National Park Service
Northern Great Plains Fire Ecology
Annual Report
Calendar Year 2010

A. Summary

2010 marked another diverse and productive year for the Northern Great Plains (NGP) fire ecology program. We worked in all ten of our National Park Service units, which had not occurred since 2007. This year, a total of 189 plots of various types were measured, an all time high for the program. Five prescribed fires occurred in the NGP parks, resulting in 24 plots being burned, 21 of which were measured immediately post-burn.

The Colorado State University-based graduate research project studying the effects of thinning and chipping continued at Mount Rushmore and Wind Cave, though the fire effects crew was less involved with direct plot measurement. Dan Swanson partnered with Amy Symstad of the USGS on a research project assessing burned areas for rapid invasion of non-native species. Two additional seasonal employees joined the group and stayed busy installing the research plots at Wind Cave, Jewel Cave, and Devils Tower. Both the Wind Cave and Jewel Cave plots burned this fall, providing Dan with 115 plots to base his analyses on.

This year the crew began a more significant collaboration with the NPS Northern Great Plains Inventory and Monitoring Network (I&M). Over the winter of 2009/2010 Dan began coordinating with I&M on the development of new protocols and delineating how the two programs would mutually benefit from a combined effort. The fire effects crew slightly modified data sheets and protocols and, as a result, our data will be compatible with I&M's, greatly increasing our sample size and statistical power. During the 2010 plot season, the fire effects crew also began co-locating new plot installs with I&M plot locations so that each time a plot is read, both programs benefit. The two crews also installed 60 forest and fuels-style plots at Mount Rushmore NM, a unit that previously lacked significant plot coverage. Now, in the event of a wildfire or prescribed fire, the pre-burn data will exist that will enable us to answer questions about the role of fire in the Rushmore area.

2010 was also the first year that long time crew lead, Andy Thorstenson was absent from the organization. Andy moved on for family reasons but made sure to leave the crew in good hands and in such a way as to provide for a smooth transition. Thanks for everything Andy! The 2011 crew will also be run by a new lead monitor, as Jon Freeman, the former assistant and currently detailed lead, will be moving on to run the Grand Teton fire effects crew.

Table 1. Fire Effects Plot Workload (2010) and Total Plots Installed

Park	Monitoring Unit	Type of Plot (FMH, photo point, other)	Pre-burn 2010	Imm. Post 2010	Postburn (1-20 yrs) 2010	Total Plots*
Agate Fossil Beds	Mixed grass prairie	Grassland Fuels Veg. Plot (GFV)			3	4
	Mixed grass prairie	I&M Plot	6			6
Badlands	Mixed grass prairie	FMH Grass Plot			7	26
	Mixed grass prairie	GFV Plot				3
	Mixed grass prairie	I&M Plot	21	7		21
	Shrubland	FMH Shrub Plot			2	4
Devils Tower	Ponderosa forest	FMH Forest Plot		1	5	15
	Mixed grass prairie	FMH Grass Plot			1	3
	Ponderosa forest	Forest, Fuels, and Veg. Plot (FFV)		2		2
	Ponderosa forest	Forest & Fuels Plot (F&F)			1	3
Fort Union	Cottonwood forest	FMH Forest Plot			1	1
	Mixed grass prairie	FMH Grass Plot			2	2
Jewel Cave	Ponderosa forest	FFV Plot			3	5
	Ponderosa forest	F&F Plot			3	5
	Ponderosa forest	FMH Forest		3	3	3
Knife River	Mixed grass prairie	GFV Plot			7	9
	Mixed grass prairie	FMH Grass Plot			6	6
	Green ash forest	FMH Forest Plot			1	3
Mount Rushmore	Ponderosa forest	I&M Plot	29			60
Scotts Bluff	Mixed grass prairie	FMH Grass Plot			2	12
	Mixed grass prairie	I&M Plot	7			7
	Juniper Woodland	FMH Forest Plot				2
	Shrubland	FMH Shrub Plot				3
Theodore Roosevelt	Mixed grass prairie	FMH Grass Plot			5	9
	Mixed grass prairie	GFV Plot				2
	Juniper Woodland	I&M Plot	5			5
	Cottonwood Forest	FMH Forest Plot				2
	Shrubland	FMH Brush Plot				5
Wind Cave	Mixed grass prairie	FMH Grass Plot				14
	Ponderosa forest	FMH Forest Plot			3	5
	Ponderosa forest	FFV Plot			3	3
	Ponderosa forest	F&F Plot		11		11
	Ponderosa forest	I&M Plot	15	8		15
Photo Points, various parks	Mixed grass prairie	Photo point	2		1	17
	Ponderosa forest	Photo point	3		5	11
	Juniper woodland	Photo point	5			5
Total	**136**		**93**	**32**	**64**	**309**

American Elk prescribed fire, Wind Cave National Park – photo Dan Swanson

Table 2. Fire Ecology Staffing 2010

Ecologist and Monitors	Starting Date	Ending Date	# of Pay Periods	READ qualified	Training and Development
Dan Swanson	1/1/2010	12/31/2010	26	No	Savannah Fire Ecology Conference, NPS FAM conference, NPS MWR GIS Conference, NATR Ecologist Mentoring, 5 fire operational periods
Jon Freeman	2/1/2010	11/6/2010	20	No	S-230, S-231, L-280, S-211, PFTC March session, NPS FAM Conference, NPS MWR GIS Conference, Mt. Rushmore MPB RRAT team member (GISS), completed ENOP, worked on FALB, opened FIRB, ENGB, CRWB, 16 fire operational periods
Valena Hofman	4/12/2010	10/23/2010	14	No	S-131, L-280, 2-week assignment with BLHI WFM, NPS MWR GIS Conference, worked on FALA, FFT1, 18 fire operational periods
Marcus Lund	4/26/2010	10/23/2010	13	No	Three 2-week assignments with BLHI WFM, worked on FALB, ENOP, 42 fire operational periods
Jess Stiles	5/17/2010	8/19/2010	7	No	S-260, S-290, botany training, worked on FALA, 3 fire operational periods
Todd Stahl	5/17/2010	8/19/2010	7	No	S-260, S-290, botany training, opened FFT1, FALA, 3 fire operational periods
Justin Ziegler	5/17/2010	8/19/2010	7	No	S-260, botany training, opened FALA

Table 3. Management Objectives and Monitoring Results

Park	Monitoring Unit	Management Objective	Monitoring Results (80% C.I.)	Objective Achieved	Year Last Analysis Completed
Wind Cave N.P.	Native Mixed-grass Prairie	Increase the relative cover of native grasses by at least 10% within two growing seasons after the burn	5% Decrease	No; N=7	2008
		Increase the relative cover of native forbs by at least 30% within two growing seasons after the burn	No change	No; N=7	
		Decrease the relative cover of non-native grasses by at least 20% within two growing seasons after the burn.	23% Decrease	Yes; N=6	
	Non-native Grass Prairie	Increase the relative cover of native grasses by at least 20% within two growing seasons after the burn	59% Increase	Yes; N=5	2008
		Increase the relative cover of native forbs by at least 20% within two growing seasons after the burn	No change	No; N=5	
		Decrease the relative cover of non-native grasses by at least 30% within two growing seasons after the burn.	No change	No; N=5	
	Ponderosa Pine Forest	Increase the relative cover of native herbs by at least 25% within two growing seasons after the burn	17% Decrease	No; N=5	2008
		Decrease the relative cover of non-native herbs by at least 25% within two growing seasons after the burn	No change	No; N=5	
		Reduce the density of overstory ponderosa pine (≥ 14.9 cm dbh) by at least 30% two growing seasons after the burn.	6% Decrease	No; N=9	
		Reduce the density of pole-size ponderosa pine (2.5 – 14.8 cm dbh) by at least 50% two growing seasons after the burn.	No change	No; N=9	
		Reduce the density of seedling ponderosa pine by at least 70% one growing season after the burn	78% Decrease	Yes; N=9	
		Reduce total fuel loading by at least 30% following one prescribed burn	21% Decrease	No; N=9	
Devils Tower N.M.	Non-native Grass Prairie	Increase the relative cover of native grasses by at least 10% within two growing seasons after the burn	39% Increase	Yes; N=3	2008
		Increase the relative cover of native forbs by at least 20% within two growing seasons after the burn	74% Increase	Yes; N=3	
		Decrease the relative cover of non-native grasses by at least 20% within two growing seasons after the burn.	49% Decrease	Yes; N=3	
	Ponderosa Pine	Increase the relative cover of native grasses by at least 10% within two growing seasons after the burn	13% Increase	Yes; N=7	2008
		Increase the relative cover of native forbs by at least 10% within two growing seasons after the burn	36% Increase	Yes; N=6	
		Decrease the relative cover of non-native grasses by at least 30% within two growing seasons after the burn.	No change	No; N=7	
		Reduce total fuel loading by at least 30% following one prescribed burn	38% Decrease	Yes; N=7	
Badlands N.P.	Western wheatgrass Mixed-grass Prairie	Increase the relative cover of native grasses by at least 10% within two growing seasons after the burn	6% Decrease	No; N=20	2008
		Increase the relative cover of native forbs by at least 30% within two growing seasons after the burn	4% Increase	No; N=18	
		Decrease the relative cover of non-native grasses by at least 20% within two growing seasons after the burn.	No change	No; N=19	
	Non-native grass Prairie	Increase the relative cover of native grasses by at least 10% within two growing seasons after the burn	30% Increase	Yes; N=4	2008
		Increase the relative cover of native forbs by at least 10% within two growing seasons after the burn	37% Increase	Yes; N=4	
		Decrease the relative cover of non-native grasses by at least 30% within two growing seasons after the burn.	No change	No; N=4	
Theodore Roosevelt	Kentucky Bluegrass Non-native Prairie	Increase the relative cover of native grasses by at least 20% within two growing seasons after the burn	57% Increase	Yes; N=3	2008
		Increase the relative cover of native forbs by at least 20%	No change	No; N=3	

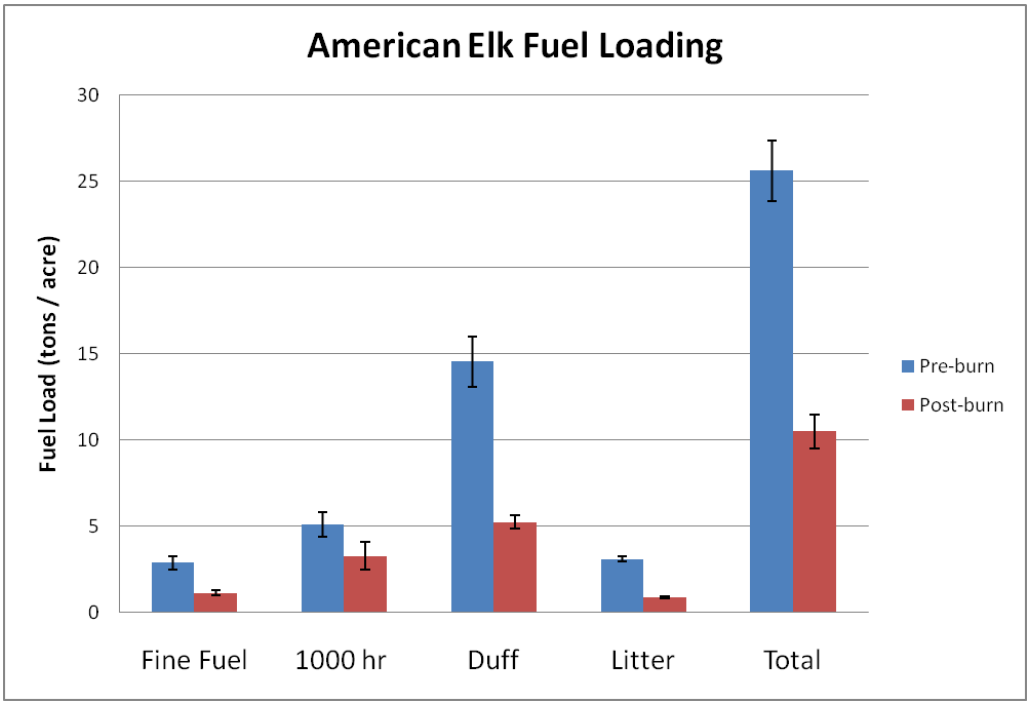
N.P.		within two growing seasons after the burn Decrease the relative cover of non-native grasses by at least 30% within two growing seasons after the burn.	3% Decrease	No; N=3	
	Crested Wheatgrass Non-native Prairie	Increase the relative cover of native grasses by at least 20% within five growing seasons after the burn Decrease the relative cover of non-native grasses by at least 20% within five growing seasons after the burn.	No change No change	No; N=3 No; N=3	2008
	Native Mixed-grass Prairie	Increase the relative cover of native grasses by at least 20% within five growing seasons after the burn Decrease the relative cover of non-native herbs by at least 20% within two growing seasons after the burn.	8% Increase 8% Increase	No; N=3 No; N=3	2008
Agate Fossil Beds N.M	Native Mixed-grass Prairie	Increase the relative cover of native grasses by at least 20% within two growing seasons after the burn. Decrease the relative cover of non-native herbs by at least 20% within two growing seasons after the burn.	5% Increase (Yr 1) 31% Decrease (Yr1)	TBD TBD	2009

Wind Cave N.P.

This past fall was a very busy time with the completion of the largest prescribed fire in Wind Cave National Park's history on October 20-22. The 3450 acre American Elk unit was located primarily within forested communities of the park but also included mixed-grass prairie, prairie dog towns, and ponderosa pine encroached meadows. Most of this unit hadn't been burned previously which resulted in dense, closed canopy stands consisting of unusually high numbers of small diameter trees. Therefore, the crown fire potential had dramatically increased and the forest was subject to a high severity stand-replacing fire. The large size of this unit allowed the prescribed fire to burn over multiple burn periods and weather conditions which replicates natural fire activity. Specific objectives for the unit included achieving 70-95% mortality in ponderosa pine seedlings, 50-70% mortality in pole-size (1-6" dbh) ponderosa pine, and 20-50% mortality in ponderosa pine greater than 6 " dbh. In addition we wanted to reduce the 100 hr and 1000 hr fuels by at least 40% and decrease the encroachment of ponderosa pine regeneration at the forest-prairie ecotone. In November and early December Dan, Amy Symstad, resource management staff and others helped collect post-burn data from over seventy five plots. Analyses indicated that 100 hr and 1000 hr fuels were reduced by 61% and 36% respectively. Total fuel load was also reduced by 59%. Figure 1 shows that fuel loading was reduced significantly across all size classes.

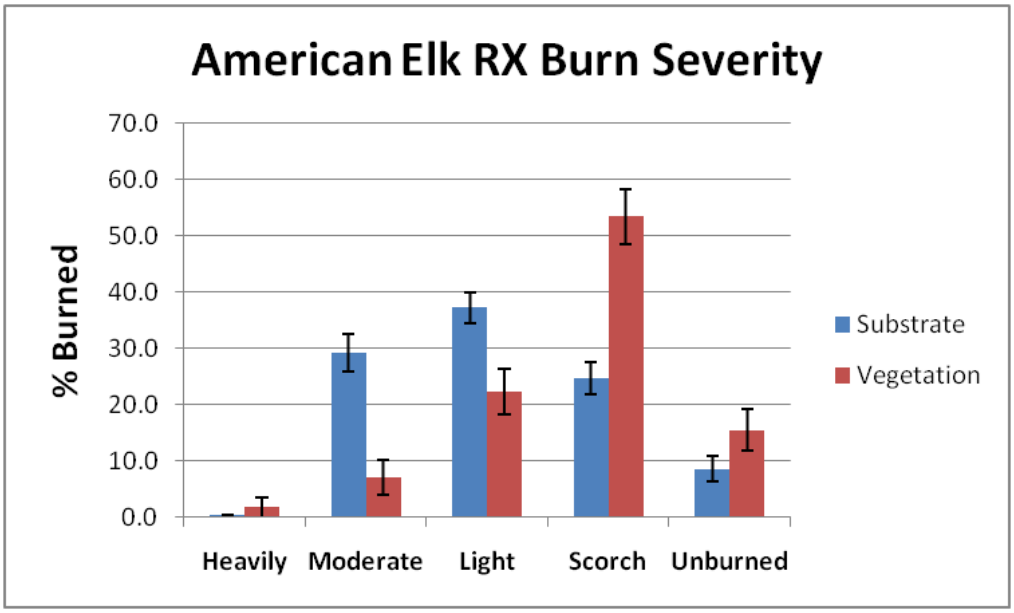
American Elk prescribed fire, Wind Cave National Park – photo WICA staff

Figure 1 Fuel loading by size class for seventy-five plots within the American Elk unit following the October prescribed burn.



The use of a helicopter allowed us to achieve variable fire severities across the landscape due to varied ignition patterns and provided fire fighter safety by eliminating the need for interior hand ignition. Figure 2 shows the substrate (litter, duff, soil) burn severity was primarily light to moderate indicating that the litter was partially to entirely consumed and duff partially to deeply charred. Vegetation severity was predominantly scorched to light indicating the foliage and smaller twigs were scorched to being partially/completely consumed.

Figure 2 Substrate and vegetation burn severity for seventy five plots within the American Elk unit following the October 20-22 prescribed burn.



Next summer our fire effects monitoring crew and invasive species research crew will be revisiting these same plots to look at mortality rates in the seedling, pole, and overstory size classes to see if our objectives were met. In addition, the invasive species research crew will collect year one data on changes to the frequency and abundance of the target invasive species within the burn unit.

Jewel Cave N.M.

The 193 acre Lithograph prescribed burn was completed on September 21 which was the third entry of fire into this unit. Thirty two invasive species research plots were installed in this unit during the summer of 2010 and were combined with three Northern Great Plains fire effects plots that were installed in 1998 to assess fuel load reduction. Figure 3 shows that this fall burn reduced duff and litter by 62% and 67% respectively. Fine woody fuels (1-100 hr) were reduced by 42% and 1000 hr fuels by 18%. I also analyzed the three Northern Great Plains fire effects plots that were installed in 1998 prior to the implementation of a September 1999 prescribed fire. The following summer the Jasper wildfire burned 83,000 acres including the entire monument's acreage. Figure 4 shows that 1000 hr fuels have been reduced 88% with three fire treatments and total fuel loading by 75%.

Figure 3 Fuel loading by size class for thirty-four plots within the Lithograph unit following the September 21 prescribed burn.

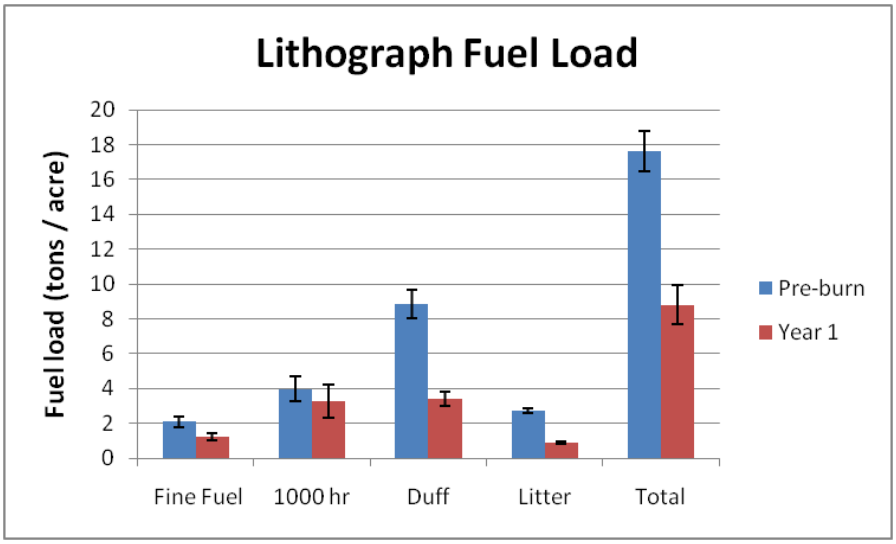
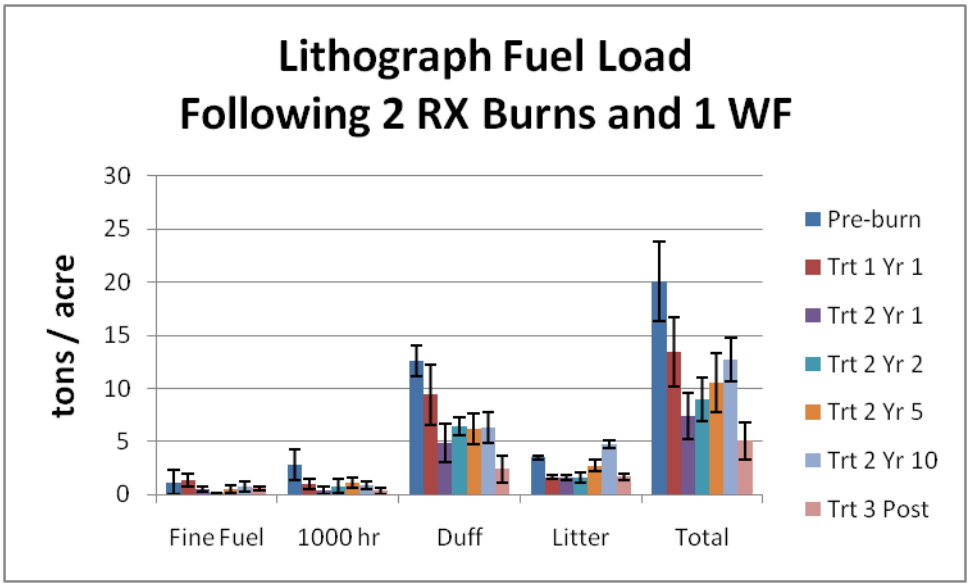


Figure 4 Fuel loading by size class for three plots within the Lithograph unit following two prescribed burns and the Jasper wildfire.



Badlands N.P.

Three monitoring plots within the Tick Draw unit were revisited this summer five years after the October 2005 1447 acre prescribed burn. Herbaceous cover objectives included reducing non-native grass cover by 20%, increasing native grass cover by 10%, and increasing native forb cover by 30%. Following one prescribed burn native grass cover decreased approximately 31% by year 5 (Figure 5). Non-native grass cover declined about 86% at year 1 but by year 5 had increased 39% from pre-burn cover levels. Native forb cover increased 73% by year five but the change wasn't significant. Figure 6 shows that Japanese brome is the most abundant non-native

grass and the literature supports the trends that we are seeing with this species. Fire tends to decrease Japanese brome populations except in wet years following the prescribed burn but this reduction only lasts for one to two years. After prescribed fire, the surface mulch gradually gets thicker and creates a microsite more conducive to seed germination and seedlings. The preferred management treatment would include prescribed burns every three to four years during the ripe seed stage in order to maximize kill of seeds in panicles.

Figure 5 Percent vegetative cover by lifeform for three plots within the western wheatgrass – mixed grass prairie monitoring type in Tick Draw following one prescribed burn.

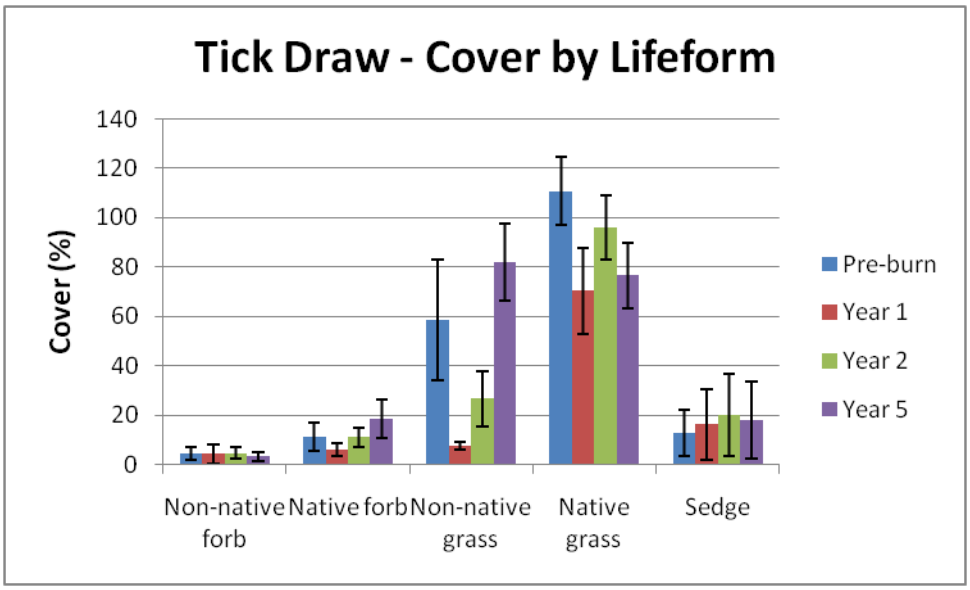
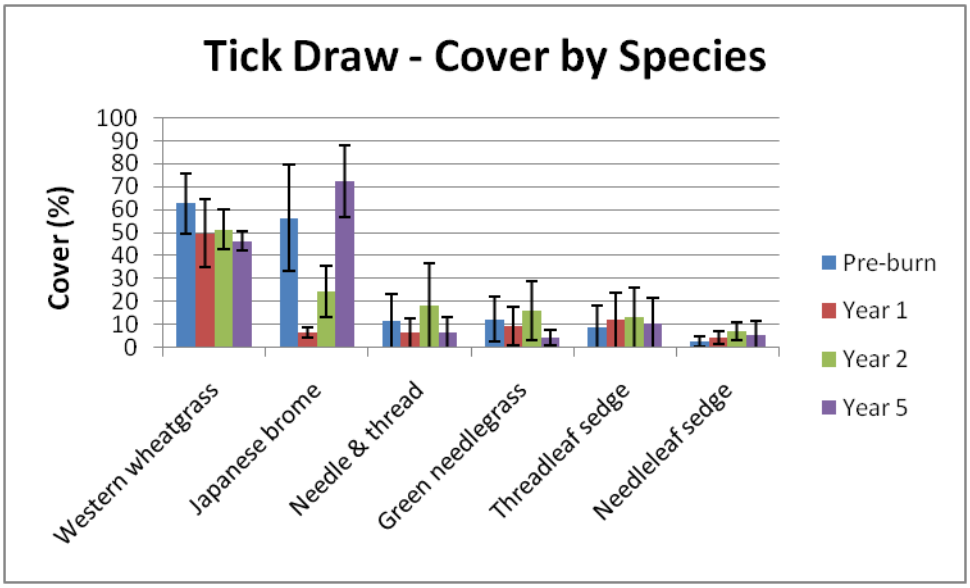


Figure 6 Percent vegetative cover for the six most abundant species on three plots within the western wheatgrass – mixed grass prairie monitoring type in Tick Draw following one prescribed burn.



Three monitoring plots were also installed within the Prairie Wind unit in 2005 and were revisited this summer five years after the October 2005 1393 acre prescribed burn. Herbaceous cover objectives included reducing non-native grass cover by 20%, increasing native grass cover by 10%, and increasing native forb cover by 30%. Following one prescribed burn native grass cover decreased approximately 46% by year 5 (Figure 7). Non-native grass cover declined about 86% at year 1 but by year 5 had increased 74% from pre-burn cover levels. Native forb cover increased by over 300% by year five but the change wasn't significant due to the extremely high variability between plots. The monitoring results between the Tick Draw and Prairie Wind units are almost identical. Japanese brome's vegetative cover went from 39% preburn to 2% year one and then rebounded to 65% at year five. As was seen in the Tick Draw unit, western wheatgrass, needle and thread, and green needlegrass are all trending downward most likely from the interspecific competition from the Japanese brome.

Figure 7 Percent vegetative cover by lifeform for three plots within the western wheatgrass – mixed grass prairie monitoring type in Prairie Wind following one prescribed burn.

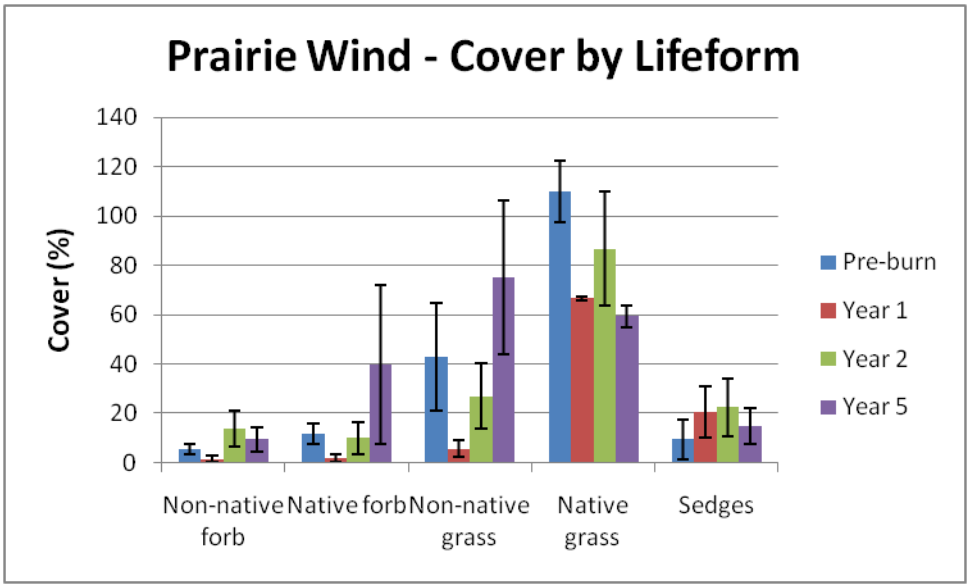
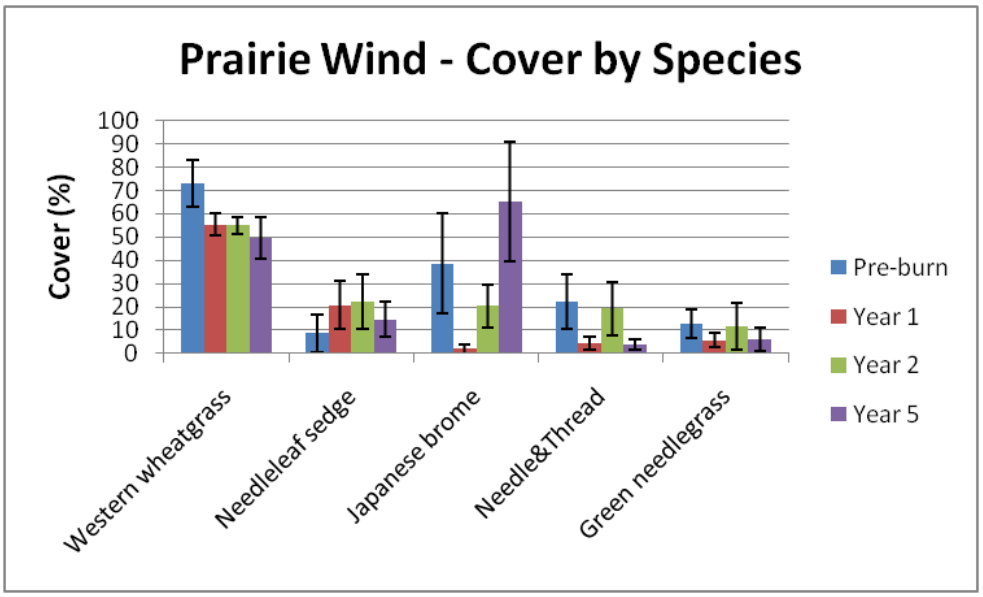


Figure 8 Percent vegetative cover for the five most abundant species on three plots within the western wheatgrass – mixed grass prairie monitoring type in Prairie Wind following one prescribed burn.



Mount Rushmore N.M.

A hazardous fuel reduction project was initiated this past fall at Mount Rushmore in which 544 acres were either thin and piled or thin and chipped. Project parameters included cutting trees with 6 inch dbh or less within the thin/pile area and 10 inch dbh or less within the thin/chip area. The NGP fire effects crew installed and read 29 forest structure and fuels plots within the park prior to this project's implementation and the NGP I&M program installed 31. It is hoped that this project will also minimize the mountain pine beetle mortality due to reductions in the stand basal area and density. In anticipation of the mountain pine beetle "wave" that will hit the memorial in the next one to two years, the NGP fire effects crew has installed three photo monitoring plots to visually document the changes on the landscape, Figures 8 & 9.

Figure 8 a. (left photo**)** View wsw from Baldy Lookout August 2009
Figure 8 b. (right photo**)** View wsw from Baldy Lookout August 2010. Note expansion of red needled trees in distance

Figure 9 a. (left photo**)** View ssw from Starling Basin Lookout August 2009
Figure 9 b. (right photo**)** View ssw from Starling Basin Lookout August 2010

Devils Tower N.M.
The North Terrace project encompassed 203 acres of dense ponderosa pine with the goal of reducing fuel loading and removing ladder fuels to create an uneven-aged, open forest. The first of two fuels treatments involved thinning the density of pole size ponderosa pine (1-6" dbh) by at least 80% within the project area and was completed in the summer of 2001. In September 2005 a prescribed burn was implemented to reduce overstory density, fuel load, and non-native herbaceous cover. This past summer monitoring results tracked changes in tree density and vegetative cover at year 5 following the prescribed burn. Following the thinning treatment, pole density decreased 98% (Figure 10). Seedling density increased slightly following the thinning treatment to 265 trees / acre (tpa). The prescribed burn decreased seedling density to zero immediately following the burn, but by year two it had dramatically increased to almost 50,000 tpa. In 2010, year five post-burn, the seedling density had decreased to approximately 9000 tpa probably from intraspecific competition for light and soil moisture. Total fuel loading decreased 46% following the prescribed burn from 32.7 to 17.8 tons / acre with duff and litter decreasing 32% and 57% respectively. The seedling response isn't that surprising considering the incident light at the surface increased substantially due to the significant decrease in ponderosa pine mid story, as well as reductions in the litter and duff layer from the prescribed burn.

Figure 10 Ponderosa pine forest structure for five plots within the ponderosa pine monitoring type in North Terrace following thinning and prescribed burn treatments.

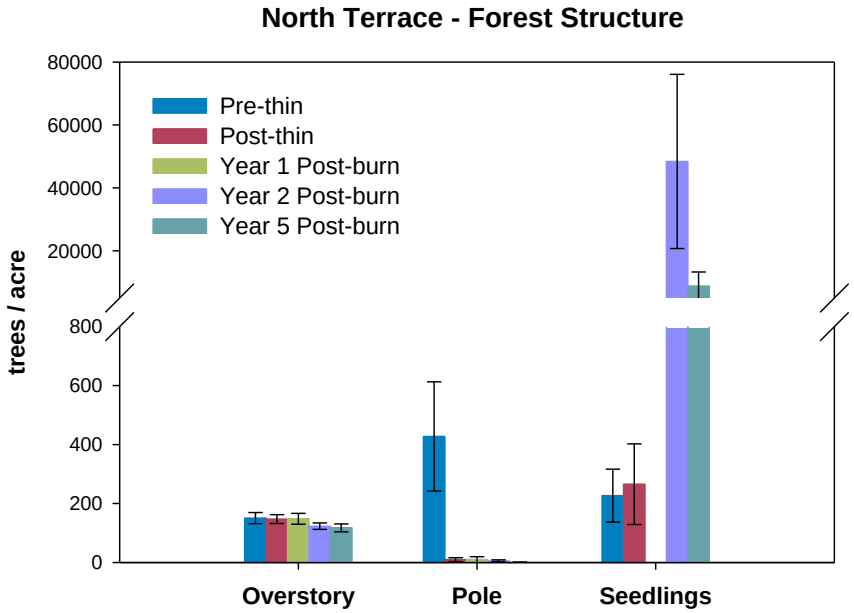
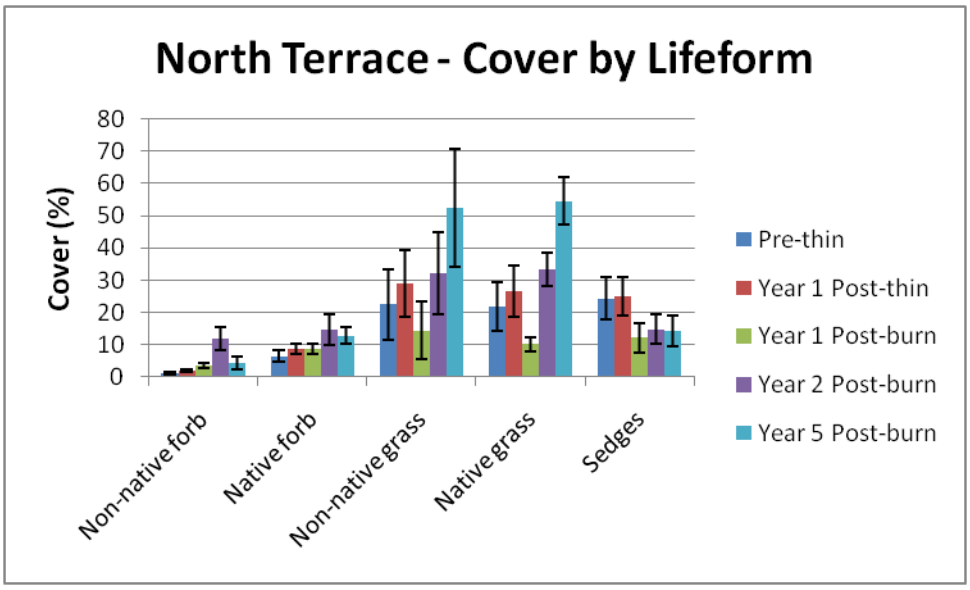


Figure 11 shows the changes in vegetative cover by lifeform following the thinning and prescribed burn treatment. Native grass and non-native grass has increased in cover by year five following the prescribed burn. Kentucky bluegrass is almost entirely responsible for the increase in non-native grass cover. Slender wheatgrass and green needlegrass are the two most abundant native grasses in these plots and both have increased significantly following the burn. In the coming years, a late Spring burn would be recommended to decrease the Kentucky bluegrass vegetative cover since it's a cool season perennial.

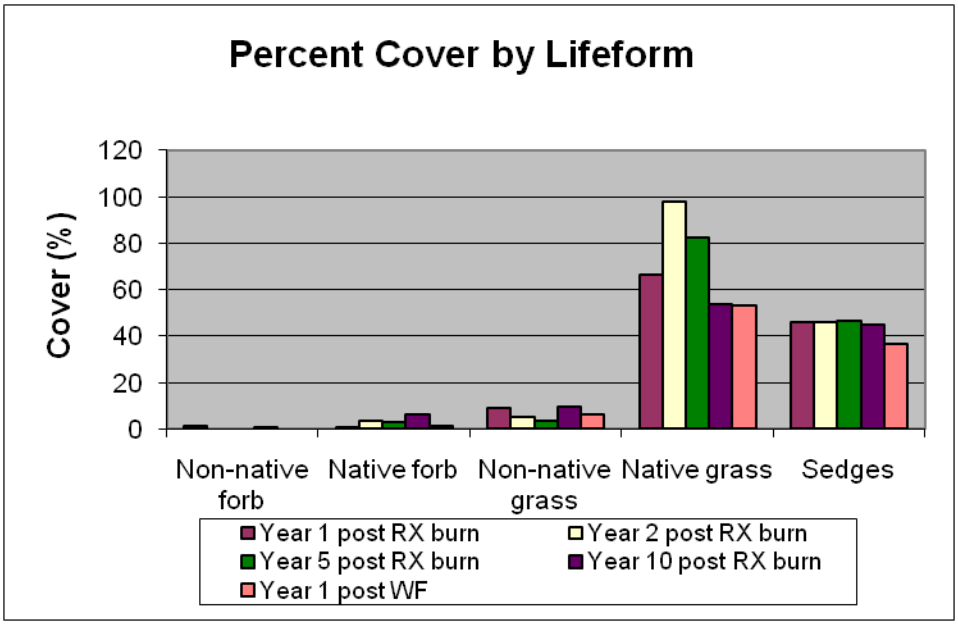
Figure 11 Percent vegetative cover by lifeform for five plots within the ponderosa pine monitoring type in North Terrace following one thinning and prescribed burn.



Scotts Bluff N.M.

The 402 acre Crown Rock unit was implemented on March 25, 1998 with objectives that included increasing native grass and forb cover by 20% as well as decreasing non-native grass and forb cover by 20%. Two needlegrass / sedge mixed-grass prairie plots and a sideoats grama / needlegrass mixed-grass plot were installed in the unit in 1997. In July 2008 the Oregon Trail Days wildfire burned through two of the monitoring plots. Figure 12 shows that native grass cover increased at year 2 following the prescribed burn but then decreased by year 10 (plots read in 2008 prior to wildfire). Non-native forb and grass cover has not changed throughout the monitoring period. Native forb cover increased from 1% to 6% in the year 1 to year 10 timeframe following the prescribed burn. The decrease in native grass cover is most likely the result of the drought in the area from 2001 to 2007 and not the prescribed burn or wildfire. Plots read in 1999, year 1, was in the midst of an above average precipitation cycle with below average precipitation for the year 2 and 5 reads. Next year we will reread these two plots again and see in fact whether the native plant cover has responded to three years of above average precipitation.

Figure 12 Percent vegetative cover by lifeform for two plots within the Crown Rock unit following a prescribed burn and wildfire.



Theodore Roosevelt N.P.

The Northwest corner prescribed burns were completed on October 2001 and 2008. The unit is comprised of native and non-native mixed grass prairie with isolated pockets of Green Ash woody draws. Primary resource objectives include: increase native grass and forb cover, restore fire back to the mixed grass prairie ecosystem, retard encroachment of woody plant species, and maintain mixture of native cool and warm season grasses while stressing cool season exotic grass species. Three monitoring plots were established in the unit in July 2001 prior to the prescribed fire to evaluate the success of the treatment. Two growing seasons after the second prescribed fire native grass cover had increased 53% from pre-burn values with non-native grass cover decreasing 82% (Figure 13). Native forb cover was trending downward but this change wasn't significant. Non-native forb cover was minimal (2%) at pre-burn and didn't change following either treatment. Figure 14 shows that the top five most abundant species are native grasses and sedges and all of them are trending upward in cover following the two prescribed burns. Needle & Thread grass and Needleleaf sedge both significantly increased in vegetative cover from 20% to 47% and 0% to 29% respectively two growing seasons after the second prescribed burn.

Figure 13 Percent vegetative cover by lifeform for three plots within the NW corner unit following two prescribed burns.

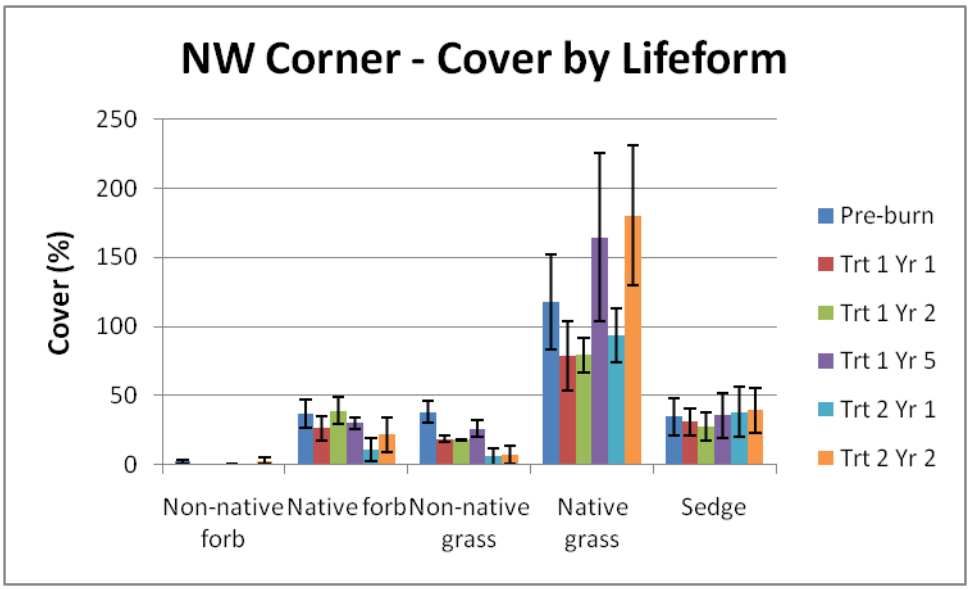
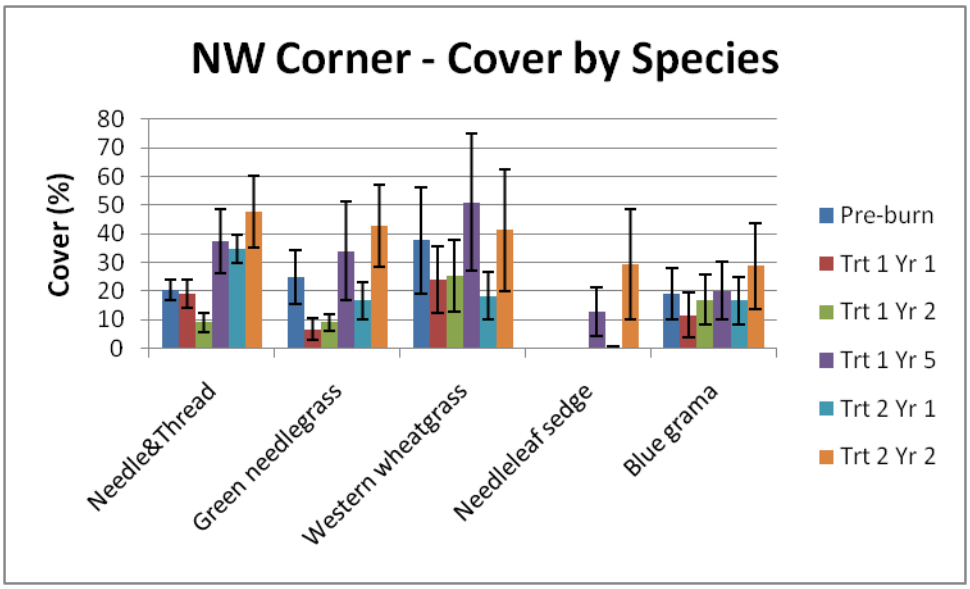


Figure 14 Percent vegetative cover by species for three plots within the NW corner unit following two prescribed burns.



Knife River Indian Villages N.H.S.

The Big Hidatsa unit, approximately 140 acres, has been burned three times, September 1999, April 2005, and May 2009. Burn objectives include decreasing non-native grass cover, increasing native grass and forb cover, and reducing 1 and 10 hr fuels. The unit is comprised of mixed grass prairie with pockets of green ash and snowberry in the drainages. Four monitoring

plots were established in the unit in July 1998 prior to the first prescribed fire to evaluate the success of the treatments. Two growing seasons after the third prescribed fire native grass cover had decreased 47% from pre-burn values with non-native grass cover increasing 745% (Figure 15). Both of these changes in cover were significant. Native forb cover was trending upward while non-native forb cover was minimal throughout the monitoring period. Kentucky bluegrass is by far the most predominant non-native grass and has increased significantly following the three prescribed fires (Figure 16). This is quite surprising considering that Kentucky bluegrass is a cool season perennial and the last two burns have taken place in the spring at a time when the grass should be most susceptible to fire damage. I haven't seen Kentucky bluegrass respond this way to spring burning from other burn and park units and this response is most likely attributed to other climatic variables including changes in precipitation throughout the monitoring period. Above average yearly precipitation was experienced at Knife River from 1998 through 2000 followed by drought conditions from 2001 to 2006. Above average precipitation then returned in 2007 and continued through 2010.

Figure 15 Percent vegetative cover by lifeform for four plots within the Big Hidatsa unit following three prescribed burns.

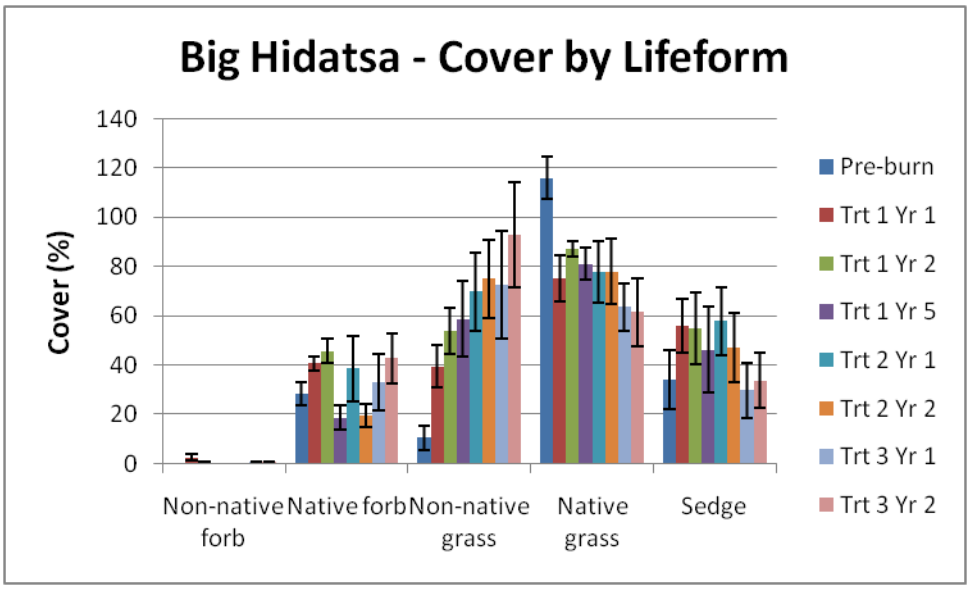
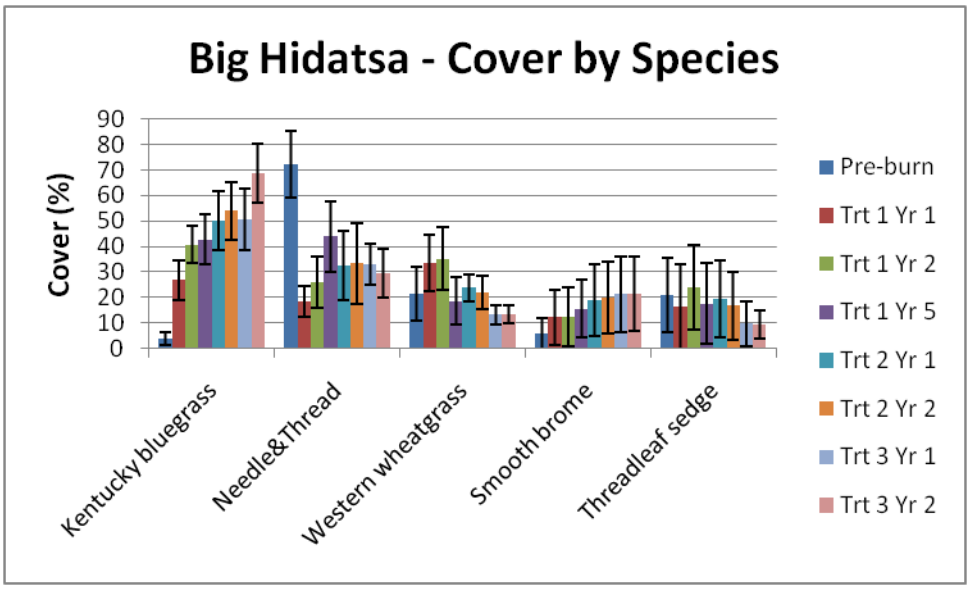


Figure 16 Percent vegetative cover by species for four plots within the Big Hidatsa unit following three prescribed burns.



B. Fire ecologist accomplishments and areas of focus

Dan Swanson partnered with Amy Symstad of the USGS on a three year research project assessing the relationship between prescribed fire burn severity and target invasive plant species abundance taking into account a variety of pre- and post-fire environmental characteristics at Wind Cave N.P., Jewel Cave N.M., and Devils Tower N.M. This was the first year of the project and we trained a two person crew in the field protocols and invasive plant species identification. One hundred and fifteen plots were installed and read June through August. The two main questions this project hopes to answer include: 1.) Does prescribed fire promote target invasive plant species in Black Hills ponderosa pine forest? 2.)What is the most efficient way to search for invasive plants affected by prescribed fire in this ecosystem?

Dan worked with Kevin Stark, Saint Mary's University of Minnesota, on the fire ecology/fire regime portion of Wind Cave N.P., Jewel Cave N.M., and Devils Tower N.M. natural resource condition assessments throughout the year.

Table 4. Fire Ecologist Accomplishments/Focus Areas

Category	Percent Time	Accomplishments and/or areas of activities
Planning	7%	Determining fire effects travel costs to area parks, training of field crew in FFI
Presentations	5%	Scientific meetings, park staff, public, etc.
NPS Meetings/ task groups	10%	Park, I&M, & FESC meetings; NGP Technical Committee meeting; National FMO meeting; BADL Climate Change Vulnerability Assessment Workshop; Worked on WICA, JECA, and DETO Natural Resource Condition assessments
Interagency work	1%	Black Hills Mountain Pine Beetle workshop, Black Hills Area Ecologist &

		Botanist Workshop
Wildfire Assignments	0%	Slow fire season!
Prescribed fire projects	1%	FEMO on 3 RX fires (3 operational periods)
Non-fire fuels projects	1%	MORU hazardous fuel reduction project
Research	10%	Invasive plant species research project – training field crew
Data Collection	12%	Invasive plant species research project – WICA, JECA, and DETO
Data entry	3%	Immediate post-burn data entry for Lithograph and American Elk RX
Data management & analysis	30%	Northern Great Plains area parks fire effects database management and analysis
Supervision/Admin	15%	Hiring, supervision, travel, payroll, etc.
Training	3%	Botany, Supervisory, and EEO training
Miscellaneous	2%	NGP fire management web site, Writing burn reports

C. Fire effects crew accomplishments and areas of focus

Table 5. Fire Effects Crew Accomplishments/Focus Areas

Category	Percent Time	Notes
FMH Plots	12%	Re-reading of FMH plots (Forest, Grass, and Brush)
NGP Plots	8%	Re-reading of burn-unit specific plots (FFV, GFV, photo points)
I&M Plots	27%	Installing I&M style plots. At MORU these were installed park-wide. All other parks' installs fell inside active burn units
Fire Assignments	10%	Wildfire assignments, including local I.A., details with the Black Hills Wildland Fire Module, Prescribed Fire Training Center detail
Prescribed Fire & Burn Unit Prep	7%	Prescribed fires in the NGP park group, calendar year 2010
Data entry, check	8%	100% of plot data entered and checked in FFI version 1.04
Supervision/Admin	13%	Travel, payroll, seasonal hiring, field season preparation, equipment upkeep and repair, end of season closeout
Training, Conferences	10%	Includes fire and ecology related training and conferences
Miscellaneous	5%	RRAT MORU Mountain Pine Beetle Project, physical training, fuel sampling, herbarium updates, NGP fire history project, annual leave