Boulder County 2012 Fourmile Fire Flood Mitigation Project
Final Project Report 6/26/2013
$24,500 CWCB grant

BACKGROUND

The Boulder County 2012 Fourmile Fire Flood Mitigation Project was designed to provide critical measures to reduce the risk of future flooding due to remaining impacts from the Fourmile Canyon Fire that compromised the area in 2010. The Fourmile Canyon Fire was a fast moving fire that occurred in the Headwaters of the Boulder Creek watershed, within three 6th level watersheds, including Fourmile Creek, Boulder Creek, and Fourmile Canyon Creek watersheds. The size of these combined watersheds is 40,579 acres, of which 6,382 burned, resulting in 16% of the watersheds damaged by the fire. In fall 2010, a watershed restoration assessment was completed for the entire burn perimeter by a multi-agency, multi-disciplinary team. The Fourmile Emergency Stabilization (FES) Team, made up of natural resource specialists and experts from Boulder County and the Bureau of Land Management (BLM), United States Forest Service (USFS), Natural Resources Conservation Service (NRCS), CSU Extension Services and Colorado State Forest Service, completed this report.

In spring 2011, Boulder County completed a large rehabilitation project targeted at improving the condition of the burned area. The 2011 treatment activities were coordinated by Boulder County and included aerial mulching, reseeding and weed control treatments in the Four Mile, Sugar Loaf, and Sunshine Canyon areas. The seeding and aerial mulching treatments were necessary to prevent soil erosion and flood impacts as a result of the wildfire. Unfortunately, two significant rainfall events in July 2011 compromised these watershed rehabilitation efforts in the burned area which resulted in loss of mulch, further soil erosion and debris flow and flooding to the area.

The Boulder County 2012 Fourmile Fire Flood Mitigation Project focused on five of the high-priority sub-basins and included another mulching, seeding and weed suppression component in these three areas: Fourmile Canyon Creek east (above Anne U. White Trailhead), Ingram Gulch, and Monument Hill/Gold Run. In addition, the project included upsizing a culvert at County Road 83 and Whispering Pine, and check dams and debris removal from the Fourmile Canyon Creek adjacent to the Anne U. White trailhead, which sustained heavy debris flow in the July 2011 flood events.

After the 2011 summer flooding events, Boulder County hired Wright Water Engineers to conduct a study of the future potential for Fourmile Canyon fire related debris flows, potential mitigation strategies, and whether it would be cost effective to implement pro-active mitigation strategies rather than take a reactive approach to future debris flows. Our 2012 project was designed from the findings from the Wright Water report, which included:

- The 5 highest priority basins were identified based on the risk of ongoing debris flow, number of potentially affected residences and presence of roadway corridors impacted by debris flows including, Fourmile Canyon Creek east (adjacent to the Anne U. White

Trailhead), Sweet Home Gulch, Ingram Gulch, Monument Hill/Gold Run, and Nancy Mine.

- There is a large inventory of sediment and debris remaining in the watersheds.
- Watershed recovery will take approximately 10 years. Debris flows will continue, but gradually diminish as the watershed recovers.

The Boulder County 2012 Fourmile Fire Flood Mitigation Project included multiple components and project partners. Boulder County Parks and Open Space coordinated the aerial application of mulch and seed to approximately 350 acres in the Fourmile area, which was funded by Boulder County and the Bureau of Land Management. Boulder County Transportation hired Anders Environmental (through Interwest Consulting Group) to implement the mitigation measures outlined in the Wright Water report, which included: debris structure retrofits, check dams, contour log felling, diversion berms, debris barrier fences, erosion blankets, and placement of jersey barriers to divert flood waters and debris around structures in critical locations.

The portion of the project that CWCB funded included providing grading and channel rehabilitation to accommodate future minor storm events, modification of a stream crossing- Whispering Pines- via an improved low water crossing/culvert, and restoration of the channel to minimize additional sedimentation after work, including some revegetation.

PROJECT BUDGET

The projected project budget at the time of Boulder County's grant application is shown below:

Projected Project Budget:

Activity	Cost
Aerial Seed & Mulch	$662,320
Check Dams, contour log felling, etc.	$181,045
Culvert Replacement (upsize); re-channel and debris removal CR 83 & Whispering Pine	$24,500
Total:	867,865

Actual Project Budget:

Activity	Cost
Aerial Seed & Mulch	$664,540
Check Dams, contour log felling, etc.	$137,073
Culvert Replacement (upsize); re-channel and debris removal CR 83 & Whispering Pine	$24,800
Total:	826,413

The actual project budget was lower than estimated, after further evaluation by the County determined that two proposed mitigation measures (erosion blankets and debris barrier fences) were not suitable for existing site conditions.

Matching funds for this project were provided by:

BLM	*$305,000*
Boulder County	*496,912*
CWCB Funds	*24,500*
Total:	*$826,412*

Please refer to the attached 2012 Fourmile Fire Budget (POS) 2012, and Fourmile Canyon Fire Funding Summary in Attachment A. The 2012 Fourmile Fire Budget (POS) shows the amount that Boulder County Parks and Open Space contributed as match for the aerial seeding and mulch activities (copies of invoices are also included). The Fourmile Canyon Fire Funding Summary reflects the amount that Boulder County has spent towards overall Fourmile fire costs, including suppression and recovery/mitigation efforts. The amount spent in 2012 towards these efforts was $790,713, excluding County staff time, and is reflected in the overall match amounts from Boulder County Parks and Open Space, Boulder County Transportation and our Boulder County general fund.

PROJECT OBJECTIVES
This project's objectives were two-fold:

1) To rehabilitate or establish healthy, stable ecosystems in the watershed that will improve watershed areas damaged by the 2010 Fourmile Fire in order to prevent further erosion and future flooding events; and to

2) Provide flood mitigation measures in the Fourmile area that will provide benefits against future flooding events.

Specific task completions included the following:

TASK 1 –Aerial mulch and seed 350 acres of Fourmile Fire burn area

Provide Aerial mulch and seed for 350 acres of Fourmile Fire burn area identified in Wright Water Engineer Report.

Task Completed: This task was completed in late spring 2012. For this project, a new, more cost effective mulch material from ground up trees called wood shreds was proposed. The wood shreds cost half the price per acre applied of the previously used wood mulch called WoodStraw®, and used local materials from a Forest Service operation located in Boulder County. Boulder County Parks and Open Space was only the third agency to use wood shreds for fire rehabilitation on a large scale (the other two agencies were the USFS and the BLM). Our project inspired the USFS to use wood shreds on their fire rehabilitations on the Waldo Canyon Fire and the High Park Fire, two large and destructive wildfires that burned along the Front Range in 2012. Our project will be featured as a case study in a publication by Pete Robichaud, a post-fire rehabilitation researcher for the USFS.

In total, 364 acres were selected for aerial seeding and mulching treatment because of poor recovery and the threats the areas still posed downslope. The treatment areas were selected

using information from the debris-flow events, field verification and GIS analysis. The areas that received retreatment in 2012 were Fourmile Canyon Creek, Black Hawk Gulch, Ingram Gulch, and Melvina. Please refer to the attached Draft Fourmile Fire 2012 Annual Report (Attachment B) which provides detailed information on the project components of the areal seeding and mulching project, monitoring and operations that were completed in 2012. This draft report will be finalized by Boulder County parks and Open Space Plant Ecology staff in September 2013 and will be forwarded to CWCB after its final completion.

TASK 2 – Debris Mitigation Measures

Develop debris structure retrofits, check dams, contour log felling, diversion berms, debris barrier fences, erosion blankets, and jersey barriers to be used to divert flood waters and debris around other values at risk, such as public infrastructure and residential structures in critical locations.

Task Completed: The Fourmile Fire Mitigation efforts were successful in protecting the local infrastructure from flood related impacts. The combination of sediment control structures installation and aerial mulching helped to stabilize the impacted basins and decrease sediment loading in the lower reaches of each basin. Items completed to date include:

Detention ponds: Two large sediment detention ponds were constructed in Ingram Gulch.

Check dams: 192 were installed in five basins.

Contour log felling: Completed on 10-acres.

Creek debris removal: Removed debris within the 10-year flood plain greater than two inches in diameter along Fourmile Creek (approximately 1.5 miles).

Debris structure retrofits: The two existing debris racks located at the base of Ingram Gulch were retrofitted with 2 inch square tubing for use as vertical bars to decrease the debris size captured by the racks. Vertical bars were welded to the existing structure and spaced 12 inches apart on the upstream side of each debris rack.

Jersey barriers: The County obtained a dozen used barriers from the State and offered to provide jersey barriers to private property owners on the condition that they picked them up and installed them, but none were utilized.

Diversion berms: Two areas adjacent to existing debris structures have been identified for diversion berm construction. This work is slated for spring 2013.

Erosion blankets and debris barrier fences: After further evaluation the County determined that these mitigation measures were not suitable for the conditions.

Please refer to the attached Fourmile Fire Treatment Implementation & Evaluation Report dated January 2013 (Attachment C) which provides detailed information on the mitigation measures completed, and evaluation of these treatments that were completed in 2012.

TASK 3 –Whispering Pines Stream Crossing Improvements

Provide 400 lf of grading and channel rehabilitation to accommodate future minor storm events, modify stream crossing of Whispering Pines via an improved low water crossing or culvert and restoration of the channel to minimize additional sedimentation after work, and provide some revegetation.

Task Completed: This task was completed in June 2013. The site was reviewed, and designs were completed to replace existing culverts crossing the road, add erosion control and regrade downstream area to provide better flow containment. Work completed included grading, channel rehabilitation, and culvert replacement and armoring (200 linear feet). Three pine trees were removed and all cottonwoods were retained. Two 36" culverts (58 feet long) were installed with boulders and cobble for riprap protection at both ends of the culvert, and 9 tons of road base was added to the project area. All disturbed areas were revegetated with onsite stockpiled topsoil and seeded and mulched .16 acres with Boulder County approved native seed mix. Please refer to the attached before and after pictures of this area included in Attachment D.

Monitoring and Maintenance

Boulder County will continue to complete qualitative monitoring for this project, which will include site visits to determine how well the treatments are maintaining and where flooding occurs after the treatments are installed. In addition to the County's reporting, BLM will also complete quantitative monitoring. Boulder County will continue to review the Four Mile site annually for an assessment of the vegetation and impacts to the watershed. The County will continue to evaluate and determine appropriate funding for any necessary mitigation projects. Based on our evaluation of the mitigation measures completed in 2012, the County has funded and implemented the following mitigation treatments for 2013 in the Fourmile burn area:

1. Clean out detention ponds (2) and fortify them
2. Install check dams above CR 83 (new area)
3. Install additional check dams in Monument Hill basin
4. Fortify debris racks at Melvina and Emerson Gulch
5. Continue to provide sandbags
6. No additional mulching/seeding is recommended

ATTACHMENT A

- Fourmile Fire Budget (POS) 2012
- Fourmile Canyon Fire Funding Summary
- Project invoices

Fourmile Fire Budget 2012

Bill Date	Vendor	Qty	Item(s)	Unit $	Total Price	Acct C	Pd	Sub-Date	From/Date
BLM (017.5500012.xxxxx.FMFREC141.xxxxx)					**$305,000.00**				
Admin	**Budgeted $12,127 (Seed + Aerial) + $5,000 (Weeds)=$17,127**								
AERIAL SEED & MULCH									
2/29/2012	Amy Ansari	43	Hourly Wages		$632.10	70010	x		
2/29/2012	Amy Ansari		FICA/Medicare		$48.36	71000	x		
2/29/2012	Amy Ansari		PERA		$86.60	71030	x		
3/30/2012	Amy Ansari	48	Hourly Wages		$705.60	70010	x		
3/30/2012	Amy Ansari		FICA/Medicare		$53.98	71000	x		
3/30/2012	Amy Ansari		PERA		$96.67	71030	x		
4/30/2012	Amy Ansari	40.5	Hourly Wages		$595.35	70010	x		
4/30/2012	Amy Ansari		FICA/Medicare		$45.54	71000	x		
4/30/2012	Amy Ansari		PERA		$81.57	71030	x		
5/31/2012	Dan Omasta	144.75	Hourly Wages		$2,026.50	70010	x		
5/31/2012	Dan Omasta		FICA/Medicare		$155.03	71000	x		
5/31/2012	Dan Omasta		PERA		$277.64	71030	x		
6/30/2012	Dan Omasta	169.5	Hourly Wages	$14.00	$2,373.00	70010	x	Dan & Phil are together on IFAS	
6/30/2012	Dan Omasta		FICA/Medicare		$181.53	71000	x		
6/30/2012	Dan Omasta		PERA		$325.10	71030	x		
6/30/2012	Jessica Smith	119	Hourly Wages	$14.00	$1,666.00	70010	x		
6/30/2012	Jessica Smith		FICA/Medicare		$127.45	71000	x		
6/30/2012	Jessica Smith		PERA		$228.23	71030	x		
8/31/2012	Dan Omasta	140	Hourly Wages	$14.00	$1,959.92	70010	x		
8/31/2012	Dan Omasta		FICA/Medicare		$149.93	71000	x		
8/31/2012	Dan Omasta		PERA		$268.51	71030	x		
					$12,084.62				
Aerial Seeding and Mulching									
4/28/2012	Baileys Traffic Control Services		digital sign rental		$2,431.00	75810		05/04/12	Ava e-mail 5/4/12
5/3/2012	Mountain West Helicopters		Aerial seeding and mulching, -10%		$236,346.30	75110		05/04/12	Bryan Burr 5/3/12
6/19/2012	Mountain West Helicopters		Aerial seeding and mulching, 10%		$26,228.70	75110		06/21/12	Bryan Burr 6/19/12
Seed									
4/4/2012	Granite Seed		Triticale & slender wheatgr	$41.91	$6,873.00	73060		04/18/12	Renee 4/12/2012

Fourmile Fire Budget 2012

Bill Date	Vendor	Qty	Item(s)	Unit $	Total Price	Acct C	Pd	Sub-Date	From/Date
Weeds ($5,000): should be 24-25% of total costs									
5/31/2012	Philip Ernest	80	Hourly Wages	$14.00	$1,120.00	70010	x		
5/31/2012	Philip Ernest		FICA/Medicare		$85.68	71000	x		
5/31/2012	Philip Ernest		PERA		$153.44	71030	x		
6/30/2012	Philip Ernest	25	Hourly Wages	$14.00	$350.00	70010		Need to JE 142 hrs to 191	
6/30/2012	Philip Ernest		FICA/Medicare		$26.78	71000		Still not JE as of 10/11/12	
6/30/2012	Philip Ernest		PERA		$47.95	71030			
6/30/2012	Evan Rumney	180	Hourly Wages	$14.70	$2,646.00	70010	x	Jessica & Evan are togther on IF	
6/30/2012	Evan Rumney		FICA/Medicare		$202.42	71000	x		
6/30/2012	Evan Rumney		PERA		$362.50	71030	x		
Check Dams									
7/9/2012	Interwest Consulting Group, Inc.		JE from Transportation		$13,983.00				
Total					**$302,941.38**				
remaining					*$2,058.62*				
Added 10/2012					**$14,500.00**				
County (017.5500012.xxxxx.FMFREC191.xxxxx)					**$364,000.00**				
Admin	**Budgeted $2,685**								
6/30/2012	Jessica Smith	41	Hourly Wages	$14.00	$574.11	70010	x		
6/30/2012	Jessica Smith		FICA/Medicare		$43.91	71000	x		
6/30/2012	Jessica Smith		PERA		$78.65	71030	x		
					$696.67				
Aerial Seeding and Mulching									
4/28/2012	Baileys Traffic Control Services		digital sign rental		$2,972.00	75810		05/04/12	Ava e-mail 5/4/12
5/3/2012	Mountain West Helicopters		Aerial seeding and mulching -10%		$288,227.70	75110		05/04/12	Bryan Burr 5/3/12
5/23/2012	Longmont Times-Call		Notice of Final Settlement		$28.83	76200		06/06/12	Renee (no date)
6/19/2012	Mountain West Helicopters		Aerial seeding and mulching, 10%		$32,057.30	75110		06/21/12	Bryan Burr 6/19/12
					$323,285.83				
Seed									
4/9/2012	McGuckin Hardware		supplies for seeding monitoring		$18.98	72500		04/26/12	*Jennifer 4/20/12*
4/4/2012	Granite Seed		Triticale & slender wheatgr	$41.91	$8,381.88	73060		04/18/12	Renee 4/12/2012
					$8,400.86				

Fourmile Fire Budget 2012

Bill Date	Vendor	Qty	Item(s)	Unit $	Total Price	Acct C	Pd	Sub-Date	From/Date
Weeds ($15,000)									
6/30/2012	Philip Ernest	142	Hourly Wages	$14.00	$1,988.00	70010		Needs to be JE from 141	
6/30/2012	Philip Ernest		FICA/Medicare		$152.08	71000		Needs to be JE from 141	
6/30/2012	Philip Ernest		PERA		$272.36	71030		Needs to be JE from 141	
7/31/2012	Philip Ernest	169	Hourly Wages	$14.00	$2,366.00	70010		Needs to be JE from 141	
7/31/2012	Philip Ernest		FICA/Medicare		$181.00	71000		Needs to be JE from 141	
7/31/2012	Philip Ernest		PERA		$324.14	71030		Needs to be JE from 141	
7/31/2012	Evan Rumney	180	Hourly Wages	$14.70	$2,646.00	70010		Needs to be JE from 141	
7/31/2012	Evan Rumney		FICA/Medicare		$202.42	71000		Needs to be JE from 141	
7/31/2012	Evan Rumney		PERA		$362.50	71030		Needs to be JE from 141	
8/31/2012	Evan Rumney	176	Hourly Wages	$14.70	$2,587.20	70010	x		
8/31/2012	Evan Rumney		FICA/Medicare		$197.90	71000	x		
8/31/2012	Evan Rumney		PERA		$354.42	71030	x		
8/31/2012	Hannah Schartel	180	Hourly Wages	$14.00	$2,520.00	70010	x		
8/31/2012	Hannah Schartel		FICA/Medicare		$192.78	71000	x		
8/31/2012	Hannah Schartel		PERA		$345.24	71030	x		
9/30/2012	Hannah Schartel	148.5	Hourly Wages	$14.00	$2,079.00	70010	x		
9/30/2012	Hannah Schartel		FICA/Medicare		$159.05	71000	x		
9/30/2012	Hannah Schartel		PERA		$284.82	71030	x		
					$17,214.91				
Other									
			For Anne U White Debris Clearing		**$12,000.00**				
Total					**$361,598.28**				
remaining					*$2,401.72*				

Boulder County
Fourmile Canyon Fire Funding Summary
Through 3.25.2013

Project Information			Funding Sources				Project Status				Administrative Information		
Project Name	Source	End Date	Amount Requested / Awarded	Match (Non-grant funded)	Total Project Funding Available	Match (grant funded)	Spending to date	Current Encumbrances	Available Funds	Project Status	Fund	GL	JL
Fire Suppression													
Fire Sup Costs	FEMA		$ 448,670	$ 79,177	$ 527,847	$ -	$ 527,847	$ -	-	Complete	001	various	602102022
Fire Sup Costs (SO)	CSFS/EFF		51,549	-	51,549	-	51,549	-	-	Complete	001	2809	602102022
Fire Sup Costs (POS)	CSFS/EFF		16,411	-	16,411	-	16,411	-	-	Complete	026	POS	602102022
Total Fire Suppression			**$ 516,630**	**$ 79,177**	**$ 595,807**	**$ -**	**$ 595,807**	**$ -**	**$ -**				
Fire Recovery													
FES 1 (FIWA)	CDPHE	9/30/11	$ 500,000	$ -	$ 500,000	$ -	$ 499,137	$ -	$ 863	Complete	017	5500012	FMFREC151
FES 2 (NRCS)	USDA	7/29/11	$ 1,300,000	$ -	$ 1,300,000	$ 433,333	$ 1,298,315	$ -	$ 1,685	Complete	017	5500012	FMFREC121
FES Admin (NRCS)	USDA	7/29/11	$ 60,000	$ -	$ 60,000	$ -	$ 60,000	$ -	$ -	Complete	017	5500012	FMFREC122
Resp & Rec 1	DOLA	9/20/12	38,000	-	38,000	-	38,000	-	-	Complete	001	various	602102023
Resp & Rec 2	DOLA	9/20/12	156,000	-	156,000	-	156,000	-	-	Complete	017	5050000	FMFREC531
Asbestos Clean-up	State	9/30/11	988,311	164,063	1,152,374	-	1,623,847	-	(471,473)	Complete	017	5810001	602102023
Rain/flood Model	DOLA	9/30/11	10,000	10,000	20,000	-	20,000	-	-	Complete	017	5700001	FMFREC331
Debris flow impact	DOLA	3/31/12	10,000	89,817	99,817	-	49,018	-	50,799	In process	011	4004000	FMFREC332
Rent Assist (BCHA)	DOLA	2/28/11	141,639	-	141,639	-	14,500	-	-	Complete	017	5220001	FMFREC431
Transportation Match				107,207	107,207	-	106,693	-	514	In process	011	4004000	FMFREC381
BOCC Match from 1311				93,158	93,158	-	24,203	-	68,955	In process	017	5050000	FMFREC371
BOCC Salary 2012				137,914		-	137,914	-	-	Complete	001	2002/1202	
Parks and Open Space Match				364,000	364,000	-	363,446	-	554	In process	017	5500012	FMFREC191
BLM monies	BLM	12/9/15	1,121,713		1,121,713	-	1,106,832	-	14,881	In process	017	5500012	FMFREC141
Total Fire Support			**$ 4,325,663**	**$ 966,159**	**$ 5,153,908**	**$ 433,333**	**$ 5,497,905**	**$ -**	**$ (333,222)**				
Grand Total			**$ 4,842,293**	**$ 1,045,336**	**$ 5,749,715**	**$ 433,333**	**$ 6,093,712**	**$ -**	**$ (333,222)**				

GRANT INVOICES

Left Hand Excavating	303.833.3326 Office
7733 North 73rd Street, Longmont, CO 80503	303.833.3353 Fax

To:
Boulder County Transportation Department P.O. Box 471 Boulder, CO 80306

Date:	6-26-013
Invoice #	LHE1881-001

Project Information:
Whispering Pines Culvert Replacement Project

Description	Quantity	Unit	Unit Cost	Sub Total	% Comp.	Total
201-1 Clearing And Grubbing (Stump Removal Only)	3	EA	$ 235.00	$ 705.00	100.00%	$ 705.00
203-2 Unclassified Excavation (CIP) - Including Disposal Of The Existing Culverts And Disposal Of The Spoil Material In The Neighborhood - Based On The Outfall Channel Being 10' Wide Instead Of The Designed 18'	175	CY	$9.00	$1,575.00	100.00%	$1,575.00
206-3 Backfill Culvert With Onsite Material	35	CY	$25.50	$892.50	100.00%	$892.50
207-4 Top Soil - Strip, Stockpile And Placement	90	CY	$11.50	$1,035.00	100.00%	$1,035.00
212-5 Seeding	0.16	ACRE	$4,127.00	$660.32	100.00%	$660.32
213-6 Mulching	0.16	ACRE	$4,127.00	$660.32	100.00%	$660.32
304-7 Aggregate Base Course (Class 6) With The Machines That Are On Site	90	TON	$35.00	$3,150.00	100.00%	$3,150.00
506-8 Harvest Boulders And Coble From Onsite And Place For Riprap Protection At The Culvert Without Fabric And Bedding Material	85	CY	$15.75	$1,338.75	100.00%	$1,338.75
603-9 36" Corrugated Steel Pipe, Galvanized, Annular Corrugations (CIP)	116	LF	$48.50	$5,626.00	100.00%	$5,626.00
620-10 Sanitary Facility	1	EACH	$160.00	$160.00	100.00%	$160.00
625-11 Construction Survey - Does Not Include As-builds	1	LS	$445.00	$445.00	100.00%	$445.00
626-12 Mobilization	1	LS	$2,950.00	$2,950.00	100.00%	$2,950.00
630-13 Traffic Control - Based On A One Day Complete Closure And The Remaining Days As Signage Only.	1	LS	$790.00	$790.00	100.00%	$790.00

Total Due this Invoice: $19,987.89

Thank you

Terms: Net 30 Days

Boulder County
JL9007_BOCO: (JL9007: Funds Review Summary by Project
As Of 5/29/2013

Fiscal Year: 2013
Period: 05
Ledger: BC

Object	Description	Current Budget	Encumbered	Current Month Activity	Project To Date	% Spent	Funds Available
TR4MIF FourMile Fire Flood Mitigation							
JL Operating Expenses							
74030	Architectural-Engineering	0.00	0.00	0.00	4,900.21	0.00	(4,900.21)
	Total JL Operating Expenses	**0.00**	**0.00**	**0.00**	**4,900.21**	**0.00**	**(4,900.21)**
TR4MIF FourMile Fire Flood Mitigation							
	Total Revenue:	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
	Total Revenue and Transfer In:	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
	Total Expenditure:	**0.00**	**0.00**	**0.00**	**4,900.21**	**0.00**	**(4,900.21)**
	Total Expenditure and Transfer Out:	**0.00**	**0.00**	**0.00**	**4,900.21**	**0.00**	**(4,900.21)**
	Net:	**0.00**	**0.00**	**0.00**	**(4,900.21)**	**0.00**	**4,900.21**
	Report Net Total:	**0.00**	**0.00**	**0.00**	**(9,800.42)**	**0.00**	**9,800.42**

JVA, Incorporated
1319 Spruce Street
Boulder, CO 80302
Ph: 303.444.1951
Fax: 303.444.1957
Toll Free: 877.444.1951
Web site:
www.jvajva.com
E-mail:
info@jvajva.com

August 20, 2012

Invoice Number: 43144

Boulder County Transportation
P.O. Box 471
Boulder, CO 80306
Attn: Pamela Hanson

5700001, 74030
TR4MiFire, 74030
4mile fire
4mile fire flood mitigation

JVA Job # 2001c

Boulder County CR 83 - Stream Stabilization

Consulting Services from July 16, 2012 through August 12, 2012

Hourly Costs:

CEC	3.00hrs. @ $96.00 /hr	$288.00
	TOTAL LABOR	$288.00
	NEW BILLING	$288.00

Aged Receivables:					
New Billing	30-60 days	60-90 days	90-120 days	>120 days	Total Now Due
$ 288.00	$ 0.00	$ 0.00	$ 0.00	$ 0.00	$ 288.00

Approved 9-12-12
Doug E Stan

Ok to pay
(8/28/12

5700001, TR4MIFIRE

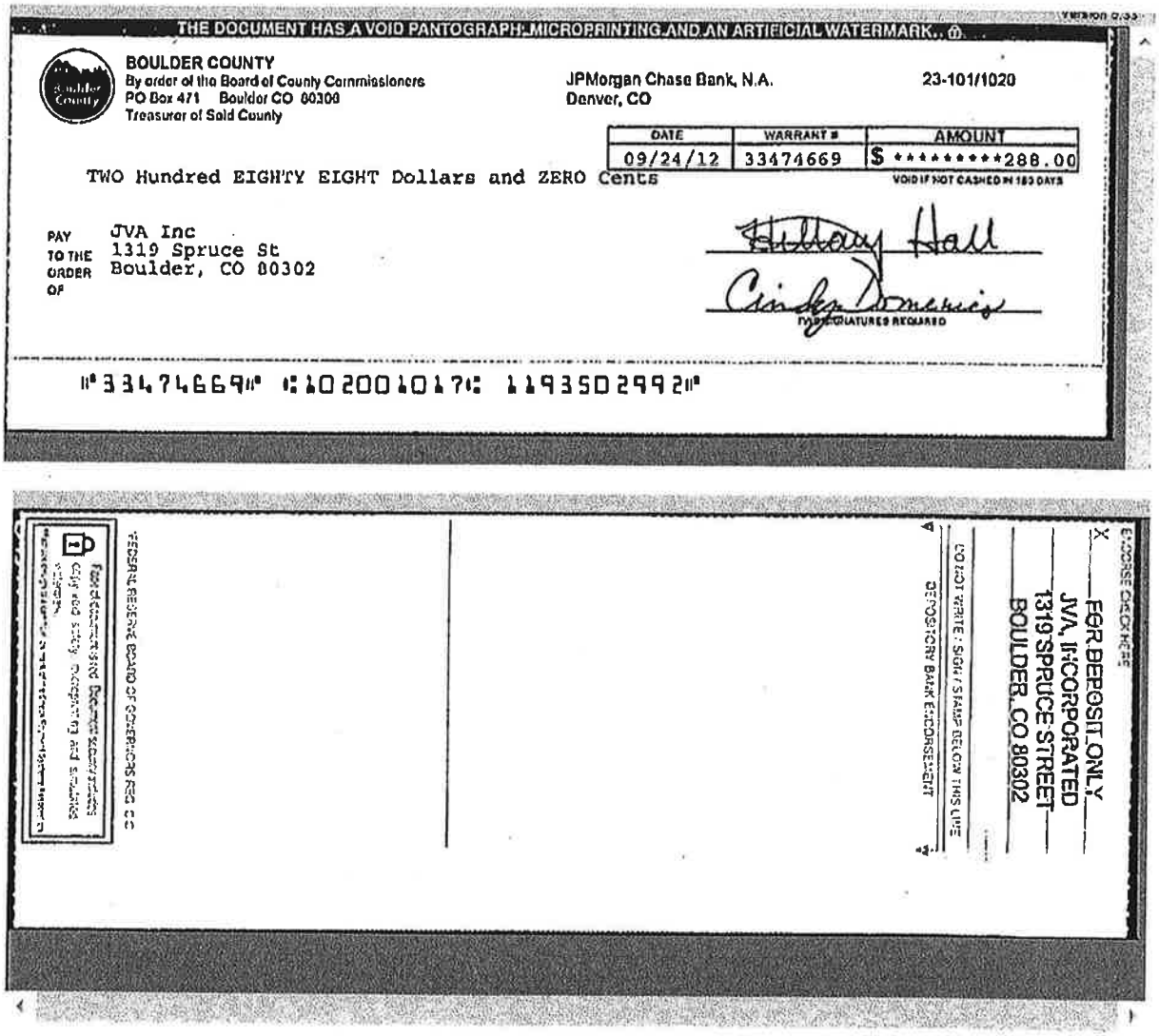
RECEIVED
AUG 27 2012
Boulder County
Transportation

Boulder County
Transportation

RECEIVED
SEP 19 2012

09/21/2012 mo 804362

Check #33474669 dated 09/24/12 for $288.00



THE DOCUMENT HAS A VOID PANTOGRAPH, MICROPRINTING AND AN ARTIFICIAL WATERMARK

BOULDER COUNTY
By order of the Board of County Commissioners
PO Box 471 Boulder CO 80306
Treasurer of Said County

JPMorgan Chase Bank, N.A.
Denver, CO

23-101/1020

DATE	WARRANT #	AMOUNT
09/24/12	33474669	$ *********288.00

VOID IF NOT CASHED IN 180 DAYS

TWO Hundred EIGHTY EIGHT Dollars and ZERO Cents

PAY TO THE ORDER OF
JVA Inc
1319 Spruce St
Boulder, CO 80302

Hillary Hall
Cindy Domenico
TWO SIGNATURES REQUIRED

⑈33474669⑈ ⑆102001017⑆ 193502992⑈

ENDORSE CHECK HERE
X
FOR DEPOSIT ONLY
JVA, INCORPORATED
1319 SPRUCE STREET
BOULDER, CO 80302

DO NOT WRITE, SIGN, OR STAMP BELOW THIS LINE
RESERVED FOR DEPOSITORY BANK ENDORSEMENT

FEDERAL RESERVE BOARD OF GOVERNORS REG CC

Check/Serial#:33474669 Account#:193502992 Amount:288.00

JVA, Incorporated
1319 Spruce Street
Boulder, CO 80302
Ph: 303.444.1951
Fax: 303.444.1957
Toll Free: 877.444.1951
Web site:
www.jvajva.com
E-mail:
Info@jvajva.com

September 24, 2012

Invoice Number: 43618

Boulder County Transportation
P.O. Box 471
Boulder, CO 80306
Attn: Mike Thomas

5700001
TRYMPIRE 74030

JVA Job # 2001c

Boulder County CR 83 - Stream Stabilization Whispering Pines

Consulting Services from August 13, 2012 through September 16, 2012

Hourly Costs:

CEC	12.00hrs. @ $96.00/hr	$1,152.00
CJB	2.50hrs. @ $128.00/hr	$320.00
	TOTAL LABOR	$1,472.00

Reimbursable expenses

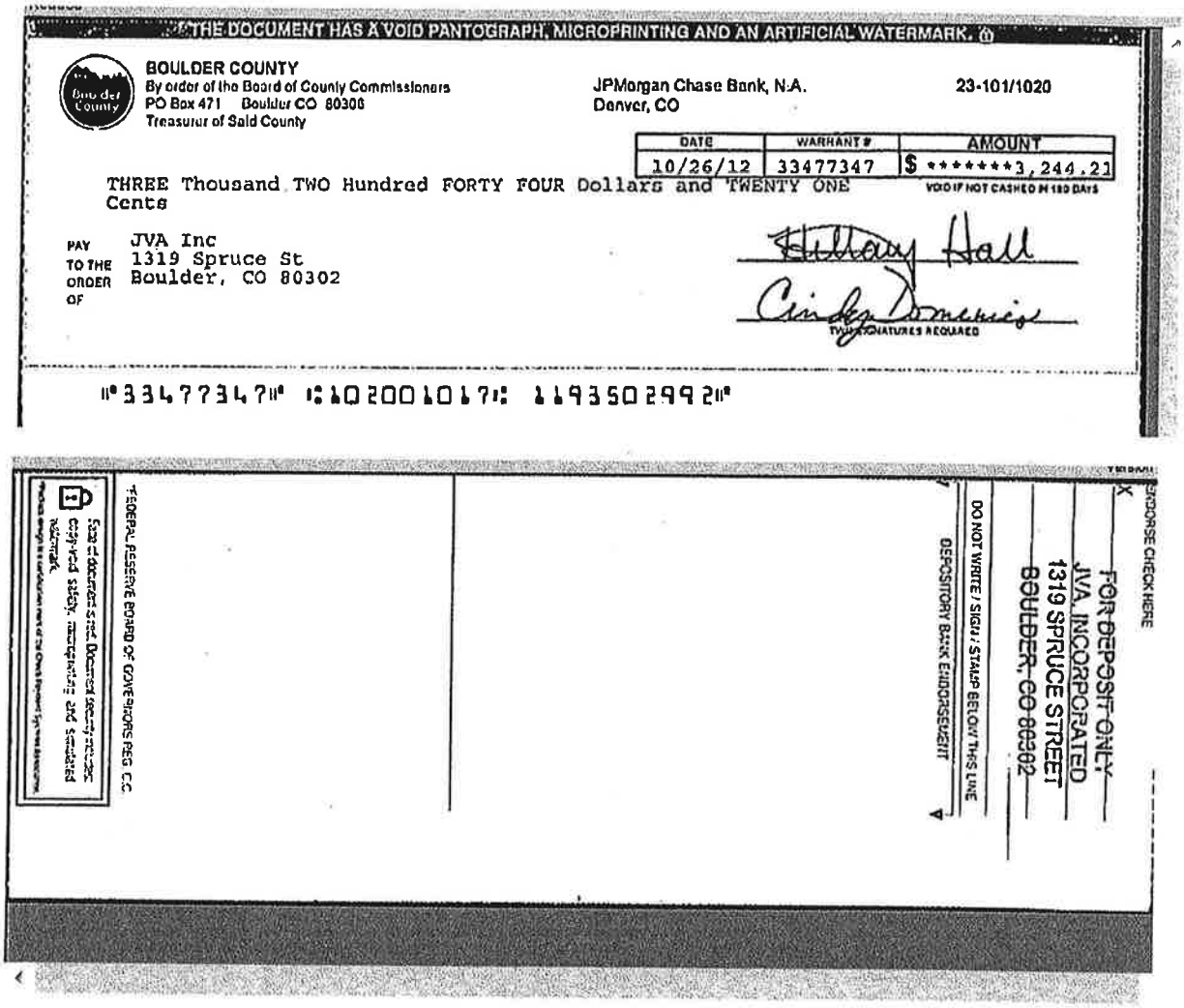
Auto Mileage	$12.21
Flatirons Surveying	$1,760.00
TOTAL REIMBURSABLE EXPENSES	$1,772.21
NEW BILLING	$3,244.21

Aged Receivables:

New Billing	30-60 days	60-90 days	90-120 days	>120 days	Total Now Due
$ 3,244.21	$ 0.00	$ 0.00	$ 0.00	$ 0.00	$ 3,244.21

OK to pay

Check #33477347 dated 10/26/12 for $3,244.21



THIS DOCUMENT HAS A VOID PANTOGRAPH, MICROPRINTING AND AN ARTIFICIAL WATERMARK.

BOULDER COUNTY
By order of the Board of County Commissioners
PO Box 471 Boulder CO 80306
Treasurer of Said County

JPMorgan Chase Bank, N.A.
Denver, CO

23-101/1020

DATE	WARRANT #	AMOUNT
10/26/12	33477347	$ *******3,244.21

VOID IF NOT CASHED IN 180 DAYS

THREE Thousand TWO Hundred FORTY FOUR Dollars and TWENTY ONE Cents

PAY TO THE ORDER OF JVA Inc
1319 Spruce St
Boulder, CO 80302

TWO SIGNATURES REQUIRED

⑈33477347⑈ ⑆102001017⑆ 193502992⑈

FEDERAL RESERVE BOARD OF GOVERNORS REG CC

DO NOT WRITE / SIGN / STAMP BELOW THIS LINE
DEPOSITORY BANK ENDORSEMENT

ENDORSE CHECK HERE
FOR DEPOSIT ONLY
JVA, INCORPORATED
1319 SPRUCE STREET
BOULDER, CO 80302

Check/Serial#:33477347 Account#:193502992 Amount:3,244.21

JVA, Incorporated
1319 Spruce Street
Boulder, CO 80302
Ph: 303.444.1951
Fax: 303.444.1957
Toll Free: 877.444.1951

Web site:
www.jvajva.com

E-mail:
info@jvajva.com

October 22, 2012

Invoice Number: 43853

Boulder County Transportation
P.O. Box 471
Boulder, CO 80306
Attn: Mike Thomas

'4 Mile debris mitigation'
5700001 74030
TR4Mifire 74030

JVA Job # 2001c

Boulder County CR 83 - Stream Stabilization

Consulting Services from September 17, 2012 through October 14, 2012

Contract Maximum:	$4,900.00
Previous Billings Against Maximum:	$1,760.00
Current Billings Against Maximum:	$1,368.00

Hourly Costs:

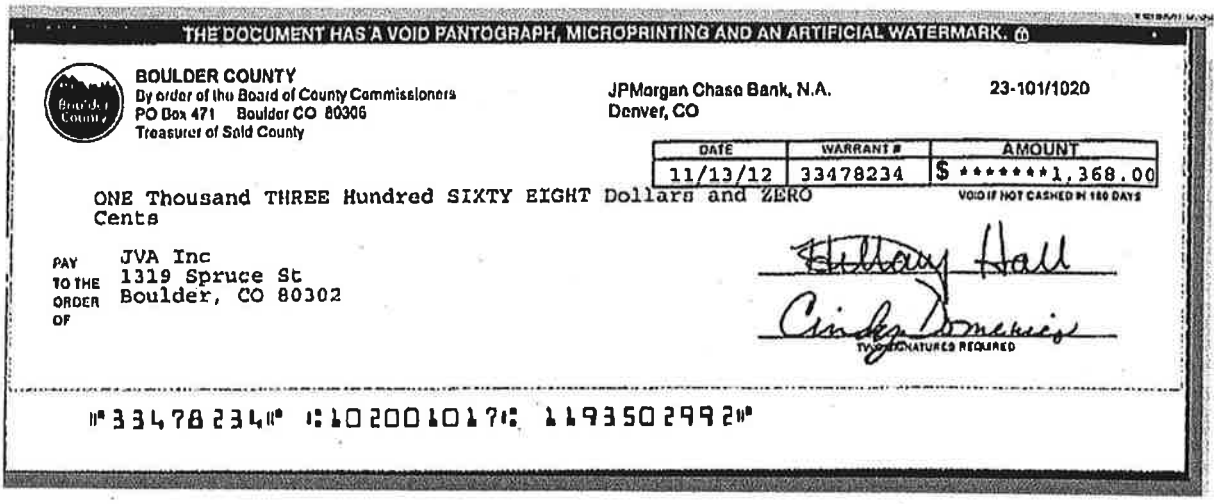
CEC	10.25hrs. @ $96.00/hr	$984.00
CJB	3.00hrs. @ $128.00/hr	$384.00
	TOTAL LABOR	$1,368.00
	NEW BILLING	$1,368.00

Ok to pay
10/31/2012

Aged Receivables:

New Billing	30-60 days	60-90 days	90-120 days	>120 days	Total Now Due
$ 1,368.00	$ 3,244.21	$ 0.00	$ 0.00	$ 0.00	$ 4,612.21

Check #33478234 dated 11/13/12 for $1,368.00



THE DOCUMENT HAS A VOID PANTOGRAPH, MICROPRINTING AND AN ARTIFICIAL WATERMARK.

BOULDER COUNTY
By order of the Board of County Commissioners
PO Box 471 Boulder CO 80306
Treasurer of Said County

JPMorgan Chase Bank, N.A.
Denver, CO

23-101/1020

DATE	WARRANT #	AMOUNT
11/13/12	33478234	$ *******1,368.00

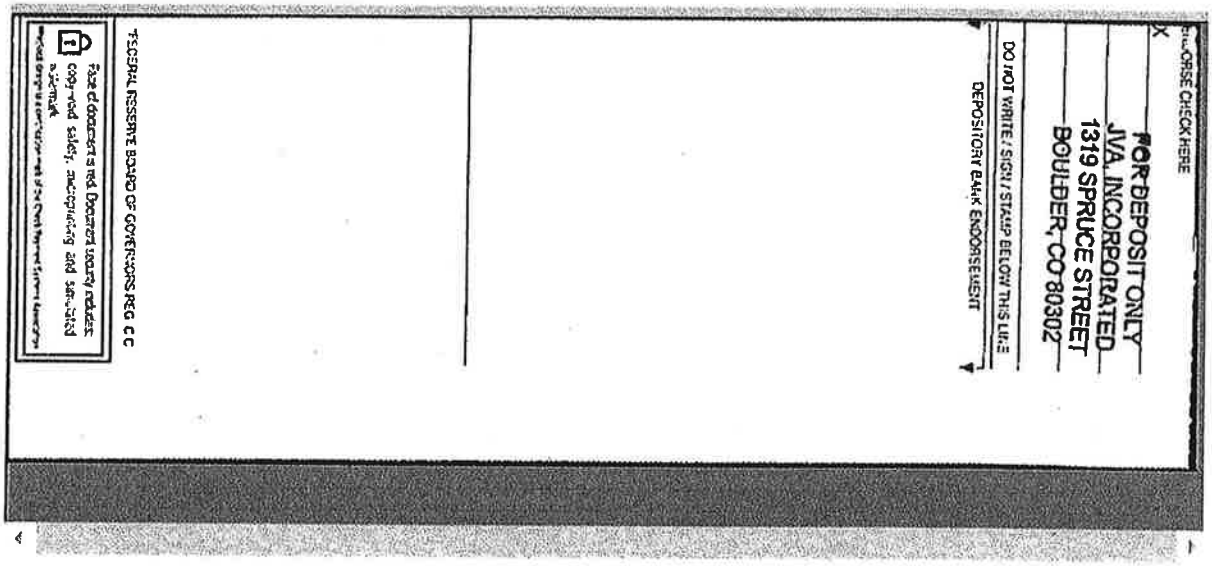
VOID IF NOT CASHED IN 180 DAYS

ONE Thousand THREE Hundred SIXTY EIGHT Dollars and ZERO Cents

PAY TO THE ORDER OF JVA Inc
1319 Spruce St
Boulder, CO 80302

Hillary Hall
Cindy Domenico
TWO SIGNATURES REQUIRED

⑈33478234⑈ ⑆102001017⑆ 193502992⑈



FOR DEPOSIT ONLY
JVA, INCORPORATED
1319 SPRUCE STREET
BOULDER, CO 80302

DO NOT WRITE / SIGN / STAMP BELOW THIS LINE
DEPOSITORY BANK ENDORSEMENT

FEDERAL RESERVE BOARD OF GOVERNORS REG CC

Check/Serial#:33478234 Account#:193502992 Amount:1,368.00

MATCH INVOICES

Boulder County

ACCOUNTS PAYABLE - VENDOR INVOICE STATUS

From 1/1/2012 to 12/31/2013

Invoice	Inv. Date	Invoice Amt.	Status	Description	Account	Check Date	Check #
V12545	**MOUNTAIN WEST HELICOPTERS LLC**						
18167	05/03/12	288,227.70	Paid	FMF CANYON FIRE REHAB	GL 5500012-75110 / BC FMFREC191-75110	05/18/12	33465371
18167	05/03/12	236,346.30	Paid	FMF CANYON FIRE REHAB	GL 5500012-75110 / BC FMFREC141-75110	05/18/12	33465371
18593	06/19/12	32,057.30	Paid	FMF CANYON FIRE REHAB	GL 5500012-75110 / BC FMFREC191-75110	06/26/12	33468309
18593	06/19/12	26,228.70	Paid	FMF CANYON FIRE REHAB	GL 5500012-75110 / BC FMFREC141-75110	06/26/12	33468309
		582,860.00					
V14401	**MOUNTAIN WEST PESTICIDE EDUCAT**						
264	10/30/12	50.00	Paid	CTHILTGEN/PEST TRNG	GL 2714000-76400	11/07/12	33478013
		50.00					
Grand Total:		**$582,910.00**					

Mountain West Helicopters

497 N. Quail Hollow Dr.
Alpine, UT 84004
Phone (801)216-4001 Fax (801)216-4004

Invoice

Date	Invoice #
5/3/2012	18167

Bill To
Boulder County Parks & Open Space Attn: Renee Edick 5201 St. Vrains Road Longmont, CO 80503

P.O. No.	Terms	Project
5612-12		

Quantity	Description	Rate	Amount
364	Aerial application of Boulder County provided seed mix. Four Mile Canyon project 2012	54.95	20,001.80
364	Acres of certified weed-free straw delivered to various treatment areas within the Four Mile Canyon Project 2012 at the rate of .5 tons per acre.	170.00	61,880.00
364	Acres of Wood shreds manufactured and delivered to various treatment areas within the Four Mile Canyon Project 2012 at the rate of 4.0 tons per acre	420.00	152,880.00
364	Aerial application of wood shreds to various areas within the Four Mile Canyon project 2012 at the application rate of 4.0 tons per acre	983.78626	358,098.20
1	Negotiated contract rate adjustment between Bryan Burr and Claie DeLeo.	-10,000.00	-10,000.00

Boulder County Contract
Approved 3/13/2012 10% retainage required

Total $582,860.00

(– 10%)
58,286.00

$524,574.00

Boulder County

ACCOUNTS PAYABLE - VENDOR INVOICE STATUS

From 1/1/2012 to 12/31/2013

Invoice	Inv. Date	Invoice Amt.	Status	Description	Account	Check Date	Check #
V13346	**GRANITE SEED CO**						
1-10364	04/12/12	6,873.00	Paid	FMF CANYON REHAB SEED	GL 5500012-73060 / BC FMFREC141-73060	05/18/12	33465349
1-10364	04/12/12	8,381.88	Paid	FMF CANYON REHAB SEED	GL 5500012-73060 / BC FMFREC191-73060	05/18/12	33465349
3-11457	10/04/12	1,248.12	Paid	Eastern Link Seed	GL 5700001-72500 / BC 900411003-72500	10/26/12	33477337
3-11458	10/04/12	38.15	Paid	EAST LINK TRL/SEEDS	GL 2713601-73060 / BC 800827000-73060	11/13/12	33478223
3-11458	10/04/12	14.00	Paid	WLDNPNDS/SEEDS	GL 2713601-73060 / BC 800322005-73060	11/13/12	33478223
3-11458	10/04/12	168.00	Paid	PECK/SEEDS	GL 2713601-73060 / BC 800259000-73060	11/13/12	33478223
3-11458	10/04/12	420.00	Paid	PLANT ECOLOGY MIXES	GL 2713601-73060	11/13/12	33478223
3-11756	11/13/12	5,307.30	Paid	ERIN ARSENAULT PROPERT	GL 6354500-73060 / BC 800394001-73060	12/31/12	33482032
3-12102	12/20/12	6,277.59	Paid	KENOSHA/33 ACRES SEED	GL 2794500-73060 / BC 800114002-73060	01/18/13	33483715
3-12140	12/20/12	5,000.00	Paid	PUMA 66/SANDY SEED	GL 6354500-73060 / BC 800805000-73060	01/29/13	33484229
3-12140	12/20/12	1,133.80	Paid	R ROBERTS/SANDY SEED	GL 6354500-73060 / BC 800279002-73060	01/29/13	33484229
3-12151	12/20/12	400.64	Paid	SEED/INGERSOL MIX	GL 2713404-73060	01/11/13	33483166
3-12152	12/20/12	264.00	Paid	SEED/SLENDER WHEATGRA	GL 2713404-73060	01/09/13	33482821
3-12152	12/20/12	160.00	Paid	SEED/CANADA WILDRYE	GL 2713404-73060	01/09/13	33482821
3-12152	12/20/12	90.00	Paid	SEED/SIDEOATS GRAMA	GL 2713404-73060	01/09/13	33482821
3-12155	12/20/12	3,194.00	Paid	R ROBERTS/FORB SEED	GL 6354500-73060 / BC 800279002-73060	01/29/13	33484229
3-12366	03/12/13	429.14	Paid	WLDN IMPROV/SEED MIX	GL 5500008-77400 / BC PZONE2000-77400	05/13/13	33491708
		39,399.62					

Grand Total: **$39,399.62**

granite SEED

INVOICE

Invoice Date:
04-APR-12

Invoice Number:
1-10364

(please show this invoice number on all payments)

1697 West 2100 North
Lehi, Utah 84043
(801) 768-4422 / (801) 531-1456
Fax (801) 768-3967

Project: Four Mile Canyon

Customer Number: GS113230

Sold To:
Boulder County Parks and Open Space
Claire DeLeo
5201 St. Vrain Road
Longmont, Co 80503

Ship To:
Boulder County Parks and Open Space
490 East 76th Ave
Denver, CO 80299

Terms:	Customer P.O.	Ordered By:	Phone Number:	Packing Slip #
Net 30	106806	Claire DeLeo	303-678-6205	237300
Shipper:	**Prepaid / Collect:**	**FOB:**	**Sales Rep:**	**Date Shipped**
NORTHPARK	Prepaid	Destination	Tren Hagman	04-APR-12

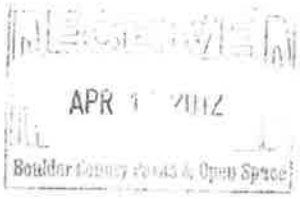
Price By	Quantity Shipped PLS	Bulk	Description	Variety	Price	Total
*** MIX # 102571 FOUR MILE CANYON ***						
PLS #	14,632.80	14,862.35	TRITICUM SECALE WINTER TRITICALE	Tyndal (S)		
PLS #	2,802.80	3,150.77	ELYMUS TRACHYCAULUS SSP. TRACHYCAULUS SLENDER WHEATGRASS	Revenue		

MIX SUBTOTAL (364 Acre @ $ 41.9090 Per Acre): $ 15,254.88

Notes: Do not invoice until they have picked up order from GS Denver.

Subtotal:	**$ 15,254.88**
Freight:	$ 0.00
Sales Tax:	Tax Exempt
GRAND TOTAL:	**$ 15,254.88**

PLEASE PAY PER THIS INVOICE NO STATEMENT WILL BE SENT



Please read the reverse side of this form carefully. The terms and conditions of sale set forth on both sides of this form constitute the entire agreement between Seller and Buyer. All purchases of products by Buyer shall be governed and subject to the terms and conditions of sale set forth on the reverse side hereof, as in effect from time to time, and nothing contained in any product order of Buyer shall in any way modify such terms and conditions of sale or add any additional terms and conditions unless agreed upon in writing by a corporate officer of Granite Seed. Any additional or inconsistent terms and conditions of any product order of Buyer shall be deemed stricken from such order and each product order shall be deemed to incorporate all of these terms and conditions of sale. Acceptance by Buyer of these terms and conditions is acknowledged by either (1) Buyer's signature set forth herein, or (2) receipt by Buyer of delivery of the products described herein and failure by Buyer to return such products within five (5) days following such delivery.

INTERWEST
CONSULTING GROUP

Interwest Consulting Group, Inc.
1076 Lincoln Place
Boulder, CO 80302

Invoice Number: 13611
Invoice Date: 12/5/2012

Bill To:
County of Boulder
Attn: Garry Sanfacon, Fourmile Fire Recovery Manager
PO Box 471
Boulder, CO 80306

Professional Services for the Period of November 1 through November 30, 2012

Total Due: $ 793.00

Approved
Garry Sfacon
12-21-12

5700001 FMFREC371

Project Summary		
Previously Invoiced:	$	136,279.86
This Invoice:	$	793.00
Project Total To Date:	$	137,072.86

Please remit to:
Interwest Consulting Group, 1076 Lincoln Place, Boulder, CO 80302
Attention: Accounting
Direct invoice questions to Sarah Ryan @ 303-444-0524 x12

Interwest Consulting Group, Inc.
1076 Lincoln Place
Boulder, CO 80302

Invoice Number: 13611
Invoice Date: 12/5/2012

Invoice Detail
Fourmile Canyon Fire Recovery - 2012 Sedimentation Control

Anders Environmental Invoice #46 (see attached detail)					$ 793.00
				Subconsultant Total:	**$ 793.00**

Total Due: $ 793.00

Please remit to:
Interwest Consulting Group, 1076 Lincoln Place, Boulder, CO 80302
Attention: Accounting
Direct invoice questions to Sarah Ryan @ 303-444-0524 x12

Interwest Consulting Group, Inc.
1076 Lincoln Place
Boulder, CO 80302

Invoice Number: 13338
Invoice Date: 10/15/2012

Bill To:
County of Boulder
Attn: Garry Sanfacon, Fourmile Fire Recovery Manager
PO Box 471
Boulder, CO 80306

Professional Services for the Period of September 1 to September 30, 2012

Total Due: $ 5,604.80

Project Summary		
Previously Invoiced:	$	130,675.36
This Invoice:	$	5,604.50
Project Total To Date:	$	136,279.86

Please remit to:
Interwest Consulting Group, 1076 Lincoln Place, Boulder, CO 80302
Attention: Accounting
Direct invoice questions to Sarah Ryan @ 303-444-0524 x12

Interwest Consulting Group, Inc.
1076 Lincoln Place
Boulder, CO 80302

Invoice Number: 13338
Invoice Date: 10/15/2012

Invoice Detail

Fourmile Canyon Fire Recovery - 2012 Sedimentation Control

Anders Environmental Invoice #45 (see attached detail)					$ 5,604.80
				Subconsultant Total:	**$ 5,604.80**

Total Due: $ 5,604.80

Please remit to:
Interwest Consulting Group, 1076 Lincoln Place, Boulder, CO 80302
Attention: Accounting
Direct invoice questions to Sarah Ryan @ 303-444-0524 x12

Invoice

ANDERS
ENVIRONMENTAL

625 PEARL ST. #23
BOULDER, CO 80302
303-817-6970

Bill To:
Interwest Consulting Group Terry Rodrigue 1076 Lincoln Place Boulder, CO 80301

Date	Invoice No.	P.O. Number	Terms
10/15/12	45	BldrCntySH3	Net 30

Item	Description	Quantity	Rate	Amount
Watershed Restoration Project Manager	Check Dams	20	257.74	5,154.80
	Treatment Evaluation Report	6	75.00	450.00
Thank You			Total	$5,604.80

Due Date
11/14/12

INTERWEST
CONSULTING GROUP

Interwest Consulting Group, Inc.
1076 Lincoln Place
Boulder, CO 80302

Invoice Number: **13256**
Invoice Date: **9/20/2012**

Bill To:
County of Boulder
Attn: Garry Sanfacon, Fourmile Fire Recovery Manager
PO Box 471
Boulder, CO 80306

Professional Services for the Period of August 1 through August 31, 2012

Total Due: **$ 7,216.72**

Project Summary		
Previously Invoiced:	$	123,458.64
This Invoice:	$	7,216.72
Project Total To Date:	$	130,675.36

Please remit to:
Interwest Consulting Group, 1076 Lincoln Place, Boulder, CO 80302
Attention: Accounting
Direct invoice questions to Sarah Ryan @ 303-444-0524 x12

Interwest Consulting Group, Inc.
1076 Lincoln Place
Boulder, CO 80302

Invoice Number: **13256**
Invoice Date: **9/21/2012**

Invoice Detail
Fourmile Canyon Fire Recovery - 2012 Sedimentation Control

Anders Environmental Invoice #43 (see attached detail)					$ 7,216.72
			Subconsultant Total:		**$ 7,216.72**

Total Due: **$ 7,216.72**

Please remit to:
Interwest Consulting Group, 1076 Lincoln Place, Boulder, CO 80302
Attention: Accounting
Direct invoice questions to Sarah Ryan @ 303-444-0524 x12

Invoice

ANDERS
ENVIRONMENTAL
625 PEARL ST. #23
BOULDER, CO 80302
303-817-6970

Bill To:
Interwest Consulting Group Terry Rodrigue 1076 Lincoln Place Boulder, CO 80301

Date	Invoice No.	P.O. Number	Terms
08/13/12	43	BldrCounty	Net 30

Item	Description	Quantity	Rate	Amount
Watershed Restoration	Sweet Home Gulch Check Dams	28	257.74	7,216.72

Thank You

Total $7,216.72

Due Date
09/12/12

INTERWEST
CONSULTING GROUP

Interwest Consulting Group, Inc.
1076 Lincoln Place
Boulder, CO 80302

Invoice Number: 12865
Invoice Date: 7/16/2012

Bill To:
County of Boulder
Attn: Garry Sanfacon, Fourmile Fire Recovery Manager
PO Box 471
Boulder, CO 80306

Professional Services for the Period of June 1 through June 30, 2012

Approved. Garry Esfacon
7-18-12

Total Due: $ 47,208.00

4004000 FMREC 381
If this exceeds this account then pay remainder with 5700001 FMREC371

Project Summary		
Previously Invoiced:	$	66,690.64
This Invoice:	$	47,208.00
Project Total To Date:	$	113,898.64

Please remit to:
Interwest Consulting Group, 1076 Lincoln Place, Boulder, CO 80302
Attention: Accounting
Direct invoice questions to Sarah Ryan @ 303-444-0524 x12

Interwest Consulting Group, Inc.
1076 Lincoln Place
Boulder, CO 80302

Invoice Number: 12865
Invoice Date: 7/16/2012

Invoice Detail
Fourmile Canyon Fire Recovery - 2012 Sedimentation Control

Anders Environmental Invoice #39 (see attached detail)					$ 47,208.00
		Subconsultant Total:			**$ 47,208.00**

Total Due: **$ 47,208.00**

Please remit to:
Interwest Consulting Group, 1076 Lincoln Place, Boulder, CO 80302
Attention: Accounting
Direct invoice questions to Sarah Ryan @ 303-444-0524 x12

Invoice

ANDERS
ENVIRONMENTAL
625 PEARL ST. #23
BOULDER, CO 80302
303-817-6970

Bill To:
Interwest Consulting Group Terry Rodrigue 1076 Lincoln Place Boulder, CO 80301

Date	Invoice No.	P.O. Number	Terms
06/18/12	39	BldrCounty	Net 30

Item	Description	Quantity	Rate	Amount
Earthwork	Completion of Vermillion excavation Scope of Work dated 5/16/12	1	47,208.00	47,208.00
Thanks!			Total	$47,208.00

Due Date
07/18/12

INTERWEST
CONSULTING GROUP

Interwest Consulting Group, Inc.
1076 Lincoln Place
Boulder, CO 80302

Invoice Number: **12778**
Invoice Date: **7/9/2012**

Bill To:
County of Boulder
Attn: Garry Sanfacon, Fourmile Fire Recovery Manager
PO Box 471
Boulder, CO 80306

Professional Services for the Period of June 1 through June 30, 2012

Total Due: **$ 27,182.22**

Approved Garry E Sanfacon 7-12-12

Acct 400400 FMFREC301

Project Summary		
Previously Invoiced:	$	39,508.42
This Invoice:	$	27,182.22
Project Total To Date:	$	66,690.64

Please remit to:
Interwest Consulting Group, 1076 Lincoln Place, Boulder, CO 80302
Attention: Accounting
Direct invoice questions to Sarah Ryan @ 303-444-0524 x12

Interwest Consulting Group, Inc.
1076 Lincoln Place
Boulder, CO 80302

Invoice Number: 12778
Invoice Date: 7/9/2012

Invoice Detail

Fourmile Canyon Fire Recovery - 2012 Sedimentation Control

Person	Title	Week Ending	Hours	Rate	Total
Terry Rodrigue	Principal	6/1/2012	2	$ 140.00	$ 280.00
Terry Rodrigue	Principal	6/8/2012	2	$ 140.00	$ 280.00
Terry Rodrigue	Principal	6/15/2012	2	$ 140.00	$ 280.00
Terry Rodrigue	Principal	6/22/2012	2	$ 140.00	$ 280.00
Terry Rodrigue	Principal	6/29/2012	2	$ 140.00	$ 280.00
				Labor Total:	**$ 1,400.00**

Anders Environmental Invoice #40 (see attached detail)					$ 25,782.22
				Subconsultant Total:	**$ 25,782.22**

Total Due: **$ 27,182.22**

Please remit to:
Interwest Consulting Group, 1076 Lincoln Place, Boulder, CO 80302
Attention: Accounting
Direct invoice questions to Sarah Ryan @ 303-444-0524 x12

Invoice

ANDERS
ENVIRONMENTAL
625 PEARL ST. #23
BOULDER, CO 80302
303-817-6970

Bill To:
Interwest Consulting Group Terry Rodrigue 1076 Lincoln Place Boulder, CO 80301

Date	Invoice No.	P.O. Number	Terms
06/28/12	40	BldrCounty	Net 30

Item	Description	Quantity	Rate	Amount
Watershed Restoration	Check Dam Installation	30	257.74	7,732.20
Watershed Restoration	Contour Felling Repair	10.2	691.18	7,050.04
Watershed Restoration	Contour Felling	27.6	398.55	10,999.98
Thanks!			Total	$25,782.22

Due Date
07/28/12

INTERWEST
CONSULTING GROUP

Interwest Consulting Group, Inc.
1076 Lincoln Place
Boulder, CO 80302

Invoice Number: **12944**
Invoice Date: **8/8/2012**

Bill To:
County of Boulder
Attn: Garry Sanfacon, Fourmile Fire Recovery Manager
PO Box 471
Boulder, CO 80306

Professional Services for the Period of July 1 through July 31, 2012

Total Due: **$ 9,560.00**

Project Summary		
Previously Invoiced:	$	113,898.64
This Invoice:	$	9,560.00
Project Total To Date:	$	123,458.64

Please remit to:
Interwest Consulting Group, 1076 Lincoln Place, Boulder, CO 80302
Attention: Accounting
Direct invoice questions to Sarah Ryan @ 303-444-0524 x12

Interwest Consulting Group, Inc.
1076 Lincoln Place
Boulder, CO 80302

Invoice Number: 12944
Invoice Date: 8/8/2012

Invoice Detail
Fourmile Canyon Fire Recovery - 2012 Sedimentation Control

Person	Title	Week Ending	Hours	Rate	Total
Terry Rodrigue	Principal	7/13/2012	3	$ 140.00	$ 420.00
Terry Rodrigue	Principal	7/20/2012	2	$ 140.00	$ 280.00
Terry Rodrigue	Principal	7/27/2012	2	$ 140.00	$ 280.00
				Labor Total:	**$ 980.00**

Anders Environmental Invoice #42 (see attached detail)					$ 8,580.00
				Subconsultant Total:	**$ 8,580.00**

Total Due: **$ 9,560.00**

Please remit to:
Interwest Consulting Group, 1076 Lincoln Place, Boulder, CO 80302
Attention: Accounting
Direct invoice questions to Sarah Ryan @ 303-444-0524 x12

Invoice

ANDERS
ENVIRONMENTAL
625 PEARL ST. #23
BOULDER, CO 80302
303-817-6970

Bill To:
Interwest Consulting Group
Terry Rodrigue
1076 Lincoln Place
Boulder, CO 80301

Date	Invoice No.	P.O. Number	Terms
07/30/12	42	BldrCounty	Net 30

Item	Description	Quantity	Rate	Amount
Watershed Restoration	Anne White Trail	1	8,580.00	8,580.00
Thanks!			Total	$8,580.00

Due Date
08/29/12

INTERWEST
CONSULTING GROUP

Interwest Consulting Group, Inc.
1076 Lincoln Place
Boulder, CO 80302

Invoice Number: 12591
Invoice Date: 6/5/2012

Bill To:
County of Boulder
Attn: Garry Sanfacon, Fourmile Fire Recovery Manager
PO Box 471
Boulder, CO 80306

Professional Services for the Period of April 1 through May 31, 2012

Total Due: $ 39,508.42

Project Summary		
Previously Invoiced:	$	-
This Invoice:	$	39,508.42
Project Total To Date:	$	39,508.42

Please remit to:
Interwest Consulting Group, 1076 Lincoln Place, Boulder, CO 80302
Attention: Accounting
Direct invoice questions to Sarah Ryan @ 303-444-0524 x12

Interwest Consulting Group, Inc.
1076 Lincoln Place
Boulder, CO 80302

Invoice Number: 12591
Invoice Date: 6/5/2012

Invoice Detail
Fourmile Canyon Fire Recovery - 2012 Sedimentation Control

Person	Title	Week Ending	Hours	Rate	Total
Terry Rodrigue	Principal	4/27/2012	2	$ 140.00	$ 280.00
Terry Rodrigue	**Principal**	**5/11/2012**	**6**	**$ 140.00**	**$ 840.00**
Terry Rodrigue	Principal	5/18/2012	6	$ 140.00	$ 840.00
Terry Rodrigue	**Principal**	**5/25/2012**	**3**	**$ 140.00**	**$ 420.00**
				Labor Total:	**$ 2,380.00**

Anders Environmental Invoice **#37** (see attached detail)					$ 37,128.42
				Subconsultant Total:	**$ 37,128.42**

Total Due: **$ 39,508.42**

Please remit to:
Interwest Consulting Group, 1076 Lincoln Place, Boulder, CO 80302
Attention: Accounting
Direct invoice questions to Sarah Ryan @ 303-444-0524 x12

Invoice

ANDERS
ENVIRONMENTAL
625 PEARL ST. #23
BOULDER, CO 80302
303-817-6970

Bill To:
Interwest Consulting Group Terry Rodrigue 1076 Lincoln Place Boulder, CO 80301

Date	Invoice No.	P.O. Number	Terms
05/29/12	37	Bldr County	Net 30

Item	Description	Quantity	Rate	Amount
Watershed Restoration	Check Dam Installation	133	257.74	34,279.42
Watershed Restoration	Debris Rack Retrofit	2	1,424.50	2,849.00
Thanks!			Total	$37,128.42

Due Date
06/28/12

Did not use.

ANDERS
ENVIRONMENTAL

April 20th, 2012

Terry Rodrigue
Interwest Consulting Group
1076 Lincoln Place
Boulder, CO 80301

Subject: Anne White debris removal project

Mr. Rodrigue:

Anders Environmental LLC is pleased to provide you a cost estimate for debris removal within the 100-year flood plain along the portion of the Anne White Trail that is in between Sections B and C, and west of the trail terminus up to Lazlo's property on the Anne U. White Trail BOCO Ownership map provided by Boulder County.

This estimate includes removing all debris as described in the Anne U. White SOW dated April 9th, 2012.

Crew size is projected to be 1 supervisor and 3 laborers. Due to the terrain, hike from trailhead to work zone, and amount of debris; Anders Environmental estimates this project will take approximately 25, 10-hour workdays to complete.

Table 1: Hand Removal of all debris in 100-year flood plain

Labor / Material Description	Rate ($)	Units	Total
Project Manager	$75/hr	60	$4,500
Field Supervisor	$45/hr	250	$11,250
USFS trained laborer	$35/hr	750	$26,250
Field Camera / GPS	$19/day	25	$475
Chain saw 16"	$22/day	25	$550
4WD truck	$70/day	25	$1,750
Materials	Lump	1	$950
Total			**$45,725**

Site photos are available upon request. Please feel free to contact me with any questions or concerns.

Sincerely,

Luke Matzke
Project Manager
Anders Environmental LLC
625 Pearl St. #23
Boulder, CO 80302

- Better pos
- pos — Lento

ATTACHMENT B

- Draft Fourmile Fire 2012 Annual Report

2012 Fourmile Canyon Fire Rehabilitation Report

Submitted by Boulder County Parks and Open Space: Claire DeLeo, Erica Christensen, Jennifer Kesler, Steve Sauer, Scott Golden

Mountain West Huey flying mulching from staging area to treatment areas 2012

Mountain West Kmax Helicopter Seeding Ingram Gulch 2012

Contents

Summary

This report covers the Fourmile Canyon fire rehabilitation efforts conducted by the Boulder County Parks and Open Space Department. These include administrative oversight of grant funds and management of the following aspects of the restoration project.
The aerial seeding and mulching of four areas that had not recovered substantially and still posed a threat to values downstream. Continued mechanical and chemical control of weeds listed on the Colorado Department of Agriculture Noxious weeds list "A and B" designated species. The removal and clearing of substantial debris that accumulated in the Fourmile Canyon Creek on the Anne U. White Open Space property downstream of the fire area was completed.

Prior to the implementation of the 2012 project, a risk assessment and analysis was completed by Boulder County, USDI Bureau of Land Management (BLM) and Wright Water Engineers.

Funding for the project was provided by the BLM, the Boulder County Commissioners (BOCC), Boulder County Parks and Open Space, and the Boulder County Transportation Department. BCPOS received funding from the Boulder County Commissioners and BLM for the weed control portion of the project. BOCC provided funds for the debris removal at the Anne U White property.
Mountain West Helicopters was awarded the Contract as the general contractor for the aerial operations. Granite Seed was awarded the contract for supplying the seed needed for the project. Boulder County Parks and Open Space staff completed the weed control applications. Anders Environmental completed the debris removal from the Fourmile Canyon Creek at the Anne U White property.

All of the rehabilitation projects were successfully completed.

Introduction

While the Fourmile Canyon Fire was still burning the Fourmile Emergency Stabilization Team was organized. The team recommended seeding 467 acres along roadsides and mulching approximately 1960 acres within the Fourmile Canyon Fire area on hillsides that were determined to be moderate and severely burned, had slopes of 20 to 60 percent and had values at greatest risk downslope. The terrain and ownership of the selected treatment areas limited the hillside stabilization methods and it was decided that aerial mulching would be the most feasible method.

The successfully implemented 2011 rehabilitation included seeding of 422 acres and mulching 1960 acres. Despite these efforts there were still areas of concern and areas that had erosion and sediment flow events after the rehabilitation measures were implemented. These events prompted Boulder County Transportation to have an assessment completed by Wright Water Engineers. After reviewing the assessment completed by Wright Water Engineers, the USDI Bureau of Land Management (BLM), and Boulder County Parks and Open Space (BCPOS) Plant Ecologists completed some field verification and decided to treat four areas inside the Fourmile Fire burn area.

Funding for the project was provided by the BLM, the Boulder County Commissioners (BOCC), Boulder County Parks and Open Space, and the Boulder County Transportation Department.

The project was begun on March 15, with a pre-construction meeting with Western States Reclamation. Straw delivery began on March 20, and the wood shreds were approved on March 21. Aerial operations began on April 9 and were completed by April 21, and the reclamation of the staging area was completed by April 26, 2012.

Planning and Interagency Cooperation

The Grant agreement between the Bureau of Land Management (BLM) and Boulder County from 2011 was amended for the 2012 project year. The Grant Agreement between Boulder County, and the BLM allowed for the cooperative completion of the following responsibilities:

1) Boulder County
   - Coordinate the overall implementation of the emergency stabilization measures, including:
     - Aerial mulching
     - Seed purchase and seed testing to BLM standards
     - Aerial Seeding
   - Coordinate weed control measures
     - Hire and supervise temporary staff
     - Purchase and apply all herbicide
   - Coordinate debris removal on Anne U. White Open Space
     - Hire and supervise Contractor
   - Act as financial administrator
   - Provide public outreach to homeowners
   - Public transportation routes: surveillance and improve public safety

2) BLM
   - Assist in the development of final treatment units
   - Assist in contracts oversight and contract inspection
   - Ensure compliance with the National Environmental Policy Act (NEPA)

Aerial Operations Contracting Process

BCPOS staff members Claire Deleo, Jennifer Kesler and Catherine Trujillo assisted by John Smeins of the BLM, created the Request for Proposals (RFP) to hire a firm capable of meeting the RFP specifications associated with helicopter seeding and mulching of 364 acres on the designated 2012 project areas.

On January 20, 2012 the RFP for the helicopter application of seed and mulch was released to Rocky Mountain Bid Net. On January 31, 2012 we conducted a mandatory pre-bid meeting and twelve contractors attended the meeting. Five Contractors submitted proposals for the helicopter seeding and mulching project.

The wood shreds were included in the Aerial Operations RFP as a stand- alone bid item or to be included as bid item in the complete aerial operations bid. The BCPOS Ecologist visited two wood shred operations to evaluate the quality of the wood shreds that were offered in the proposals by the two most likely contractors. After the team assessed the

wood shreds and compared the revised pricing of the Wood Shreds submitted by the alternative contractor, BCPOS decided to select Mountain West Helicopters to complete the aerial operations. The Contract with Mountain West Helicopters was signed by the County Commissioners on March 13, 2012. Mountain West Helicopters subcontracted two firms, Western States Reclamation and West Range Reclamation. Western States completed the ground support operations and reclamation of the staging area. West Range Reclamation supplied the wood shreds from their local Allen's Park Forest Stewardship Project.

On January 27, 2012 a second RFP was released to vendors who could supply seed for the aerial operations. The vendors who bid on the seed RFP were also required to attend the mandatory pre-bid meeting held on January 31, 2012. Five Contractors submitted proposals for the seed mix. Granite Seed was selected for the seed contract based on the cost and quality of the seed.

Environmental Clearances

Property Owner Permissions

The County Fourmile Fire Coordination team was able to obtain additional permission waivers that were necessary for the 2012 project areas.

2012 Aerial Treatments and Specifications

In 2012 a total of 364 acres were selected for aerial seeding and mulching treatment because of poor recovery and the threats the areas still posed downslope. The treatment areas were selected using information from the debris-flow events, field verification and GIS analysis. The actual acreages were calculated using GIS hill slope analysis and included a percentage error to account for smaller scale topography. Of the 364 acres that were treated in 2012, approximately 145 acres were treated with only agricultural straw in 2011. The areas that received retreatment in 2012 were Fourmile Canyon Creek, Black Hawk Gulch, Ingram Gulch, and Melvina. The 2012 treatment by watershed was Fourmile Canyon Creek 25 acres, Black Hawk Gulch 34 acres, Ingram Gulch 249 acres, and Melvina Basin 14, 56 acres treated. All 364 acres of the 2012 project had seed aerially applied at a rate of 48 pounds of Pure Live Seed per acre.

Project Management and Aerial Operations Specifications

The contractor was required to complete the aerial operations by April 27, 2012 and have all the staging area reclamation completed by May 4, 2012.
Operational hours were from sunrise to sunset with no operations on holidays.
The general contractor was required to obtain all FAA permits.
The staging area was to be agreed upon and approved by Boulder County Project Managers, Boulder County Land Use and Boulder County Risk Management. This staging area was to be reclaimed to the satisfaction of the private land owner and Boulder County.
The aerial treatment specification also included some general guidelines that have become a standard for this practice, they are as follows:

1) The mulch must be evenly distributed over the designated treatment units.
2) Use of an industry standard mesh net with holes no greater than 2 to 4-inches in diameter.
3) Avoid treating areas within the units that are rock face or rock slopes incapable of vegetative cover.
4) Avoid treating areas that did not burn and areas of extensive regeneration.
5) Avoid drifting of mulch onto houses and other structures, and primary roads.

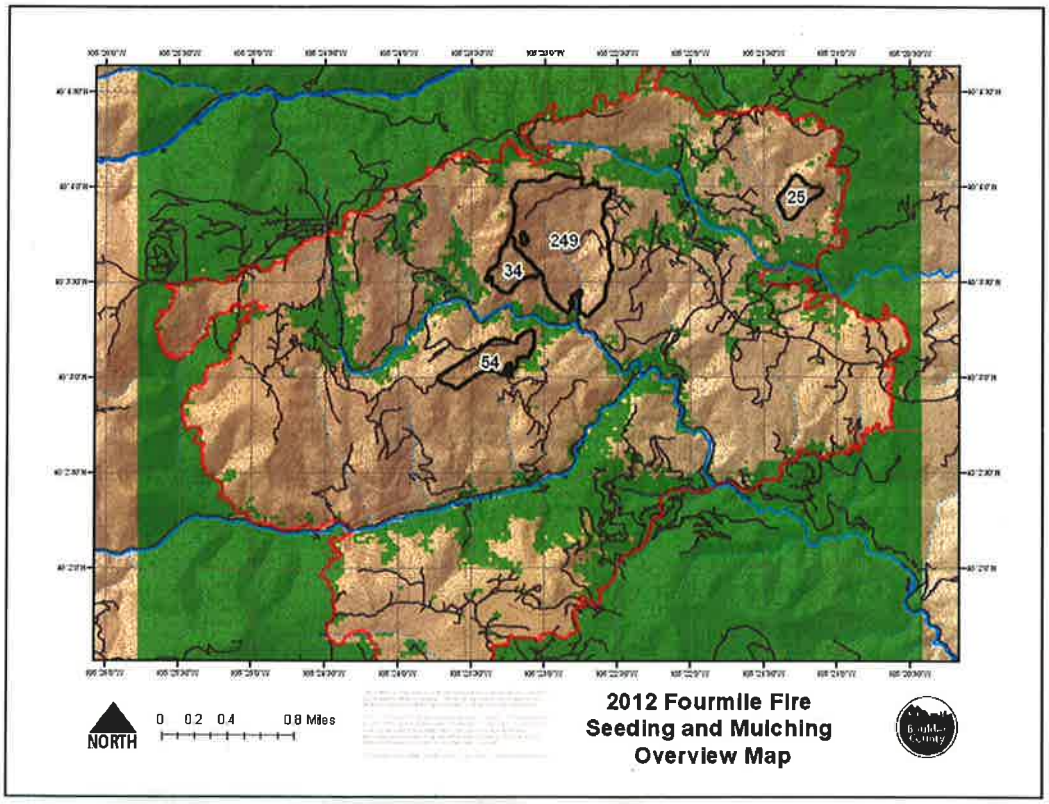


Figure 1: 2012 Aerial treatment map

Seed Specifications

Boulder County and BLM agreed to species in the seed mix and specifications for the 2012 seed mix. The seed mix was composed of two reclamation species (*Triticale aestivum x Secale cereale*) and Slender wheat (*Elymus trachycaulus*). The project required 17, 430 pure live seed pounds of seed to cover the 364 acres. The supplier was required to comply with Colorado Seed Certification Standards and Colorado seed laws. Only certified seed was accepted and Cheatgrass was prohibited from the mix. Both cheatgrass (Bromus tectorum) and Japanese brome (*Bromus japonicas*) were prohibited. The Triticale was required to be free of Cereal Rye (*Secale cereale*). The selected vender was also required to provide the seed certification papers to the County.

Seed Testing

Samples were required to be drawn from each lot of seed delivered in accordance with the methods prescribed in the Journal of Seed Technology, Rules for Testing Seeds, Association of Official Seed Analysts (AOSA). http://www.aosaseed.com
The furnished seed was tested for Pure Live Seed (PLS), purity (including noxious weed seed, weed seed, other crop seed, and inert matter), and germination (TZ). All percent germination will be determined by a TZ test. These results were submitted to Claire DeLeo for evaluation and acceptance of the seed mix.

Seed Packaging and Delivery

The seed was delivered in 1200 to 1500 pound totes (bags), sealed containers, with the dealer's tags. As required in the specifications the seed tags complied with state and federal regulations and the Association of Official Seed Analysis (AOSA).

Table 1: Seed Mix

Common Name *Species* Variety	**Approx. Seeds/#**	**% of Mix**	**Minimum PLS**	**PLS#/Acre**
Triticale *Triticum aestivum x Secale cereale* "Spring" Variety	13,000	30	0.81	40.2
Slender Wheatgrass *Elymus trachycaulus* Pryor, Revenue, or San Luis	159,000	70	0.80	7.7
Totals		**100**		**48**

Mulch Specifications

To meet the erosion mitigation requirements of 60 % cover and 1-3 inch depth on the ground surface it was determined that a ratio of 1/3 agricultural straw to 2/3 wood shreds was necessary. The mix of agricultural straw and wood shred came to 4.5 tons per acre. The agricultural straw was Colorado certified weed-free and was applied at a rate of 0.5 tons per acre. The prescribed wood shred application rate was 4 tons per acre.

The wood shreds specifications required the material be pine, spruce or fir trees. Urban tree removal was restricted because of possible contamination of seed from undesirable non-native tree species. The selected wood shreds were produced from the unmarketable tops of the trees from a Forest Service Stewardship Project in Allen's Park. The wood shreds were processed with a horizontal grinder that used 4 inch screens. The wood shred size specifications were for two dominant sizes with an even mix of small strands (2-3 inches in length and large strands up to 8 inches in length. The diameter of the strands could range from of 1/8 inch to ¼ inch for shorter shreds to 1 inch in diameter for longer shreds. Finer materials (less than about 1 inch) was allowed, but at a much lower percentage compared to

the two dominant sizes. The wood shreds specifications required shreds that were free from dirt and rocks.

The County project managers visited the Forest Concepts Stewardship Project site and inspected the production of the wood shreds. Several combinations of screens from 2 inch combined with 4 and 6 inch screens were tested. The best product came from using only the 4 inch screens. The raw tree material did include some limbs with pine needles still attached.

Figure 2: Raw material for wood shred production from USFS Forest Stewardship Project.

Figure 3: Peterson horizontal grinder

Figure 4: Final approved wood shreds (Claire DeLeo in photo).

Figure 5: Wood shreds and agricultural straw mixed on staging area.

Results

Aerial Treatments

On March 15, we began the project with a pre-construction meeting with Mountain West Helicopters subcontractor's Western States Reclamation and West Range Reclamation. Starting on March 20, straw delivery began at the staging area on Sunshine Road. Also, on March 21, Claire DeLeo evaluated the wood shred production and finalized the size of the shreds and quantity of fines being produced West Range Reclamation. Aerial operations

began on April 9, 2012 and were completed by April 21, 2012. The reclamation of the staging area was completed by April 26, 2012.

Mountain West Helicopters applied 17,472 pounds of seed, and 1,456 tons of wood shreds mixed with 182 tons of Colorado certified weed free straw. The aerial operations were begun on April 9, 2012 and completed by April 20, 2012.

Table 2: Fourmile Fire 2012 Aerial Operations

Basin Name	Acres	Bulk Seed Lbs	Mulch Tons
Basin 0 Fourmile Canyon Creek	25	1,237	112.5
Basin 5 Black Hawk Gulch	34	1,683	153.0
Basin 7 Ingram Gulch	249	12,322	1,120.5
Basin 14 Melvina Basin	56	2,771	252.0
Totals	**364**	**18,013**	**1,638.0**

Fourmile Canyon Creek (Basin 0)

We treated 25 acres in 2012, all of this area was treated in 2011, but large areas of this unit were very open and a wind event blew much of the agricultural straw off the unit. This area contributed to one of the significant flow events on July 7, 2011. Despite all the erosion control measures applied this watershed did have a flow event in 2012 on July 30, 2012.

Black Hawk Gulch (Basin 5)

On July 13, 2011 a flooding and flow event occurred in this area. Portions of this area were treated with agricultural straw in 2011, but much of it blew off shortly after application. The wood shred mix was applied to 34 acres of Black Hawk Gulch in 2012.

Ingram Gulch (Basin 7)

The Ingram drainage basin was the largest of the 2012 treatment areas, with 249 acres treated in 2012. This drainage had treatment in 2011 of agricultural straw in the upper 30 acres and Wood Straw (Forest Concepts) treatment in the rest of the 208 acres. This drainage was also the drainage that received check dams and catchment ponds at the base of the hill.

Figure 6: Ingram Gulch post treatment 2012

Figure 7: Ingram Gulch post treatment spring 2012

Melvina (Basin 14)

The 2011 treatment was not centered over this 2012 unit that drains to the northeast but focused more on the Melvina Gulch watershed that flows to the south towards Fourmile Canyon Drive. This area that is within the 2012 treatment area was treated with agricultural straw in 2011 and had a significant wind event that pushed the straw off much of the area. The 2012 treatment of 56 acres including seed and wood shreds applied in the drainage that drains towards Gold Hill Road.

Aerial Operations Project Costs

In comparing the cost of the 2012 project to the 2011 project cost and correcting for the lower application rates the cost per acre of the 2012 aerial mulching project was substantial lower than the 2011 project. This can be attributed to using wood shreds from a local Forestry Stewardship Project. The transportation costs were considerably lower and the cost of the product itself was much lower than the 2011 product.

Table 3: Wood shred project costs at an application of 4 tons per acre. Aerial straw mulching was removed from these costs.

Wood Shred item	Per Acre	Total
Wood Shreds Only, Delivered	$ 408	$ 148,519
Wood Shreds - Aerial Application only	$ 885	$ 322,184
Wood Shreds and Aerial Application	$ 1,293	$ 470,703

Table 4: Seed Costs

Seed Cost per Acre	*Being determined*	
Seed Application Cost		
Total Seeding Cost		

County Treatment Inspections

The two County inspectors were on the ground inside the treatment polygons during both the seeding and mulching aerial operations.

The seed application inspections included visual observation and walking of the polygon to determine complete coverage of the polygon. We also tried using pizza boxes treated with spray on glue to catch the seeds for a count of seeds per square foot hitting the surface. The seeding inspections included estimations of percentage of ground covered, number of seeds per square foot, and drift of seed outside the treatment units. The pizza box method was unsuccessful because the glue was not sticky enough and the seeds bounced out of the boxes.

The mulch application inspections included the percentage of ground covered by mulch, depth of mulch, proportional coverage by the wood shreds and agricultural straw and any clumping of the agricultural straw. There was minimal clumping of either mulch product. Despite consistent mixing of the agricultural straw and the wood shreds on the ground prior to loading the nets, we found that in some areas the two mulch types separated while falling to the ground.

Figure 8: 2012 Applied mixed mulch

2012 Treatment Monitoring

Monitoring Method

Monitoring of the applied mulch was completed by randomly locating transects with a random bearing inside the treatment polygons. Monitoring of ten transects in both Ingram Gulch and Melvina Basin (Hoosier Hill) was completed by staff. The monitoring of the transects was completed by the observer taking ten paces and placing the monitoring grid (figure # 10) on the ground surface at approximately every 30 feet.

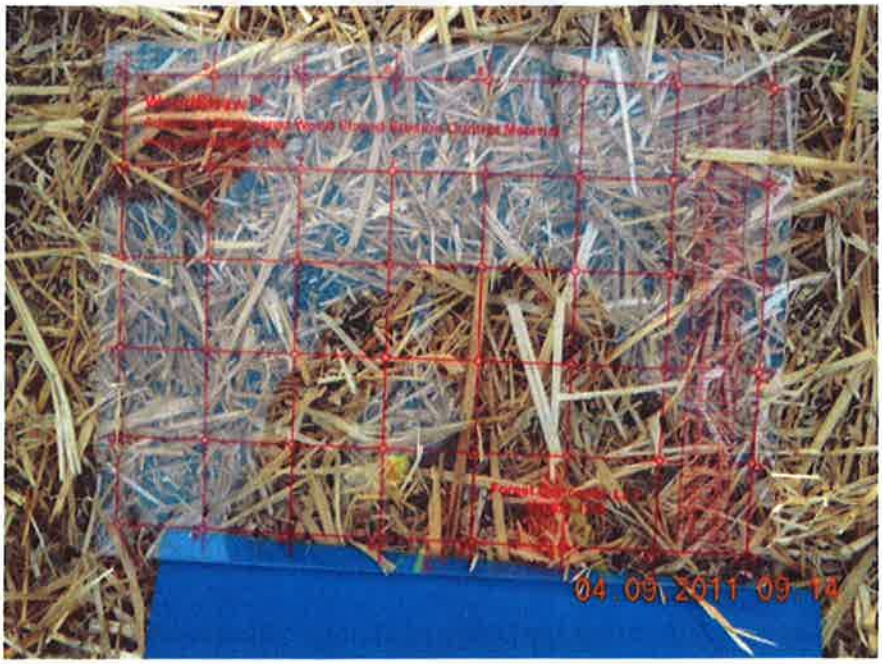


Figure 9: Treatment inspection transect monitoring grid

The number of intersections on the grid that intercepted mulch was counted and the designated percentage was recorded. The percentages for the ten plots for each transect were then averaged and then the ten averages for each plot were averaged for all ten transects.

2012 Application Monitoring Results

The total average percent cover of all the transects from the Ingram Gulch data was 69 percent cover. The same procedure was completed for ten transects at Melvina Basin. The Melvina transect monitoring data results were similar to Ingram with an averaged result of 70 percent cover of mulch.

2012 Treatment Monitoring Discussion

The averages calculated from the monitoring data indicate that the percent cover of mulch met the specifications. Despite the data results it was evident both during the aerial application and during the on the ground monitoring that the mulch products were separating. The project managers observed that this separation resulted in a broader dispersal of the agricultural straw compared to the dispersal area of the wood shreds. These percent cover values could be substantially represented by the cover of the agricultural straw. The effective cover of wood shreds compared to agricultural straw was not differentiated in these transects. These observations lead the project managers to think that a more consistent application in both area and depth of each type of mulch would be more effective in meeting the desired erosion protections.

No monitoring has been completed on the 2012 mulching areas since the application inspections.

Table 5: Summary of treatment inspection monitoring

Treatment Area	Total averaged plot hits on transects 1-10	Total averaged percent cover transects 1-10
Ingram Gulch	33.06	69
Melvina Basin (Hoosier Hill)	33.42	70

2012 Aerial Mulching and Seeding Lessons Learned

A. Seeding

1. The seed traps were not sticky enough and many of the seeds bounced out of the monitoring boxes.
2. Seeding was very fast compared to the mulching. The specification to mulch within a specified time period of mulching was not met by Mountain West Helicopters.

Recommend splitting up larger areas into smaller units to portion out the seeding and mulching smaller sections at one time.

3. More inspectors are needed on the ground when the treatment polygons are close to the staging area.
4. The 2200 pound tote bags are the most efficient for loading into Isolair type aerial seeders.

B. Mulching

1. Wood shred weight varies because of differing moisture contents. Therefore, the treatment should not be based on wood shred weight; rather it should be based on the percent cover desired. The contractor can base percent cover on cubic yards, but the contract should be enforced on percent cover.
2. If you must base the material on tons/acre each truck should be weighed and percent moisture content estimated. It is advisable to add a measure of error to make up for the potential weight variability.
3. The loading of this type of material into trucks is often based on the cubic yard capacity of the loader and the truck. We would advise future project managers to track the amount of delivered material by cubic yards. This then can be converted to the expected quantity of material needed to meet the expected cover specifications.
4. Do not mix straw and wood shreds. If possible lay down agricultural straw then overlay with wood shreds, or just mulch with wood shreds.
5. The quality of the wood shreds was not consistent because of the inclusion of a high percentage of fines, namely smaller than desired shreds and pine needles. Suggest removal of pine needles by removing the limbs from the tops of the trees and then shredding the remaining wood. The Waldo Canyon Fire developed methods to measure for the specified amount of fines. In the future, specify the percentage of fines acceptable and test every truck load for compliance.
6. Agriculture mulch: The straw mulch was too fine and the pieces were too small to provide the desired erosion protections. Specify mulch harvested by a conventional combine rather than a rotary combine. Conventional combines will cut longer lengths, and rotary combines will chop straw into smaller pieces. The specifications on straw lengths and percentage of fines can be refined.
7. More inspectors are needed on the ground when the treatment polygons are close to the staging area.
8. Mountain West Helicopters needs to provide a higher level of leadership over the subcontractors in the beginning of the project when materials are being inspected and delivered. Western States Reclamation did an excellent job in preparing the site and coordinating the delivery of the materials. West Range Reclamation could improve the product production and delivery coordination.

2012 Fourmile Fire Rehab Monitoring of 2011 Treatments

Three transects were studied in 2011 (the first growing season following spring treatment) and five more were added in 2012 (more than a full year following 2011 treatments). Transects were located in each of the three rehabilitation types—Seed Only, Seed + Mulch,

and Mulch Only. Staff collected data from four Daubenmire plots along each transect to gather ocular estimates of vegetative cover. This method was chosen as a rapid and simple method of estimating vegetative cover to monitor the effectiveness of rehabilitation treatments.

Staff's initial observations were as follows:

- Seeded species [oats (*Avena sativa*), bottlebrush squirreltail grass (*Elymus elymoides*), slender wheatgrass (*Elymus trachycaulus*), and Sandberg's bluegrass (*Poa secunda*)] had more cover in the combined seed + mulch treatment compared to seed only.
- Native vegetation cover was highest in seed only treatments.
- Bare soil decreased and litter increased from 2011 to 2012.
- Native forb cover was higher in 2012 compared to 2011, and native graminoid (grass-like) cover was lower in 2012.
- Seeded species responded as follows:
    - Oats had more cover in 2011, and was rarely found in 2012.
    - Bottlebrush squirreltail grass and slender wheatgrass were present in both years, but had a greater percent cover in 2012.
    - Sandberg's bluegrass was not found in plots in 2011, rarely found in plots in 2012. Percent cover was <1% when present.

More results will be made available by staff in the forthcoming *Fourmile Seeding Monitoring Report, Preliminary Results, 2011 and 2012.* Staff plans to continue monitoring in 2013 and at longer return intervals in the future.

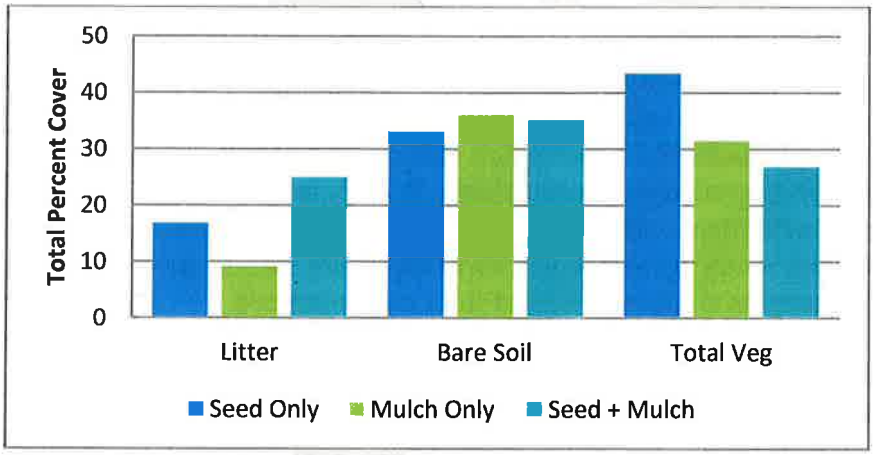


Figure 10: Total cover by treatment, 2012

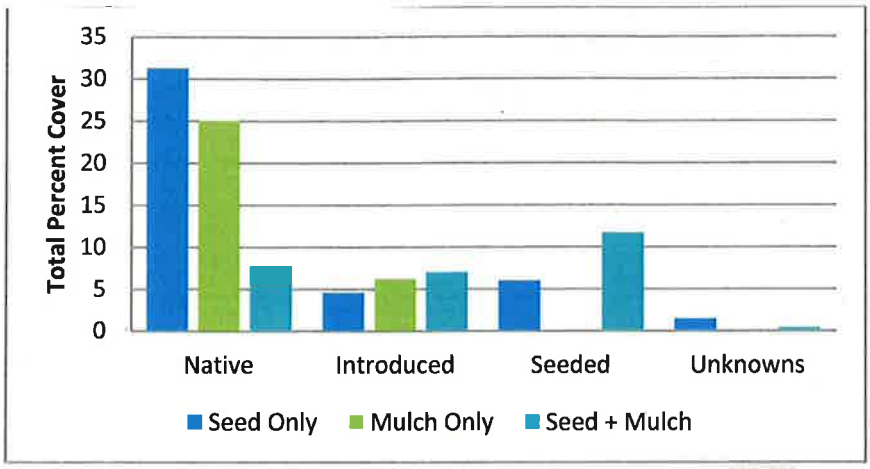


Figure 11: Vegetative cover by treatment, 2012

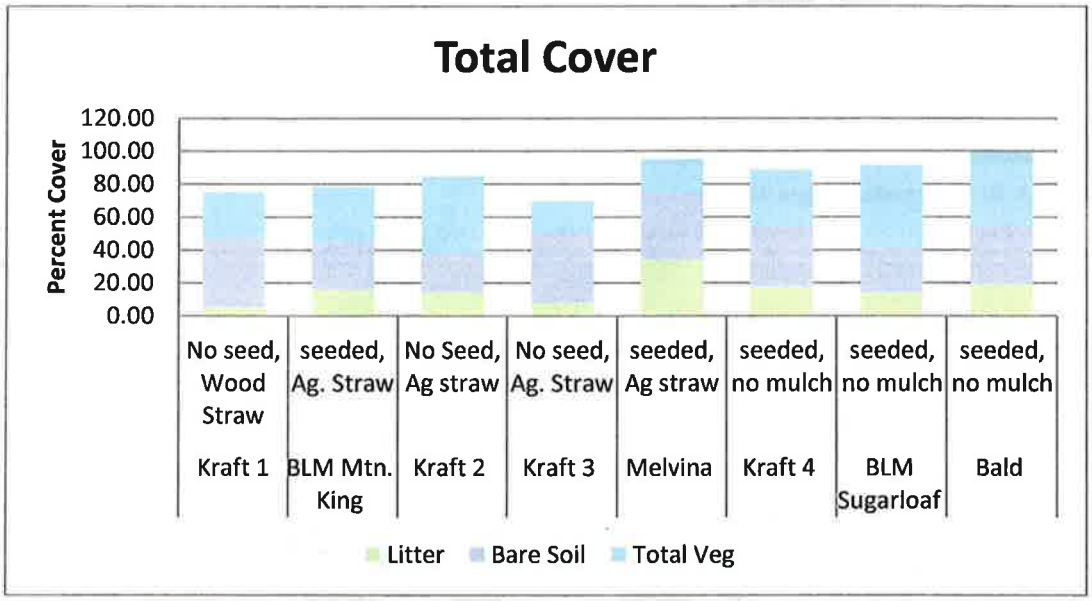


Figure 12: Total cover at all sites.

Figure 13: BLM Sugarloaf origin 2011.

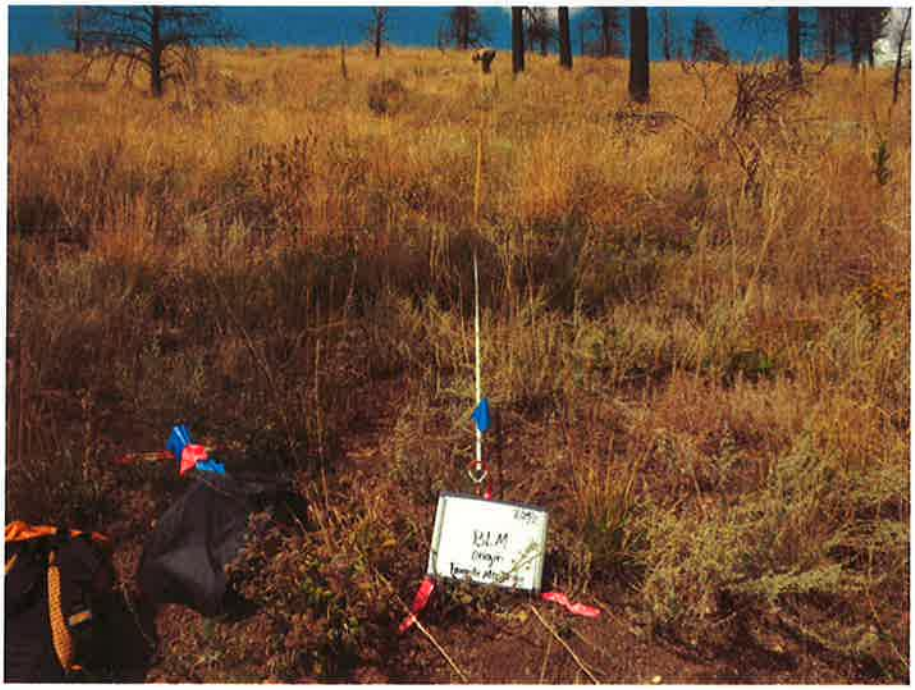


Figure 14: BLM Sugarloaf origin 2012.

Weed Control

During the summer of 2012 over 800 man hours were spent controlling weeds in the Four Mile Burn area. Approximately 620 acres were surveyed, inventoried and treated. These treatment methods included both herbicide applications and mechanical control. Eleven different weeds species were identified and of one of these was a Colorado List A weed Myrtle spurge (*Euphorbia myrsinites*).

Fourmile Canyon Creek Anne U White Debris Removal

Anders Environmental was contracted to remove all debris greater than two inches in diameter from the 10- year flood plain of Fourmile Canyon Creek on the Anne U. White Open Space Property. This debris was secured above the 10- year flood plain. Anders Environmental completed this project in five days at a total cost of $ 8,580.00.

2012 Debris Flow Events

(To be summarized)

Conclusion

The effectiveness of the aerial treatments in reducing the threat of debris flows is *(to be added).* Vegetative response monitoring inside the treatment polygons will be completed by Boulder County Parks and Open Space staff in the summer of 2013. Boulder County will continue to monitor and treat weeds under the County weed management program.

Appendix A: 2012 Polygon Treatment Inspection Monitoring Data

Table 1: Ingram Gulch Plot Cover Data

Transect #	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5	Plot 6	Plot 7	Plot 8	Plot 9	plot 10	Average	% Cover
Ingram 1	46	42	45	47	35	36	24	13	10	19	31.7	66
Ingram 2	44	45	47	44	48	47	24 Castle rock				42.7	89
Ingram 3	40	46	44	39	46	48	30	35	25	32	38.5	80
Ingram4	34	45	47	35	43	37	33	12	36	7	32.9	69
Ingram 5	12	10	2	12	8	10	20	39	48	40	20.1	42
Ingram 6	29	34	43	44	43	40	42	35	8	16	33.4	70
Ingram 7	17	22	39	33	39	42	45	39	46	39	36.1	75
Ingram 8	10	44	45	15	16	15	15	44	21	23	26.0	54
Ingram 9	46	12	41	36	35	15	42	38	45	36	34.6	72
Ingram 10	37	40	30	48	41	41	38	23	42	6	34.6	72
Average												**69**

Table 2: Ingram Gulch Transect Vegetation Cover Averages

Transect Number	Average of hits in Plots 1-10	Percent Cover
Ingram 1	31.7	66
Ingram 2	42.7	89
Ingram 3	38.5	80
Ingram 4	32.9	69
Ingram 5	20.1	42
Ingram 6	33.4	70
Ingram 7	36.1	75
Ingram 8	26.0	54
Ingram 9	34.6	72
Ingram 10	34.6	72
Total Averages	**33.06**	**69**

Table 3: Melvina Basin (Hoosier Hill) Plot Vegetation Cover Data

Transect #	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5	Plot 6	Plot 7	Plot 8	Plot 9	plot 10	Average	% Cover
Hoosier 1	38	28	38	40	20	2	3	4	46	36	25.5	53
Hoosier 2	43	42	28	5	20	15	14	22	11	44	24.4	51
Hoosier 3	35	10	15	18	44	46	41	33	43	34	31.9	66
Hoosier 4	38	25	45	41	43	41	42	44	33	44	39.6	83
Hoosier 5	36	45	38	41	43	28	36	17	26	23	33.3	69
Hoosier 6	43	43	41	17	48	46	39	42	41	46	40.6	85
Hoosier 7	33	45	36	10	30	46	42	39	38	42	36.1	75
Hoosier 8	48	46	48	40	43	47	41	32	39	23	40.7	85
Hoosier 9	21	47	41	48	43	15	28	12	5	20	28.0	58
Hoosier 10	32	25	5	20	42	47	38	42	46	44	34.1	71
Average												**70**

Table 4: Melvina Basin (Hoosier Hill) Transect Vegetation Cover Averages data

Transect Number	Average of hits in plots 1-10	Percent Cover
Hoosier 1	25.5	53
Hoosier 2	24.4	51
Hoosier 3	31.9	66
Hoosier 4	39.6	83
Hoosier 5	33.3	69
Hoosier 6	40.6	85
Hoosier 7	36.1	75
Hoosier 8	40.7	85
Hoosier 9	28.0	58
Hoosier 10	34.1	71
Total Averages	**33.42**	**70**

ATTACHMENT C

- Fourmile Fire Treatment Implementation & Evaluation Report dated January 2013

Fourmile Fire
Treatment Implementation & Evaluation Report
Boulder, Colorado

Prepared for:

Boulder County
Garry Sanfacon
Fourmile Fire Recovery Manager

Prepared by:

ANDERS
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Anders Env. Project Number: BldrCounty12
January 2013

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1 INTRODUCTION

1.1 Purpose and Scope

The following report details the remedial activities conducted by Anders Environmental on behalf of Boulder County, as a result of the Fourmile Fire. Basin condition, remediation techniques, mitigation, and results of the treatments will be discussed in detail. Anders Environmental was contracted to implement the mitigation measures outlined in the Wright Water Engineers (WWE) *Fourmile Canyon Debris Flow and Review and Mitigation Analysis, December 2011* report.

1.2 Remedial Objectives

- To reduce the sedimentation rates in the basins
- To minimize impacts to the local infrastructure during flood events
- Allow for vegetative re-growth in scoured channels

2 SITE CHARACTERIZATION

2.1 Initial Characterization

WWE completed the initial watershed delineation and characterization. The results of their findings can be found in the *Fourmile Canyon Debris Flow and Review and Mitigation Analysis* report, and it's associated technical memorandum, dated December 2011.

Anders Environmental began implementing the mitigation measures in May 2012, and completed the work in August of 2012.

3 MITAGATION MEASURES

3.1 Ingram Gulch

3.1.1 Check Structures

A total of fifty-three (53) check structures were placed in Ingram Gulch as specified by the WWE *Fourmile Canyon Debris Flow and Review and Mitigation Analysis, December 2011* report. Check structures were placed in the general locations outlined by the 2012 Proposed Watershed Protection & Noxious Weed Treatments map (See Figure 2). GPS coordinates for the exact locations of each check structure can be found in Table 1. Check structures were constructed in areas that provided the greatest sediment capture rates, and where suitable anchor points for the horizontal beam could be found (See Appendix A for pictures).

3.1.2 Check Structure Performance / Evaluation

In general, the check structures located in Ingram Gulch preformed as intended during the monsoon season. Upper basin check structures remained in place and captured sediment during precipitation events. Water velocity was decreased incrementally, allowing for greater sedimentation rates along the upper portion of the watershed.

The lower check structures in the basin functioned in the same manner, but were breached much more often during the large rainfall events that the area experienced during the monsoon rains in July. Structural failure of the check structures generally occurred in the upper horizontal crossbeam due to overloading during large precipitation events. Some failures were a result of high velocity flood events sweeping or floating the vertical poles and lower horizontal logs.

To mitigate the upper crossbeam failures, living trees should be utilized when available as opposed to the fallen timber outlined in *Table 1, Section 3.2, Technical Memorandum 5*, of the *WWE December 2011* report. The increased flexibility and structural integrity of living trees will enhance the durability of most check structures.

Decreasing the failure rate of check structures due to high velocity water can be mitigated by increasing the number of structures in the lower reaches of the basin. This is evident by the high survival rate of the lower Monument Hill structures.

3.1.3 Debris Rack Retrofitting

The two existing debris racks located at the base of Ingram Gulch were retrofitted with 2 inch square tubing for use as vertical bars to decrease the debris size captured by the racks. Vertical bars were welded to the existing structure and spaced 12 inches apart on the upstream side of each debris rack.

3.1.4 Debris Rack Retrofitting Performance / Evaluation

Approximately 90% of the vertical bars remained intact after the large precipitation events and subsequent debris clearing after the storms. It is assumed that the dislodged bars were caused by the twelve to twenty four inch boulders or the heavy equipment used to clear debris from behind the rack. The debris racks are very effective at stopping large items from impacting the county road. However, they are not entirely effective at containing fine-grained sediment.

Suggested Improvements:

- Vertical bars should be included in the initial design of future debris racks so that the ends can be properly buried, which will provide increased stability.
- To capture more sediment, jute matting or a similar material should be added to the upstream side of the debris racks.

3.1.5 Sediment Detention Ponds

Two large sediment detention ponds were constructed in Ingram Gulch on Mr. Vermillion's property. The upper pond is located approximately 1,500 feet west of the former building pad. The lower pond is located 200 feet south of the large mine adit below the former building pad. The upper pond is located along the path of the historical streambed. The lower pond is inline with the streambed that Mr. Vermillion rerouted.

Upper Pond Construction (See Appendix A for pictures):

- Approximately 2,500 cubic yards of sand, soil, gravel and rocks were excavated from the area, to a total depth of 11-13 feet at the western end of the pond, tapering to 3-4 feet at the terminus on the eastern end of the pond.
- Excavated material was placed at a two and a half foot to one-foot slope at an onsite repository, and compacted with an 80,000 lb. excavator.
- A 6-foot high low flow boulder spillway was constructed on the eastern end of the pond. A tracked hydraulic excavator drove foundation boulders into the earth until refusal. Subsequent boulder layers were seated into each other by strategic positioning and driving them with the excavator bucket. The approximate dimensions of the boulder spill way are; six feet in height, 15 feet in width, and 15 feet thick.
- The sides and bottom of the pond were compacted with the excavator tracks.
- The historical mine road leading the to upper pond was re-graded to eliminate erosion along the ridge.

Lower Pond Construction (See Appendix A for pictures):

- Approximately 600 cubic yards of material was removed from the bottom and sides of the channel to increase sediment detention volume.
- A eight-foot high, thirteen foot wide, and 12 foot thick boulder check dam was constructed at the southern end of the pond.
- The bottom and sides of the new channel were compacted with a front-end loader and excavator bucket.
- Excavated material was utilized onsite to build up Mr. Vermillion's new building pads.

3.1.6 Sediment Detention Ponds Performance / Evaluation

Both detention ponds performed as intended during the monsoon season. As of September 28th, 2012 the upper pond had captured approximately 40-50% of its maximum volume. The lower pond had captured approximately 70-80% of its maximum volume. The upper pond served as a velocity trap for the incoming floodwaters, as evident by no new visible erosion directly below the pond. The lower pond effectively prevented sediment from reaching the county road, as well as serving as a velocity trap for the floodwaters.

Operations and Maintenance (O&M) will be needed on both ponds to ensure their viability for the 2013 monsoon season. Excavation of captured sediments will increase the effectiveness of both structures. Some erosion has occurred around the spillway in the upper pond, this should be filled in to prevent any further decay of the structure. Anders Environmental recommends semi-annual inspections to stay ahead of any maintenance issues.

Improvements to the channels between the ponds and below the lower pond will enable each mitigation feature to operate more effectively. The current channels are insufficient for the volume of water encountered during anything but the smallest flood events. The channel below the lower pond is of critical importance, during events this system is quickly overwhelmed causing floodwaters to spill into the driveway, increasing the volume of sediment that can potentially be deposited on the county road. Excavation of a wider channel with shallow meanders or installation of berms along the current channel is recommended to alleviate the flooding in this section.

3.2 Sweet Home Gulch

3.2.1 Check Structures

Seventy-five (75) check structures were installed in Sweet Home Gulch over the course of the summer. Forty-seven (47) initial structures were installed in May 2012 and twenty eight (28) were installed in August 2012 after the monsoons. Check structures were placed in the general locations outlined by the 2012 Proposed Watershed Protection & Noxious Weed Treatments map (See Figure 2). GPS coordinates for the exact locations of each check structure can be found in Table 1. Check structures were constructed in areas that provided the greatest sediment capture rates, and where suitable anchor points for the horizontal beam could be found.

3.2.2 Check Structure Performance / Evaluation

The upper basin check structures preformed as intended. However they quickly reached their maximum capacity of sediment during the significant flood events during the monsoon season, rendering them useless for sediment capture during subsequent events.

The lower basin check structures preformed poorly during the monsoon flood events. The poor performance was due to:

- Crossbeams being compromised by the weight of the captured sediment.
- Flood water levels in the lower slot canyon rose above structure height, causing destructive eddies downstream of the check structure.
- Velocity of the incoming floodwaters.

To mitigate the upper crossbeam failures, living trees should be utilized when available as opposed to the fallen timber. The increased flexibility and structural integrity of living trees will enhance the durability of the structure.

Decreasing the failure rate of check structures due to high velocity water can be mitigated by increasing the number of structures in the lower reaches of the basin.

3.3 Nancy Mine Gulch

3.3.1 Check Structures

Twenty one (21) check structures were installed in Nancy Mine Gulch. Check structures were placed in the general locations outlined by the 2012 Proposed Watershed Protection & Noxious Weed Treatments map (See Figure 2). GPS coordinates for the exact locations of each check structure can be found in Table 1. Check structures were constructed in areas that provided the greatest sediment capture rates, and where suitable anchor points for the horizontal beam could be found.

3.3.2 Check Structure Performance / Evaluation

Check structures in this basin performed very well during the monsoon season. The majority of the structures are still intact and will remain viable for the 2013 season. The vegetative coverage in this basin from the aerial mulching campaign greatly increased the effectiveness of the check structures. No additional sedimentation controls will be needed in this basin.

3.4 Monument Hill

3.4.1 Check Structures

Twenty-three (23) check structures were installed in the Monument Hill basin. Check structures were placed in the general locations outlined by the 2012 Proposed Watershed Protection & Noxious Weed Treatments map (See Figure 2). GPS coordinates for the exact locations of each check structure can be found in Table 1. Check structures were constructed in areas that provided the greatest sediment capture rates, and where suitable anchor points for the horizontal beam could be found.

3.4.2 Check Structure Performance / Evaluation

Check structures in the Monument Hill basin performed excellent during the 2012 monsoon season. All of the structures are still intact and will remain viable for the 2013 season. The success of these structures can be attributed to:

- Decreased spacing between the lower check structures.
- The gradual slope of the watershed.
- Due to the burn area being at the top of the gulch and a lack of dead trees at the bottom of the gulch, live trees were used for cross beams, increasing the durability of each structure.

No additional sedimentation controls will be needed in this basin.

3.5 4-Mile Canyon Creek East

3.5.1 Check Structures

Twenty-three (23) check structures were installed in 4-mile Canyon Creek East basin. Due to property owner complications fourteen check structures were relocated from 458 Whispering Pines to 382 Whispering Pines. The remaining 14 structures were placed according to the 2012 Proposed Watershed Protection & Noxious Weed Treatments map (See Figure 2).

3.5.2 Check Structure Performance / Evaluation

A through investigation of the lower check structures is needed to ascertain their effectiveness. A brief investigation of the upper check structures found them to be functioning as intended. The catchment size of the upper portion of this basin is significantly less than that of the other basins, which decreases the stress placed on the check structures. The structures in this gulch should remain viable through the 2013 season, beyond that Anders Environmental recommends annual site visits to assess the effects of the mitigation efforts in this basin.

3.5.3 Contour Felling Repair

10.2 acres of contour felling repair was conducted along the Hoffman property in the 4-mile Canyon Creek East basin (See Figure 2). The property owner contracted a third party to clear cut all of the burned timber on his property, resulting in a multitude of log piles, unstable logs and other hazardous debris. Anders Environmental was contracted to ensure that the unstable logs were repurposed to provide sediment control as Log Erosion Barriers (LEBs) Anders Environmental technicians walked the entire property identifying unstable logs, excavating shallow trenches with hand tools, and placing the unstable logs in the trenches. This work transformed the randomly placed loose logs into sediment control barriers

3.5.4 Contour Felling Repair Performance / Evaluation

The contour felling repair operation succeeded in eliminating the deposition of additional hazardous debris in the flood plain as well as capturing sediment behind the newly positioned logs. The contour felling repair in conjunction with the aerial mulching has stabilized this portion of the watershed.

3.5.5 Contour Felling

27.6 acres of contour felling was completed at 458 & 382 Whispering Pines. Anders Environmental installed LEBs in accordance with the methods for contour felling laid out in Chapter 2 of the *USFS BAER Treatments Catalog*. Due to the undulating rocky terrain found in this area, LEBs were concentrated on the eastern portion of this basin due to the steep slopes that had the highest probability of erosion (See Appendix A for pictures).

3.5.6 Contour Felling Repair Performance / Evaluation

A small segment on the eastern side of this area was surveyed after the heavy monsoonal rains in July. The LEBs appeared to be functioning as intended at that time. Due to the small volume of sediment each log can capture the logs in the steep bare areas had already been covered. During a subsequent site visit on September 27th, 2012, Anders Environmental observed increased vegetative cover, which stabilized the slopes on the western side of the treatment area.

The contour felling in this area in conjunction with the aerial mulching has stabilized the slopes in this basin negating the need for additional sediment control. Anders Environmental recommends more site visits to the eastern side of this area to evaluate the vegetative cover and sedimentation rates behind the LEBs.

3.6 Anne White Trail

3.6.1 Check Structures

Five (5) check structures were placed approximately 1 mile above the terminus point of the Anne White Trail. GPS coordinates for the exact locations of each check structure can be found in Table 1. Check structures were constructed in areas that provided the greatest sediment capture rates, and where suitable anchor points for the horizontal beam could be found.

3.6.2 Check Structure Performance / Evaluation

The Anne White check structures preformed poorly during the monsoon flood events. The poor performance was due to the high velocity of the incoming floodwaters. Floodwaters in this basin are unimpeded for approximately one mile prior to coming in contact with the check dams. To mitigate this Anders Environmental recommends the addition of a complete system of check structures extending from the Anne White trail terminus to the 4-Mile Canyon Creek East check structures.

3.6.3 Debris Removal

Anders Environmental removed all debris within the 10- year flood plain greater than two inches in diameter along creek segments selected by Boulder County. The project took approximately 5 days; removed debris was secured above the 10-year flood plain to ensure that minor flood events would not reach the removed material. The majority of the

material removed appeared to be chain saw cut logs that measured one to five feet in length.

3.6.4 Debris Removal Performance / Evaluation

The debris removal efforts were successful in eliminating debris that could cause structural damage to the homes located at the bottom of the gulch. The subsequent flood events only deposited fine grained sediments and vegetation as opposed to the large logs and other objects that were deposited by events that occurred prior to the clean up. Costs for this activity can be found in Table 2.

4 CONCLUSION

The Fourmile Fire Mitigation efforts were successful in protecting the local infrastructure from flood related impacts. The combination of sediment structure installation and aerial mulching helped to stabilize the impacted basins and decrease sediment loading in the lower reaches of each basin.

The most effective treatments were the Sediment Dention Ponds and the Check Structures. Both structures retained the greatest amount of sediment while providing the most stabilization along critical reaches of the watershed.

Table 1: *Check Structure Coordinates*

Check Dam	North*	West*	Comments
1	40° 03.495'	105° 22.735'	
2	40° 03.510'	105° 22.722'	
3	40° 03.517'	105° 22.713'	
4	40° 03.530'	105° 22.707'	
5	40° 03.544'	105° 22.691'	Log type
6	40° 03.551'	105° 22.691'	Log type
7	40° 03.573'	105° 22.665	7-8-9 all in a row at top of gulch
8	40° 03.573'	105° 22.666	7-8-9 all in a row at top of gulch
9	40° 03.573'	105° 22.667	7-8-9 all in a row at top of gulch
10	40° 03.604'	105° 22.813'	
11	40° 03.606'	105° 22.808'	
12	40° 03.645'	105° 22.776'	
13	40° 03.645'	105° 22.776'	
14	40° 03.652'	105° 22.760'	
15	40° 03.671'	105° 22.748'	
16	40° 03.685'	105° 22.742'	
17	40° 03.745'	105° 22.742'	
18	40° 03.692'	105° 22.737'	
19	40° 03.764'	105° 22.699'	
20	40° 03.772'	105° 22.695'	BAER, 8' tall by 15' wide below culvert
21	40° 03.771'	105° 22.681'	
22	40° 03.772'	105° 22.673'	
23	40° 03.773'	105° 22.670'	
24	40° 03.769'	105° 22.718'	
25	40° 03.777'	105° 22.723'	
26	40° 03.790'	105° 22.732'	
27	40° 03.794'	105° 22.730'	
28	40° 03.810'	105° 22.753'	
29	40° 03.835'	105° 22.785'	
30	40° 03.842'	105° 22.797'	
31	40° 03.872'	105° 22.838'	
32	40° 03.881'	105° 22.842'	
33	40° 03.606'	105° 22.820'	
34	40° 03.604'	105° 22.818'	
35	40° 03.617'	105° 22.823'	no sat coverage +/- 58' acc
36	40° 03.629'	105° 22.849'	no sat coverage +/- 46' acc
37	40° 03.637'	105° 22.882'	
38	40° 03.636	105° 22.885'	
39	40° 03.640'	105° 22.900'	
40	40° 03.654'	105° 22.886'	
41	40° 03.670'	105° 22.893'	
43	40° 03.700'	105° 22.911'	
44	40° 03.708'	105° 22.913'	
45	40° 03.706'	105° 22.935'	

46	40° 03.737'	105° 22.938'	
47	40° 03.755'	105° 22.954'	
48	40° 03.768'	105° 22.972'	
49	40° 03.781'	105° 22.988'	
50	40° 03.783'	105° 23.001'	
51	40° 03.785'	105° 23.010'	
52	40° 03.788'	105° 23.023'	
53	40° 03.788'	105° 23.035'	
54	40° 02.535'	105° 23.551'	no sat coverage +/- 45' acc
55	40° 02.550'	105° 23.562'	no sat coverage +/- 42' acc
56	40° 02.559'	105° 23.556'	no sat coverage +/- 38' acc
57	40° 02.579'	105° 23.591'	
58	40° 02.601'	105° 23.605'	
59	40° 02.504'	105° 23.543'	
60	40° 02.518'	105° 23.526'	
61	40° 02.622'	105° 23.602'	
62	40° 02.626'	105° 23.599'	
63	40° 02.634'	105° 23.597'	
64	40° 02.661'	105° 23.611'	
65	40° 02.685'	105° 23.624'	
66	40° 02.707'	105° 23.640'	
67	40° 02.722'	105° 23.654'	
68	40° 02.608'	105° 23.612'	
69	40° 02.609'	105° 23.631'	
70	40° 02.612'	105° 23.641'	
71	40° 02.612'	105° 23.650'	
72	40° 03.232'	105° 23.000'	
73	40° 03.226'	105° 23.003'	
74	40° 03.223'	105° 23.009'	
75	40° 03.271'	105° 23.008'	
76	40° 03.212'	105° 23.009'	
77	40° 03.208'	105° 23.005'	no sat coverage +/- 36' acc
78	40° 03.205'	105° 22.998'	no sat coverage +/- 119' acc
79	40° 03.182'	105° 23.036'	no sat coverage +/- 91' acc
80	40° 03.180'	105° 23.036'	
81	40° 03.176'	105° 23.077'	large area 81 & 82 span entire channel
82	40° 03.176'	105° 23.077'	large area 81 & 82 span entire channel
83	40° 03.150'	105° 23.046'	
84	40° 03.142'	105° 23.052'	
85	40° 03.115'	105° 23.070'	
86	40° 03.099'	105° 23.090'	no sat coverage +/- 40' acc
87	40° 03.088'	105° 23.108'	no sat coverage +/- 38' acc
88	40° 03.079'	105° 23.119'	
89	40° 03.077'	105° 23.137'	
90	40° 03.085'	105° 23.159'	
91	40° 03.094'	105° 23.186'	
92	40° 03.100'	105° 23.201'	

93	40° 03.108'	105° 23.230'	
94	40° 03.110'	105° 23.249'	
95	40.07170°	105.36043°	
96	40.07141°	105.36034°	
97	40.71180°	105.36031°	
98	40.05516°	105.36874°	
99	40.05540°	105.36896°	
100	40.05569°	105.36942°	
101	40.05629°	105.36980°	
102	40.05640°	105.36979°	
103	40.05661°	105.36983°	
104	40.05679°	105.36982°	
105	40.05705°	105.36964°	
106	40.05730°	105.36953°	
107	40.05751°	105.36929°	
108	40.05781°	105.36919°	
109	40.05797°	105.36922°	
110	40.05577°	105.36842°	
111	40.05531°	105.36826°	
112	40.05549°	105.36823°	
113	40.05581°	105.36800°	
114	40.05616°	105.36789°	
115	40.05650°	105.36766°	
116	40.05671°	105.36748°	
117	40.05689°	105.36736°	
118	40.05708°	105.36713°	
119	40.05743°	105.36667°	
120	40.05636°	105.37009°	
121	40.05646°	105.37028°	
122	40.05703°	105.37033°	
123	40.05743°	105.37054°	
124	40.05776°	105.37063°	
125	40.05799°	105.37090°	
126	40.05817°	105.37088°	
127	40.05676°	105.37075°	
128	40.05675°	105.37122°	
129	40.05683°	105.37151°	
130	40.05709°	105.37219°	
131	40.05750°	105.37298°	
132	40.05759°	105.37321°	
133	40.05774°	105.37490°	
134	40.05191°	105.37047°	
135	40.05210°	105.37059°	
136	40.05230°	105.37058°	
137	40.05250°	105.37042°	
138	40.05275°	105.37012°	Poor Sat coverage
139	40.05346°	105.36930°	Poor Sat coverage

140	40.05454°	105.36880°	Poor Sat coverage
141	40.05466°	105.36868°	Poor Sat coverage
142	40.05433°	105.36889°	Poor Sat coverage
143	40.05369°	105.36910°	Poor Sat coverage
144	40.05339°	105.36946°	
145	40.07030°	105.36029°	
146	40.06993°	105.36024°	
147	40.06977°	105.36023°	
148	40.06962°	105.36022°	
149	40.06937°	105.36002°	
150	40.06810°	105.35564°	
151	40.06799°	105.35371°	
152	40.06775°	105.35585°	
153	40.06758°	105.35590°	
154	40.06747°	105.35593°	
155	40.06731°	105.35599°	
156	40.06576°	105.35728°	
157	40.06570°	105.35720°	
158	40.06557°	105.35712°	
159	40.06536°	105.35707°	
160	40.06522°	105.35706°	
161	40.06500°	105.35691°	
162	40.06474°	105.35677°	
163	40.06453°	105.35675°	
164	40.06443°	105.35665°	
Sweet 2			
Check Dam	**North**	**West**	**Comments**
1	40.05087°	105.37051°	48' accuracy
2	40.05195°	105.37045°	71' accuracy
3	40.05211°	105.37052°	
4	40.05218°	105.37059°	
5	40.05242°	105.37059°	
6	40.05249°	105.37041°	
7	40.05269°	105.37035°	
8	40.05278°	105.37025°	
9	40.05312°	105.36985°	
10	40.05318°	105.36983°	
11	40.05373°	105.36968°	
12	40.05354°	105.36945°	
13	40.05360°	105.36919°	
14	40.05355°	105.36918°	
15	40.05355°	105.36918°	10' away from #14 staggered in wide portion
16	40.05393°	105.36891°	
17	40.05454°	105.36880°	
18	40.05469°	105.36873°	
19	40.05471°	105.36865°	

20	40.05471°	105.36865°	15' away from #19 staggered in wide portion
21	40.05492°	105.36864°	
22	40.05502°	105.36859°	
23	40.05511°	105.36874°	
24	40.05520°	105.36883°	
25	40.05525°	105.36882°	
26	40.05544°	105.36893°	
27	40.05544°	105.36893°	5' away from #26 in wide portion of stream
28	40.05308°	105.36991°	
AnneWhite			
Check Dam	**North**	**West**	
1	40.05947°	105.34696°	
2	40.05931°	105.34628°	
3	40.05908°	105.34599°	
4	40.05894°	105.34567°	
5	40.05894°	105.34567°	*10' North of #4

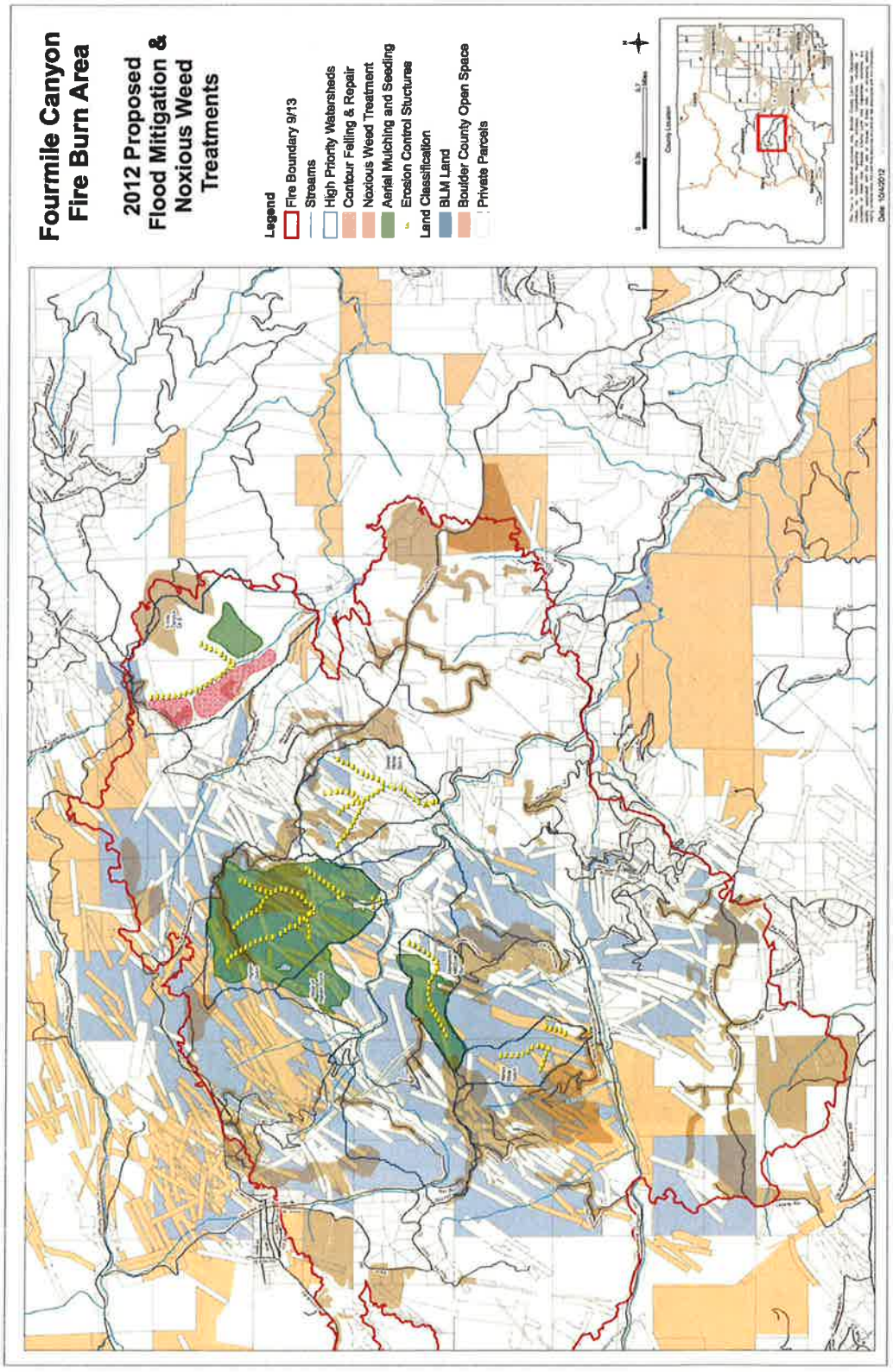
*Position Format hddd.ddddd°
Map Datum WGS 84
Map Spheroid WGS 84

Table 2: *Treatment Unit Costs*

Labor / Material Description	Rate ($)	Units	Total
Check Structure	$257.74 / unit	192	$49,486.08
Contour Felling	$398.55 / acre	27.6	$10,999.98
Contour Felling Repair	$691.18 / acre	10.2	$7,050.03
Debris Rack Retro Fit	$1424.50 / unit	2	$2,849.00
Sedimentation Ponds	Lump Sum	1	$47,208.00
Anne White Debris Clearance	Lump Sum	1	$8,580
Total Cost			**$126,173.09**

Figure 1: Site Location Map

Figure 2: 2012 Proposed Watershed Protection & Noxious Weed Treatments



Appendix A
Photographs

Ingram Gulch

Upper Pond, As Built

Upper Pond, Post Event

Lower Pond, As Built

Lower Pond, Post Event

Ingram Gulch

Upper Pond

Upper Pond, Spillway

Lower Pond, Check Dam

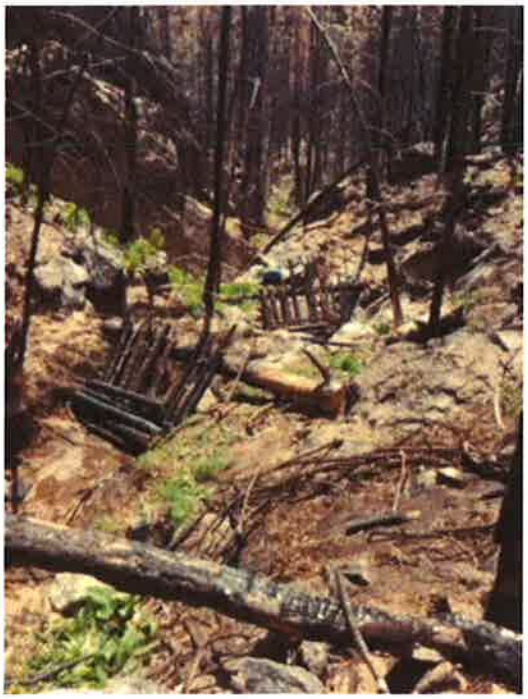
Lower Pond, Culvert Removal

Check Structures

Check Structure, As Built

Check Structure, Post Event

Check Structure, As Built



Check Structures, As Built

Check Structures

Check Structure, As Built

Check Structures, As Built

Check Structures, Post Event

Check Structures, Post Event

Contour Felling

Contour Felling, As Built

Contour Felling, As Built

Contour Felling, As Built

Contour Felling, As Built

ATTACHMENT D

- Photos-Before and After

Project Pictures:

Whispering Pines Project Area Before

Fourmile Canyon Creek east (above Anne U. White Trailhead)

Whispering pines above upper culvert preconstruction

Whispering pines below lower culvert preconstruction

Whispering pines below upper culvert preconstruction

Whispering Pines Project Area After

Whispering pines below lower culvert preconstruction