2006 SUMMARY REPORT **10/20/06** Jennifer Hrobak
Shannon Park (AA32)

Hazard Fuel Reduction

A hazard fuel reduction project was conducted along the border of Ft. Wainwright and the Shannon Park housing subdivision following the 1999 wildfire that threatened many homes and structures. Several acres of primarily black spruce forest were thinned to an approximate 8 x 8 foot spacing with lower limbs pruned by the Alaska Fire Service Northstars firefighting crew in August of 2000 (Figure 1).

Figure 1. Shannon Park fuel treatment one year after thinning.

Understory Cover

Three monitoring plots designed to detect changes in vegetation cover and composition were established 2001, one year after thinning was completed in Shannon Park. Labrador tea (*Ledum palustre*), low-bush cranberry (*Vaccinium vitis-idaea*), and dwarf blueberry (*Vaccinium uliginosum*) dominated understory cover one year post treatment (Table 1). These species continue to dominate vegetation cover six years post-treatment (2006), along with grass species and horsetail *(Equisetum* species).

Table 1. Average absolute percent cover (total cover includes multiple species located at a single point) one year post treatment (2001) and six years post treatment (2006).

Species Name	Common Name	% Cover YR1	% Cover YR6
Ledum palustre	Labrador tea	26.0	29.3
Vaccinium vitis-idaea	Low-bush cranberry	24.7	34.3
Vaccinium uliginosum	Dwarf blueberry	15.0	17.7
Equisetum species	Horsetail	3.0	18.7
Grass species	Grass	2.7	12.3
Saussurea angustifolia	Narrowleaf saw-wort	2.3	1.7
Salix species	Willow	2.0	2.0
Carex species	Sedge	1.3	0.0
Empetrum nigrum	Crowberry	1.0	0.3
Rosa acicularis	Prickly Rose	0.7	2.7
Other Shrubs		0.0	1.0
Other Forbs		0.7	2.3
Total Vegetation % Cover		79.3	122.3

Some gradual changes in cover and species composition have become evident in the six year old thinning treatment. Horsetail has demonstrated the most substantial increase in cover from 3% in 2001 to 18.7% in 2006 (Figure 2). Low-bush cranberry and grasses/sedges (primarily *Calamagrostis canadensis* and *Carex* species) have also increased in the fuel reduction area from 24.7 to 34.3% and 4 to 12.3% respectively. An increase in species diversity was noted in 2006, particularly in the forb classification, including Coltsfoot (*Petasites frigidus*), Wintergreen (*Pyrola secunda*), Starwort (*Stellaria* species), and Bastard Toadflax (*Geocaulon lividum*). Total vegetation cover has also increased, demonstrating an increase in vertical complexity (meaning more layers of vegetative strata).

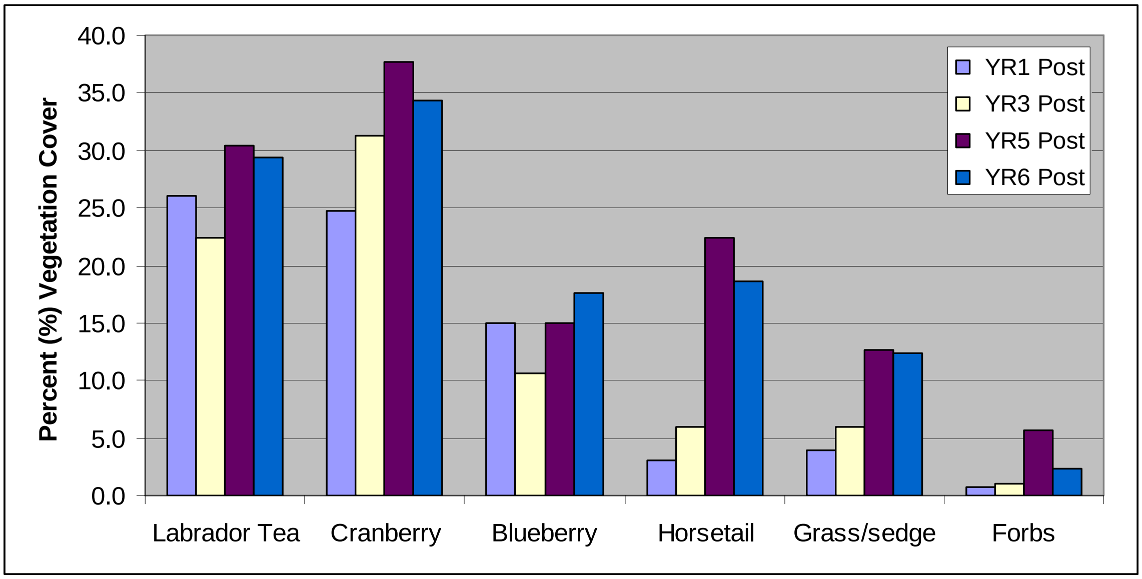

Figure 2. Average absolute percent vegetation cover in 2001 (YR1), 2003 (YR3), 2005 (YR5), and 2006 (YR06) (n=3).

Changes in substrate cover have been more difficult to monitor due to inconsistent sampling methods. Feather moss cover has remained constant at 50% from 2005 (YR5) to 2006 (YR6). The forest floor does not appear to be experiencing significant drying as there is very little moss mortality. Litter and duff cover also showed an increase from 40% to 60% in the past year. There are several potential reasons for this, one being the buildup of leaf litter from the increase in low shrub cover.

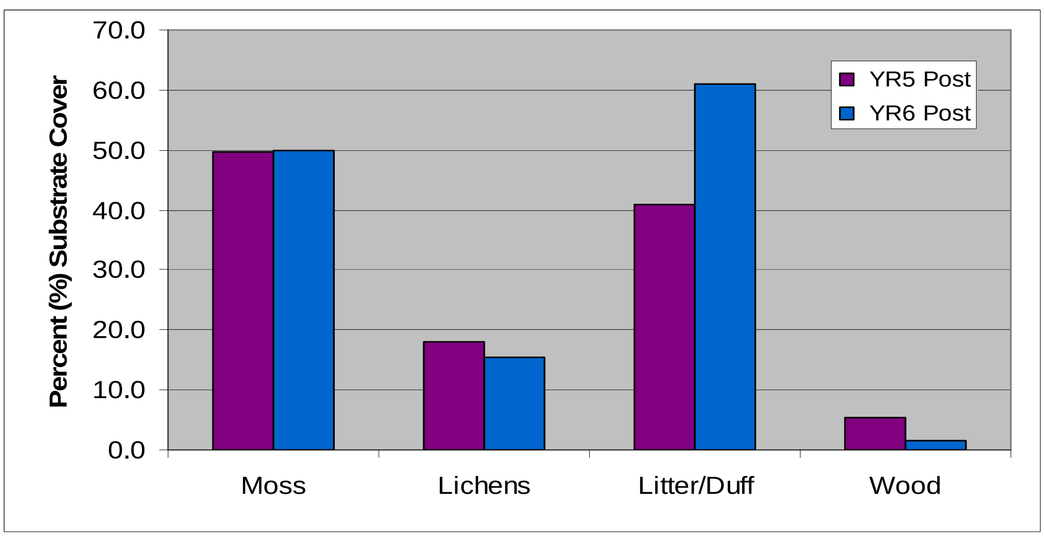

Figure 3. Average absolute percent substrate cover in 2005 (YR5), and 2006 (YR6) (n=3). Data from 2001 and 2003 were eliminated from substrate cover analysis.

Tree Density

Figure 4. Dead spruce trees surrounding transect 1, along the border of the fuel break and the housing development.

The Shannon Park fuel treatment is located in a predominately black spruce (*Picea. mariana*) forest with localized patches of white spruce (*P. glauca*) and a small aspen (*Populus tremuloides*), birch (*Betula papyrifera*), and balsam poplar (*Populus balsamifera*) component. Total tree density has remained relatively constant over the monitoring period with a change of less than 1% (Table 2). Regeneration within the monitoring plots continues to be dominated by spruce seedlings with over 4300 seedlings/acre compared to only 522 hardwood seedlings/acre. Of the 180 trees inventoried in 2006, only 6% were found dead, over half of which were seedlings. Though we are not seeing any substantial spruce tree mortality within the three monitoring plots, there is evidence of some localized tree mortality throughout the unit (Figure 4). The cause is currently unknown.

Table 2. Average stem counts and tree densities by size class and tree type (n=3). Tree data collected in 2005 was eliminated from analysis due to sampling error.

Size Class	Tree Type	2001 (YR1)		2003 (YR3)		2006 (YR6)		% Change to YR 06
		Stem count	Trees/ acre	Stem count	Trees/ acre	Stem count	Trees/ acre	
Overstory dbh ≥ 15.0 cm	Spruce	2.7	58.1	3.0	65.3	2.7	58.1	0
	Hardwood	1.0	21.8	1.0	21.8	1.0	21.8	0.0
Pole dbh 2.5-14.9 cm	Spruce	30.0	653.4	26.7	580.8	28.7	624.4	-4.4
	Hardwood	0.3	7.3	0.3	7.3	0.3	7.3	0.0
Seedling dbh < 2.5 cm	Spruce	27.7	4820.6	25.7	4472.2	25.0	4356.0	-9.6
	Hardwood	0.3	58.1	0.3	58.1	3.0	522.7	88.9
Total	**-**	**62.0**	**5619.2**	**57.0**	**5205.4**	**60.7**	**5590.2**	**-0.5**

Duff Moisture

Two to three duff moisture samples were collected from inside the fuel treatment and in adjacent unthinned areas in 2001, 2003, and 2004. Although precipitation varied in the years sampled, live moss and dead moss layers were drier in the treatment than in unaltered or "control" areas (Figure 5). Upper duff and lower duff layers showed almost no difference in moisture content between the thinned and unthinned sections of the unit. Additional fuel moisture samples should be collected in the future to assess longer term changes in moisture dynamics.

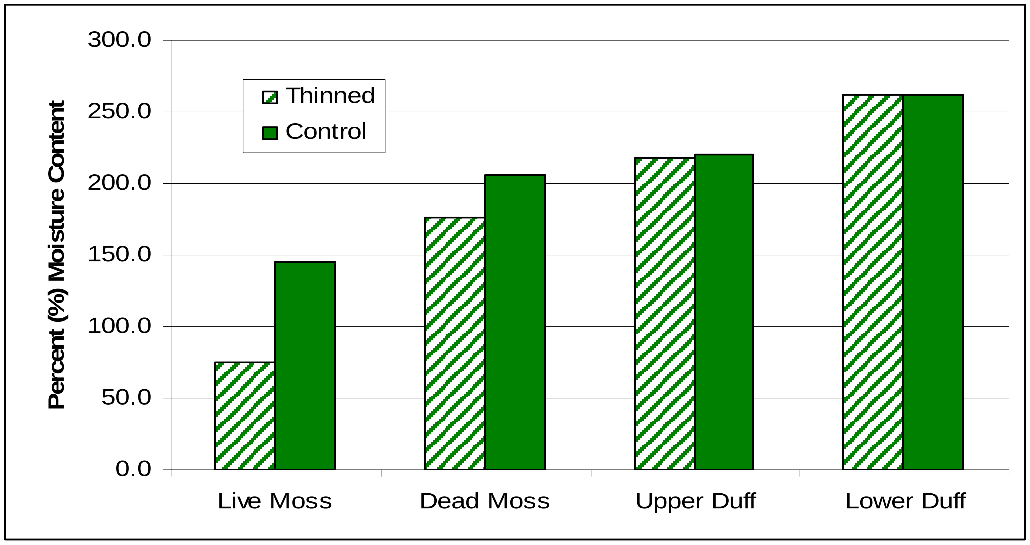

Figure 5. Average percent gravimetric duff moisture content from 2001, 2003, and 2004 in thinned and unaltered or "control" areas. (n=3 for thinned, n=2 for control)

Conclusion

Though it is difficult to determine the full extent of overstory and understory changes without pre-treatment and control data, we are able to detect several moisture and vegetative trends within the fuel break. Grass incursion along with lower surface fuel moistures in fuel treatments is currently sparking attention amongst fire mangers since it is a flashy fuel type and can induce fast moving, high intensity fire behavior that may not be ideal in certain areas. Grass cover within the Shannon Park unit is experiencing a slow upward trend reaching 12% cover in 2006 but has not nearly attained a critical level forming a continuous grass fuel type. We are seeing similar trends in several other thinning treatments throughout the interior (Joint Fire Science Fuel Demonstration Sites and Tanacross Shaded Fuelbreak) where grass cover has exceeded pre-treatment levels. However, control plots are exhibiting equal to if not higher percentages of grass cover suggesting this increase may not be a result of the thinning treatment but of some other mechanism. Thinning treatments generally allow much less grass incursion compared to other fuel reduction methods including prescribed burning and mechanical treatments. Low shrubs are also experiencing an upward trend in percent cover due to opening the canopy, which has increased understory species productivity. The Shannon Park 8 x 8' thinned unit does not appear to be experiencing any significant moss mortality from drying as we have seen in more drastic 14 x 14' thinning treatments. At this point in time, the fuel treatment may prevent crown fire type behavior from occurring and provide easier access for firefighters and other suppression efforts but will this always be the case? Currently, we are not seeing rapid tree re-establishment so fuelbreak maintenance should not be need for some time but these conditions can change. Further monitoring of this thinning fuel treatment will be used to determine long-term vegetation changes, effectiveness, and longevity.