CENTRAL AND SOUTHERN CALIFORNIA FIRE EFFECTS MONITORING PROGRAM 2001 ANNUAL REPORT

INTRODUCTION

The Central and Southern California Fire Effects Monitoring Program covers six parks: Channel Islands National Park, Golden Gate National Recreation Area, Joshua Tree National Park, Pinnacles National Monument, Point Reyes National Seashore, and Santa Monica National Recreation Area. As of last year, responsibilities for the fire effects program at Lake Mead National Recreation Area were transferred to the Utah/Great Basin Fire Effects Monitoring Program due to the Utah/Great Basin program's proximity to Lake Mead and its familiarity with the Ponderosa Pine and Pinyon-Juniper Woodland plant communities.

The Central and Southern California Fire Effects Monitoring Program, currently base out of Golden Gate National Recreation Area, experienced a change in positions in the last year. In the spring 2001, the former Lead Monitor, resigned, and in June 2001, the new Lead Monitor was hired. In the interim, the Fire Ecologist for PORE, GOGA and PINN, supervised the Fire Effects Program.

The 2001 field season proved to be rather atypical, as there were only 19 FMH plots due for re-measurement (5 forest plots on GOGA, 10 brush plots on PORE, and 3 brush/ 1 forest plot on SAMO). Six additional post-burn plots were measured on the McDonald Omnibus burn units in PORE. There were no plots to be read in CHIS, JOTR, or PINN. Thus, much of the Fire Effects Monitoring Crew's time was spent on other fire-related projects. These projects include:

-Fieldwork on the Velvet Grass fire research project at Point Reyes overseen by the PORE Fire Ecologist and PORE Vegetation Ecologist. The Fire Effects crew measured the PRE-treatment reads for the study examining the effects of fire on Velvet Grass (*Holcus lanatus*). This fieldwork consisted of estimating cover for species on an array of quadrats nested within a plot.

-Fuel moisture sampling at Golden Gate NRA. The fire effects monitors sampled and compiled fuel moisture data on three sites from July to October. These three sites are Bolinas Ridge, Muir Woods, and Milagra Ridge.

-Fieldwork and GIS support on the Baccharis Biomass fire research project on PORE and GGNRA overseen by the PORE Fire Ecologist. This project examines three different methods for estimating the amount of fuel accumulation in the coyote brush plant community. The three methods to estimate biomass in a square meter are an estimation of leaf area using the Licor 2000, an average height measurement, and a measurement of the basal stem area of the shrubs. These are compared to destructively sampling the Baccharis in the square meter plot. The Fire effects crew assisted in the location of the sample points using GIS and GPS, collecting and processing the sample data, and creating a database design for the data collected. The biomass processing and database work is still in progress.

-Fire monitoring and effects support for Marin Municipal Water District prescribed burns. The Fire Effects Crew trained and assisted the MMWD crew on FMH protocols for measuring fuel loading transects and burn severity transects as well as participating in fire monitoring and operational duties on the burns. This work was associated with a joint agency fire research project coordinated by the ecologists at MMWD, CDF, and the forester for Marin County Fire Dept., and the project examines the interaction of fire, sudden oak death, and oak woodland stand dynamics.

-Fire operations support for Calif. State Parks on the Mt. Tamalpais prescribed burn.

-Preparation support for prescribe burn planning at Point Reyes. The fire effects monitors provided GIS support on maps for the burn plans and helped prepare the Scotch Broom control plots for the McDonald Omnibus prescribed fires.

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-Fire monitoring/operations and post-burn vegetation summary for the PORE prescribed burns.

-The fire effects monitors assisted GGNPA with sampling design and fire hazard considerations for an Eucalyptus/Broom removal WUI project on recently acquired GGNRA land above Marin City.

-As of August 2001, the Fire Effects Monitoring Program is the only program left at the GOGA Fire Management Office. In the absence of filled positions (FMO, Mobilization Coordinator, FPA, Engine/Fire Techs), the Fire Effects Monitors have been maintaining the very basic Fire Management Office functions and paperwork.

In addition to these projects, the fire effects monitors utilized various training opportunities. Members of the crew attended basic fire training, a week GIS course, two GPS training sessions, and training on firing operations. The Assistant Lead Monitor had the opportunity to participate on a ten-day fire assignment. The Lead Monitor had the opportunity to attend classes on Lichens, keying Poaceae, and keying Asteraceae, and was able to attend the Western Regional Fire Mgmt. meeting in November.

For the 2002 field season, a total of 61 FMH plots are due for re-measurement (37 burn plots and 25 control plots) on all parks except JOTR. This does not include projected installs for the proposed fennel burns on CHIS, and the proposed mustard burns in Cheeseboro Canyon on SAMO.

PLOT NETWORK INFORMATION

Table 1 shows the number of plots installed in previous years, the number of plots installed in 2001, and the total number of plots installed for each of the six parks. In the 2001 field season, no new plots were installed. This may be due to uncertainty in burn planning, and/or the lack of any new monitoring types in planned burn units.

TABLE 1. **Plot installation by plot type**.

	Number of Plots Installed Previous Years				Number of Plots Installed 2001				Total Number Plots Installed			
Park	**G**	**B**	**F**	**Total**	**G**	**B**	**F**	**Total**	**G**	**B**	**F**	**Total**
CHIS	0	17 24-C	0	17 24-C	0	0	0	0	0	17 24-C	0	17 24-C
GOGA	0	78 24-C	14	92 24-C	0	0	0	0	0	78 24-C	14	92 24-C
JOTR	0	10 2-C	0	10 2-C	0	0	0	0	0	10 2-C	0	10 2-C
PINN	0	54	16	70	0	0	0	0	0	54	16	70
PORE	0	28 11-C	4	32 11-C	0	0	0	0	0	28 11-C	4	32 11-C
SAMO	0	82 2-C	11 1-C	93 3-C	0	0	0	0	0	82 2-C	11 1-C	93 3-C

C = Control Plot

In the SAMO plot database, 21 burn plots (11 AVFA, 10 BRDI) and 2 control plots (1 AVFA, 1 BRNI) were previously changed from grassland plots to brush plots. This has created some confusion in the database.

During the winter 2002, it is recommended that all plots and monitoring types be re-evaluated for objectives, measurement schedules, and validity. For instance: is one control plot valid at all? This issue applies to three monitoring types in the SAMO database. These monitoring types are strong candidates for plot installation consideration.

Table 2 shows the plot re-measurement counts per plot type for 2001 and the projected re-measurement count per plot type for the 2002 field season.

TABLE 2. Plot re-measurements by plot type for 2001 and 2002.

	Total Plots to Re-measure 2002				Total Plots Re-measurement 2001			
Park	**G**	**B**	**F**	**Total**	**G**	**B**	**F**	**Total**
CHIS	0	17 24-C	0	17 24-C	0	0	0	0
GOGA	0	0	3	3	0	0	3	3
JOTR	0	0	0	0	0	0	0	0
PINN	0	3	1 1-C	4	0	0	0	0
PORE	0	14	0	14	0	10 6-P	0	10 6-P
SAMO	0	5	0	5	0	0	0	0
TOTAL	0	40 24-C	4 1-C	43 25-C	0	10 6-P	3	13 6-P

C = Control Plots

P = Immediate Post-burn re-measurements

As shown in Table 2, there are a total of 43 burn plots and 25 control plots due for re-measurement throughout the six parks covered by our Fire Effects Monitoring program. Approximately 37% of this plot work consists of control plots. Unfortunately, this was not reflected in the report to the FirePro Steering Committee Year End Report requested in October 2001due to confusion in naming protocol in the CHIS database (as plots were queried by burn status). The information requested in the FPSC year end report would be collected much more accurately and efficiently had it been coordinated with the regional annual report as the season for the fire effects monitors didn't end until mid-November.

Table 3 shows the projected number of plots due for re-measurement per park for the next five years. These numbers are based solely on existing plots in the database and are subject to change with additional plot installation.

TABLE 3. Five-year projected number of plot re-measurements by year

Number of Plots						
Park	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**
CHIS	17 24-C	0	0	0	0	17 24-C
GOGA	3	21 13-C	0	18 5-C	11	5
JOTR	0	10 2-C	0	0	0	0
PINN	4 1-C	8 3-C	4 2-C	0	0	3
PORE	14	32 4-C	4	0	12	2
SAMO	5	43	0	22	0	5

Table 4 shows the projected plot installation per plot type for each park. The numbers followed by a question mark are tentative. For example, the fire effects monitoring program is tentatively planning to install 7 additional plots on the fennel burns in CHIS during the upcoming 2002 field season, however, the sampling design has not yet been solidified. This number may be increased to include control plots. This same case applies to the tentative plot installs for SAMO. As of yet, the planners of these projects have not indicated whether or not control plots are desired.

TABLE 4. Projected plot installation.

	Plots to be Installed 2002				**Projected Total**			
Park	**G**	**B**	**F**	**Total**	**G**	**B**	**F**	**Total**
CHIS	0	7?	0	7?	0	24? 24-C	0	24? 24-C
GOGA	0	0	0	0	0	78 24-C	14	92 24-C
JOTR	0	0	0	0	0	10 2-C	0	10 2-C
PINN	0	0	0	0	0	54	16	70
PORE	0	0	0	0	0	28 11-C	4	32 11-C
SAMO	0	18?	0	18?	0	100? 61-C	11 1-C	111? 61-C

Table 5 shows the difference between the budget request and the actual work accomplished per plot type for each park. GOGA shows a difference of –2 as two forest plots were rejected because these plots did not fit the description of the monitoring type. The SESE monitoring type describes a plant community "dominated by *Sequoia sempervirens*", however, at the time of installation, Redwood overstory tree cover of FSESE1D0801 was 15.3% and the Redwood overstory tree cover of FSESE1D0804 was 10.5%. These two plots are dominated by Douglas-fir, *Pseudotsuga menziesii* consisting of overstory tree cover of 50% and 42.1% respectively. This trend is evident in the subsequent re-reads. Consequently, the plots are more accurately described as a Douglas-fir community type (for which there is no monitoring type) and to analyze them with Redwood data would be misleading. There is a Douglas-fir monitoring type in PORE, however, it consists of only one plot. If future burns are planned in this type, it would be worthwhile to install more plots to monitor incidence of mortality of Douglas-fir.

SAMO shows a total difference of –4. This is composed of 1 BAVFA1D01 **plot**, 1 BAVFA1D01 **control plot**, 1 BBRNI1D01 **control plot**, and 1FQUAG1D02 **control plot**. This was due to a misunderstanding between parks as to who would measure these plots. If there are interests in re-measuring control data sets of sample size equal to one, these will be re-measured next year. However, it is somewhat confusing how a **control** plot should come up for re-measurement without re-measurement of a corresponding **burn** plot.

TABLE 5. Workload difference between the budget request and actual work accomplished.

Workload Difference in 2002				
Park	**G**	**B**	**F**	**Total**
CHIS	0	0	0	0
GOGA	0	0	-2	-2
JOTR	0	0	0	0
PINN	0	0	0	0
PORE	0	+6-P	0	+6-P
SAMO	0	-1 -2-C	0 -1-C	-1 -3-C

Table 6 shows the number of plots that have been burned per plot type for each park. In the 2001 field season, 6 CYSC plots burned in the McDonald Omnibus prescribed burn on PORE. These burn plots should be analyzed with caution as this burn unit is also affected by grazing, mowing, and Scotch broom cutting. These alternative fuel treatments may be considered for future plot installation, however, control over treatment history is essential.

TABLE 6. Number of plots that have burned or otherwise treated.

	Total Plots Burned 2001				Total Plots Burned to Date			
Park	**G**	**B**	**F**	**Total**	**G**	**B**	**F**	**Total**
CHIS	0	0	0	0	0	17	0	17
GOGA	0	0	0	0	0	33 9-R	10	43 9-R
JOTR	0	0	0	0	0	10	0	10
PINN	0	0	0	0	0	9	5	14
PORE	0	6-R	0	6-R	0	28 22-R	0	28 22-R
SAMO	0	0	0	0	21 20-R	29 1-R	11 8-R	61 29-R

R = Reburns

Tables 7a-7f show the total number of plots per plot type for each burn status. Due to the detail of the following information, there is a table for each park.

TABLE 7a. Post-treatment plot summary for CHIS.

Park	Status	G	B	F	Total
CHIS	01 Immediate Post-burn	X	17	X	17
CHIS	01 Year 01 Post-burn	X	17	X	17
	00 Year 01 Post-burn		19-C		19-C
CHIS	01 Year 02 Post-burn	X	17	X	17
	00 Year 02 Post-burn		23-C		23-C
CHIS	01 Year 05 Post-burn	X	X	X	X
CHIS	01 Year 10 Post-burn	X	X	X	X

TABLE 7b. Post-treatment plot summary for GOGA.

Park	Status	G	B	F	Total
GOGA	01-Immediate Post-burn	X	33	10	43
	02-Immediate Post-burn	X	9	X	9
GOGA	01 Year 01 Post-burn	X	33	10	43
	02 Year 01 Post-burn	X	9	X	9
	00 Year 01 Post-burn	X	7-C	X	7-C
GOGA	01 Year 02 Post-burn	X	33	10	43
	02 Year 02 Post-burn	X	9	X	9
	00 Year 02 Post-burn	X	8-C	X	8-C
GOGA	00 Year 03 Post-burn	X	5-C	X	5-C
GOGA	00 Year 04 Post-burn	X	5-C	X	5-C
GOGA	01 Year 05 Post-burn	X	25	4	29
	00 Year 05 Post-burn	X	11-C	X	11-C
GOGA	00 Year 06 Post-burn	X	2-C	X	2-C
GOGA	00 Year 07 Post-burn	X	7-C	X	7-C
GOGA	00 Year 08 Post-burn	X	6-C	X	6-C
GOGA	00 Year 09 Post-burn	X	2-C	X	2-C
GOGA	01 Year 10 Post-burn	X	2	X	2
	00 Year 10 Post-burn	X	2-C	X	2-C

TABLE 7c. Post-treatment plot summary for JOTR.

Park	Status	G	B	F	Total
JOTR	01 Immediate Post-burn	X	10	X	10
JOTR	01 Year 01 Post-burn	X	10	X	10
JOTR	01 Year 02 Post-burn	X	10	X	10
JOTR	00 Year 04 Post-burn	X	2-C	X	2-C
JOTR	01 Year 05 Post-burn	X	10	X	10
JOTR	01 Year 10 Post-burn	X	X	X	X

TABLE 7d. Post-treatment plot summary for PINN.

Park	Status	G	B	F	Total
PINN	01 Immediate Post-burn	X	8*	5	13
PINN	01 Year 01 Post-burn	X	9	5	14
PINN	01 Year 02 Post-burn	X	9	5	14
PINN	01 Year 05 Post-burn	X	5	2	7
PINN	01 Year 10 Post-burn	X	X	X	X

*** No 01 Immediate Post-burn severity data collected on ADFA 10.**

TABLE 7e. Post-treatment plot summary for PORE.

Park	Status	G	B	F	Total
PORE	01-Immediate Post-burn	X	27	X	27
	02-Immediate Post-burn	X	16	X	16
	03-Immediate Post-burn	X	7	X	7
	04-Immediate Post-burn	X	4	X	4
	05-Immediate Post-burn	X	4	X	4
PORE	01 Year 01 Post-burn	X	28	X	28
	02 Year 01 Post-burn	X	16	X	16
	03 Year 01 Post-burn	X	5	X	5
	04 Year 01 Post-burn	X	4	X	4
PORE	01 Year 02 Post-burn	X	23	X	23
	02 Year 02 Post-burn	X	16	X	16
	03 Year 02 Post-burn	X	7	X	7
	04 Year 02 Post-burn	X	4	X	4
PORE	00 Year 03 Post-burn	X	11-C	X	11-C
PORE	01 Year 04 Post-burn	X	4	X	4
PORE	01 Year 05 Post-burn	X	14	X	14
	02 Year 05 Post-burn	X	5	X	5
	00 Year 05 Post-burn	X	11-C	X	11-C
PORE	01 Year 10 Post-burn	X	3	X	3

TABLE 7f. Post-treatment plot summary for SAMO.

Park	Status	G	B	F	Total
SAMO	01-Immediate Post-burn	21	29	11	61
	02-Immediate Post-burn	20	1	8	29
SAMO	01 Year 01 Post-burn	21	29	11	61
	02 Year 01 Post-burn	20	1	8	29
SAMO	01 Year 02 Post-burn	13	29	8	50
	02 Year 02 Post-burn	20	1	8	29
SAMO	01 Year 03 Post-burn	0	1	2	3
	00 Year 03 Post-burn	2-C	0	1-C	3-C
SAMO	01 Year 04 Post-burn	0	1	2	3
	00 Year 04 Post-burn	0	0	1-C	1-C
SAMO	01 Year 05 Post-burn	1	12	0	13
	02 Year 05 Post-burn	20	1	8	29
	00 Year 05 Post-burn	2-C	0	1-C	3-C
SAMO	01 Year 06 Post-burn	1	0	0	1
	00 Year 06 Post-burn	2-C	0	1-C	3-C
SAMO	01 Year 07 Post-burn	0	1	3	4
SAMO	01 Year 09 Post-burn	1	0	0	1
	00 Year 09 Post-burn	2-C	0	1-C	3-C
SAMO	01 Year 10 Post-burn	X	X	X	X

Tables 8a-8f show the number of plots installed in 2001 and the total number of plots installed by monitoring type for each park. Due to the detail of the following information, there is a table for each park.

TABLE 8a. Number of plots installed by monitoring type in 2001 for CHIS.

Monitoring Type Code	Monitoring Type Name	Number of Plots Installed in 2001	Total Number of Plots Installed	
			B	C
BARCA1D05	Coastal Sage Scrub	0	7	14-C
BNAPU1D01	Coastal Grassland	0	10	10-C
		Totals	17	24-C

As shown in table 8a, the number of control plots for the monitoring type BARCA1D05 is twice the number of burn plots for this same type. Typically, these sample sizes should be reversed. The treatment plots should have a larger sample size in order to capture variability introduced by the treatment itself. This control data set probably contains plots

originally installed as burn plots that didn't burn. If so, should these plots be separated? The plots occur within a treatment unit that didn't receive treatment, where technically, control plots should be located in a separate treatment unit to reduce edge effects (thus, the "control").

TABLE 8b. Number of plots installed by monitoring type in 2001 for GOGA.

Monitoring Type Code	Monitoring Type Name	Number of Plots Installed in 2001	Total Number of Plots Installed	
			B	C
BARCA1D05	Northern Coastal Scrub	0	1	0
BARGL1D04	Maritime Chaparral	0	4	0
BBAPI1D05	Northern Coastal Scrub	0	11	7
BBRDI1D01	Annual Non-native Grassland	0	25	3
BBRDI2D01	Annual Non-native Grassland	0	5	3
BCAPY1D03	Non-native Thistle	0	5	0
FEUGL1D10	Eucalyptus Forest	0	1	0
BHIIN1D01	Non-native Mustard	0	1	0
BNAPU1D01	Northern Coastal Prairie	0	16	9
BPHAQ1D03	Perennial Non-native Grassland	0	6	2
BFEAR1D03	Perennial Non-native Grassland	0	4	0
FSESE1D10	Redwood Forest	0	7*	0
FUMCA1D10	Calif. Bay Woodland	0	4	0
		Totals	92	24-C

* Reduced by two to reflect the rejected plots.

As shown in table 8b, GOGA has three monitoring types with a sample size of one. If there is interest in monitoring these plant communities, these vegetation types are prime candidates for plot installation. If not, these monitoring types should become "de-activated". The BARCA1D05 is a very ubiquitous plant community in GOGA which should be considered for further plot installation, however, as of yet, there are no future burn plans in this vegetation type or on this park.

Golden Gate has not conducted any prescribed burns since 1998, and consequently, there is not much need for additional plot installation. However, there are ongoing Wildland Urban Interface (WUI) projects on the park. In the absence of a burn program, it may be interesting to install plots in areas treated with alternative fuels management methods.

TABLE 8c. Number of plots installed by monitoring type in 2001 for JOTR.

Monitoring Type Code	Monitoring Type Name	Number of Plots Installed in 2001	Total Number of Plots Installed	
			B	C
BCORA1D05	Black Brush Scrub	0	10	2-C
		Totals	10	2-C

Table 8c shows the data for JOTR. However, in the FMH database, there are two monitoring types BCORA1 and BCORA2.

TABLE 8d. Number of plots installed by monitoring type in 2001 for PINN.

Monitoring Type Code	Monitoring Type Name	Number of Plots Installed in 2001	Total Number of Plots Installed	
			B	C
BADFA1D04	Chamise Chaparral	0	26	0
BCECU1D04	Calif. Mixed Chaparral	0	28	0
FQUDO1D01	Blue Oak Woodland	0	16	0
		Totals	70	0-C

TABLE 8e. Number of plots installed by monitoring type in 2001 for PORE.

Monitoring Type Code	Monitoring Type Name	Number of Plots Installed in 2001	Total Number of Plots Installed	
			B	C
BBAPI1D05	Northern Coastal Scrub	0	6	4-C
BCYSC1D05	Non-native Grassland with Scotch Broom	0	8	0
BLOPE1D01	Non-native Grassland	0	10	7-C
BGEMO2D05	Non-native Grassland with French Broom	0	4	0
FPIMU1D05	Bishop Pine Forest	0	3	0
FPSMED10	Douglas-fir Forest	0	1	0
		Totals	32	11-C

TABLE 8f. Number of plots installed by monitoring type in 2001 for SAMO.

Monitoring Type Code	Monitoring Type Name	Number of Plots Installed in 2001	Total Number of Plots Installed	
			B	C
BAVFA1D01	Annual Non-native Grassland	0	11	1-C
BBRDI1D01	Annual Non-native Grassland	0	10	0
BBRNI1D01	Annual Non-native Grassland	0	0	1-C
BNAPU1D01	Native perennial Grassland	0	8	0
FQUAG1D02	Oak Woodland	0	11	1-C
BARCA1D05	Coastal Sage Scrub	0	16	0
BADFA1D04	Chamise Chaparral	0	17	0
BARGL1D04	Eastwood Manzanita Chaparral	0	1	0
BCEME1D04	Big-pod Ceanothus Chaparral	0	11	0
BCESP1D04	Mixed Chaparral	0	5	0
BMALA1G05	Coastal Sage Scrub dominated by *Malosma laurina*	0	1	0
BSAME1D04	Black Sage Chaparral	0	2	0
		Totals	93	3-C

As shown in table 8f, a number of monitoring types and control data sets have a sample size of one. As reiterated above, these data sets should be re-evaluated for rejection or further plot installation according to monitoring objectives and future burn plans.

CONCLUDING REMARKS

The past year was a rather a atypical year for the Central and Southern California Fire Effects Monitoring Program due to a change in personnel and a relatively light plot load. The NPS moratorium on prescribed fire also has affected the program directly in terms of providing ongoing projects and the demand for fire effects plot work. In the 2002 field season, 68 plots (43 burn & 25 control) are scheduled for re-measurement. Proposed projects on CHIS and SAMO would include at least 25 new plots to be installed and measured both pre-burn and post-burn.

This winter the FMH database for these six parks should be re-examined and re-organized. As shown in the tables above, there are many monitoring types and control data sets of sample size equal to one. There are also monitoring types with control plots, but no corresponding burn plots. Additionally, many monitoring types exist without monitoring type description sheets.

Another problem encountered in the database is replication of one plot with different names to reflect the various methods that one plot was measured. For example, in the PINN database, there are three ADFA monitoring types: BADFA1, BADFA2, and BADFA3. In the JOTR database, there are two BCORA monitoring types. In the GOGA database, there is a BTEMP1 monitoring type. In the SAMO database, there are plots with an assigned burn unit, and replications of the same plots that show no burn unit data. These are discrepancies which make it difficult to use the FMH software properly (especially the monitoring schedule feature which is extremely useful for plot accounting) and should be re-evaluated before the 2002 field season. The second part of the annual report, particularly the minimum plot

calculation, should shed more light on these issues, and provide clear direction on which data sets need more plot installation/analysis.

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Part 2

DATA ANALYSIS

Minimum Plot Calculations

The tables below minimum pre plot calculations for each monitoring type at each park. The bolded plot numbers indicate that the minimum plot requirements were met for the corresponding level of confidence. Many monitoring types have not met minimum pre plot calculations. Please note that the rows between the "number of plots" column and the "number of plots burned" column are not aligned, and do not correspond.

TABLE 9a. CHIS: Results of minimum plot calculations by monitoring type and monitoring type variable.

Monitoring Type	Primary Monitoring Type Variable	# of plots	# of plots burned	Mean ± S.D.	Minimum plot calculations	
					80%/25	90%/25
BARCA1D05 Burn plots	% relative cover of native shrub species	7	7 (1x)	19.7±9.0	**7**	13
BARCA1D05 Control plots	% relative cover of native shrub species	14	0	14.7±9.9	**13**	23
BNAPU1D01 Burn plots	% relative cover of native grass species	**10**	10 (1x)	13.9±5.9	**5**	**10**
BNAPU1D01 Control plots	% relative cover of native grass species	**10**	0	19.8±6.1	**3**	**5**

The CHIS data set are the most complete, up to date, and well defined data sets out of the six parks. The Fire Management Objectives for the BARCA1D05 monitoring type is " to encourage establishment of *Artemisia californica* and *Baccharis pilularis* seedlings in order to increase brush cover of coastal sage scrub by 5% one-year post-burn, 10% two –years post-burn, and 20% five years post-burn." This monitoring type does not currently meet the minimum pre plot requirements for the 90% confidence level. Minimum detectable change analysis also indicates that the sample size must be 110 plots to meet the confidence level of the primary monitoring objective for 01yr02 plot status.

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The Fire Management Objectives for the BNAPU1D01 monitoring type is "to increase native grass cover by 5% one-year post-burn, 10% two –years post-burn, and 20% five years post-burn." The NAPU monitoring type does meet the minimum pre plot requirements for the 90% confidence level, however, minimum detectable change analysis at 01yr02 shows that a total of 71 plots would be needed to meet the 90% confidence requirements for the primary monitoring objective.

TABLE 9b. GOGA: Results of minimum plot calculations by monitoring type and monitoring type variable.

Monitoring Type	Monitoring Type Variable	# of plots	# of plots burned	Mean ± S.D.	Minimum plot calculations	
					80%/25	90%/25
BARCA1D05	1° Relative cover of *Artemisia californica*	1	0	--	--	--
BARGL1D04	1° Relative cover of *Arctostaphylos glandulosa*	6	0	30.7±12.3	**6**	10
BBAPI1D05	1° Relative cover of *Baccharis pilularis*	**11**	4 (1x)	25.9±5.8	**2**	**4**
BBRDI1D01	1° Relative cover of *Bromus diandrus*	25	13 (1x) 3/13 (2x)	11.6±13.0	35	59
BBRDI2D01	1° Relative cover of *Brachypodium distachyon*	5	1 (1x)	37.7±13.4	**5**	9
BCAPY1D03	1° Relative cover of *Carduus pycnocephalus*	5	5 (1x) 4/5 (2x)	25.5±16.4	16	31
FEUGL1D10	1° Total fuel loading	1	1 (1x)	--	--	--
BFEAR1D03	1° Relative cover of *Festuca arundinacea*	4	0	81.0±19.2	**2**	5
BHIIN1D01	1° Relative cover of *Hirschfeldia incana*	1	0	--	--	--
BNAPU1D01	1° Relative cover of *Nassella pulchra*	16	6 (1x)	14.5±9.1	**11**	20
BPHAQ2D03	1° Relative cover of *Phalaris aquatica*	4	2 (1x) 2 (2x)[1]	70.3±21.6	**4**	8

[1] BPHAQ1D03 plots 8 and 9 burned one time in 1998 on the Pablo burn unit. BPHAQ1D03 plots 1 and 2 burned for the second time in 1998 on the Pablo burn. ~~Evidently, there are no 01 reads for plots 1 and 2 prior to 1998.~~

Monitoring Type	Monitoring Type Variable	# of plots	# of plots burned	Mean ± S.D.	Minimum plot calculations	
					80%/25	90%/25
FSESE1D10	1° Density of overstory *Sequoia sempervirens*	**9**	9 (1x)	85.7±16.9	**1**	**3**
	2° Total fuel loading (tons/acre)			72.0±15.5	**2**	**4**
FUMCA1D10	1° Density of overstory *Umbellularia californica*	4	0	112.3±45.5	7	15
	2° Total fuel loading (tons/acre)			69.6±11.4	**2**	**3**

The only two monitoring types that meet minimum pre plot requirements for the primary monitoring objective are the BAPI and SESE monitoring types. As these monitoring objectives are not clearly defined, it is not possible to analyze these sample sizes using minimum detectable change. Instead, the condition minimum plot function in FMH must be used. Although the BAPI type has met the requirements for sample size at the 90% confidence level, condition minimum plots post-burn analysis indicate that a total of 13 plots are necessary to meet the 90%confidence level. This is due, in part, to a small sample size (only 4 BAPI plots have burned) and large variation between the plots that burned.

The BCAPY1D03 monitoring type consists of 5 plots that have been burned one time (1 plot burned in 1990 on the Willow camp burn unit, 1 burned in 1995 on the Tennessee Chaparral burn unit, and 3 burned in 1996 on the White Gate I burn unit). Four out of these five plots have been burned a second time (1 in 1998 on the Pablo burn unit, and 3 in 1998 on the White Gate II burn unit). This disparate treatment history poses potential problems in analyzing the data.

The BNAPU1D01 monitoring type consists of 6 plots that have been burned one time (2 burned in 1993 on Tennessee Coastal burn unit, 2 burned June 1995 on Tennessee chaparral burn unit, and 2 burned August 1995 on Bolinas/Fairfax unit. Due to difference in year, seasonality, and locality, these plots should be analyzed by burn unit rather than lumped as a whole.

The SESE monitoring type has qualified, yet unquantified monitoring objectives which limit post-burn plot analysis to condition minimum plots. The minimum pre plot requirement has been met at the 90% confidence level, yet post treatment plot analysis indicates that a sample size of 50 is necessary to meet the 90% confidence level given the large variation in standard error between plots. A small sample size and a disparate treatment history further complicate this.

TABLE 9c. JOTR: Results of minimum plot calculations by monitoring type and monitoring type variable.

Monitoring Type	Primary Monitoring Type Variable	# of plots	# of plots burned	Mean± S.D.	Minimum plot calculations	
					80%/25	90%/25
BCORA1D05 Burn plots	% relative cover of Coleogyne ramosissima	**10**	10 (1x)	36.1±13.8	5	8
BCORA1D05 Control plots	% relative cover of Coleogyne ramosissima	2-C	0	48.6±4.2	1	5

The JOTR database has three monitoring types of ten plots each, which are essentially the same ten plots with three different monitoring type names. The original monitoring type BCORA1D05 contains all the data for these plots, yet the BSCAT1D05 and the BYUBR1D05 monitoring types have ten plots with only shrub density data. These data should be compiled and included in the BCORA1D05 plots. Data from differing shrub density belts should be adjusted with a correction factor to correspond with that of the BCORA1D05 plots. This will be worked on during the Winter/Spring 2002 FMH database re-organization.

TABLE 9d. PINN: Results of minimum plot calculations by monitoring type and monitoring type variable.

Monitoring Type	Primary Monitoring Type Variable	# of plots	# of plots burned	Mean ± S.D.	Minimum plots calculation	
					80%/25	90%/25
BADFA1D04	% relative of *Adenostoma fasiculatum*	**26**	7 (1x)	53.8 ± 20.8	**4**	**7**
BCECU1D04	% relative cover *Ceanothus cuneatus*	**28**	3 wildfire	31.5 ± 18.8	**10**	**17**
FQUDO1D01	density of overstory trees	**16**	1 (1x) 3 wildfire	177.5/ha ± 58.9	**3**	**5**

PINN has three monitoring types, all of which meet the minimum pre plot requirements for the 90% confidence level. However, in each type less than a quarter of the plots has burned via prescribed fire. The most robust data set is the BADFA1D04 monitoring type, but the treatment history is disparate. Seven BADFA1D04 plots burned one time: 3 plots burned in 1994, 3 plots burned in 1997, and 1 plot burned in 1998. The monitoring variables for this type are relative cover and density of *Adenostoma fasiculatum*. Post-burn condition minimum plots analysis indicates 45 plots are required to meet the 90% confidence level associated with the primary variable of relative cover, and 31 plots are required to meet the 80% confidence level associated with the secondary variable of density.

All plots in the BCECU1D04 monitoring type and three plots in the FQUDO1D01 monitoring type burned in the 1998 Stonewall Wildfire. These plots should not be included for analysis with any prescribed fire plots due to differences in fire behavior between the two treatments.

The plots that burned in the Stonewall wildfire will subsequently be moved to another subdirectory in the FMH database during winter re-organization.

None of these monitoring types meet post burn minimum plot requirements.

TABLE 9e. PORE: Results of minimum plot calculations by monitoring type and monitoring type variable.

Monitoring Type	Monitoring Type Variable	# of plots	# of plots burned	Mean± S.D.	Minimum plots calculation	
					80%/25	90%/25
BBAPI1D05	1° % Relative cover of *Baccharis pilularis*	6	6 (1x) 2/6 (2x)	25.2±10.8	**6**	12
BCYSC1D05	1° % Relative cover of *Cytisus scoparius*	6[2]	8 (2x) 7/8 (3x) 4/8 (5x)	8.7±4.3	8	16
BGEMO2D05	1° % Relative cover of *Genista monsplessulana*	3[3]	4 (1x) 3/ 4 (2x)	21.0±11.3	16	39
BLOPE1D01	1° % Relative cover of *Lolium perenne* 2° % Relative cover of native species	10	9 (1x) 3/9 (2x)	16.4±8.8 34.5±15.1	**9** **6**	16 **10**
FPIMU1D05	1° Density of overstory *Pinus muricata*	3	0	326.7/ha ± 135.8	10	24
BPSME1D10	1° Density of overstory *Pseudostuga menziesii*	1	0	--	--	--

[2] CYSC 07 and 08 not included in minimum plot calculations being dissimilar in composition to plots CYSC 1-6

[3] GEMO 01 not included in minimum plot calculations being dissimilar in composition to plots GEMO 2-4

Out of the six PORE monitoring types, none have met the minimum pre plot installation requirements for the primary monitoring objective at the 90% confidence level, although two have met such requirements for the 80% level for primary and secondary monitoring objectives.

None of the monitoring types have met post burn plot requirements.

The BBAPI1D05, BCYSC1D05, BLOPE1D01, & FPIMU1D05 monitoring types are the most pertinent monitoring types for PORE; however, it is unlikely that the FPIMU1D05 plots will ever burn.

The BCYSC1D05 monitoring type doesn't have documented monitoring objectives (read no FMH-4) with the exception of data included in past annual reports. This data defines the primary monitoring variable as "relative cover of *Cytisus scoparius*." The BCYSC1D05 plots show the most promise for monitoring as the prescribed fire treatments have been relatively consistent, thus this type should be considered for additional plot installation. Six of these plots are on the McDonald Ranch burn unit. Of these six, four have burned five times and two have burned three times. The analysis of these plots is further complicated by grazing and hazard fuel treatments (Scotch Broom removal).

The other two CYSC plots are located in the Divide Meadow Burn unit. These two plots also have a disparate treatment history in that one plot has burned more often than its corresponding plot. Such disparate treatment history as detailed above for all CYSC plots makes analysis of the monitoring objectives difficult, as it is nearly impossible to decipher whether vegetation effects are due to fire treatment, annual variation in weather, other fuel treatments, or a combination of factors. Condition minimum plot analysis indicates the McDonald Ranch burn unit requires 354 plots to meet the 90% confidence level associated with the primary monitoring variable, and 102 plots are required when analyzing shrub density measurements instead of relative cover.

The BGEMO2D05 plots have a relatively disparate treatment history with some plots being mowed. One plot burned in 1996, four plots burned in '97 throughout two different burn units, each with two plots. Due to differences in mowing treatments, the sample of two in each burn unit should be analyzed separately.

The FPSME1D10 plot is a pilot plot of sample size one; no prescribed fire or alternative treatments are planned for this type.

TABLE 9f. SAMO: Results of minimum plot calculations by monitoring type and monitoring type variable.

Monitoring Type	Primary Monitoring Type Variable	# of plots	# of plots burned	Mean ± S.D.	Minimum plot calculations	
					80%/25	90%/25
BAVFA1D01	% relative cover of *Avena fatua*	**11** 1-C	11 (1x) 10 (2x)	58.9 ± 16.5	**2** --	**4**

Monitoring Type	Primary Monitoring Type Variable	# of plots	# of plots burned	Mean ± S.D.	Minimum plot calculations	
					80%/25	90%/25
BBRDI1D01	% relative cover of *Bromus diandrus*	**10**	10 (1x) 10 (2x)	69.7 ± 15.0	**1**	**2**
BBRNI1D01	% relative cover of *Brassica nigra*	1-C	--	--	--	--
BNAPU1D01	% relative cover of *native grass*	6	5 (1x)	24.1± 8.7	**5**	9
FQUAG1D02	Overstory tree density of *Quercus agrifolia*	**11** 1-C	11 (1x) 8 (2x)	240.0/ha ± 81.1	**3** --	**6** --
BARCA1D05	% relative cover of *Artemisia californica*	**16**	10 (1x) 2 (2x) 1 wildfire	39.3 ± 13.0	**3**	**5**
BADFA1D04	% relative cover of *Adenostoma fasiculatum*	**17**	2 (1x) 3 wildfire	51.4 ± 13.7	**2**	**3**
BARGL1D04	% relative cover of *Arctostaphylos glandulosa*	1	1 wildfire	--	--	--
BCEME1D04	% relative cover of *Ceanothus megacarpus*	**11**	3 wildfire	54.0 ± 15.4	**2**	**4**
BCESP1D04	% relative cover of *Ceanothus spinosus*	5	1 wildfire	48.5 ± 17.0	**5**	9
BMALA1D05	% relative cover of *Malosma laurina*	1	1 (1x)	--	--	--
BSAME1D04	% - relative cover of *Salvia mellifera*	2	1 wildfire	49.4 ± 21.5	29	121

The SAMO database has two solid data sets in which nearly all plots in that type have seen two prescribed fire treatments: BAVFA1D01 & BBRDI1D01.

The primary monitoring variable for BAVFA1D01 is relative cover of *Avena fatua*. The post-burn condition minimum plot analysis indicates that 17 plots are now required to meet the 90% confidence level associated with the primary monitoring variable. This is, in part, due to a larger variation between plots after the second burn (mean=21.4±12.1).

Similarly, the BBRDI1D01 monitoring type shows larger variation between plots post-treatment. The Primary monitoring variable, relative cover of *Bromus diandrus*, requires 13 plots to meet the 90% confidence level due to a 100% increase in standard deviation (mean 62.2±30.4).

In the SAMO database, many of the monitoring types contain plots burned by the Green Meadow Wildfire. These plots will be re-classified into another directory as wildfire plots and should not be analyzed with the prescribed fire plots.

The BBRNI1D01, BARGL1D04, BCESP1D04, BMALA1D05, and BSAME1D04 plots will be re-classified and stored in a separate directory under the path C:\FMH310.20\SAMO\OLDPLOTS. The one control plot for the FQUAG1D02 and BAVFA1D01 types will also be classified in the "old plots" sub-directory. The BCEME1D04 plots will be classified in an "unplanned" sub-directory.

Initial Interpretation of the Data

For this portion of the Annual report, the BARCA1D01 and BNAPU1D01 data sets from CHIS were selected for analysis as these two data sets constitute the bulk of the 2002 field season plot load.

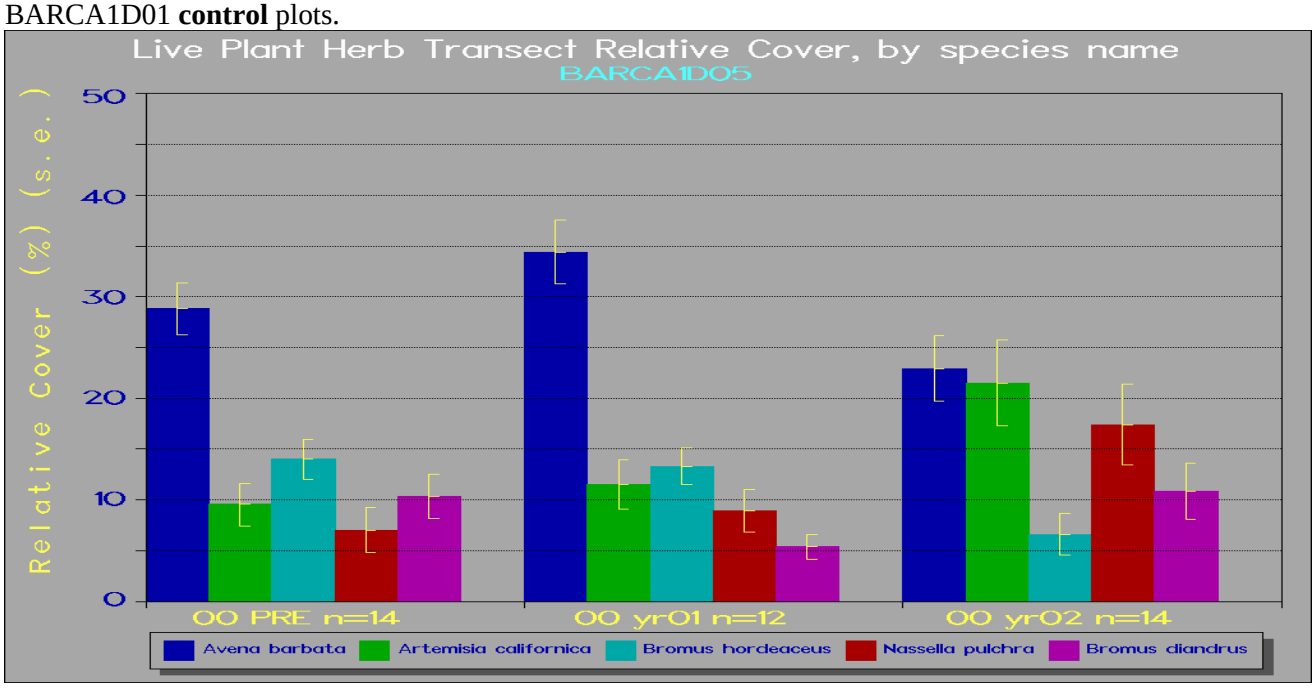
BARCA1D01 monitoring type

Fire Management Objectives: "To encourage establishment of *Artemisia californica* and *Baccharis pilularis* seedlings in order to increase brush cover of coastal sage scrub by 5% one-year post-burn, 10% two –years post-burn, and 20% five years post-burn."

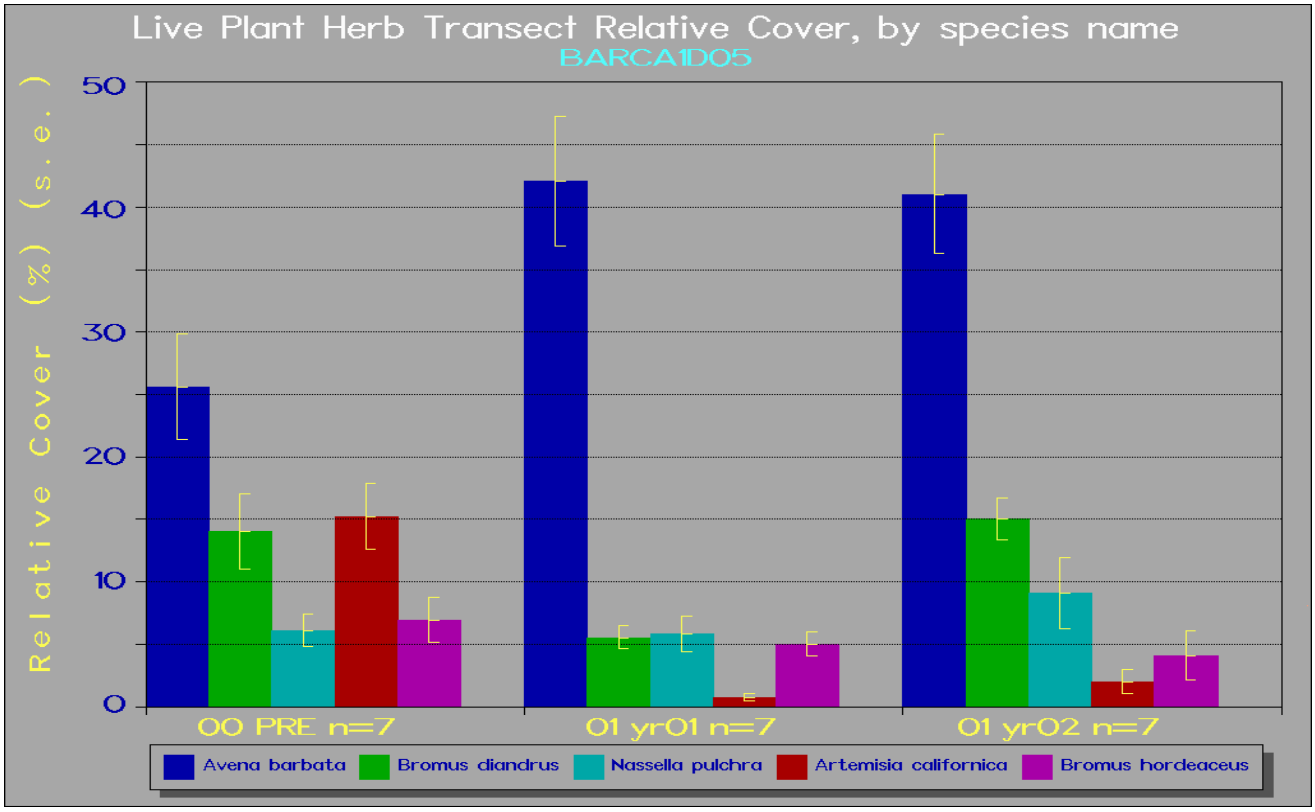
Fire Monitoring Objectives: "To Measure the relative cover of native brush species with a sufficient sample size to be 90% confident that the sample mean is within 25% of the population mean."

Fire Monitoring Variable: Relative cover of Native Shrub species

Graph 1. The following graph shows the percent relative cover of the five most frequent species for the BARCA1D01 **control** plots.



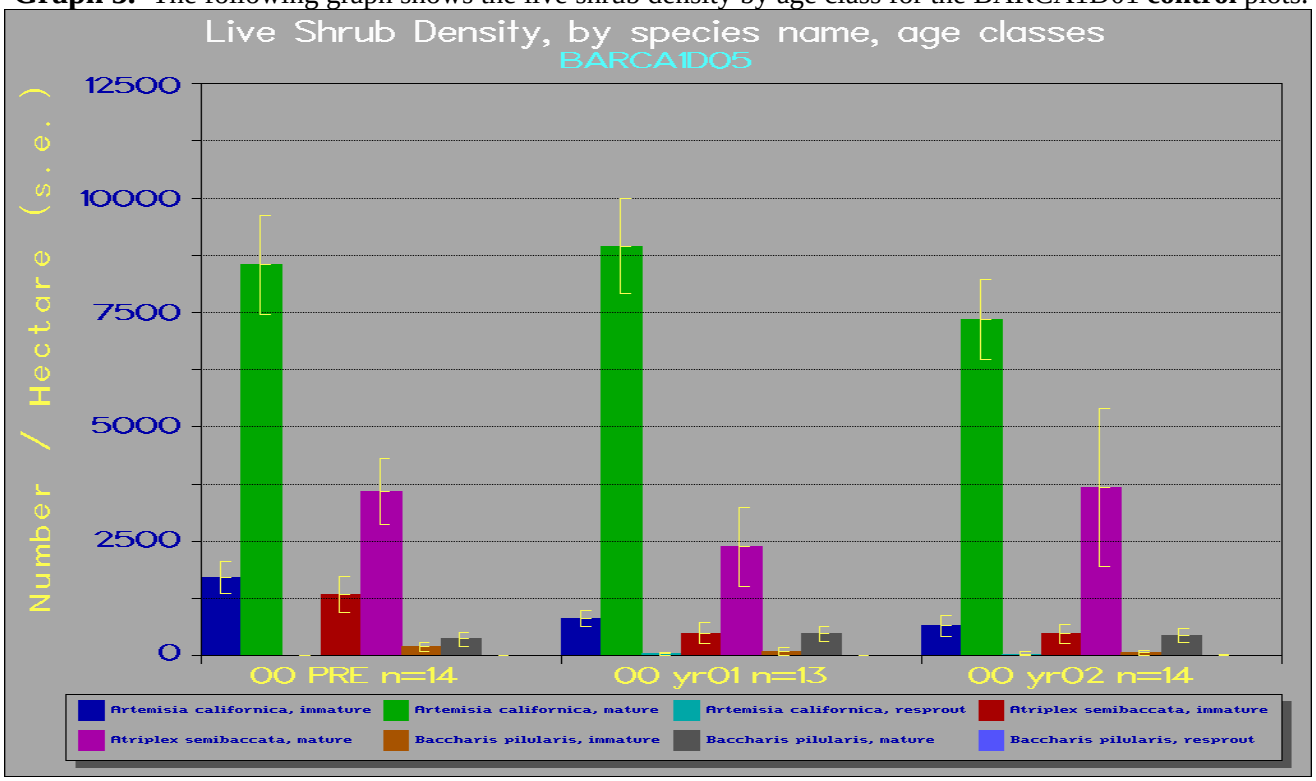
Graph 2. The following graph shows the percent relative cover of the five most frequent species for the BARCA1D01 **burn** plots.



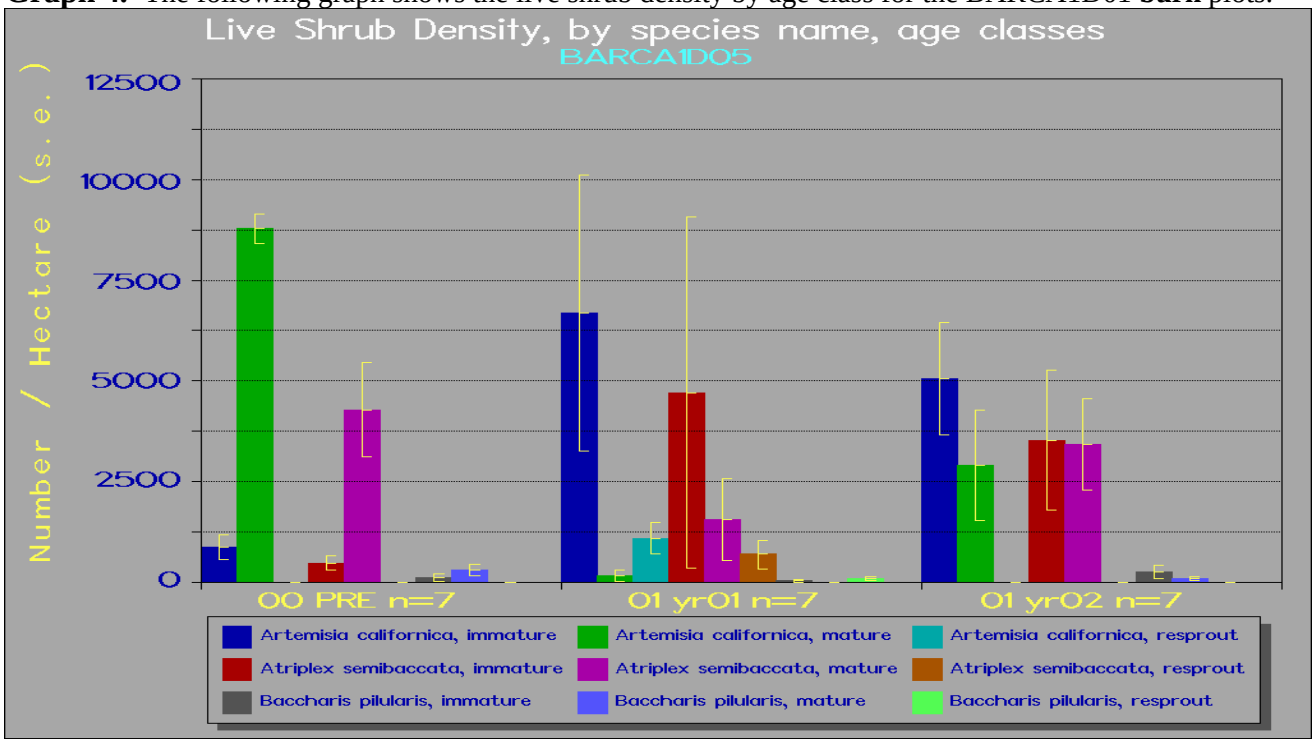
The control data set shows a 20% decrease in relative cover of *Avena fatua* (AVFA) from 28.8 ± 9.7 pre-burn to 23.0 ± 12.2 two years post-burn. The burn data set shows a 60% increase in relative cover of AVFA from 25.6 ± 11.2 pre-burn to 41.1 ± 12.7 two years post-burn. The control data set shows a 125% increase in relative cover of *Artemisia californica* (ARCA) from 9.6 ± 7.7 pre-burn to 21.6 ± 15.8 two years post-burn. The burn plots showed an 87% decrease in relative cover of ARCA from 15.2 ± 7.0 pre-burn to 2.0 ± 2.5 two years post-burn most likely due to fire-induced mortality and consumption of leaf canopy.

From these estimates of relative cover, it appears as though the prescribed fire treatment had a negative effect on the target restoration species, *Artemisia californica*. The fire treatment effectively creates an early succession stage characterized by bare mineral soil and relatively low amounts of leaf area. In this environment, the *Avena* seems to have the competitive advantage in terms of re-establishment post-fire. The control plots maintained a strong sage shrub component throughout measurement years. Perhaps, two years post-fire may be too fine resolution to look at the re-establishment of the *Artemisia* canopy.

Graph 3. The following graph shows the live shrub density by age class for the BARCA1D01 **control** plots.



Graph 4. The following graph shows the live shrub density by age class for the BARCA1D01 **burn** plots.



Graphs 3 & 4 show the live shrub density by age class for the control and burn plots respectively over the three existing read years. The control plots show a decrease in shrub density for mature ARCA individuals by 14.1% from 8547.6 ± 1083.3 individuals/hectare pre-burn to 7345.2 ± 872.8 individuals/hectare two years post-burn. The burn plots show a decrease of 66.9% for the mature ARCA from 8785.7 ± 359.5 individuals/hectare pre-burn to 2904.8 ± 1372.9 individuals/hectare two years post-burn. Those plots that burned showed a more dramatic decrease in shrub density for the mature age class, however, live shrub density for the burn plots two years post-burn increased by 475% compared to pre-burn measurements from 881.0 ± 312.3 individuals/hectare pre-burn to 5071.4 ± 1398.6 individuals/hectare two years post-burn. The live shrub density of immature ARCA one-year post-burn showed a higher increase, yet this varied immensely between burn plots as shown by the large standard error. The re-sprout data for the burn plots varies largely over the three measurement years and this may be due to qualitative age class definitions that were not consistent between field crews of different measurement years.

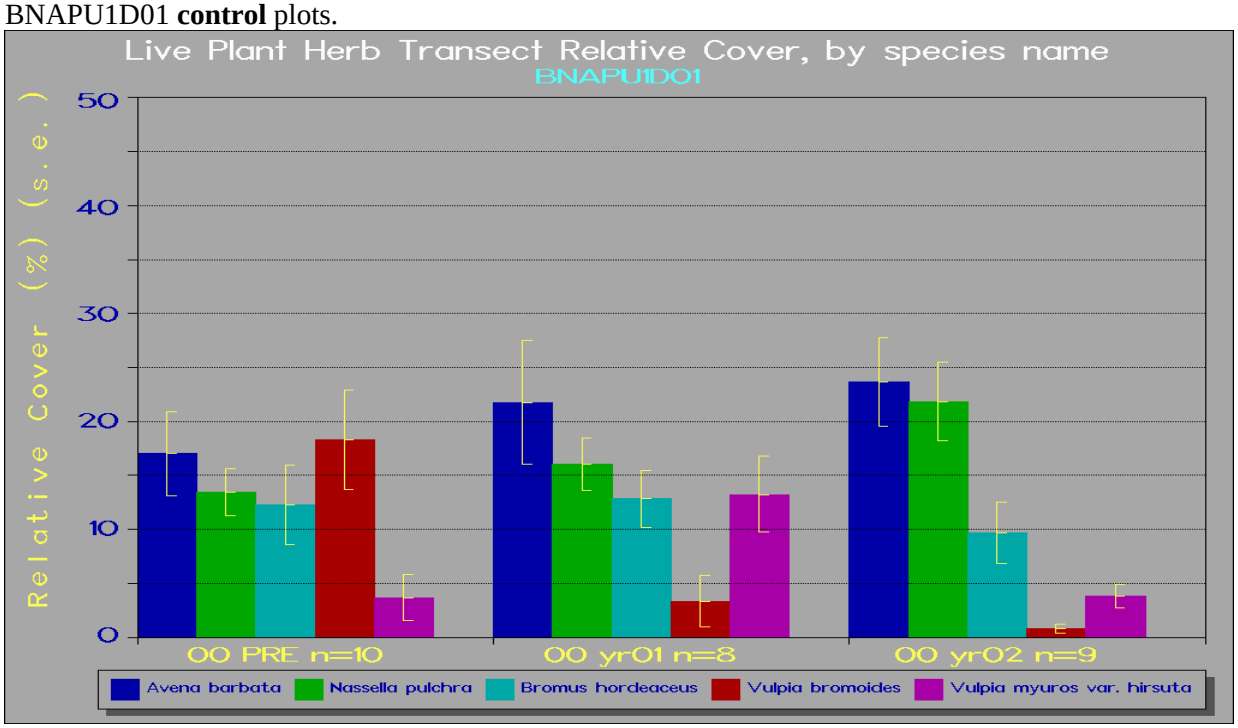
BNAPU1D01 monitoring type

Fire Management Objectives: "to increase native grass cover by 5% one-year post-burn, 10% two –years post-burn, and 20% five years post-burn."

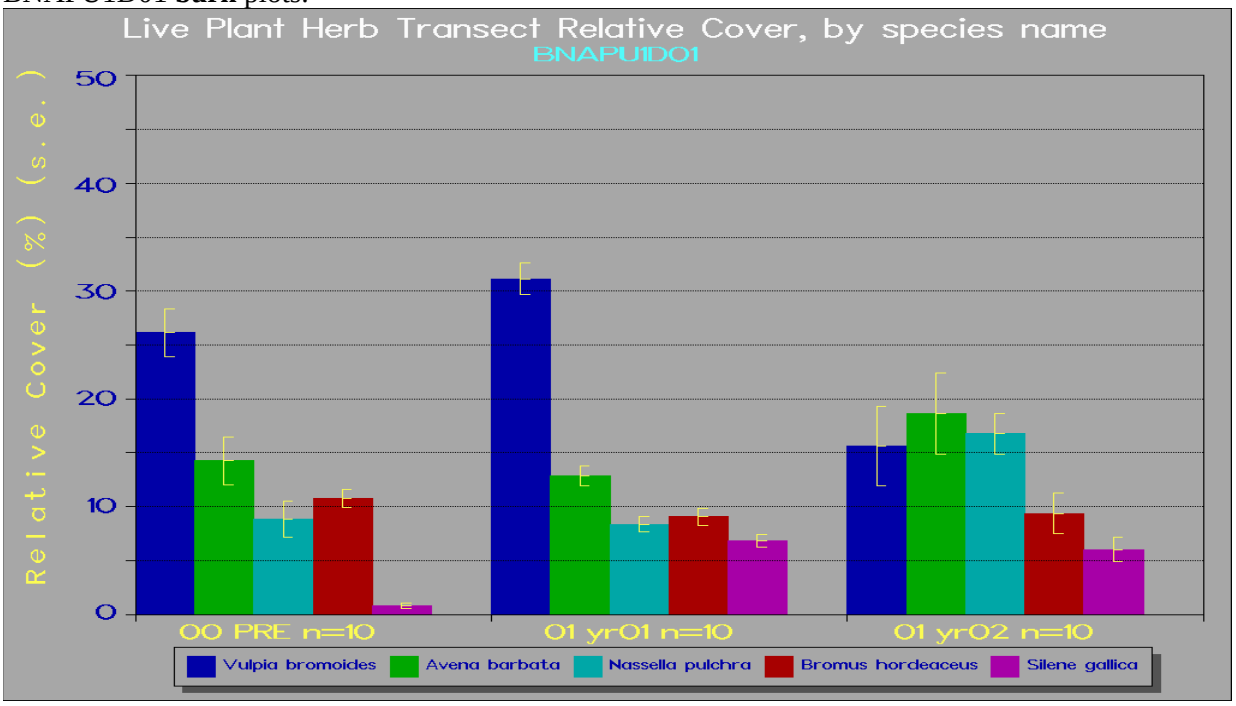
Fire Monitoring Objectives: "To Measure the relative cover of native and non-native grass species with a sufficient sample size to be 90% confident that the sample mean is within 25% of the population mean."

Fire Monitoring Variable: Relative cover of native grass species; relative cover of non-native grass species.

Graph 5. The following graph shows the percent relative cover of the five most frequent species for the BNAPU1D01 **control** plots.



Graph 6. The following graph shows the percent relative cover of the five most frequent species for the BNAPU1D01 **burn** plots.



According to the pre-burn data, both burn and control plots are grasslands dominated by the exotic annual grasses *Avena barbata* (AVBA), *Vulpia bromoides* (VUBR), and *Bromus hordeaceous* (BRHO) with a strong native perennial component of *Nassella pulchra* (NAPU). The **control** plots show a 38.9% increase in relative cover of AVBA (from 17.1 ± 3.9 percent relative cover pre-burn to 23.7 ± 4.1 percent two years post-burn), and a 95.5% decrease in relative cover of VUBR (from 18.3 ± 4.6 percent relative cover pre-burn to 0.8 ± 0.4 percent two years post-burn). The **control** plots show a 62.3% increase in relative cover of NAPU over three measurement years from 13.5 ± 2.1 percent relative cover pre-burn to 21.9 ± 3.6 percent two years post-burn. The **burn** plots show a 30.8% increase in relative cover of AVFA (from 14.3 ± 2.3 percent relative cover pre-burn to 18.7 ± 3.8 percent two years post-burn), and a 40.2% decrease in relative cover of VUBR (from 26.2 ± 2.3 percent relative cover pre-burn to 15.6 ± 3.7 percent two years post-burn). The **burn** plots show an 88.7% increase in relative cover of NAPU over three measurement years from 8.9 ± 1.7 percent relative cover pre-burn to 16.8 ± 1.9 percent two years post-burn. In both the burn and control plots BRHO consistently accounted for 10-15 percent of the relative cover over the three measurement years.

Throughout the measurement years, both the burn and control plots displayed the same general trends in relative cover but in varying magnitudes. All plots showed a 30-39% increase in relative cover of AVFA, a 40-95% decrease in relative cover of VUBR, and a 62-89% increase in relative cover of NAPU, while BRHO remained consistent throughout the measurement years. These general trends may be due in part to annual variation in precipitation. However, the difference in magnitude between the burn and control plots is likely due to the prescribed fire treatment. As mentioned above, two years post-treatment may be too fine resolution at which to analyze the accomplishment of the fire management objectives. At this moment in time, it appears as if the prescribed fire treatment had a negative impact on the occurrence of VUBR while encouraging an increase in relative cover of NAPU. However, this must be interpreted with caution as the burn and the control plots had differing amounts of NAPU pre-burn.

Actions to be Taken Based on this Data Analysis & Additional Analyses Needed

Plant succession is a dynamic process that cannot always be analyzed at fine resolution. The target restoration plant communities in these monitoring types are represented by perennial natives that may require time to fully recover and respond to prescribed fire treatment. All plots are due for five year measurement for the 2002 field season. Any management decisions should wait for this data to be analyzed.
ANOVA tests for significance should be analyzed to determine response to treatment.

PROGRAM INFORMATION

Staff Participants

Ryan Tompkins- Lead Monitor
Wende Rehlaender- Assistant Lead Monitor
Isaiah Hirschfield- Seasonal Monitor

Length of Season

TABLE 10. Number of pay periods in field season devoted to fire effects.

Monitor	Starting Date	Ending Date	# of Pay Periods
Ryan Tompkins	06/17/01	12/31/01	13
Wende Rehlaender	04/01	12/30/01	16
Isaiah Hirschfield	05/15/01	11/20/01	13

Changes in Protocol

For the 2001 field season, no major changes in monitoring protocol were made; In the FSESE1D10 plots smaller seedling sample quadrats were used, yet all data was converted to the standard size using a correction factor.

Recommended Changes in Protocol

Changes in Protocol following a Program Review

Issues pertaining to the above titles were discussed at the Rapid Assessment Workshop (2/25/02) in WHIS. This workshop consisted of National, Regional, and Park Wide Fire Ecologists, Fire Effects Monitors, and other interested parties discussing areas in which FMH could be altered/enhanced to better meet the monitoring needs of Fire Managers. This information can be found on the fire Intranet (http://inside.nps.gov/fire, search on ecology). Guidelines for approving alternative sampling protocols were discussed.

The regional fire effects coordinator, Paul Reeberg, has spent time in the winter 2002 with the Lead Fire Effects Monitor providing assistance in the re-organization of the FMH database. In this re-organization, all plots are being data checked, old plots are reclassified as inactive, and current plots are being standardized for belt width density measurements. The end product should be a database with archived historical plot read information in sub-directories and current monitoring types in the main park directories.

EQUIPMENT/SOFTWARE/GIS INFORMATION:

Equipment for the fire effects crew has not changed since last year. Please reference the 2000 year end report for all details. The most pertinent information is found below.

1. All equipment, supplies and original data sheets for GOGA & PORE are stored in Bldg. 1069 of the Fire Management Office at Golden Gate NRA. The original data sheets for CHIS, JOTR, PINN, and SAMO are located at the respective parks.

2. The CSC Fire Effects database is located on the Fire effects computer in Bldg. 1069 of the Fire Management Office at Golden Gate NRA, and is archived with the regional FMH coordinator, Paul Reeberg, at PWRO.

3. All plots were GPS'd in 2000. The data was successfully downloaded, corrected and exported to ArcView. See Appendix D of the 2000 Annual report for GIS/GPS File Organization at Golden Gate. All related files are also stored with the GIS specialist at PORE at **S:/GIS/PFDATA/FMHPORE**

4. Slides for the most recent monitoring date are stored in the burn unit folders which contain all original data sheets. All previous years slides are stored in the black two drawer file cabinet in Bldg. 1068, Fire Management Office, Fort Cronkhite.

INNOVATIONS

No new innovations to report here for now. Although, a local flora field guide for the plots may be in the works depending on the amount of available time.

MONITORING TYPE INFORMATION

The following monitoring types in the six parks covered do not have a corresponding FMH-4 documented.

GOGA: FEUGL1D10
JOTR: BCORA1D05 (an old rough draft exists)
PORE: BCYSC1D05, BGEMO2D05, and FPSME1D10
SAMO: BBRDI1D01, BBRNI1D01, BNAPU1D01, BMALA1D05, and BSAME1D04

Many of these monitoring types are old and have small sample sizes. During the FMH database re-organization, these monitoring types will be evaluated and classified according to monitoring priority. Those types that we will continue to maintain will be updated for monitoring objectives.

Many completed FMH-4's for active monitoring types have objectives that are vague, qualified yet unquantified, or out of date. Objectives for monitoring types should be re-assessed given status of burns and/or fire programs objectives.

STATUS OF FIVE-YEAR BURN PLAN

Currently, only PINN has an up to date burn plan, written by Ian Martin in 2000. CHIS conducted the Old Ranch burn in 1997 and may have a exotic fennel burn planned for Fall 2002; however, no burn schedule has been communicated to the fire effects monitors.
GOGA and PORE currently do not have an updated burn plan due to vacancies at the Fire Management Officer Level; however, PORE has a number of burn projects on an annual basis. PORE is in the process of re-writing the five-year burn plan this year.
JOTR has not had a prescribed fire project since 1993, and no plans have been indicated for the future.
SAMO has a burn planned for June 2002? However, it is part of a project/experiment designed by John Tizler and, as of yet, no FMH plots will be installed with the project. A number of plots in various monitoring types fall inside the proposed Cheeseboro burn unit boundary, and will continue to be measured post burn.

APPENDIX A.

TABLE 10. Transects/plots classified by burn unit and monitoring type.

**Please reference Monitoring Schedule Spreadsheets for each park. These schedules contain burn unit, monitoring type, plot number, burn/control status, and read status data for 1989-2009 (projected). These files are entitled CHISplotschedule.xls, GOGAplotschedule.xls, JOTRplotschedule.xls, PINNplotschedule.xls, POREplotschedule.xls, and SAMOplotschedule.xls.

APPENDIX B.

Table 11.

** Please reference the plotreads2002.xls spreadsheet