



National Park Service Teton Interagency Fire Fire Ecology Annual Report Calendar Year 2019

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Grand Teton National Park and the Bridger-Teton National Forest



A. Summary

This year was the 20th anniversary of the Teton Interagency Fire Effects Monitoring program. It began in 1999, one year after the GRTE fire effects crew was established. The crew was hired by the park, but took on monitoring on BTNF projects under an agreement where the Forest Service hired extra interagency Helitack seasonal employees to offset the biological technicians. This arrangement continues to the present. In 2006, Fire Effects took on monitoring mechanical thinning projects in addition to prescribed fire monitoring and work in tracking the effects of unplanned fires.

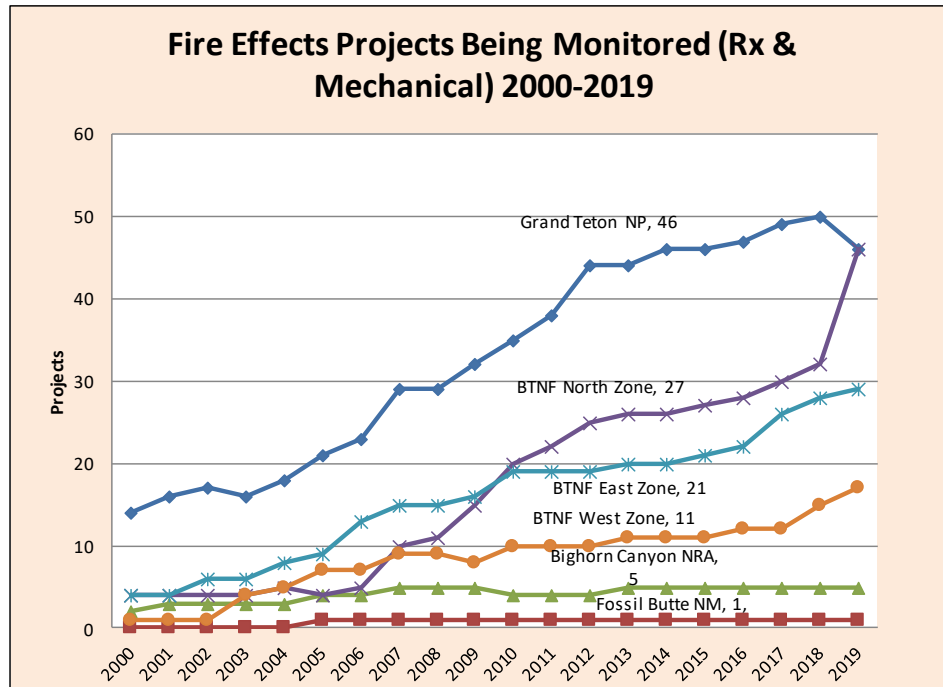
The Grand Teton Fuels and Fire Effects Monitoring Plan was completed in 2009, and the latest version of the Bridger-Teton National Forest Fuels and Fire Effects Monitoring Handbook is dated 2006. Both documents are in need of an update. This was planned for 2019, but was postponed due to employee turnover.

Lead Fire Effects Monitor Alex Spannuth moved on to take a Fire Ecologist job with the Coconino National Forest. Jill Stephenson was hired to replace him in April 2019. Diane Abendroth continues as the interagency Fire Ecologist.

See Table 1 for a summary of all the fuels projects that the Fire Effects Crew evaluated this year. As in previous summers, the crew was able to get help from our cooperators from the Wyoming Game & Fish Department Wildlife and Habitat biologists. BTNF Zone fuels employees, Fire Module crewmembers, and Engine 301 also assisted.

As the number of projects being tracked continues to grow, and more is learned about the long term results of fire and mechanical thinning on the local vegetation, monitoring has been simplified for many projects. In 2019 several meta analyses were done comparing dozens of aspen, conifer, and sagebrush burns to derive trends and lessons learned. Common factors leading to success (and poor results) have emerged. The spring Fire Effects presentations to fire managers focused on these topics. In the future, photopoints will be used instead of quantitative measurements. For projects that are less certain or controversial we will continue installing plots and transects.

Figure 1. Fire Effects Crew Project Tracking 2000-2019



Another way that the Fire Effects monitors are gaining appreciation from fire managers is through high quality FEMO reports written for prescribed burns. In 2019 FEMO Jill Stephenson, FOBS Ron Steffens, and several trainees produced in-depth post burn reports with weather observations, fire behavior, photopoints, mosaic mapping, smoke observations, and overall interpretation of first order fire effects. These were provided to funding organizations and agency leadership with very positive feedback. Two of these are included in Appendix D for BTNF East Zone projects.

In 2019 the Teton Interagency Fire Ecology Program continued to collaborate with scientists from Penn State and the University of Wisconsin at Madison. With changing climate and more megafires expected, several scientists have expressed concern about forest resilience in this fire regime. The fire effects crew assisted with field sampling on a research project that is investigating the use of LiDAR for fuels mapping, and a study tracking tree seedling survival in experimental plantings in a post fire environment.

Fire season in Western Wyoming was slow this year, which allowed for a few extra monitoring projects including some very old burns and fires. This included a 45-year post burn visit to Breakneck Flats in the Gros Ventre, and some indepth evaluation of 20-year-old sagebrush and bitterbrush burns near Blacktail Butte.

As in previous years, the fire effects crew also helped out occasionally with saw work, taking part in the Teton Type II IA Crew, backfilling on engines and Helitack, and maintaining IA readiness. While this adds extra work and complexity to their jobs, it leads to more engagement and buy-in from local fire managers for the ecological aspects of our work.

Table 1. Fire Effects Plot Workload (2019) and Total Plots Installed

Park/ Forest	Monitoring Unit	Plot Type	Pre-burn/ MX 2019	Immed. Post 2019	Postburn (1-20 yrs) 2019	Annual Total (2019)	Total Plots
Grand Teton National Park	Alder Fire	Photopoints			8	8	8
	Bearpaw Bay Fire	Photopoints			5	5	5
	South Blacktail RX	Aspen Circles			30	30	30
	Death Canyon Rd MX	Photopoints			3	3	3
	Powerline Watertank South Half MX	Photopoints Brown's Transects	2 10			12	12
	Signal Mtn. Brinkerhoff	Stand Exams			6	6	10
	Sky Ranch MX	Photopoints	5			5	5
	Row Fire (Year 25)	Shrub Transects Photopoints			60 1	61	61
	Beaver Creek North MX	Photopoints	2			2	2
	Blacktail Fire	Photopoints			6	6	6
	Blacktail Area Bitterbrush RXs	Photopoints			3	3	3
	Cow Lake	Photopoints			2	2	2
North Zone Bridger-Teton NF	Trails End RX	Photopoints Comp & Cover	6 6	3		12	12
	Lower Gros Ventre RX	Photopoints			10	10	10
	Breakneck Aspen RX (Year 45!)	Photopoints			9	9	9
	Lower Palmer RX	Photopoints			10	10	10
	Turpin Meadows MX	Photopoints	4			4	4
	Dry Quad MX	Photopoints Aspen Circles	3 30			33	33
	Taylor Mtn RX	Photopoints Shrub Transects	7 30			37	37
	Mosquito Creek RX	Photopoints Comp & Cover	2 1			3	42
West Zone Bridger-Teton NF	Hams Fork Indian Creek Unit 19	Photopoints Ground Cover			2 10	12	12
	Hams Fork Basin Creek Unit 11N	Photopoints	1	3		3	3
	Little Hornet RX	Photopoints Aspen Cirles Comp & Cover	8 30 4			42	42
	Strawberry Creek	Photopoints	3			3	9
	Hams Ridge Unit 6	Photopoints Comp & Cover	4 2			6	6
	Hams Ridge Unit 8	Photopoints	3			3	3
	Nugent Park Unit 2	Photopoints Comp & Cover	4 3			7	7
East Zone Bridger-Teton NF	Sylvan Bay Day Use MX	Stand Exams Photopoints			8	8	10
	Marsh Creek RX	Photopoints			3	3	3
	Burnt Lake RX	BFH Macroplots			3	3	3

	Chicken Creek RX	Aspen Circles Ground Cover Photopoints			60 20 5	85	85
	West Fortification RX FEMO Report	Photopoints	3	4		4	4
	Maki Creek MACB2	Aspen Circles Photopoints			30 4	34	35
	Cottonwood II Unit 11 (Nylander) & 13	Aspen Circles Photopoints			30 5	35	35
	Cottonwood II Unit 12 (Sjhoberg) FEMO Report	Photopoints	2	2		2	3
	WG&F Cheatgrass Monitoring	Line Point Intercept	2			2	2
Total			177	12	333	522	560

This year the GRTE Fire Effects Program hit the ground running with a new Lead Monitor, Jill Stephenson. She brought three years of experience on the crew, and was able to make a quick transition into leadership. It was a difficult year for hiring seasonal crew members, with a substantial delay in recruitment resulting from the 2019-2020 US Government furlough of Federal employees. Only one seasonal was hired from the cert. The seasonal GS6 assistant lead position went unfilled due to lack of qualified applicants. Two volunteers came in to do a great job for the season, Olivia Burke and Ray Lopez. At times GS5 Crewmember Kate Patronik stepped up to take over field and office management while Jill was training as a FFT1.

Ron Steffens returned again in 2019 as the Fire Monitor, filling in as duty officer several times, and serving as Operations Section Chief Trainee on the Wyoming Type II Team for the Boulder Lake Fire.

Interagency Fire Ecologist Diane Abendroth split her time between the Bridger-Teton National Forest and Grand Teton National Park, under an Interagency Operating Plan that offsets her cost to BTNF with matching salary for Fire Planner Eric Neiswanger.

Table 2. Fire Ecology Staffing 2019

Ecologist and Monitors	Starting Date	Ending Date	# of Pay Periods	READ Qualified (Yes or No)	Training and Development
Diane Abendroth Fire Ecologist	1/1/19	12/31/19	26	Yes	S495 Steering Committee RMTC Remote Education Collector, Google Earth, SITL skills, Survey 1-2-3, Avenza. LTAN assignments.5 RX Burns.

Ron Steffens Fire Monitor	5/20/19	9/13/19	8.5	No	GRTE Duty Officer Duty officer detail in Tucson, AZ (SAGU) Served on Wyoming IMT3 as OSC3 Weather analyst for GRTE SAR Keynote speaker at Wildfire England (11/19) Co-planner, Fire Workshop for Media and Congressional Staff, Association for Fire Ecology (11/19)
Jill Stephenson Lead Fire Effects Monitor	4/1/19	11/15/19	16.5	No	L-280 S-215 S-131 Forest Habitat Typing Training 3 RX burns on BTNF as FEMO 1 Teton Crew Type 2 IA assignment – FFT1 (T) FFT1 taskbook signed off 2 IA's in GTNP – ICT5 (T)
Kate Patronik Fire Effects Monitor	5/13/19	10/11/19	11	No	S-131 Forest Habitat Typing Training 2 RX burns on BTNF as FEMO(T) 1 Teton Crew Type 2 IA assignment – RX burn Worked on FEMO task book FALA taskbook signed off
Olivia Burke NPS ACE Intern	6/17/19	11/1/19	10	No	S-131 1 Teton Crew Type 2 IA assignment Detail with Saguaro Fire Module FALA taskbook signed off
Ray Lopez ACE NPS Academy Intern	5/13/19	8/16/19	7	No	S-130/190 S-212 First Aid, CPR Driver for Jackson Fire Cache for two days

Table 3a. 2019 Management Objectives and Monitoring Results for Grand Teton National Park

Monitoring Unit	Management Objective	Objective Achievement and Monitoring Results (Results with 80% confidence interval in bold)	Objective Achieved?	Year Analysis Completed (Range of Data [Yrs] Included in Analysis)
1999 Alder Fire	- Wildland fire used for resource benefit then converted to suppression. Track recovery of	- Strong shrub and tree recovery - Reduced invasive weeds in year 20 post burn as compared to 5, 10 years	Yes	Year 20 Post 1999-2019

	low, moderate, and high severity burn locations using photopoints.	post.		
2009 Bearpaw Bay Fire	Lightning-caused fire, managed for natural processes and suppression along one side. Track recovery in lodgepole pine and Douglas-fir according to severity levels using photopoints.	- Sparse lodgepole recovery in reburned area. Some Douglas-fir recovery. Minimal weeds.	Yes	Year 10 Post 2009 - 2019
Death Canyon Road Mechanical Thinning	Determine need for maintenance treatment in mechanical thinning unit ten years post.	-Photopoints and field visits show some increased ladder fuels and jackpots of woody debris, will postpone retreatment 2-5 years.	Yes	Year 10 Post 2007 - 2019
Powerline Watertank South Mechanical Thinning	Reduce down woody debris to less than 10 tons per acre Reduce visual obscurity to less than 20% 2 meters above ground level.	Total woody debris 21.2 tons per acre +/- 11.8 T/a. Visual obscurity 26-45%	Pre Data Only	Pre Treatment 2019
Signal Mt. Brinkerhoff Mx (Post)	-Reduce seedling and pole tree density (< 3" DBH) to less than 200 trees per acre -Reduce average visual obscurity to less than 20% below two meters over the treatment area -Reduce 1000 hour down woody fuels to less than 10 tons per acre	- Average seedling density decreased from 2072/acre to 794/acre, not a statistically significant difference. -Percent obscured is currently less than 20% above .5 meters and 31% below .5 meters. -Thousand hour fuels reduced from 12.5 tons/ac to 6.4 tons/ac (<i>n=10 stand exams</i>)	Yes Yes Yes	Additional Post Plots added in 2019 (2017-2019)
Sky Ranch Mechanical Thinning	-Reduce ladder fuels, dead and down fuel loading, and visual obscurity while retaining historic landscape values.	-Dead and down fuel loading is visually estimated to be up to 20 tons/ac Visual obscurity estimated to be above 20% 0-2m above the ground.	Pre Data Only Pre Data Only	Pre Treatment 2019
1994 Row Fire Sagebrush	Suppression fire in sagebrush vegetation from 1994. Burned considerable area of sage grouse habitat. Track sagebrush cover and height recovery.	Sagebrush cover has returned to 19.4%. Unburned control is 29-32%. Average sage height is 61.7 cm. Unburned control is 64-71cm	Yes Yes	Year 25 Post 2004-2019
Beaver Creek North Mechanical	Reduce dead and down fuel loading to 10 tons per acre or less Reduce visual obscurity to less than 20% between 0-2m Reduce seedling and sapling trees to fewer than 200 per acre.	Total down woody fuel loading is 6.5 tons per acre Visual obscurity ranges from 35-57% Sapling density is 220/acre Seedling density is 2020/acre	Pre Data Only	Additional Pre Treatment 2018-2019
2003 Blacktail Fire	Suppression fire in sagebrush vegetation from 2003. Burned considerable area of sage grouse habitat. Track sagebrush cover and height recovery.	Sagebrush cover has returned to 18.0%. Unburned control is 29-32%. Average sage height is 47.8 cm. Unburned control is 64-71cm	Yes Yes	Additional Photopoints Year 16 2003-2019
1999 Blacktail Area Bitterbrush Burns	Long term tracking of sagebrush height and percent cover and bitterbrush cover post burn	Sagebrush is nearly half of the percent cover in the control area 20 years post burn. Sagebrush plants in the burns	Yes	Year 20 Post 1999-2019

		average 47-56 cm, while control area sagebrush is 71 cm tall. Bitterbrush in the spring burn is 19.4 % cover. The fall burn is 7.2% cover, and the control area is 21.9% cover.		
1999 Cow Lake RX Burn	Regenerate and increase aspen trees Reduce fuel loading Reduce live conifer trees Track the long term effects on aspen and invasive weeds	Aspen regeneration and sucker survival in the burned areas has been negligible. Ungulate browsing (elk) is the likely reason for aspen suppression. Weeds continue to be a problem in the area, as they were prior to the burn.	Long and short term objectives were not met	Year 20 Post 1998-2019

Table 3b. 2019 Management Objectives and Monitoring Results for Bridger-Teton National Forest North Zone

Monitoring Unit	Management Objective	Objective Achievement and Monitoring Results (Results with 80% confidence interval in bold)	Objective Achieved?	Year Analysis Completed (Range of Data [Yrs] Included in Analysis)
2019 Trails End RX Burn	Blacken 25-50% of sagebrush/shrub vegetation creating a burn mosaic pattern Create younger aspen communities by burning 35-70% of stands. Monitor the condition of noxious weeds and cheatgrass in the burned area.	Photopoints show thick and dense sagebrush mixed with areas of sparse fuel. Some musk thistle present on the slope and spotted knapweed on the ridge Initial burn entry accomplished 80 acres in 2019	Yes, initial burn to be finished in 2020.	Pre and Immpost, partial burn 2019
2009 Lower Gros Ventre RX Burn (Phase II)	Reduce live conifer presence in aspen stands to promote aspen health and vigor on the landscape: >60% conifer mortality in treated aspen, >60% aspen mortality > 6"DBH. Track long term effects using photopoints at various severity levels	Aspen regeneration is most dense in moderate and severely burned areas. Five needle pine seedlings noted in severe areas 10 years post.	Yes	Year 10 Post Burn 2008-2019
1974 Breakneck Flats RX Burn Aspen	Original objectives for conifer mortality and aspen regrowth	Type conversion to sagebrush in heavily browsed areas since the 1974 burn. Some areas are recovering more aspen in recent years.	Yes and No	Year 45 Post Burn Photopoints
2014 Lower Palmer RX Burn	Blacken between 40 and 80% of sagebrush in the burn unit in a mosaic pattern Achieve at least 40% mortality of encroaching conifers in sagebrush Track long term effects using photopoints	Mosaic and Conifer mortality achieved in 2014. Fuel reduction remains effective and some sagebrush are seeding into the area.	Yes, photopoints only in 2019	Year 5 Post (2013-2019)
Turpin Meadows Summer Homes Mechanical Thinning	Thin and pile young trees and limb overstory trees to create defensible space around summer home sites.	Photopoints taken pre treatment show conifers have filled in since previous treatment and woody fuels have accumulated after bark beetle epidemic.	Pre Data Only	2019 only Pre Treatment

Dry Quad Aspen Slashing and RX Burn	Attain 2000-5000 aspen stems/acre at 6 ft height over 70% of the treatment area with a strong terminal leader within 5 years post treatment. Attain at least 1000-2000 aspen stems/acre at 10-15 ft height with a strong terminal leader, within 15 years post-treatment. Maintain ungulate herbivory levels at $\leq 30\%$ browse levels of terminal, main leader. Attain $\geq 85\%$ conifer mortality	Aspen sucker density averaged 2,406.7 (+/- 365) per acre. Browse impacts from ungulates appear to be minor with only 17% of the trees showing removal of the previous year's apical leader. Percent browse on aspen suckers was 17%	Pre treatment only	Pre Slashing 2019
Taylor Mountain RX Burn	Blacken 25-50% of the sagebrush/bitterbrush Blacken 35-75% of ground fuels within established aspen stands Track the percent cover and height of sagebrush and bitterbrush recovery post burn to evaluate long term treatment effectiveness and fire effects on vegetation. Monitor the condition of noxious weeds and cheatgrass in the unit to limit spread	Sagebrush percent cover ranged from 16.6% in Unit 1 to 27.6% in Unit 2 Bitterbrush cover averaged 13.1% overall with variable cover in the three units. Sagebrush height averaged 59.3 cm. Musk thistle and western salsify were sparsely distributed in the pre burn weed plots.	Pre treatment only	Pre Burn 2019
Mosquito Creek RX Burn	Reduce subalpine fir and lodgepole pine ladder fuels by 20-60% ($<6'$) Retain Douglas-fir trees over 16" dbh Kill more than 50% of conifer trees within the burn perimeter Attain 10-foot-tall aspen sucker density of at least 1000 stems per acre before 10 years post burn Monitor noxious weeds and cheatgrass	Pre burn only, additional photopoints added in 2019.	Pre Burn only	Pre Burn Additional Plots 2018-2019

Table 3c. 2019 Management Objectives and Monitoring Results for Bridger-Teton National Forest West Zone

Monitoring Unit	Management Objective	Objective Achievement and Monitoring Results (Results with 80% confidence interval in bold)	Objective Achieved?	Year Analysis Completed (Range of Data [Yrs] Included in Analysis)
Hams Fork Indian Creek RX Burn	Stimulate aspen regeneration to achieve a density of >1000 stems/ac within 15 years post-burn. Maintain ground cover at $<40\%$ bare soil at two years post-burn, and $<20\%$ bare soil at 5 years post-burn.	Aspen regeneration very dense with many above 3 ft. Browsing estimated to be 5% Ground cover shows 28% bare soil, meeting year 2 objectives Some thistles in high severity patches	Yes	Year 2 Post (2017-2019)
Hams Fork Basin Creek Slash and RX Unit 11n	Stimulate aspen regeneration to achieve a density of >1000 stems/ac within 15 years post-burn. Maintain ground cover at $<40\%$ bare soil at two years post-burn, and $<20\%$ bare soil at 5 years post-	Newly burned area experienced desired fire mosaic Later in summer aspen regeneration was overbrowsed Previous 2017 entry overbrowsed,	Yes and No	Immediate post and Year 2 post (2017-2019)

	burn.	multiple years		
Little Hornet RX Burn	Track the burn mosaic and determine percent blackened post burn Identification of noxious weeds and invasive annual grasses post burn Track the re-colonization of sagebrush and key mountain shrubs in the burned areas post fire. Reduce live conifer trees and regenerate aspen suckers to dominate the forested areas post burn.	Aspen sucker density 3050/acre in monitoring area Percent browsing 12% Overstory aspen 16/acre. Conifers 56/acre in aspen stand Sagebrush cover estimated 5-25% No weeds detected in high risk areas	Pre Burn Data Only	Pre Burn (2019)
Star Valley Front RX Unit 8 Strawberry Creek	Create a burn mosaic in vegetation types in the burn target area Achieve stand replacing fire in targeted stands Reduce fuels in targeted conifer stands	Visual obscenity 20-40% Woody fuel loading 18.8 tons/ac	Pre Burn Data Only	Pre Burn (2018-2019)
Hams Fork Hams Ridge Unit 8 Slash and RX	Stimulate aspen regeneration to achieve a density of >1000 stems/ac within 15 years post-burn. Maintain ground cover at <40% bare soil at two years post-burn, and <20% bare soil at 5 years post-burn.	Numerous stands of conifer-encroached aspen Little aspen regeneration occurring NO invasive weeds observed	Pre Data Only	Pre Treatment (2019)
Hams Fork Hams Ridge Unit 8 Slash and RX	Stimulate aspen regeneration to achieve a density of >1000 stems/ac within 15 years post-burn. Maintain ground cover at <40% bare soil at two years post-burn, and <20% bare soil at 5 years post-burn.	Thick subalpine fir stands with remnant aspen in overstory Minimal aspen suckering Canada thistle along northern boundary	Pre Data Only	Pre Treatment (2019)
Hams Fork Nugent Park Unit 2 Slash and RX	Stimulate aspen regeneration to achieve a density of >1000 stems/ac within 15 years post-burn. Maintain ground cover at <40% bare soil at two years post-burn, and <20% bare soil at 5 years post-burn.	Thick conifer stands with aspen growing along outer edges. Some regeneration in aspen, browsing minor. Invasive thistles along former timber harvest areas	Pre Data Only	Pre Treatment (2019)

Table 3d. 2019 Management Objectives and Monitoring Results for Bridger-Teton National Forest East Zone

Monitoring Unit	Management Objective	Objective Achievement and Monitoring Results (Results with 80% confidence interval in bold)	Objective Achieved?	Year Analysis Completed (Range of Data [Yrs] Included in Analysis)
Sylvan Bay Day Use Area Mech Thinning	Reduce fuels so that the FVS Fire and Fuels Extension model predicts flame lengths less than 4 ft, and Torching Index and Crowning Index wind speeds more than 30	-Predicted flame lengths post treatment are 2.2 ft. Torching Index: 122 mph	Yes and no	Post Pile Burn (2016-2019)

	miles per hour during 90th percentile weather conditions.	Crowning Index 20.5 mph		
Marsh Creek RX Burn (2004)	Treat 30-50% of the sagebrush having >15% canopy cover in a mosaic pattern within the project area. Attain >70% mortality of sagebrush plants in treated (burned) areas.	Achieved and measured with visual estimates immediate post burn. Blackened areas had nearly complete sagebrush mortality.	Yes	Year 15 Post (2004-2019)
Burnt Lake RX Burn (1997)	Improve age class diversity in shrub communities Increase the percent cover of grasses and forbs Maintain suitable ground cover	Sagebrush was removed from the plot areas and is only gradually returning to the site. Bitterbrush resprouted post burn at low density, and has not significantly returned to the sites. Grasses and forbs initially increased and still dominate the plots. Ground cover was not measured in 2019.	Yes	Year 22 Post (1993-2019)
Chicken Creek RX Burn (2009)	Treat 30-50% of sagebrush with 15% canopy cover or greater in a mosaic pattern over the landscape. Attain 60% ground cover in treated sagebrush/grass areas within 2 years post burn and 80% within 5 years post burn Attain 1000 aspen stems per acre in burned aspen areas that are 10 feet tall within 15 years	Achieved burn mosaic objectives according to post burn mapping in 2009. Ground cover achieved 5 years later in Stand 1, not yet achieved in Stand 2 in Year 10 post burn. Ten years post burn, one aspen stand had 4663.3 suckers per acre and 76.7/acre over 10ft. The other stand had 3670/acre suckers and 176.7/acre over 10 ft.	Yes and No	Year 10 Post (2008-2019)
West Fortification slash and RX Burn FEMO Report	Consume greater than 80% of the 10s, 100s and 1000 hour (sound and rotten) dead fuel over the targeted area of activity slash within the Unit Boundary by creating 2-7 foot flame lengths during the ignition period of implementation. Restrict mortality of Douglas fir and whitebark pine trees to 10% or less over the Unit Area by limiting scorch height to less than 10 feet during ignition phase of implementation.	Woody fuels and fire behavior consumption achieved according to estimates post burn Douglas-fir and whitebark pine will be assessed in year 2 post.	Yes	Immediate Post (2017-2019)
Maki Creek 2 Slashing and RX Burns (2009)	Obtain aspen sucker (>10ft) density of 1000 stems/acre 15 years post-burn and/or post-thin.	Average total aspen sucker density year 10 post burn was 3983/acre with 731/acre over 10ft tall.	Likely in 2024	Year 10 Post (2006-2019)
Cottonwood II Unit 11 (Nylander) and Unit 13 slash and RX Burns	Attain > 1000 stems per acre in burned aspen areas ≥ 2 meters tall within 15 years post burn. Attain 60% ground cover in burned aspen areas within 2 years post burn and 80% within 5 years post burn.	Average total aspen sucker density year 5 post burn was 1997/acre Ground cover was 96% five years post burn.	Likely in 10 years Yes	Year 5 Post (2006-2019)
Cottonwood II Unit 12 (Sjoberg) slash and RX Burn FEMO Report	Achieve flame lengths ≥ 2 feet to kill > 40% parent aspen trees. Obtain aspen sucker (≥ 10 ft. height) density of 1000 stems per acre 10-15 years post-burn. Maintain or increase ground cover to $\geq 60\%$ within 2 years post-burn and $\geq 80\%$ within 5 years post-	During and immediate post monitoring only	N/A	Immediate Post (2006-2019)

	burn.			
	Reduce activity created slash fuels to 5-7 tons/acre.			

B. Program Information

Table 4. Planning - 2019

Unit	Does Unit have written Desired Future Conditions? (yes or no)	Date Unit-level Monitoring Plan completed (or revised)	Total # of Project- or Community-level Monitoring Plans (not just 2019)	Assisted with how many BAER/BAR plans in 2019?
Grand Teton National Park and John D. Rockefeller Parkway	Yes – 2005 FMP	2009	46	0
Bridger-Teton National Forest North Zone	Yes 1990 Forest Plan, to be revised in 2020	2006	26	0
Bridger-Teton National Forest East Zone	Yes 1990 Forest Plan, to be revised in 2020	2006	29	1
Bridger-Teton National Forest West Zone	Yes 1990 Forest Plan, to be revised in 2020	2006	17	0
Bighorn Canyon National Recreation Area	Linked to historic fire regime 2004 FMP	Covered by GRTE's 2009	5	0
Fossil Butte National Monument	Linked to historic fire regime 2005 FMP	Covered by GRTE's 2009	1	0

Table 5. Monitoring – 2019

Unit	% 2019 Data Entered	% 2019 Data Quality Checked	# Prescribed Fires Monitored*	# Non-fire Fuels Treatments Monitored*	# Wildfires Monitored *	# BAER/BAR Treatments Monitored*
Grand Teton National Park and John D. Rockefeller Parkway	100%	100%	4	7	4	1

Bridger-Teton National Forest North Zone	100%	100%	6	2	0	0
Bridger-Teton National Forest West Zone	100%	100%	7	0	0	0
Bridger-Teton National Forest East Zone	100%	100%	6	1	0	0
Bighorn Canyon National Recreation Area	N/A	N/A	N/A	N/A	N/A	0
Fossil Butte National Monument	N/A	N/A	N/A	N/A	N/A	0

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

Table 6. Communicating Results – 2019

Unit	# of Project Monitoring Reports completed in 2019	# of Annual Fire Effects meeting(s) with staff	# of Formal presentations of results	Do you use Minitab?*
Grand Teton National Park and John D. Rockefeller Parkway	8	1	2	No
Bridger-Teton National Forest North Zone	8	2	1	No
Bridger-Teton National Forest West Zone	3	1	1	No
Bridger-Teton National Forest East Zone	10	2	1	No
Bighorn Canyon National Recreation Area	0	0	0	No
Fossil Butte National Monument	0	0	0	No

JFSP Fire Science Exchange Networks

Grand Teton Fire Ecologist Diane Abendroth is on the Board of Directors for the Northern Rockies Fire Science Network. This involves working with the organization's staff and other board members to develop priorities for future field trips, publications, webinars, and videos. There is also an opportunity to network with fellow managers and researchers to further the organization's goals. In December, Diane represented the NRFSN at the annual Wyoming Prescribed Fire Council meeting.

Table 7. Research – 2019

Units	Are research needs identified in FMP or Monitoring Plan? (yes or no)	# of Proposals Submitted in 2019	# of Proposals Funded in 2019	# of Research Projects Supported in 2019*	Additional Comments
Grand Teton National Park and John D. Rockefeller Parkway. Also includes Yellowstone NP, Glacier NP and the BTNF	Yes but dated	4 (As collaborators)	2	4	Includes two funded Fuels Reserve Projects, one JFSP GRIN proposal, one NAS Science Communication proposal, one Conway Fellowship, and the Camp Monaco Prize.

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



Reserve Fund Research

Grand Teton has a three Reserve Fund research projects in progress.

A paper “Can wildland fire management alter 21st-century subalpine fire and forests in Grand Teton National Park, Wyoming, USA?” based on a Fuels Reserve grant project will be published in Ecological Applications. The study area includes the northern portion of Grand Teton National Park and the John D. Rockefeller Parkway.

A second Fuels Reserve project is underway with the University of Wisconsin that is testing the use of LiDAR in measuring and mapping forest fuels in the mixed conifer vegetation of Grand Teton. It will capitalize on LiDAR data obtained with financial support from the Fuels Reserve Program in 2014.

Outcomes from the study are expected in 2020. They will include maps of fuels and fuel models suitable for use in IFTDSS and FlamMap models. The investigator, Kristin Braziunas from the University of Wisconsin, will also test the use of LiDAR in quantitatively comparing fuels in treated vs. untreated areas (or pre vs. post treatment). The Berry Fire may provide an opportunity to examine pre vs. post fire fuels according to severity levels as well.

The third project is a collaboration with the University of Wisconsin at Madison and Yellowstone, Glacier, and Grand Teton National Parks. It will study the drivers of postfire tree regeneration in burned areas under future climate scenarios in the three parks. It will help

determine the factors associated with the highest resilience and vulnerability. When these are understood, fire managers will be better informed of the risks and benefits of unplanned fires in the future. Field work will begin in the summer of 2020.

C. Fire ecologist accomplishments and areas of focus

The Teton Interagency Fire Ecologist position covers both Grand Teton National Park and the Bridger-Teton National Forest. The top emphasis areas from both agencies are fire effects monitoring, planning, and wildland fire decision support.

Diane Abendroth has been working in the Fire Ecologist role for over 10 years. On the Grand Teton National Park side, Diane is also involved in supervision, budget, and administrative duties. In 2019, this included hiring for the career seasonal Lead Fire Effects Monitor and seasonal crew. On the Forest side, planning work for the Land and Resource Management Plan revision is becoming a larger workload. As with the Grand Teton Fire Management Plan update, the process has been delayed with staff turnover and the Federal furlough.

One of the larger planning activities this year is the Teton Interagency Quantitative Risk Assessment. This is a geospatial analysis of fire probability and effects to highly valued resources and assets on the Bridger-Teton National Forest and Grand Teton National Park. The analysis is done by a contractor, but there is a lot of GIS work and coordination with resource management and leadership colleagues. The results will inform our responses to unplanned fires and help priorities areas for fuels treatments.

For wildland fire decision support, Diane was an LTAN for Great Basin Type 2 Team 6 (Chadwick). There were no call-outs during 2019. Diane also teaches S495, S590, and local WFDSS refreshers to keep up to date on fire behavior modelling technology. The S495 class is a significant workload with regular updates to the curriculum.

See Table 8 for specific projects and accomplishments for 2018.

Table 8. Fire Ecologist 2019 Accomplishments/Focus Areas

Category	Percent Time	Accomplishments and/or areas of activities
Planning	15%	• BTNF Forest Planning Steering Committee • GTNP Invasive Species Control EA ID Team • BTNF East Zone Monument Ridge EA ID Team • Initial GRTE FMP revision planning • Teton Interagency Quantitative Risk Assessment

Category	Percent Time	Accomplishments and/or areas of activities
Presentations	10%	• Fire Effects Reports and 20 year lessons learned to BTNF Zones and GRTE Resource Management • S495 Lesson development and presentation, NAFRI • WFDSS Refreshers • Wyoming Prescribed Fire Council Presentation on Monitoring and Fire Effects on aspen, bitterbrush, and conifers. • Aspen fire ecology field trip with Caribou-Targhee NF and Western Aspen Alliance. • Radio appearance KHOL about how we track fire danger • S290 Unit Instructor
NPS and Interagency Meetings/ task groups	7%	• BTNF Forest Plan Revision Steering Committee • GRTE Wilderness Committee • BTNF Fuels Committee • S495 Steering Committee • Northern Rockies Fire Science Network Board • NWCG Advanced Fire Environment Learning Unit
Interagency work	18%	Extensive Interagency work with Bridger-Teton NF as Fire Ecologist and Monitoring Program Manager
Wildfire assignments	4%	• Great Basin Team 6 LTAN • Remote LTAN fire behavior modelling assistance to IMR parks and Wyoming Type III Teams • PLSC3T for Saddle Butte Fire • FFT2 on Engine 301 for 2 IAs
Prescribed fire projects	4%	• RXB3 Whitegrass Piles • FFT1 Other pile burns and Taylor RX • FEMO West Fortification RX and Trails End RX •
Non-fire fuels projects	1%	• Planning, field trips, monitoring design.
Research	6%	• Co-author for paper to be published on Fuels Reserve project with Univ. Wisconsin and Columbia U. • Fuels Reserve Grant Admin: Drivers of Postfire Tree Regeneration in GRTE, YELL, GLAC • Assistance with LiDAR mapping project funded by Fuels Reserve • Assisted with BTNF Penn State fire ecology project funded by JFSP GRIN. • Collaborated on additional grant proposals to JFSP GRIN, Conway Fellowship, NAS that were not funded

Category	Percent Time	Accomplishments and/or areas of activities
Data collection	3%	Fire Effects Data collection, Interagency cheatgrass monitoring transects on Wind River front, Assistance with LiDAR research project ground truthing
Data entry	2%	Minimal
Data analysis	5%	Annual Fire Effects data analysis workload
Supervision/Admin	18%	Supervised • 1 GS 6 Permanent Career Seasonal Lead Fire Effects Monitor • 1 seasonal GS 6 Fire Monitor • 1 Seasonal GS 5 Fire Effects Monitor • 1 ACE Fire Effects Intern • 1 ACE NPS Academy Intern Hired • 1 Permanent GS 6/7 Lead Fire Effects Monitor • 1 Seasonal GS 6 Fire Monitor • 1 seasonal GS 5 Fire Effects Monitor Negotiated For: • 1 permanent career seasonal GS 6 Assistant Lead FEM funded by BTNF
Training	1%	• IFTDSS – Self Guided • NRTC RED, NRTC Remote Education Workshop (Avenza, PLSC3 skills, Google Earth, Survey 123, CalTopo)
Travel out-of-park for plot or project work	1%	• Fire Effects Data Collection - BTNF East and West Zones
Miscellaneous	5%	• Fire Communication Education grant projects – help with Fire History Audio Tour and GRTE web fire page revisions • Host Argentinean FMO from sister park (Los Glaciares)

D. Fire effects crew accomplishments and areas of focus

The fire effects crew for 2019 was led by new Lead Fire Effects Monitor Jill Stephenson, who was a crew member during the past three seasons. There were three other crew members including Kate Patronik (GS5 seasonal), Olivia Burke (Fire Effects ACE volunteer), and Ray Lopez (NPS Academy intern).

The Interagency Fire Effects program has many moving parts with three USFS zones and three park units to serve. With project level monitoring, there are many protocols and field visits to plan and coordinate over a large landscape. The program must prioritize activities that promote adaptive management and support fire managers as much as possible. Monitoring protocols are targeted to stated objectives, and additional “nice to have” data collection is rare.

Not only do the fire effects crew members do a lot of field work, but they also try to be proficient and competent in fire operations as well. This helps them integrate with fire managers and better

understand how to support them. GRTE’s fire effects crew is well respected for their solid fireline skills, leadership, fitness, and excellent FEMO work.

On top of the busy field and fireline schedules, the Teton fire effects crew members are interested in the big picture of adaptive management and fire ecology. Over the years they have begun to participate more and more in compiling and analyzing their own data. While this is not required of them, they make it a priority because they want to see the results of their work and participate in sharing it with their colleagues.

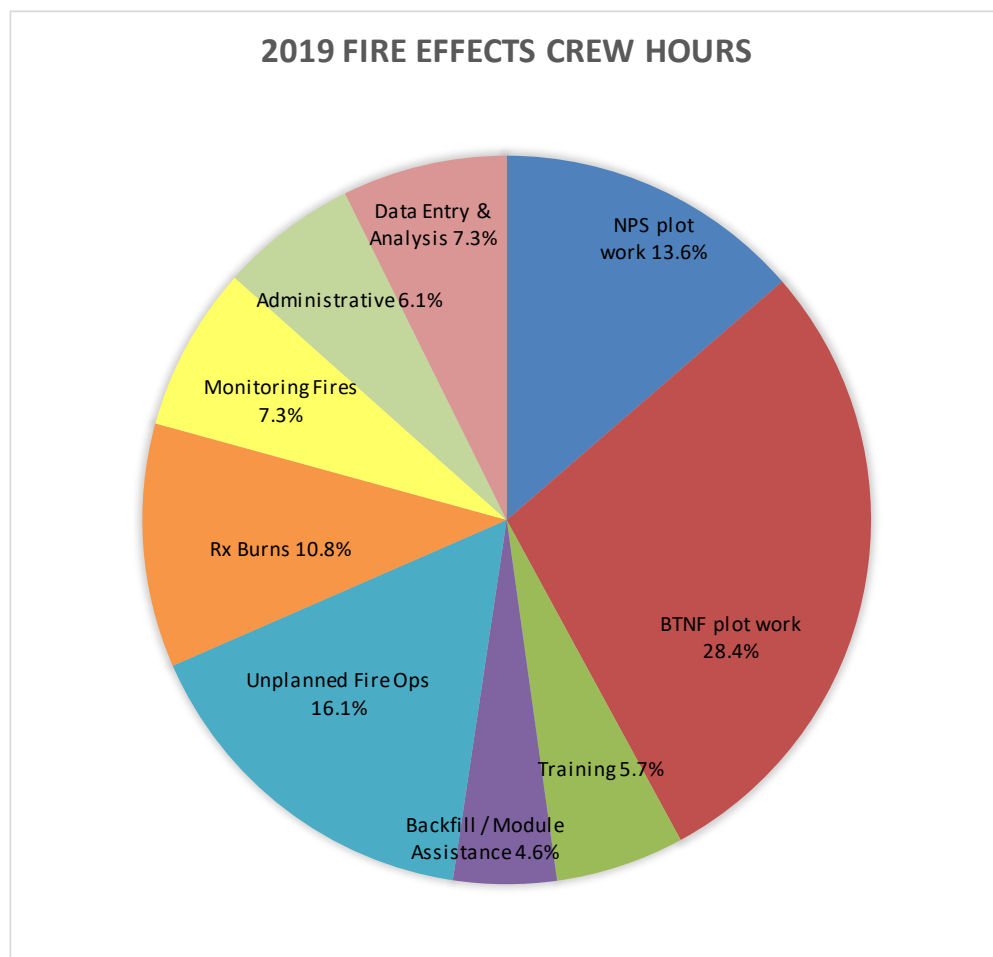


Table 9. Fire Effects Crew 2019 Accomplishments/Focus Areas

Category	Percent Time	Notes
FMH plots	0%	
CBI plots	0%	
Other plot work	42%	14% was for GTNP, 28% BTNF. Plot types include Stand Exams, Sage Intercepts, Aspen Circles, and Photopoints
Wildfire assignments	23%	Fire assignment details include: Teton Type II Crew, FEMOs on Teton County’s Museum Fire, and GTNP Type 6 Engine. Crewmember detail with Saguaro Fire Module (“Monitoring Fires” on pie chart)

Prescribed fire projects	11%	The Fire Effects crew participated in four RX burns implemented on the Bridger-Teton NF, and one RX burn on the Caribou Targhee NF. The crew's role in the burns on the Bridger-Teton was as FEMO's, collecting fire weather and fire effects observations.
Backfill/Module Assistance	5%	Members of the crew backfilled and provided assistance throughout the season with Teton Interagency Helitack and GTNP Type 4 Engine.
Data entry and Analysis	7%	All data entry and quality checking was completed by the FX Crew. Lead monitor and extended seasonals assisted with data analysis.
Supervision/Admin	6%	Payroll, travel authorization/voucher, etc.
Training	6%	S-215, L-280, S-130/190, and orientation for new crewmembers

Figure 2. Fire Effects Crew 2019 Activity Chart



E. 2020 Direction

Our goals for 2020 are centered around strengthening the foundations of the Teton Interagency Fire Effects Crew and providing the best possible support to our agencies' fuels programs. It is time to update the monitoring plans for the park and forest. The monitoring program has

evolved somewhat since that latest documents were written. Revising them will also be an opportunity to engage and remind our colleagues about our role in adaptive management.

In 2020 we will recruit and hire an interagency GS6 career seasonal Assistant Lead Fire Effects Monitor. This will bring our program up to full strength with sufficient field supervision, better employee retention, and greater depth for tracking our many projects.

Our interagency program often struggles with internet based firewalls between the DOI and USDA. In the coming year we will be obtaining credentials for more of our employees to access the fsweb. Diane Abendroth has recently obtained a login for the USDA network, which greatly helps with project tracking and making our reports and data more available to the BTNF fuels group.

Finally, the Fire Effects Crew will experiment with using Arc Collector to collect photopoints and navigate to plots. In this way we will share GIS information in much the same way as resources on an incident do.

F. Overall Data Entry Status and FFI suggestions

All of the Teton Interagency Fire Effects data is stored in one FFI database. It is accessed from a remote desktop server connection maintained at the park. This works well, but only one person can be on the server at a time. We are eagerly looking forward to the cloud-based FFI in the coming years.

75% of the fire effects data is entered into FFI. What remains are a couple of protocols for which excel is still the best way. These spreadsheets are organized on a network server with daily backups. The excel data is more prone to errors, but there is an established checking system to make sure formulas are correctly applied.

MS Excel is used exclusively for conducting statistical analysis. This usually consists of summarizing dataset means, percent changes, and confidence intervals at the 80% level.

Photopoint data is also located on the network server. Powerpoint presentations are used to display time series comparisons and produce printouts for field use.

We do not anticipate additional data conversion needs, however we might be uploading many photopoints to Arc Collector for field use instead of print outs.

G. Optional Information Fire and Fuels Monitoring

Grand Teton National Park's Fire Monitor, Ron Steffens, works within the fire ecology group. This seasonal position manages the fuel moisture and fire danger tracking for the park and forest. For the past 20+ years, Ron has maintained six fuel moisture monitoring sites within the park. Ron also produces seasonal and monthly outlooks for the Teton Dispatch area and updates the

website to help with fire danger decisions. These outlooks are found at <https://gacc.nifc.gov/gbcc/dispatch/wy-tdc/home/predictive-services/outlooks>.

New Media Projects:

See the links below for new educational material about Grand Teton's fire ecology (funded by regional Comm-Ed Grants!)

- Grand Teton National Park Fire History Audio Tour (new in 2019):
<https://www.nps.gov/grte/learn/nature/fireaudiotour.htm>
- Grand Teton national Park Wildland Fire Web Page (Updated in 2019)
<https://www.nps.gov/grte/learn/nature/wildlandfire.htm>