



Teton Interagency Fire Fire Ecology Annual Report Calendar Year 2020

Jill Stephenson, Paul Hood, Olivia Burke, Krista Reicis, Ron Steffens, Diane Abendroth
Grand Teton National Park and the Bridger-Teton National Forest



The 2020 Fire Effects Crew practicing social distancing in 2020

A. Summary

This year marked the 21st anniversary of the Teton Interagency Fire Effects Monitoring program. The program facilitates analysis of wildfire trends and monitoring of mechanical thinning and prescribed fire projects, in addition to tracking the effects of unplanned wildfires, throughout GRTE and the Bridger-Teton National Forest (BTNF). The program houses the Teton Interagency Fire Effects crew, which is based and hired out of Grand Teton National Park (GRTE). Diane Abendroth continues to oversee the Fire Effect Monitoring program, and supervise the Fire Effects crew, as the Teton Interagency Fire Ecologist. Ron Steffens is the program's Fire Monitor, who also provides fuel moisture sampling, outlooks, and tech support for websites, mobile devices, and other multi-media tools.

Fire Effects crewmembers spend their season collecting monitoring data throughout the GRTE and BTNF and are also available to serve as Fire Effects Monitors (FEMO) and wildland firefighters on local and national wildfire incidents. In 2020, Lead Fire Effects Monitor, Jill Stephenson completed her second year in this position before leaving on a detail to Capital Reef National Park as an Ecologist in October. Through an ongoing agreement with the BTNF, a GS-6 career seasonal position was added to the Fire Effects crew in an effort to build a crew structure that incentivizes employee retention. Paul Hood was hired into this position in June of 2020. Typically, the Fire Effects crew hires two GS-5 positions and ACE National Park Service (NPS) Academy intern. The ACE intern was not hired this year due to a housing shortage resulting from the Covid-19 pandemic. After two seasons an ACE intern on Fire Effects Crew, Olivia Burke returned as a GS-5. Krista Reicis joined the crew this year in the remaining GS-5 position.

In 2020, the Fire Effects crew successfully collected extensive pre- and post-monitoring data on a variety of projects throughout the North, East and West Zones of the BTNF, and GRTE (Table 1). Data consisted of collecting tree plot data, photo points, stand examinations, shrub cover and line point intercepts. Crewmembers also participated as active members in fuels thinning and hazard tree mitigation projects in GRTE, in addition to backfilling on engines during their days off.

The fire season was extremely busy throughout the western United States, but there were average numbers of local fires in Western Wyoming. Members of the Fire Effects program were called upon as firefighters to aid with local initial attack and as FEMOs on large fires at other national parks. The entire Fire Effects crew completed a 19 day assignment on the Lone Star Fire, in Yellowstone National Park, where they served as FEMOs. Two members of the fire effects crew joined GRTE Engine 301 on the Mullen Fire, located in in southern Wyoming. The other two members remained local and were assigned to the Kerr Fire, on the BTNF, as an initial attack resource. Additionally, one member was assigned to Saguaro National Park and two members were assigned to Yosemite National Park to complete post-fire assessments.

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 worked with our cooperators from the Wyoming Game & Fish Department Wildlife and Habitat biologists, and from Sublette County Weed and Pest Resource Specialists. BTNF Zone fuels employees, Fire Module crewmembers, and Engine 301 also assisted.

Table 1. 2020 Plot Workload

Park/ Forest	Monitoring Unit	Plot Type	Pre-burn/ MX 2020	Immed. Post 2020	Postburn (1-20 yrs) 2020	Annual Total (2020)	Total Plots
Grand Teton National Park	Sage Strips Airport Road	Photopoints			2	2	2
	Ditch Creek Mechanical	Photopoints			1	1	1
	Shadow Mountain MX	Photopoints			3	3	3
	Matilda RX	Photopoints Aspen Circles			11 30	11 30	41
	Signal Mountain Lower End	Photopoints Stand Exams		10		10	10
	Diamond L RX	Photopoints Aspen Circles			6 90	6 90	96
	Lower Gros Ventre Phase III RX	Photopoints Aspen Circles			6 60	6 60	66
	Rec Trails MX	Photopoints Stand exams		7 20		7 20	27
	Boulder Fire	Photopoints			2	2	2
	Red Top MX	Photopoints Stand exams	5 10			5 10	15
	Dry Quad MX	Photopoints Aspen Circles	4 30			3 30	33
West Zone Bridger-Teton NF	Bradley Mountain	Photopoints Aspen Circles			12 30	12 30	42
	Spring Creek RX	Photopoints Shrub Cover			5 1	5 1	6
	Blind Trail Fire	Photopoints			12	12	12
	Pole Creek RX	Photopoints Aspen Circles			10 30	10 30	40
	Hams Ridge WFU	Photopoints			2	2	2
	Hams Fork Basin Creek	Photopoints Aspen Circles Cover			4 30 20	4 30 20	54
	Hams Fork 7 Acre Unit	Photopoints			1	1	1
East Zone Bridger-Teton NF	Fremont II RX	Photopoints Aspen Circles BFH plots			7 30 3	7 30 3	40
	Willow Rim RX	Photopoints Aspen Circles			3 30	3 30	33
	Fremont Ridge RX	Photopoints FMH brush plots			6 6	6 6	12
	Cooperative Cheatgrass Monitoring	Photopoints Line Point Intercepts		2 2		2 2	4
	West Fortification Mtn Units 4 & 5	Photopoints Stand Exams			11 6	11 6	17
	Elkhart Park	Photopoints Stand Exams			4 11	4 11	15
	Fremont Campground	Photopoints	3			3	3
	East Fortification Mtn	Photopoints		6		6	6
	Monument Ridge Unit 2	Photopoints Aspen Circles Sage Transects			5 30 30	5 30 30	65
	Cottonwood II Unit 1	Photopoints			1	1	1

	Monument MX/RX Units 1-13	Photopoints Aspen Circles	13 90			13 90	103
	Monument Thin and Pile Unit E	Photopoints Stand Exams	4 10	4		8 10	18
Total			172	51	551	774	774

This year marked Jill Stephenson’s fifth year with the GRTE Fire Effects Program and her second year as the crew lead. Her experience with the program was instrumental in hiring the excellent field crew and orchestrating a successful field season. The hiring of the new GS-06 career seasonal Assistant Lead position brought additional leadership to crew. Paul Hood was chosen for this position and joined the crew one pay period after the seasonal employees started. His wildland fire, fuels and fire ecology research background allowed for quick integration into the Fire Effects program.

The GS-05 seasonal employees, Olivia Burke and Krista Reicis, started May 25th and remained employed unit late October/November. Olivia’s previous two years of experience with the Fire Effects crew and Krista’s background in forest ecology and forest mensuration protocols allowed for all members of the crew to provide exceptional contributions to the data collection efforts and overall efficacy of the season. All crewmembers participated in several training opportunities that contributed to their professional development and the crews’ overall ability to assess monitoring objectives and participate in fire related management activities.

Ron Steffens returned for his 29th season at GRTE as the Fire Monitor. He filled in as the GRTE Duty Officer several times throughout the fire season and served his 8th season on the Wyoming IMT3 team as ICT3.

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 2020

Ecologist and Monitors	Starting Date	Ending Date	# of Pay Periods	READ Qualified (Yes or No)	Training and Development
Diane Abendroth Fire Ecologist	1/1/20	12/31/20	26	Yes	
Ron Steffens Fire Monitor	5/11/20	9/12/2020	10	Yes?	Duty Officer, GRTE and Coronado NF/Saguaro NP LTAN and district liaison, Bighorn Fire, Coronado NF ICT3, Wyoming Team, Lonestar Fire, Yellowstone NP COVID Wildland Response Simulation Off-season work: ICT3, Cataline Fire, Coronado NF LSC3, Round Valley Fire, Coronado NF Completed term (10 years) as editor of Wildfire Magazine Adjunct Graduate Faculty, Prescott College
Jill Stephenson Lead Fire Effects Monitor	2/2 3/29	3/6 10/11	2.5 15	No	M-410 L-380 1 RX burn on CTNF as FEMO 2 WF assignments as FEMO and FFT1 1 WF assignment as IC5
Paul Hood Assistant Lead Fire Effects Monitor	6/8/20	12/31/20	15	No	L-280 FFI Online Training 1 RX burn on BTNF as FEMO (T) 3 WF assignments as FEMO (T) and FFT1 (T) FEMO taskbook signed off FFT1 taskbook signed off Faller 2 taskbook signed off
Olivia Burke Fire Effects Monitor	5/25/2020	11/6/20	12.5	No	L-280 S-290 1 RX burn on BTNF as FEMO (T) 3 WF assignments as FEMO (T) and FFT1 (T) FEMO taskbook signed off
Krista Reicis Fire Effects Monitor	5/25/2020	10/30/20	12	No	S-290 1 RX burn on CTNF as FEMO (T) 3 WF assignments as FEMO (T)

Each monitoring project below is summarized according to how objectives were described and monitoring results assessed success.

Table 3a. 2020 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)
Sage Strips Airport Road	Reduce shrub cover along road to airport.	Achieved, with unintended consequences for invasive species	Yes and No	Year 10 Post

Ditch Creek Mechanical	Reduce dead and down fuel loading to 10 tons per acre or less. Remove all conifer ladder fuels (limb trees, remove regeneration). Increase tree spacing and distance to 10-12 feet (1500 stems per acre) between trees or groups of trees.	Achieved post treatment, remains below objective Ladder fuels have not recovered	Yes	Year 10 Post
Shadow Mountain MX	Reduce dead and down fuel loading to 10 tons per acre. Remove all ladder fuels (limb trees, remove conifer regeneration). Increase tree spacing distance to 10-12 feet (1500 stems per acre) between trees or groups of trees. Reduce visual obscenity in the available forest understory (conifer regeneration and branches) to less than 20% below 1.5 m (as an index of stand ladder fuels)	Fuel loading objective nearly reached (objective is within confidence interval) post treatment but some rotten logs remained Shrubs remain in understory but are not as flammable as conifers Achieved but aspen is not a concern for crown fire. Ten years post treatment the reduction effects still remain.	Yes	Year 10 Post
Matilda RX	Reduce down woody fuel loading to less than 10 tons per acre Reduce average fuel bed depth to less than 2" Reduce the probability of torching by at least 50%, and torching and crowning indexes to greater than 30 mph under the 90th percentile fire weather conditions Monitor the distribution of exotic thistle species in the unit pre and post treatment up to 2 years post. Evaluate burn mosaic to determine burn extent and percent blackened Attain at least 1000 aspen suckers per acre over 10 feet in height by 15 years post treatment in the designated stand. Progress will be monitored 2, 5, and 10 years post burn.	Original burn objectives were not met in conifer stands Aspen objectives evaluated in 2020. Five years post burn sucker density averaged 1357 stems per acre, not statistically different from pre burn estimates. Regeneration has thinned and browsing may be suppressing the stand, long term objectives may be difficult to attain.	No Not Yet – Evaluate Year 15 Post	Year 5 Post
Signal Mountain Road MX	Reduce average visual obscenity to below 2 meters over the treatment area. Reduce seedling and sapling tree density (<3" DBH) to less than 200 trees per acre post thin. Reduce 1000 hour down woody fuels to less than 10 tons per acre.	Achieved substantial and significant decrease in saplings to less than 200/acre and no significant different in seedlings, many of which are very small. Not achieved, mean tons per acre of woody fuels 25.2	Yes and No	Summary of all blocks post treatment

Table 3b. 2020 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)
Dry Quad MX	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.	Pre treatment aspen sucker density 2406.7 per acre on average, Browse on suckers was 17%.	Pre Treatment Data only	Pre Bum Post slashing
Diamond L RX	Kill 50-80% of the overstory trees (over 5.9" dbh) and 85% of conifers in the identified stands. Produce 1000+ live aspen stems per acre over 10 feet in height within 15 years post fire. Maintain less than 20% bare soil within 5 years post fire.	Overstory mortality was not achieved post burn Year 10 post burn 2 of 3 stands met this objective. One stand did not produce the desired density and height results.	Yes and No	Year 15 Post
Lower Gros Ventre Phase III RX	Reduce live conifer presence in aspen stands by $>60\%$ to promote aspen health and vigor. Reduce live aspen overstory tree density by $> 60\%$. Attain at least 1000 aspen stems per acre at 10 ft or taller within 15 years post burn in treated aspen stands. Maintain aspen browse levels at less than 30% on terminal leaders.	Aspen overstory and conifer mortality not achieved post burn but burn severity was good. Sucker regeneration height and density still below the year 15 objective but are likely on track for 2025.	No and Not Yet	Year 10 Post
Rec Trials MX	Decrease visual obscurity to 30% two years post or when pile burning is completed. Fuels loads reduced to 6 T acre⁻¹ two years post or when pile burning is completed. Remaining over story tree density of 70-150 stems/ac two years post or when pile burning is completed. Decrease densities of conifers around aspen clones two years post or when pile burning is completed. Double aspen sucker density in 10 years in plots where aspen existed pretreatment.	Total woody fuel loading was 12.1 tons per acre Overstory tree density reduced to 69/ac Photopoints show some openings in conifers around aspen stands. Aspen suckering has not had time to respond to the thinning treatment.	Yes and No	Post Treatment
Red Top MX	Reduce down woody fuels to 5.6-8.4 tons per acre (7 tons +/- 20%). Other objectives to be determined	Pre treatment fuel loading was 5.9 tons per acre.	Pre Treatment data	Pre Treatment Data

Table 3c. 2020 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)
Bradley Mountain	Treat 30-60% of the project area, with a focus on mapped high and moderate priority areas (identified according to wildlife habitat values) east of the Alpine viewshed, while also treating lower priority areas to the extent feasible. Attain 10 foot tall aspen sucker density of at least 1000 stems per acre at or before 15 years post burn. Achieve 40-80% mortality of encroaching conifers.	Burn mosaic blackened 46% of the unit. Only 180 suckers per acre in the over 10' height class ten years post burn Photopoints show most conifers were killed in the stand, but there is not quantitative data.	Yes Not Yet Yes	Year 10 Post
Spring Creek RX	Enhance vegetation health and improve wildlife habitat. Track shrub recovery to better understand fire effects	At 25 years post burn, sagebrush density and cover are only a fraction of pre burn measurement. Bitterbrush is beginning to return to nearly 50% of the pre burn measures. Rabbitbrush cover has nearly doubled since the burn.	Yes	Year 25 Post
Blind Trail Fire	Track post fire forest regeneration and other fire effects	Aspen and lodgepole pine are regenerating, mixed conifer is taking longer. Some cheatgrass found in burned Douglas-fir stands. Invasive thistles common.	Yes	Year 20 Post
Pole Creek RX	Blacken 30-60% of mountain shrubs and sagebrush, 80% of conifer forest, and >80% of conifer-encroached aspen. Reduce live conifer and overstory aspen trees. Regenerate > 1000 live aspen suckers per acre over 10ft tall, 15 years post burn. Track the fire effects on the sagebrush community and subsequent recovery.	Mosaic objectives probably reached but more units may be burned. One aspen monitoring stand was burned. Year 3 monitoring showed 77% reduction in conifer density. Average aspen sucker density was 1076/acre. Suckers had 70% browsing, a cause for concern about long term viability.	Yes Not yet	Year 25 Post
Hams Ridge WFU	Track post fire forest regeneration and other fire effects	Aspen stands are growing vigorously. Mixed conifer showing minimal seedlings and saplings with mainly forbs.	Yes	Year 15 Post
Hams Fork Basin Creek	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.	Average aspen sucker density increased significantly after the treatment from 2227 per acre to 14583 per acre. Browsing was 21%, reduced from 51% in 2016. Percent cover of bare soil was 13%	Preliminary results are encouraging Yes	Year 2 Post
Hams Fork 7 Acre Unit	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,	Aspen was not found in this unit pre burn but any new populations will be noted in the coming years. Photopoints show herbaceous plants and sagebrush, no conifer seedlings yet.	Yes	Year 3 Post

	and <20% bare soil at 5 years post-burn.			
--	--	--	--	--

Table 3d. 2020 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)
Fremont II RX	Treat 30-50% of sage/grass communities having >15% canopy cover in a mosaic pattern within the project area. Increase aspen suckering from 100-200 stems/acre to at least 5,000 stems/ac three years post-burn. Attain 10+ foot tall aspen sucker density of at least 1000/ac at or before 15 years post-burn (in burned stands). Attain >80% ground cover in sagebrush/grass communities and aspen communities within 5 years post-burn.	Sagebrush density in the burn remains greatly reduced (less than 10% of control). Bitterbrush is similar to control 15 years post burn (809 plants per acre). Average density of suckers over 10 ft tall was 950 in year 11 and 1370 year 15 post.	Yes Yes	Year 15 Post
Willow Rim RX	Attain 1000 stems per acre in burned aspen areas $\geq$ 10 feet 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.	Overall sucker density was 3080 per acre 15 Years post burn Average stems per acre over 10 ft tall was 860, not quite reaching the objective Bare soil cover was 10% two years post burn meeting the objectives.	No Yes	Year 15 Post
Fremont Ridge RX	Detect at least a 200% increase in bitterbrush density three years post burn. Detect a 50-80% reduction of sagebrush cover post burn. Increase grass and forb production by 100% two years post burn and 250% 5 years post burn.	Bitterbrush averaged 2.5% cover 20 years post burn, compared to 23.7% cover pre burn. Sagebrush averaged 1.6% cover in year 25 compared to 20.8% pre burn Herbaceous cover did increase but did not double post burn. Cheatgrass was newly detected in burned plots.	No, unrealistic objective Yes No	Year 20 Post
West Fortification Mtn Units 4 & 5	Skyline Fuels Reduction Objectives call for reduced predicted fire behavior using FVS for flame length, Torching Index, Crowning Index.	Flame length reduced from 5.7 ft to 1.7 ft Torching Index increased from 17 mph to over 400 mph. Crowning Index increased from 48 mph to 314 mph.	Yes	Post Treatment
Elkhart Park	Skyline Fuels Reduction Objectives call for reduced predicted fire behavior using FVS	Pre Treatment flame length 2.2 ft. Torching Index 56 mph	Pre Treatment only	Pre Treatment

	for flame length, Torching Index, Crowning Index.	Crowning Index 35 mph. Sparse forest dominates this unit and the thinning treatment will not need to be intensive.		
Fremont Campground				
North Fortification				
South Fortification				
East Fortification Mtn				
Sweeny Creek MX				
Monument Ridge Unit 2	Burn 30-60% of the sagebrush communities in a mosaic pattern within the project area. Measure the reduction of big sagebrush (<i>Artemisia tridentata</i> var. <i>vaseyana</i> and <i>Artemisia cana</i>) height and canopy cover 1, 10 and 15 years post burn in treated areas. Attain less than 40% bare ground in burned sage/grass communities one year post burn, and less than 20% bare ground after the fifth growing season post-burn. Attain 1000 stems per acre in burned aspen areas that are 10 feet tall within 15 years. Attain 3000 aspen stems/acre at 6+ feet in height within monitoring stand 5 years post-burn			
Cottonwood II Unit 1	Obtain sucker (≥ 10ft) density of 1000 stems/acre 10-15 years post-burn. Obtain sucker density of 3000 stems/acre 5 years post-burn. Attain ground cover of less than 40% bare ground in year 2 post burn and less than 20% bare ground in year 5 post burn.			
Monument Ridge North	Remove live conifer trees (except old age individuals) growing in sagebrush vegetation. Increase grass, shrub, forb species diversity and % cover in designated conifer encroached sagebrush area. Obtain sucker (>10 feet) density of 1000 stems/acre 10-15 years post in designated stands. Attain ground cover $<40\%$ bare ground year 2 post burn ($<20\%$ year five) in aspen stands. Reduce predicted flame length to less than 4 feet under high fire danger conditions. Reduce predicted torching and crowing index to greater (?) than 30 mph under high fire danger conditions.			

	Monitor noxious weeds and cheatgrass.			
--	---------------------------------------	--	--	--

B. Program Information

Table 4. Planning - 2020

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 2020?
Grand Teton National Park and John D. Rockefeller Parkway	Yes – 2005 FMP	2009	38	0
Bridger-Teton National Forest North Zone	Yes 1990 Forest Plan, to be revised in 2020	2006	23	0
Bridger-Teton National Forest East Zone	Yes 1990 Forest Plan, to be revised in 2020	2006	32	0
Bridger-Teton National Forest West Zone	Yes 1990 Forest Plan, to be revised in 2020	2006	16	0
Bighorn Canyon National Recreation Area	Linked to historic fire regime 2004 FMP	Covered by GRTE's 2009	4	1
Fossil Butte National Monument	Linked to historic fire regime 2005 FMP	Covered by GRTE's 2009	1	0

Table 5. Monitoring – 2020

Unit	% 2020 Data Entered	% 2020 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%	2	3	0	0
Bridger-Teton National Forest North Zone	100%	100%	2	3	0	0
Bridger-Teton National Forest West Zone	100%	100%	5	0	2	0
Bridger-Teton National Forest East Zone	100%	100%	4	6	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 – 2020

Unit	# of Project Monitoring Reports completed in 2020	# 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	2	1	No
Bridger-Teton National Forest North Zone	8	3	1	No
Bridger-Teton National Forest West Zone	3	2	1	No
Bridger-Teton National Forest East Zone	10	3	1	No
Bighorn Canyon National Recreation Area	0	0	0	No
Fossil Butte National Monument	0	0	0	No

JFSP Fire 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.

Diane also collaborated with a JFSP GRIN Researcher Jamie Peeler from Penn State University who is researching tree regeneration on the Bridger-Teton National Forest.

Table 7. Research – 2020

Units	Are research needs identified in FMP or Monitoring Plan? (yes or no)	# of Proposals Submitted in 2020	# of Proposals Funded in 2020	# of Research Projects Supported in 2020*	Additional Comments
Grand Teton National Park and John D. Rockefeller Parkway. Also includes Yellowstone NP, Glacier NP and the BTNF	Yes but dated	2 (As collaborators)	0	4	Includes work related to 3 funded Fuels Reserve Projects, and one JFSP GRIN project on the BTNF.

*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 two 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 was published in Ecological Applications. The study area included the northern portion of Grand Teton National Park and the John D. Rockefeller Parkway.

A second Fuels Reserve project is nearly complete 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. The final report was completed and a webinar is scheduled for 2021. A published paper will be completed in a peer reviewed journal in 2021. It capitalized on LiDAR data obtained with financial support from the Fuels Reserve Program in 2014. Outcomes from the study include maps of fuels and fuel models suitable for use in IFTDSS and FlamMap models.

The third project is a collaboration with the University of Wisconsin at Madison and Yellowstone, Glacier, and Grand Teton National Parks. The final field season will take place in 2021. It is a study of 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.

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 since 2009. On the Grand Teton National Park side, Diane is involved in Fire Effects Crew supervision, budget, and administrative duties. In 2020, this included hiring for the career seasonal Assistant Lead Fire Effects Monitor that is funded through a cooperative agreement with the Bridger-Teton National Forest. On the Forest side, planning work for the 5 year fuels plan and Quantitative Fire Risk Assessment were the main projects for 2020.

For wildland fire decision support, Diane was an LTAN for Great Basin Type 2 Team 6 (Chadwick) on three fires in 2020. Diane also taught S590 at NAFRI and assisted with virtual WFDSS refreshers.

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 • BTNF Five Year Fuels Plan • Initial GRTE FMP revision writing • Teton Interagency Quantitative Risk Assessment
Presentations	10%	• Fire Effects Reports to BTNF Zones and GRTE Resource Management • WFDSS Refreshers: Local examples of WFDSS geospatial modeling and how it is used.
NPS and Interagency Meetings/ task groups	7%	• BTNF Forest Plan Revision Steering Committee • GRTE Wilderness 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 • Completed FOBS taskbook
Prescribed fire projects	4%	• FFT1 Various pile burns
Non-fire fuels projects	1%	• Planning, field trips, monitoring design.

Category	Percent Time	Accomplishments and/or areas of activities
Research	8%	- Co-author for paper to be published on Fuels Reserve project with Univ. Wisconsin and Columbia U. - Assistance with LiDAR mapping project funded by Fuels Reserve - Assisted with BTNF Penn State fire ecology project funded by JFSP GRIN.
Data collection	5%	Fire Effects Data collection, Interagency cheatgrass monitoring transects on Wind River front, Assistance with scouting for Berry Fire Research.
Data entry	2%	Minimal
Data analysis	10%	Annual Fire Effects data analysis workload
Supervision/Admin	18%	Supervised 1 GS 6 Permanent Career Seasonal Lead Fire Effects Monitor 1 STF GS 6 Fire Monitor 2 Seasonal GS 5 Fire Effects Monitors Hired 1 Permanent GS 6 Assistant Lead Fire Effects Monitor
Training	1%	IFTDSS – Self Guided
Travel out-of-park for plot or project work	1%	Fire Effects Data Collection - BTNF East and West Zones
Miscellaneous	5%	- Produced video for virtual Fire School about the fire regimes of western Wyoming - Interviewed about my career as part of the 2020 Women's Leadership Conference in Boise ID. The video was made by NPS Com-Ed Specialists.

D. Fire effects crew accomplishments and areas of focus

The Teton Interagency Fire Effects program completes monitoring throughout the three Bridger-Teton National Forest zones and three units within Grand Teton National Park. With project level monitoring, there are many protocols and field visits to plan and coordinate over a large and diverse geographic landscape. Crewmembers work directly with agency personal to orchestrate data collection efforts, field visits and other monitoring activities. The program seeks to prioritize activities that promote adaptive management in addition to supporting fire managers. Monitoring protocols are targeted to stated objectives, and additional “nice to have” data collection is rare, but sometimes necessary if special resource issues call for data.

Early season training efforts focus on orienting new crewmembers to data collection protocols and overall monitoring objectives. Crewmembers also participate in fire operations trainings and are expected to be qualified, and available, as resources for both wildfire suppression and monitoring (FEMO) activities. This helps them integrate with fire managers and better understand how to support them. The Fire Effects crew is well respected for their fireline skills, leadership, fitness, and excellent FEMO work.

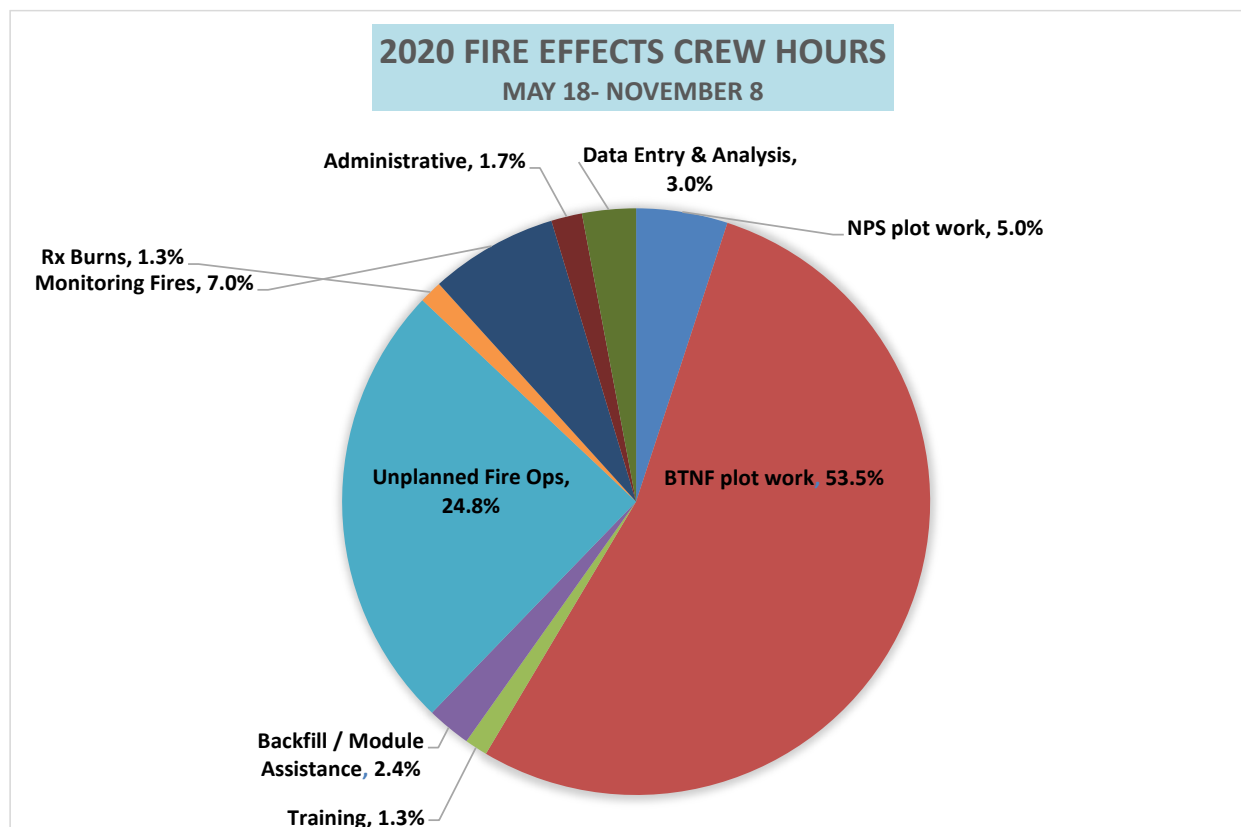
On top of the busy field and fireline schedules, the Fire Effects crew members are interested in the big picture of adaptive management and fire ecology. Both permanent and temporary staff participate in compiling and analyzing field data. While this is not required of them, they make it a priority because 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
Plot work	59%	9% of plot monitoring was for GTNP and 91% was for BTNF. Plot types include Stand Exams, Sage Intercepts, Aspen Circles, and Photopoints
Wildfire assignments	25%	Fire assignment details include: FEMOs on the Lonestar Fire, and FFT2 and FEMO with GTNP Type 2 Engine.
Prescribed fire projects	1%	The Fire Effects crew participated in one RX burn implemented on the Bridger-Teton NF, and one RX burn on the Caribou Targhee NF. The crew's role in the burns was as FEMO's, collecting fire weather and fire effects observations.
Monitoring Fires	7%	Members of the crew were sent to Saguaro NP and Yosemite NP as FEMOs to complete post-fire monitoring.
Backfill/Module Assistance	2%	Members of the crew backfilled and helped throughout the season with GTNP Type 2 and GTNP Type 6 Engine.
Data entry and Analysis	3%	All data entry and quality checks were completed by the FX Crew. Lead monitor and extended seasonals assisted with data analysis.
Supervision/Admin	2%	Payroll, travel authorization/voucher, etc.
Training	1%	S-290, L-280, S-130/190, and orientation for new crewmembers

Figure 1. Fire Effects Crew 2020 Activity Chart



E. 2021 Direction

Our goals for 2021 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 recruited and hired 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.

Program Data

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.

Approximately 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 human 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.

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>.