



**National Park Service
Fire Ecology Annual Report
Southern Utah Parks Group
Calendar Year 2012**



A. Summary

The Southern Utah Parks Group had a safe and productive year in 2012. The field staff consisted of a permanent GS-07 lead fire effects monitor, and three GS-05 seasonal staff members. The crew completed all scheduled FMH plots (29) at Zion NP and Bryce Canyon NP, read 122 aspen monitoring plots in the Pocket Mesa burn unit and the Kolob Creek thinning project, read all 140 plots in the final year of the Kolob Fire cheatgrass treatment project and assisted the Zion module leader with structure assessments at Zion NP and Glen Canyon NRA. Similar to 2011, the crew was able to borrow a field laptop from the Zion GIS lab. This allowed the crew to enter Kolob Fire cheatgrass treatment data while collecting it. A 40 acre prescribed burn, the Zion Grass RX, was completed early spring in the developed area around the campground and visitor services section of Zion Canyon. All fire effects crew members assisted the Zion wildland fire engines with several fires in the local Color Country Interagency Area. Wildland fire activity in the local area was more active during the 2012 season than it has been the previous couple years. Color Country saw record breaking indices in 2012 for the months of May, June and July. Zion National Park was in severity from early June to late July and as a result the fire effects crew shared engine coverage duties with the fire staff.

All field crew members were able to participate in at least one detail and worked on a wide range of wildland fire fighting skills. Elizabeth Dodson worked two Color Country crews and traveled to Montana and Idaho for full detail assignments. Adam Birely worked one Color Country crew and traveled to Montana for a full two week assignment. Andrea Tomlinson detailed with the Color Country dispatch center in Cedar City and spent 10 shifts working on expanded dispatch skills. Katie Walsh worked one Color Country crew assignment as a squad boss trainee and was able to complete her FFT1 taskbook. These new skills will allow the crew to be available for response to wildfire incidents within Zion and Bryce Canyon. Katie Walsh also traveled to Grand Canyon NP to assist their fire effects crew with post plot reads for the Thompson and Range RX units.

Mid-summer the fire ecologist, Katie Johnson, took another park service position at Bryce Canyon as their Natural Resource Specialist. The program continues to look forward to using her recently completed research to make changes to the data protocols that will increase the efficiency and usefulness of the field data collected. Katie Walsh, the lead fire monitor, detailed into the position for 120 days from early September until the end of December. The duties included continuing to lead the fire effects crew until the end of the field season in October. Katie Walsh was the recipient of an Intermountain Region Individual Development Grant in the amount of \$1,940 to attend training in Santa Fe titled *Measuring and Monitoring Plant Population and Vegetation*. The BLM sponsored training focuses on sampling design and monitoring protocols. It is intended to provide participants with the knowledge to design and implement protocols for monitoring vegetation types for various reasons.

Similar to previous years, the fire effects program continued to help support the development of a Zion working herbarium. An intern from the Chicago Botanical Gardens collected and cataloged herbarium specimens from the park, with a total of 1233 voucher plants cataloged. The fire effects program was also able to continue supporting plant identification training with

assistance from the Zion Natural History Association and the Zion Vegetation Program. All crew members participated in 20 hours of plant identification and herbarium skills training.

Table 1. Fire Effects Plot Workload (2012) and Total Plots Installed

Park	Monitoring Unit	Plot Type (FMH Brush plot, photo point, CBI, etc.)	Pre-burn	Immed. Post	Post-burn (1-20 yrs.)	Annual Total	Total Plots
Zion	Ponderosa Pine	FMH Forest Plot	-	-	2	2	19
Zion	Sagebrush	FMH Brush Plot	-	-	9	9	20
Zion	Gambel Oak	FMH Forest Plot	-	-	1	1	12
Zion	Juniper Woodland	FMH Forest Plot	-	-	-	-	8
Zion	Aspen	FMH Forest Plot	-	-	1	1	10
Zion	White Fir	FMH Forest Plot	-	-	7	7	10
Zion	Kolob Fire	Cheat grass treatment plots	-	-	140	140	140
Zion	Pocket Mesa	Aspen Monitoring*	70	-	-	70	70
Zion	Kolob Creek	Aspen Monitoring*	52	-	-	52	52
Bryce	White Fir	FMH Forest Plot	-	-	-	-	18
Bryce	Ponderosa Pine	FMH Forest Plot	-	-	4	4	23
Bryce	Black Sage	FMH Brush Plot	-	-	5	5	7
Bryce	Dave's Hollow RX	Tree Density Ponderosa Pine	-	-	15	15	15
Bryce	Dave's Hollow RX	Photo Points	-	-	3	3	3
Bryce	Lodge Thinning	Photo Points	7	-	-	7	7
Golden Spike	Sagebrush	FMH Brush Plot	-	-	-	-	10
Total FMH	---	FMH Plots	-	-	29	29	137
Plot Total	---	All Plot Types	122	-	187	316	429

*Aspen Monitoring plots are randomly-located circular plots to determine density of aspen suckers, overstory trees, and/or conifers.



Former fire ecologist Katie Johnson assisting with Zion Grass RX

Table 2. Fire Ecology Staffing 2011

Ecologist and Monitors	Starting Date	Ending Date	# of Pay Periods	READ Qualified (Yes or No)	Training and Development
Katie Johnson Fire Ecologist	N/A	8/11/12	16	Yes	RAWS refresher, I-200, I-300, NEPA/Section 106, First Aid/CPR, Operational Leadership
Katie Walsh Lead Monitor	1/30/2012	12/23/2012	24	Yes	Detail as Fire Ecologist 8/27-12/23, Measuring and Monitoring Plant Populations and Vegetation- BLM course 1730-05, I-200, WFR recertification
Adam Birely Monitor	4/9/2012	9/30/2012	12.5	No	S290. Wilderness First Aid
Elizabeth Dodson Monitor	4/9/2012	9/30/2012	12.5	No	S-271, Wilderness First Aid
Andrea Tomlinson Monitor	4/9/2012	9/30/2012	12.5	No	D-110, Wilderness First Aid

Table 3. Management Objectives and Monitoring Results

Table 3a Zion National Park Management Objectives and Monitoring Results 2012

Monitoring Unit	Management Objective (Restoration)	Monitoring Results (20% confidence interval)	Objective Achieved?	Year of Analysis
Ponderosa Pine FPIPO1T09	Reduce needle and duff layer by 40-60% (immediate post-burn)	1 st burn, reduction: 43 to 67% (<i>n</i> =19 plots) 2 nd burn, reduction: 38 to 69% (<i>n</i> =13 plots)	Yes; perhaps slightly over-achieved Yes; perhaps slightly over-achieved	2009 (1995-2009)
	Attain 30-60% mortality of live ponderosa pine 4-8" DBH (5 years post-burn)	1 st burn, mortality: 20 to 41% (<i>n</i> =17 plots)	Yes, perhaps slightly low	2011 (1995-2011)
	Reduce 1,000 hour fuels by 40-80% (immediate post-burn)	1 st burn, reduction: 3% INCREASE to 31% DECREASE (<i>n</i> =19 plots) 2 nd burn reduction: 11 to 91% (<i>n</i> =13 plots)	No Uncertain; minimum sample not achieved	2009 (1995-2009)
	Lower brush cover height by 40% (1 year post-fire)	1 st burn, reduction: 15 to 40% (<i>n</i> =18 plots) 2 nd burn, reduction: 6 to 45% (<i>n</i> =12 plots)	No No	2009 (1995-2009)
Quaking Aspen FPOTR1T02	Reduce fuel load 40-70% immediate post-burn	1 st burn total fuel reduction: 4 INCREASE to 4% DECREASE (<i>n</i> =7 plots)	No; aspen groves barely burned	2009 (1998-2009)
	Reduce live overstory tree (POTR) density 20-50% within 5 years post-burn	1 st burn, reduction: 26 to 46% (<i>n</i> =9 plots)	Yes, BUT NOT DUE TO FIRE; Rx burn was too damp to ignite the aspen groves.	2009 (1998-2009)

Monitoring Unit	Management Objective (Restoration)	Monitoring Results (20% confidence interval)	Objective Achieved?	Year of Analysis
	Increase seedling and pole density/regeneration 15-40% within 5 years post-burn	Pole density: 7% INCREASE to 66% DECREASE (<i>n=9 plots</i>) Seedlings density: 46 to 192% increase (<i>n=9 plots</i>)	No; minimum sample not achieved; no fire in groves. Yes, BUT NOT DUE TO FIRE; no fire in groves; also, minimum sample not achieved.	2009 (1998-2009)

White Fir FABCO1T10	Reduce fuel load 50-80% immediate post-burn	Total fuel reduction = 28 to 70% (<i>n=4 plots</i>)	Borderline; 49% mean fuel reduction	2009 (1998-2009)
	Limit the reduction/mortality of overstory trees (ABCO) to 30-50% within 5 years post-burn	Overstory reduction = 14 to 118% (<i>n=3 plots</i>)	Uncertain; minimum sample not achieved	2009 (1998-2009)
Gambel Oak FQUGA1T06	Reduce total fuel load 30-80% immediate post-burn	Fuel Reduction: 29 to 54% (<i>n=11 plots</i>)	Yes	2009 (1997-2009)
	Reduce oak (QUGA) density of all size classes by 25-80% in 1 year	Seedling increase: 45 to 154% (<i>n=11 plots</i>) Pole size reduction: 22 to 65% (<i>n=11 plots</i>) Overstory reduction: 3 to 59% (<i>n=11 plots</i>)	No, <i>increased</i> seedlings; re-sprouts and seedlings are both included in this count; also, minimum sample not achieved Yes, but minimum sample is borderline. No, but minimum sample not achieved	2009 (1997-2009)
	Limit ponderosa overstory mortality to <50% within 2 years	Reduced by 5 to 28% (<i>n=18 plots</i>)	Yes	2009 (1997-2009)
Juniper and Pinyon FJUOS1T06	Reduce overstory tree density by 20-40% within 1 year post-burn	Reduced by 4 to 33% (<i>n=8 plots</i>)	No	2009 (1999-2009)

	Reduce brush density by 5-25% within 1 year post-burn	Brush reduction: 6 to 76% (<i>n=8 plots</i>)	Probably, but minimum sample not achieved	2009 (1999-2009)
	Reduce seedling and pole sized trees by 5-20% within 1 year post-burn	Seedling reduction: 16 to 44% (<i>n=8 plots</i>) Pole reduction: 10 to 62% (<i>n=8 plots</i>)	Probably, but minimum sample not achieved Uncertain; minimum sample not achieved	2009 (1999-2009)
Sagebrush BARTR1T06	Reduce brush density by 40-80% within 2 years post-burn	Brush density reduction: 49 to 80% (<i>n=10 plots</i>)	Yes	2009 (1997-2009)
	Increase native grasses and forbs in 5-10 years by >10% cover	Increase in cover 10 yrs post fire: 27 to 112% (<i>n=6 plots</i>)	Yes, but minimum sample not achieved; need to review how well pre-fire grass ID was conducted too.	2009 (1997-2009)
Brome GBRDI1T02	Reduce Ripgut Brome (BRDI) and Cheat grass (BRTE) density 100%	81% decrease in BRDI at YR02 1232% increase in BRTE at YR02 (<i>n=4 plots</i>)	NO – Partial decrease in rip gut brome offset by dramatic increases in cheat grass and Russian thistle (overall non-native density decreased by 29%)	2009
	Increase relative cover of native vegetation 30-40% within 5-10 years post-treatment	51% increase at YR02 (<i>n=4 plots</i>)	YES – Over-achieved by increasing relative cover more than expected (no year 5 data yet—analysis run with year 2 data)	2009

Table 3b. Bryce Canyon National Park Management Objectives and Monitoring Results 2011

Monitoring Unit	Management Objective (Restoration)	Monitoring Results (20% confidence interval)	Objective Achieved?	Year of Analysis
Ponderosa Pine FPIPO1T09	Reduce total fuel load by 30-60% within immediate post-burn	2 nd entry burn: 14 to 88% decrease (<i>n=10 plots</i>) 3 rd entry burn: 7% INCREASE to 44% DECREASE (<i>n=5 plots</i>)	Uncertain; minimum sample not achieved No; mean was 18%	2011 (1989-2011)

Monitoring Unit	Management Objective (Restoration)	Monitoring Results (20% confidence interval)	Objective Achieved?	Year of Analysis
	Increase native grasses and forbs by 5-20% within 5 years	2 nd entry burn: 7% DECREASE to 15% INCREASE (<i>n=10 plots</i>)	Uncertain; minimum sample not achieved	2009 (1989-2009)
Ponderosa pine Dave's Hollow	Consume 50 – 100% needle-cast post-burn	1 st entry burn: 36 - 63% decrease (<i>n = 15 plots</i>)	Uncertain; minimum sample not achieved (22 plots)	2011 (2009-2011)
	Reduce pole-sized ponderosa pine by 50% within 2 yrs. post-burn	Undetermined	Undetermined	
Mixed Conifer FABC01G08	Reduce total fuel load by 20-50% immediate post-burn	2 nd entry burn: 22% decrease (<i>n=12 plots</i>)	Yes	2010 (1995-2010)
	Reduce White Fir (<i>Abies concolor</i>) pole density by 10-20% within 2 years post-burn	2 nd entry burn: 31% reduction (<i>n=12 plots</i>)	Yes	2010 (1995-2010)
	Reduce White Fir seedling density by 20-40% within 1 year post-burn	2 nd entry burn: 6 to 42% decrease (<i>n=12 plots</i>)	Yes	2010 (1995-2010)
	Increase Quaking Aspen (<i>Populus tremuloides</i>) seedling density by 30-70% within 2 years post-burn	Only 1 POTR seedling found in 1 plot (<i>n=12</i>)	No	2010 (1995-2010)

Table 4. Fire Ecologist 2012 Accomplishments/Focus Areas*

Category	Percent Time	Accomplishments and/or areas of activities
Planning	<5%	Burn plan review,
Presentations	5%	Success stories, helping PIO with distribution products
NPS Meetings/ task groups	<5%	Park meetings
Interagency work	<5%	Inventory and Monitoring collaboration
Wildfire assignments	0%	Identify types of assignments (FEMO, FFT1, GISS, PIO2, etc.); include READ (Resource Advisor) activities
Prescribed fire projects	<5%	Campground, Nature Center, and PTI areas
Non-fire fuels projects	<5%	Estimated amount of time spent assisting with non-fire fuels projects; include mechanical fuel reduction using chainsaws or other, herbicide/mowing, and associated READ activities (note: planning activities for non-fire treatments should be included in Planning category above)
Research		NPS Reserve Fund Research Request, JFSP, other
Data collection	5%	Estimated amount of time spent in the field collecting data; include time spent preparing for field work and travel time to local plot locations
Data entry	<5%	Correcting legacy data in FFI
Data analysis	15%	Estimated amount of time spent performing analyses, including data summaries and statistical tests.
Supervision/Admin	20%	Supervision, payroll, purchasing
Training	15%	Webinar trainings, DOI required training, RAWs refresher, I-200, I-300, Refresher, NEPA/Section 106, First Aid/CPR, Operational Leadership,
Travel out-of-park for plot or project work	0%	
Miscellaneous	20%	PT, RAWs maintenance, leave taken,

*From February 2012- August 2012 due to vacancy in position

C. Fire effects crew accomplishments and areas of focus

Table 5. Fire Effects Crew 2012 Accomplishments/Focus Areas

Category	Percent Time	Notes
FMH plots	20	22 plots at Zion, 9 FMH plots at BRCA
WUI plots	0	
CBI plots	0	
Other plot work	30	Kolob Monitoring Plots, Dave's Hollow Tree Density plots, Aspen monitoring- non-permanent plots to assess sapling density, photo points
Wildfire assignments	20	9 shifts spent assisting engine with severity coverage. Lead- 1 two week assignment on Color Country crew- FFT1-(T) Crew member- 2 two week assignments on Color Country crews Crew member- 1 two week assignment on Color Country crew Crew member- 1 two week detail I as expanded dispatch recorder
Prescribed fire projects	<5	Project prep for Clear trap RX- digging hand line, clearing brush

Non-fire fuels projects	5	Assist with mechanical reduction of fuels for Kolob Treatment Project. Assist with structure assessments for Zion Canyon and Glen Canyon.
Travel out-of-park for plot or project work	<2	2 days travel total to get to Bryce Canyon. Includes 4 half day trips.
Data entry	15	Completed all data entry
Data analysis	0	This is expected to be very low number or zero for fire effects crew/lead monitor
Supervision/Admin	<5	Lead hired and supervised three seasonal employees, time and travel paperwork
Training	5	All attended refresher, I-200, S-290, S-271, D-110, WFA, WFR
Miscellaneous	<2	Assist other park work groups with monitoring or surveys. Lead traveled to GRCA to assist with post reads in November.



Working on the Kolob Cheatgrass Monitoring Project at Crater Hill in Zion NP

D. Additional Program Information

Table 6. Planning - 2012

Park	Does Park have written DFCs? (yes or no)	Date Park-level Monitoring Plan completed (or revised)	Total # of Project- or Community-level Monitoring Plans (not just 2011)	Assisted with how many BAER plans in 2011?
Zion National Park	Yes (not refined)	2004	0	0
Bryce Canyon National Park	Yes (not refined)	2004	0	0
Golden Spike National Historic Site	Yes (not refined)	2004	0	0

Table 7. Monitoring - 2012

Park	% 2011 Data Entered	% 2011 Data Quality Checked	# Prescribed Fires Monitored*	# Non-fire Fuels Treatments Monitored*	# Wildfires Monitored *	# BAER Treatments Monitored*
Zion National Park	100	100	4	1	0	1
Bryce Canyon National Park	100	100	3	1	0	0
Golden Spike National Historic Site	100	100	0	0	0	0

* Number of treatment units with treatment effects monitoring conducted. Include pre-burn and post-burn monitoring but not burn-day monitoring.

Non-fire fuels pre-treatment monitoring was done at Zion and Bryce Canyon for fuels thinning projects. Aspen monitoring was completed at Zion for the Kolob Creek Thinning Project at Lava Point. Photo points were taken at Bryce Canyon to monitor the Bryce Lodge thinning project.

Table 8. Communicating Results - 2012

Park	# of Project Monitoring Reports completed in 2012	# of Annual meeting(s) with Park staff	# of Formal presentations of results	Do you use Minitab?*
Zion National Park	0	0	0	Yes
Bryce Canyon National Park	0	0	0	Yes
Golden Spike National Historic Site	0	0	0	Yes

* This information will help to assess Minitab multi-user license needs.

Table 9. Research - 2012

Park	Are research needs identified in FMP or Monitoring Plan? (yes or no)	# of Proposals Submitted in 2012	# of Proposals Funded in 2012	# of Research Projects Supported in 2012*	Additional Comments
Zion National Park	Yes	0	1	1	Kolob fire re-treatment effectiveness
Bryce Canyon National Park	No	0	0	0	
Golden Spike National Historic Site	Sort of	0	0	0	

*Number of funded research projects, new or ongoing, supported by the fire ecology program including logistical info or support, staffing, etc.

E. 2013 Direction

Plans for the future include continuing to work towards sharing data results and information with Fire Management and Resource Management at both Zion and Bryce Canyon. The program needs to continue to initiate protocols that are more fire objective specific. For example, rapid assessment plots can be installed in burn units planned for the near future. Protocols can address specific burn objectives like reducing tree density and fuel loading. By collecting more relevant information and sharing those results in a timely manner, there may be more opportunities for adaptive management. In order to address future budget constraints the lead would like to explore options like local trainings, hiring interns, and maximizing the efficiency of data collected with electronic field devices like tablets. Continuing to keep the crew fully staffed is preferred by the lead monitor and helps provide more opportunities for all.