



**National Park Service
San Francisco Bay Area Network
Fire Ecology Annual Report
Calendar Year 2011**

**Golden Gate National Recreation Area
Pinnacles National Monument
Point Reyes National Seashore**

A. Summary

During 2011, the San Francisco Bay Area Network (SFBAN) fire ecology and fire effects program worked closely with both fire management and natural resources management at five different parks. The program conducted monitoring on several 2010 prescribed fire projects. In addition, monitoring work was carried out to quantify the impacts of two non-native diseases on fuel loads at Point Reyes National Seashore (PRNS). Also at PRNS, new plots were installed to measure the impacts of mechanical fuel reduction. The fire ecology and fire effects program assisted with several prescribed burns at Golden Gate National Recreation Area (GGNRA) and PRNS. Lastly, the fire effects crew assisted Redwood National Park with monitoring needs that were unmet due to staffing changes.

In total, the fire effects crew monitored over 180 plots in 2011 at PRNS, GGNRA, Pinnacles National Monument (PNM), Santa Monica Mountains National Recreation Area (SMMNRA) and Redwood National Park (RNP). Additional highlights include a paper published about landscape scale changes in vegetation following the 1995 Vision Fire at PRNS.

Right: Members of the fire effects monitoring crew examining smoke dispersal patterns on the Gerbode prescribed burn at GGNRA.



Monitoring 2010 Prescribed Fire Projects

A large portion of the 2011 field season was focused on year one monitoring of 2010 prescribed fire projects. At GGNRA, year one remeasurements were part of an experiment comparing the impacts of fire and mechanical disturbance on habitat quality for the federally endangered Mission blue butterfly (*Icaricia icarioides missionensis*). At PRNS, year one monitoring was focused on the efficacy of fire in controlling the invasive shrub Scotch broom (*Cytisus scoparius*). At PNM, monitoring was aimed at quantifying the impacts of fire and herbicide treatments on invasive yellow starthistle (*Centaurea solstitialis*).

Quantifying Fuels Changes Associated with Non-native Plant Diseases

Another area of focus of the SFBAN fire ecology and fire effects program during 2011 was quantifying the impacts of two non-native pathogens, sudden oak death (SOD, *Phytophthora ramorum*) and pine pitch canker (*Fusarium circinatum*) on fuel loads at PRNS. SOD plots were initially established in 2007 and had their third measurement in 2011. Pine pitch canker plots were newly established in 2011.



Crew members take a break between SOD plots

At PRNS, small experimental burns were carried out as part of a USFWS-funded project to re-establish showy indian clover (*Trifolium amoenum*). This species was collected at PRNS around the turn of the 20th century but had not been seen in the park since. This project is aimed at re-introducing a population to PRNS and includes funding to compare disturbance treatments on population success. Fifteen small prescribed burns took place as pre-planting site preparation using 1m x 1m burn boxes. Burn treatments will be compared to grazing and control treatments. Also at PRNS, the McCurdy prescribed burn unit was treated to control French broom (*Genista monspessulana*).



Above: Lead Fire Effects Monitor observes fire behavior in showy indian clover burn boxes

At GGNRA, nine acres of the Gerbode Valley were burned to control the invasive perennial grass *Festuca arundinacea*. This was the first broadcast burn at GGNRA since the late 1990's.

At PNM, a prescribed fire was carried out in collaboration with the Amah Mutsun Tribal Band. This Joint Fire Science funded project took place at a traditional gathering ground that

was used for collecting white root sedge and deergrass for basketry materials. The goal of the project was to reintroduce traditional management practices to the site. This unique collaboration was covered in the San Francisco Chronicle (<http://www.sfgate.com/cgi-bin/article.cgi?f=/c/a/2011/12/12/MNNN1M97EL.DTL>).

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

Park	Monitoring Unit	Type of Plot (FMH, photo point, other)	Pre-trtmt 2011	Immed. Post 2011	Post trtmt (1-20 yrs) 2011	2011 Annual Total	Total Plots
Golden Gate NRA	Mission Blue Butterfly	Modified FMH			8	8	8
Pinnacles NM	Yellow Starthistle	FMH; Point Frame			18	18	18
Point Reyes NS	Scotch Broom	FMH; Modified FMH			31	31	32
	French Broom	FMH		4	13	17	13
	SOD	Circular Forest Plot - 12.6m radius			28	28	29
	Pine Pitch Canker	Circular Forest Plot - 6.3m radius			23	23	23
	Fuel Modification	Circular Forest Plot - 9m radius	5			5	5
Redwood NP*	Oregon Oak	FMH			6	6	NA ¹
	Mixed Prairie	FMH			1	1	NA ¹
	Douglas Fir	Rapid Assessment			14	14	50
Total			5	4	142	151	

¹Redwood is not one of the BAN parks, and we don't know the total number of oak and prairie plots.

Table 2. Fire Ecology Staffing 2011

Ecologist and Monitors	Starting Date	Ending Date	# of Pay Periods	READ Qualified (Yes or No)	Training and Development
Alison Forrestel	NA	NA	26	Yes (trainee)	Operational Leadership
Wende Rehlaender	2-20-11	11-19-11	19	No	Operational Leadership
Jennifer Cribbs	4-10-11	10-15-11	13	No	S-130/190
Monica Delmartini	4-10-11	10-15-11	13.5	No	FEMOt on one burn
Naomi LeBeau	4-10-11	10-8-11	13.5	No	S-130/190

Table 3. 2011 Management Objectives and Monitoring Results

Golden Gate National Recreation Area

Monitoring Unit	Management Objective (Restoration)	Monitoring Results (90% confidence interval)	Objective Achieved?	Year Last Analysis Completed
Redwood Forest	Reduce Fuel Loads	No significant difference between pre-fire fuel loads and year 10 post-fire fuel loads. Fuel loads did decrease significantly in YR01, but by YR02 had returned to pre-fire levels. (<i>n=8 plots, 3 fires</i>)	NO* *But results confounded by Sudden Oak Death which has killed most of the tanoak in Muir Woods National Monument, where the plots are, and has thus lead to additional fuel loads.	2008

Pinnacles National Monument

Monitoring Unit	Management Objective (Restoration)	Monitoring Results (90% confidence interval)	Objective Achieved?	Year Last Analysis Completed
Chamise chaparral	Enhance native vegetation* * This was not the original burn objective. The original goal was to create a discontinuity in the fuels along the boundary without type converting the area to grass. This objective is no longer considered valid.	-30% to +21% change in native species absolute cover (<i>n=7 plots, 3 fires</i>)	NO	2007
Yellow starthistle FMH	95% reduction in yellow starthistle cover	-14% to +3.5% change in yellow starthistle cover (<i>n=5 plots, 1 fire</i>)	NO	2011
	Maintain or decrease non-native species cover	-3% to +1% change in non-native species absolute cover (<i>n=5 plots, 1 fire</i>)	YES	2011
Yellow starthistle modified plots	95% reduction in yellow starthistle cover	-12% to -3% change in yellow starthistle cover (<i>n=10 plots, 1 fire</i>)	NO	2011
	95% reduction in yellow starthistle density	-110% to 539% change in yellow starthistle density (<i>n=10 plots, 1 fire</i>)	NO	2011
	Maintain or decrease non-native species cover	-16% to +3% change in non-native species cover (<i>n=10 plots, 1 fire</i>)	NO	2011

Point Reyes National Seashore

Monitoring Unit	Management Objective (Restoration)	Monitoring Results (90% confidence interval)	Objective Achieved?	Year Last Analysis Completed
Non-native grassland (D Ranch)	Increase cover of <i>Bromus carinatus</i>	-5% to +21% change in BRCA (n=6 plots, 2 fires)	NO	2011
	Increase cover of native species	-7% to +10% change in native species cover (n=6 plots, 2 fires)	NO	2011
Non-native perennial grassland	Decrease cover of <i>Baccharis pilularis</i>	5% mean decrease in BAPI cover for burn plots compared to 8% increase in BAPI cover for control plots*	YES	2011
	Maintain or decrease cover of <i>Phalaris aquatica</i>	27% mean decrease in PHAQ cover for burn plots compared to 37% decrease in PHAQ cover for control plots** (n=7 plots, 1 fire)	NO	2011
	Maintain or increase cover of native species	3.5% mean decrease in native cover for burn plots compared to 7% increase in cover for control plots* (n=7 plots, 1 fire)	NO	2011
<i>Deschampsia</i> prairie	Maintain or increase cover of native species	21% to 28% decrease in native species cover. Decrease is also statistically significant when compared to control plots. (n=7 plots, 1 fire)	NO	2011
Bishop pine	Maintain or increase cover of native species	Minimum of 2% decrease in native species cover in a one-sided test. Mean decrease of 20%. (n=3 plots, 1 fire)	NO	2011
French broom	Decrease cover of French broom to 10% or less	9% to 22% decrease in French broom cover; mean post broom cover 0% to 14% (n=3 plots, 4 fires)	NO	2011
	Maintain or increase cover of native species	6% to 15% decrease in native species cover (n=3 plots, 4 fires)	NO	2011
Scotch broom	Decrease cover of Scotch broom to 10% or less	0% to 3% cover in Scotch broom (n=6 plots, 3-5 fires)	YES	2008
	Maintain or increase cover of native species	2% to 16% decrease in native species cover (n=6 plots, 3-5 fires)	NO	2011
Eucalyptus	Decrease standing BA of eucalyptus	811-4315cm ² decrease in BA (n=5 plots, mechanical)	YES	2008
	Decrease dead and downed fuel loads	No statistically significant change in fuel loading (n=5 plots, mechanical)	NO	2008

Monitoring Unit	Management Objective (Restoration)	Monitoring Results (90% confidence interval)	Objective Achieved?	Year Last Analysis Completed
	Minimize resprouts	-10% to +75% change in resprouts from initial post treatment to 5 years post-treatment (n=5 plots, mechanical)	NO	2011

All results shown are 90% confidence intervals of the mean. Objectives/results are mean percent change from pre-burn to most recent post-burn visit.

* Statistically significant at $\alpha=0.10$

** NOT Statistically significant at $\alpha=0.10$

B. Fire ecologist accomplishments and areas of focus

Table 4. Fire Ecologist 2011 Accomplishments/Focus Areas

Category	Percent Time	Accomplishments and/or areas of activities
Planning	15%	- Coordinated READ training at PNM - Assisted with planning for prescribed fire and fuels project at all parks - Wrote burn plan for showy indian clover prescribed burn - Worked on IDT for FMP 5 Year Update
Presentations	5%	- Hosted visiting national park employees from Australia - SOD data presented at SAF - SOD article published in Forest Wisdom - Presented at fire orientation week about PRNSfire ecology - Presented at Tilden staff ride
NPS Meetings/ task groups	3%	- Participated in I&M Plant Community Change working group - Assisted national office with FFI
Interagency work	<1%	- Assisted FMO with WFDSS implementation for PORE, PNM & GGNRA - Assisted FMO with FPA workload
Wildfire assignments		
Prescribed fire projects	<1%	Assisted with prescribed burn implementation at network parks
Non-fire fuels projects		
Research	15%	- Coordinated with UC Berkeley, UC Davis and SFSU students on SOD, pine pitch canker and bishop pine ecology research projects at PORE. - Vision Fire vegetation change report accepted at Fire Ecology - PRNSSudden Oak Death paper accepted at Journal of Vegetation Science - Submitted funding proposals for SOD-owl and rare maritime chaparral research projects
Data collection	20%	Assisted crew with field work at PRNS, GGNRA & PNM
Data entry		
Data analysis	5%	Analysis of MBB data
Supervision/Admin	20%	Hiring, supervision, payroll, travel authorization/vouchers, purchasing, etc.
Training	5%	- Crucial conversations - Operational leadership - Supervisory training
Travel out-of-park for plot or project work	<1%	Travel to PNM
Miscellaneous	10%	- Updated fire history and mechanical treatments layers with 2010 fires/treatments - Historic vegetation mapping project

C. Fire effects crew accomplishments and areas of focus

Table 5. Fire Effects Crew 2011 Accomplishments/Focus Areas

Category	Percent Time		Notes
	Crew	Lead	
FMH plots	39%	27%	Includes training on methods and plant i.d. (lead training crew)
WUI plots	-	-	All plots were pretty much WUI plots
CBI plots	0	0	
Other plot work	27%	14%	SOD, pine pitch canker, mechanical fuels plots
Wildfire assignments	0	0	
Prescribed fire projects	<5%	<4%	Crew participated in one park prescribed burn and about an hour with burn boxes. They participated in 2 or 3 local-area Rx burns, and one crew member joined the fuels crew for a week at YOSE. Lead participated in two park Rx burns as FEMO, burn boxes on two days, and wrote burn reports.
Non-fire fuels projects	<<1%	2	One crew member spent a day with gps, mapping mowed areas. Lead took photopoint pictures at GGNRA & PORE, labeled photos.
Travel out-of-park for plot or project work	5%	4%	
Data entry	15%	12%	Crew completed data entry and checking of all plot data for 2011. Also they labeled digital photos and scanned data sheets. Lead created FFI sample events, added species, made sure metadata added, wrote FMH-4's, and other tasks to manage databases.
Data analysis	0	5%	CHIS fennel data collected in 2010
Supervision/Admin	1%	23%	Hiring, planning, timesheets, travel, and other paperwork, preparing for trips, ordering things, reconciling credit card statements, annual report, and various other administrative tasks.
Training	7%	7%	All attended fire refresher and park safety training. Regular PT. Lead only: Operational Leadership and migratory bird training.
Miscellaneous	1%	2%	Crew and lead: helped plant seeds of rare clover; misc. meetings. Lead only: rare plant monitoring, project review meeting and wrote up comments.

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?
Golden Gate National Recreation Area	No	No	1	0
Pinnacles National Monument	No	No	1	0
Point Reyes National Seashore	No	Dec. 2007	2	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*
Golden Gate National Recreation Area	100%	100%	2	0	0	0
Pinnacles National Monument	100%	100%	2	0	0	0
Point Reyes National Seashore	100%	100%	3	3	0	0
Redwood National Park	100%	100%	6	0	0	0

* 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?*
Golden Gate National Recreation Area	0	4	1	Yes
Pinnacles National Monument	0	4	1	Yes
Point Reyes National Seashore	0	4	3	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
Golden Gate National Recreation Area	Yes	1	0	1	
Pinnacles National Monument	Yes	0	1	1	
Point Reyes National Seashore	Yes	1	0	1	

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

E. 2012 Direction

The focus in 2012 will be on remeasuring plots from 2010 and 2011 prescribed burns and mechanical projects. We also plan to establish a development program where the fire effects seasonals have the opportunity to take on analysis or other growth projects of interest.

F. Optional Information

Fire Effects Monitoring Narrative

The San Francisco Bay Area Network fire effects and ecology program had a productive and varied year. We were able to hire an additional seasonal fire effects crew member this year, in order to help out the Klamath Cascades Network (which currently lacks staff). The extra person allowed us to accomplish a lot more work.

The fire effects seasonals started in mid April, and after a week of orientation training, we were off to Pinnacles National Monument (PNM) with the fire ecologist. At PNM we read recently-burned yellowstar thistle (*Centaurea solstitialis*) plots in two different burn units, and used FMH and another sampling method. PNM park staff members continue vegetation restoration work in the yellowstar-infested Bottomlands unit, and our work helped to monitor the progress. We also read yellowstar plots in the Entrance Meadow, a small but highly visible unit.

In late April and early June, we read the Mission Blue Butterfly plots at GGNRA, in a study to examine ways to enhance the habitat of this endangered butterfly. Each plot comprises three blocks: burn, mechanical fuel removal, and control. The burning (inside burn boxes) and mechanical removal were done last year, so this was year 1 for collecting post-treatment data.

In May we left for a month of work at Santa Monica Mountains National Recreation Area. In a departure from the past, we stayed at SMMNRA for two back-to-back pay periods, in order to cut down on travel costs (it's an eight-hour drive). Further reducing expenditures, SMMNRA now has a dorm that is available for visiting NPS staff, and we stayed there. At SMMNRA we participated in a study of the recovery of coastal sage scrub after wildfire. Plots had been established after a wildfire, and this was the five-year re-read. The method was based on protocols designed by Jon Keeley, and used visual estimates of percent cover of species.

In June we traveled to Redwood National Park. Both the fire ecologist, Jen Beck, and the lead monitor, Becky Smith, at RNP had moved on to new jobs, so there was no fire ecology staff for the Klamath Cascade network parks. To take up the slack, the SFBAN and the

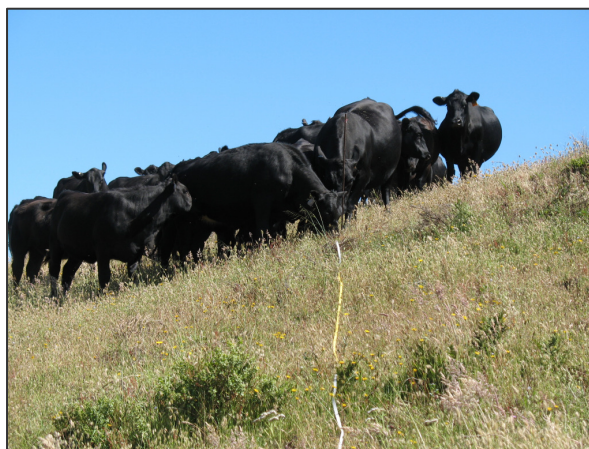


Southern Cascades networks spent one pay period each at RNP and Whiskeytown NRA, respectively. The SFBAN has been assisting northern parks since 2005, but this was the first trip to RNP. At RNP we worked in the Bald Hills, where we sampled Oregon oak, Douglas fir rapid assessment, and mixed prairie plots. Jen and Becky planned the workload and got together

Left: wearing Tyvek in the “tick and TODI”(poison oak) plot at RNP

the data sheets, equipment, and computer files that we needed before they left RNP, and were also available from their new jobs to answer our questions. While we were at RNP, John McClelland, the RNP fuels specialist, took care of many logistical things, anything from getting us into the HQ building to arranging for our flat tire to be fixed.

For most of the rest of the summer we were at Point Reyes National Seashore, where there was a lot to do. There were two main groups of FMH transects: We read Scotch broom (*Cytisus scoparius*) plots as part of a large project to eradicate the Scotch broom in the park, while determining the best broom control methods in the process. Fire, mechanical removal, and herbicide are the treatments being employed. Plots were first established in Scotch broom at PRNS in the early 1990’s, but the park is now able to expand on these efforts, because it has received funding to attack this pesky exotic in a systematic and organized way. Broom control work is being carried out on both the core population and the more scattered individuals; so far over 100 acres have been treated.



Right: Bovine field assistants gather to read a Scotch broom plot (hope they straighten the tape first).

French broom (*Genista monspessulana*) grows in another part of the park, and has been repeatedly burned for control purposes; we read a set of plots in this monitoring type.

In August, the fire effects crew participated in two studies of tree diseases. First, SOD, or sudden oak death, has been plaguing oaks and their relatives for a number of years in Marin County. The crew read plots in tanoak (*Lithocarpus densiflorus*) that had been established in 2007 (and re-read in 2009) as a joint study with U.C. Berkeley. The study aims to investigate “the impacts of SOD-induced tanoak mortality, with respect to vegetation dynamics and fuel loading.” There were two sets of plots, “healthy” and “diseased” but depressingly, tanoak trees in both kinds of plot were in very poor shape in 2011. SOD is having a devastating impact on the

tanoaks, killing trees and preventing seedlings from reaching maturity; these changes will lead to a wide range of effects.



Healthy tanoak forest (left) and diseased fallen branches (below)



The second disease studied was pine pitch canker (PCC), which has been affecting the local pines, most notably in the park, the dense stands of regenerating Bishop pine (*Pinus muricata*) that came in after the 1995 Vision Fire. Like SOD, PCC is caused by a fungus. PCC is a relative newcomer to California (its signs were first observed at PRNS in 2007), and its potential impacts are as yet unknown. As with the SOD study, the goal of PCC project is to monitor the impacts of the disease on the ecology of the forest.

Two prescribed burns were carried out in the SFBAN parks this year. In September, eight acres

Below: Burning a dense tall fescue meadow at GGNRA



containing tall fescue (*Festuca arundinacea*) were burned at GGNRA. The area burned did not include the fire effects transects, but it was exciting nevertheless to accomplish this, as it was the first broadcast burn at GGNRA since 1999. This site in a valley bottom is slated to be restored to native vegetation. The intent of the burn was to remove some of the dense thatch so that the

fescue would be more receptive to herbicide and other restoration processes. The park's Habitat Restoration Team (HRT) has already begun replanting the site with natives.

In October, the McCurdy unit at PRNS, which contains large amounts of French broom, was burned for the sixth time. The broom species are stubbornly resistant to control, and must be repeatedly treated in order for progress to be made.

Lastly, burn boxes were used again, for a very targeted application of fire on a species that had been presumed to be extinct. Efforts have been underway at PRNS to re-establish a viable population of Showy Indian Clover (*Trifolium amoenum*), a species which had been extirpated from the park. Small one-meter square plots have now been exposed to fire and grazing, and seeds planted in the different treatments.

FFI Wishes

To be able to move visits from one macroplot to another.

To be able to include both date (calendar year) and status in a query.

To have an update to the species list incorporating the new Jepson names

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.