



Yosemite National Park Fire Ecology Annual Report Calendar Year 2011

A. Summary

The year literally began with the fire ecologist on a READ assignment on January 1 in Pascagoula, MS on the Deep Water Horizon oil spill. The fire ecologist also participated in the Pacific West Region “future of fuels funding” meeting in Oakland. Gus represented Fire Ecologists generally along with Robin Wills. Hiring in Yosemite this year was the slowest it has ever been which resulted in no one being hired off of the GS 05 Certificate. Gus hired a first year college student at UC-Merced in the Yosemite Leadership Program, and the graduate student hired by Jim Lutz at University of Washington to complete the carbon pools work. Both employees were good additions to the crew this year but crew activity in the early season was not completed because of the late arrival of all seasonals.

In July Gus left Yosemite for a detail with the Office of Wildland Fire Coordination in Washington D.C. Gus worked as the DOI representative on the Cohesive Strategy Subcommittee, as the Coordinator for the Northeast Regional Strategy Committee, and represented these groups for the Wildland Fire Executive Council meetings. The detail was a great learning experience and an outstanding opportunity to see how fire decisions are made at the highest levels.

The park had a busy year with one prescribed fire in Hodgdon and several wildland fires managed for multiple objectives and one wildfire that threatened the Park on Highway 140. It was also a record year for visitation in the park due to the spectacular waterfalls and national publicity on the waterfalls.

Table 1. Fire Effects Plot Workload (2011) and Total Plots Installed

Park	Monitoring unit	Plot type	Pre-burn	Post	Post-burn	Park total
YOSE	white fir – mixed conifer	FMH – forest		1		24
YOSE	white fir – carbon pools study	Global climate Δ	15		11	26
YOSE	red fir – carbon pools study	Global climate Δ	4		4	8
YOSE	lodgepole – carbon pools study	Global climate Δ	0		4	4
YOSE	Jeffrey pine – carbon pools study	Global climate Δ	5		4	9
YOSE	ponderosa pine – carbon pools study	Global climate Δ	11		9	20
SEKI	white fir – carbon pools study	Global climate Δ	0		1	1
SEKI	red fir – carbon pools study	Global climate Δ	8		10	18
SEKI	lodgepole – carbon pools study	Global climate Δ	1		3	4
SEKI	Jeffrey pine – carbon pools study	Global climate Δ	2		10	12
SEKI	ponderosa pine – carbon pools study	Global climate Δ	1		2	3

Table 1a. Carbon pools and greenhouse gas emissions study plots in YOSE and SEKI.

forest type	Yosemite		Sequoia-Kings		
	unburned	burned	unburned	burned	TL
white fir	15	11	0	1	27
red fir	4	4	8	10	26
lodgepole pine	0	4	1	3	8
Jeffrey pine	5	4	2	10	21
ponderosa pine	11	9	1	2	23
TL	35	32	12	26	105

Table 2. Fire Ecology Staffing 2011

Ecologist and Monitors	Starting Date	Ending Date	# of Pay Periods	READ Qualified (Yes or No)	Training and Development
Gus Smith ¹	1/1/2011	07/17/2011	19	Yes	Refresher, defensive driving, detail in OWFC
Justin Romanowitz	5/23/2011	10/21/2011	10	No	FEMO completed except S290.
Tim Martel ²	5/23/2011	09/30/2011	9.5	Yes	HECM, abbreviated READ training.
Kendall Becker ³	6/6/2011	08/12/2011	5	No	None
Kevin Song ⁴	6/6/2011	08/02/2011	4	No	Internship

¹Gus took a 120 day detail in Washington D.C. working for the DOI Office of Wildland Fire.

²Tim left the season early to take a job as a wage grade employee for RM&S in YOSE.

³Kendall was a STEP student from University of Washington and had to return to graduate school.

⁴Kevin was an intern with the Yosemite Leadership Program and was a UC-Merced undergraduate student and had to end early to complete his internship.

Table 3. 2011 Management Objectives and Monitoring Results

Table 3a. Restoration target conditions and monitoring results of tree density, YNP, 2010.

Monitoring Unit	Management Objective	Monitoring Results $\bar{X}$ (+/- 90% CI)	Objective Achieved Yes or No
Red Fir Forest (n = 2 plots)	20-202 trees/ac <31.5in dbh 4-30 trees/ac >31.5in dbh	38.4 trees/ac <31.5in dbh (+/-36.6) 20.2 trees/acre > 31.5in dbh (+/- 6.7)	Too few plots Too few plots
Giant Sequoia/mixed conifer Forest (n = 13 plots, 1 fire)	20-101 trees/ac <31.5in dbh 4-26 trees/ac >31.5in dbh	116 trees/ac <31.5in dbh (+/- 43.0) 10.4 trees/ac >31.5in dbh (+/- 2.6)	No confidence Yes
White fir/mixed Conifer forest (n = 24 plots)	20-89 trees/ac <31.5 in dbh 4-20 trees/ac >31.5 in dbh	<31.5 in – 43.2 trees/ac (+/- 4.4) ¹ >31.5 in – 13.5 trees/ac (+/- 9.7) ¹	Yes Yes
Ponderosa pine/mixed conifer forest (n = 4 plots)	4-91 trees/ac <31.5 dbh 4-30 trees/ac >31.5 dbh	<31.5 in – 409.8 trees/ac (+/- 311.0) >31.5 in – 15.2 trees/ac ¹ (+/- 5.7)	No confidence Yes
Ponderosa pine/bear clover (n = 18 plots)	No management objectives at time of FMP	<31.5in – 165.4 trees/ac (+/- 79.3) >31.5 in – 8.8 trees/ac (+/- 2.4)	

¹Analysis included only the Re02YR10 plots (10 years after the second burn).

Table 3b. Restoration target conditions and monitoring results for species composition, YNP, 2008.

Monitoring Unit	Management Objective (Restoration)	Monitoring Results $\bar{X}$ (+/- 95% CI)	Objective Achieved Yes or No
Red Fir Forest FABMA1T08	70-100% fir, 0-30% pine	Trees < 31.5 in dbh 56% ABMA, 44% ABCO Trees > 31.5in dbh 70% ABMA, 30% ABCO	Yes Yes
Giant Sequoia/mixed conifer Forest (n = 13 plots)	35-65% fir, 0-20% SEGI, 40- 55% pine	Trees <31.5in dbh 73% ABCO, 11% PILA, 11% CADE, 2% SEGI, 2% CONU, <1%PSME & PIPO Trees >31.5in dbh 55% PILA, 23% SEGI, 20% ABCO, 3% CADE	No No, but very close
White fir/mixed Conifer forest FABCO1T08 (n = 24 plots)	40 – 60% fir, 15 – 50% pine, 0 – 10% cedar	Trees <31.5 in dbh 79% fir, 12% cedar, 9% pine Trees >31.5 in dbh 40% fir, 30% cedar, 30% pine	No No (cedar)
Ponderosa pine/mixed conifer forest FPIPO1T09 (n = 4 plots)	60-95% pine, 15-40% cedar, 1- 10% oak	Trees <31.5 dbh 62% ABCO, 16% CADE, 17% pine, 3% oak, 2% PSME Trees >31.5 in dbh 74% pine, 20% CADE, 7% oak	No Yes
Ponderosa pine/bear clover FPIPO1T02 (n = 18 plots)	No management objectives at time of FMP	Trees <31.5 dbh 41% CADE, 29% PIPO, 19% QUKE, 5% PILA, 5% ABCO, 1% PSME, < 1% CUCH2	

		Trees >31.5 dbh 65% PIPO, 30% CADE, 3% PILA, 3% QUKE	
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B. Fire ecologist accomplishments and areas of focus

A very large and significant period of the year was spent in Washington D.C. working for the Office of Wildland Fire Coordination. Outside of my detail in D.C., significant work included preparing for the field season to do the carbon work (funded by the NPS Climate Change Initiative), preparing the objectives and meeting all the resource concerns on the Hodgdon burn (units A, B, C). This is a VERY unique portion of the park and there are many rare plants of concern as well as an entire community of plants that is a relic of an earlier climate. Although we met all the resource concerns on the YOSE side and the Stanislaus National Forest side of the burn, it took me several weeks of work reading the literature, developing mitigation plans and coordinating with Park and STF botanists. Hodgdon is a very difficult place to work! The Wawona NW and Soup bowl burns had far fewer issues.

Table 4. Fire Ecologist 2011 Accomplishments/Focus Areas

Category	Percent Time	Accomplishments and/or areas of activities
<i>Detail at OWFC</i>	<i>30%</i>	<i>Coordinated the Northeast Regional Strategy Committee development of a regional cohesive strategy, DOI representative on the Cohesive Strategy Subcommittee, DOI representative on the National Science and Analysis Team, Reported NE RSC activities to the WFEC.</i>
<i>Planning</i>	<i>10%</i>	<i>Helped prepare burn plans for Hodgdon Meadow, Wawona Northwest, Soup bowl; YOSE FMP-EIS briefing to Superintendent, rewrite; Mariposa Grove Restoration EIS team, Merced River Plan – role of fire.</i>
<i>Presentations</i>	<i><5%</i>	<i>Presentation to the Tehachapi Chapter of the Sierra Club 11 March; Fire careers presentation to Green Meadows High School 28 March, and two day course on fire ecology and fuels treatment at the USFS Fire Academy</i>
<i>NPS Meetings/ task groups</i>	<i><5%</i>	<i>Fire Management Committee meetings, BAR meeting with VER Branch (Siefkin), Research permit meetings, American Indian compliance</i>
<i>Interagency work</i>	<i>10%</i>	<i>Worked with Stanislaus National Forest and YOSE botanists to mitigate concerns about Rx impacts to two rare plants, helped Rx manager plan the interagency prescribed burn, worked with STF silviculturalist to modify firing and fire behavior to meet their (STF) objectives, Southern Sierra Fire Science Working group</i>
<i>Wildfire Assignments</i>	<i>0</i>	<i>No fire assignments in 2011</i>
<i>Prescribed fire projects</i>	<i>0</i>	<i>No time on prescribed fires in 2011</i>
<i>Non-fire fuels projects</i>	<i>0</i>	
<i>Research</i>	<i>10%</i>	<i>Planned and trained crew for the Carbon pools research field season, reviewed draft deliverables from phase I of carbon pools project, Collaborated with researchers on the LiDAR gaps project to fine tune analyses so we get what we need. Worked with Breezy Jackson (Ohio State University) to develop proposal to study fire severity impacts to river morphology and ecosystem function. Worked with USGS and the YOSE bear management team to develop a new database and data gathering protocols to gather data that will help evaluate whether management actions work to reduce negative human-bear interactions</i>
<i>Data collection</i>	<i>1 %</i>	<i>Assisted with some of the field work during the training of the crew</i>
<i>Data entry/QAQC</i>	<i><5%</i>	<i>Error checked and corrected errors for FMH plots used in carbon pools study.</i>
<i>Data analysis</i>	<i>10%</i>	<i>Completed data summaries for 3 prescribed fire projects and the SEGI analyses for the Mariposa Grove Restoration EIS</i>
<i>Supervision/Admin</i>	<i>15%</i>	<i>Hired 4 BioTechs, hired GS 07 Lead!, extensive backcountry travel and travel for OWFC detail.</i>
<i>Training</i>	<i>1%</i>	<i>Fire fighter refresher, defensive driving</i>
<i>Miscellaneous</i>	<i><5%</i>	<i>READ on Deepwater Horizon Oil Spill 2 weeks</i>
<i>Significant non-park activities</i>	<i><2%</i>	<i>Was selected in a gang violence criminal jury trial in Madera Co. that was just short of life changing. Retooled my teaching skills to teach a somewhat racist jury the difference between innocence and guilt and what it means to have reasonable doubt. Measurable result – mistrial!</i>

C. Fire effects crew accomplishments and areas of focus

This year the fire effects crew spent nearly the entire summer working on the Carbon pools study. They sampled over 100 plots in Sequoia and Kings Canyon and Yosemite National Parks in five vegetation types in burned and unburned forests. They also did a post burn read on an FMH plot that burned in the Hodgdon unit this summer.

Justin Romanowitz returned this year as the Assistant Lead of the crew. Tim Martel returned as a crew member and we hired a University of California – Merced student from the Yosemite Leadership Program as an intern. Additionally, we hired University of Washington Researcher, Jim Lutz’s graduate student Kendall Becker because she will read all the tree cores and analyze all the data. Kevin Song left early in August to go back to school and Kendall left the park in mid-September to return to graduate school. Justin and Tim stayed on the crew until mid and late October and worked on several wildfire assignments in the park.

Table 5. Fire Effects Crew 2011 Accomplishments/Focus Areas

Category	Percent Time	Notes
FMH plots	<1%	Prep and travel and plot read for Hodgdon Rx POST read
Carbon plots	60%	Crew spent their entire summer outside of training reading these carbon plots.
Wildfire assignments	5%	READ, FEMO, FFII, HECM for Justin and Tim. Kendall and Kevin were not FFT 2
Prescribed fire projects	0%	
Non-fire fuels projects	< 5%	Piles and pile burning with Crew 6 and 7
Travel out-of-park for plot or project work	30%	Travel to and plot work in SEKI (Carbon pools study)
Data entry	1%	
Data analysis	0%	
Supervision/Admin	<5%	Evaluations, travel.
Training	<5%	Fire refresher, READ (Martel), HECM (Martel), defensive driving, ethics
Miscellaneous	0%	

D. Additional Program Information

Table 6. Planning - 2011

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 2011)	Assisted with how many BAER plans in 2011?
Yosemite National Park	yes	Not completed	0	0

Table 7. Monitoring - 2011

Park	% 2011 Data Entered	% 2011 Data Quality Checked	# Prescribed Fires Monitored*	# Non-fire Fuels Treatments Monitored*	# Wildfires Monitored*	# BAER Treatments Monitored*
Yosemite National Park	90%	90%	1	0	4	1

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

Table 8. Communicating Results - 2011

Park	# of Project Monitoring Reports completed in 2011	# of Annual meeting(s) with Park staff	# of Formal presentations of results	Do you use Minitab?*
Yosemite National Park	1	2	1	Yes

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

Table 9. Research - 2011

Park	Are research needs identified in FMP or Monitoring Plan? (yes or no)	# of Proposals Submitted in 2011	# of Proposals Funded in 2011	# of Research Projects Supported in 2011*	Additional Comments
Yosemite National Park	yes	2	0	2	LiDAR project completed in 2011, Valley Visualization project completed in 2011, and year 2 of phase II of carbon pools study completed

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

Highlights from completed research projects

Combining Landsat and LiDAR remote sensing data to refine fire management objectives for forest structural heterogeneity in Yosemite National Park

Van Kane and Jim Lutz completed the final report for this study of forest structural heterogeneity. In this study the investigators used LiDAR to quantify differences in forest canopy structure.

- We found that vertical and horizontal canopy structure varied by fire severity class and vegetation type.
- LiDAR defined 5 different vertical structural class in the YOSE study area.
- LiDAR also detected changes in vertical forest structure and in gaps for fires of all severity classes.

- Low severity fires decreased the vertical canopy structure between 2m and 16m and increased the number and size of small canopy gaps.
- The moderate severity class decreased canopy forest cover above 16m and created a patch/gap forest structure.
- High severity fires increased patch/gap area and created open/patch areas.
- Jeffrey pine forest structure was mostly unchanged by fire.
- In the lower mixed conifer vegetation types the proportion of forest area in each of their five structural classes was related more to fire severity than to forest type.
- Forests unburned between 1984 and 2010 were characterized as continuous canopy and increasing fire severity decreased the proportion of continuous canopy patches and increased the proportion of gaps until gaps merged into open spaces.
- In patches that burned at moderate and high severity, tall trees decreased with time since fire.
- Burn patches with same dNBR reflectance values showed considerable structural variation between fires, suggesting that dNBR alone does not adequately describe potential fire effects.
- Fires that showed no detectable change in reflectance (no change category) significantly increased the number of canopy gaps and decreased the vertical structure (ladder fuels) between 2m and 16m.

E. 2012 Direction

The big direction change in 2012 will be to orient our new Lead Fire Effects Monitor, Karen Palmer. Karen will EOD in the park on 25 March.

With good leadership for the fire effects crew in place, the fire ecologist can finally pull away from some of the administration of a field crew and focus on the Park Monitoring Plan and rewriting our EIS to remove the “suppression zone” from our terminology and update the plan to 2009 Federal Wildland Fire Policy guidance (Implementation Guide). Also the Fire Ecologist is needed on the Mariposa Grove Restoration EIS and on the Merced River Plan; helping to determine if we can use fire to restore meadows (wetlands), and woodlands with fire but without making major changes to hydrology.

Projects for the Lead this winter will include further work on the Plot photos database, creating a fuel moisture database and populating it with historic data.

INSTRUCTIONS FOR UPLOADING 2011 ANNUAL REPORT

1. Save your report as a PDF file using the following file naming convention "2011 *Park/Network Name* Annual Report.pdf".
2. Go to the NPS Fire Ecology Sharepoint site (<http://npsfamshare.nps.doi.net/wildlandfire/firescience/fireecology/default.aspx>). In Fire Ecology Documents, upload your report to the 2011 Park and Network Fire Ecology Program Annual Reports folder.
3. Please e-mail your regional ecologist, Nate Benson, and MaryBeth Keifer to let us know when you get your report uploaded.

Call MaryBeth Keifer (603-795-2333) or Nate Benson (208-387-5219) if you have any questions or problems.