National Park Service
North Pacific / Columbia Basin
Fire Ecology Annual Report
Calendar Year 2019

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Cedar Drake, Lead Fire Effects Monitor

A. Summary

The North Pacific/Columbia Basin (NPCB) Fire Ecology program experienced a dynamic and highly varied field season in 2019. The fire effects monitoring crew completed 61 plot reads within North Cascades National Park (NOCA), San Juan Island National Historical Park (SAJH), and Lake Roosevelt National Recreation Area (LARO). An additional 40 plots were read at Crater Lake National Park (CRLA) in conjunction with the NPS Klamath Network fire effects monitoring crew. Throughout the season NPCB crew members also participated in search and rescue, wildfire, and prescribed fire operations in Washington State and California.

Early Season: In early April the Lead Monitor travelled to central California to serve on the cadre of a Resource Advisor training hosted by Yosemite National Park & the Sierra National Forest. The following payperiod he returned to California to assist Santa Monica Mountains National Recreation Area (SAMO) with a number of post-fire vegetation monitoring assessments associated with the 2018 Woolsey wildfire. Upon his return he travelled to LARO with incoming Student Conservation Association (SCA) intern, Martin Malate, to serve as a qualified FEMO and FFT1 on the Evans and Marcus Islands prescribed burns. FMH plots impacted by the burns received post-burn assessments. In mid-May, a Geoscientists in the Park (GIP) intern, Allie Lalor, joined the fire effects crew. The crew then travelled to SAJH where they conducted a series of post-treatment Brome research plots as well as one FMH plot. During this time the Assistant Lead Fire Effects Monitor, Julia Bartley, served as a Firing Boss trainee on a southern Oregon TREX assignment. In early June the crew travelled to the Stehekin Valley at NOCA to support the annual Stehekin fire refresher, complete the Pack Test, participate in a Regional Readiness Review, and conducts a series of FMH plots. In mid-June the crew split off in multiple directions. The two interns and Assistant Lead participated in the NOCA seasonal orientation, the Marblemount fire refresher, and a NOCA fire team annual meeting. The interns then attended a two-day search and rescue training before participating in a five day regional wildland firefighter guard school. During this time, the Lead Monitor travelled once again to California to participate as a cadre member at the first ever Lead Resource Advisor training on the Lassen National Forest. Upon his return, he and the Assistant Lead Monitor travelled to SAJH where they completed a set of FMH plots. The Lead Monitor then returned to NOCA to facilitate an annual Resource Advisor Refresher for park resource managers.

Mid Season: In late June, a 2nd seasonal fire effects monitor, Ian Woodruff, joined the fire effects crew. Collectively, the entire team travelled back to Stehekin where they completed a series of FMH plots. During mid and late July, the NPCB fire effects crew conducted two 8-day trips to CRLA where they joined forces with the Klamath Network fire effects monitoring crew to collectively complete 35 FMH and 5 UMN plots. At the end of the second CRLA trip, the Assistant Lead Monitor departed to conduct a 14-day Helicopter Crewmember trainee assignment with the Wenatchee Valley Rappellers in central Washington. In early August the remaining crew members returned to SAJH to conduct a second round of Brome treatment research plot reads then travelled back to Stehekin to complete an additional series of FMH plot reads. In late August the crew travelled to LARO and conducted a series of FMH plots. In early September the crew returned once again to Stehekin to complete a final set of FMH plots and to assist the NOCA fire crew with fireline construction for the anticipated 2019 fall Lower McGregor RX unit. At the end of this payperiod, the Lead Monitor was assigned to the Walker Wildfire in northern California as a Fire Behavior Analysis Team (FBAT) member. Upon completing his FBAT duties on the incident, the Lead Monitor transitioned into a fireline resource advisor (REAF) position and later assumed the Lead Resource Advisor (READ) role resulting in a 21-day wildfire assignment.

Late Season: In late September and early October, the NPCB Fire Effects Monitoring crew conducted two trips to LARO; completing a large quantity of FMH plot reads. Unfortunately, wet weather conditions proved incompatible for fall broadcast prescribed burning. Subsequently, the crew returned to Stehekin for their final payperiod in late October to conduct pile burning associated with the neighboring Devore Creek fire and completed other season-ending duties.

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

Park	Monitoring Unit	Plot Type	Pre-burn 2019	Immed. Post 2019	Postburn (1-20 yrs) 2019	Annual Total (2019)	Total Plots
North Cascades NP	Stehekin Valley FFRA: Mixed Conifer	FMH Forest	0	3	15	**18**	**52**
	Stehekin Valley Contours (Open/Mid/Closed Canopy Mixed Conifer)	FMH Forest	0	0	0	**0**	**23**
	Douglas Fir/ Western Hemlock/ Western Red Cedar	Westside Fuels Reduction	0	0	0	**0**	**6**
Lake Roosevelt NRA	Ponderosa Pine/ Common Snowberry Forest	FMH Forest	0	10	18	**28**	**63**
	Ponderosa Pine/Bitterbrush	FMH Forest	0	0	0	**0**	**3**
San Juan Island NHP	Garry Oak Woodland	FMH Forest	0	0	3	**3**	**12**
	Non-Native Brome	Experimental	0	0	12 (6 spring + 6 fall reads)	**12**	**6**
	Douglas Fir/ Lodgepole (permanent RAPS plots)	Rapid Assessment	0	0	0	**0**	**4**
	Annual Brome Grasses	FMH Grass	0	0	0	**0**	**10**
	Coastal Prairie Grassland	FMH Grass	0	0	0	**0**	**12**
John Day Fossil Beds NM	Big Sagebrush/Bunchgrass	FMH Brush	0	0	0	**0**	**21**
	Western Juniper Shrubland	FMH Forest	0	0	0	**0**	**16**
Olympic NP	East-side Mixed Conifer (permanent RAPS plots)	Rapid Assessment	0	0	0	**0**	**5**
Whitman Mission NHS	Giant Wild Rye Meadow Restoration	FMH Grass	0	0	0	**0**	**5**
Total			**0**	**13**	**48**	**61**	**238**

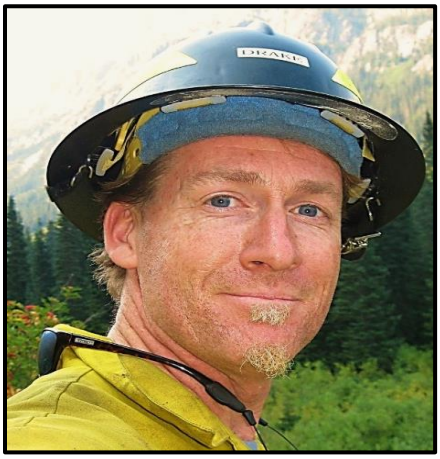
* Pilot sampling plots

Table 2. Fire Ecology Staffing 2019

Ecologist and Monitors	Starting Date	Ending Date	# of Pay Periods	READ Qualified (Yes or No)	Training and Development
Karen Kopper Fire Ecologist	1/01/19	n/a	26	No	Supervisor training, UW doctoral research
Cedar Drake Lead Fire Effects Monitor	3/17/19	12/31/19	20	Yes	RT-130, instructed READ and Lead READ courses, READ/REAF/FEMO assignments, FBAT assignment, completed Master's degree in Natural Resource Management, Restoration Ecology & Fire Ecology
Julia Bartley Asst. Lead Fire Effects Monitor	5/12/19	10/26/19	12	No	RT-130, Ashland, OR TREX assignment, HECM(t) assignment, search and rescue assignments
Ian Woodruff Fire Effects Monitor	6/23/19	10/26/19	9	No	RT-130
Martin Malate SCA Intern	4/28/19	10/26/19	13	No	Guard School, RT-130, search and rescue training, FEMO task book initiated
Allie Lalor GIP Intern	5/12/19	10/26/19	12	No	Guard School, RT-130, search and rescue training, search and rescue assignments, FFT2 assignment, FEMO task book initiated

2019 North Pacific/ Columbia Basin Fire Ecology Crew

Karen Kopper: Fire Ecologist



Cedar Drake: Lead Fire Effects Monitor

Julia Bartley: Asst. Lead Fire Effects Monitor

Ian Woodfruff: Fire Effects Monitor

Allie Lalor: GIP Fire Ecology Intern

Martin Malate: SCA Fire Ecology Intern

North Cascades National Park: Ponderosa Pine / Douglas Fir Forest

FPSME2-52 P1-O, PRE Treatment (2015)

FPSME2-55 50P-O, PRE Treatment (2015)

FPSME2-52 P1-O, POST Treatment (2019)

FPSME2-55 50P-O, POST Treatment (2019)

Table 3a NOCA Management Objectives and Monitoring Results		
NOCA: Boulder Units 2 & 3 (2015 – 2019) **Management Objectives** **(Restoration)**	**Monitoring Results:** **PRE = Pre-Burn Average (standard deviation)** **YR02 = Two Years Following Broadcast Burn of a Previously Thinned Unit (standard deviation)**	**Achieved?**
Trees		
Reduce the density of live pole size trees (1 – 6" dbh dbh) to 10-30 trees/acre as measured 2 years after final treatment prior to maintenance.	**Boulder unit:** n = 4 PRE = 11.1 (12.1) trees/acre YR02 = 4.0 (5.7) trees/acre	**NO**
Reduce the density of live small and medium sized overstory trees (6-24" dbh) to 25-75 trees/acre as measured 2 years after final treatment prior to maintenance.	**Boulder unit**: n = 4 PRE = 78.9 (26.5) trees/acre YR02 = 76.9 (24.5) trees/acre	**NO**
Maintain the density of large overstory trees (>24" dbh) at 1-20 trees/acre as measured 2 years after final treatment prior to maintenance.	**Boulder unit:** n = 4 PRE = 2.0 (2.3) trees/acre YR02 = 3.0 (3.9) trees/acre	**YES**
Reduce live basal area to an average of 70 (± 35) ft^2/ acre as measured 2 years after final treatment prior to maintenance.	**Boulder unit:** n = 4 PRE = 111.2 (42.9) ft^2/ acre YR02 = 113.7 (47.3) ft^2/ acre	**NO**
Increase seedlings (<1 m. tall) and saplings (1-3 m. tall) to 25 – 75 PIPO live seedlings per acre by 2 years post-treatment.	**Boulder unit:** n = 4 PRE = 3.0 (3.9) PIPO seedlings/ acre, 5.4 (5.1) PIPO saplings/acre YR02 =87.1 (74.3) PIPO seedlings/ acre, 18.4 (18.0) PIPO saplings/acre	**NO**
Increase live canopy base height to 2 meters as measured 1 year post-treatment.	**Boulder unit:** n = 4 PRE = 7.3 (2.8) m. YR02 = 7.8 (2.9) m.	**YES**

Vegetation		Achieved?
Maintain a minimum of 30 percent cover of live native understory vegetation 2 years after the initial treatment.	**Boulder unit:** n = 4 PRE = 33.4 (19.0) % cover of native understory vegetation YR02 = 43.2 (18.3) % cover of native understory vegetation	**YES**
Report percent cover of non-natives per species. Alert managers to the presence of new exotic species, and work with them to determine critical thresholds.	**Boulder unit** n = 4 *Bromus tectorum* PRE = 5.3 (4.6) **%** YR02 = 17.2 (10.7) **%** *Poa bulbosa* PRE = 0.1 (0.2) **%** YR02 = 0.4 (0.8) **%** *Centaurea diffusa* PRE = 0 (0) **%** YR02 = 0.1 (0.2) **%** *Poa pratensis* PRE = 0.6 (1.2) **%** YR02 = 0.2 (0.3) **%** *Mycelis muralis* PRE = 0.4 (0.5) **%** YR02 = 0 (0) **%** *Tragopogon dubius* PRE = 0.1 (0.2) **%** YR02 = 0 (0) **%** *Vulpia myuros* PRE = 0.2 (0.3) **%** YR02 = 0 (0) **%**	**-**
Fuel Load		**Achieved?**
Maintain an average small diameter (1-100 hour) fuel load of 2-6 tons/acre 2 years after final treatment prior to maintenance.	**Boulder unit:** n = 4 PRE = 5.1 (2.5) tons/acre YR02 = 1.9 (1.1) tons/acre	**Almost**
Maintain an average large diameter (1000 hour) fuel load of 4-12 tons/acre 2 years after final treatment prior to maintenance.	**Boulder unit:** n = 4 PRE = 5.9 (3.1) tons/acre YR02 = 1.3 (0.6) tons/acre	**No**
Maintain an average litter and duff load of 3.5-14 tons/acre 2 years after final treatment prior to maintenance.	**Boulder unit:** n = 4 PRE = 14.9 (2.6) tons/acre YR02 = 7.9 (1.0) tons/acre	**Yes**

Two-years following thinning and burning in the Boulder fuel reduction unit

The forest fuel reduction program at NOCA uses a combination of thinning and prescribed burning to reduce hazardous fuel loads and restore fire-adapted Doug-fir / Ponderosa pine forests in the wildland-urban interface of Stehekin. This year we analyzed the 2nd-year post-burn effects of the 2017 prescribed burn in the Boulder unit. Two of the four plots were thinned in 2006, and all four plots were under-burned in 2017.

Trees: The overall density and basal area of the stand are very slightly above the desired condition. The thinning and burning was a little too heavy on pole-size trees (64% reduction), and a little light on the small/medium sized (6-24" dbh) overstory trees (2.5% reduction). Fortunately, the density of large (resilient) overstory trees (> 24" dbh) was maintained (increasing from 2 to 3 trees/acre). Basal area is still a little high, and actually increased slightly as a result of the release.

The seedlings/saplings made an impressive rebound! Seedlings increased by 97% (Pre = 3.0 to Yr2 = 87.1 trees/acre) and saplings increased by 71% (Pre = 5.4, Yr2 = 18.4). Although these densities are above the stated objective, their increases make up for the paucity of pole-size trees.

Vegetation:
The native vegetation (forbs, grass and shrubs) continues to thrive! It increased by 23% (Pre = 33.4, Yr2 = 43.2 % cover. Unfortunately, the non-native vegetative cover is also increasing. Although four of the seven non-natives had diminished in cover, the cover of Cheatgrass (Bromus tectorum) increased by 69% (Pre = 5.3, Yr2 = 17.2 % cover).

Fuels: Fuel conditions are fairly close to desired. The heavy (1000 hour) fuel load is a bit sparse (1.3 tons/acre) compared to the desired range of 4-12 tons/acre, and the smaller diameter woody fuels (1-100 hour) are just slightly lower than desired (1.9 tons/acre compared to the desired range of 2-6 tons/acre). The litter and duff load was reduced by an impressive 47% (Pre = 14.9, Yr2 = 7.9 tons/acre), which brings it comfortably into the desired range (3.5 – 14 tons/acre).

Recommendations: This unit is very close to desired conditions. There are other priorities in the area, however, selective thinning of the mid-story would bring the basal area and tree density into the desired range. It would be appropriate to thin mid-story trees, especially those surrounding the largest >24" overstory trees, to develop more heterogeneous clumps and gaps. This would open up the canopy to increase resiliency of the leave trees, and reduce basal area.

Another prescribed fire may be needed to thin out some of the plentiful seedlings/saplings, however care should be taken not to further deplete the heavies.

Lake Roosevelt National Recreation Area: Ponderosa Pine / Snowberry Forest

FPIPO1-53 Q4-Q1, PRE Treatment (2016)

FPIPO1-56 0P-O, PRE Treatment (2016)

FPIPO1-53 Q4-Q1, POST Treatment (2019)

FPIPO1-56 0P-O, POST Treatment (2019)

Table 3b LARO Management Objectives and Monitoring Results		
LARO: Copa & Log Yard C Units (2016 – 2019) **Management Objectives** **(Restoration)**	**Monitoring Results:** **PRE = Pre-Burn Average (standard deviation)** **YR02 = Two Years Following First Pile Burn (standard deviation)**	**Achieved ?**
Trees		
Reduce the density of live pole size trees (1-6" dbh) to 2-20 trees/acre as measured 2 years after final treatment prior to maintenance.	**Copa & Log Yard units:** n = 4 PRE = 9.1 (2.0) trees/acre YR02 = 6.1 (5.2) trees/acre	**Yes**
Reduce the density of live small and medium sized overstory trees (6-24" dbh) to 25-75 trees/acre as measured 2 years after final treatment prior to maintenance.	**Copa & Log Yard units:** n = 4 PRE = 7.1 (2.0) trees/acre YR02 = 7.1 (2.0) trees/acre	**No** **(Maintained)**
Maintain or increase the density of live large overstory trees (> 24" dbh) to 1-8 trees/acre as measured 5 years after final treatment prior to maintenance.	**Copa & Log Yard units:** n = 4 PRE = 3.0 (3.9) trees/acre YR02 = 3.0 (3.9) trees/acre	**Yes**
Reduce live mean basal area (poles+overstory) to an average of 70 (±35) ft^2 /acre as measured 2 years after final treatment prior to maintenance.	**Copa & Log Yard units:** n = 4 PRE = 145.0 (22.5) ft^2/acre YR02 = 125.2 (29.8) ft^2/acre	**No**
Increase live canopy base height (poles+overstory) to 2 meters as measured 1 year post-treatment.	**Copa & Log Yard units:** n = 4 PRE = 6.8 (3.3) m. YR02 = 8.4 (3.7) m.	**Yes**
Reduce the density of seedlings (<1 meter tall) and saplings (1-3 meters tall) to 2-20 live trees/acre as measured 2 years after final treatment prior to maintenance.	**Copa & Log Yard units:** n = 4 PRE = 21.2 (12.1) seedlings/ acre, 738.4 (1109.0) saplings/acre YR02 = 1982.5 (1637.9) seedlings/ acre, 124.4 (144.5) saplings/acre	**No**
Vegetation		
Maintain a minimum of 30 percent cover of live native understory vegetation 2 years after initial treatment.	**Copa & Log Yard units:** n = 4 PRE = 39.8 (17.0) % native understory cover YR02 = 36.6 (17.5) % native understory cover	**Yes**

Table 3b LARO Management Objectives and Monitoring Results		
LARO: Copa & Log Yard C Units (2016 – 2019) **Management Objectives** **(Restoration)**	**Monitoring Results:** **PRE = Pre-Burn Average (standard deviation)** **YR02 = Two Years Following First Pile Burn (standard deviation)**	**Achieved ?**
Maintain <20% cover of live non-native understory species relative to total cover by 5 years following treatment.	**Copa & Log Yard units:** n = 4 PRE = 33.6 % relative non-native understory cover YR02 = 32.7 % relative non-native understory cover	**No**
Fuels		
Maintain an average small diameter (< 3 inch) woody fuel load of 2–6 tons/acre 2 years after final treatment prior to maintenance.	**Copa & Log Yard units:** n = 4 PRE = 1.8 (1.4) tons/acre YR02 = 1.8 (1.2) tons/acre	**No**
Maintain an average large diameter (≥ 3 inch) woody fuel load (no litter and duff) of 1-10 tons/acre 2 years after final treatment prior to maintenance.	**Copa & Log Yard units:** n = 4 PRE = 8.7 (7.2) tons/acre YR02 = 2.9 (2.6) tons/acre	**Yes**
Maintain an average litter and duff fuel load of 3.5-14.0 tons/acre 2 years after final treatment prior to maintenance.	**Copa & Log Yard units:** n = 4 PRE = 16.2 (5.0) tons/acre YR02 = 13.8 (5.1) tons/acre	**Yes**

Two-years following pile-burns in the Copa and Log yard units

Hazard fuel reduction and ecological restoration go hand-in-hand at Lake Roosevelt NRA, where fire suppression in Ponderosa pine stands has resulted in hazardous fuel conditions. This report analyzes the average post-treatment conditions in the Copa and Log yard units in order to determine if/when further treatments will be needed in these areas. Please note that treatment conditions and effects were fairly similar in both units, although Log yard had somewhat higher densities of trees, fuels and vegetation.

Trees: These units are very close to desired conditions with respect to live trees. The mean basal area is still a bit higher than desired (125.2 ft^2/acre compared to desired range of 105-35 ft^2/acre) especially in Log yard, but all of the pole and overstory tree densities are within their desired ranges, or cannot be achieved (not enough midstory trees to begin with). The crew did an excellent job of targeting the pole-size trees (1-6" dbh), which were thinned by 33 percent, while maintaining the sparse overstory.

Seedling/sapling densities are still high. Great progress was made in the sapling class (1-3 meters tall), which was reduced by 83% (Pre = 738.4, Yr2 = 124.4 saplings/acre)! Unfortunately the seedlings responded vigorously to the treatment, increasing by 99% (Pre = 21.2, Yr2 = 1982.5 seedlings/acre).

Vegetation: Understory vegetation cover and species composition is moving in the right direction in these units. The cover of native vegetation was maintained above 30 percent (Yr2 = 32.7%), as desired, and the relative cover of non-natives was reduced by 3% (Pre = 33.6, Yr2 = 32.7 % relative cover).

Fuels: The fuel loadings are near or within desired ranges. The crew did an excellent job of maintaining the small diameter woody fuels (1 – 100 hour) at 1.8 tons/acre, just below the desired 2 tons/acre, while targeting the heavies (1000 hour) and litter and duff. The heavies were reduced by 66% (Pre = 8.7, Yr2 = 2.9 tons/acre), and the litter and duff were reduced by 15% (Pre = 16.2, Yr2 = 13.8 tons/acre).

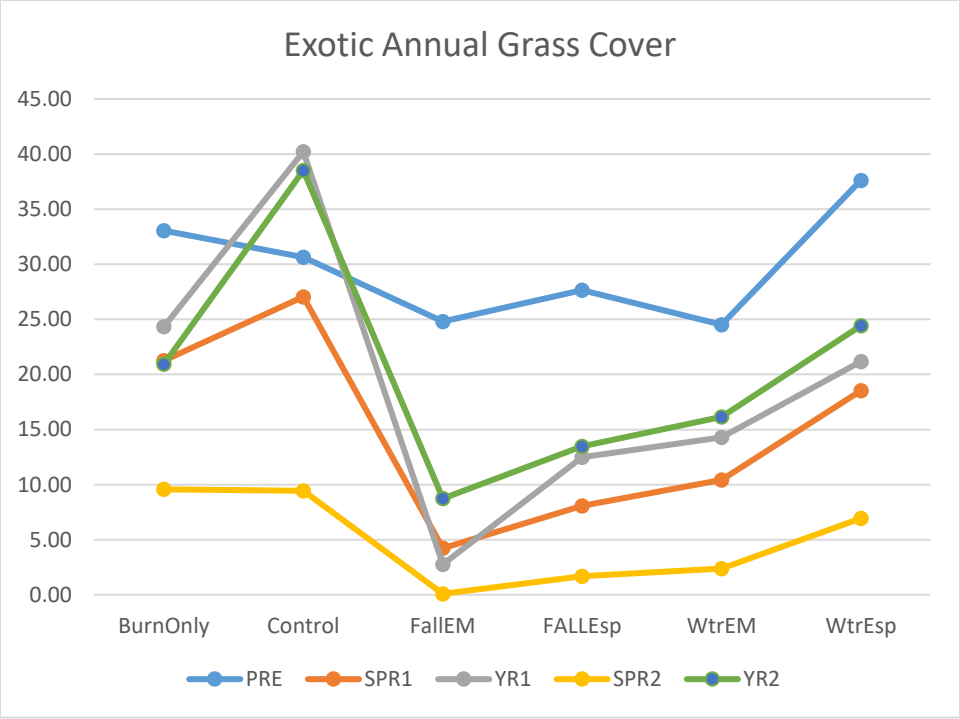
Recommendations: The Copa and Log yard units are in good shape, thanks to hard work, although the understory trees and seedlings need further attention. The basal area is still a bit high, particularly at Log yard, indicating that further treatment of the live pole trees is warranted. However, the high seedling and sapling densities are the most pressing concerns for these units. A controlled under-burn or hand-thinning are advisable.

San Juan Island National Historical Park: Brome Treatment Experiment

Annual Brome Experiment:
The NPCB Fire Ecologist and Fire effects monitoring crew worked with the North Coast EPMT and SAJH managers to conduct an experiment at Young Hill comparing the effects of fall burning with and without follow-up treatments of herbicide (Esplanade and Matrix). In August of 2017 the pre-treatment cover of native and non-native grasses and forbs was recorded on six plots with six randomized treatment blocks each. The plots were burned in September 2017, and herbicide treatments were applied to the treatment blocks in November, 2017 (fall treatment), and February, 2018 (winter treatment). The post-treatment covers of grasses and forbs were collected in the spring and fall of 2018 and 2019.

Data Collection:
PRE= pre-treatment 8/11/2017
SPR1= 1st Spring post-treatment 6/5/2018
YR1= Fall 1-year post-treatment 8/11/2018
SPR2= 2nd Spring post-treatment 5/19/2019
YR2= Fall 2nd year post-treatment 8/7/2019

Treatments:
1) Control,
2) Burn Only,
3) Burn + Fall Esplanade + Matrix (FallEM),
4) Burn + Fall Esplanade (FallEsp),
5) Burn + Winter Esplanade + Matrix (WtrEM),
6) Burn + Winter Esplanade (WtrEsp)



Treatment effects on Non-native Graminoid Cover at Young Hill, San Juan Islands NHP

In previous fire effects monitoring reports we have shown that non-native graminoid cover (especially annual brome species) has more than doubled by the second year following prescribed burning in the grassland at the center of Young Hill Garry Oak Woodland restoration area. The grassland area has been burned in conjunction with the Oak woodland restoration project to reduce flashy fuels adjacent to and above the woodland. All prescribed burn treatments in the area have been paused until an effective means of controlling the non-native bromes (among other resource concerns) has been determined.

This summary focuses on identifying which treatment is most effective at controlling non-native annual grass cover. Esplanade, an herbicide that targets non-native annual bromes at the pre-emergent stage, is the primary treatment. We compared effects of applying Esplanade in the fall verses winter, and using it in combination with and without Matrix (a glyphosate used to reduce emergent vegetation). The effects of the treatments on other vegetation in the plots (e.g. native grass, exotic and native forbs) were also examined and will be included in a full write-up of the results.

Our results show that the cover of annual exotic grasses (primarily bromes) was significantly lower by the first year following post-burn treatment with Esplanade and/or Esplanade and Matrix, and remained substantially lower than the pre-treatment cover in the second year. It is clear that the most effective treatment in all reads was post-burn treatment of Esplanade and Matrix in the fall. Fall treatment of Esplanade alone was second most effective, indicating that the fall treatment was more effective than the winter treatments, and also that the combination of Esplanade and Matrix was more effective than using Esplanade alone.

Our experiment clearly indicates that burning followed by the application of Esplanade and Matrix in the fall is the most effective means of reducing exotic annual grass cover. Although these results are clear with respect to annual bromes, we still need to examine the treatment effects on native forbs and grasses more thoroughly, and work with the SAJH community regarding the use of herbicides.

Conducting post-treatment read of SAJH Brome plot

B. Program Information

Table 4. Planning - 2019

Park	Does Park have written Desired Future Conditions? (yes or no)	Date Park-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?
Lake Roosevelt NRA	yes	2013	1	0
North Cascades NP	yes	2010, revision in progress	2	0
San Juan Island NHP	yes	1998	1	0
Olympic NP	no	unknown	?	0

n/a – no plan(s) required

Table 5. Monitoring - 2019

Park	% 2019 Data Entered	% 2019 Data Quality Checked	# Prescribed Fires Monitored*	# Non-fire Fuels Treatments Monitored*	# Wildfires Monitored *	# BAER/BAR Treatments Monitored*
Lake Roosevelt NRA	100%	100%	1	0	0	0
North Cascades NP	100%	100%	0	0	0	0
San Juan Island NHP	100%	100%	0	0	0	0
Olympic NP	n/a	n/a	0	0	0	0

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

n/a – no data collected or no monitoring required

Table 6. Communicating Results - 2019

Park	# of Project Monitoring Reports completed in 2019	# of Annual meeting(s) with Park staff	# of Formal presentations of results	Do you use Minitab?*
Lake Roosevelt NRA	2	2	0	no
North Cascades NP	2	2	1	no
San Juan Island NHP	2	2	0	no
Olympic NP	n/a	n/a	n/a	n/a

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

n/a – no new data to report/present

JFSP Fire Science Exchange Networks – Karen Kopper is on the Advisory Board for the NW Fire Science Consortium

Table 7. Research - 2019

Park	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
Lake Roosevelt NRA	yes	0	0	0	
North Cascades NP	yes	2	2	3	
San Juan Island NHP	yes	0	0	0	
Olympic NP	no	0	0	0	

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

Reserve Fund Research - If your park(s) received Reserve Fund Research funding or completed a previously-funded project in the last year, please provide the following:
Current project status (short description)
Expected project completion date
List of deliverables

Also, if a Reserve Fund research project is completed, please remember to submit a summary report of the research.

C. Fire ecologist accomplishments and areas of focus

Table 8. Fire Ecologist 2019 Accomplishments/Focus Areas

Category	Percent Time	Accomplishments and/or areas of activities
Planning	15	Planning for NOCA FMP Revision Planning/Proposal Development for Seattle City Light (SCL) Re-licencing
Presentations	5	PWR Climate Change Webinar Panelist NOCA interpretive staff training SAJH presentation of brome experiment results Presentation to SCL for relicencing
Data collection	3	Site visit and assessment of SAJH Brome Experiment
NPS Meetings/ task groups	5	Spring Fuels and Fire Ecology Committee Meeting NOCA Housing Committee

Category	Percent Time	Accomplishments and/or areas of activities
Interagency work	10	Fuels research with SCL and Pacific Wildland Fire Science Lab, Seattle
Non-fire fuels projects	2	NOCA READ Guide Review
Research	15	Stehekin Fire History
Wildfire assignments	2	GISS on Devore Creek Fire
Data entry	2	Transferring fire history data Wilderness Character Assessment
Data analysis	15	Dendro-chronology for PORE Bishop Pine Ecology Stehekin Fire History
Supervision/Admin	20	Hiring, supervision, payroll, travel authorization/vouchers, purchasing, etc.
Training	2	Supervisor Trainings
Travel out-of-park for plot or project work	2	SAJH site visit
Miscellaneous	2	NOCA Fire Team Meetings

D. Fire effects crew accomplishments and areas of focus

Table 9. Fire Effects Crew 2019 Accomplishments/Focus Areas

Category	Percent Time	Notes
FMH plots	47	84 FMH plot reads at NOCA, LARO, SAJH, and CRLA. CRLA plot reads conducted in conjunction with KLAM Fire Effects crew.
Wildfire assignments	12	Wildfire assignments: FBAT, READ, REAF, HECM(t)
Other plot reads	8	12 SAJH Brome experimental treatment plots (6 spring + 6 summer reads) and 5 CRLA UMN plots. CRLA plot reads conducted in conjunction with KLAM Fire Effects crew.
Prescribed fire	7	LARO spring and NOCA fall RX: FEMO, FFT1, FFT2. Fireline prep and pile burning.
Supervision/Admin	6	Travel, payroll, credit card statements, vehicle maintenance, purchasing, hiring, performance evaluations, etc.
Instruction	5	Lead READ and READ course instruction and curriculum preparation (Cedar)
Training	5	Fire Refresher, TREX, NOCA orientation, guard school, required NPS trainings, search and rescue training, aviation trainings
Travel for plot or project work	5	Travel to SAJH, LARO, NOCA, and CRLA.
SAMO support	3	1 payperiod support for post-fire vegetation monitoring (Cedar)
Data analysis	2	Data analysis, reporting, and completion of 2019 Year End Report

E. 2020 Direction

The NOCA fire team, including the NPCB Fire Ecology Program, is gearing up for the NOCA FMP Revision. This revision will focus on hazard fuel reduction treatments on the west-side of the park where fires are naturally more severe and less common. This area is beginning to experience more fires; a trend that is expected to continue with climate change. Our FMP will focus on protecting the west-side structures while maintaining old-growth forest characteristics. We will also work on ways to facilitate continued use of wildland fire for resource benefit.

During the 2020 field season the NPCB fire effects monitoring crew will begin installing permanent monitoring plots in the west-side treatment areas. These plots will be used to model effective defensible space thinning prescriptions, and then maintained as permanent fire effects monitoring plots when fuels treatments begin. The research associated with this project will be a collaborative effort between the NPS, SCL and Pacific Wildland Fire Science Lab.

F. Overall Data Entry Status and FFI suggestions

Program Data - In an effort to ensure the longevity of NPS fire effects monitoring data, please provide the following:

- **FFI databases for which no new data were collected this year:**
  - WHMI
  - JODA
  - OLYM
- 90% of the total monitoring program data are in FFI. The other 10% of the data are fuel mapping data for MORA, NOCA, and OLYM which are stored as Microsoft Access databases.

FFI Feedback from Cedar Drake

- For the Surface Fuels protocol:
  - Automatically transfer transect slope between fine woody debris and coarse woody debris tabs.
  - Provide for the ability to save data on the fine woody debris tab without having every entry space filled. Currently it is only possible to save fuels data per transect by entering place holder values for 1, 10, and 100-hr fuels for all transects on the fine woody debris tab.
- Provide the ability for users to assign repeatable values in columns
- Automatically assign a default status of "X" to substrates (Ex. LITT, BARE, ROCK, SCAT)
- Provide the ability for users to associate certain codes with a default height = MOSS and LICHEN (0.01 m)
- For the Cover_Points (metric) protocol, provide the ability to automatically populate the next sample point with the last species entered on the previous sample point. This would increase efficiency in long stretches of similar vegetation.
- Provide a back (undo) button
- Provide the ability to create/edit drop down options for all columns
- Block the ability to enter the same monitoring status more than once to the master drop down list of monitoring statuses on the Project Management tab.
- In the Query tab…present the monitoring statuses in some kind of order.
- When a monitoring status for a plot read is changed for a sample event in the Project Management tab, have that automatically change the monitoring status assigned to that sample event in the Reports and Analysis tab. This appears to populate when you first create the sample event but if you close FFI and reopen this is no longer assigned and must be re-entered.

- Provide users with a “Copy, Cut, and Paste” functions. Such capability would significantly increase efficiency in data entry.
- Provide the ability to copy data sheets over from previous reads….similar to copying tree data from previous reads but for other protocols as well.
- In the Cover_Points (metric) protocol it would be extremely helpful to have a tool (button) that when pressed automatically changes the sample point number to the next subsequent value and populates the position number to “1”. Additionally, each added new row would automatically increase the position number while maintaining the sample point number. When a new sample point is measured then the data recorder can simply push the button to populate the next ascending sample point with a position number of “1”. This may seem like a minor point but consider that an average 50 meter herb transect line has 166 points often with an additional 50-100 rows of positional data. With two transect lines per plot this means that sample point and position points are each entered between 300-400 times per plot. It is a time consuming and tiring task for the data recorder and one that could easily be completed by FFI’s software.
- Please provide a toggled option in Surface Fuels tab to automatically populate Transect and Sample Location fields for Browns Lines fuel sampling in forested plots. This template of 40 points would be for Transect 1,2,3,4 each with sample locations of 1,5,10,15,20,25,30,35,40,45.
- Provide some means of mitigating issues related to multiple entries of the same species in the Species management tab. It is a ponderous task to consolidate these multiple entries into one entry for the species and “replace species in method data” for all occurrences of multiple species entries. When there are multiple entries with the same four letter code it is often confusing to decipher which code(s) are being recognized and worked with.
- Review of the nativity data in the Species Management tab. We have encountered repeated occurrences in which native/non-native assignments per species were incorrect.

FFI LITE Feedback

- Nearly all feedback comments mentioned in the FFI section apply to FFI Lite as well.
- **Provide the ability to toggle off drop down menus and/or drag them to a different location on the screen**. **Species drop down menus often get in the way when entering data.**
- Display Sample Event Monitoring Statuses on Project Management and Data Entry and Edit tabs in FFILITE. These appear in FFI but not in FFI-Lite.

- Provide the ability for users to enter plot visit date in Project Management in FFI-Lite and have it carry over to Project Management in FFI.
- Provide the ability for users to enter data points via voice command.

G. Optional Information

NPCB Fire Effects crew preforming FMH plot reads with the KLAM Fire Effects Monitoring Crew at CRLA

Measuring large diameter Ponderosa pine at CRLA

NPCB Fire Effects crew preforming post-fire plot reads with KLAM Fire Effects crew at CRLA

F2019 NPCB Fire Effects Monitoring Crew