



Teton Interagency Fire Fire Ecology Annual Report Calendar Year 2013

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A. Summary

The Teton Interagency Fire Ecology Program serves Grand Teton National Park, Fossil Butte National Monument, Bighorn Canyon National Recreation Area, and the Bridger-Teton National Forest. In 2013, the program was staffed by Diane Abendroth, Fire Ecologist, Jon Freeman, Lead Fire Effects Monitor, Ron Steffens, Fuels Monitor, Kal Stromberg, Assistant Lead Monitor, and Fire Effects Crew Members Carly Monahan and Joe Vaughn.

Fire Effects Crew:

This is the third year in a row that the crew was composed of 100% returning employees. One crewmember from 2012 accepted a permanent fire position with the US Forest Service, and due to budget shortfalls, the fire effects crew did not fill behind this resignation. Productivity would normally be expected to diminish with such a major loss, but with a solid and experienced workforce the crew continued to improve efficiency, fire preparedness, training, morale, and overall functionality.



2013 Teton Interagency Fire Effects Crew in the Gros Ventre Wilderness, WY (from left: Carly Monahan, Kal Stromberg, Joe Vaughn. Not pictured: Jon Freeman)

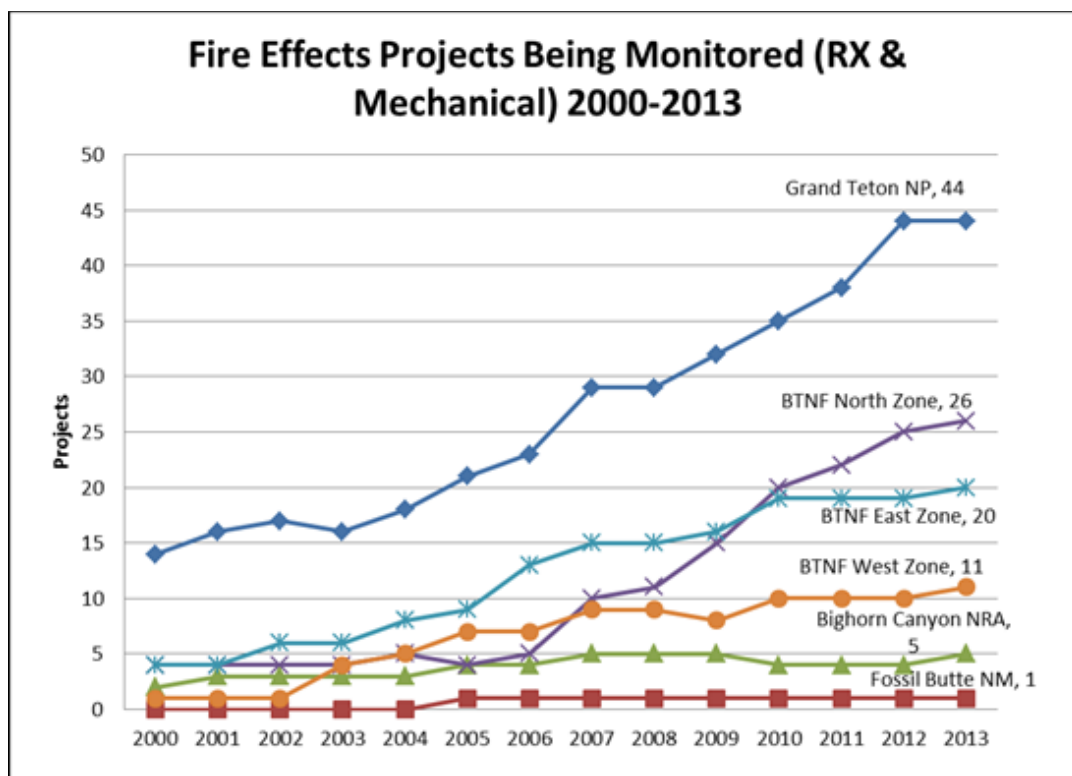
The Fire Effects Crew group has increased its operational fire capabilities each year, while tackling a complex workload of monitoring field data collection. This evolution is thanks to the leadership of Lead Monitors Jon Freeman and Kal Stromberg.

Jon detailed to Big Bend National Park as an Engine Captain for 6 weeks in June and July. This detail was a major help to Big Bend, which was lacking crucial overhead during its prime fire season, as well as a great opportunity for Jon to work on new skills and qualifications. This provided Kal with an opportunity to temporarily promote to the fire effects crew leader position. Later in the year, Kal also took advantage of a vacancy on the Teton Fire Module, and detailed in as a Squad Leader for 90 days during the heart of fire season. Once fire effects monitoring field work was completed in mid August, the NPS and USFS decided to combine

the fire effects crew and the Teton Fire Module for two fire assignments in order to support incidents and cross train. While this was a temporary agreement, everyone involved was pleased with the results, and this could prove useful again in the future. Only one prescribed burn was conducted in fall 2013 due to wet weather.

Five new fire qualifications were earned among the four crewmembers, who averaged 500-600 hours of overtime for the season. The crew also regularly collected fuel moisture samples for the park and forest. The crew also had important help from engine and fire module crewmembers who joined for a couple of short details.

In 2013, the fire ecology program employees visited 25 locations on the park and forest for plot work (down from a total of 32 projects from 2012), and participated in numerous unplanned fires locally and further afield in the Eastern Great Basin, Northwest, and Southwest GACCs. In addition to the Fire Effects Crew, the Teton Interagency Fire Ecology Program depends on collaboration with numerous fire and resource managers and crews in the parks and on the forest as well as the Wyoming Game & Fish Department.



The workload proportional breakdown for the 2013 Fire Effects Crew shows a greater proportion of fire suppression (which includes FEMO work). No time was spent on prescribed burns due to rainy weather during the fall burning season. Exchange programs with other modules that helped with field work are not captured in the monitoring hours. The large proportion of suppression work is partly due to the six week detail that Jon Freeman did as an engine foreman.

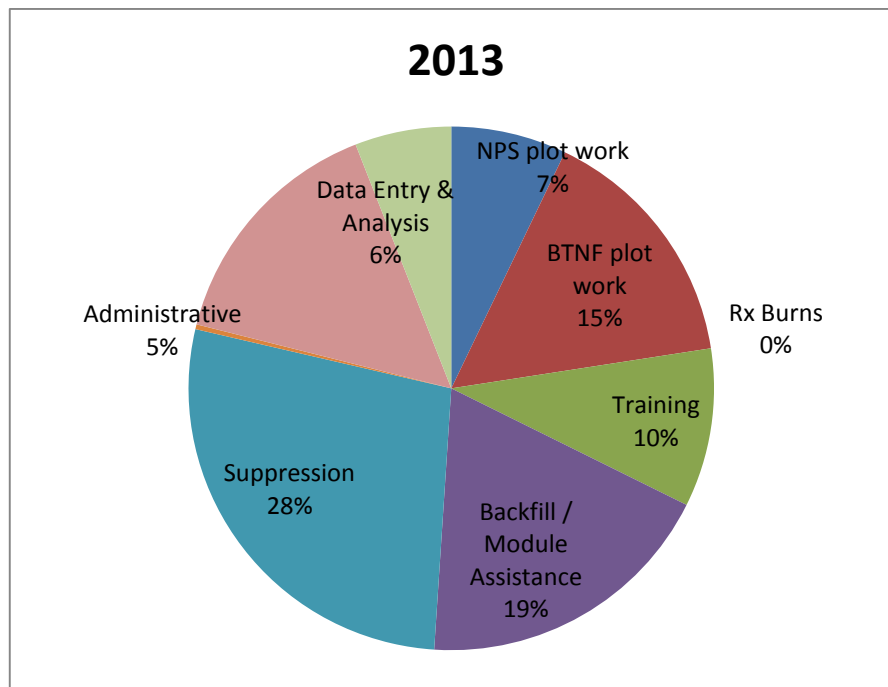


Figure 1. Fire Effects Crew Hourly Workload Breakdown

Seasonal Fire Danger Monitoring:

Seasonal Fuels Monitor Ron Steffens worked only six pay periods in 2013. He continued the data collection for fuel moistures that he has managed for over two decades. He also provided Teton Interagency Fire with seasonal outlooks over the course of the summer. In August, while the park was in Planning Level 5 for a couple of weeks, Ron served as ICT3 on a local incident, and acted as duty officer while the FMO and AFMO were on team assignments. He managed the Moose Fire decision process in WFDSS, and facilitated the resource benefit objectives associated with monitoring the fire versus suppression.

Ron has developed a series of links about fire danger indices, weather forecasts, and fuel conditions for the tetonfires.com website. His skills with web design and programming are key to the success of the site. Ron's winter job is as a professor of environmental communication, which makes him a helpful asset to our program's social media and internet presence. Ron also continues to be a member of the International Association of Wildland Fire board.

Fire Ecologist

During the winter of 2013 Diane Abendroth participated in teaching two advanced level fire classes; RX510 Applied Fire Effects and S495 Geospatial Fire Analysis Interpretation and Application. She also taught a webinar for FlamMap and Basic fire behavior using WFDSS. In spring, several annual Fire Effects Analysis and Interpretation meetings were held to share monitoring results with local fire managers, vegetation specialists, and wildlife biologists. During fire season Diane pitched in to help with monitoring field work while Jon Freeman was on a detail to Big Bend. In July, she led the crew to Bighorn Canyon to do CBI plots in the Big Fork Fire. Diane used this data to create several maps that depicted burn severity, tree mortality, and soil severity (see Appendix E). Diane was a crew boss trainee on a two-week assignment in August, and a PIOF on another fire in September.

Diane was a co-principal investigator on a Douglas-fir fire ecology research project funded by the NPS. She completed a white paper describing the findings (see Appendix F).

Table 1. Fire Effects Plot Workload (2013) and Total Plots Installed

Park/Forest	Monitoring Unit	Plot Type	Pre-Burn 2013	Immed. Post 2013	Post (1-20 yrs) 2013	Annual Total 2013	Total Plots
Grand Teton National Park	Blacktail Fire	Shrub Line Intercept			30	30	30
	Blacktail C, Gros Ventre Rx	Sage Cover Photo Points			90 2	90 2	90 2
	Blacktail South Rx	Aspen Circles			30	30	30
	Pilgrim Creek Fire	Photo Points			5	5	5
	Colter Bay Hazard Trees	Photo Points		12		12	12
	Beaver Creek B1P2 Mx	Stand Exams Photo Points		10 2		10 2	10 2
	Beaver Creek Historic Housing Mx	Stand Exams Photo Points		10 2		10 2	10 2
	Moose Fire	Photo Points		4		4	4
Bighorn Canyon NRA	Big Fork Fire	CBI Photo Points		47 47		47 47	47 47
Fossil Butte NM	N/A – No projects monitored in 2013					0	0
North Zone Bridger-Teton NF	Upper Palmer Rx	Aspen Circles Shrub Line Intercept Photo Points			48 30 2	48 30 2	48 30 2
	Lower Palmer Rx	Shrub Line Intercept Photo Points	30 3			30 3	30 3
	Lava Creek Rx	Shrub Line Intercept Photo Points		1	30 3	30 4	30 4
	Lower Gros Ventre P1 Rx	Aspen Circles Photo Points			21 10	21 10	21 10
	Ann Mountain Mx	Stand Exams Photo Points			10 2	10 2	10 2
	North Willow Mx	Stand Exams Photo Points			10 2	10 2	10 2
	Beaver Mountain RX	Pre and ImmPost		2		2	43
	Dry Quad RX	FEMO Summary					N/A
	Horsethief Canyon Fire	Photopoints			5	5	5
West Zone Bridger-Teton NF	Lower Cottonwood Rx	Sage Cover Photo Points			30 4	30 4	30 4
	Shingle Mill Fire	Photo Points			3	3	3
	Kelley Mx	Stand Exams		4		4	4
	Alpine Fuels Mx	Photo Points	5			5	5
	Wiener Creek Rx	Aspen Circles Photo Points	44 4			44 4	44 4
East Zone Bridger-Teton NF	Maki Creek Rx	Aspen Circles BFH Macroplots Photo Points			30 2 4	30 2 4	30 2 4
	South Boulder Rx	Shrub Line Intercept			2	2	2
	Kendall Fire	Brown’s Transects Photo Points	6 10	2 6		8 16	8 16
						TOTAL: 654	

Table 2. Fire Ecology Staffing 2013

Ecologist and Monitors	Starting Date	Ending Date	# of Pay Periods	READ Qual? (Yes or No)	Training and Development
Diane Abendroth	1/1/13	12/31/13	26	YES	I-800 online S-403 Fire Information Officer CRWB Training Assignment 37 Fire Operational Periods
Ron Steffens	5/21/12	8/24/12	5.5	NO	S-339 Division/group Supervisor 35 Fire Operational Periods
Jon Freeman	1/1/13 4/1/13	1/31/13 11/1/13	18	NO	BIBE Engine Captain Detail Los Diablos CRWB Detail Teton Module Asst Foreman Detail Completed CRWB, ICT4 taskbooks I-400 45 Fire Operational Periods
Kal Stromberg	5/13/13	11/1/13	12 ½	NO	Lead Fire Effects Detail Teton Module Squad Leader Detail Completed ICT5 taskbook Worked on HECM and FALB taskbooks S-230, S-231, S-260 (online) 31 Fire Operational Periods
Carly Monahan	5/28/13	9/28/13	9	NO	Teton Crew, Teton Module assignments Completed ICT5, HECM taskbooks S-230, S-231, A-219, S-260 (online), I-200 48 Fire Operational Periods
Joe Vaughn	5/28/13	8/16/13	6	NO	Teton Crew, Teton Module, Teton Helitack assignments Completed FALA taskbook Worked on FEMO taskbook S-271 26 Fire Operational Periods

Table 3. 2013 Management Objectives and Monitoring Results

All results shown are 80% confidence intervals of the mean if they are in **bold**.

Park/Forest	Monitoring Unit	Management Objective	Monitoring Results	Objective Achieved?
Grand Teton National Park	2003 Blacktail Fire Year 10 Post	Track the recovery of sagebrush cover and height post fire	Cover has increased to 8.7% since Year 5 Post burn. Target cover is approximately 30% Average sagebrush height has increased to 35 cm. This is about half the target height of roughly 60 cm.	YES
	1998 Blacktail Butte Area Bitterbrush Burns (South Gros Ventre and Blacktail Unit C) – Year 15 Post	Track bitterbrush height and cover compared to unburned control	Bitterbrush cover lags behind control at both sites. 6.8% and 8.6% compared to 31.0%	NO
		Track sagebrush height and cover compared to unburned control	Bitterbrush height is nearly equal to control at 51.4 cm vs. 60.5 cm.	YES
			Young bitterbrush plants appear to be absent.	YES
			Sagebrush cover is approaching the control at SGV (20.0%) and remains low at Blacktail Unit C (3.4%). Control cover is 30.4%.	NO
				YES
			Sagebrush height is roughly 80% of the control (51.5 cm and 47.0 cm vs. 64.3 cm for the control)	YES
	2002 Pilgrim Creek Fire Year 10 Post	Document the recovery of this conifer community following a stand replacement event Track the presence of resprouting aspen	Photopoints show lodgepole pine regeneration reaching pole-sized heights. Aspen resprouting in the burn is more noticeable than Year 7 Post. Browsing appears heavy, however.	YES YES
	Blacktail South Rx Year 15 Post	Attain 1000 live suckers per acre over 10' 10 years post burn	573 suckers per acre over 10' tall Year 15 Post. 2,966 total aspen suckers per acre Browsing is only 9.4% Aspen distribution is variable depending on burn pattern. Unburned patches show very few young trees.	NO
	Beaver Creek Historic Housing Mechanical - Post Treatment	Dead and down woody fuel reduction	Woody fuels reduced to 7.4 tons per acre	YES
		Reduce poles and seedlings roughly 50%	Poles reduced by roughly ¾, Seeding density not changed	YES
		Reduce average visual obscurity to less than 20% post treatment below 2 meters.	Visual obscurity 20 30%	YES
		Remove snags to <1 per acre	Snag estimate at >1 per acre, with ongoing beetle mortality	NO
	Beaver Creek Block 1 Phase II Mechanical Post Treatment	Dead and down woody fuel reduction	Woody fuels reduced to 13.8 tons per acre	YES
		Reduce CBD & Increase CBH	Canopy base height maintained at 6 ft.	NO
		Reduce poles and seedlings roughly 50%	Poles reduced by roughly half Seeding density not changed	YES NO

		Reduce average visual obscurity to less than 20% post treatment below 2 meters.	Visual obscurity 30-55%	NO
	Colter Bay Hazard Trees	Remove targeted hazard trees using contracted services	Photopoints show trees have been removed	YES
	Moose Fire	Track the long term post fire effects in a poorly understood fire regime	Photopoints installed	N/A
Park/Forest	Monitoring Unit	Management Objective	Monitoring Results	Objective Achieved?
Bighorn Canyon National Recreation Area	Big Fork Fire – Immediate Post	Map burn severity using MTBS Landsat products and ground plots	Several maps showing overall burn severity, cottonwood mortality, soil effects, and understory plant responses	YES
Park/Forest	Monitoring Unit	Management Objective	Monitoring Results	Objective Achieved?
North Zone Bridger-Teton NF	Lower Gros Ventre – Phase I Rx Year 5 Post	Reduce live conifer density in aspen stands >60%	Live conifer density was not significantly different post burn	NO
		Reduce live aspen overstory by >60%	Live overstory aspen showed no significant difference	NO
		Attain >1000 aspen suckers per acre >10' ten years post burn	Year 5 Post - sucker density was 6305 stems per acre.	YES
		Maintain aspen browse levels <30%	Stems over 10' tall were 586 per acre Browse was measured at 25.5%	YES
	Lower Palmer RX Pre Burn	Monitor sagebrush cover post burn	Pre burn sagebrush cover was 30% +/- 4%	N/A
		Achieve >40% conifer mortality in sagebrush openings		
	Lava Creek Rx Immediate Post / Year 1 Post	Reduce live sagebrush cover to less than 5%	Sagebrush cover reduced to <1%	YES
	Ann Mountain MX Post Treatment	Reduce dead and down fuel loading to less than 7 tons per acre	Woody Fuels reduced by 2/3 to 10.3 tons per acre	NO
		Increase canopy base height to 10 ft.	Post treatment canopy base height was only 6 feet	NO
	Upper Palmer RX Year 2 Post	Monitor shrub reduction and subsequent recovery post burn	All shrub species reduced to less than 1% cover except for resprouting snowberry (10%).	YES
		Reduce live conifer in aspen stands by 20-60%	Live conifer reduced by 73% and 33% in two stands	YES/NO
		Attain more than 3000 aspen suckers per acre two years post burn	Year two aspen sucker density was 2142 and 6705 stems per acre	NO/YES
	North Willow MX Post Treatment	Maintain aspen browse below 30% on regeneration	Post burn aspen browse was 5%	YES
		Reduce dead and down fuel loading to less than 7 tons per acre	Woody Fuels reduced by 25% to 9.7 tons per acre	NO

		Increase canopy base height to 10 ft.	Post treatment canopy base height was only 6 feet	
	Beaver Mountain RX Immediate Post	Reduce live conifer by 20% - 60% in designated aspen stand #1, (see map) to promote aspen health and vigor. Regenerate at least 1000 aspen suckers/acre over 10' in height 15 years post burn Blacken between 40% and 80% of the sagebrush within in the burn unit, in a mosaic pattern. Achieve 10-30% canopy fire effects in representative stand #2 (see map). Increase crown base height and decrease crown bulk density. Detect and treat noxious weeds or cheatgrass along the road portion of the burn.	Photopoints only retaken in a portion of the burn that was completed in 2013.	YES
	Dry Quad RX FEMO Summary	Track the weather, fire behavior, and burn prescription window	FEMO observations showed the burn was in prescription but fire effects were not quite as severe as desired.	N/A
	Horsethief Canyon Fire	Track vegetative recovery over time with photopoints	Initial photo installment	YES
Park/Forest	Monitoring Unit	Management Objective	Monitoring Results	Objective Achieved?
West Zone Bridger-Teton NF	Lower Cottonwood RX Year 5 Post	Attain > 60-80% mortality of juniper (<i>Juniperus spp.</i>) in burned areas	76% reduction occurred in juniper documented in 2009.	YES
		Restore canopy cover of antelope bitterbrush (<i>Purshia tridentata</i>) to at least 50% of pre-burn levels within 10 years and to pre-burn levels within 20 years.	Bitterbrush cover was 2.9% in 2013. Pre burn it was 13%	N/A
		Restore canopy cover of palatable shrubs, in total, to pre-burn levels within 20 years.	Palatable shrub cover lags behind pre levels, to be evaluated in YR20.	N/A
		Restore the pre-burn density of mountain mahogany (<i>Cercocarpus ledifolius</i>) on a designated site (terminal buds beyond wintering mule deer height) within 25 years.	Mountain mahogany density reduced by 55.6% immediately post burn. To be evaluated in YR025.	N/A
	Shingle Mill Fire Year 5 Post	Track the effects of the fire on forest regeneration in high and moderate severity areas with repeat photography	High severity areas are still dominated by herbaceous plants Moderate severity areas show partial canopy mortality with herbaceous understory.	YES

	Kelley Guard Station MX	Create defensible space around the cabin by reducing fuels.	Total woody fuel loading less than 8 tons per acre post thinning Canopy base height increased to 9 feet Probability of torching reduced from 56% to 0% under 75 th and 97 th percentile weather. Torching index increased to 98 miles per hour until 97 th percentile weather.	YES
	Alpine Fuels MX Pre Treatment	Create defensible space around the south side of Alpine in the Greys River valley.	Pre treatment photopoints only	N/A
	Wiener Creek RX Pre Treatment	Promote aspen forest by burning 75% of a mixed conifer-aspen forest Attain 1000 stems per acre of aspen suckers over 10' tall fifteen years post burn.	Aspen suckers currently 1826/acre and 2726/acre in tow representative stands. Browse levels are 17% and 34% in terminal aspen leaders. Conifer density is 707/acre and 472/acre, compared to aspen overstory density of 39/acre and 33/acre.	Pre treatment only
Park/Forest	Monitoring Unit	Management Objective	Monitoring Results	Objective Achieved?
East Zone Bridger-Teton NF	Maki Creek RX	Attain >1000 aspen suckers per acre >10' fifteen years post burn Regain ground cover of less than 20% bare ground 5 years post fire	Year 5 post burn measurements estimated 7000 suckers per acre. Browse level was less than 5% 24% bare ground in year 5	N/A YES NO
	South Boulder RX	1998 objective: Increase shrub age class diversity	YR15 Shrub density data shows sagebrush starting to recover, with 2558 young and seedling stems per acre. Control density is 3302 mature and decadent stems per acre. Bitterbrush recovery still lagging considerably. Rabbitbrush density unchanged between burn and control 15 years post	YES
	Kendall Fire	Measure fuel reduction and track fire recovery	64% reduction in surface fuel loading	YES

B. Fire ecologist accomplishments and areas of focus

Table 4. Fire Ecologist 2013 Accomplishments/Focus Areas

Category	Percent Time	Accomplishments and/or areas of activities
Planning	10%	Teton to Snake Fuels Project EA and ID Team GTRE Fire Management Working Group
Presentations	15%	GRTE Annual Fire Effects Report meeting North Zone BTNF Annual Fire Effects Report results

		presentation East Zone BTNF Annual Fire Effects Report results presentation West Zone BTNF Annual Fire Effects Report results presentation Monitoring Unit Lecture to RX510 FlamMap Webinar FlamMap, Basic, Short Term Modeling lecture, S495 Fire Effects Monitoring Program presentation to GRTE Superintendent, BTNF Supervisor
NPS Meetings/ task groups	5%	GRTE Wilderness Committee VRP Supervisors Group
Interagency work	(50%)	Technical Transfer ID Teams Fire Effects Monitoring Teton Interagency Area Risk and benefit Assessment Network of Fire Science Champions Burn Severity Mapping and imagery requests & interpretation
Wildfire assignments	10%	FFT1, CRWBt, ICT5, PIOF, RXB3 (37 operational days),
Prescribed fire projects	2%	3 burns BTNF
Non-fire fuels projects	1%	2 operational days
Research	10%	Douglas Fir NPS Research Reports with Donato, Harvey, Mellander Provided data for Harvey et al Research on BTNF and YELL
Data collection	10%	Work with Fire Effects Crew, collect live fuel moistures bi-monthly with Steffens
Data entry	1%	Assist with fire effects data entry
Data analysis	10%	Approximately 50% of projects, fuel moistures with Steffens
Supervision/Admin	5%	Supervise 1 STF, 1 seasonal
Training	5%	S403, I-800, CRWB-T
Travel out-of-park for plot or project work	5%	Bighorn Canyon Burn Severity CBI plots
Miscellaneous	10%	Instruction: S495 cadre, RX510 Cadre

C. Fire effects crew accomplishments and areas of focus

Table 5. Fire Effects Crew 2013 Accomplishments/Focus Areas

Category	Percent Time	Notes
FMH plots	1%	NPS only
NPS plots	7%	Aspen circles, brown's lines, stand exams, shrub intercepts, photopoints
USFS plots	15%	Aspen circles, brown's lines, stand exams, shrub intercepts, photopoints

Wildfire assignments	28%	3 T2IA handcrew assignments, 6 Wildland Fire Module (WFM) assignments, 1 Single Resource Assignment (CRWB)
Prescribed fire implementation	0%	1 early spring burn completed (Lava Creek) prior to crew start date. One fall burn completed.
Module Support	19%	Fuels reduction projects, backfill/step up staffing (E3, E4, E441, Helitack), Big Bend Detail -excludes weekend/lieu day staffing
Data entry	5%	FFI, FVS, Excel
Data analysis	1%	FFI, FVS, Excel
Supervision, Administration	7%	Timekeeping, travel, conferences/presentations/meetings, evaluations, gear/vehicle maintenance and upkeep
Training, Teaching	10%	S-230, S-231, S-260, S-271, I-200, I-400, misc. NPS training

D. Additional Program Information

Table 6. Planning - 2013

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 2013)	Assisted with how many BAER plans in 2013?
Grand Teton National Park	Yes - vague	2010	44	0
Fossil Butte NM	no	2004	1	0
Bighorn Canyon NRA	no	2012	5	0
Bridger-Teton NF – N Zone	Yes – 1990 vintage	2006	26	0
Bridger-Teton NF – W Zone	Yes – 1990 vintage	2006	11	0
Bridger-Teton NF – E Zone	Yes – 1990 vintage	2006	20	0

Table 7. Monitoring – 2013

Park	% 2013 Data Entered	% 2013 Data Quality Checked	# Prescribed Fires Monitored*	# Non-fire Fuels Treatments Monitored*	# Wildfires Monitored*	# BAER Treatments Monitored*
Grand Teton National Park	100%	100%	2	3	3	0
Fossil Butte NM	N/A	N/A	0	0	0	0
Bighorn Canyon NRA	100%	100%	0	0	1	0
Bridger-Teton NF – N Zone	100%	100%	6	2	0	0
Bridger-Teton NF – W Zone	100%	100%	2	2	1	0
Bridger-Teton NF – E Zone	100%	100%	2	0	1	0

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

Table 8. Communicating Results - 2012

Park	# of Project Monitoring Reports completed in 2013	# of Annual meeting(s) with FS/Park staff	# of Formal presentations of results	Do you use Minitab?*
Grand Teton National Park	9	1	1	No
Bighorn Canyon NRA	1	0	0	No

Fossil Butte NM	0	0	0	No
Bridger-Teton NF – N Zone	8	1	2	No
Bridger-Teton NF – W Zone	4	1	1	No
Bridger-Teton NF – E Zone	3	1	1	No

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

Table 9. Research - 2013

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 2013*	Additional Comments
Grand Teton NP	yes	2	0	1	• RMEF Aspen study proposed • Fire History Study proposed • UW Harvey et al study – provided data •
Bighorn Canyon NRA	no	0	0	0	
Fossil Butte NM	no	0	0	0	
Bridger-Teton National Forest	no	1	0	1	• RMEF Aspen study proposed • UW Harvey et al study – provided data

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

Reserve Fund Research:

In 2012 a research project entitled, “Using Archival Digital Orthophotographs to Investigate the Effects of Fire Exclusion and Insect Outbreaks on Douglas-fir in Grand Teton National Park and Surrounding Areas” was funded for \$9,500.00. Dr. Daniel Donato from Oregon State University is the co-P. I. with Diane Abendroth. Dan was a GRTE Fire Effects Crew member in 2000.

The project proposed to use scanned and georectified archival air photographs from 1945 and 2006 to locate sites for pilot field investigations. Specifically:

- 1) Where Douglas-fir appears to have encroached into open shrub communities in the past decades:
 - a. How long has encroachment generally taken?
 - b. Do tree growth rates differ between these types and adjacent long-standing forest?
 - c. What other factors may be associated with tree colonization in these openings?
- 2) Where past stand-replacement fire scars are evident in Douglas-fir landscapes:
 - a. What are stand age distributions?
 - b. Does the apparent susceptibility to Douglas-fir beetle outbreaks differ between these stands and adjacent forest?
 - c. Do adjacent stands show evidence of co-incident surface fire?
 - d. What characteristics differentiate stands from past surface fires versus stand-replacement patches and patches without detectable fire history?

In 2013 the data collected in 2012 was analyzed, and final reports were written (see appendix F)

E. 2014 Direction

Fire Ecology:

- Clarify roles and expectations for weed monitoring. Establish appropriate protocols.
- Synthesize 12 years of fire effects results for general findings and recommendations
- Utilize Burn Severity Atlas data to develop objectives for future managed fires
- Prioritize future prescribed burn projects based on Teton Interagency Area Risk (and benefit) Assessment.
- Propose prescribed burns in Douglas-fir forest types according to research findings
- Develop measurable objectives for the resource benefits of managed fires, to be used in WFDSS documentation
- Contribute to NAFRI training courses – RX510 and S495
- Foster coordination between fire managers and researchers in the Greater Yellowstone Area.

Fire Effects:

- Continue to pursue needed career seasonal Assistant Lead Monitor position
- Assist in development of electronic field data entry platform
- Provide an SCA internship for a diverse student in 2014
- Continue to develop streamlined weed monitoring and CBI protocols
- Continue to train Teton Fire Module in fireline and immediate post burn monitoring protocols for managed fire monitoring. This greatly increases the volume of fire effects data created in a season.
- Continue to provide a highly qualified pool of firefighters for the park and forest fire staff

Fuels Monitoring:

- Synthesize 21 years of fuels monitoring data
- Continue to develop fuels information on tetonfires.com website
- Promote the interagency fire program internationally
- Train new FOBS, LTAN, and SOPL candidates within the Teton Interagency Fire organization.

F. Appendices

Please see the attached appendices A through F for complete fire effects monitoring reports for all projects visited by the Fire Effects Crew in 2012, as well as the Bighorn Canyon NRA Big Fork Fire Burn Severity Report and Douglas-fir Fire Regimes research paper.