area. The greenback population extends five miles above the burn area. Fish in the upper sections of Forest Canyon represent the natural source for recolonizing the burn area.
 - b. A station located in the lower extent of the greenback population in Forest Canyon within the burn area. This station will document changes in the greenback population over time in the affected portion of the Big Thompson River. We are specifically interested in

- natural recolonization. If recolonization does not occur, reintroduction of the threatened greenback cutthroat trout may be needed to restore them to the affected portion of the river.
- c. Survey the existing trend site at Fern Lake Trailhead. Although this area is located outside of the greenback population it is the closest long-term monitoring site with multi-year, recent, data available for comparison. The last survey conducted at this site was 2011. If greenback were displaced from Forest Canyon and sought refuge downstream they may be found at this site. Comparing 2013 surveys to past surveys will reveal if species composition has changed and whether greenback are now more prevalent at this trend site. If the fire substantially affected fish populations more generally due to changes in water temperature, water quality, etc., the overall numbers and biomass recorded through surveys at this station are expected to be lower.
 - d. Survey the existing trend site at Mailbox Junction. Similar to the Fern Lake Trailhead trend site this station is located outside of the greenback population. It has the most robust pre-burn data set of any trend site within the burn area and is at the far downstream extent of the burn. This station was also last surveyed in 2011. Changes in species composition, numbers and biomass may indicate whether greenbacks were displaced or continue to be displaced far from their population of origin.
2. In combination with the electrofishing work above, fish >80mm will be marked with a unique PIT tag. Marking individual fish and their location will allow us to track fish migration. These observations will answer our key questions regarding fish displacement and recolonization and provide an indication of the source and sink areas associated with these movements.

Justification for Treatment One: Fire effects to the federally listed greenback cutthroat trout must be documented to complete emergency consultation with the United States Fish and Wildlife Service. If displacement has occurred and suitable habitat exists the greenback should be re-established within the burn area. This re-establishment may occur naturally from upstream sources outside of the burn area or the park may need to physically move and reintroduce them. By implementing treatment one the park will know whether recovery is occurring naturally or reintroduction is warranted.

Treatment Two: Conduct stream morphology to determine changes in stream and bank habitat resulting from the Fern Lake Fire.

3. Sites will be established to collect information on baseline conditions and record changes during the first three years post-burn. Sampling sites will be established by stratifying habitat types throughout the affected greenback reach and randomly selecting points for stream monitoring. The first sampling will occur the spring of 2013 as soon as it is safe and feasible. Follow-up surveys will be conducted in the fall of 2013, 2014, 2015 and 2016. A monitoring protocol will be established and will likely include collecting the following parameters: stream length, width, velocity, turbidity, pebble counts, sediment traps, percent riparian cover, and percent undercut banks.

Justification for Treatment Two: The fire and its ongoing effects may change stream and bank habitat subtly over several years. Trout are very sensitive to changes in habitat and accurately recording changes may help explain observed fish distribution. Observed habitat parameters may guide whether reintroduction of greenback should occur or whether additional stream restoration work is needed.

Boreal Toad

Issue: A boreal toad breeding population occurs at Spruce Lake within a quarter mile of the Fern Lake Fire edge. This is one of only two breeding sites in the park that have exhibited consistent breeding over the last five years. Spruce Lake is also the most intensively studied active site, one of the largest in the park and has virtually no recruitment (Muths and Scherer 2011). The primary concern related to the Fern Lake Fire is the potential introduction of disease into the Spruce Lake breeding site. The disease of interest is *Batrachochytrium dendrobatidis* (Bd), a fungal pathogen which is generally fatal to boreal toads, and is likely an important factor in the rapid declines of boreal toads within Rocky Mountain National Park (Muths et al. 2003, Scherer et al. 2005). Boreal toads congregate at their natal ponds during breeding but can travel more than two miles throughout the rest of the summer. Typically young disperse downstream. In this case young are likely to disperse down Spruce Creek and directly into the burn area. Water used in suppression activities on the Fern Lake Fire likely came from Bd positive sources. To our knowledge direct transfer of Bd water to Spruce Lake did not occur; however, we cannot rule out this possibility. Natural toad movements may expose toads at infected water sources in the burn area and then bring the disease back to the breeding site in the spring.

Treatment: We propose to monitor Spruce Lake for disease presence by collecting 20-30 samples each year for the next four years. Disease samples via non-invasive swabs will be collected during ongoing capture-recapture work. We only request funding for sample supplies and analysis.

Justification: RMNP contains only two known consistent boreal toad breeding sites. If disease is introduced to the Spruce Lake population and a subsequent die-off occurs park management may decide to undertake a reintroduction in suitable habitat to mitigate for loss of this population.

White-tailed Ptarmigan

Issue: White-tailed ptarmigan were continuously monitored in the Tombstone Ridge area on the edge of the Fern Lake Fire from 1966 to 2000. A mark-recapture study was re-initiated in this area in 2010 to the present time to examine the current status of white-tailed ptarmigan along Trail Ridge Road. This more recent work shows preliminary results that nesting densities and chick survival are lower than the earlier years of study. The Fern Lake Fire is of concern because it is unclear whether and to what extent suitable nesting habitat was destroyed by the fire.

Treatment: During 2013, researchers familiar with the area will conduct a cursory visual survey to evaluate whether ptarmigan habitat was affected by the burn. If habitat was affected, funding may be needed in the future to further evaluate the impacts to ptarmigan and whether habitat restoration actions are needed. No funds are requested at this time for the ptarmigan.

Justification: Preliminary results from recent research indicate that nesting densities and chick survival are lower than historic levels along Trail Ridge Road. If the Fern Lake Fire destroyed ptarmigan nesting habitat additional declines may occur and habitat restoration may be needed.

References

- Dunham, J. B., M. K. Young, R. E. Gresswell, and B. E. Rieman. 2003. Effects of fire on fish populations: landscape perspectives on persistence of native fishes and nonnative fish invasions. *Forest Ecology and Management* 178: 183-196.
- Muths, E. and R. D. Scherer. 2011. Portrait of a small population of boreal toads (*Anaxyrus boreas*). *Herpetologica* 67: 369-377.

Muths, E., P. S. Corn, A. P. Pessier, and D. E. Green. 2003. Evidence for disease-related amphibian decline in Colorado. *Biological Conservation* 110 (3): 357-365.

Scherer, R. D., E. Muths, B. R. Noon, and P. S. Corn. 2005. An evaluation of weather and disease as causes of decline in two populations of boreal toads. *Ecological Applications* 15 (6): 2150-2160.

PART E - SUMMARY OF ACTIVITIES AND COSTS (T & E Species)

LINE ITEM NUMBER	SPECIFICATION NUMBER	TITLE	UNIT	UNIT COST	NUMBER OF UNITS	WORK AGENT	COSTS
1	FLTE-1	ES - Greenback Cutthroat Trout Assessment	1	#DIV/0!	0	FWS/NPS	\$ 30,587
2	FLTE-2	ES - Boreal Toad Disease Assessment	1	#DIV/0!	0	USGS/NPS	\$ 850
3	FLTE-3	BAR - Greenback Cutthroat Trout Assessment	1	#DIV/0!	0	FWS/NPS	\$ 55,530
4	FLTE-4	BAR - Boreal Toad Disease Assessment	1	#DIV/0!	0	USGS/NPS	\$ 2,550
5							
6							
7							
8							
9							
10							
11							
12							
13							
TOTAL COSTS							\$ 89,517

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

PART F - INDIVIDUAL SPECIFICATION

TREATMENT/ACTIVITY NAME	Greenback Cutthroat Trout Assessment	PART E SPECIFICATION #	FLTE-1
NFPORS TREATMENT CATEGORY*		FISCAL YEAR(S) (list each year):	2013
NFPORS TREATMENT TYPE *		WUI? Y / N	
IMPACTED COMMUNITIES AT RISK	Big Thompson River	IMPACTED T&E SPECIES	Greenback Cutthroat Trout
		FUNDING SOURCE (ES, BAR, OTHER)	ES

* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

WORK TO BE DONE (describe or attach exact specifications of work to be done):

Number and Describe Each Task:

- A. General Description: 1) Conduct 2 electrofishing surveys at four sites, 2) mark fish to determine movements 3) Conduct 2 stream morphology surveys;
 B. Location/(Suitable Sites): Electrofish 4 key sites - above burn, within greenback reach burn area, Fern Lake Trailhead trend site and Mailbox Jct trend
 C. Design/Construction Specifications: See additional narrative. Implementation plans will be more fully developed when funded.
 D. Purpose of Treatment Specifications: Evaluate changes in fish abundance and distribution and changes in greenback habitat.
 E. Treatment Effectiveness Monitoring Proposed: Greenback distribution will be monitored. If fish have been displaced from burn we will evaluate whether

LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST / ITEM
Electrofishing and marking: 2 GS-5 biotechs @ \$1,394/pp for 1.25 PP each = \$3,485	\$ 3,485
Electrofishing and marking: 1 GS-4 biotech @ \$1,246 for 1.25 PP = \$1,558	\$ 1,558
Stream morphology: 2 GS-5 biotechs @ \$1,394/pp for 0.75 PP each = \$2,091	\$ 2,091
Stream morphology: 1 GS-4 biotechs @ \$1,246/pp for 0.75 PP each = \$935	\$ 935
TOTAL PERSONNEL SERVICE COST	\$ 8,069
EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note: Purchases require written justification that demonstrates cost benefits over leasing or renting.	COST / ITEM
PIT tag reader = \$475	\$ 475
Electrofishing equipment (pro-rated for life-cycle replacement, partial use) = \$210	\$ 210
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	\$ 685

MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	COST / ITEM
Fish samplings misc. supplies (waders, nets, fish bags, buckets, scales, disinfectant, etc.) = \$150	\$ 150
PIT tags estimated at \$6.50 ea. X 75/site x 4 sites x 2 surveys = \$3,900	\$ 3,900
Stream morphology misc. sampling supplies (tape measures, stream gauge, sediment traps, etc.) = \$150	\$ 150
temperature loggers = 2 @ \$150 each = \$300	\$ 300
TOTAL MATERIALS AND SUPPLY COST	\$ 4,500
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):	COST / ITEM
Backcountry per diem \$20/day x 10 days x 3 employees (2 GS-5s, 1 GS-4) = \$600	\$ 600
TOTAL TRAVEL COST	\$ 600
CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):	COST / ITEM
Electrofishing and marking: GS-9/6 FWS Fisheries Biologist @ \$3,205/PP x 2.4 PP (2.5 weeks sampling, 1 day planning, equipt.,	\$ 7,692
Stream morphology: GS-9/6 FWS Fisheries Biologist @ \$3,205/PP x 2 PP (.5 week planning, mob/demob, 1.5 weeks to sample , 2 weeks	\$ 6,410
Backcountry per diem: \$20/day x 10 days = \$200	\$ 200
17% OH = \$14,302 x .17 = \$2,431	\$ 2,431
TOTAL CONTRACT COST	\$ 16,733

SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION DATE (M/D/YYYY)	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISHMENTS	PLANNED COST
FY 13	05/01/13	09/30/13	FWS/NPS		#VALUE!	stream morphology	\$ 30,587
FY					#DIV/0!		
FY					#DIV/0!		
FY					#DIV/0!		
TOTAL					#DIV/0!	0	\$ 30,587

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	X
3. Estimate supported by cost guides from independent sources or other federal agencies.	
4. Estimates based upon government wage rates and material cost.	
5. No cost estimate required - cost charged to Fire Suppression Account.	

P = Personnel Services, E = Equipment M = Materials/Supplies, T = Travel, C = Contract, F = Suppression

RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT

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TOTAL COST BY JURISDICTION

JURISDICTION	UNITS TREATED	COST
NPS		\$ 30,587
TOTAL COST		\$ 30,587

PART F - INDIVIDUAL SPECIFICATION

TREATMENT/ACTIVITY NAME	Boreal Toad Disease Assessment	PART E SPECIFICATION #	FLTE-2
NFPORS TREATMENT CATEGORY*		FISCAL YEAR(S) (list each year):	2013
NFPORS TREATMENT TYPE *		WUI? Y / N	
IMPACTED COMMUNITIES AT RISK	Spruce Lake/Creek	IMPACTED T&E SPECIES	Boreal Toad
		FUNDING SOURCE (ES, BAR, OTHER)	ES

* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

WORK TO BE DONE (describe or attach exact specifications of work to be done):

Number and Describe Each Task:
A. General Description: Sample boreal toads at Spruce Lake for the amphibian chytrid fungus (Batrachochytrium dendrobatidis).
B. Location/(Suitable Sites): Spruce Lake - 1/4 mi. from the burn perimeter.
C. Design/Construction Specifications: Non-invasive cotton-tipped swabs will be used to collect samples.
D. Purpose of Treatment Specifications: Confirm continued disease-free status of Spruce Lake breeding population.
E. Treatment Effectiveness Monitoring Proposed: Results of disease testing will be our monitoring.

LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST / ITEM
TOTAL PERSONNEL SERVICE COST	\$ -
EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note: Purchases require written justification that demonstrates cost benefits over leasing or renting.	COST / ITEM
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	\$ -
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	COST / ITEM
cotton-tipped swabs, vials, EtOH, latex gloves for sample collection and preservation	\$ 100
sample analysis = 30 samples x \$25 = \$750	\$ 750
TOTAL MATERIALS AND SUPPLY COST	\$ 850

SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION DATE (M/D/YYYY)	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISHMENTS	PLANNED COST
FY 13	05/15/13	09/30/13	USGS/NPS	1	#VALUE!	analyze 20-30 diseased	\$ 850
FY					#DIV/0!		
FY					#DIV/0!		
FY					#DIV/0!		
TOTAL					#DIV/0!	0	\$ 850

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

TOTAL COST BY JURISDICTION

JURISDICTION	UNITS TREATED	COST
NPS	1	\$ 850
TOTAL COST		\$ 850

PART F - INDIVIDUAL SPECIFICATION

TREATMENT/ACTIVITY NAME	Greenback Cutthroat Trout Assesmer	PART E SPECIFICATION #	FLTE-3
NFPORS TREATMENT CATEGORY*		FISCAL YEAR(S) (list each year):	2014, 2015, 2016
NFPORS TREATMENT TYPE *		WUI? Y / N	
IMPACTED COMMUNITIES AT RISK	Big Thompson River	IMPACTED T&E SPECIES	Greenback Cutthroat Trout
		FUNDING SOURCE (ES, BAR, OTHER)	BAR

* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

WORK TO BE DONE (describe or attach exact specifications of work to be done):

Number and Describe Each Task:

- A. General Description: 1) Conduct 3 electrofishing surveys (2014, 2015, 2016) at four sites, 2) mark fish to determine movements 3) Conduct stream
 B. Location/(Suitable Sites): Electrofish 4 key sites - above burn, within greenback reach burn area, Fern Lake Trailhead trend site and Mailbox Jct trend
 C. Design/Construction Specifications: See additional narrative. Implementation plans will be more fully developed when funded.
 D. Purpose of Treatment Specifications: Evaluate changes in fish abundance and distribution and changes in greenback habitat.
 E. Treatment Effectiveness Monitoring Proposed: Greenback distribution will be monitored. If fish have been displaced from burn we will evaluate whether

LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST / ITEM
Electrofishing and marking: 2 GS-5 biotechs @ \$1,394/pp for .625 PP/year for 3 years = \$5,228	\$ 5,228
Electrofishing and marking: 1 GS-4 biotech @ \$1,246 for .625 PP/year for 3 years = \$2,336	\$ 2,336
Stream morphology: 2 GS-5 biotechs @ \$1,394/pp for .375 PP/year for 3 years = \$3,137	\$ 3,137
Stream morphology: 1 GS-4 biotechs @ \$1,246/pp for .375 PP/year for 3 years = \$1,402	\$ 1,402
	\$ 12,103
EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note: Purchases require written justification that demonstrates cost benefits over leasing or renting.	COST / ITEM
PIT tag reader refurbishment in 2014 and 2016 = \$100/refurbishment x 2 refurbishments = \$200 (2014, 2016)	\$ 200
Electrofishing equipment (pro-rated for life-cycle replacement, partial use) = \$105/year x 3 years = \$315	\$ 315
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	\$ 515
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	COST / ITEM
Fish samplings misc. supplies (waders, nets, fish bags, buckets, scales, disinfectant, etc.) = \$150/year for 3 years = \$450	\$ 450
PIT tags estimated at \$6.50 ea. X 50/site x 4 sites x 3 surveys = \$3,900	\$ 3,900
Stream morphology misc. sampling supplies (tape measures, stream gauge, sediment traps, etc.) = \$150/year for 3 years = \$450	\$ 450
Temperature loggers = 2 x \$150 = \$300 (2014)	\$ 300
TOTAL MATERIALS AND SUPPLY COST	\$ 5,100
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):	COST / ITEM
BC per diem = \$20/day x 5 days/year x 3 years x 3 employees (2 GS-5s, GS-4) = \$900	\$ 900
TOTAL TRAVEL COST	\$ 900
CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):	COST / ITEM
Electrofishing and marking: GS-9/6 FWS Fisheries Biologist @ \$3,205/PP x 1.75 PP/year x 3 years (3.75 weeks sampling, .75 weeks	\$ 16,826
Stream morphology: GS-9/6 FWS Fisheries Biologist @ \$3,525/PP x 1.5 PP/year for 3 years (.75 weeks planning, mob/demob, 2.25 wee	\$ 14,423
BC per diem = \$20/day x 5 days/year for 3 years = \$300	\$ 300
17% OH = \$31,549 x .17 = \$5,363	\$ 5,363
TOTAL CONTRACT COST	\$ 36,912

SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION DATE (M/D/YYYY)	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISHMENTS	PLANNED COST
FY 14	10/01/13	09/30/14	NPS/FWS		#VALUE!	1 set of stream mo	\$ 18,744
FY 15	10/01/14	09/30/15	NPS/FWS		#VALUE!	1 set of stream mo	\$ 18,343
FY 16	10/01/15	09/30/16	NPS/FWS		#VALUE!	1 set of stream mo	\$ 18,443
FY					#DIV/0!		
TOTAL					#DIV/0!	0	\$ 55,530

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	X
3. Estimate supported by cost guides from independent sources or other federal agencies.	
4. Estimates based upon government wage rates and material cost.	
5. No cost estimate required - cost charged to Fire Suppression Account.	

P = Personnel Services, E = Equipment M = Materials/Supplies, T = Travel, C = Contract, F = Suppression

RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT

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TOTAL COST BY JURISDICTION

JURISDICTION	UNITS TREATED	COST
NPS		\$ 55,530
	TOTAL COST	\$ 55,530

PART F - INDIVIDUAL SPECIFICATION

TREATMENT/ACTIVITY NAME	Boreal Toad Disease Assessment	PART E SPECIFICATION #	FLTE-4
NFPORS TREATMENT CATEGORY*		FISCAL YEAR(S) (list each year):	2014, 2015, 2016
NFPORS TREATMENT TYPE *		WUI? Y / N	
IMPACTED COMMUNITIES AT RISK	Spruce Lake/Creek	IMPACTED T&E SPECIES	Boreal Toad
		FUNDING SOURCE (ES, BAR, OTHER)	BAR

* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

WORK TO BE DONE (describe or attach exact specifications of work to be done):

Number and Describe Each Task:	
A. General Description: Sample boreal toads at Spruce Lake for the amphibian chytrid fungus (Batrachochytrium dendrobatidis). B. Location/(Suitable Sites): Spruce Lake - 1/4 mi. from the burn perimeter. C. Design/Construction Specifications: Non-invasive cotton-tipped swabs will be used to collect samples. D. Purpose of Treatment Specifications: Confirm continued disease-free status of Spruce Lake breeding population. E. Treatment Effectiveness Monitoring Proposed: Results of disease testing will be our monitoring.	
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	COST / ITEM
cotton-tipped swabs, vials, EtOH, latex gloves for sample collection and preservation = \$100/year x 3 years = \$300	\$ 300
sample analysis = 30 samples x \$25 = \$750 x 3 years = \$2,250	\$ 2,250
TOTAL MATERIALS AND SUPPLY COST	\$ 2,550

SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION DATE (M/D/YYYY)	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISHMENTS	PLANNED COST
FY 14	05/15/14	09/30/14	USGS/NPS	1	#DIV/0!		\$ 850
FY 15	05/15/14	09/30/15	USGS/NPS	1	#DIV/0!		\$ 850
FY 16	05/15/14	09/30/16	USGS/NPS	1	#DIV/0!		\$ 850
FY					#DIV/0!		
TOTAL					#DIV/0!	0	\$ 2,550

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	X
3. Estimate supported by cost guides from independent sources or other federal agencies.	
4. Estimates based upon government wage rates and material cost.	
5. No cost estimate required - cost charged to Fire Suppression Account.	

P = Personnel Services, E = Equipment M = Materials/Supplies, T = Travel, C = Contract, F = Suppression

TOTAL COST BY JURISDICTION

JURISDICTION	UNITS TREATED	COST
NPS	1	\$ 2,550
	TOTAL COST	\$ 2,550

CULTURAL RESOURCES ASSESSMENT

Cultural Resources Objectives

- Evaluate impacts to ten (10) archeological sites.
- Determine stabilization needs such as erosion control on specific sites.

Issues

- To conduct archeological condition assessments and prevent further damage of ten (10) archeological sites, including one grave.

Resource Assessments

Cultural Resources –Six (6) prehistoric and four (4) historic archeological sites, including one grave, are within or on the edge of lands burned by the Fern Lake Fire. Of these, 10 sites are potentially eligible for listing in the National Register of Historic places according to previous survey. Condition assessments on all of the sites are necessary to determine possible damage from fire or fire management activities and assess them for risks of post-fire effects such as erosion (Figure 5).

Justification for Condition Assessments on Cultural Sites

Condition assessments need to be conducted to determine long term and irreversible direct and indirect impacts. The 2008 Programmatic Agreement among the National Park Service, Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers for compliance with Section 106 of the National Historic Preservation Act describes the actions of the fire and fire management activities as undertakings. These undertakings have potential to affect known cultural resources. If the undertakings have a negative effect on potentially eligible sites, the corrective action plan or mitigation of potential effects may be erosion control.

Budget

IDIQ Contractor Personnel	Costs	Total
Principal Investigator	\$95.00 x 4 hrs.	387.00
Project Director	\$74.00 x 12 hrs.	840.00
Staff Archeologist	\$62.00 x 40 hrs.	2,500.00
Arch Tech I	\$52.00 x 24 hrs.	1,245.00
Admin Support	\$37.00 x 8 hrs.	300.00
	Travel/Misc.	1,330.00
	Total	\$6,602.00

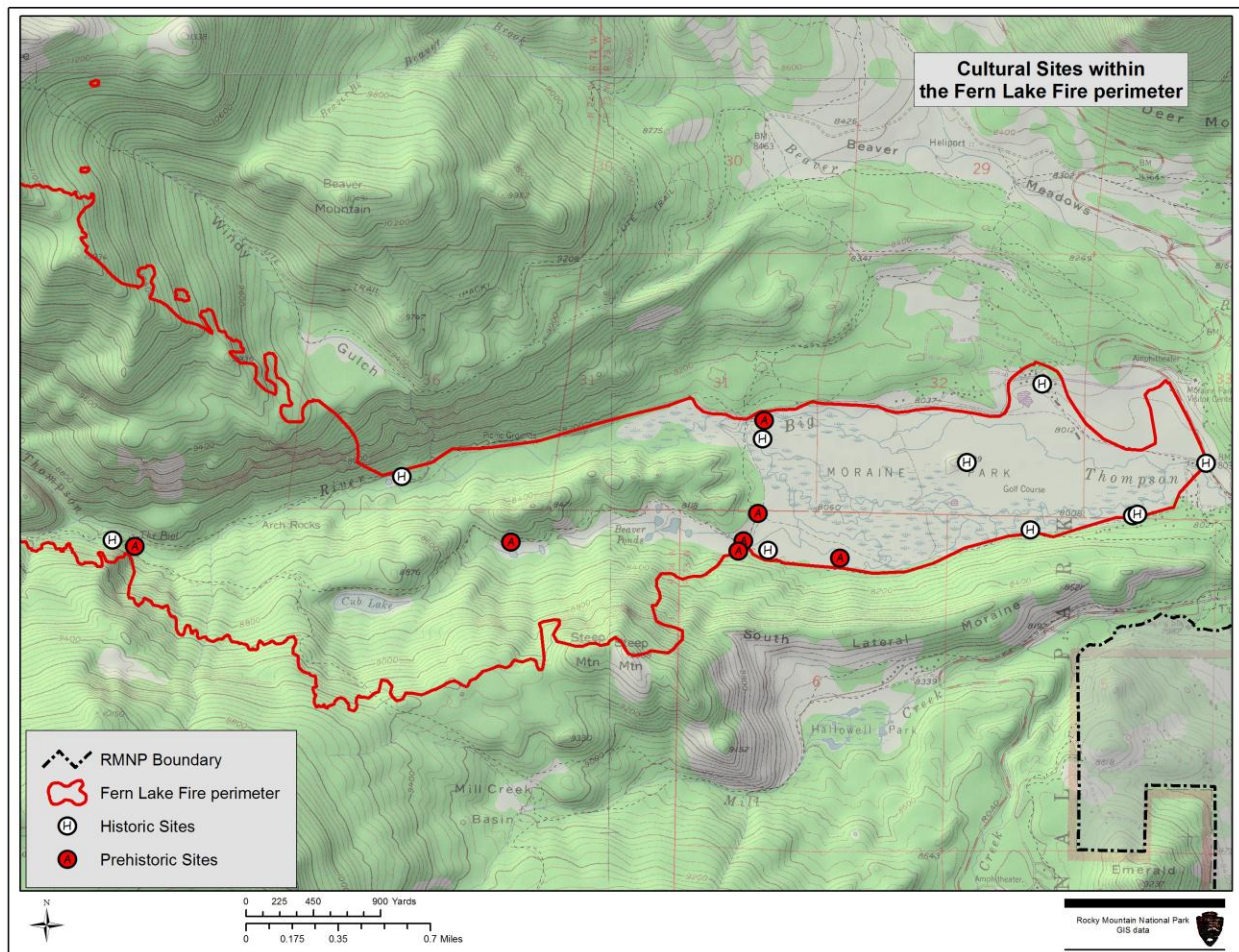


Figure 5. Cultural Sites within the Fern Lake Fire perimeter.

PART E - SUMMARY OF ACTIVITIES AND COSTS (Cultural Resources)

LINE ITEM NUMBER	SPECIFICATION NUMBER	TITLE	UNIT	UNIT COST	NUMBER OF UNITS	WORK AGENT	COSTS
1	FLC-1	Condition Assessments/Arch Sites	0	#DIV/0!	0	S	\$6,602
TOTAL COSTS							\$6,602

PART F - INDIVIDUAL SPECIFICATION

TREATMENT/ACTIVITY NAME	Condition Assessments/Arch Sites	PART E SPECIFICATION #	FLC-1
NFPORS TREATMENT CATEGORY		FISCAL YEAR(S) (list each year):	FY13
NFPORS TREATMENT TYPE *		WUI? Y / N	N
IMPACTED COMMUNITIES AT RISK		IMPACTED T&E SPECIES	N
		FUNDING SOURCE (ES, BAR, OTHER)	BAR

* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

WORK TO BE DONE (describe or attach exact specifications of work to be done):**Number and Describe Each Task:**

- A. General Description: Conduct archeological condition assessments
 B. Location/(Suitable Sites): 10 archeological sites in burn area
 C. Design/Construction Specifications:
 D. Purpose of Treatment Specifications:
 E. Treatment Effectiveness Monitoring Proposed:

LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST / ITEM
TOTAL PERSONNEL SERVICE COST	-
EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note: Purchases require written justification that demonstrates cost benefits over leasing or renting.	COST / ITEM
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	\$0
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	COST / ITEM
TOTAL MATERIALS AND SUPPLY COST	\$0
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):	COST / ITEM
Travel @ 4 personnel @ \$332.00 x 1	\$1,330
TOTAL TRAVEL COST	\$1,330
CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):	COST / ITEM
Principal Investigator @\$95.00 x 4	\$387
Project Director @\$74.00 x 12	\$840
Staff Archeologist @ \$62.00 x 40	\$2,500
Arch Tech I @ \$52.00 x 24	\$1,245
Admin Support @ \$37.00 x 8	\$300
TOTAL CONTRACT COST	\$5,272

SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION DATE (M/D/YYYY)	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISHMENTS	PLANNED COST
FY_13_	05/01/13	09/30/13	S		#DIV/0!		\$6,602
FY_					#DIV/0!		
FY_					#DIV/0!		
FY_					#DIV/0!		
TOTAL					#DIV/0!	0	\$6,602

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	
3. Estimate supported by cost guides from independent sources or other federal agencies.	TC
4. Estimates based upon government wage rates and material cost.	
5. No cost estimate required - cost charged to Fire Suppression Account.	

P = Personnel Services, E = Equipment M = Materials/Supplies, T = Travel, C = Contract, F = Suppression

RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT**TOTAL COST BY JURISDICTION**

JURISDICTION	UNITS TREATED	COST
National Park Service		\$6,602
TOTAL COST		\$6,602

WATERSHED AND SOIL ASSESSMENT

A Soil and Water Resources Damage Assessment Report and Burned Area Assessment was completed on 11/26/2012. Please refer to Appendix B for this assessment. On December 1, 2012, the fire increased in size significantly and burned additional drainages. Further assessment of the watershed and soils is planned for these additional burned areas. Specific recommendations were made during the initial assessment and are described below. However, at this time, funding is requested only for sign installation and public information. Some recommendations, such as noxious weed monitoring are included in previous assessments and treatments.

Issues

Critical values considered in the burned area assessment prior to 11/26/12 were:

- Human life and Safety: National park personnel and visitors, Estes Park residents and visitors
- Property: Fern Lake Trail, roads and bridges within RMNP, developed areas within Estes Park, water delivery infrastructure
- Natural Resources: Soil productivity, The Pool, water quality

Treatments

To reduce risks to the critical values, recommendations are:

- Installation of warning signs at the Fern Lake Parking Lot/Trailhead, along the Fern Lake Trail and at the bridge across the Big Thompson River near The Pool
- Dissemination of information to park personnel and visitors to warn of burned area conditions and associated risks
- Following thundershower events, monitor wildfire response to determine if the preceding treatment recommendations are adequate to protect life and safety or if Fern Lake Trail closure should be recommended.
- Trail storm-proofing (additional drainage features)
- Storm inspection and response
- Communicate with potentially affected parties to share the findings of the Fern Lake Burned Area Report and discuss issues and concerns. Affected parties include the owners and managers of Lake Estes Reservoir and other downstream drinking and/or irrigation water providers.
- If the level of concern from Lake Estes owners/managers or other downstream water providers is high, consider water quality monitoring at Lake Estes.
- If the level of concern from Lake Estes owners/managers or other downstream water providers is high, review infrastructure management or water treatment options, such as use of alternate water supplies or modifying treatment methods as needed.
- Monitor noxious weed populations within and directly adjacent to the burned area, and treat if needed.

Justification

Critical values at risk considered in the burned area assessment were human life and safety, property and natural resources. Risk assessment methodology was used to determine the level of risk to the critical values at risk. The following are the outcomes of the risk assessment:

- the risk rating for impacts on human life and safety within the burned area or in steep gulches draining directly from the burned hill-slopes was determined to be intermediate.
- the risk rating for impacts on human life and safety directly downstream from the burned area on or near the Fern lake Trail is intermediate.
- the risk rating for impacts on human life or safety in the Estes Park area is intermediate.
- the risk rating for impacts to the Fern Lake Trail is low
- the risk rating for impacts to roads, trailheads or bridges within RMNP or developed areas within Estes Park is low.

Note: This is based on 11/26/12 assessment. See Facilities Resource Assessment for impacts to trails, trailheads and bridges since December first fire spread.

- the risk rating for impacts to water storage or delivery infrastructure is low.
- the risk rating for impacts to water quality is high.
- the risk that noxious weed establishment or spread could impact native plant communities is high. (Addressed in Vegetation Resource Assessment)

PART E - SUMMARY OF ACTIVITIES AND COSTS (Watershed and Soils)

LINE ITEM NUMBER	SPECIFICATION NUMBER	TITLE	UNIT	UNIT COST	NUMBER OF UNITS	WORK AGENT	COSTS
1	FLWS-1	Watershed and Soils - signs/info	0	#DIV/0!	0	F	\$ 12,537
TOTAL COSTS							\$ 12,537

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

PART F - INDIVIDUAL SPECIFICATION

TREATMENT/ACTIVITY NAME	Watershed and Soils - signs/info	PART E SPECIFICATION #	FLWS-1
NFPORS TREATMENT CATEGORY*		FISCAL YEAR(S) (list each year):	FY13
NFPORS TREATMENT TYPE *		WUI? Y / N	N/A
IMPACTED COMMUNITIES AT RISK	Estes Park	IMPACTED T&E SPECIES	N/A
		FUNDING SOURCE (ES, BAR, OTHER)	ES

* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

WORK TO BE DONE (describe or attach exact specifications of work to be done):

Number and Describe Each Task:
A. General Description: Design and install warning signs, communicate and inform the public and visitors. B. Location/(Suitable Sites): Fern Lake/Cub Lake Trailhead, along the Fern Lake Trail and at the bridge across the Big Thompson River near The Pool C. Design/Construction Specifications: Signs and info can be obtained locally or created at the park. D. Purpose of Treatment Specifications: Public information E. Treatment Effectiveness Monitoring Proposed:

LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST / ITEM
GS-05 @ 15.82/hr for 7PP for FY13 (1362.42 per PP)	\$ 9,537
TOTAL PERSONNEL SERVICE COST	\$ 9,537
EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note: Purchases require written justification that demonstrates cost benefits over leasing or renting.	COST / ITEM
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	\$ -
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	COST / ITEM
30 signs @ 100.00/sign for FY13	\$ 3,000
TOTAL MATERIALS AND SUPPLY COST	\$ 3,000
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):	COST / ITEM
TOTAL TRAVEL COST	\$ -
CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):	COST / ITEM
TOTAL CONTRACT COST	\$ -

SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION DATE (M/D/YYYY)	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISHMENTS	PLANNED COST
FY 13	06/02/13	09/07/13	F		#DIV/0!		\$ 12,537
FY					#DIV/0!		
FY					#DIV/0!		
FY					#DIV/0!		
TOTAL					#DIV/0!	0	\$ 12,537

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	
3. Estimate supported by cost guides from independent sources or other federal agencies.	
4. Estimates based upon government wage rates and material cost.	PM
5. No cost estimate required - cost charged to Fire Suppression Account.	

P = Personnel Services, E = Equipment M = Materials/Supplies, T = Travel, C = Contract, F = Suppression

RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT

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TOTAL COST BY JURISDICTION

JURISDICTION	UNITS TREATED	COST
National Park Service		\$ 12,537
TOTAL COST		\$ 12,537

FACILITIES RESOURCES ASSESSMENT - TRAILS

Facilities Resources Objectives

- Identify and mitigate/repair damage to trails assets within the burned area.

Issues

The fire significantly damaged several trail structures beyond repair and left the trail and landscape slopes open to significant erosion and slough offs. These structures and trails provide access to the park's valuable wilderness for visitors and concessionaires. They also reduce significant impacts to the park's natural resources by providing an established route into the wilderness which keeps all visitors within an established impacted area.

The fire area has also left the area littered with dead standing and downed trees creating hazardous conditions for park personnel and hikers. Many of the trees left standing along The Pool to Cub Lake Trail (FR-24) (Figure 6.) have been burnt out at their base, increasing the realized hazardous conditions.

- Two multi-use bridges were damaged beyond repair along FR-24 and if not repaired significant natural resources will be damaged as stock and hikers veer off the trail to look for possible crossing points. Not repairing the bridges will also increase the risk of injury to park visitors as hiking outside the trail corridor will introduce them to unstable terrain and swift water, due to the impacts the fire had on the vegetation, and steep terrain.
- One backcountry sign was destroyed which provided direction to visitors in the backcountry to ensure their safety.
- Several linear feet of trail retaining structures (log retaining bars, log turnpikes and outside rock wall) have been damaged along FR-24, the Flattop to Cub Lake Trail (FR-23) and a small section of the Moraine Park Trail (FR-25). These structures along with natural vegetation help define the trail edge and protect the natural landscape of the slope from erosion.

Background

The following trails FR-24, FR-23 and FR-25 extend through the Big Thompson River and Cub Creek drainages. The Big Thompson River is a major water source for the town of Estes Park and several Front Range towns/cities in northern Colorado. This river is also important in sustaining the delicate ecosystem of a natural moraine in RMNP. The trail is a popular day-hike for many park visitors, as well as for backpackers accessing Fern Lake, Spruce Lake, and Odessa Lake from Moraine Park. The trail is open to public use, however, it may need to be temporarily closed during and after spring run-off to prevent visitor injury and significant damage to the park's natural resources.

Reconnaissance Methods

The East District Trails Supervisor, a District Trail Crew Lead and the Park Engineer conducted field and reconnaissance of all affected trail systems during the month of January 2013. Reconnaissance efforts concentrated on identifying and documenting potential hazard trees, trail tread and bridge

conditions, damage to erosion prevention structures, potential debris flow routes and targets, and fire suppression impacts.

Findings

All of the downed logs and most of the debris on FR-24 and FR-25 within the Fern Lake Fire have been removed during reconnaissance efforts. However, safety concerns are still present due to several remaining burned out trees still standing within the trail corridor.

Many of the tread retaining structures have been lost due to the fire burning valuable vegetation that provide structural support to the historic rock walls and trail edges on sections of the trail that provide pathways through steep sloped landscapes. This is caused by the removal of vegetation along the base of the walls which weaken the foundational support causing some sections of the wall to fall down the slope or settle. The settling of the wall's foundation opens the joints increasing the risk of further damage during spring run-off or heavy storms throughout the summer. Along FR-24, there has been an estimated 75 linear feet of single-tier and multi-tiered rock wall that have been weakened or damaged due to the fire. (Photo 1) Another 25 linear feet of damaged wall has been identified along FR-23 as well as 5 linear feet along FR-25. (Photo 2)

Several hundred linear feet of outside trail edge has also been identified to be at risk of increased erosion due to the loss of vegetation. (Photo 3 and 4) As we depend on tree and plant roots to provide structural support to steep slopes, we also depend on it to do the same for outside or downslope trail edges. We have already noticed some erosion happening which is surprising as we have had very little melting snow occurring so far, which shows how weakened the fire has made the landscape. Three hundred linear feet along FR-24 along with another 50 linear feet along FR-25 have been identified to be at risk of increased erosion.

One backcountry sign has been lost in the fire. This sign provides for public safety by informing the park visitor physical directions towards major visitation points within the trail district. (Photo 5)

Two major losses were to the multi-use bridges on FR-24. These bridges provide for safe crossing of two steep drainages along trail. They also ensure that visitors and stock remain within the trail corridor, protecting the surrounding natural landscape. The first bridge (B1-24-6) is located about .5 miles from The Pool towards Cub Lake. It was constructed of native log sills, stringers and kick rails with ACQ treated planks for bridge surfacing (Photos 6 and 7). Although most of the bridge is under snow and ice, the visible portion shows significant fire damage. At least one stringer has been damaged enough to compromise the structural integrity of the bridge, therefore all stringers will need to be replaced along with the planks and kick rail.

The second bridge B1-24-5, the Wuh Creek Bridge (Photo 8), allows for safe crossing of a well-established creek that runs throughout the spring, summer, and fall. This is a very steep creek at this crossing with little or no opportunities in the surrounding area for visitors to cross safely. The bridge was built in 2007 and is constructed of rock abutments, steel I-beam stringers with natural fascia logs, ACQ treated planks and natural log post and handrails. Most of the materials were flown in by helicopter with the natural lumber gathered onsite. As you can see in Photo 9, most of the lumber on the bridge was destroyed. Very little of the bridge remains and without knowing how hot the fire burned in the area (structural strength of steel can be compromised at temperatures as low as 250 °C), most of the

remaining material is unusable including the I-beams. Only the abutments can be used in the new construction given that they were built of stone with a solid foundation and the fire didn't compromise the base in anyway.

Recommendations

B1-24-5, Wuh Creek Bridge

The entire structure will have to be rebuilt aside from the abutments. If the abutment foundations have been weakened, another wall just below the abutments will have to be built with a solid base on stable mineral soil or bed rock. All the materials for this bridge will have to be flown in by helicopter as there is no usable natural lumber in the surround area left. In kind, the remaining material will have to be disassembled and flown out for recycle or disposal. It will take 1 backcountry trail crew 7 weeks to complete the bridge including gathering natural lumber from other areas of the park and delivering them to the flight operational area.

B1-24-6 Backcountry Bridge

This bridge will also have to be reconstructed with imported material. The remaining ACQ treated planks will have to be flown out for disposal. It will take 1 backcountry trail crew 3 weeks to complete the bridge including gathering natural lumber from other areas of the park and delivering them to the flight operational area.

Backcountry Sign with Post

The sign will need to be replaced in FY13 as it provides for visitor safety. The sign and post will be prepared at park headquarters and carried in by a seasonal woodcrafter for placement. This should only take 1.5 days.

Multi-tiered Historic Rock Walls

As with the bridge abutments, these walls will have to be further assessed to determine whether the wall foundations are structurally solid and the wall did not settle compromising the joints. If so, the wall will have to be disassembled to prepare a solid base for the wall on mineral soil or bed rock. After a foundation is established, the wall will be reassembled in the same manner as before providing for increased header stones to be placed and a placed rock crush fill to increase to stability of the wall from future erosion and fires.

If the foundations are solid and the wall has not settled then the wall will be left as it is. In a few places of the wall, some of the rock became dislodged during the fire and fell down the slope. These rocks will be recovered and set back into the wall. If these rocks cannot be recovered, then a suitable replacement will be identified.

Outside Retaining Structures

These areas will need to be stabilized until vegetation can reestablish itself and stabilize the slope. To do this, ACQ pressure treated logs will have to be flown in. A backcountry trail crew will place these

logs as a single tier or multi-tiered wall with header logs placed to secure the wall. The wall will then be back-filled with crush rock to increase the walls stability.

Approved and funded construction of the wooden bridges, trail tread repair and log removal will commence in the spring of FY13. BAR funds are also sought to continue trail repairs in FY14, FY15, and FY16.

Cub Creek Campsite Replacement

The Cub Creek campsite and privy need to be relocated and replaced because the current location was burned over and the remaining hazard trees are a threat to visitor safety. First, a new location for the campsite needs to be determined and approved. Second, the new site needs to be cleared and tent pads constructed. Third, a new privy needs to be dug and related facilities (base, privy seat, and walls) need to be constructed. Finally, access trails need to be constructed to provide access to the campsite and privy. Funding for relocation and replacement of the Cub Creek Campsite is requested for FY14.

Old Kaley Pump House Restoration

An abandoned pump house was completely burned to the foundation near the Kailey Cottage area during the run on December 1, 2012. The remaining infiltration gallery poses potential hazards to visitors and wildlife despite the fact that the lid to the gallery has been secured with a hasp and lock. To date the park has remediated the site for lead paint and asbestos and would like to remove the remaining foundation to restore/re-veg the site to natural conditions. Work would be done in-house with day-labor staff and equipment, preferably this spring before the ground thaws and run-off increases.

Consultations

Kevin Dowell, Trail Foreman, ROMO

Kevin Soviak, East District Trails Supervisor, ROMO

Doug Parker, North District Trail Crew Leader, ROMO

Mark Koughl, Supervisory General Engineer, ROMO

Danny Basch, Facility Manager – Operations and Maintenance, ROMO

Dave Pettebone, Wilderness Coordinator, ROMO

PHOTOS OF TRAIL AND BRIDGE DAMAGE



Photo 1 - Damaged Rock Walls



Photo 2 - Damaged Rock Wall FR-25



Photo 3 - Loss of vegetation



Photo 4 - Eroding trail edge



Photo 5 - Backcountry Sign

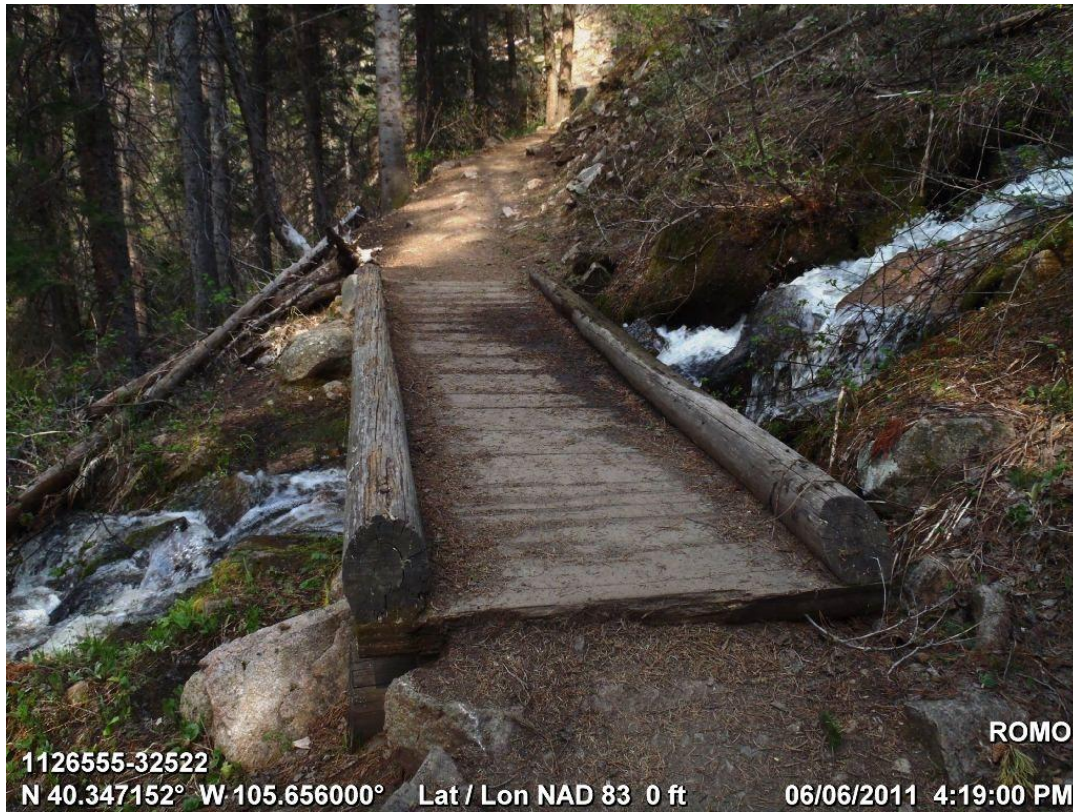


Photo 6 - B1-24-6 Before



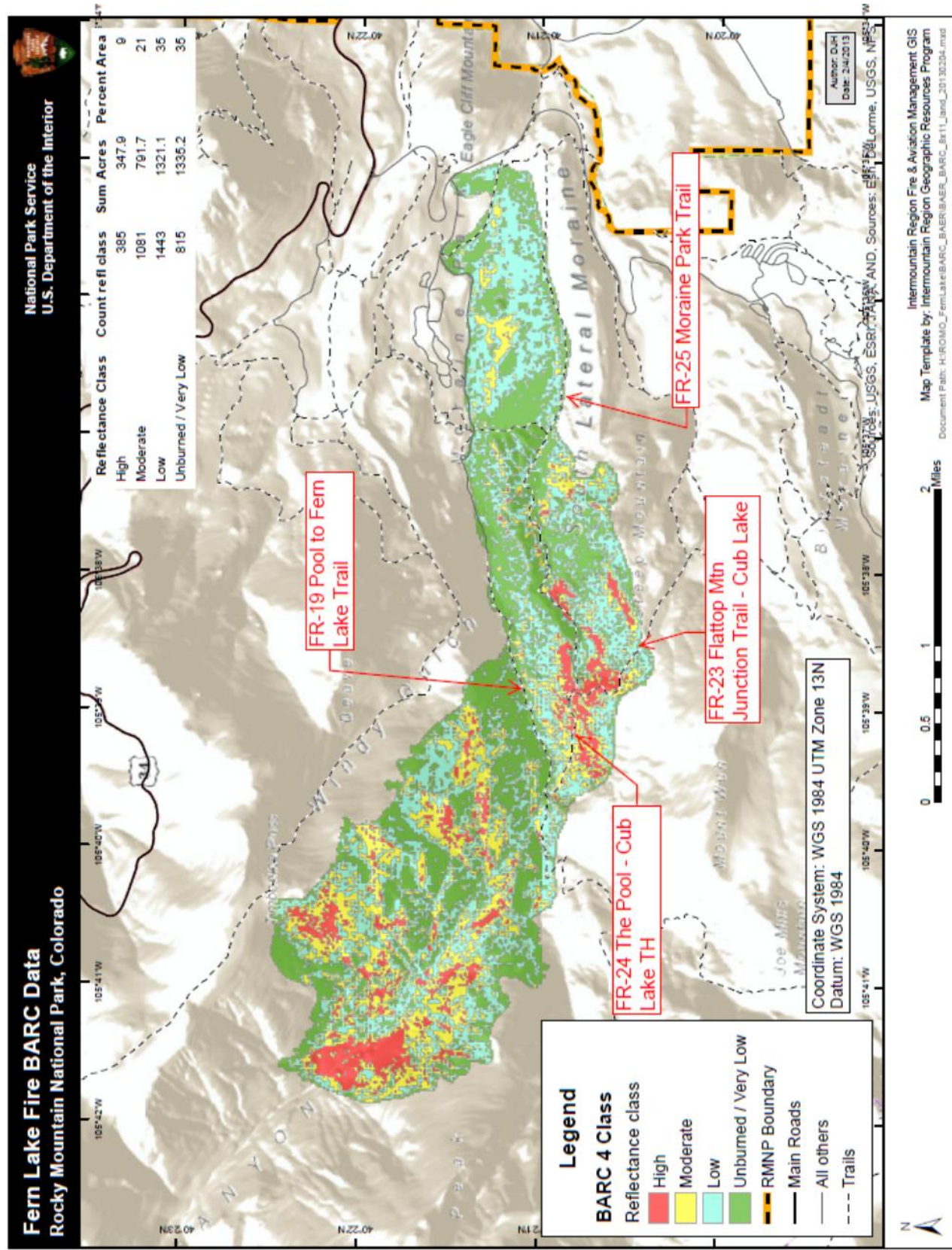
Photo 7 - B1-24-6 After



Photo 8 - B1-24-5 Wuh Creek Bridge Before



Photo 9 - B1-24-5 Wuh Creek Bridge After



Fern Lake Fire

PART E - SUMMARY OF ACTIVITIES AND COSTS (Facilities Resources/Backcountry)

LINE ITEM NUMBER	SPECIFICATION NUMBER	TITLE	UNIT	UNIT COST	NUMBER OF UNITS	WORK AGENT	COSTS
1	1126531	B1-24-5 Wuh Creek Multi-use Bridge	1	\$ 76,512	1	F,S	\$ 76,512
2	1126555	B1-24-6 Multi-use Bridge	1	\$ 32,707	1	F,S	\$ 32,707
3	1125664	Backcountry Sign	1	\$ 428	1	F	\$ 428
4	1125457	Multi-tiered historic rock retaining walls	LF	\$ 128	75	F	\$ 9,570
5	LW-1	Outside retaining structures	LF	\$ 85	350	F,S	\$ 29,865
6	FLFR-1	Cub Creek Campsite	1	\$ 10,060	1	F	\$ 10,060
7	FLFR-2	Kailey Pumphouse	1	\$ 4,766	1	F	\$ 5,266
TOTAL COSTS							\$ 164,407

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer
Specification # correlates with the FMSS asset # except for line # 5.

PART F - INDIVIDUAL SPECIFICATION

TREATMENT/ACTIVITY NAME	B1-24-5 Wuh Creek Multi-use Bridge	PART E SPECIFICATION #	1126531
NFPORS TREATMENT CATEGORY*		FISCAL YEAR(S) (list each year):	FY13
NFPORS TREATMENT TYPE *	Restoration	WUI? Y / N	N
IMPACTED COMMUNITIES AT RISK	None	IMPACTED T&E SPECIES	None
		FUNDING SOURCE (ES, BAR, OTHER)	ES, BAR

* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

WORK TO BE DONE (describe or attach exact specifications of work to be done):

Number and Describe Each Task:
A. General Description: Reconstruction of the Wuh Creek Bridge.
B. Location/(Suitable Sites): FR-24 The Pool - Cub Lake TH, ROMO
C. Design/Construction Specifications: ROMO Multi-Use Bridge Specifications
D. Purpose of Treatment Specifications: To continue to protect the parks natural landscapes and resources by limiting visitor traffic to a designated trail corridor.
E. Treatment Effectiveness Monitoring Proposed: None required.

LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST / ITEM
1 Backcountry Trail crew for 7 weeks (1 WL-07, 1 WG-07, 1 WG-05, 2 WG-03) - \$8123.87 per PP	\$ 56,867
TOTAL PERSONNEL SERVICE COST	\$ 56,867
EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note: Purchases require written justification that demonstrates cost benefits over leasing or renting.	COST / ITEM
Helicopter Time (Type 3, Light Duty , Project) \$2,590 per hour for 3 hours plus 2 hrs ferry time	\$ 12,950
Backcountry Stock Team (105.19 per hour for 22 hours)	\$ 2,314
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	\$ 15,264
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	COST / ITEM
Steel Threaded Rod 1-1/2-6, 3' L (6 @ \$68.45)	\$ 411
W10x22 Wide Flange Steel Beam - 26' (3 @ \$18.62 per linear foot)	\$ 1,452
1/2 x 4" Steel Lag Bolts (20 - \$5.25 per box of 10)	\$ 11
2-1/2"x2-1/2"x3/16" Angle Clips, 2 1/2" L (48 @ \$0.53 per inch)	\$ 93
3/8" x 3" Lag Screws (4 boxes of 10 pieces @ \$2.13)	\$ 9
3x6, 16' L Pressure Treated Lumber (8 @ \$36.88)	\$ 295
3"x12" .40 ACQ Hem/Fir Treated Lumber, 12' L (6 @ \$44.775)	\$ 269
3"x12" .40 ACQ Hem/Fir Treated Lumber, 10' L (22 @ \$37.3125)	\$ 821
Lag Bolts 6" (1 box of 25 @ \$95.60)	\$ 191
TimberLoks 4" (250 count bucket)	\$ 76
TimberLoks 8" (250 count bucket)	\$ 171
3/8" pitch Chainsaw Chain (2 @ \$36.96)	\$ 74
Chainsaw Gas (16 gallons @ \$4.00)	\$ 64
BioPlus Bar Oil (2 gallon @ \$22.49)	\$ 45
Delivery Charge	\$ 400
TOTAL MATERIALS AND SUPPLY COST	\$ 4,380

EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item):	COST / ITEM
Note: Purchases require written justification that demonstrates cost benefits over leasing or renting.	
Helicopter Time (Type 3, Light Duty , Project) \$2,590 per hour for 2 hours (Ferry time included in Spec 1)	\$ 5,180
Backcountry Stock Team (105.19 per hour for 22 hours)	\$ 2,314
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	\$ 7,494
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	COST / ITEM
3"x12" .40 ACQ Hem/Fir Treated Lumber, 10' L (20 @ \$37.3125)	\$ 746
TimberLoks 6" (250 count bucket)	\$ 95
TOTAL MATERIALS AND SUPPLY COST	\$ 841
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):	COST / ITEM
TOTAL TRAVEL COST	\$ -
CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):	COST / ITEM
TOTAL CONTRACT COST	\$ -

SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION DATE (M/D/YYYY)	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISHMENTS	PLANNED COST
FY13	06/24/13	09/20/13	F,S	EA	\$ 32,707	1	\$ 32,707
FY					#DIV/0!		
FY					#DIV/0!		
FY					#DIV/0!		
TOTAL					\$ 32,707	1	\$ 32,707

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	
3. Estimate supported by cost guides from independent sources or other federal agencies.	C,M
4. Estimates based upon government wage rates and material cost.	P,E
5. No cost estimate required - cost charged to Fire Suppression Account.	

P = Personnel Services, E = Equipment M = Materials/Supplies, T = Travel, C = Contract, F = Suppression

RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT

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TOTAL COST BY JURISDICTION

JURISDICTION	UNITS TREATED	COST
DOI, NPS, ROMO	1	\$ 32,707
TOTAL COST	1	\$ 32,707

PART F - INDIVIDUAL SPECIFICATION

TREATMENT/ACTIVITY NAME	Backcountry Sign	PART E SPECIFICATION #	1125664
NFPORS TREATMENT CATEGORY*		FISCAL YEAR(S) (list each year):	FY13
NFPORS TREATMENT TYPE *	Restoration	WUI? Y / N	N
IMPACTED COMMUNITIES AT RISK	None	IMPACTED T&E SPECIES	None
		FUNDING SOURCE (ES, BAR, OTHER)	ES, BAR

* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

WORK TO BE DONE (describe or attach exact specifications of work to be done):

Number and Describe Each Task:
A. General Description: Replacement of a backcountry directional sign.
B. Location/(Suitable Sites): FR-24 The Pool - Cub Lake TH, ROMO
C. Design/Construction Specifications:
D. Purpose of Treatment Specifications: To replace a backcountry sign which prevents visitors from being lost in the wilderness.
E. Treatment Effectiveness Monitoring Proposed: None required.

LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST / ITEM
1 Woodcrafter WG-05 (2 hrs @ \$18.81)	\$ 38
TOTAL PERSONNEL SERVICE COST	\$ 38
EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note: Purchases require written justification that demonstrates cost benefits over leasing or renting.	COST / ITEM
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	#REF!
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	COST / ITEM
CESS (minimeans)	\$ 390
TOTAL MATERIALS AND SUPPLY COST	\$ 390
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):	COST / ITEM
TOTAL TRAVEL COST	#REF!
CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):	COST / ITEM
TOTAL CONTRACT COST	\$ -

SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION DATE (M/D/YYYY)	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISHMENTS	PLANNED COST
FY13	05/20/13	06/14/13	F	EA	\$ 428	1	\$ 428
TOTAL					\$ 428	1	\$ 428

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	
3. Estimate supported by cost guides from independent sources or other federal agencies.	
4. Estimates based upon government wage rates and material cost.	P,M
5. No cost estimate required - cost charged to Fire Suppression Account.	

P = Personnel Services, E = Equipment M = Materials/Supplies, T = Travel, C = Contract, F = Suppression

RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT

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TOTAL COST BY JURISDICTION

JURISDICTION	UNITS TREATED	COST
DOI, NPS, ROMO	1	\$ 428
TOTAL COST		\$ 428

PART F - INDIVIDUAL SPECIFICATION

TREATMENT/ACTIVITY NAME	Multi-tiered historic rock retaining wall	PART E SPECIFICATION #	1125457
NFPORS TREATMENT CATEGORY*		FISCAL YEAR(S) (list each year):	FY13
NFPORS TREATMENT TYPE *	Restoration	WUI? Y / N	N
IMPACTED COMMUNITIES AT RISK	None	IMPACTED T&E SPECIES	Nonoe
		FUNDING SOURCE (ES, BAR, OTHER)	ES, BAR

* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

WORK TO BE DONE (describe or attach exact specifications of work to be done):

Number and Describe Each Task:
A. General Description: Repair historic rock walls damaged due to loss of vegetation.
B. Location/(Suitable Sites): FR-24 The Pool - Cub Lake TH, FR-23 Flattop Mtn Junction Trail - Cub Lake, FR-25 Moraine Park Trail
C. Design/Construction Specifications:
D. Purpose of Treatment Specifications: To repair several square feet of damaged rock wall due to loss of vegetation.
E. Treatment Effectiveness Monitoring Proposed: None required.

LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST / ITEM
CESS minimeans estimate - \$69.10 per square foot (difficult gathering factor) 105 linear feet	\$ 7,256
TOTAL PERSONNEL SERVICE COST	\$ 7,256
EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note: Purchases require written justification that demonstrates cost benefits over leasing or renting.	COST / ITEM
Backcountry Stock Team (105.19 per hour for 22 hours)	\$ 2,314
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	\$ 2,314
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	COST / ITEM
TOTAL MATERIALS AND SUPPLY COST	#REF!
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):	COST / ITEM
TOTAL TRAVEL COST	#REF!
CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):	COST / ITEM
TOTAL CONTRACT COST	#REF!

SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION DATE (M/D/YYYY)	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISHMENTS	PLANNED COST
FY13	06/24/13	09/20/13	F	LF	\$ 128	75	\$ 9,570
TOTAL					\$ 128	75	\$ 9,570

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	
3. Estimate supported by cost guides from independent sources or other federal agencies.	
4. Estimates based upon government wage rates and material cost.	P, E
5. No cost estimate required - cost charged to Fire Suppression Account.	

P = Personnel Services, E = Equipment M = Materials/Supplies, T = Travel, C = Contract, F = Suppression

RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT

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TOTAL COST BY JURISDICTION

JURISDICTION	UNITS TREATED	COST
DOI, NPS, ROMO	75	\$ 9,570
	TOTAL COST	\$ 9,570

PART F - INDIVIDUAL SPECIFICATION

TREATMENT/ACTIVITY NAME	Outside retaining structures	PART E SPECIFICATION #	LW-1
NFPORS TREATMENT CATEGORY*		FISCAL YEAR(S) (list each year):	FY13
NFPORS TREATMENT TYPE *	Restoration	WUI? Y / N	N
IMPACTED COMMUNITIES AT RISK	None	IMPACTED T&E SPECIES	None
		FUNDING SOURCE (ES, BAR, OTHER)	ES, BAR

* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

WORK TO BE DONE (describe or attach exact specifications of work to be done):

Number and Describe Each Task:
A. General Description: Construct several hundred linear feet of treated log retaining structures to hold trail edge until regrowth of sustainable vegetation.
B. Location/(Suitable Sites): FR-24 The Pool - Cub Lake TH, FR-23 Flattop Mtn Junction Trail - Cub Lake
C. Design/Construction Specifications:
D. Purpose of Treatment Specifications: To prevent further erosion of landscape side slope and trail edges.
E. Treatment Effectiveness Monitoring Proposed: Bi-annual until vegetation is reestablished

LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hour X # Hours X # Fiscal Years = Cost/Item):	COST / ITEM
Do not include contract personnel costs here (see contractor services below).	
CESS minimeans estimate - \$55.63 per linear foot (treated logs) 350 linear feet	\$ 19,471
TOTAL PERSONNEL SERVICE COST	\$ 19,471
EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item):	COST / ITEM
Note: Purchases require written justification that demonstrates cost benefits over leasing or renting.	
Helicopter Time (Type 3, Light Duty , Project) \$2,590 per hour for 2 hours	\$ 5,180
Backcountry Stock Team (105.19 per hour for 22 hours)	\$ 2,314
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	\$ 7,494
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	COST / ITEM
6" x 12' ACQ Treated Logs (100 @ \$27.50 ea, \$150 shipping)	\$ 2,900
TOTAL MATERIALS AND SUPPLY COST	\$ 2,900
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):	COST / ITEM
TOTAL TRAVEL COST	#REF!
CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):	COST / ITEM
TOTAL CONTRACT COST	#REF!

SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION DATE (M/D/YYYY)	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISHMENTS	PLANNED COST
FY13	06/24/13	09/20/13	F,S	LF	\$ 85	350	\$ 29,865
TOTAL					\$ 85	350	\$ 29,865

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	
3. Estimate supported by cost guides from independent sources or other federal agencies.	M, C
4. Estimates based upon government wage rates and material cost.	P, E
5. No cost estimate required - cost charged to Fire Suppression Account.	

P = Personnel Services, E = Equipment M = Materials/Supplies, T = Travel, C = Contract, F = Suppression

RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT

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TOTAL COST BY JURISDICTION

JURISDICTION	UNITS TREATED	COST
DOI, NPS, ROMO	300	\$ 29,865
TOTAL COST		\$ 29,865

PART F - INDIVIDUAL SPECIFICATION

TREATMENT/ACTIVITY NAME	Cub Creek Campsite	PART E SPECIFICATION #	FLFR-1
NFPORS TREATMENT CATEGORY*		FISCAL YEAR(S) (list each year):	2014
NFPORS TREATMENT TYPE *		WUI? Y / N	
IMPACTED COMMUNITIES AT RISK		IMPACTED T&E SPECIES	
		FUNDING SOURCE (ES, BAR, OTHER)	BAR

* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

WORK TO BE DONE (describe or attach exact specifications of work to be done):

Number and Describe Each Task:
A. General Description: Relocate and reconstruct Cub Creek Campsite
B. Location/(Suitable Sites): Cub Lake area
C. Design/Construction Specifications: Same as original, camp pad construction, privy, minimal improvements
D. Purpose of Treatment Specifications: Relocate dur to hazard trees
E. Treatment Effectiveness Monitoring Proposed: N/A

LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hour X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST / ITEM
Privy Relocation: 2 GS 5's @ 10 hours x 2 Days X \$18/hour	\$ 720
New Privy Screen: 2 GS 5's @ 10 hours x 2 Days X \$18/hour	\$ 720
New Bridge: 4 GS 5's @ 10 hours x 3 Days X \$18/hour	\$ 2,160
Campsite Relocation (2 sites): 3 GS 5's @ 10 hours x 8 Days X \$18/hour	\$ 4,320
Construct Access Trails: 2 GS 5's @ 10 hours x 2 Days X \$18/hour	\$ 720
Supervision: 1 GS 9 @ 10 hours x 4 Days X \$30/hour	\$ 1,200
TOTAL PERSONNEL SERVICE COST	\$ 9,840
EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note: Purchases require written justification that demonstrates cost benefits over leasing or renting.	COST / ITEM
4 - 4x4 pressure treated posts @ \$20/ea	\$ 80
20 rough cut wood slabs @ \$5	\$ 100
Wood Screws	\$ 25
Plastic Toilet Seat	\$ 15
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	\$ 220
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	COST / ITEM
TOTAL MATERIALS AND SUPPLY COST	#REF!
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):	COST / ITEM
TOTAL TRAVEL COST	#REF!
CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):	COST / ITEM
TOTAL CONTRACT COST	#REF!

SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION DATE (M/D/YYYY)	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISHMENTS	PLANNED COST
14	05/01/14	09/30/14	NPS		#DIV/0!		
TOTAL					#DIV/0!	0	\$ 10,060

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	
3. Estimate supported by cost guides from independent sources or other federal agencies.	
4. Estimates based upon government wage rates and material cost.	
5. No cost estimate required - cost charged to Fire Suppression Account.	

P = Personnel Services, E = Equipment M = Materials/Supplies, T = Travel, C = Contract, F = Suppression

RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT

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TOTAL COST BY JURISDICTION

JURISDICTION	UNITS TREATED	COST
National Park Service		\$ 10,060
	TOTAL COST	\$ 10,060

PART F - INDIVIDUAL SPECIFICATION

TREATMENT/ACTIVITY NAME	Kailey Pumphouse	PART E SPECIFICATION #	FLFR-2
NFPORS TREATMENT CATEGORY*		FISCAL YEAR(S) (list each year):	2013
NFPORS TREATMENT TYPE *		WUI? Y / N	N
IMPACTED COMMUNITIES AT RISK		IMPACTED T&E SPECIES	N
		FUNDING SOURCE (ES, BAR, OTHER)	BAR

* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

WORK TO BE DONE (describe or attach exact specifications of work to be done):

Number and Describe Each Task:
A. General Description: Remove and restore infiltration gallery from abandoned pumphouse burned in December, 2012
B. Location/(Suitable Sites): Kailey Cottage area in Moraine Park
C. Design/Construction Specifications: Remove or crush in-place existing foundation and restore and revegetate area
D. Purpose of Treatment Specifications: Remove and restore area of obsolete infiltration gallery
E. Treatment Effectiveness Monitoring Proposed: N/A

LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hour X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST / ITEM
Personal Services: 2 Engineering Equipment Operators for 1 week	\$ 3,301
Revegetation (4 person NPS day-labor crew for 2 hours)	\$ 500
TOTAL PERSONNEL SERVICE COST	\$ 3,801
EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note: Purchases require written justification that demonstrates cost benefits over leasing or renting.	COST / ITEM
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	\$ -
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	COST / ITEM
Fuel for excavator and dump truck (150 gal @ \$4.00/gal)	\$ 600
Dumpster (30 yrd for 2 weeks)	\$ 465
Backfill material (20 tons @ \$20.00/ton)	\$ 400
TOTAL MATERIALS AND SUPPLY COST	\$ 1,465
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):	COST / ITEM
TOTAL TRAVEL COST	#REF!
CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):	COST / ITEM
TOTAL CONTRACT COST	#REF!

SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION DATE (M/D/YYYY)	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISHMENTS	PLANNED COST
13	03/15/13	10/30/13	NPS	F	#DIV/0!		
TOTAL					#DIV/0!	0	\$ 5,266

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	
3. Estimate supported by cost guides from independent sources or other federal agencies.	
4. Estimates based upon government wage rates and material cost.	P, M
5. No cost estimate required - cost charged to Fire Suppression Account.	

P = Personnel Services, E = Equipment M = Materials/Supplies, T = Travel, C = Contract, F = Suppression

RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT

See photos and narrative in report.

TOTAL COST BY JURISDICTION

JURISDICTION	UNITS TREATED	COST
National Park Service		\$ 5,266
TOTAL COST		\$ 5,266

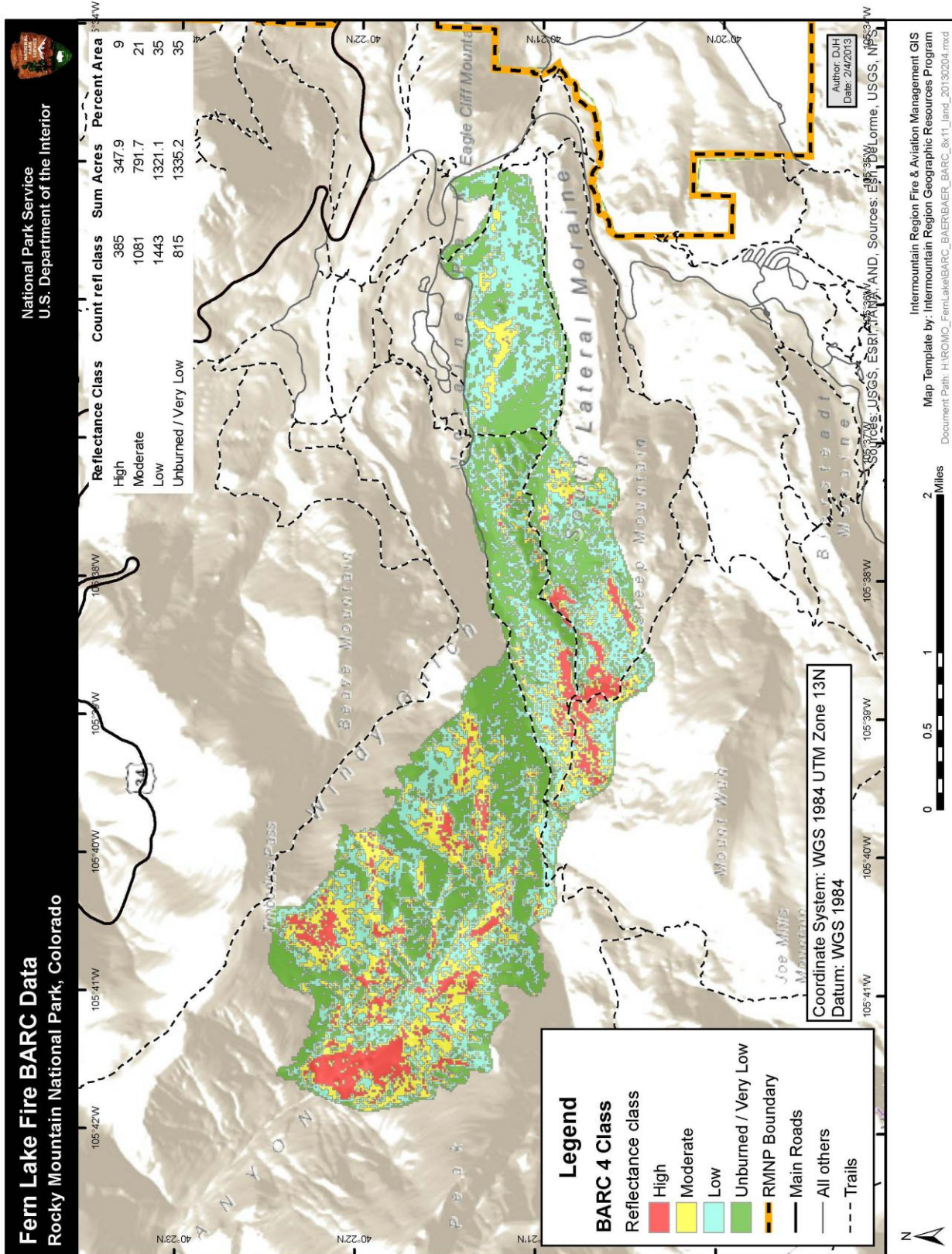
Environmental Compliance

An environmental compliance document specific to the Fern Lake Fire BAER/BAR Plan was completed (see Appendix D). All proposed BAER and BAR activities are addressed in either approved existing park plans with NEPA compliance (see Appendix D for a list of existing plans) or are categorically excluded (See categorical exclusion form in Appendix D). All existing park plans were prepared in accordance with the requirements of the National Environmental Policy Act (NEPA) and each resulted in a Finding of No Significant Impact or in the case of the Elk and Vegetation Management Plan Environmental Impact Statement as a Record of Decision. The one exception is the park's 2006 Vegetation Restoration Management Plan. The Vegetation Restoration Management Plan did not go through NEPA compliance, but does provide best management practices for vegetation restoration in wilderness and non-wilderness areas that were implemented as mitigating measures in other park management plans.

Any activities approved in the BAER/BAR Plan will be reviewed through the park's project proposal and clearance process and any activities proposed within wilderness will require a Minimum Requirements Analysis.

Herbicidal treatments of invasive exotic species were evaluated in the 2003 Environmental Assessment (EA) for exotic plants and any use of herbicides proposed in the Fern Lake Fire BAER and BAR Plan is consistent with the Exotic Plant Management Plan EA Finding of No Significant Impact. Exotic Plant treatments are not just limited to herbicides. They will involve all Integrated Pest Management techniques that are addressed in the Exotic Plant Management Plan.

Appendix A. Fern Lake Burned Area Reflectance Classification (BARC) Data



Appendix B. Initial Soil and Water Resources Damage Assessment Report

**Soil and Water Resources Damage Assessment Report/Burned Area Assessment
Fern Lake Burned Area
Rocky Mountain National Park
11/26/2012**

Objectives

- Evaluate burned area conditions
- Identify critical values in, or in close proximity to, the burned area
- Identify potential threats to critical values
- Conduct risk evaluation to determine the level of risk to each critical value
- When unacceptable risks are identified, prescribe treatment recommendations for Rocky Mountain National Park/Dept. of Interior (RMNP/DOI) review
- Document methods, findings, consultations and literature reviewed

Issues

Critical values considered in this burned area assessment:

- Human life and Safety: National park personnel and visitors, Estes Park residents and visitors
- Property: Fern Lake Trail, roads and bridges within RMNP, developed areas within Estes Park, water delivery infrastructure
- Natural Resources: Soil productivity, The Pool, water quality

Observations - Background Information

At the time of this report, the Fern Lake Fire burned approximately 1095 acres within the Headwaters of the Big Thompson River HUC6 watershed (the fire is only partially contained and is still growing). The burned area is located on steep south facing slopes directly adjacent to the Big Thompson River. Rock outcrops and cliffs are common in this glacially carved valley. The fire burned through spruce and fir dominated stands in the valley bottom and lower slopes, and moderately dense lodgepole pine dominated stands on the upper hill-slopes. The lodgepole pine dominated stands were impacted by the ongoing mountain pine beetle epidemic and approximately 50% of the trees were in the “dead and grey” stage. According to a recent fire history study, fire had not occurred in these stands in over 800 years. The resulting soil burn severity pattern is a mosaic of unburned, low, moderate and high soil burn severities. However, within large contiguous areas of moderate and high soil burn severity, extensive ground cover removal occurred.

The following map (Figure 1) provides visual perspective on the relatively small size of the burned area compared to the size of all watersheds tributary to Lake Estes. Fires that are relatively small in relation to the watershed in which they occur tend to limit the impacts to downstream values at risk.

In Moraine Park, less than two miles downstream from the burned area, the Big Thompson River braids into multiple sinuous, low gradient channels within the wide valley bottom. While there is a main channel thread on the northern side of the park, other channels appear to be available to carry flow at stages approaching bankfull. At flood flows, the large, well vegetated floodplain would also be accessed. The multiple channels and floodplain would serve as an effective depositional, filtering and energy dissipation zone, reducing flood threats to downstream values at risk.

Below Moraine Park, Big Thompson River exits RMNP and flows through Estes Park. Within Estes Park, there is extensive residential and commercial development directly adjacent to the river. In some locations between RMNP and Lake Estes, the river has been channelized and there is limited access to the floodplain. In other locations, development has occurred on the floodplain and to the banks of the stream. Historically, Estes Park has been impacted by flooding, and the risk of flooding from snowmelt and/or high intensity summer thundershowers remains. It is unlikely that burned area runoff would significantly exacerbate this risk.

Approximately 8 miles from the burned area, the Big Thompson River flows into Lake Estes. Lake Estes is part of the Colorado-Big Thompson Project (CBT). Water from Lake Estes is provided to numerous irrigation and drinking water providers downstream.

Figure 1: Fern Lake Burned Area and Source Watershed for Lake Estes

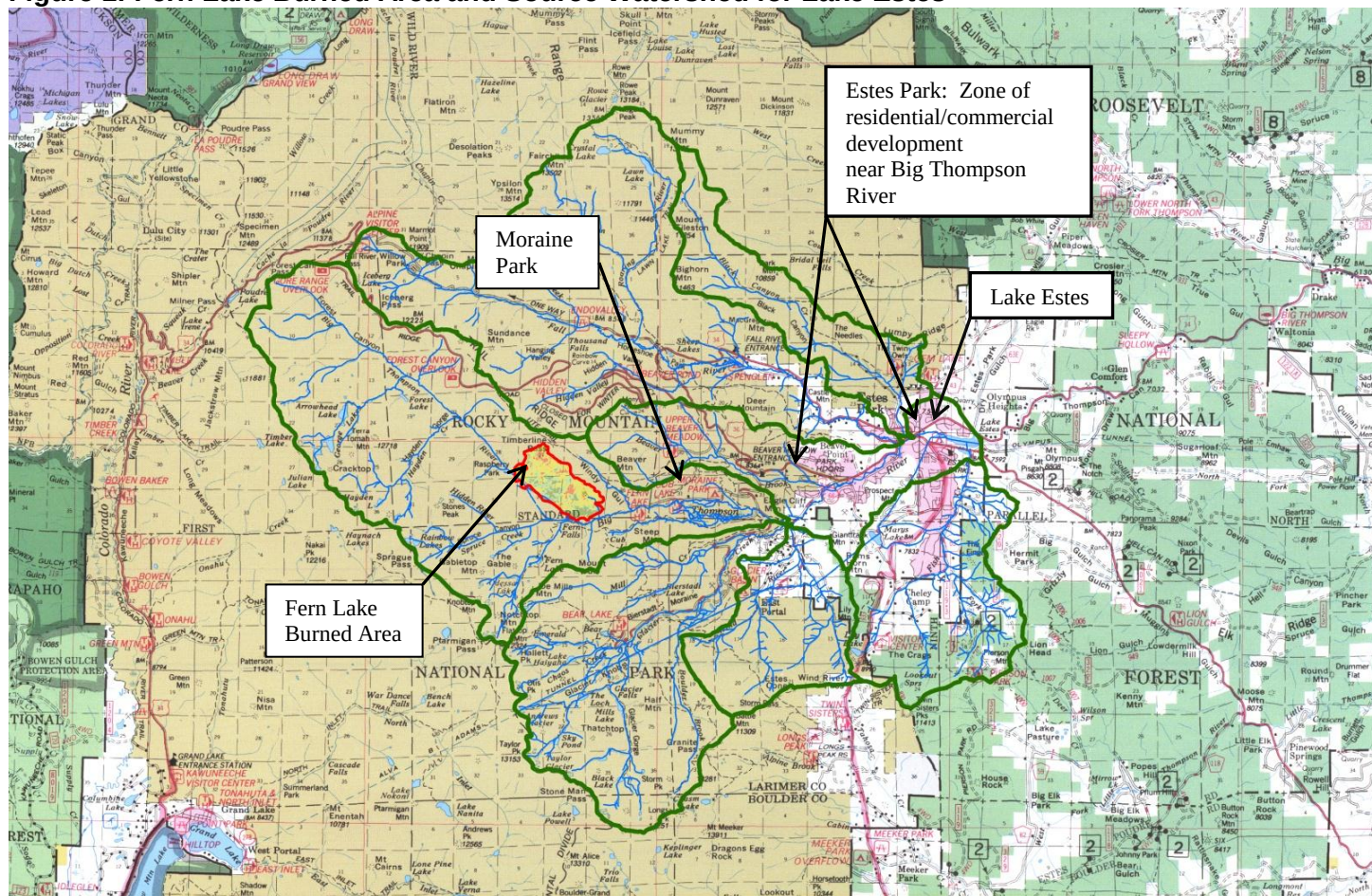


Table 1: Source Watersheds for Lake Estes

6th Level Watershed	Area (Ac.)
Black Canyon Creek	6410
Headwaters Big Thompson River	25602
Wind River	6532
Fish Creek	9982
Glacier Creek	16117
Fall River	25504
Lake Estes-Big Thompson River	9276
Total	99423

Lake Estes receives water from 99,423 source watershed acres within the Big Thompson watershed, as well as water from the headwaters of the Colorado River through Grand Lake via the Alva B. Adams Tunnel and

Mary's Lake. Runoff comes from both snowmelt and rainfall.. For the purposes of this assessment, high intensity summer thundershowers are considered to be "storms of concern". These events generally rain heavily on a localized area before dissapating or moving into the next watershed. If an intense thunderstorm occurred over the Fern Lake Burned Area, it is likely that erosion, increased runoff and sediment delivery to the Big Thompson River would occur. It is unlikely that high flows and/or movement of sediment and/or debris would impact downstream values at risk because of the relatively small size of the burned area compared to the entire watershed area. However, it is likely that dissolved and suspended materials from burned area runoff would be transported as far downstream as Lake Estes or further, potentially affecting water quality.

Figure 2: Burned Area Soil Map Units and Moraine Park

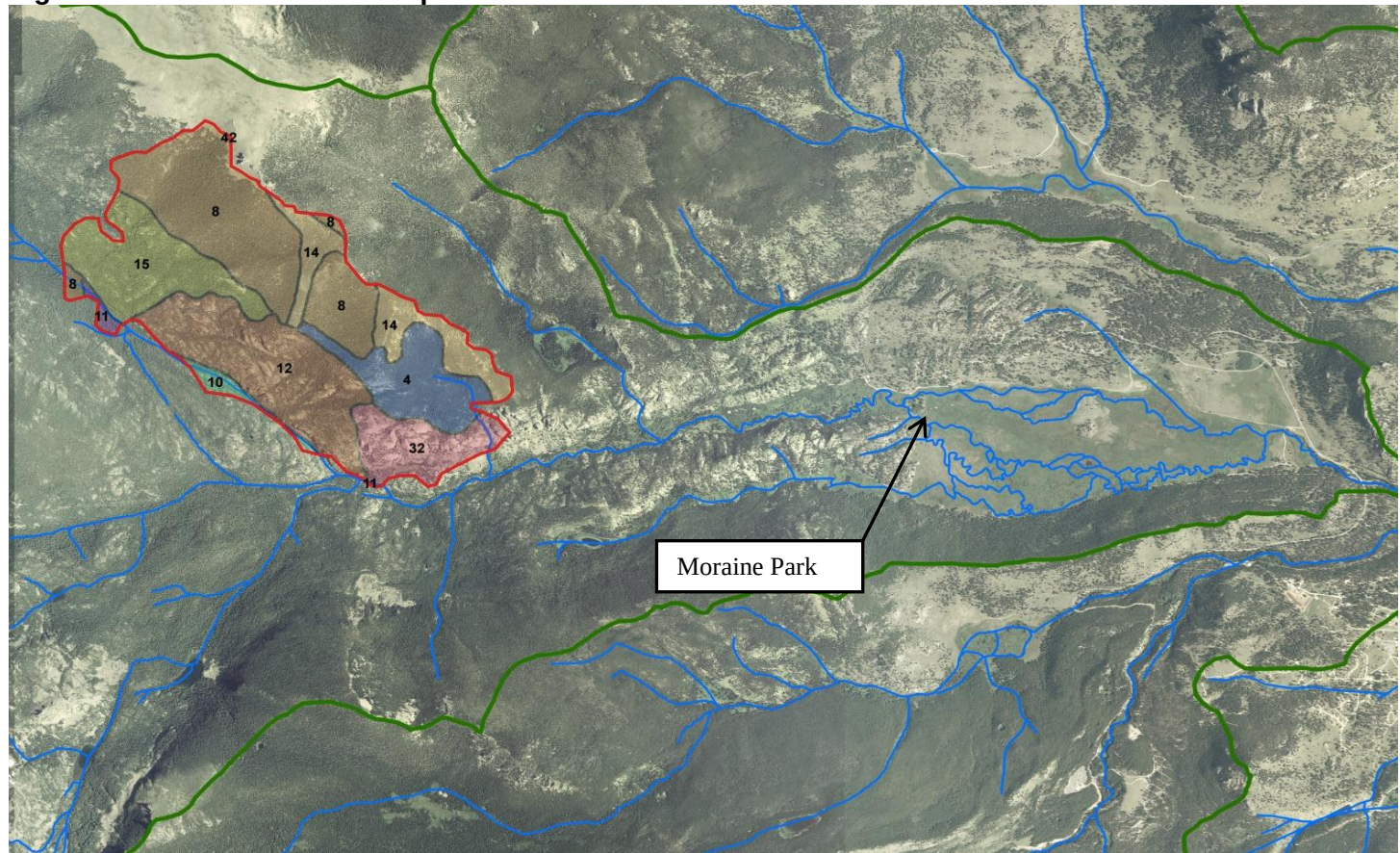


Table 2: Soil Map Units, Soil Properties and Vegetation

Soil Map Unit Name	Map Unit Symbol	Ecological Site	Suscept. to Damage from Fire	Runoff Potential	Erosion Hazard Rating	Acres	% Area
Fallriver gravelly sandy loam, 10 to 45 percent slopes	8	Subalpine Fir-Engelmann's, Spruce/Grouse Whortleberry	M	Low	Moderate	323	30
Galuche-Rock outcrop complex, 20 to 90 percent slopes	12	Ponderosa Pine-Rocky Mountain Douglas Fir/Mountain Muhly	L	Very High	Very Severe/Not Rated	242	22
Hiamovi-Rock outcrop complex, 15 to 80 percent slopes	15	Lodgepole Pine/Grouse Whortleberry	L	Very High	Severe/Not Rated	170	16
Catamount gravelly coarse sandy loam, 5 to 20 percent slopes	4	Lodgepole Pine/Kinnikinnick	H	High	Slight	122	11
Hiamovi-Rock outcrop complex, 5 to 40 percent slopes	14	Limber Pine/Common Juniper	H	Very High	Moderate/Not Rated	107	10
Rock outcrop-Cathedral complex, 20 to 100 percent slopes	32	Ponderosa Pine/Antelope Bitterbrush	L	Very High	Not Rated/Severe	102	9
Fallriver-Hiamovi complex, 10 to 55 percent slopes	10	Subalpine Fir-Engelmann's Spruce/Grouse Whortleberry, Lodgepole Pine/Grouse Whortleberry,	L	Moderate/Very High	Moderate	20	2
Fallriver-Rock outcrop complex, 30 to 70 percent slopes	11	Subalpine Fir-Engelmann's, Spruce/Grouse Whortleberry	L	Moderate/Very High	Severe/Not Rated	9	1
Total						1095	100

Soil Damage from Fire Rating

Potential for damage to soil by fire is based on texture of the surface layer, content of rock fragments and organic matter in the surface layer, thickness of the surface layer, and slope. The ratings indicate the potential impact of prescribed fires or wildfires that are intense enough to remove the duff layer and consume organic matter in the surface layer. Within the Fern Lake Burned Area, pre-fire litter/duff layers were relatively sparse and thin and were consumed in areas mapped as moderate or high soil burn severity. Based on the thin litter/duff layer and minimal consumption of heavy fuels on the ground, it is assumed that heat effects on the soil were not severe in areas mapped as moderate. However, due to steep slopes and lack of ground cover, post wildfire erosion is likely to remove some of the dark organic rich surface soil, further impacting soil productivity. Generally, the pre-fire vegetation communities are adapted to and depend upon periodic wildfire, so it is unlikely that fire damage to soils and/or post wildfire erosion would impact the ability of the site to support native vegetation.

Rock Outcrop, Surface Rock Cover Soil Rock Content and Texture

The Fern Lake burned area has a large component of rock outcrop acres. There is minimal, if any, difference between pre and post wildfire runoff from rock outcrops but additional runoff and erosion from burned slopes below rock outcrops could occur due to high rates of runoff from these relatively impermeable, steep rocky areas.

Generally, surface rock cover is high throughout the burned area. Surface rocks are effective in reducing erosion by preventing detachment of soil particles. However, sheet erosion (slope wash) and rill erosion (small channels) have been observed on other Front Range burned hill slopes with high surface rock cover. This is likely due to rapid runoff from high intensity thunderstorms that are common in July and August.

Soil rock content and soil texture are needed for ErMIT soil erosion modeling. Based on their particle size classifications, Fern Lake burned area soils have at least 35% rock fragments within the soil profile. High soil rock content increases surface erosion by decreasing the water storing capacity of the soil. However, it is

likely that high rock content could limit gully erosion. Sandy loam surface textures, common throughout the burned area, are relatively cohesive and not highly susceptible to erosion.

Soil Hydrologic Group, Runoff Rating and Erosion Hazard Rating

Soil hydrologic groups are used for runoff/peak flow modeling. Most of the burned area (approx. 68%) has soils with hydrologic group D. The remaining 32% falls into hydrologic group B. Hydrologic soil groups correlate with runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms. Group B soils have a moderate infiltration rate when thoroughly wet. These soils are moderately deep or deep, moderately well drained or well drained soils and have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission and moderate runoff potential. Group D soils have a very slow infiltration rate when thoroughly wet or are shallow/rocky over nearly impervious material. These soils have a very high runoff potential.

Erosion Hazard ratings for burned area soils range from slight to very severe. Ratings are based on slope and soil erodibility factor K. This rating considers risk for soil loss caused by sheet or rill erosion where 50 to 75 percent of the surface has been exposed by disturbance. A rating of slight indicates that erosion is unlikely under ordinary climatic conditions; moderate indicates that some erosion is likely; severe indicates that erosion is very likely; and very severe indicates that significant erosion is expected. It is important to note that, in addition to inherent soil erosion hazard, actual post wildfire erosion potential depends heavily on the burn severity pattern and consumption of effective ground cover.

Geologic Types

Geologic map unit Ysp (Silver Plume Granite) makes up approximately 97% of the burned area. This map unit contains proterozoic intrusive igneous rocks such as monzogranite and syenogranite

Geologic map unit Xs (Biotite Schist) makes up approximately 1.5 % of the burned area. This map unit contains proterozoic metamorphic banded rock rich in biotite, sillimanite, magnetite, quartz and feldspar
Geologic map unit Qa (Alluvium) makes up approximately 1.5 % of the burned area. This map unit is located in the valley bottom and contains Holocene and upper Pleistocene unconsolidated deposits of gravel, sand, silt, till, eolian sand and silt, clay and peat. Moraine Park, downstream from the burned area, is also mapped as Qa.

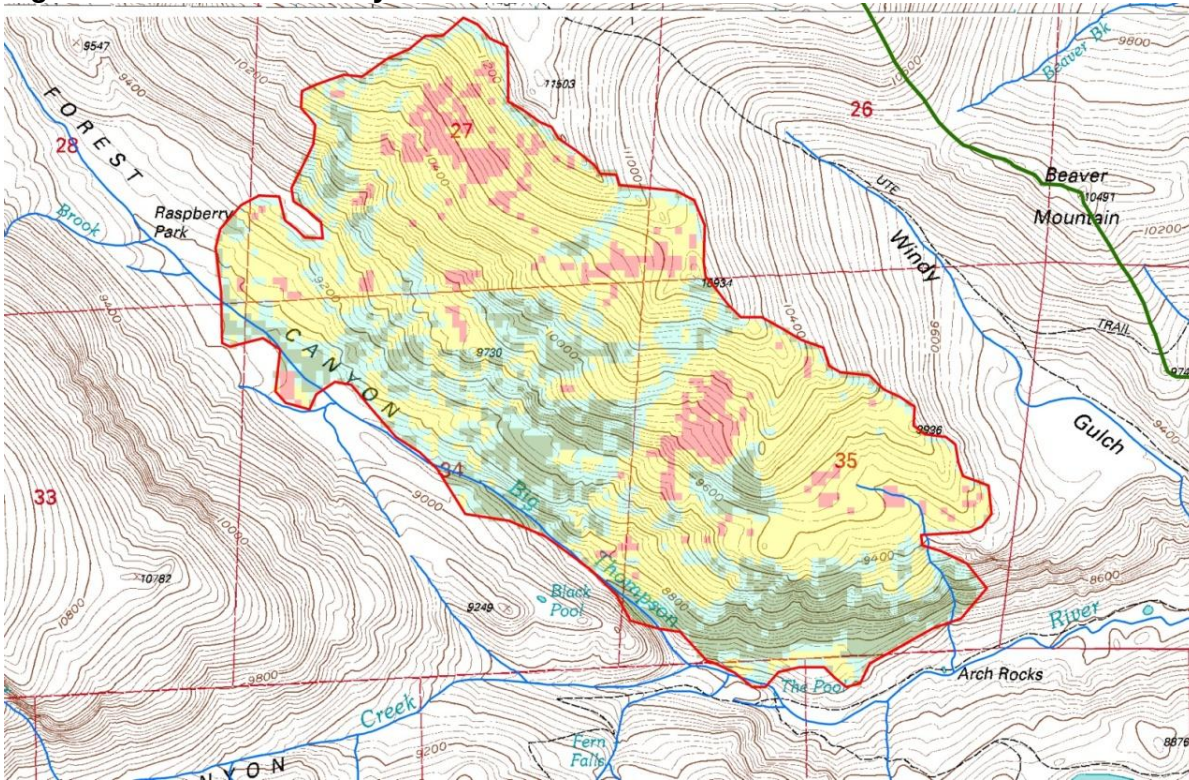
Soil Burn Severity (SBS)

A burned area reflectance classification (BARC) image was obtained on 11/09/2012. On 11/15/2012, a reconnaissance flight was taken to verify the BARC. In areas mapped as moderate or high, minimal ground cover remained and the potential for ground cover replacement through needle cast is low. Surface rock cover was high and consumption of heavy downed fuels was low. Prior to the fire, approximately 50% of the Lodgepole within the burned area had been affected by mountain pine beetles and were in the “dead and grey” stage. The original BARC was not adjusted following aerial reconnaissance of the burned area. Soil burn severity observations and mapping were based on criteria outlined in the Field Guide for Mapping Post Fire Soil Burn Severity (Parsons et.al., 2010)

Table 3: Post Fire Soil Burn Severity

SBS	Acres	Percent Area
Unburned	199	18%
Low	235	21%
Moderate	578	53%
High	85	8%
	1096	100%

Figure 3: Soil Burn Severity



Dark Green=Unburned, Light Green=Low SBS, Yellow=Moderate SBS, Red=High SBS

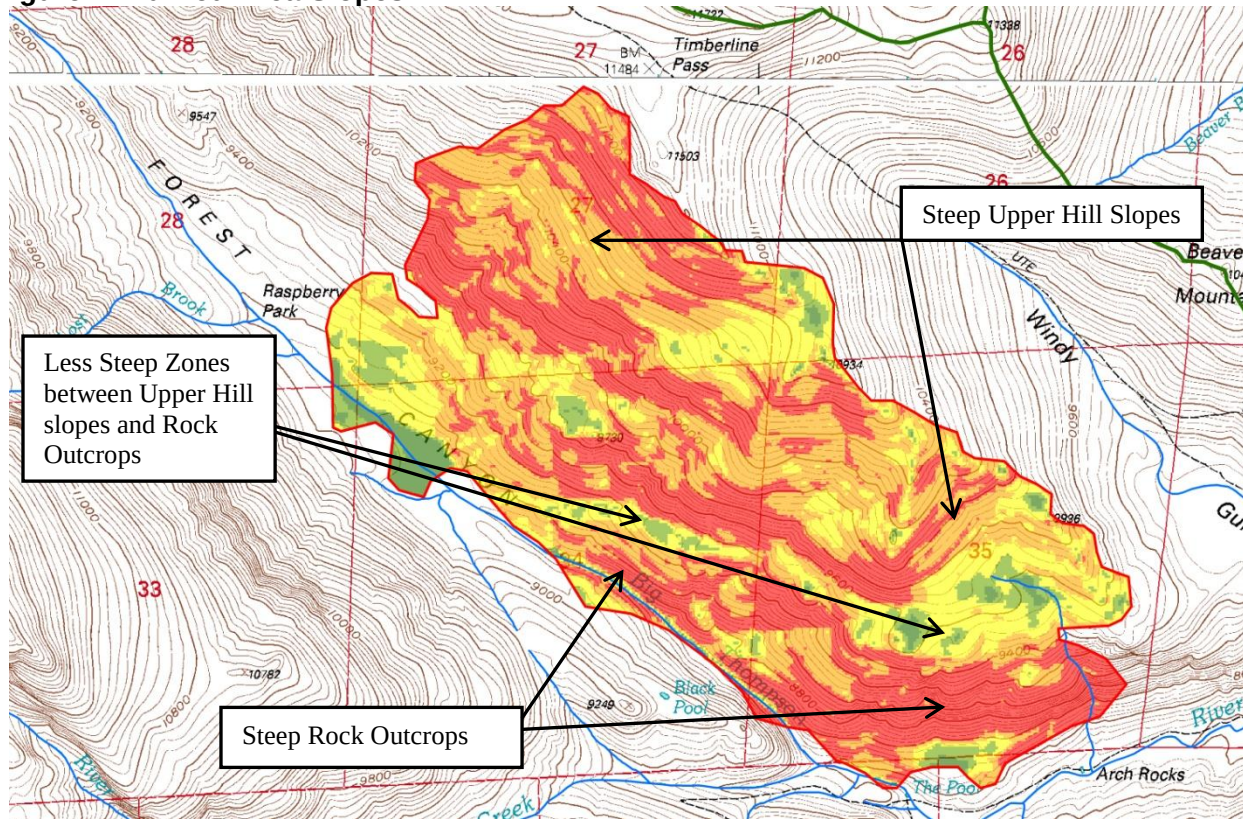
Erosion Potential

Erosion potential depends heavily on burn severity and slope. At the hill-slope scale, it is anticipated that significantly increased rates of erosion will occur on slopes above 20% where soil burn severity is mapped as high or moderate, excluding rock outcrop areas.

Burned Area Hill-Slopes

The following map illustrates that the Fern Lake Burned Area contains steep upper hill slopes, steep rock outcrops, cliffs and talus slopes adjacent to the Big Thompson River and a distinctive lower gradient zone. Based on field observations, in many places, direct connectivity of the upper hill slopes to the river is interrupted by lower gradient areas in which deposition of eroded sediment could occur. This will result in significantly lower sediment delivery to the river. Additionally, adjacent to the Fern Lake Trail, there is a relatively flat river terrace zone between the river and the talus slopes/rock outcrops that would serve as a sediment/debris deposition zone.

Figure 4: Burned Area Slopes



Green=Less than 20% Slopes
 Yellow=20-40% slopes
 Orange=40-60% Slopes
 Red=60+% Slopes

Representative Soil Erosion Rates from Erosion Risk Management Tool (ERMiT) Modeling

ERMiT was used to model both pre-fire and post-fire sediment response for the burned area. This model predicts how much hill-slope erosion will be delivered to the bottom of the modeled slope by overland flow. The following paragraphs summarize ERMiT modeling for the forested vegetation types within the burned area. Representative rates of erosion are modeled to illustrate the difference between pre and post fire soil erosion.

Erosion Risk Management Tool Results

ERMiT: High Burn Severity and Steep Slopes

Fern Lake Fire CO +
 sandy loam; 40% rock; 50% uniform slope; 600 ft; high soil burn severity
 [Run ID wepp-26347]

There is a 10% chance that sediment delivery will exceed 16.22 ton / ac in the first year following the fire.
 There is a 10% chance that sediment delivery will exceed 6.7 ton / ac in the second year following the fire.
 There is a 10% chance that sediment delivery will exceed 2.5 ton / ac in the third year following the fire.
 There is a 10% chance that sediment delivery will exceed 0.98 ton / ac in the fourth year following the fire.
 There is a 10% chance that sediment delivery will exceed 0.45 ton / ac in the fifth year following the fire.

ERMiT: Low Burn Severity and Steep Slopes

Fern Lake Fire CO +
 Sandy loam; 40% rock; 50% uniform slope; 600 ft; low soil burn severity
 [Run ID wepp-26521]

There is a 10% chance that sediment delivery will exceed 5.48 ton / ac in the first year following the fire.
 There is a 10% chance that sediment delivery will exceed 2.24 ton / ac in the second year following the fire.

There is a 10% chance that sediment delivery will exceed 0.89 ton / ac in the third year following the fire.

ERMiT: Unburned Conditions and Steep Slopes

There is a 10% chance that sediment delivery will exceed 0.45 ton / ac on unburned forest hillslopes (based on low soil burn severity and fifth year following the fire).

NOTE: 'Sediment delivery' shown in the previous sections is sediment delivered to the bottom of the modeled hillslope, not to the stream channel.

Erosion/Sediment Model Assumptions

- Model accuracy assumes +/- 50%.
- Rock:Clime Rocky Mountain Research Station Climate Generator¹ was employed to develop the climate needed to drive the sediment delivery model. The climate data, available in the project file, was chosen to best represent the Fern Lake Burned Area
- Background erosion/sedimentation rates for the hill slopes within the Fern Creek Burned Area were generated using the 5th year ERMiT "untreated" output.

Conclusions on Hill-Slope Erosion based on Field Observations and ERMiT Modeling:

- Post fire hill-slope and sediment delivery rates are expected to be approximately 15-30X pre-fire erosion rates
- There is a high probability (>90%) that soil erosion and sediment delivery to stream channels will occur on this site within the next 3 years.
- Most soil erosion and sediment delivery to stream channels will be associated with precipitation events of high intensity likely to occur in any given year. The highest rates of soil erosion are expected to occur on the steep slopes within the moderate and high burn severity polygons
- Natural recovery of hillslope stability is likely to occur within 3-5 years following the fire.

Hydrologic Design Factors

A. Estimated Vegetative Recovery Period, (years):	3-5 years (recovery of hill-slope stability)
B. Design Chance of Success, (percent):	80%
C. Equivalent Design Recurrence Interval, (years):	10
D. Design Storm Duration, (hours):	1
E. Design Storm Magnitude, (inches):	1.25

Flood Flow Estimates

Reduction in ground cover and organic matter and increases in soil water repellency following fire increases surface water runoff and can greatly increase flood flows. Values at risk that may be affected by the Fern Lake fire are located downstream of the burned area. Changes in flood flow were modelled to estimate the increased risk to these downstream values as a result of increased post-fire flood flows. Modelling of post-fire flood flows was done with a combination of models. These included StreamStats (USGS, 2012), a US Geological Survey (USGS) on-line statistical flow model, and Wildcat (Hawkins and Barreto-Munoz, 2011), a model that uses Curve Numbers (CN). Modelling for the Fern Lake fire was complicated by the fact that the

fire burned only a small portion of a much larger watershed. This necessitated the use of the two methods. CN models are commonly used to predict changes in flood flows as a result of fire, because the method accounts for the change in watershed response due to the burn. However, the method was developed for small watersheds, of less than 5000 acres. The Big Thompson watershed that contains the burned area is more than 26,000 acres in size. StreamStats uses statistical equations to predict flood discharge for flows of a given probability or recurrence interval, but does not account for changes in flood discharge as a result of changed watershed conditions, such as fire. The results of both methods were used to estimate changes in flood flows of the Big Thompson River following the Fern Lake Fire.

The fire burned a portion of the watershed that is directly tributary to the Big Thompson River. Part of the fire is drained by a number of small ephemeral channels and part is drained from hillslopes directly to the river. The entire burned area was treated as one watershed and modelled in Wildcat to estimate the pre-fire and post-fire flood flow from the burned area. Flood flows were estimated for a 10-year-1 hour storm of 1.25 inches. The 1.25 inch precipitation depth was calculated from data and methods found in NOAA Atlas 2 (Miller, et.al. 1973). The 10 year-1 hour storm was selected because it represents the high intensity convective thunderstorms that are of greatest concern for producing erosion, sedimentation, and flood flows from burned areas along the Front Range. Experience with other fires along the Front Range indicates that while storms of 0.5 inches or less will cause erosion and produce elevated flows and sediment, it is typically storms of 1 inch or greater that cause damaging events.

StreamStats was used to estimate pre-fire flood flows for the Big Thompson River immediately below the burned area and at the USGS streamgage in Estes Park, just upstream from Lake Estes. Methods for ungaged sites were used for the upper site and methods for gaged sites were used for the lower site. The predicted 10-year peak flow was obtained for each site. A 10-year peak flow is the flow that has a 10% probability of occurrence in any given year.

An upper and lower estimate of post-fire flood flows is provided for two locations along the Big Thompson River; immediately below the burned area above Moraine Park, and at the USGS streamgage is Estes Park, just upstream of Lake Estes. The lower value was calculated by

- calculating the StreamStats unit discharge (cubic feet per second (cfs) per square mile for the 10-year flow
- calculating the percentage increase in flow estimated by Wildcat for the burned area
- increasing the unit discharge from the burned area by the percentage increase from Wildcat

The upper value was calculated by

- calculating the additional flow from the burned area estimated by Wildcat (post-fire minus pre-fire flow)
- adding it to the 10-year flow estimated by StreamStats

Table 4: Peak Discharge Estimates, Pre- and Post-Fire

Location	Discharge		% of Pre-fire Flow	Pre-fire Equivalent Return Interval
	Pre-fire	Post-fire		
Burned Area	97	458	470%	N/A
Big Thompson below burned area	886	1052-1247	119-141%	50+ to 100+year
Big Thompson at Estes Park	1600	1794-1961	112-122%	10+ to 25+ year

While the predicted increase in discharge from the burned area is 470% of pre-burn discharge, the predicted increase in discharge for the Big Thompson River immediately below the burned area is 119-141% of pre-burn discharge. This is because a relatively small proportion of the watershed area (app. 5%) burned. The predicted increase in discharge at the Estes Park gage is even smaller, 110-122%, because the contributing watershed area has increased, and the proportion of burned area is even smaller (app. 1%). In effect, the

increases in flow as a result of the fire will produce flood flows of greater recurrence interval for the same storm. So rather than a 10 year recurrence interval, flows are likely to be equivalent to a 50-100 year recurrence interval directly downstream from the fire, and equivalent to a 10-25 year recurrence interval in Estes Park.

It is important to recognize that there is an implicit assumption in combining the results of StreamStats and Wildcat. The assumption is that flood flows produced by a thunderstorm over the burned area would enter the Big Thompson River when it was already carrying a 10-year flood. However, even though summer thunderstorms are the events of concern following wildfire, in high elevation watersheds such as the Big Thompson above Moraine Park, peak flows and floods are typically a result of snowmelt runoff rather than rainfall. While high intensity storms do occur in the watershed, thunderstorm cells along the Front Range tend to be fairly small and localized. While they can produce floods in smaller tributary watersheds, they rarely rain over enough of the area of a larger watershed, such as the 33.8 sq. mi. watershed above the burned area, to produce significant flood flows. So the assessment presented above is essentially a worst case assessment of adding increased flood flows from a burned area to an already flooding stream. It is more likely that flood flows from the burned area would occur during the thunderstorm season in July and August, when flows in the Big Thompson would be much lower. Mean discharge at the USGS gage below Moraine Park is 144 cfs in July and 58 cfs in August. At the USGS gage in Estes Park, mean flow is 329 cfs in July and 147 cfs in August. If the 10-year storm was to occur over the burned area in July or August, flows in the Big Thompson would likely be in the range of 500-600 cfs below Moraine Park and in the range of 600-800 cfs in Estes Park. While this would certainly cause elevated flows, it would be unlikely to cause flooding.

As discussed above, the Big Thompson River enters Moraine Park downstream from the fire area. The stream has multiple channel threads throughout the park (see Figures 2 and 5) and access to a broad floodplain. Temporary storage of floodwaters provided by the multiple channel threads and floodplain should serve to attenuate any peak flood flows caused by increased flow from the burned area, as well as providing lower water velocities and locations to settle out and store sediment.

Figure 5: Big Thompson River in Moraine Park



Note multiple channels and broad floodplain.

Water Quality

Many studies have found effects to source water quality following fires. Writer and Murphy (2012) found increases in turbidity, dissolved organic carbon, nitrate, iron and manganese following the Fourmile fire, west of Boulder, CO. Increases were much larger following summer thunderstorms than during spring runoff. Writer and Murphy found very large increases for some constituents (1 to 4 orders of magnitude). While increases in the same constituents are expected following the Fern Lake fire, the increases are expected to be considerable smaller because a much larger proportion of the watershed burned in the Fourmile fire (23%) than the Fern Lake fire (5%). However, there are no effective burned area treatments to remove increased dissolved and suspended material resulting from fire, other than increased municipal water treatment.

Examples of Field Observations

The BAER team reviewed the burned area and roads, trails, crossings (bridges), trailheads, parking lots and floodplains downstream from the burned area.

Figure 5: Steep Burned Hillslopes



High rates of erosion are likely on steep burned hillslopes. Localized debris flows and/or flooding are also possible within and below these areas.

Figure 6: Flatter Zones within the Burned Area



Lower slope areas within the burned areas will serve as deposition zones for erosion occurring on steep upper hillslopes.

Figure 7: Cub Creek Trail Bridge across Big Thompson River below Burned Area



Five bridge crossings were inspected in the field. Generally, bridges are robust and have adequate clearance. Bridges, parking lots and trailheads are unlikely to be impacted by seasonal high flows or burned area runoff.

Figure 8: Outside Bend along Fern Lake Trailhead Access Road



Limited evidence of stream bank erosion on outside bend of stream. Good access to floodplain on opposite side. The road is unlikely to be impacted by post wildfire runoff.

Critical Values/Resources and Threats and Recommendations

Critical values at risk considered in this burned area assessment were human life and safety, property and natural resources. The following risk assesment methodology was used to determine the level of risk to the critical values at risk.

Probability of Damage or Loss	Magnitude of Consequences		
	Major	Moderate	Minor
	RISK		
Very Likely	Very High	Very High	Low
Likely	Very High	High	Low
Possible	High	Intermediate	Low
Unlikely	Intermediate	Low	Very Low

Probability of Damage or Loss: The following descriptions provide a framework to estimate the relative probability that damage or loss would occur within one to three years (depending on the resource):

Very likely- nearly certain occurrence (>90%)

Likely- likely occurrence (>50% to < 90%)

Possible- possible occurrence (>10% to <50%)

Unlikely- unlikely occurrence (<10%)

Magnitude of Consequences:

Major- Loss of life or injury to humans; substantial property damage; irreversible damage to critical natural or cultural resources.

Moderate- Injury or illness to humans; moderate property damage; damage to critical natural or cultural resources resulting in considerable or long term effects.

Minor- Property damage is limited in economic value and/or to few investments; damage to natural or cultural resources resulting in minimal, recoverable, or localized effects.

Human Life and Safety

Within the burned area or in steep gulches draining directly from the burned hillslopes, the probability that post wildfire flooding and/or debris would occur is likely. However, due to remote location, steep slopes and lack of trails, it is unlikely that park personnel or visitors would be in these areas so the probability that these processes would threaten human life or safety is unlikely. If human life and safety was impacted, the consequences would be major. **Therefore, the risk rating for impacts on human life and safety within the burned area or in steep gulches draining directly from the burned hill-slopes is intermediate.**

Downstream from the burned area and on the Fern Lake Trail, the probability that post wildfire flooding and/or debris would threaten the life or safety of national park personnel and visitors is unlikely. While it is possible that people would be on the trail when flooding or debris flows occur within the burned area, there is a flat terrace located between the trail and hillslope that would serve as a deposition zone and make it unlikely that trail users would be threatened. If human life and safety was impacted, the consequences would be major. **Therefore, the risk rating for impacts on human life and safety directly downstream from the burned area on or near the Fern lake Trail is intermediate.**

To reduce risk, BAER recommendations are:

- Installation of warning signs at the Fern Lake Parking Lot/Trailhead, along the Fern Lake Trail and at the bridge across the Big Thompson River near The Pool
- Closure of the burned area for at least one year to protect public safety and provide for natural recovery
- Dissemination of information to park personnel and visitors to warn of burned area conditions and associated risks
- Following thundershower events, monitor wildfire response to determine if the preceding treatment recommendations are adequate to protect life and safety or if Fern Lake Trail closure should be recommended

Between RMNP and Estes Lake, there is extensive development directly adjacent to and on the floodplains of the Big Thompson River and Fall River. While these areas are inherently at risk from flood associated with high intensity summer thundershowers or rapid snowmelt, it is unlikely that post wildfire runoff would

exacerbate this risk. If human life or safety was impacted, the consequences would be major. **Therefore, the risk rating for impacts on human life or safety in the Estes Park area is intermediate.**

BAER Recommendations:

- Communicate with potentially affected parties (or their representatives) to share the findings of the Fern Lake Burned Area Report and discuss issues and concerns
- Monitor burned area response by collecting rainfall data in the burned area, stream flow data below the burned area (there is an existing stream gage below Moraine Park) and monitoring movement of burned woody debris through and/or below Moraine Park.

Property

The probability that Fern Lake Trail will be impacted by post wildfire runoff and/or erosion is likely. If the trail is impacted, the consequences would be minor. **Therefore, the risk rating for impacts to the Fern Lake Trail is low.**

BAER Recommendations:

- Trail storm-proofing (additional drainage features)
- Storm inspection and response

The probability that roads, trailheads or bridges within RMNP or developed areas within Estes Park would be impacted by post wildfire runoff is unlikely. If it occurred, the impacts would be moderate. **Therefore, the risk rating for impacts to roads, trailheads or bridges within RMNP or developed areas within Estes Park is low.**

The probability that water storage or delivery infrastructure would be impacted by post wildfire runoff is unlikely. If it occurred, the impacts would be moderate. **Therefore, the risk rating for impacts to water storage or delivery infrastructure is low.**

Natural Resources

Water Quality

The probability that measurable amounts of suspended and dissolved materials from wildfire runoff will be delivered to Lake Estes is likely. Reductions in water quality may require municipal water providers to change treatment methods, and costs may be increased, so the consequences are expected to be moderate.

Therefore, the risk rating for impacts to water quality is high.

BAER Recommendations:

- Communicate with potentially affected parties to share the findings of the Fern Lake Burned Area Report and discuss issues and concerns. Affected parties include the owners and managers of Lake Estes Reservoir and other downstream drinking and/or irrigation water providers.
- If the level of concern from Lake Estes owners/managers or other downstream water providers is high, consider water quality monitoring at Lake Estes.
- If the level of concern from Lake Estes owners/managers or other downstream water providers is high, review infrastructure management or water treatment options, such as use of alternate water supplies or modifying treatment methods as needed.

The probability that The Pool will be impacted by sediment is likely but, because this is a natural plunge pool within a high energy stream channel environment, the sediment is likely to wash out naturally, and the consequences would be relatively short term and minor. **The risk rating for impacts to The Pool is low.**

Noxious Weeds

There are several areas with known weed infestations close to the burned area. Within and directly adjacent to the burned area, the recovery of native vegetation is threatened by noxious weed establishment and/or spread affecting natural plant community integrity, wildlife habitats, and watershed values. It is expected that native vegetation will recover if weed invasions do not become established. It is possible that noxious weeds could become established and/or spread within the burned area. If this occurred, the consequences would be major. **Therefore, the risk that noxious weed establishment or spread could impact native plant communities is high.**

BAER Recommendations:

- Monitor noxious weed populations within and directly adjacent to the burned area, and treat if needed.

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Appendix C. Resource Advisor Report: Fern Lake Fire

Resource Advisor Report: Fern Lake Fire

Rocky Mountain National Park - Fern Lake Fire 2012/2013

Charlie Reynar, Fire/Fuels Technician, Rocky Mountain National Park

Fire Summary

The Fern Lake Fire started in Rocky Mountain National Park on Tuesday, October 9, 2012, from an illegal backcountry campfire. The fire started in steep and rugged Forest Canyon. Firefighters from across the country battled the fire for two months. On the night of November 30, and the early morning of December 1, strong winds pushed the fire more than three miles in thirty-five minutes, prompting evacuation orders. Through careful planning and rapid action, firefighters successfully prevented the fire from progressing across Bear Lake Road and leaving the park. While the fire was making a run through Moraine Park, firefighters successfully burned out around the Bear Lake Road in the face of 70 mph winds. In addition, two engine crews successfully suppressed several spot fires within the Kaley Cottage Cabins on the south side of Moraine Park. These two efforts stopped the fire from jumping the Bear Lake Road and burning into the Highway 66 corridor where homes and businesses were threatened. Previously completed hazard fuels projects were instrumental in stopping the fire from jumping the road. A national Type 1 Incident Management Team was brought in by park officials on Sunday, December 2. At the peak of operations, over 600 firefighters were aided by up to six helicopters, two airtankers, and twenty engines. The Type 1 IMT was released from the fire with 88% containment. As of December 12, the fire has cost over \$6 million. The nearly 3,500 acre blaze was temporarily halted by an early December snowstorm. This high-elevation winter fire is unprecedented in park history.

Largely inaccessible, Forest Canyon had been untouched by fire for at least 800 years. A long-term drought had left fuels tinder-dry in a dead and down fuel layer that in some areas exceeds twenty feet deep. Mountain pine beetles had killed half the trees in the canyon, with every compromised tree posing a hazard for firefighters. The typically windy conditions in the canyon only increased the danger. There was limited opportunity to fight the fire directly because of high winds, steep terrain, and beetle-killed trees. The high winds impacted both air operations and safety of firefighters. Firefighter safety was, as always, the park's number one priority.

November was the driest November in more than one hundred years in the park combined with 2012 being the warmest on record in the United States. A combination of extremely dry deep forest fuels, high winds, and difficult access contributed to the fire's rapid growth in December. Although mid-December brought approximately a foot of snow to the fire, managers were still suppressing hot spots that are safe to access as recently as January 11. Little smoke has been seen since that time and the fire has not grown in size since early December. Although unlikely, managers are preparing and planning for the potential of the fire surviving the winter. Long-term

weather outlooks through the end of April are calling for continued above average temperatures and below average precipitation for north central Colorado.

Wilderness Values

Approximately 95 percent of the Fern Lake Fire burned in designated Wilderness. However, most suppression activities and resulting impacts stayed out of the Wilderness Area. The management of this fire focused on using Minimum Impact Suppression Tactics (MIST) throughout its duration. Consultation by the home unit Resource Advisor was also provided throughout fire suppression operations. One of the goals of wilderness management at Rocky Mountain National Park is to preserve the natural conditions and processes that shape the landscape. Wildfire does not threaten these values, however some suppression activities, especially soil and vegetation clearing for fire line construction, does. Therefore, care was taken to utilize as much existing trails and roads as possible for potential containment lines. Overall, Wilderness values were carefully considered throughout the management of this fire.

Damages Cause by The Fern Lake Fire

Pump House at Kaley Cottage:

One structure was lost as a result of the Fern Lake Fire. Asbestos/Lead paint clean-up

Power Outages at Kaley Cottage:

Elk Exclosures – Moraine Park:

Moraine Park consists of fenced areas which are part of the Park's Elk and Vegetation Management Plan (EVMP). These fences help reduce the impacts of elk on vegetation and help restore the natural range of variability in the elk population as well as the affected plant and animal communities. The temporary fence helps protect and restore key vegetation, like aspen and willow, which will in turn help the wildlife that depend on aspen and willow for habitat. Some of these fenced areas were directly affected by the Fern lake Fire. Fire effected trees have fallen on the fence and portions need to be replaced. One portion of an exclosure fence was nylon, which burned beyond repair. Another portion of a metal fence near Kaley Cottages was cut during suppression actions.

Recommendations – Assess all exclosures in Moraine Park for damages and repair or replace sections that were impacted. Repair open sections of fence with nylon fencing as soon as possible to prohibit elk from entering the exclosures and creating natural resource damage.

Sound Monitoring Station:

In an effort to inventory the soundscape of the park and investigate areas of special management concern, automated sound monitoring stations were deployed at various locations. Prior to the fire, there was a sound monitoring station just east of Cub Lake. The equipment was completely destroyed by the fire. Metal tripod poles remain. The equipment consisted of LiFe PO4 prismatic module: 3.2 V 40 Ah, 10C rate batteries which were completely consumed by the fire.

Recommendations – Consult with Hazardous Material specialist. Remove all remaining equipment from the site and conduct haz-mat clean-up if needed. Purchase new equipment and set up a new station.

**see itemized list of destroyed equipment.*

Trail Damage - Cub Lake Trail to “The Pool” and the Fern lake Trail:

This area was impacted by the wind-driven run in the early hours of December 1. There are a substantial number of downed trees across the trail of various diameters. Many of these trees impacting the trail were a direct result of the fire, however many were impacted only by the wind event. Numerous fire-weakened hazard trees are still present near the trail that have the potential to impact the trail corridor during future wind events.

All that remains of the foot bridge located between Cub Lake and “The Pool” are the concrete footings and steel I-beam supports, the wooden railings, decking, etc. were consumed in the fire (see picture below). For additional information see “Damage Assessment From The Fern Lake Fire – Cub Lake Trail” in the appendices.



Recommendations to complete rehab:

- The foot bridge between Cub Lake and The Pool will need to be rebuilt. The remaining structure (concrete footings, steel I-beams) should be assessed by qualified personnel to ensure their integrity.
- When weather and snow conditions permit:
 - The trail will need to be cleared of downed trees following park trail maintenance standards.
 - The trail corridor will need to be assessed for hazard trees with the potential to impact the trail and pose a risk to visitor safety.

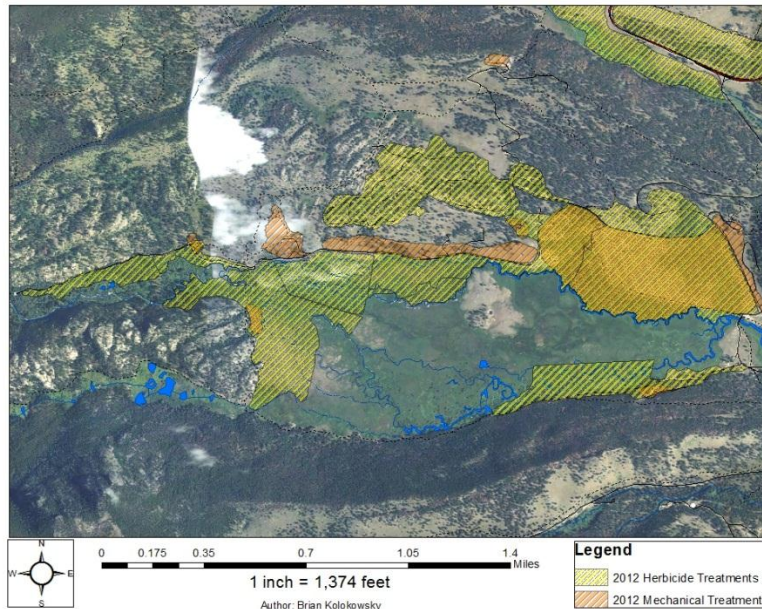
Impacts From Aviation Operations

1 helispot (H-9) was constructed during the Fern lake Fire, west of Steep Mountain along the trail from Mill Creek Basin to Cub Lake. An area of 90 feet in diameter was cleared in order to provide a med-evac site for crews working in the area. Within this area, approximately 15 Limber Pine were cut as well as numerous live and dead Lodgepole Pine. To the extent possible, the felled trees were positioned in a way that replicates a natural blow-down event. In addition, Cub Lake and the Big Thompson River on the East Side of Moraine Park were used as water dipping sites. Approximately 146,600 gallons of water was dropped during suppression operations. Buckets and snorkels were disinfected prior to use. Also, sound quality was temporarily impacted periodically due to over flights during operations.

Spread of Noxious and Invasive Weeds

Overall, the potential for spread of noxious weeds is moderate to high. During the Fern Lake Fire, firefighters did not spike camp nor did they operate extensively in any areas that had known populations of noxious weeds. Vehicles were not allowed to drive off-pavement during any operations. However, the potential for spread of noxious weeds exists from off-trail foot travel due to seeds being carried on boots. At Upper Beaver Meadows, helicopter operations took place in areas where traces of Canada thistle and cheatgrass have been present. At the Hollowell Park trailhead area, personnel hiked into areas west of Steep Mountain and just south of Cub lake. At the trailhead, yellow toadflax, Canada thistle, cheatgrass and common mullein have been documented. Yellow toadflax has been particularly aggressive in this area. Crews also worked along the north edge of Moraine Park along the road where Canada, bull and musk thistle have all been managed. Large populations of Canada thistle and musk thistle have also been treated in the Moraine Park meadow, leaving a seed bank of these species with great potential for spread. Cheatgrass surrounds the northern and eastern borders of Moraine Park, and poses a serious threat to spreading into the meadow and particularly up the south facing slopes after the fire. At the Fern Lake trailhead where crews hiked in to various locations off-trail, Canada and bull thistle have been found. 2012 treatments of these invasive species in Moraine Park and near the Fern Lake trailhead are shown in the map below. The Fern Lake fire swept through mostly designated wilderness, and noxious invasive weeds impair the wilderness resource. Immediate actions should at a minimum consist of monitoring these areas for spread of noxious and invasive weeds. Efforts to control invasive weeds as these areas recover to acceptable wilderness and wildlife habitat over the next few years will also be necessary.

Moraine Park



Fireline Construction

On the Fern Lake Fire approximately 4 miles of hand line was constructed using Minimum Impact Suppression Tactics (MIST). Fire lines were located in areas that were identified using a “least impact” concept. Existing trails, roads, and previously impacted areas were utilized when feasible for potential containment lines.

Rehabilitation Intent and guidelines: The intent of fire line rehabilitation is to restore the area to its natural condition, or condition prior to the fire, in order to maintain wilderness values and to reduce hillside erosion and sedimentation into water bodies. The timeline to complete these rehabilitation measures will vary due to the current fire situation, winter weather conditions, rugged terrain, beetle-killed trees. Public and employee safety will be the primary objective during all rehabilitation operations.

These guidelines are intended to cover constructed fire lined areas. While a number of specific guidelines are included below, this set of standards is not necessarily all inclusive. The independent judgment of the personnel implementing these standards must be relied upon to fully accomplish the intent. Improvements to these standards are welcomed and encouraged.

Division Alpha

Many Parks Curve to Drop Point 1 (Fern Lake Bus Stop) and Ute Trail:

Some rehabilitation has already been completed (see photos) from Many Parks to Drop Point 1. However, this area needs to be revisited to complete rehab measures. Along the fires edge south of the Ute Trail, minimal impacts occurred during mop-up operations.

Recommendations to complete fireline rehab:

- The line needs to be revisited and more organic matter needs to be re-introduced. The line should look as “natural” as possible after rehab. Hide saw cuts to the extent possible. Pay particular attention to the area of line just below Many Parks Curve. (See Line Rehab Photos)
- There are a few stumps along the line that need to be cut level. Stumps should be cut level with the ground, not more than 1 inch above ground level. Stumps should not be cross-hatched. This is ineffective, and only serves to attract visual attention.
- Scatter large windrows or piles of slash. (See Saw Cut photos)
- Add water bars to steep section of line below Many Parks curve. There has been some water bars completed but more are needed. Place debris and/or waterbars on steeper sections only. Allow flat or non-bermed section of handline to naturally rehabilitate. Water bars should be built with soil and rocks where possible, rather than cut logs. This strategy will allow the opportunity for the waterbar to gradually be reincorporated into the slope.
- When hand lines tie into roads or trails, pay particularly close attention to handline rehab standards.
- Just north and east of the Fern Lake Bus Stop, there was saw work done on a down tree. Line was dug around the tree and limbs were cut flush. The line needs to be rehabbed and saw cuts need to be hid to the extent possible. (See last photo in this section)







Areas that Need Saw Cuts Scattered and low stumped:







Division Yankee

There was a tree bucked on the trail and the rounds were left. Needs to be scattered and hid (or hauled out).



Division Zulu

Kaley Cottage:

Approximately 250 feet of hand line was constructed at the western-most structure, heading up the hill from the main road towards a private water tank. The fire line then ties in to an existing trail, which was improved heading east with the intent of using it as holding line. Some snags were felled along the trail and dead and down was dispersed away from the line. This area was rehabbed completely on 12/10/12. Also, the bridge leading to Kaley Cottage from Bear Lake Road was damaged due to suppression actions taken on beam of the bridge.



SW Moraine Park:

- Burnt Aspen was felled in the meadow. Rounds remain and saw cuts are highly visible from Cub Lake Trail. Needs to be hauled out, low stumped. Fire's edge was "hot-spotted" from the Beaver Pond Area heading up Steep mountain. Line construction was minimal and not visible from trails. Rehab needs include:
 - Hide saw cuts
 - Low stumping
 - Clean up flagging and litter
 - 1 squad, 1-2 days

South Lateral Moraine Contingency Line:

- create rock water bars as needed.
- Reintroduce organics to constructed line.
- Pile windrowed material at top of Moraine
- Scatter windrowed material on North slope
- Low stump if needed. (already low stumped on 12/6)
- Clean up flagging and litter
- 1 crew, 3-4 days

Mill Creek Basin Trail Contingency Line (Hollowell Park to Mill Creek Basin):

- Hide cut ends
- Low stump as needed
- Already rehabbed but needs to be inspected and approved.
- 1 squad, 1 day

Old Telephone Line Contingency Line:

- Old road was improved for possible burning/contingency line. It was not completed due to weather and fire behavior. It was worked from the top and the bottom, about 1/3 completed. Screening was left near trail. Rehab needs include:
 - Low stumping
 - Re-introduce organics to constructed line.
 - Pile or scatter cut material
 - Hide cut ends
 - Clean up flagging and litter
 - 1 crew, 2-3 days

Steep Mountain ("notch") west to H-9:

- Line was constructed to cut off green finger west of "notch". Rehab needs include:
 - Scatter cut material
 - Pull flagging and clean up litter
 - 1 crew, 2 days

H-9 (Constructed Helispot):

- Drag material into heli-pad area. Hide stumps.
- 1-2 squads, 1 day

H-9 to West:

- Scatter cut material
- Pull flagging and clean up litter
- 1 crew, 2 days

Bear Lake Road Contingency Line:

RESOURCE ADVISOR REPORT APPENDICES

Fern Lake Fire

Line Construction Considerations and Line Rehabilitation Standards

1. Stumps should be less than 1" tall on all sides. Conceal or cover with dirt, brush, or rock.
2. Limbing less than ¼ inch without scaring the bole
3. Number of saw cuts should be minimized, when possible.
 - Directionally fell trees to favorable location
 - Diagonally cut bole so cut face is down.
 - Conceal directional cut piece under limbs.
4. Residual saw cuts should be concealed.
 - a. Stack bucked logs or stumps end to end or side to side with one cut end up against another log and the cut limbs stacked on top.
 - b. Place piles or saw cuts so they are not visible from road or trail.
5. Avoid removal of live aspen, limber pine, cavity nesting, or wild life trees.
 - a. Use line relocation.
 - b. Scratch line around base of tree.
 - c. Consider limbing or ladder fuel removal of other trees or shrubs adjacent to above trees.
6. Limit line width to that needed to secure edge.
 - a. For example, short grass or needle litter usually requires narrower line if tactics include moving brush or pulling dead and down from line.
7. Utilize boulder or fuel free areas to connect line.

Line Rehabilitation Standards

1. Flush cut stumps 1 inch tall on all sides. No waffle cuts. Conceal or cover with dirt, brush, or rock. Conceal stump pieces in limbs or other nearby material.
2. Pull in cup trenches and level berms.
3. Scatter slash accumulations, windrows, and debris.
4. Place debris and/or water bars on steeper sections only.
5. Allow flat or non-bermed areas to rehabilitate naturally.

Mop-up Standards

1. Limit exposure and associated risk by confining mop-up to the fire perimeter only. Mop-up only to the distance which minimizes the potential for spread or spotting, by considering fuel height, slope, and burn intensity (consumption).
2. Fall only Snags or trees which provide a source of fire spread, interfere with access, or pose an immediate hazard to firefighters or the public. Trees which are felled should not be bucked or limbed unless they conflict with the above criteria.
3. For burned areas adjacent to homes and structures: 100% mop-up within 100'.

Appendix D. Environmental Compliance

FERN LAKE FIRE BURNED AREA EMERGENCY RESPONSE PLAN
And
FERN LAKE BURN AREA REHABILITATION PLAN
Rocky Mountain National Park
Environmental Compliance Documentation

A. Federal Environmental Compliance Responsibilities

All projects proposed in the Fern Lake Burned Area Emergency Response Plan (BAER) and Burned Area Rehabilitation (BAR) Plan that are prescribed, funded, or implemented on park lands are subject to compliance with the *National Environmental Policy Act* (NEPA) in accordance with the guidelines provided by the *Council on Environmental Quality (CEQ) Regulations (40 CFR 1500-1508)*. This Appendix documents the BAER/BAR Team considerations of NEPA compliance requirements for prescribed emergency stabilization and monitoring actions described in this plan for areas affected by the Fern Lake Fire in Rocky Mountain National Park, Colorado.

This plan identifies specific emergency stabilization, rehabilitation, and monitoring actions and recommendations designed to mitigate damages to resources as a result of the Fern Lake fire and associated fire suppression activities. The park must complete separate NEPA analyses and compliance for fire response activities not addressed in this plan.

Agency Specific Guidance: This NEPA documentation has been developed in accordance with National Park Service specific guidelines. Emergency stabilization actions proposed on National Park Service lands, involving the agencies permitting, funding, or implementation, must comply with regulations set forth in the *Department of the Interior Manual Part 516 (DM 12)*.

B. Related Plans and Cumulative Impacts Analysis

NPS. 1976. Master plan and Environmental Impact Statement for the Rocky Mountain National Park. Rocky Mountain National Park, CO.

This document provides management guidance and identifies land use decisions for the preservation of park resources and management of the park.

NPS. 1998. Rocky Mountain National Park Resources Management Plan. Rocky Mountain National Park, CO.

This plan did not go through NEPA compliance but does provide management guidance and identifies land use decisions for the preservation of park resources and management of the park.

NPS. 2001. Backcountry/Wilderness Management Plan and Environmental Assessment. Rocky Mountain National Park, CO.

This plan provides direction for management of natural and cultural resources within the context of wilderness management policies.

NPS.2000. Trail System Maintenance and Reconstruction Plan, an update to the 1982 Trail Plan.

This plan did not go through NEPA compliance but does provide management guidance for restoring and maintaining existing trails.

NPS. 2003. Invasive Exotic Plant Management Plan and Environmental Assessment. Rocky Mountain National Park, CO.

This plan provides IPM guidance that included approving the use of herbicides in the park to control invasive exotic plants.

NPS. 2005. Bark Beetle Management Plan: Environmental Assessment. Rocky Mountain National Park, CO.

This plan addresses hazard tree removal in and outside wilderness.

NPS. 2006. Rocky Mountain National Park Vegetation Restoration Management Plan version 2. Rocky Mountain National Park, CO.

This plan did not go through NEPA compliance but does provide direction for revegetation efforts on disturbed sites including stabilization and control of invasive plant species in order to perpetuate natural ecosystems within the park. Best Management Practices in the plan are often implemented as mitigating measures in other park plans.

NPS. 2007. Elk and Vegetation Management Plan and Final Environmental Impact Statement. Rocky Mountain National Park, CO.

This plan provides for the management of elk and vegetation on the elk winter range. It approved the use of elk exclosures, planting willow, restoring aspen and monitoring recovery that is proposed in the Fern Lake Fire BAER and BAR Plan. The EVMP ROD allows for up to 440 acres of willow and 160 acres of aspen to be fenced on the elk winter range to allow for restoration. A little over 200 acres are currently fenced and the proposed protective fence in the Fern Lake Fire BAER/BAR Plan will not exceed the 440 acre limit.

NPS. 2012. Fire Management Plan and Environmental Assessment. Rocky Mountain National Park, Colorado.

This plan allows for BAER and BAR actions for any wildland fire. The document recommends utilization of the least intrusive and least resource damaging methods to manage wildland fires, and the least intrusive BAER/BAR actions required to mitigate actual or potential damage caused by a fire.

Cumulative Impact Analysis: The BAER and BAR treatments for the Fern Lake fire, as proposed in this plan, do not result in an intensity of impact (i.e., major ground disturbance, etc.) that would cumulatively constitute a significant impact on the quality of the environment. The treatments are consistent with the above park management plans and any associated environmental compliance documents of the NPS, and categorical exclusions presented below.

No direct or indirect unavoidable adverse impacts to the biological or physical environment would result from the implementation of this Fern Lake BAER/BAR Plan.

C. Applicable Categorical Exclusions and Prior Approved Compliance Documents Relevant to the Fern Lake BAER and BAR Plan

[illegible]

D. Consultation Structure

National Park Service

- Ben Bobowski, Chief of Resources Stewardship, Rocky Mountain National Park
- John Mack, Branch Chief of Natural Resources, Rocky Mountain National Park
- Mike Lewelling, Fire Management Officer, Rocky Mountain National Park
- Nathan Williamson, Fire Ecologist, BAER/BAR Plan Co-Lead, Rocky Mountain National Park
- Charlie Reynar, Fire/Fuels Technician, BAER/BAR Plan Co-Lead, Rocky Mountain National Park
- Larry Gamble, Branch Chief of Planning and Compliance, Rocky Mountain National Park
- Mary Kay Watry, Wildlife Biologist, Rocky Mountain National Park
- Therese Johnson, Wildlife Biologist, Rocky Mountain National Park
- Jim Cheatham, Biologist, Rocky Mountain National Park Service
- Karen Waddell, Cultural Resource Specialist, Rocky Mountain National Park
- Danny Basch, Branch Chief of Facility Maintenance

Categorical Exclusion Form

Fern Lake Fire, Rocky Mountain National Park

Project: Fern Lake Fire BAER/BAR Plan

Date: February 14, 2013

Project Location: Fern Lake, Cub Lake and Forest Canyon area, Rocky Mountain National Park, Larimer County, Colorado

Project Description: There are seven proposed treatments in the Fern Lake Fire BAER/BAR Plan that are categorically excluded. Those treatments include:

1. Invasive species surveys/removal and monitoring
2. Limber pine assessment and replanting
3. Willow impact assessment and replanting
4. T&E habitat suitability and impact assessment surveys
5. Cultural resources condition assessment
6. Maintain trail tread and bridges and replace burned bridges for public safety
7. Infrastructure repair and replacement for public safety

All treatments are described in greater detail in the Fern Fire BAER/BAR Plan Resource Assessments.

Mitigation(s): Treatment activities will be reviewed through the park's project proposal and clearance process. Any activities carried out within wilderness will require a minimum requirements analysis.

Describe the category used to exclude action from further NEPA analysis and indicate the number of the category (see section 3.4 of NPS-12):

The following CE's apply for treatments one to seven. Other park compliance for the building of a protective fence and the use of herbicides to control exotic plants was completed through an approved plan with an environmental assessment or environmental impact statement and associated decision documents.

Project 1 – 3 and 5 - 8: DO-12 3.4 G(2)

Post-fire rehabilitation activities not to exceed 4,200 acres (such as tree planting, fence replacement, habitat restoration, heritage site restoration, repair of roads and trails, and repair of damage to minor facilities such as campgrounds) to repair or improve lands unlikely to recover to a management approved condition from wildland fire damage, or to repair or replace minor facilities damaged by fire.

Project 4: DO-12 3.4 E(5)

Nondestructive data collection, inventory (including field, aerial, and satellite surveying and mapping), study, research, and monitoring activities.

Project 6: DO-12 3.4 E(1)

Archeological surveys and permits involving only surface collection or small-scale test excavations.

On the basis of the environmental impact information in the park file, with which I am familiar, either the proposed treatments are consistent with approved park plans and associated NEPA decision documents or are categorically excluded from NEPA compliance as described in the BAER and BAR Plan.

Prepared by: /s/ Jeff Connor, Natural Resource Management Specialist (Connor)

Recommended by: /s/ Larry Gamble, Chief of the Branch of Planning and Compliance (Gamble)