National Park Service
CENTRAL AND SOUTHERN CALIFORNIA
Fire Ecology Annual Report
Calendar Year 2005

Channel Islands National Park
Golden Gate National Recreation Area
Joshua Tree National Park
Pinnacles National Monument
Point Reyes National Seashore
Santa Monica Mountains National Recreation Area

Summary

Calendar year 2005 was a productive year for the Southern and Central California Fire Ecology/Effects Program. Most of the plot and ecology work was concentrated at Santa Monica Mountains NRA (SAMO) and Point Reyes National Seashore (PORE). The Fire Effects Crew installed 55 new plots, re-read 62 existing plots, and conducted 86 immediate-postburn fire severity reads. The Crew was also able to assist Crater Lake NP (CRLA) with a last minute request install new forest plots. The Southern California Fire Ecologist focused much of her energy late in the season on the Topanga Fire, which burned through parts of SAMO at the end of September. The Bay Area Network Fire Ecologist was able to develop a new monitoring protocol for mechanical thinning, give several presentations, and develop several proposals for research and management. The FEAT conversion was completed for all parks in the network.

Fire Effects

The Fire Effects Crew made two trips to SAMO in the early season, to do 10-year re-reads of oak plots, and 3-year reads of established grass plots. Three prescribed burns were planned in annual grassland at strategic control points adjoining WUI areas. The crew, with assistance from SAMO staff, installed 34 new grass plots, including controls, in the three areas planned for

the prescribed burns. Late in the summer the Topanga Fire burned through Cheeseboro Canyon, where the bulk of the SAMO plots are located. The fire burned all but three of the FMH plots, in addition to coastal sage scrub, valley oak, and *Nassella pulchra* experimental restoration plots. The Lead Monitor, assisted by a Sequoia NP staff member, visited SAMO in October to assess burn severity in all of the established plots.

At PORE, six prescribed burns in three different monitoring types were carried out during the fall of 2005. In addition, new plots were installed in the French broom monitoring type. Fire has been used to control French broom at PORE since the mid-nineties, but the small number of plots (3) prevented us from drawing meaningful conclusions about the effectiveness of fire for French broom management. The addition of 10 new plots should meet minimum sample size requirements and allow for a much better understanding of the effects of fire on French broom.

In addition to the bulk of our work load at SAMO and PORE this year, the Fire Effects Crew traveled to Golden Gate NRA (GOGA) for several ten-year re-reads. The Crew also did a second PRE read on four plots that GOGA plans to burn soon. There was no plot work this year at Pinnacles National Monument (PINN), Joshua Tree National Park (JOTR), or Channel Islands National Park (CHIS).

The Central and Southern California Fire Effects Crew was also able to fill a last minute request from CRLA to install forest plots in a unit that was scheduled for treatment only a week later. The Lead Monitor and one of the seasonals helped out the CRLA FMO by installing the required plots.

The Fire Effects Monitors also found time to participate in other activities. On three half-days, we assisted with cleaning up debris from a boat that had wrecked in the park on a sensitive reef. The Lead Monitor and one of the seasonals each completed a 14-day helicopter crew member trainee assignment at Lake Mead, during their high severity summer. Also at summer's end, the Lead Monitor spent a week assisting Resource Management staff in assessing damage done by the park's fallow deer during leking activities.

Bay Area Network Fire Ecology

Fire Ecology activities in the Bay Area Network were varied and exciting during FY06. Highlights of FY05 include the development of a new monitoring protocol for mechanical treatments, the completion of the GOGA FMP, the 10 year anniversary of the Vision Fire, and the completion of an experimental native grass seeding project at PORE. Although the Network certainly has room for improvement in terms of collaboration between parks, sharing of resources, and incorporating ecology into fire management, good progress was made this year on all fronts. PORE Fire and resource management staff meets to discuss projects on a monthly basis (or bimonthly during fire season) and communication between the two groups has improved significantly. The Fire Ecologist (stationed at PORE) and Fire GIS specialist (stationed at GOGA) also work together closely, including joint site visits to help in planning potential burns at Muir Woods.

PORE-GOGA Eucalyptus Monitoring: A new monitoring protocol was developed for mechanical treatments and plots were installed in areas where eucalyptus is being mechanically thinned. One year re-reads will take place in 2006. This new protocol should be extremely valuable as the Bay Area Network parks move towards more and more mechanical treatments.

D Ranch Grassland Restoration: The park also completed a research burn at the historic D Ranch. This area was intensely grazed until approximately 5 years ago and is heavily

dominated by non-native *Lolium multiflorum*. The area was burned in 2004 and 2005 and then seeded with native, local *Bromus carinatus*. The fire effects crew installed pilot plots to determine appropriate seeding rates as well as traditional FMH plots to monitor the success of *B. carinatus* establishment at the site. This project was a unique opportunity to use fire for native grassland restoration.

Proposal Development: Several new research/management proposals were developed during FY05. A proposal to look at the interactions between fire and Sudden Oak Death (SOD) was developed in collaboration with Dr. Max Moritz (UC Berkeley). Sudden Oak Death primarily affects oak and tanoak and is caused by a fungus-like organism that is believed to be non-native. Recent studies suggest that areas that have burned in the last fifty years may be less affected by SOD than areas that have not burned. Point Reyes National Seashore is in a unique position to follow up on this research as the disease front is currently located within the park. Hopefully, this proposal will eventually be forwarded to JFSP. In the mean time, it has been adapted into a CESU collaboration. SOD field work should start at PORE during the spring of 2006.

A proposal was also developed to remove a stand of non-native Monterey pine that is infected with pine pitch canker. Native Bishop pine are susceptible to this disease and a few isolated patches of Bishop pine that are relatively close to the infested plantation are already infected. If the disease spreads to the primary Bishop pine population, the park will have a significant problem in terms of fuels and vegetation management. This proposal aims to remove the infested trees before the main Bishop pine population is infected. This proposal is currently being considered through the Service-wide Comprehensive Call.

Presentations: Two presentations were given by the Bay Area Network Fire Ecologist during FY05. Both were in association with the Vision Fire 10 year anniversary. The first was to the BAER teams during their annual meeting in January. The subject was lessons learned from the Vision Fire rehabilitation process and a presentation of the results of 10 years of photomonitoring of dozer lines. The second presentation was part of the Vision Fire 10 year anniversary events hosted by the park. The subject of this presentation was the BAER process and rehabilitation at PORE after the Vision Fire.

FPA: The Bay Area Network Fire Ecologist became heavily involved in the FPA process during FY05. She developed the FMU shapefile for all of FPU 5 (which includes multiple agencies and large parts of coastal central California) and calculated the weighted acres for PORE FMUs. Additionally, she has attended all FPA trainings and meetings, both at the park level and at the FPU and state levels.

FEAT: The FEAT conversion was completed for all parks in the network this fiscal year!!

Mediterranean Coast Network Fire Ecology

Fire Ecology activities in the Mediterranean Coast Network continued to be busy during 2005. Highlights of 2005 include completion of the FMP's for SAMO, CHIS and CABR, completion of the third and final year of the post-burn restoration project in Cheeseboro Canyon, implementation of one of three planned prescribed burns, providing READ support during the Topanga Fire, and developing and implementing a Burned Area Emergency Stabilization Plan for the Topanga Fire. The Fire Ecologist and Fire GIS specialist worked with the Fire Management staff to develop this year's prescribed burn projects and to plan fuels projects for FY2007. The Fire GIS specialist has assumed the major responsibility for technical support for our region's FPA analysis.

Management Objectives and Monitoring Results 2005

Park: Point Reyes NS

Monitoring Unit	Management Objective	Monitoring Results (90% CI)	Objective Achieved?
Northern Coastal Scrub	Native grassland improvement/exotic grass reduction	16-41% Reduction in native species (n=6)	No
Non-native Annual Grassland	Native grassland improvement/exotic grass reduction	4-9% Reduction in native species (n=16)	No
Scotch Broom	Scotch broom reduction (1º)/native plant enhancement(2º)	1º: 3-24% Reduction in Scotch broom 2º: 5-26% Reduction in native species (n=7)	1º: Yes 2º: No
French Broom	French broom reduction(1º)/native plant enhancement(2º)	1º: 4-34% Reduction in French broom 2º: 0-33% Reduction in native species[#] (n=3)*	1º: Yes 2º: Unknown

[#] Indicates that results are not statistically significant at α= 0.1
*10 new plots were established in this monitoring type to meet minimum sample size requirements. The first post-burn reads for these plots will be in 2006.

Park: Golden Gate NRA

Monitoring Unit	Management Objective	Monitoring Results (90% CI)	Objective Achieved?
Northern Coastal Scrub	Native grassland improvement/exotic grass reduction	0-17% Increase in native species[#] (n=4)	Unknown
Non-native Annual Grassland	Native grassland improvement/exotic grass reduction	1-8% Increase in native species (n=13)*	Yes
Non-native Annual Thistle	Thistle reduction(1º)/native plant enhancement(2º)	1º: 0-33% Reduction in thistle[#] 2º: 0-9% Reduction in native species[#] (n=5)	Unknown
Northern Coastal Prairie	*Nasella pulchra* increase(1º)/native plant	1º: -16 to +6 Change in *Nasella pulchra*[#]	Unknown

	enhancement(2º)	2º: -1 to +6 Change in native species[#] (n=6)	
Non-native Tall Perennial Grassland	*Phalaris aquatica* decrease (1º)/native plant enhancement(2º)/fuel reduction	1º: 10% Increase to a 20% decrease in *Phalaris aquatica* [#] 2º: 0-22% Increase in native species (n=6)	1º: Unknown 2º: Yes

[#] Indicates that results are not statistically significant at α= 0.1
* 10 year reads were completed for most of these plots in 2005. However, this data has not been entered into FEAT yet, so analysis will have to wait until 2006.

Park: Pinnacles NM

Monitoring Unit	Management Objective	Monitoring Results (90% CI)	Objective Achieved?
Chamise Chaparral	Enhance native plants*	8-35% Decrease in native species (n=7)	No
California Mixed Chaparral	Enhance native plants, specifically *ceanothus**	2º: -44 to +97 Change in native species[#] (n=2)	Unknown
Blue Oak Woodland	Enhance native plants**	Unknown	Unknown

[#] Indicates that results are not statistically significant at α= 0.1
* 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.
** This was not the original burn objective. The original goal was to prevent encroachment by shrubby species and remove low limbs in the boundary buffer area. This objective is no longer considered valid.

Park: Channel Islands NP

Monitoring Unit	Management Objective	Monitoring Results (95% CI)	Objective Achieved?
Coastal Sage Scrub (Santa Rosa Island)	Increase native shrub cover/decrease exotic species cover	Control plots 5 year ARCA cover average increase =12.9%, ST DEV=16.4, n=14 Burn plots 5 year ARCA cover average decrease = 23.3%, ST DEV= 21.2, n=7 Control vs. burn are significantly different, P = 0.003	No Need 10 year analysis (2007)

Nassella pulchra grassland (Santa Rosa Island)	Increase native grass cover/decrease exotic species cover	Burn plots 5 year NAPU cover average increase = 17.5%, ST DEV = 9.05, n=10 Control plots 5 year NAPU cover average increase=11.7%, ST DEV = 12.1, n=9 Control vs. burn are not significantly different, P = 0.257	No clear benefit Need 10 year analysis (2007) Need more analysis: e.g. % increase cover correlated to initial cover in both burn and control plots

Park: Santa Monica Mountains NRA

Monitoring objectives need to be redefined.

Fire Effects Plot Workload 2005

Channel Islands

There was no fire effects work done at Channel Islands in 2005. The forty plots on Santa Rosa Island (in coastal sage scrub and coastal grassland) are due for their ten-year re-read in '07. Below is a table of the plots installed to date in the different monitoring types.

Park: Channel Islands

Monitoring Type Name	Number of Plots Read in 2005			Total # of Plots, by Monitoring Type	
	Pre-burn	Immediate Post	Postburn, (1-20 yrs)	Burn	Control
Coastal Sage Scrub				7	14
Coastal Grassland				9	10
Fennel				5	0
Mixed Fennel				7	0
Mixed Coastal Sage Scrub				6	0
Island Manzanita				5	0
Island Scrub Oak				6	0
Total Plots for 2005	**0**	**0**	**0**		
Total Number of Plots Installed to Date				**45**	**24**

Golden Gate

Ten-year re-reads were done for 15 plots at Golden Gate (14 brush plots and one forest). Also, four perennial grassland (*Festuca arundinacea*) plots that had been established in 1990 but never burned, were read in preparation for a planned burn.

Park: Golden Gate

Monitoring Type Name	Number of Plots Read in 2005			Total # of Plots, by Monitoring Type	
	Pre-burn	Immediate Post	Postburn, (1-20 yrs)	Burn	Control
Northern Coastal Scrub (ARCA)				1	0
Northern Coastal Scrub (BAPI)				11	7
Manzanita Chaparral				4	0
Annual Non-native Grassland (BRDI)			8	25	3
Annual Non-native Grassland (BRDI2)				5	3
Italian Thistle			1	5	0
Eucalyptus Forest			1	1	0
Mustard				1	0
Northern Coastal Prairie			5	16	9
Perennial Non-native Grassland (PHAQ)				6	2
Perennial Non-native Grassland (FEAR)	4			4	0
Redwood Forest				9	0
Bay Woodland				4	0
Total Plots for 2005	**4**	**0**	**15**		
Total Number of Plots Installed to Date				**92**	**24**

Joshua Tree
No trips were made to Joshua Tree this year. The park has 12 plots in one monitoring type (as shown in the table), and the ten-year read was done in 2003. No new burns or plot work are planned.

Park: Joshua Tree

Monitoring Type Name	Number of Plots Read in 2005			Total # of Plots, by Monitoring Type	
	Pre-burn	Immediate Post	Postburn, (1-20 yrs)	Burn	Control
Black Brush Scrub				10	2
Total Plots for 2005	**0**	**0**	**0**		
Total Number of Plots Installed to Date				**12**	

Pinnacles
No fire effects plots were read in Pinnacles this year. There are seven more 10-year reads upcoming, but this park has no plans for more burns or plot work at the present time. Below is a table showing the plots that have been installed to date, in the three different monitoring types.

Park: Pinnacles

Monitoring Type Name	Number of Plots Read in 2005			Total # of Plots, by Monitoring Type
	Pre-burn	Immediate Post	Postburn, (1-20 yrs)	
Chamise Chaparral				26
Mixed Chaparral				28
Blue Oak Woodland				16
Total Plots for 2005	**0**	**0**	**0**	
Total Number of Plots Installed to Date				**70**

Point Reyes
The six grassland FMH plots at the historic D Ranch were burned for the second time in fall 2005. In addition, during the spring of '05, the Fire Ecologist carried out seeding trials using *Bromus carinatus*, a native species. A large plot was treated with herbicide, then raked and seeded at different densities. Results from this pilot study were used to select the seeding density for sowing over a larger area. Thirty acres were seeded with *B. carinatus* using a seed drill, after the '05 burn.

Ten new French broom plots were established in two burn units that had been previously burned several times, joining the three existing plots in this monitoring type. The units were burned again in 2005, though unfortunately two of the plots ended up outside the area that was burned.

In early 2005, five eucalyptus plots were established and read before a mechanical fuel reduction project. The method was an adaptation of FMH protocols, and was designed to assess pre-cut stand conditions.

Park: Point Reyes

Monitoring Type Name	Number of Plots Read in 2005			Total # of Plots, by Monitoring Type	
	Pre-burn	Immediate Post	Postburn, (1-20 yrs)	Burn	Control
Non-native Annual Grassland		6	9	22	14
Non-native Perennial Grassland		4		4	3
Non-native Grassland with Scotch Broom				18	0
Non-native Grassland with French Broom	10	11	3	13	0
Northern Coastal Scrub				6	4
Bishop Pine				3	0
Douglas Fir				1	0
Eucalyptus*	5			5	0
Total Plots for 2005	**15**	**21**	**12**		
Total Number of Plots Installed to Date				**72**	**21**

* These eucalyptus plots were modified FMH plots for assessing stand density before a cutting operation. On each plot we measured tree dbh's, did one Brown's transect, and counted shrubs.

Santa Monica Mountains

Most of the '05 SAMO plots were in busy Cheeseboro Canyon. Three prescribed burns were planned for this year, one in Cheeseboro and two at Rancho Sierra Vista, but the park was only able to carry out the one in Cheeseboro Canyon. In preparation for the burns we installed 34 new non-native grass plots (24 in annual grass, and 10 in perennial Harding grass). We

measured canopy diameters of individuals of *Ericameria palmeri* var. *pachylepis*, a subshrub species that is of special concern to the park, to determine post-fire recovery. We also collected biomass samples from the annual grass plots. After the burn window closed on the two RSV burns, the grass plots were mowed instead.

As mentioned above, plot-packed Cheeseboro Canyon burned in a wildfire in the fall. In addition to the immediate post reads of the FMH plots, we also assessed burn severity on twelve forb plots and approximately 100 tagged pole *Quercus lobata* trees.

Park: Santa Monica Mountains

Monitoring Type Name	Number of Plots Read in 2005			Total # of Plots, by Monitoring Type	
	Pre-burn	Immediate Post	Postburn, (1-20 yrs)	Burn	Control
Avena fatua Non-native Annual Grassland		9	9	11	1
Bromus diandrus Non-native Annual Grassland		10	9	10	0
Non-native Annual Grassland	24	8		16	8
Non-native Perennial Grassland	10			10	0
Nassella pulchra Native Perennial Grassland		6	2	8	0
Mustard				0	1
Forb (non-native annuals and herbaceous perennials)		12		12	0
Coastal Sage Scrub		2	1	16	0
Laurel Sumac Coastal Sage Scrub				1	0
Chamise Chaparral		6		18	0
Big-pod Ceanothus Chaparral				11	0
Greenstem Ceanothus Chaparral				5	0

Hoary-Leaf Ceanothus		1		1	0
Eastwood Manzanita Chaparral				1	0
Black Sage Chaparral				1	0
Oak Woodland		11	10	11	1
Total Plots for 2004	**34**	**65**	**31**		
Total Number of Plots Installed to Date				132	11

Fire Ecology Staffing 2005

Monitor	Starting Date	Ending Date	# of Pay Periods	Training and Development
Alison Forrestel	n/a	n/a	26	READ, ICS 200, GIST, fire refresher, SOD workshop, NEPA, UC Berkeley Fire Ecology seminar
Marti Witter	n/a	n/a	26	READ, fire refresher, FEAT/stats training, USGS Fire Ecology Workshop
Wende Rehlaender	1-24-05	12-31-05	24.5	S-260, supervisory training (approx. 28 hrs), HECM trainee assignment, Intro. to ARC GIS, First Aid/CPR/AED
Angela Sokolowski	5-1-05	9-10-05	9	started HECM and FEMO taskbooks
Jay Lininger	5-1-05	9-30-05	11	S-212, Intro. to ArcGIS, ropes class
Amanda Young	10-25-05	11-2-05	1	

Bay Area Fire Ecologist Accomplishments/Focus Area

Category	% Time	Accomplishments/Focus Area
General Planning	5%	• Assisted with project review for PORE fuels projects • Assisted with GOGA FMP • Assisted with development of 5 year plan

Monitoring Plans	0%	Scheduled for 2006 workplan.
Presentations	8%	• Presented to BAER Team Annual Meeting on post Vision Fire rehabilitation efforts and results of 10 years of photomonitoring • Presented on the BAER process after the Vision Fire to a public audience as part of the Vision Fire 10 year anniversary events • Reviewed Success Stories for Fire Education Specialist
NPS Meetings / Task Groups	10%	• Facilitated monthly meetings/fieldtrips for PORE fire & resource management staff • Attended national fire ecology meeting • Attended PWR fire ecology meeting
Interagency Work	15%	• Developed FMUs for entire FPU for FPA • Attended all park, FPU & state level FPA meetings • Calculated weighted acres for PORE • Attended Landfire Modeling workshop
Fire Assignments and Fuels Projects	5%	• Attended 4 PORE prescribed burns; performed FEMO duties for 3 of these • READ on Lassen Prospect escaped RX fire (~ 3 days)
Research	10%	• Developed JFSP to study the interaction of SOD and fire in the Bay Area Network. Proposal lacked administrative support and wasn't forwarded to compete for funding. Adapted proposal into smaller scale CESU collaboration with Max Moritz at UC Berkeley • Developed proposal for UC Hardwood Range RFP to study changes in oak woodlands at PORE over the last 100 years. Proposal was not funded. • Developed proposal removed stand of Monterey pine that is infected with pine pitch canker. Currently being considered for funding.
Monitoring Field Work	10%	• Developed & installed eucalyptus plots at PORE • D Ranch native grass seeding plots at PORE • Assisted YOSE with Meadow Fire CBI plots
Data Entry	0%	Monitors completed data entry.
Data Management and Conversion	15%	Completed data conversion for all parks
Data Analysis	5%	Completed data analysis for planning, presentations,

		and annual report.
Supervision/Admin	7%	• Supervised lead monitor • Ranked seasonal applications • Travel & time paperwork • Administered contracts w/ UC Berkeley (data analysis) & Geoff Smick (WUI boundary resurvey)
Training & Professional Development	10%	• READ training • ICS 200 • GIST training • Fire refresher • SOD workshop • NEPA training • Participated in UC Berkeley Fire Ecology Seminar

Mediterranean Coast Fire Ecologist Accomplishments/Focus Area

Category	Accomplishments/Focus Area
General Planning	• Assisted with development and review of SAMO fuels projects • Assisted with SAMO, CHIS, CABR FMPs • Assisted with I&M monitoring program development
Monitoring Plans	Scheduled for 2006 workplan.
Presentations	• UCLA 'Ecology of Oaks' class presentation on Cheeseboro restoration • UCLA 'Wildfire management in Southern California' class presentation
NPS Meetings / Task Groups	• SAMO fire management meetings for fuels project planning • Attended PWR fire ecology meeting • Weekly BAER progress meetings
Fire Assignments and Fuels Projects	• Cheeseboro prescribed burn • READ on Topanga fire
Research/ Co-operative Projects/Park Projects	• Completed 3rd year of Cheeseboro prescribed burn/restoration project in collaboration with John Orrock, National Center for Ecological Synthesis and Analysis (NCEAS), Santa Barbara

Research/ Co-operative Projects/Park Projects	• Prepared and am currently managing/implementing Topanga Fire BAER Plan • Supported JFSP rapid response proposal by SAMO wildlife ecologist Seth Riley to monitor wildlife impacts of the Topanga Fire at the WUI. • Supported Smith fellowship for Alex Syphard to continue fire modeling in the Santa Monica Mountains • Supported deployment of portable rain gauges in Topanga burn area as part of USGS project to model debris flow potential in Southern Califonia (Sue Cannon, Denver USGS)
Monitoring Field Work	• Cheeseboro restoration plots • New annual grassland and Harding grass plots with controls and biomass samples
Data Entry	Fire effects monitors completed data entry.
Data Management and Conversion	Data conversion completed by PORE Fire Ecologist & Lead Fire effects monitor
Data Analysis	Data analysis for projects, publications, presentations, and annual report.
Supervision/Admin	• Prepared cert for BAER biotechnicians; selected and hired 6 biotechnicians for BAER and fire effects projects • Administered BAER project
Publications	• Moyes, A.B., M.S. Witter, J.A. Gamon. 2005. *Restoration of native perennials in a California annual grassland after prescribed spring burning and solarization*. Restoration Ecology 13:659-666. • Witter, M. and R. Taylor. 2005. Preserving the future: A case study in fire management and conservation from the Santa Monica Mountains. Pp. 105-111 In: *Fire, Chaparral and Survival in Southern California* by Richard Halsey. Sunbelt Publications, San Diego, CA.

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Fire Effects Crew Accomplishments

Category	Percent Time		Notes
	Crew	Lead	
FMH Plots	45%	20%	Includes 9 people-days travel to away parks.
Mechanical Trt Plots	0%	1%	Eucalyptus plots at PORE
Fire Assignments	7%	5%	• All three were on two prescribed burns (each burn was one shift) • Lead and one crew member did HECM(t) assignments, 27 shifts total for two people • Lead participated on two more prescribed burns (one shift each), and one shift of pile burning
Data Entry, Slide & Photo Labeling, Keying Vouchers, and Miscellaneous	29%	2%	
Data Management and Conversion	2%	15%	
Supervision and Administration	1%	37%	For Lead: hiring, planning, time and other paperwork, evaluations, annual report, and various administrative tasks
Meetings	<1%	5%	
Training and Development	10%	12%	Fire refresher, training and development as noted in previous table, regular PT
Orientation and Informal Training	5%	0%	
Assisting Other Divisions	1%	3%	• Shipwreck clean-up • Crew removed noxious weeds • Lead did fallow deer damage assessment: field and office work • Lead participated in deer count • Lead helped search for SODS