



National Park Service Southern Cascades Network Fire Ecology Annual Report Calendar Year 2016

Calvin Farris

A. Summary

In 2016 I focused primarily on collaborative research and monitoring projects with interagency and university partners. Aside from the normal workload of supporting parks with fire/vegetation planning and project development, I worked in varying capacities on 11 fire ecology research projects to address specific fire management questions. This emphasis stems from the fact that (a) a concerted effort was made a few years ago to pursue funding and collaboration to address fire ecology questions given the planned decrease in personnel and fire effects funding, and (b) the fact that majority of the burned acreage in the network continues to come from wildland fires in the backcountry that either lack existing plot data, and/or are best studied at landscape scales. Additionally, given the relative small size of the parks, we continue to engage in projects that address park units but must be studied at a broader scale for context (such as trends in synoptic climate-tree growth and mortality relationships, or fire-climate relationships). Three of these projects are in conjunction with the USGS, with whom we continue to increase collaboration: one funded by NPS in the Klamath Network, one funded by USGS in Fort Collins, and a third at the multi-region level funded by the Southwest Fire Climate Consortium.

We wrapped up two CESU projects with the University of Washington at Crater Lake NP that focused on the use of LiDAR to quantify vegetation-fire relationships and provide tools and data to implement mechanical fuels treatments. We continue to focus the majority of our limited monitoring resources on the large mechanical treatments at LAVO in 2014 (Northwest Gateway) because they serve as pilot projects for other parks in the network. We also try to stay current with the most significant fires, like the Reading Fire that reburned a number of previous fuels treatments but exited the park.

The primary theme in our new projects and proposals is to determine the extent to which Rx fire, wildland fire, and mechanical treatments are increasing forest resilience (primarily tree vigor, in addition to traditional FMH variables). Another theme in LAVO is the dynamics and persistence of seral shrub fields following high severity fires (and reburns). Alan Taylor's group at Penn St continues to work with park staff on ongoing projects, and the fire ecologist is participating in a NASA DEVELOP grant to quantify post-fire patch dynamics as a function of pre-fire satellite indices. Finally, sagebrush continues to be an emerging issue. Although LABE is small it contains relict, intact sage steppe with native species that have responded well to cool season burning. We just completed field work on the last of the long-term fire effects units in sagebrush steppe in LABE in 2016 and will coordinate with a university to analyze this comprehensive dataset. Some of the data was synthesized to show how it is being used to inform fire management (part of the chapter on northeastern CA plateaus in the forthcoming revised edition of the *Fire in CA Ecosystems*).

Finally, this was the first year without any staffing support, although I borrowed some resource management and fire effects personnel from other units to keep current on the key field monitoring, namely the Northwest Gateway Project in LAVO. I continue to be involved in network park support for project planning and evaluation. Although health issues have limited my involvement in fire operations, I continue to help with incident management. I worked on three wildland fires doing fire behavior projections, risk assessment, and WFDSS planning. Only one small Rx burn was conducted in the network parks again in 2016, but nobody was available to support it. Two FMH plots did burn though (sagebrush) and those were among the 10 remeasured in 2016.

Table 1. Fire Effects Plot Workload (2016) and Total Plots Installed

Park	Monitoring Unit	Plot Type (FMH Forest/Brush/Grass plot, photo point, Rapid Assessment, CBI, etc.)	Pre-burn 2016	Immed. Post 2016	Postburn (1-25 yrs) 2016	Annual Total (2016)	Total Plots
Lava Beds	Sagebrush Steppe	FMH Brush plot	-	-	10	10	90
Lava Beds	Perennial Bunchgrass	FMH Brush plot	-	-	-	-	24
Lava Beds	Ponderosa Pine	FMH Forest plot	-	-	-	-	18
Lava Beds	Juniper	FMH Forest plot	-	-	-	-	9
Lava Beds	Aspen	Modified FMH Forest plot	-	-	1	1	1
Lava Beds	Mahogany tree girdle	Individual tree assessment	-	-	-	-	1
Lava Beds	Jack Fire	Photo point	-	-	-	-	7
Crater Lake	Lodgepole Pine	FMH Forest plot	-	-	5*	5 *	9
Crater Lake	Mixed Conifer (White Fir)	FMH Forest plot	-	-	-	-	24
Crater Lake	Ponderosa Pine	FMH Forest plot	-	-	-	-	14
Crater Lake	Mountain Hemlock	Modified FMH Forest plot	-	-	-	-	18
Crater Lake	Lodgepole Pine	Modified FMH Forest plot	-	-	-	-	4
Crater Lake	Mixed Pine	Fixed radius forest plot	-	-	-	-	21
Crater Lake	Whitebark Pine	Modified FMH transect	-	-	-	-	16
Crater Lake	Red Cone Fire	Photo Point	-	-	-	-	6
Lassen Volcanic	Mixed Conifer (White Fir)	FMH Forest plot	-	-	-	-	36
Lassen Volcanic	Lodgepole Pine	FMH Forest plot	-	-	-	-	3
Lassen Volcanic	Jeffrey Pine	FMH Forest plot	-	-	-	-	2
Lassen Volcanic	Red Fir	FMH Forest plot	-	-	-	-	9
Lassen Volcanic	Ponderosa Pine	FMH Forest plot	-	-	-	-	5
Lassen Volcanic	Greenleaf Manzanita	FMH Brush plot	-	-	-	-	17
Lassen Volcanic	Mixed Meadow	FMH Grass plot	-	-	-	-	4
Lassen Volcanic	Aspen thinning	Modified FMH Forest plot *	-	-	-	-	63
Lassen Volcanic	Aspen deer enclosure	Aspen sucker heights - Read 3x this year	-	-	-	-	10
Lassen Volcanic	Mixed Conifer thinning	Modified FMH Forest plot *	-	-	-	-	39
Lassen Volcanic	Riparian Meadow thinning	Modified FMH Forest plot **	-	-	-	-	30
Lassen Volcanic	NWG Mechanical thinning	, Modified cruz plots; modified FMH	-	-	24	24	24
Total			-	-	40	40	504

* Also read some research plots in this unit at the same time, in conjunction with UMN crew.

Table 2. Fire Ecology Staffing 2016

Ecologist and Monitors	Starting Date	Ending Date	# of Pay Periods	READ Qualified (Yes or No)	Training and Development
Calvin Farris (Fire Ecologist)	1/1/16	12/31/16	26	Yes (but no red card in 2016 due to health)	AFE Tucson
None *					

* borrowed a crew from REDW doing USGS work for ~2 pay periods

Table 3. 2016 Management Objectives and Monitoring Results

Crater Lake NP programmatic FMH monitoring results through 2016. For percent-change objectives, Confidence Intervals were calculated using a nonparametric bootstrapping ($n = 1000$ simulations) of the Ratio of Means Statistics, except for paired plots in mountain hemlock which were from the Mean of Ratios bootstrap. Other CIs were derived from distributions of individual values (unless reported as SE). Fuels reduction measurements were assessed using 01Post data, unless otherwise noted.

Monitoring Unit	Resource Management Objective (Restoration)	Monitoring Results (sample sizes)	Objective Achieved?	Year Analysis Completed (Range of Data [Yrs] Included in Analysis)
Interior Ponderosa Pine	Reduce surface fuel load to 60-90% of existing load	Total fuel reduction = 9% (CI _{80%} : +5% to 24%) ($n=16$ plots, 10 yrs)	NO	2016 (FMH: 2002-2014 fire occurrence through 2016)
	20-50 trees/acre > 12" dbh*	98 trees/ac > 12" (SE +/- 11.4)	NO	
	< 400 trees/acre 2-6" dbh	366 trees/ac 2-6" (SE 104) ($n=16$ plots)	YES	
	Limit post-fire mortality of <i>Pinus</i> >18" (45 cm) dbh to <25% within 2-years post-treatment	2-year mortality = 4% (CI _{80%} : 2% to 7%) (Note: 10 year mortality = 11%, CI _{80%} : 3-24%) ($n=16$ plots)	YES	
	Increase low-mixed severity burn occurrence to "MFRI" of 9-15 years	Unable to calculate MFRI ^a NFR ₍₁₉₃₃₋₂₀₁₆₎ = 79-85 yrs ^b NFR ₍₁₉₇₈₋₂₀₁₆₎ = 36-46 yrs ^b	NO	
Lodgepole Pine	Reduce surface fuel load to 35-55% of existing load	Total fuel reduction = 54% (CI _{80%} : 43.2 to 64.7%) ^c ($n=30$ plots, 4 fires, 5 years)	YES	2016 (FMH: 2006-2016; Fire Occurrence through 2016)
	Total tree density = no metric	Tree/acre =993 (SE +/- 364) Note: tree density reduction was 48% (CI _{80%} 35%-61%)	N/A	
	Composition 80-90% pine, 0-10% fir, 0-10% hemlock	Avg = 94% pine (SE +/-9%) Avg = 1% fir Avg = 9% hemlock	YES	
	Increase occurrence of low/mixed severity burns to MFRI 60-80 yrs	NFR ₍₁₉₃₃₋₂₀₁₃₎ = 428 yrs ^b NFR ₍₁₉₇₈₋₂₀₁₃₎ = 196 yrs ^b	NO	
Mixed Conifer	Reduce 60-90% of existing dead & down fuels	Total fuel reduction 79% (CI _{80%} :75% to 86%) ^c ($n = 4$ plots, 2 fires, 3 years)	YES, but insufficient sample size	2015 (2003-2014)
	30-80 trees/acre > 12" dbh < 600 trees/acre 2-12" dbh	94 trees/ac >12" (SD +/-27) 128 trees /ac (SE +/-56)	YES, but insufficient sample size	

Monitoring Unit	Resource Management Objective (Restoration)	Monitoring Results (sample sizes)	Objective Achieved?	Year Analysis Completed (Range of Data [Yrs] Included in Analysis)
	Composition: 40-80% fir 15-40% pine, 0-20% other	avg. = 97% fir avg. = 12% pine avg. = 1% other	NO , but insufficient sample size	
	Constraint: Limit post-fire mortality of <i>Pinus</i> >18" (45 cm) dbh to <25% within 2-years post-treatment	2-year mortality = 14% (CI _{80%} : 0% to 43%)	YES , but insufficient sample size	
Mountain Hemlock	Reduce 35-55% of existing dead & down fuels	Total fuel reduction = 43% (CI _{80%} : 26 to 54.7%) (n = 14 plots, 1 fire, 5 years)	YES	2015 (2006-2011 years)
	Composition (15-60% hemlock, 0-40% fir, 0-10% pine)	avg.= 77% hemlock avg.= 32% fir avg.= 13% pine	YES (if CI intervals are included)	
Red Fir	Insufficient data available for stand metrics (patch data currently being analyzed from dNBR)			2016
	Increase occurrence of fires to a MFRI of 40-65 years	NFR ₍₁₉₃₃₋₂₀₁₆₎ = 463 yrs NFR ₍₁₉₇₈₋₂₀₁₆₎ = 232 yrs	NO	
Whitebark Pine	No contemporary fire activity; No objectives met			

^a The MFRI in the FMP is described as the mean interval for all pine sites. This can't be calculated with the relatively short time frame and lack of overlapping fires unless it is as a composite, but the NFR serves as an approximation (time required to burn area of PIPO in park for a given time period, equating roughly to a mean interval for each pixel). The first time period (1933-2016) is the entire park history; the second period (1978-2016) represents the era of managed fires (lightning and Rx).

^b Dates in parentheses indicate the time period used for the calculation to determine the average. The period of data availability is 1933-2016; the period 1978-2016 spans the fire management era when restoration burns began. For PIPO, the low range given includes all acreage in 1980 Sharp Peak polygon, and the high range includes only 10% of it (most of this huge Rx polygon never burned, but records are lacking to determine exactly how much did).

^c No Post1 fuels data was available for any PICO plots for various reasons, so 01Yr01 data is used here. This is a conservative estimate of fuels reduction given that there is often input of new fuels after the first winter, but objectives were still met.

NOTES:

PICO Monitoring Type Data are from Bybee WFU, Cornerstone Rx, and Phoenix Wildland Fire, and UMN research plots

PIPO Monitoring Data are from Timber Crater Burn Units (TC, TC2, TC3), and UMN research plots

Mixed Conifer Data are from Phoenix Wildland Fire and Panhandle3 Rx Burn. An additional 20 mixed conifer plots in the park have not been burned yet.

Mtn Hemlock Data are from Bybee WFU and UCB research plots.

Lassen Volcanic NP programmatic FMH monitoring results through 2016. For percent-change objectives, Confidence Intervals were calculated using a nonparametric bootstrapping (n = 1000 simulations) of the Ratio of Means. Other CIs were derived from distributions of individual values (unless reported as SE)

Monitoring Unit	Resource Management Objective (Restoration)	Monitoring Results (sample sizes)	Objective Achieved?	Year Analysis Completed (Range of Data [Yrs] Included in Analysis)
Ponderosa / Jeffrey Pine	Fuel Load: Reduce surface fuel load to 30-80% of existing load	Total reduction = 52% decrease (CI _{80%} : 32% to 99%) (n=7 plots)	YES small sample size	2014 (1995-2011) All but one plot burned 2X
	Tree density: 40-250 trees/ha all sizes 10-80 trees/ha >80 cm dbh	131 trees/ha (CI _{80%} : 82 to 181) Note: reduction from pre-fire was 60% (CI _{80%} : 45-81%) 16 trees/ha (CI _{80%} : 10 to 27) Note: reduction from pre-fire was 33% (CI _{80%} : 10-74%) (n=7 plot,)	YES	
	Composition: 60-90% Jeffrey pine 10-30% Other Species	avg = 70% Jeffrey pine (CI _{80%} : 51 to 90) avg. = 30% Other spec. (CI _{80%} : 10 to 48) (n=7 plots)	YES	
Lodgepole Pine	Fuel Load: Reduce surface fuel load to 35-55% of existing load	1X Fires (plots burned just once) Total fuel reduction = 35% (CI _{80%} : 30 to 47%) (n=3 plots, 11 years) 2X Fires (plots burned twice) Total fuel reduction = 78% (CI _{80%} : 58 to 89%) (n=3 plots)	Insufficient Sample Size	2015 (2002-2014) All plots burned 2X (Data includes 2012 Reading Fire)
	Tree density (all sizes): No target specified for Trees per Hectare	General Information Unburned: = 1143 (575-1711) Burned 1X: = 993 (127-339) Burned 2X: <10 TPH (0-9) (n=3 plots)	Insufficient Sample Size	
	Composition: 80-90% lodgepole 0-10% fir, 0-10% hemlock	Avg = 97% PICO (CI _{80%} : 92-100%) Avg = 3% Fir Avg = <1% Hemlock (n=3 plots)	Insufficient Sample Size	
Mixed Conifer	Fuel Load: Reduce 60-75% of existing dead & down fuels	63% reduction (CI _{80%} : 57% to 68%) (n = 27 plots)	YES	2015 (1994-2012)

Monitoring Unit	Resource Management Objective (Restoration)	Monitoring Results (sample sizes)	Objective Achieved?	Year Analysis Completed (Range of Data [Yrs] Included in Analysis)
	Tree Density: 50-300 trees/hectare all sizes	406 trees/ha (CI _{80%} : 338 to 475) Note: reduction from pre-fire was 60% (CI _{80%} 56%-65%) (<i>n</i> = 34 plots).	NO (but much closer after burning)	
	< 10-80 trees/hectare >80 cm dbh	16 trees/ha (CI _{80%} : 12 to 19) Note: reduction from pre-fire was 9% (CI _{80%} 0%-19%) ^c (<i>n</i> = 34 plots)	YES	
	Composition: 40-60% fir 15-40% pine, 0-20% other	Avg = 80% fir (CI _{80%} : 76-84%) Avg = 18% pine (CI _{80%} : 14-22%) Avg = 2% other (CI _{80%} : 0.5-3%) (<i>n</i> = 34 plots)	NO , (but much closer after burning)	
Mountain Hemlock and	Fuel Load: Reduce 35-55% of existing dead & down fuels	No Data at LAVO (see CRLA for data from this type)	N/A	N/A
	Composition 15-60% hemlock, 0-40% fir, 0-10% pine (inc. PILA)	No Data at LAVO (see CRLA for data from this type)	N/A	
Red Fir / White Pine	Fuel Load: Reduce 60-75% of existing dead & down fuels	40% reduction (CI _{80%} : 10% to 66%) (<i>n</i> = 5 plots, 2 years)	YES small sample size	2015 (2004-2012)
	Tree Density: 60-350 trees/ha all sizes	248 trees/ha (CI _{80%} : 84 to 411) Note: reduction from pre-fire was 76% (CI _{80%} : 34-85%)	YES small sample size	
	10-100 trees/ha ≥80 cm dbh	48 trees/ha (CI _{80%} : 26 to 69) Note: reduction from pre-fire was 14% (CI _{80%} : 7-29%)		
	Composition: 30-70% fir 20-50% <i>Pinus</i> 0-20% other	Avg = 78% fir (CI _{80%} : 69-88%) Avg = 21% pine (CI _{80%} : 12-31%) Avg = ~1% other (<i>n</i> = 5 plots)	YES small sample size	

NOTES:

PICO Monitoring Type Data are from the Hole Rx and subsequent Reading Wildland Fire

PIJE/PIPO Monitoring Data are from Butte Lake Rx, Hole Rx, and Warner Rx units

Mixed Conifer Data are from Butte Lake, Flume, Hole, Knob, Raker, Roadside, Shack and Warner Valley Rx Units.

Red Fir data reea from

Lava Beds National Monument programmatic monitoring results for fuels reduction objectives through 2016. Other ecological objectives are currently being assessed using newly obtained mapping data from a recent reserve project and ancillary aerial photo analysis (see report citation below).

For percent-change objectives, Confidence Intervals were calculated using a nonparametric bootstrapping (n = 1000 simulations) of the Ratio of Means. Other CIs were derived from distributions of individual values (unless reported as SE)

Monitoring Unit	Resource Management Objective (Restoration)	Monitoring Results (sample sizes)	Objective Achieved?	Year Analysis Completed (Range of Data [Yrs] Included in Analysis)
Ponderosa Pine (FPIPO)	Fuel Load: 50-90% total fuel load reduction	48% reduction (CI _{80%} : 30% to 62%) (<i>n</i> = 16 plots)	YES	2016 (9-23 years))
Sagebrush Steppe (BRUSH)	Fuel Load: 30-70% total fuel load reduction	21% reduction (CI _{80%} : -11% to 27%) (<i>n</i> = 13 plots)	NO (doesn't include standing shrub biomass)	2016 (8-25 years)
Perennial Bunchgrass (BGRAS)	Fuel Load: >70% total fuel load reduction	Biomass Calculations not yet completed	N/A	(1994-2010)
Juniper Woodland (FJUOC)	Fuel Load: All plots still unburned	N/A	N/A	2014

B. Program Information

Table 4. Planning - 2016

Park	Does Park have written DFCs? (yes or no)	Date Park-level Monitoring Plan completed (or revised)	Total # of Project- or Community-level Monitoring Plans (not just 2016)	Assisted with how many BAER plans in 2016?
Lassen Volcanic	Yes	periodic revision	3	0
Lava Beds	Yes	periodic revision	2	0
Crater Lake	Yes	periodic revision	2	1

Table 5. Monitoring - 2016

Park	% 2016 Data Entered	% 2016 Data Quality Checked	# Prescribed Fires Monitored*	# Non-fire Fuels Treatments Monitored*	# Wildfires Monitored	# BAER Treatments Monitored
Lava Beds	75%	0%	1	1	0	0
Crater Lake	10%	0%	0	0	2	0
Lassen Volcanic	50%	0%	0	2	0	0

* treatments did not occur in 2016 but were monitored in 2016

Table 6. Communicating Results - 2016

Park	# of Project Monitoring Reports completed in 2016	# of Annual meeting(s) with Park staff	# of Formal presentations of results	Do you use Minitab?*
Lassen Volcanic NP	0	3	1	Yes (I have one of the offline licenses)
Crater Lake NP	0	2	0	
Lava Beds NM	0	1	0	
Klamath Network	0	0	2	

Table 7. Research - 2016

Park	Are research needs identified in FMP or Monitoring Plan? (yes or no)	# of Proposals Submitted in 2016	# of Proposals Funded in 2016	# of Research Projects Supported in 2016	Additional Comments
Lassen Volcanic NP	Yes	See network		3	Included in funded network proposal
Crater Lake NP	Yes	See network		2	
Lava Beds NM	Yes	See network		1	
Klamath Network	n/a**	2	In review	2	LAVO/WHIS/RED W/CRLA/LABE
Non-network parks	n/a**	1	In review	1	CA wide
Other federal units	n/a **	1	0	1	Adjacent national forests
Parks in other regions	n/a**	1	1	2	SAGU, GRCA, BAND

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

** Not a park I am responsible for FMP planning input.

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:

Ongoing Projects:

- *Project Title:* Using LiDAR to Guide Restoration in the Crater Lake Panhandle (with *Cooperator:* Jerry Franklin and Van Kane, University of Washington

Goal: To develop LiDAR tools to facilitate mechanical restoration planning and monitoring, and compare field inventory methods with LiDAR derived methods.

Expected Completion: Completed (Draft Report received in Dec 2016)

Deliverables: Final report, raw data, gap and patch classification maps, legacy tree classification maps, recommended prescriptions, visualization tools for planning/scoping.

- *Project Title:* Relationship Between Fire History and Forest Structure Using LiDAR, with Jerry Franklin and Van Kane, UW.

Goal: Quantify the influence of biophysical environmental parameters on forest structure and fire severity using LiDAR.

Expected Completion: Completed in 2016

Deliverables: Final report, raw data, TAO and structure maps park planning, scripts

- *Project Title:* Does forest management promote forest resistance and resilience to drought?

Cooperator: Phil van Mantgem, USGS).

Goal: To determine if stand conditions created by NPS forest management encourages forest resistance and resilience to severe drought and how this varies across the diverse conditions in the Klamath region.

Expected Completion: 2018 (funded in 2014). Field work to be done in 2016. One M.S. Thesis project under this project (with matching HSU funds) also underway

Other NPS related research publications forthcoming (using some data from reserve fund projects completed previously):

- Riegel, G.M. et al (with Farris). In Review. Northeastern Plateaus Bioregion. In, Sugihara, Neil G. Fire in California's Ecosystems, 2nd Edition. Univ of California Press, 2006. (includes FMH data and completed Reserve Fund Research from Lava Beds and Lassen Volcanic National Park)
- Stevens J.T., et al. (with Farris). 2016. Average Stand Age From Forest Inventory Plots Does Not Describe Historical Fire Regimes in Ponderosa Pine and Mixed-Conifer Forests of Western North America. PLOS ONE. Published: May 19, 2016: <http://dx.doi.org/10.1371/journal.pone.0147688>

C. Fire ecologist accomplishments and areas of focus

Table 8. Fire Ecologist 2016 Accomplishments/Focus Areas

Category	Percent Time	Accomplishments and/or areas of activities
Planning and Project Support	20%	Field review and delineation of Northwest Gateway Phase II units; Analysis and development of silviculture prescriptions for Phase II; coordination of inventory and analysis work for Panhandle Restoration; field delineation of treatment units and objective development; participate in EA planning and scoping for Panhandle; Field collaboration with foresters. Assist with fuels treatment and project planning in networks parks; FMP review; Assist with WFDSS training
Research	30%	Proposal writing and new project collaboration; Manuscript preparation and peer review revisions; collaboration with universities and agencies on research in parks and other units; data analysis and syntheses; journal peer reviewer; field work; meetings and workshop
Fire Fx Monitoring (planning, field work, data, analysis)	20%	• Planning and oversight of fire effects field work • Deer browse and field enclosure monitoring • Assisting seasonal in various tasks
Fire Assignments	10%	WFDSS and fire modeling support for Bybee 2 and Soup Complex
Training	0%	No amount of training can help me at this point.
Presentations and Workshops and Field Trips (including prep time)	15%	AFE, Cent OR Fire Meeting; Oregon Tech fire lectures; outreach (two field trips)
Administrative/Supervisory,	5%	Administrative paperwork and reporting and planning

D. Fire effects crew accomplishments and areas of focus

N/A – I had no personnel this year, but see Table 1 for some work that personnel on loan from other parks completed for me. This includes resource management bio techs from WHIS (most work), and Wende from PORE. A REDW seasonal working on a USGS project entered some data for me.

E. 2017 Direction

Plans are in the works to come up with a way to share a seasonal with the Klamath Network. This will address the challenge of maintaining the rich network of legacy fire effects monitoring/FMH plots. I'm also working with the new vegetation ecologist at LAVO to fill this gap. I'll assist more parks transfer to a spatial FMP format. The other trend that will increase in 2017 is mechanical thinning in conjunction with Rx Fire in old-growth frontcountry. A major project is in the planning phase at CRLA now and LAVO continues to expand their program. I'm increasing partnership and IAAs with USGS and will continue to collaborate to go after internal and external funding.

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:

- We're up to date on data entry except for last year's work. I'm planning to have access to a seasonal and Wende in 2017 who will finish.
- No migration necessary.

FFI Feedback – No.

G. Optional Information

Just an example of the long-term sagebrush data at LABE that is being worked on (resilient site on top and converted site on bottom)

