



Yosemite National Park Fire Ecology Annual Report Calendar Year 2014

A. Summary

Two thousand and fourteen was a busy year in Fire Management in Yosemite. We have been working for several years on an amendment to the Fire Management Plan which would amend the “Suppression unit” and “Fire Use unit” into one fire management unit in the Park following the 2009 Guidance on Implementation of Federal Wildland Fire Management Policy. In 2014 we completed two programmatic Minimum Requirement Analyses to manage fire in wilderness and prescribe fire in wilderness. These were required as part of the Categorical Exclusion.

The Park also ordered three Incident Management Teams to manage fires in the park. The first was the El Portal and Dark Hole Fires managed by a Type I team. The second was the Meadow Fire managed by a Type II team and the last of the season was the Dog Rock Fire managed by a Type I team. The Fire Ecologist supported each of these, and the other wildfires in the park by authoring WFDSS documents, as Lead READ and line READ, and writing IAP elements during initial attack.

In 2013, we were awarded a Joint Fire Sciences Program grant, in collaboration with Brandon Collins at USFS PSW Research Station, and Matt Brooks at USGS Yosemite Field Station, to study how wildfires and prescribed fire treatments impacted the rate of spread and severity of the Rim Fire. We started the field data gathering campaign in June and completed it by the end of August with Fire Effects Monitors from Lassen Volcanoes, North Cascades, and Point Reyes National Parks. The NPS crew leaders were exceptional, and led a team of three USGS seasonal employees and three USGS interns to complete the work. Most of the anticipated field data was collected and all of it was entered into FFI.

The Fire Ecologist took a 120 day detail on the Sierra National Forest as Deputy District Ranger from March – June. The experience was rewarding and Gus learned a lot about building collaborative groups around landscape restoration.

The Fire Ecologist co-authored two peer-reviewed papers in 2014. One was published in Remote Sensing of Environment and the other in Forest Ecology and Management. The papers originate from LiDAR data collected in 2010 with a Fuels Reserve grant. Three published

papers resulted from that work. Additionally, we completed the “Impacts of Fire Management on Aboveground Tree Carbon Stocks in Yosemite and Sequoia & Kings Canyon National Parks” and filed the completed report with Patrick Gonzales, NPS Natural Resources Stewardship and Science. We also completed the “Annually resolved impacts of fire management on carbon stocks in Yosemite and Sequoia & Kings Canyon National Parks”. Jim Lutz and Kendall Becker filed the report with me in December. This work was funded with two NPS Fuels Reserve grants and an NPS Global Climate Change grant. The group of collaborators will begin working on peer-reviewed publications.

In 2014 we were awarded a \$99,000 NPS Fuels Reserve grant for investigating the critical forest structural elements of Pacific fisher. The group collaborating on this is large, and includes some of the best LiDAR analysts, Pacific fisher biologists, and fire ecologists from academia, NPS, and USFS.

Fire Ecologist, Gus Smith marks 2014 as his final year in the park. Gus will move onto a District Ranger position with the Superior National Forest on the Kawishiwi District in Ely, MN. Plans for a new fire ecologist are not yet determined and the Future Target Organization only funds a 0.5 FTE Fire Ecologist.

Table 1. Fire Effects Plot Workload (2014) and Total Plots Installed

Park	Monitoring Unit	Plot Type (FMH Forest/Brush/Grass plot, photo point, Rapid Assessment, CBI, etc.)	Pre-burn 2014	Immed. Post 2014	Postburn (1-20 yrs) 2014	Annual Total (2014)	Total Plots
YOSE	Mixed Conifer – white fir (Ackerson Fire)	FMH Forest plot, post 1996 Ackerson fire forest succession	0	7	7	7	10 ¹
YOSE	Mixed Conifer – white fir	FMH Forest plot	0	11	11	11	24
YOSE	Red fir	FMH Forest plot	0	2	2	2	2
YOSE	Mixed Conifer – ponderosa pine/bear clover	FMH Forest plot	0	4	4	4	18
YOSE	Mixed Conifer – ponderosa pine	FMH Forest plot	0	4	4	4	7
YOSE	Mixed Conifer – giant sequoia	FMH Forest plot	0	3	3	3	13
YOSE	Mixed Conifer	1911 plots ²	0	39	39	39	120
Total			0	70	70	70	172

¹Ackerson Fire plots include 3 red fir (FABMA1T10), and 4 ponderosa pine (FPIPO1T10)

²1911 Plots were timber inventory ‘lots’ that were reread by Rick Everett et al. in 2005-2007. The 2014 plot read is the second plot read on the plots in the 21st century. Plots used in paper: Collins, B.M., R. G. Everett and S. L. Stephens. 2011. Impacts of fire exclusion and current fire management on forest structure in old growth Sierra Nevada mixed-conifer forests. *Ecosphere* 2(4)1-14.

Table 2. Fire Ecology Staffing 2014

Ecologist and Monitors	Starting Date	Ending Date	# of Pay Periods	READ Qualified (Yes or No)	Training and Development
Todd Erdody	06/02/2014	08/23/2013	6	Yes	None
Wende Rehlander	06/02/2014	08/23/2014	6	?	None
Sheah Mucci	06/02/2014	08/23/2014	6	Yes	None

Complete the following summary table for each monitoring unit for which analysis is available (Table 3). Monitoring results should include time frame, confidence interval, and sample size. An example from Sequoia-Kings Canyon is provided to illustrate how to complete the table. **Note the last column indicating the year the analysis for that monitoring unit was last completed and the range of data (in years) included in the data analysis.**

Table 3. 2014 Management Objectives and Monitoring Results

All results shown are 80% confidence intervals of the mean. Sample sizes and determination of whether objectives met based on plot read Monitoring Status indicated in the "Monitoring unit" column. Response to column "Objective achieved" is based on the mean. We don't have the sample size to provide greater certainty.

Monitoring Unit	Management Objective (Restoration)	Monitoring Results Mean (80% confidence intervals of the mean)	Objective Achieved?	Year Analysis Completed (Range of Data [Yrs] Included in Analysis)
White fir – mixed conifer forest (n = 9 plots; Re02Year10)	Density: 20-89 trees/acre < 31.5" dbh 4-20 trees/acre > 31.5" dbh	98 trees/acre < 31.5" (+/- 85.5) 11 trees/acre > 31.5" (+/- 6.6) (n = 8, removed an outlier plot): 53 trees/acre < 31.5" (+/- 44.7) 12 trees/acre > 31.5" (+/- 6.5)	(n = 9) NO for trees < 31.5" YES for trees > 31.5" (n = 8) YES	2012 (2007-2012)
	Species composition: 40 – 65% fir, 15 – 50% pine, 0 – 10% cedar	<u>a) trees < 31.5"</u> and 9 plots = 75% fir, 18% pine, 7% cedar <u>b) trees > 31.5"</u> and 9 plots = 48% fir, 40% pine, 12% cedar <u>c) trees < 31.5"</u> and 8 plots = 75% fir, 14% pine, 11% cedar <u>d) trees > 31.5"</u> and 8 plots = 48% fir, 39% pine, 13% cedar	a) NO, fir is too high b) NO, cedar is a bit high c) NO d) NO	2012 (2007-2012)
Ponderosa pine – bear clover forest (n = 13 plots; Re02Year05)	No density or species composition objectives identified in FMP	88 trees/acre < 31.5" (+/- 85.2) 8 trees/acre > 31.5" (+/- 11.5)	N/A	2012 (2007-2010)
		<u>a) trees < 31.5"</u> = 42% pine, 41% cedar, 17% black oak <u>b) trees > 31.5"</u> = 80% pine, 16% cedar, 4% black oak	N/A	2012 (2007-2010)
Giant Sequoia – mixed conifer forest (n = 2 plots; Re01Year02)	Density: 20-101 trees/acre < 31.5" dbh 4-26 trees/acre > 31.5" dbh	53 trees/acre < 31.5" (+/- 34.5) 10 trees/acre > 31.5" (+/- 4.5)	YES *but sample size too small	2012 (1998-2010)
	Species composition: 35-65% fir, 0-20% sequoia, 40-55% pine	<u>a) trees < 31.5"</u> = 85% fir, 8% cedar, 4% sequoia, 4% pine <u>b) trees > 31.5"</u> = 63% fir, 21% cedar, 16% sequoia, 0% pine	NO	2012 (1998-2010)
Red fir – mixed conifer forest (n = 2 plots; Re01Year10)	Density: 20-202 trees/acre < 31.5" dbh 4-30 trees/acre > 31.5" dbh	30 trees/acre < 31.5" (+/- 16.8) 20 trees/acre > 31.5" (+/- 12.9)	YES *but sample size too small	2012 (2012)

Monitoring Unit	Management Objective (Restoration)	Monitoring Results Mean (80% confidence intervals of the mean)	Objective Achieved?	Year Analysis Completed (Range of Data [Yrs] Included in Analysis)
	Species composition: 70-100% fir, 0-30% pine	a) <u>trees < 31.5"</u> = 100% fir, 0% pine b) <u>trees > 31.5"</u> = 100% fir, 0% pine	YES	2012 (2012)
Ponderosa pine – mixed conifer forest (n = 2 plots; Re02Year01)	Density: 4-91 trees/acre < 31.5" dbh 4-30 trees/acre > 31.5" dbh	16 trees/acre < 31.5" (+/- 12.3) 20 trees/acre > 31.5" (+/- 7.6)	YES *but sample size too small	2012 (2006-2010)
	Species composition: 60-95% pine, 15-40% cedar, 1-10% oak	a) <u>trees < 31.5"</u> = 87.5% fir, 12.5% pine, 0% cedar, 0% oak b) <u>trees > 31.5"</u> = 70% pine, 30% cedar, 0% oak	a) NO, fir is present in high % b) YES, but no oak	2012 (2006-2010)
Incense cedar – mixed conifer forest (n = 3 plots; Re01Year10)	No density or species composition objectives identified in FMP	94 trees/acre < 31.5" (+/- 47.8) 7 trees/acre > 31.5" (+/- 4.8)	N/A	2012 (2009)
		a) <u>trees < 31.5"</u> = 54% cedar, 36% fir, 10% pine b) <u>trees > 31.5"</u> = 100% pine, 0% fir, 0% cedar,	N/A	

B. Program Information

Table 4. Planning - 2014

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 2014)	Assisted with how many BAER plans in 2014?
Yosemite National Park	yes	Has not been completed	0	2

Table 5. Monitoring - 2014

Park	% 2014 Data Entered	% 2014 Data Quality Checked	# Prescribed Fires Monitored*	# Non-fire Fuels Treatments Monitored*	# Wildfires Monitored*	# BAER Treatments Monitored*
Yosemite National Park	100%	100%	0	0	1	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 - 2014

Park	# of Project Monitoring Reports completed in 2014	# of Annual meeting(s) with Park staff	# of Formal presentations of results	Do you use Minitab?*
Yosemite National Park	0	> 15	1	Yes

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

Table 7. Research - 2014

Park	Are research needs identified in FMP or Monitoring Plan? (yes or no)	# of Proposals Submitted in 2014	# of Proposals Funded in 2014	# of Research Projects Supported in 2014*	Additional Comments
Yosemite National Park	yes	6	1	5	Of the 6 proposals submitted, 5 have yet to be peer reviewed at this date (JFSP, and JFSP GRIN)

*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:

2010 Annually resolved impacts of fire management on carbon stocks in Yosemite and Sequoia and Kings Canyon National Parks. This was funded in 2010 with Reserve funds but also \$250K from the NPS Global Climate change funds.

Project is complete, Park has final report

Lutz, Becker, Brooks, Tarnay, Smith, and Matchette working on publications

2014 Finding critical Pacific fisher habitat structures using LiDAR

Project just started. Funds obligated in 2 agreements through the Colorado Plateau CESU and the Pacific Northwest CESU.

C. Fire ecologist accomplishments and areas of focus

This section deals with roles and functions of the ecologist. Identify accomplishments and/or focus areas along with a rough estimate of the amount of time spent in these areas (see table format and example below). This includes planning documents produced or reviewed (e.g. fire management plans, monitoring plans, prescribed fire or mechanical treatment plans, etc.), presentations given and audience, meetings and task groups attended, contracts reviewed, interagency collaboration efforts, volunteer hours managed, and scientific or research publications produced.

Table 8. Fire Ecologist 2014 Accomplishments/Focus Areas

Category	Percent Time	Accomplishments and/or areas of activities
Planning	10%	Completion of amendment to the FMP to remove the “suppression” and “fire use” management units. Completion of the Programmatic Minimum Requirement Analyses for wildfire management and prescribed fire in Wilderness.
Presentations	<1%	“Using wildfires as fuels treatments” 2014 Large Fire Conference (AFE and IAWF)
NPS Meetings/ task groups	10%	Park, regional,
Interagency work	5%	Pacific Fisher Conservation Strategy
Wildfire assignments	10%	READ and BAER (READ: Dark Hole, Dog Rock, Meadow, El Portal); BAER (El Portal and Dog Rock)
Prescribed fire projects	< 1%	We only had one prescribed burn in the park in 2014 and I was on a detail on the Sierra National Forest. No burn plans were written in 2014 so no assistance from fire ecologist.
Non-fire fuels projects	<1%	Scouting and mapping drainages to retain canopy cover along the Wawona Road fuel reduction project.
Research	15%	JFSP Rim Fire project, developing proposals with collaborators, writing agreements, providing logistical support for researchers, field support.
Data collection	5%	Estimated amount of time spent in the field collecting data; include time spent preparing for field work and travel time to local plot locations
Data entry	5%	Estimated amount of time spent entering data from paper to PC
Data analysis	5%	Estimated amount of time spent performing analyses, including data summaries and statistical tests. Largely fuel moisture data
Supervision/Admin	10%	Hiring, supervision, payroll, travel authorization/vouchers, purchasing, etc.
Training	25%	Detail on Sierra National Forest as Deputy District Ranger
Travel out-of-park for plot or project work	0%	Include <u>travel time only</u> for distant, multi-day plot/project work requiring a travel authorization (Note: include data collection or project time associated with these trips in the plot or project categories above)
Miscellaneous		Things that don’t fit in other categories – BAER, BAR plans, etc.

Example of Fire Ecologist Accomplishments/Focus Areas (These are fictitious estimates with some help from SHEN)

Category	Percent Time	Accomplishments and/or areas of activities
Planning	10%	Work on the Research and Adaptive Management pages of the Spatial Fire Management Plan

		• Completion of the 2015 Categorical Exclusion for the 2004 Fire Management Plan • Completion of the Programmatic MRAs for Wildfire and prescribed fire management in Wilderness • Update of the 2014 Yosemite Lightning Ignition Risk Assessment and Planning Tool • WFDSS author on Dark Hole, El Portal, Meadow, and Dog Rock Fires • Providing fire ecology perspective/assessments on lightning ignitions in the park
Presentations	<1%	• One formal presentation at the 2015 Large Fire Conference in Missoula, MT on the role of lightning fires as fuels treatments
NPS Meetings/ task groups	10%	• Southern Sierra Nevada Fire Science Working Group • Association for Fire Ecology (AFE) Board of Directors • AFE Education Committee • AFE professional Certification review • AFE Academic program Certification review • CA Fire Science Consortium Advisory Board
Interagency work	5%	• Southern Sierra Pacific Fisher Working Group • Southern Sierra Pacific Fisher Conservation Strategy development team
Wildfire Assignments	10%	• READ on Dark Hole, Meadow, El Portal, and Dog Rock Fire
Prescribed fire projects	<1%	Only one, 53 acre prescribed fire in the park in 2014 and Fire Ecologist was on a detail with the Sierra National Forest
Non-fire fuels projects	< 1%	Worked with the Wildlife specialist to scout drainages to retain canopy cover for Pacific Fisher culvert crossings in the Wawona Road fuels reduction project
Research	15%	• Co-coordinated field data gathering campaign on the Rim Fire JFSP project • Assisted with logistics on Ohio State University researcher, Breezy Jackson's JFSP GRIN research project • Assisted with logistics on Utah State University researcher, Jim Lutz's Reserve funded tree mortality in the Yosemite Forest Dynamics Plot • Assisted with the development of a geospatial database of all suppression actions taken on the Rim Fire – suppression funded • Co-mentored, REU student with Steve Hart, UC-Merced professor for a soil carbon study comparison of burned and unburned soil
Data collection	5%	Field data collection planning, outfitting crew, logistics, training
Data entry	5%	• QC'd data entered by NOCA fire effects monitors • Entered fuel moisture data • Developed "linked spreadsheet" to server-based Access database with fuel moistures • Uploaded 2014 fuel moisture data into the NFMD
Data analysis	5%	• Analyzed fuel moisture data
Supervision/Admin	10%	• Routine program management administrative work
Training	25%	• Detail as Deputy District Ranger on the Sierra National Forest
Miscellaneous	0%	

D. Fire effects crew accomplishments and areas of focus

This section deals with roles and functions of the fire effects crew. Identify accomplishments and/or focus areas along with a rough estimate of the amount of time spent in these areas (see table format and example below).

Table 9. Fire Effects Crew 2014 Accomplishments/Focus Areas

There is no fire effects crew or crew supervisor in the current or future target organization.

E. 2015 Direction

On 22 February 2015, Gus Smith, Fire Ecologist is leaving Yosemite National Park for a new job with the Superior National Forest. Fire Management Officer, Kelly Martin, Chief of Resource Management and Science, Linda Mazzu, and PWR Chief of Operations, Robin Wills will work to determine the future of fire ecology in Yosemite National Park. Stay tuned.

F. Optional Information

Include any additional material not already covered in the sections above:

- Graphics and/or tables of data analysis results or presentations
- Alternative monitoring activities descriptions
- Challenges facing monitoring program
- Unique solutions to problems
- Collaboration with natural resource managers, other federal agencies, or research institutions
- Photographs of monitoring and fire activities

Also, to help in the ongoing effort to improve FFI, please include any feedback or suggestions here based on your experiences using FFI.

G. Metadata and FFI Database Update on NPS Data Store

As you know, long-term monitoring data are highly valuable! We are glad to have almost all of the NPS FFI databases centrally located on the NPS Data Store. This central data storage option allows us to have an additional secure data location other than those in the parks' or regional offices. It also allows NPS users and others to view the metadata and contact data stewards for access to monitoring data for research or educational purposes. In addition, Landfire staff will be able to download the needed FFI databases directly from the Data Store for Landfire model validation purposes, eliminating the need for NPS staff to respond to another, separate data call.

Once this season's FFI data entry and quality checking are complete, please follow these instructions to update your park(s) metadata ("references") and upload the updated FFI databases to the NPS Data Store.

- 1) Backup the FFI database(s) in FFI (note backup file date for metadata).
- 2) Zip backup file(s) - **this step is critical to reduce file size**, upload time and server storage space utilized. PLEASE use the following naming convention for your zip files: “**FFI_2014_XXXX**”, where XXXX is the 4 letter code for the park, or for the lead park in a network if more than one parks’ data are included in the database.
- 3) Access the Data Store at: <https://irma.nps.gov/App/Reference/Welcome>
- 4) Select **Manage**, then **Manage My References** and click on the **Search** button (don’t need to enter any search criteria to display all references for which you are an owner).
- 5) Select the reference (metadata record) you wish to update from the list displayed to open the Reference Profile where you can make edits to update the reference.
- 6) Expand “Version History”, to view and select the **Manage Versions** option. You will then select **Clone this Reference to Create a New Version** to create a new Reference for this year’s update while preserving past metadata and databases as archives.
- 7) Once you **Save** the new, cloned reference, you can make any changes necessary to update the reference with this year’s information. Most likely, the edits will be to the “Date of Issue/Release”, which is the date of the new FFI backup file, and the “Content End Date”, if you have collected new data this year that was added to the FFI database. Select **Edit Details** from the menu at the top of the profile to make these changes. If anything else has changed (e.g. new protocols established, old protocols abandoned, etc.), you can make these edits to the text fields (e.g. Abstract) as well. Once changes are complete, you must select the “Save and set to” **Active** button at the bottom of the window.
- 8) Finally, upload the new zipped FFI database backup file by selecting **Add Digital File** from the menu at the top of the reference profile (or Add Holding from the Holdings section). Click on **Select Files** and then browse to your zipped FFI database backup file to select it, and then select **Upload**. You must also add additional owners here who have permission to edit the holdings if necessary (we recommend at least one person besides yourself; I (MB) am happy to serve as an additional owner to assist with Data Store if you’d like, but not required!). Remember to Save as **Active** once you have completed any changes.
- 9) Repeat the above steps for each of your FFI databases.

Please feel free to contact MB if you have any questions at all about the process of updating the metadata and FFI databases on the Data Store.

INSTRUCTIONS FOR UPLOADING 2014 ANNUAL REPORT TO DATA STORE

1. Save your report as a PDF file using the following file naming convention "2014 *Park/Network Name* Annual Report.pdf".
2. **NEW THIS YEAR!!!** We will now be uploading our annual reports to the IRMA Data Store instead of the Fire Ecology Sharepoint site. This change will allow us to have all of our Fire Ecology Program information stored in one reliable, accessible location. We are working with the I&M program to transfer all of our past annual reports from Sharepoint to the Data Store. Once this is done, you will be able to use the versioning feature of Data Store to clone the last annual report reference and update it with the current year's report (just as we are doing with the FFI databases). I will be sending out separate, detailed instructions for uploading the annual reports to the Data Store as soon as they are finalized.
3. Please e-mail your regional ecologist, MaryBeth Keifer, and Nate Benson to let us know when you get your report uploaded.

Call MaryBeth Keifer (603-795-2333) if you have any questions or problems.