



**National Park Service
Fire Ecology Annual Report
Calendar Year 2005**

Summary

The 2005 Klamath Cascades fire effects monitoring team was one of the most well-rounded group of folks in the present Lead's time as a monitor. In addition to the Lead (Dana Sandifer) and the assistant Lead (Julie DuBose) the team consisted of two returning and two new seasonal employees: Christy Frenzen, who returned for her fourth season; Paul Senyszyn back for his third; Jena DeJulio, formerly the seasonal lead for the CRLA fuels crew; and Jesse Plummer, a recent Humboldt State graduate in forest ecology.

Despite the wide spectrum of ability and experience within the crew, we were unable to fully utilize it all, due to the change in focus for our crew this season. Our main goal was to resolve the ongoing backlog of data – some of which dated back to 2002. Equally important was the goal to convert at least four of the six parks' FMH databases to FEAT. In order to accomplish these two goals, we had to sacrifice a second round of field work for each park in the cluster. Despite minimal time in the field, we were at least able to achieve data collection for the highest priority project in each park. Our accomplishments: Crater Lake and Lava Beds data has been converted to FEAT; all past data - except 2004 data for the two parks that have been converted and all data collected this season – has been entered into FMH. Less time in each park may become more the status quo: backlogged data is the result of over-accommodating requests for data collection, without allotting time for data management.

The other downside of the year was the lack of a fire ecologist for the eastside parks (CRLA/LABE/LAVO). As several new and crucial projects were in their tender stages of development, it was a critical time to have the link between Fire Management and the monitoring team and guidance in determining project priorities. Despite this, the new ecologist began working remotely in August, organizing last-minute requests from FMOs for new plot installations. Due to this dedication, both LAVO and CRLA were able to get new plots installed into important units. The Point Reyes crew installed plots at Crater Lake; simultaneously, the Redwood/Klamath crew installed plots at Lassen.

Early in the season (April/May), Christy Frenzen received supplemental funding to complete work at Whiskeytown NRA, including BAER monitoring within the French Fire, fire contaminants monitoring of upper Clear Creek with the USGS and Joint Fire Science brush mastication research. This funded detail allowed for the hiring of a fourth seasonal to assist with normal monitoring activities.

For only the second time, the crew assisted with CBI plots. Last year, one crew member assisted at Whiskeytown for a few days. This year, the ecologist Tim Bradley led an informal training day with the crew while we were at Lassen. This occurred in conjunction with collecting post-burn severity information on two existing fuels plots in the Prospect Peak prescribed burn and escape. Both the Lead and Assistant Lead had the opportunity to join a Forest Service Fire Behavior Assessment Team on an assignment consisting of multiple fires. Unfortunately, due to an inability for the Forest Service to compensate NPS employees this opportunity may have come to an abrupt end.

As an added note, while it has been identified and discussed for the past several years, there is still much concern over the disproportionate size of the Klamath Network fire effects monitoring crew and the amount of potential work that is desired of them. At this point in time there is little or no activity spent resolving the issue. If anything, dissatisfaction has increased with all personnel involved. The fact that the team is not co-located with one of the Network ecologist continues to be a challenging venture.

Table 1. Fire Effects Crew Accomplishments

Category	Percent Time	Notes
FMH plots	20%	This includes “capping” rebar at REDW due to safety concerns and flagging rebar to prepare for rx burns.
Mechanical Treatment plots	2%	Crewmembers assisted with marking second-growth stands in preparation for thinning.
CBI plots	1%	CBI plot reads were primarily for training purposes.
Other plot work	2%	Crewmembers assisted REDW vegetation management read transects in a State Parks’ burn unit. “Extra” work for WHIS not included, besides mention in Summary.
Fire Assignments and Fuels Projects	15%	✦ Crew assisted on a total of 13 prescribed fires in 4 of the Network parks (FEMO, FFT1, FFT2) - 67 shifts ✦ 2 crewmembers detailed for two weeks at YNP (FEMO and FFT1 on 2 WFU, 2 rx fires, 1 search and rescue) – 24 shifts ✦ Lead and Assistant detailed with FS FBAT team (FFT1) – 20 shifts
Data Entry	28%	Estimated amount of time spent entering data from paper to PC
Data Management and Conversion	15%	Converted CRLA and LABE data, began preparation on WHIS data
Data Analysis	N/A	No analyses were done by either the Lead or Assistant.
Supervision/Admin	10%	(Way too much of this!)
Training & Professional Development	5%	This includes winter/spring fire-related trainings, annual fire refresher, field training for new folks
Miscellaneous	2%	Crewmembers assisted REDW fuels crew with burn unit preparations.

Table 2. Fire Effects Plot Workload 2005

Park	Monitoring Unit	Type of Plot (FMH, photo point, other)	Pre-burn	Immed. Post	Postburn (1-20 yrs)	Total Plots
CRLA*	Lodgepole Pine – Open	FMH Forest Plots	2			2
	Lodgepole Pine – Closed		2			2
	Lodgepole Pine – Mixed		2			2
	Other Types					8
LABE	Ponderosa Pine	FMH Forest Plots		1	4 Burn, 2 Control	12
	Perennial Bunchgrass	FMH Brush Plots				36
LAVO	Seral Shrub	FMH Forest, Modified	1,1	2		2
	Seral Shrub to White Fir	FMH	1			22
	Prospect Peak	CBI				2

Park	Monitoring Unit	Type of Plot (FMH, photo point, other)	Pre-burn	Immed. Post	Postburn (1-20 yrs)	Total Plots
	Other Forest Types	FMH Forest				42
ORCA	No work in 2005.					
REDW	Mixed Prairie	FMH Grassland			3	36
	White Oak Woodland	FMH Forest			2	25
WHIS	Knobcone Pine	FMH Forest			5	5
	Other Vegetation types	FMH Forest			0	23
	Burn Severity	CBI			0	99
Total			9	3	16	

Table 3. Fire Ecology Staffing 2005

Monitor	Starting Date	Ending Date	# of Pay Periods	Training and Development
Dana Sandifer	PFT	PFT	26	Completed NPS Fundamentals, S-390, S-230, S-261, CPR, Wilderness 1 st Aid
Julie DuBose	Feb 27	Dec 16	21	Completed NPS Fundamentals, RX-510, S-230, S-261, Intro to GIS (community college), Wilderness First Aid
Christy Frenzen	Feb 22 Apr 18 Jun 1	Feb 25 May 27 Oct 26	.5 3 11	S-390 (Intermittent status) WHIS "side monitoring" (see Summary) S-390+BehavePlus, Wilderness First Aid
Jena DeJuilio	May 16 Nov 31	Oct 28 Nov 23	12 Intermittent	Wilderness First Aid, S-230 (Completing end-of-season rx burn monitoring reports)
Jesse Plummer	May 16 Aug 22	Aug 19 Oct 28	7 Intermittent	Wilderness First Responder Assistance with rx burns at Redwood
Paul Senyszyn	Jun 13	Oct 28	10	Wilderness First Aid
Tim Bradley	PFT	PFT	26	Completed S-490, completed RXI2 Taskbook, Initiated ICT type 4 taskbook. No advancement on Strike Team Leader taskbook. Completed 1-day DOI/Department of Justice NEPA training, PEPC training.

The Klamath Cascades NPS cluster has two fire ecologist positions, one covering the units west of Interstate 5 and the other, vacant during 2005, covering the units to the east of the Interstate. The west side fire ecologist is Tim Bradley, who is stationed in Whiskeytown. During 2005 Tim completed the second year of a 3-year detail working for the DOI International Technical Assistance Program. Since the detail was reimbursed by DOI-ITAP, some backfill support was completed by Jennifer Gibson, an ecologist at Whiskeytown. The past year was Tim's fifth with the National Park Service.

A number of diverse activities were conducted by the fire ecologist. In his DOI-ITAP position, Tim serves as program coordinator for DOI fire and pest management activities covering all of Central America and Mexico. Primary duties were coordinating and organizing a variety of training courses on themes that included forest quarantine pests of importance, fire investigation, wildland fuels, bark beetle ecology and management, valuation of fire damage to natural ecosystems and tropical forest pest management. Most of the duties were accomplished

through e-mail correspondence or telephone conversations, although Tim did also assist on site with training activities in Mexico, Honduras and Costa Rica. Other duties of note that Tim completed within his detail position include the preparation of activity reports and status updates, review of budgets and collaboration with contractors and other program participants. In total, Tim spent approximately 30% of his time in this detail position. In a backfill capacity, Jennifer was involved or organized a wide range of fire related activities, including field monitoring, supervision of staff, collaboration with outside researchers, data analysis, and project planning and compliance. A significant accomplishment in 2005 of both Jennifer and Tim was the preparation of a final report for their Joint Fire Science brush mastication project.

Efforts in support of fire management were another significant aspect of Tim's job, and fire planning was a big component of this support. During 2005 Tim completed Whiskeytown's first mechanical treatment plan consistent with RM 18 chapter 10, organized and led the park's first ever fire program review and assisted with FPA planning and implementation. In addition, Tim supervised the completion of field work for a forest and fuels inventory project that will become Whiskeytown's first fuel reduction-forest thinning-biomass utilization project. Tim also provided field support for the implementation of mechanical treatment projects and prescribed fires throughout the year and served as acting FMO for almost two months time

During the year Tim implemented one new research project at Whiskeytown that involved investigating effects of pile burning and burn pile mitigation methods on vegetation establishment. Tim also assisted the fire effects crew in monitoring at varied parks throughout the year.

For the next 6-12 months there are a number of carryover activities that the Whiskeytown Fire Ecologist will be working on, as well as some new ones. One ongoing focus will be to finalize a revision of the Whiskeytown EIS. The original planning document, although only one year old, was based on unrealistically high treatment target goals for fall and summer treatments and contains important text sections that are vague and open to varied interpretations. The appended EIS will clarify sections where ambiguity has been identified, will broaden the treatment options for condition class 2

Table 4. Fire Ecologist Accomplishments/Focus Area

Category	Percent Time	Accomplishments/Focus Areas
General Planning	14	- Organized and led Whiskeytown Fire Program Review - Initiated and directed NEPA compliance for varied projects - Wrote WhiskeyCreek Pioneer Drive mechanical treatment Plan
Monitoring Plans	1	Review of varied plans
Presentations	2	- Presentation at regional fire ecology meeting - Presentations at in park meetings
NPS Meetings/ Task Groups	3	- Regional fire ecology meeting, - Regional FMO conference - I&M network vegetation monitoring workgroup - Park meetings
Interagency Work	2	- Regional LANDFIRE workshop particiapnt - FPA planning and workshop attendance
Fire Assignments and Fuels Projects	8	- Ignition specialist (Salt Creek and Mule burns) - Lead FEMO (Queen Mary and Roost B) - Mechanical treatment unit layout and evaluation (East boundary, Brandy Creek units)

Category	Percent Time	Accomplishments/Focus Areas
Research	8	- Joint Fire Science funding proposal - Pile burning research - Brush Mastication (JFSP) final report
Training & Professional Development	6	- S490 - Physical training - Firefighter refresher - Online training (PEPC, IT Security, other)
Data Entry	2	Brandy Creek biomass project, CBI, burn pile, FMH data
Data Management and Conversion	2	FMH and other data
Data Analysis	5	FMH and JFSP data
Supervision/Admin	7	- Hiring and supervision - Travel and payroll - Miscellaneous admin duties
DOI Fire & Pest Management Detail	30	Project coordination, training, budget review, contractor coordination, etc.
Miscellaneous	10	Backfill as acting FMO

and 3 forest and will incorporate an adaptive management approaches that park managers believe will more closely approximate identified program goals and objectives. Additional ongoing effort will be directed towards writing prescribed fire and mechanical treatment plans. This effort will focus on two new treatments types, small scale high priority burns and biomass extraction treatments. The small scale burns will be much smaller than typical burns, and will be limited to the heart of the parks urban interface where both model 9 fuels and condition class 3 vegetation exist. The biomass extraction units will be designed as the first open bid projects within the park and will incorporate biomass extraction treatments, including small scale logging.

While funding has ended for the Joint Fire Science brush mastication project, more work is anticipated on that project. Of note, brush mastication research will be presented at two national conferences, including submission of findings to two peer reviewed journals. Ongoing monitoring will be conducted in brush mastication, pile burn, rapid assessment, FMH, and photo point plots in a variety of different units.

New work will investigate development age of different chaparral and knobcone pine vegetation patches within the park to see if reliable and consistent dating can be derived for the initiation of vegetation patches and to determine if these dates coincide with past fire occurrences.

Data Summary:

As an ongoing effort to improve fire programs all parks within the cluster have scheduled periodic program reviews. As a component of these reviews, data analysis is conducted and reviewed with the goal of informing managers about effects of actions. Ecological monitoring is an important component of those review process. Attached are some brief summaries of data that will be presented at upcoming reviews at both Redwood and Whiskeytown. The primary data source are established FMH plots and CBI plots. A few rapid assessment plots are available, although data from upcoming reads will be required for meaningful analysis.

At Redwood National and State Parks, the fire effects FMH plot history is extensive, almost all of which consists of prairie and oak woodland plots in the 4,500 acre Bald Hills FMU.

Programmatic objectives are directed at maintaining presence of prairie system that is being encroached by surrounding Douglas fir forests, and maintaining or increasing relative cover of native plants. Burn frequency has been highly variable, with reapplied fire treatments occurring anywhere between 1 and 5 times within the past 15 years. Data from these plots show a huge level of variability, as indicated in tables 5-8. These summary data show a huge amount of variability is evident, with both native and exotic species show both increases and declines with varied fire regimes. These data point to the fact that the prairie systems are quite dynamic, suggesting that factors such as weather or herbivores may be equally if not more important than fire regime. Without a more rigorous study design, the current monitoring system likely will never provide a clear answer on the best fire regime for maintaining native to exotic plant cover. Because of this dilemma, the park fire ecologist has recommended scaling back the existing fire effects program at Redwood. Since the park is now anticipating application of treatments in as yet untested areas, the suggested emphasis is to divert to those new fire management treatments, which would include the establishment of reference control sites that will not be treated.

Table 5: Relative cover, common plant guilds, all Redwood FMH prairie plots with 03 year 05 status

		Pre-Burn	01 Year 02	02 Year 02	03 Year 02	03 Year 05
Non-native	Annual Grasses	44.4	30.5	33.7	37.7	38.6
	Perennial. Grass	11	13.2	13.7	12.1	15.1
	Perennial. Forbs	16.9	13.6	20.4	9.3	9.6
Native	Perennial Grasses	0.9	0.6	0.3	0.8	0.6
	Annual Forbs	11.9	19.9	14.3	18.3	17.8
	Perennial Forbs	4.6	8.3	5	3.2	1.6

(data source: Redwood GMIPR monitoring type, plots 20, 21, 25, 27, 29, 31)

Table 6: Mean relative cover of most common plant species, all Redwood FMH prairie plots with 03 year 05 status

Genus	Species	Pre-Burn	01 Year 02	02 Year 02	03 Year 02	03 Year 05
Aira	caryophyllea	17.5	8.2	10.2	12.9	7.2
Cynosurus	echinatus	12.2	9.4	12.3	11.7	18.1
Bromus	hordeaceus	9.7	11.7	4.4	3.6	10.1
Linum	bienne	8.8	1.3	5.8	0.8	2.5
Phalaris	aquatica	4.5	4.3	2.6	3.3	3.1
Rumex	acetosella	3.9	5.8	4.8	3.3	4.2
Lotus	micranthus	3.6	9.2	6.8	5.3	4
Danthonia	californica	2.9	3.8	3.9	3.6	3.6

(data source: Redwood GMIPR monitoring type, plots 20, 21, 25, 27, 29, 31)

Table 7: Mean relative cover of common plant species, all Redwood FMH prairie plots burned four times with two year post-burn status

Genus	Species	Pre-Burn	01 Year 02	02 Year 02	03 Year 02	04 Year 02
Aira	caryophyllea	0.6	2.5	11	13.7	14.8
Anthoxanthum	aristatum	1.1	0	0	7.1	3.5
Arrhenatherum	elatius	24.3	25.2	13.8	10.4	11.9
Cynosurus	echinatus	4.7	6.7	4.0	1.1	1.8
Danthonia	californica	9.9	0	6.7	6.9	4.8
Elymus	glaucus	15.3	17.5	12.7	15.3	14.3
Holcus	lanatus	10.9	1.6	13.6	4.4	4.3
Lotus	micranthus	1.4	9.9	2.4	3.8	4.8
Pteridium	aquilinum	4.2	4.1	1.2	1.8	1.71
Rumex	acetosella	6.6	6.3	5.1	6.5	4.9

(data source: Redwood GMIPR monitoring type, plots 7, 9, 12, and 17; note, burn cycle 01 and 02 n=3, all other n=4)

Table 8: Mean relative cover of common plant species, all Redwood FMH Oak Woodland plots with one burn and nine year post-burn status

Genus	Species	Pre	01 02	01 05	01 09
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Agrostis	hallii	2.8	8.6	5.4	5.9
Anthoxanthum	odoratum	0.3	3.3	5.9	4.7
Arrhenatherum	elaius	12.1	13.1	18.9	12.6
Cynosurus	echinatus	7.9	21.7	10.3	8.2
Dactylis	golmerata	7.4	6.7	7.9	10.8
Elymus	glaucus	12.7	17.3	21.4	11.8
Osmorhiza	chilensis	2	1.2	2	3.1
Poa	pratensis	11.1	2.1	0.2	1.3
Torilis	arvensis	1.4	0	0.5	3.5
Toxicodendron	diversilobum	10.1	11.7	7.8	5.4

(data source: Redwood FQUGA monitoring type, plots 6 and 7)

Objectives for fire treatments at Whiskeytown are primarily aimed at reducing fire threat to surrounding communities and using fire to promote and/or protect park resources (i.e. increase native plant cover, reduce threat of large scale high-severity fire, promote old growth characteristics). While not as numerous in total volume of plots and plot reads, the Whiskeytown fire effects plot network is diverse and includes both FMH, CBI, shaded fuelbreak and varied rapid assessment plots. Many of the rapid assessment plots are relatively new, and post burn status is not yet available. CBI plots conducted over the past few years have shown that the remote sensing for determination of burn severity is a very good method for detecting landscape level effects.

For plot data that does exist, recent and ongoing analysis at the park show that prescribed fire and mechanical treatments in lower elevations increases herbaceous plant diversity and cover, although most of this increase is from common exotic annuals such as *Aira caryophyllea* and *Hypochaeris* spp. In upper elevations, a small increase in herbaceous native cover has been detected with no detected exotic plant increase, although sample sizes are too low to have confidence in results.

Fuel loading is a common attribute tracked in monitoring at Whiskeytown. Most data show a decrease immediate post burn in total fuel loading. One exception of note comes from data from the parks only knobcone pine monitoring. These data, following two spring burns, indicate that total fuel load actually increase following two treatments. This increase is attributable to an influx of downed trees (1000 hour fuel load increase), some from storm damage but most from fire killed trees that have fallen down. While ponderosa and other tree species may be killed by fire, very limited data indicate that they tend to stand as snags for numerous years, whereas fire killed knobcone pine trees are very short lived snags and rapidly fall to the ground to contribute to total surface fuel loading (Graph 1).

Graph 1: Average total surface fuel loading, Whiskeytown Knobcone Pine FMH Monitoring Plots

Fuel Load by Size Class
Shasta Divide, Knobcone Pine Vegetation

