



## **Northern Great Plains Fire Ecology Annual Report Calendar Year 2007**

### **Summary**

The Northern Great Plains Fire Ecology program measured 85 plots in 8 National Park units. Fire Management conducted 8 prescribed fires in 5 National Park units in calendar year 2007. The program had significant staff turnover with 4 new seasonal monitors hired to fill the crew this season. We did have the opportunity to detail Fire Ecology veteran Mike Bynum from the Inventory and Monitoring program to assist with plant identification and plot measurement. 2007 proved to be the most active year for fire suppression activities in program history. Crew members served 81 separate days in various roles on 9 wildfires between the months of May and September.

We have worked with the Northern Great Plains Inventory and Monitoring Program to develop a plot sampling protocol to suit the needs of both programs. This season we installed NGP plots at Devils Tower, Knife River, and Scottsbluff. Cody Wienk presented an update on restoration projects at Mount Rushmore and Devils Tower to the Annual Black Hills Botanists and Ecologists Workshop in Rapid City, South Dakota. Cody Wienk and Andy Thorstenson presented findings at the George Wright Society Conference in St. Paul, Minnesota.

### **Fire Effects Plot Workload 2007**

The number of plot measurements in the Northern Great Plains was similar to previous years. One of the biggest issues for the program this year was the use of four distinct protocols for measuring plots. We used the Fire Monitoring Handbook (FMH) protocols for grassland and forest areas for previously installed plots. We used the collaboratively developed Northern Great Plains (NGP) style plot for new plot installation in grassland and forest areas. Keeping up with different sampling protocols was a challenge for our new staff members.

The Fire Ecology program also provided interagency support to the Bureau of Land Management (BLM) for their Land Management Planning process. These site assessments occurred on several sites near National Parks or on sites with similar ecological characteristics. This project was funded through 2008 and we will continue to visit BLM sites next year.

**Table 1. Fire Effects Plots 2007**

Park	Monitoring Unit	Type of Plot (FMH, photo point, other)	Pre-burn	Imm. Post	Postburn (1-20 yrs)	Total Plots
Badlands	Mixed grass prairie	FMH grass plot			10	25
	Mixed grass prairie	NGP grass plot		5		5
	Chokecherry shrubland	FMH Shrub plot			2	4
Devils Tower	Ponderosa Pine	FMH and NGP Forest plot	1	2	5	12
	Grassland	FMH grass plot			1	5
Jewel Cave	Ponderosa forest	Forest and Fuels	0			0
Fort Union	Grassland	FMH grass plot			2	2
	Riparian forest	FMH Forest plot			1	1
Knife River	Non-native grassland	Modified nested sample			9	9
	Grassland	FMH grass plot			2	6
	Grassland	NGP grass plot	3			3
	Green Ash Woodland	FMH Forest plot			1	5
Mount Rushmore	Ponderosa forest	Forest and Fuels	7		9	16
Scotts Bluff	Grassland	NGP grass plot	3			3
Theodore Roosevelt	Non-native grassland	FMH grass plot			3	3
	Grassland	NGP grass plot	2	2		2
Wind Cave	Native grass	FMH grass plot			2	14
	Ponderosa forest	FMH Forest plot			3	15
	Ponderosa forest	Forest and Fuels			4	11
BLM Sites	N/A	Site assessment	6			6
<b>Total</b>			<b>22</b>	<b>9</b>	<b>54</b>	

**Fire Ecology Staffing 2007**

The NGP program utilized Mike Bynum from the NGP Inventory and Monitoring Network to fill in for the assistant position during the height of field season. His knowledge of NGP protocols, plant identification skills, and leadership was greatly appreciated. Four new seasonal fire monitors were hired this year. They kept busy by quickly learning protocols and plants and serving in a variety of wildland fire roles. 2007 has been one of the most active wildfire years for the NGP program with staff expending over 1200 base hours on suppression and wildland fire use fires. In addition, 8 prescribed fires occurred in the Park group in 2007. As a result, employees had many opportunities to develop fire qualifications. Staff members initiated and/or completed FEMO and FFT1 taskbooks and developed leadership skills during this time.

**Table 2. Fire Ecology Staffing 2007**

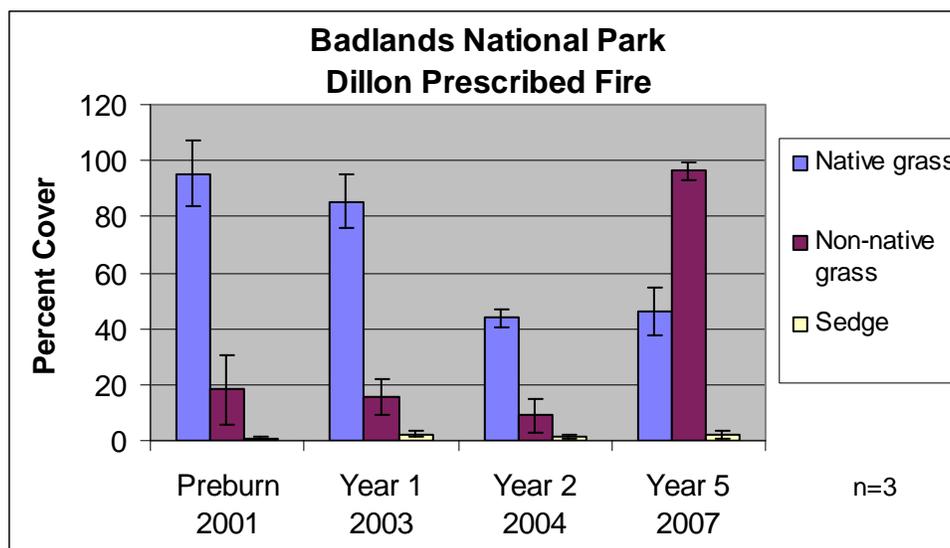
Monitor	Starting Date	Ending Date	# of Pay Periods	Training and Development
Cody Wienk	1/1/07	12/8/07	25	S-133, single resource trainee
andy thorstenson	3/19/07	12/18/07	22	S-330, Fire Use Module crewboss, FFI software training
Mike Bynum	6/4/07	7/31/07	3	Detailed from I&M program
Andrea Holmquist	4/30/07	10/11/07	12	L-280, completed FEMO taskbook

Monitor	Starting Date	Ending Date	# of Pay Periods	Training and Development
Keith Mitchell	4/30/07	11/15/07	15	S-131, S-133, L-280, S-290, RX-310, completed FFT1/ICT5 taskbook, initiated FEMO taskbook
Marcus Lund	5/14/07	10/25/07	12	S-131, L-280, S-290, S-212, initiated FFT1 and FEMO taskbooks
Lindsey Barney	5/14/07	8/30/07	8	S-212, S-133

## Monitoring Results 2007

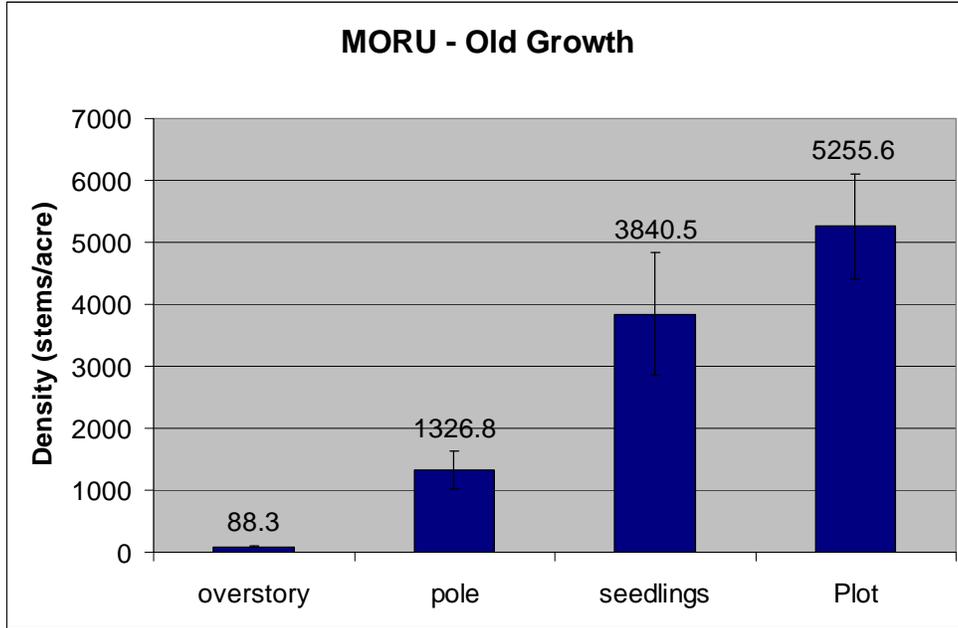
### Badlands National Park

Drought across much of the Great Plains has had an impact of the vigor of native perennial grass. In this instance the dominant native grass, western wheatgrass, has shown a significant reduction in cover following a particularly dry year in 2004 while the non-native annual grass, Japanese brome has increased significantly.

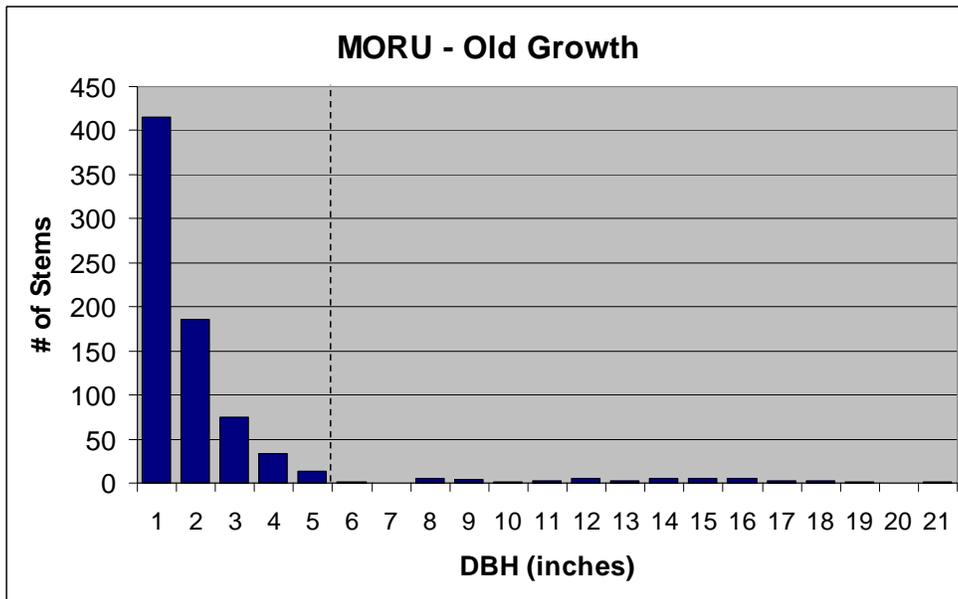


### Mount Rushmore National Memorial

We continued to expand our project-level monitoring of mechanical fuel reduction using an alternative protocol (Forest & Fuels). This protocol includes a fixed-radius circular plot and two Brown's transects to measure tree density and fuel load, the two variables of most interest to managers. It is a simple design that allows us to quickly install and read plots, which we can then provide feedback for managers shortly after visiting plots. At MORU, completion of a JFSP funded research project lead directly to a mechanical fuel reduction project. This project was started late in the fiscal year to take advantage of year-end money. Because of the simplicity of our sampling design, we were able to respond quickly and install plots ahead of the contract thinning crew. Below is pre-thin density by size class and overall stand structure.



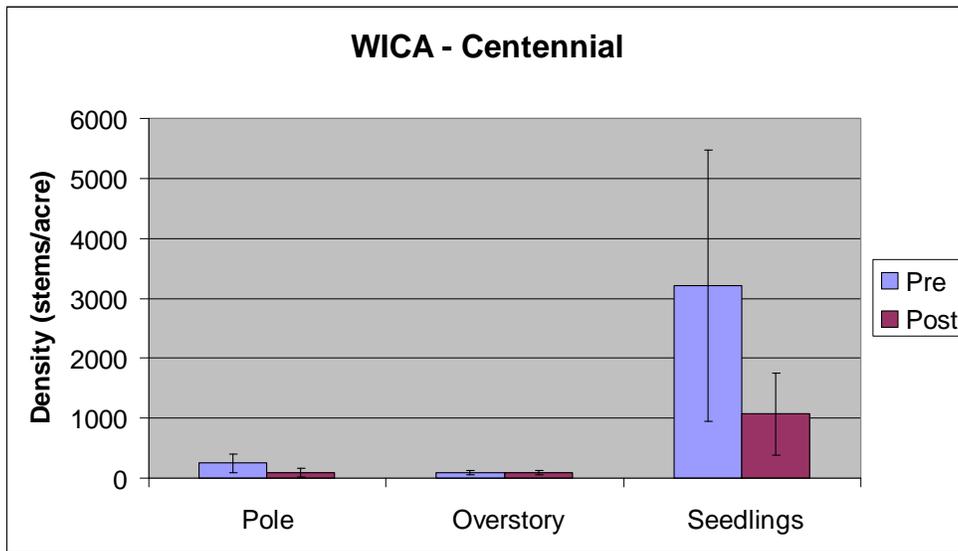
Average stem density by size class and by plot. Seven plots are included in this summary.



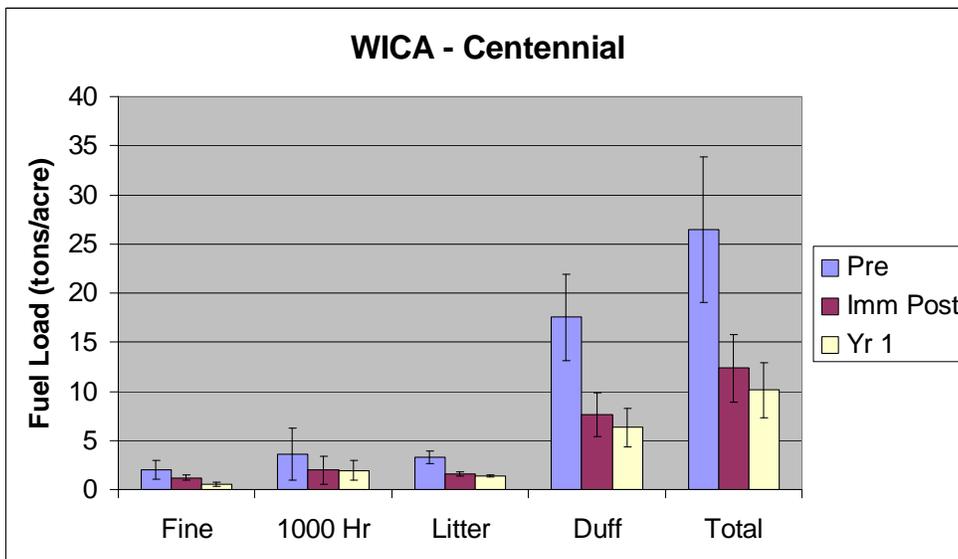
Cumulative overstory and pole stem count by size class. Graph represents 769 trees in 7 plots. The vertical dashed line indicates the maximum tree size targeted in the thinning treatment.

Wind Cave National Park

We have also installed Forest & Fuels plots at Wind Cave in prescribed fire units. In some cases these plots are installed in units that also include FMH-style plots and sometimes they are the only plots in the unit, depending on the monitoring priorities for the unit. The data presented below comes from 4 plots from the Centennial Block of the Rankin Ridge Unit.



Average tree density by size class pre- and 1 year post-treatment. Standard error bars included.



Average fuel load in tons/acre by category pre- and post-treatment. Fine fuels includes 1, 10, and 100-hour fuels.

### Fire ecologist accomplishments and area of focus

2007 turned out to be a year of big changes. The majority of the year was spent on the typical responsibilities of giving presentations, coordinating research projects, data management and analysis, and fire assignments. Cody had the opportunity to assist with prescribed fires on park units in Arkansas and Kansas. Two of these prescribed fires were associated with the JFSP funded research project assessing prescribed fire effects on archeological resources. This gave him a change to get some experience in new fuel types. After a couple of unsuccessful attempts to put together a Dakota IA crew, Cody worked to configure the NGP fire effects crew as a fire use module. This required some assistance to get the crew into ROSS and finding individuals to

fill a couple of positions to meet the requirement of a fire use module (FALB and EMT). This turned out to be quite successful as the crew went out on two fire use assignments, and the crew received excellent performance ratings on each assignment.

One of the significant accomplishments of the year was the successful submission of a research proposal for NPS fire research funding. Even though Cody had been involved with a couple of research projects funded by JFSP, this was a new experience for him. Once the project was funded, Cody had to set up a cooperative agreement through the CESU with Colorado State University and find a graduate student to work on the project. The NGP was fortunate enough to steal Kate Cueno from the Grand Teton fire ecology program to work on this project. Kate will join the NGP fire effects crew spring 2008 will begin coursework at Colorado State fall 2008.

The year ended with Cody accepting the regional Fire Ecologist position with the Midwest Regional Office in Omaha, NE. He hopes to continue to support the success of the NGP fire ecology program from his new position.

#### Fire Ecologist Accomplishments/Focus Areas

Category	Percent Time	Accomplishments and/or areas of activities
Planning	2	Reviewed prescribed fire plans.
Presentations	5	Oral presentations at Black Hills Ecologist & Botanist Workshop, meeting of National Association of Retired Federal Employees, and the George Wright Society conference
NPS Meetings/ task groups	5	Assisted with FEAT SameTime Training, FFI Working Group, Park meetings, I&M annual meeting, FESC meeting
Interagency work	10	LANDFIRE fuels workshop, Coordinated Black Hills Ecologist & Botanist Workshop, Member of SD Project Learning Tree Board of Directors, BLM Site Assessment Project
Fire Assignments	12	Rx Fire at BUFF, PERI, HOSP, TAPR, THRO, KNRI, WICA, and BADL; 1 local wildfire assignment (Alabaugh Canyon – SD) and 1 out-of-area assignment (Krassel Complex WFU – ID)
Research	12	Completion of JFSP funded project at MORU (Fire History and Stand Structure), Year 1 of JFSP funded project in MWR (Prescribed Fire and Archeological Resources), Initiation of new research project (Assessment of alternative to mechanical fuel reduction and pile burning).
Monitoring Field Work	5	Assisted fire effects crew at SCBL, BADL, WICA, and MORU.
Data entry	1	Entered a small amount of Forest & Fuels data into FEAT.
Data Conversion	2	Prepared data for conversion to FFI database.
Data management & analysis	20	Standard data management, preparation for presentations, preparation for park meetings and annual report
Supervision/Admin	15	Hiring, supervision, travel, payroll, etc.
Training	1	I-200 (online), RT-212, S-133
Miscellaneous	10	NGP server maintenance, NGP fire library, NGP fire management website, WICA Board of Survey

### Fire Effects Crew Accomplishments and Area of Focus.

Category	Percent Time	Notes
FMH plots	24	Includes immediate postburn measurements
Other plot work	11	New style NGP plots that integrate Fire and Inventory and Monitoring protocols. Ponderosa pine Forest and Fuels plots.
Fire Assignments	22	2007 marked the most active wildfire season on record for the NGP crew. Multiple wildfire and fire use assignments
Prescribed Fire and Fuels	7	8 Prescribed fires in the park group in calendar year 2007
Data entry	15	All plot data in FEAT version 2.4.0.4
Data conversion		No data conversion in 2007
Data analysis	7	
Supervision/Admin	9	Hiring 4 seasonals, and GS-6 Assistant
Training	5	Includes fire and ecology related training
Miscellaneous		

#### Additional Items from 2007

A collaborative project with the Bureau of Land Management had the crew visit 6 BLM sites in western South Dakota. At these sites we made a qualitative assessment of vegetative community and fuel conditions, established photographic monitoring locations, determined Fire Regime Condition Class, and summarized findings for the BLM managers. This information will be used in planning documents for that agency. Attached is one example site assessment form.

A new product for the Northern Great Plains Fire Ecology Program was a crew video that summed in pictures and music the people and places of 2007. Keith Mitchell did an outstanding job as creator and producer of this video.

In August and September, the NGP Fire Effects crew reconfigured into a Fire Use Module. We completed 14-day assignments on the Tag Wildland Fire Use (Krassel Complex) on the Payette National Forest and on the Roosevelt Fire Use at Grand Canyon National Park.



Northern Great Plains FMO Jim McMahon records fire behavior data

Bureau of Land Management Site Condition Class Assessment  
National Park Service Northern Great Plains Fire Ecology Program

Site Name: **Cycad**

Date: **22 May 2007**

BLM Map: **Hot Springs**

Assessment by: **C. Wienk, M. Lund, A. Thorstenson, L. Mitchell, K. Mitchell, L. Barney**

T/R/S: **T7S, R3E, Sec 35**

Lat: **43° 23.714'**

Long: **103° 43.864'**

Datum: **NAD 83**

Anderson Fuel Model: **1 & 2**

Scott & Burgan Fuel Model: **GR2**

Vegetation Community

General description of vegetation communities: **The site is primarily an upland mixed-grass prairie with a few scattered stands of ponderosa pine. There is a very nice hardwood draw in the southwest corner of the unit, under the Highway 18 bridge. The draw is fairly steep with a stand of quaking aspen and a dense understory of shrubs.**

Community	% of Site	Dominant Species
mixed-grass prairie	75	upland sedges, western wheatgrass, little bluestem, sideoats grama, yucca, fringed sage, white sage, leadplant, poison ivy, skunkbush sumac
pine savanna	20	all of the above with an overstory of ponderosa pine
hardwood draw	5	quaking aspen, chokecherry, plum, wild grape, mountain ninebark, ponderosa pine, Rocky Mountain juniper

Estimate of native to non-native ratio: **10 % non-native**

Common non-native species: **annual bromes (*Bromus tectorum* & *Bromus japonicus*)**

Fuel load/Fire Potential: **low to moderate**

Site History

Estimated historical fire regime: **frequent, high intensity fire in the grasslands; frequent, low intensity fire in the pine; historic fire frequency approximately 5-15 years**

Evidence of past fire: **no evidence of recent fire**

Evidence of other management actions: **some evidence of historic timber harvest**

Forage Utilization: **low utilization**

Photo Points Established? **YES**

Photo point IDs: **CYC 1, 2**

Comments: Condition class = 2; This is a generally high quality site with high plant diversity. There is some occurrence of non-native species (primarily annual bromes) and the site has probably missed several fire return intervals. Condition class would probably calculate at a high 2 or a low 1.

