Monitoring Conducted

Fuel Reduction

Wilderness Burn Units

No prescribed fires were carried out within the Boundary Waters Canoe Area Wilderness (BWCAW) as part of the 2001 BWCAW Fuel Treatment project. However, parts or all of seven prescribed burn units (7,800 acres) re-burned during the May, 2007 Ham Lake Wildfire. All of the seven units were intentionally burned to reduce fuels between 2002 and 2006. The dry spring followed by an unusually wet fall reduced the Superior National Forest's (SNF) ability to implement a fall prescribed burn program.

Fire/Fuels Summary Points

- The spring of 2007 was an active period for wildfires when the Ham Lake Wildfire burned approximately 75,500 acres.
- Within the BWCAW, parts or all of seven prescribed burn units (7800 acres) re-burned during the May, 2007 Ham Lake Wildfire.
- Monitoring findings did validate that mitigations outlined in the BWEIS and Burn Plans were successful in protecting the soil organic layer, eagle nests, shoreline old forest, and interior old forest from impacts by prescribed fire.
- The frequency of fire in blow-down demonstrates the continued high fire risk of these fuels 7 years following the 1999 windstorm. This risk is further enhanced by conifer succession, particularly increased balsam fir and spruce budworm infestations.
- Increase prescribed fire within red and white pine forest to promote seedling establishment.
- Community Wildfire Protection Plans were completed for Cook and Lake Counties and initiated for St. Louis County.

The Superior National Forest monitored fire effects within the Ham Lake fire and continued data collection within the 2006 BWCAW wildfire areas, particularly the Cavity Lake fire. During August, fire and monitoring personnel worked with the Salt Lake Remote Sensing Lab (RSAC) to examine fire effects, particularly fire severity. In September, SNF staff collaborated with a Fire Behavior Assessment team from California (FBAT) to assess fire effects. The purpose of RSAC and FBAT monitoring was to evaluate how effective prior year fuel treatment practices have been in achieving BWCAW Fuel Treatment project objectives.

Non Wilderness Burn Units

Fire effects monitoring also occurred within fuel treatment or burn units outside the BWCAW. During June 2007, fuel transects which were burned or re-burned by the Ham Lake fire were visited to assess and compare. The burn units visited included: Cross River, Gunflint Palisades, Iron Mash, Kekekabic, Mayhew Ridge, Meditation, Moose Pond, Overlap, and Round Lake.

Fuel Reduction Accomplishments

Approximately 5,442 acres within twenty eight projects were treated to reduce fuels during Fiscal Year (FY) 2007. Treatment methods included pile burning, hand piling, prescribed burning, and harvesting.

Table 1. 2007 Wildfires

Fire	Acres Burned	Time of Year
Ham Lake	75484	May
Bog Lake	1.2	May
Coleman	1.5	July
Snowbank 2	1.3	August
Dunka Rd.	1	August
Pike Rd.	13	August
Ramshead Lake	2.1	September
Herriman Lake	1.3	September

Wildfires

The spring of 2007 was an active period for wildfires on the east side of the SNF. The Ham Lake fire ignited May 5, 2007 on the Superior National Forest. It burned a total of approximately 75,000 acres, including areas treated for fuel hazard reduction, untreated areas, and developed wildland urban interface along the Gunflint Trail. Erratic strong winds during the fire caused major fire runs in each wind direction. The fire burned after a dry winter and spring, with early

snow and ice melt. Leaves had not come out yet (prior to green up) and the primary fuels of down litter, sticks and wood within previously untreated areas and grass and jack pine seedlings within treated areas burned intensely and rapidly in low and varied humidity.

Following the Ham Lake fire, green up and returning rains (particularly during September) reduced the fire threat and only small wildfires occurred during the remainder of the year. Table 1 shows 2007 wildfires, acres burned, and when fires occurred. Table 2 displays wildfire acres burned and causes of fires for years 2002-2007, as well as a 5 year average.

Table 2. Wildfire Acres During Past 5 Years and Fire Cause

Cause	2002	2003	2004	2005	2006	2007	5-Year Avg.
Lightning	15	10	9	20	39,970	16.2	8,005*
Equipment	0	4	1	0	7	0	2
Smoking	0	0	0	3	1	0	1
Campfire	9	11	7	22	9	75,500	12,593**
Debris Burning	10	7	7	6	2	1.3	6
Railroad	4	6	6	0	3	0	4
Arson	0	6	0	3	0	0	2
Children	0	5	3	4	2	0	3
Misc.	10	16	9	5	3	0.6	9
TOTALS	48	65	42	61	42,003	74,518	8,444

*The high average reflects the large acreage burned in 2006. **The high average reflects the large acreage burned in 2007.

Evaluation and Conclusions

Fuel Reduction

Wilderness Burn Units

Monitoring of the 2006 BWCAW wildfires, particularly the Cavity Lake wildfire, validated how effective previous year prescribed burning was in: (1) Preventing or minimizing blow-down wildfires from exiting the wilderness and threatening life and property; and (2) Protecting wilderness resources through effective implementation of mitigation measures. The prescribed fire units accomplished their intended BWCAW Fuel Treatment project purpose and need. Moreover, monitoring findings did validate that mitigations outlined in the BWCAW Fuel Treatment project and Burn Plans were successful in protecting the soil organic layer, eagle nests, shoreline old forest, and interior old forest.

Monitoring of the 2007 Ham Lake Fire generally reaffirmed conclusions reached through 2006 monitoring. Major conclusions reached by the Fire Behavior Assessment Team's *Fire Behavior and Effects Suppression and Fuel Treatments* report were:

Ham Lake Fire

- Treated areas had evidence of less intense fire behavior and lower severity than untreated areas but results varied depending upon the information source.
- Treated areas were utilized during suppression along several flanks of the fire.
- Mechanically and prescribed fire treated fuels around the Seagull guard station aided in successful structure protection using sprinklers and spot fire attack.
- Prescribed fire treated areas were utilized for suppression burn operations, aiding in safe, effective application.
- Treated areas near Iron Lake aided successful suppression efforts to constrain eastward progression of the fire toward homes.

Cavity Lake Fire

- The fire extinguished itself and was readily suppressed with direct attack when it reached large prescribed fire treated areas. Treatments were concentrated to the west of the Gunflint Trail wildland urban interface area, which helped stop the fire from progressing toward homes.

Overall

- In both fires, treated areas were utilized during suppression and modified fire behavior. Fire behavior was decreased in treated areas to a greater degree during the Cavity Lake fire in the summer than during the Ham Lake fire in early spring.

SNF fuels and monitoring personnel evaluated plots that were burned multiple times. Eight plots and six plots were initially prescribe burned and then re-burned by the Ham Lake and Cavity Lake fires respectively. Within these multiple burns, fuel loadings were reduced on average by 69%. However, despite being burned more than once, over 25% of the soil organic layer remained. Table 3 displays average percent fuel reduction for the eight plots initially prescribed burned and then re-burned in the Ham Lake fire. Figures 1-3 depicts the change in fuel loads from prior to prescribed burning to immediately after the Ham Lake fire.

Table 3. Plots Burned By Prescribed Fire and Ham Lake Wildfire (Avg. Change in Tons/Acre)

Totals	1 hour	10 hour	100 hour	1000 hour	Avg. Fuel Depth
Pre Burn	17	6.6	3.4	7.2	1.97
Immediate post RX	5.2	3.2	1	4.4	0.86
% Reduction	70%	52%	71%	49%	57%
1 yr post Ham	4	1.2	0.4	5	0.62
% Reduction	33%	63%	60%	113%	28%
Overall reduction	77%	82%	89%	31%	69%

Figure 1*.BU042 Plot 1 Pre-Burn 7/8/03*

Figure 2. BU042 Plot 1 1yr Post-Rx 8/16/06

Figure 3. BU042 Plot 1 2 Months post Ham 7/26/07

The 2001 BWCAW Fuel Treatment project made a decision to treat about 85,000 acres of hazardous fuels through prescribed burning by 2008. To date, approximately 50% of the 85,000 acres have been treated (see Table 4). It is unlikely that the remaining untreated acres will be completed within the next 2 years as an average of only 7,300 acres have been treated each year since 2001. Monitoring has shown that fire hazard risk is still high. This was confirmed during the Cavity Lake fire when severe, intense fires occurred within 7 year old blow-down fuels.

Table 4. Attainment of BWCAW Fuel Treatment Project Projected Acres

Year	***Acres Treated***	***Cumulative Acres Treated***	***Percent Completion***
Decision. Year 1	0	0	
2001	291	291	
2002	2,274	2,565	
2003	3,744	6,309	
2004	6,643	12,952	
2005	13,972	26,924	
2006	16,936	43,860	
2007	90	43950	
Status-Total			
Total Project Acres	85,573		
Total Completed	43,950		51%
Dropped	3,465		4%
Incomplete	38,158		44%

Non Wilderness Fuel Reduction

During FY 2007, approximately 5,442 acres within sixteen projects outside the BWCAW were treated to reduce fuels. This compare to 3,006 acres treated in 2006 and 2,025 acres in 2005. Table 5 portrays acres of hazardous fuel reduction from 2004 to 2007.

Table 5. Non Wilderness Fuel Reduction Acres			
2004	2005	2006	2007
690	2,025	3,006	5,442

The effects of prescribed burning of 265 acres to reduce fuel loadings were assessed within nine sites outside the BWCAW within the Gunflint Corridor project. Following prescribed burning, these treatment areas were re-burned by the Ham Lake fire. Fuel loadings were reduced on the average by about 10 tens per acre from prescribed burning. The Ham Lake fire further reduced fuels by about 20 tons per acre where plots burned in both fires were evaluated. In addition, about 150 acres were prescribe burned within two other projects. Figures 4-6 show changes in fuel reduction following prescribed burning and following the subsequent Ham Lake Fire.

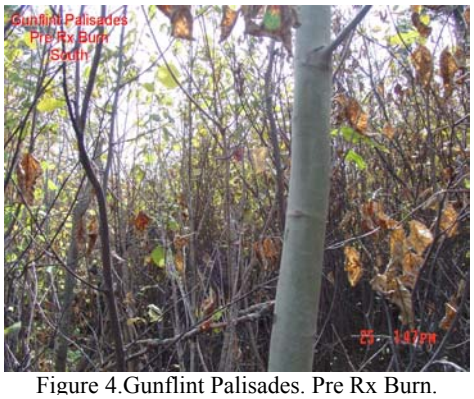

Figure 4.Gunflint Palisades. Pre Rx Burn.

Figure 5.Gunflint Palisades. Post Rx Burn.

Figure 6.Gunflint Palisades. Post Ham Lake.

Wildfires

There are no Forest Plan objectives or desired projected conditions for wildfire acreage. However, the preponderance of fire in blow-down during 2006 and 2007 demonstrates the continued high fire risk of blow-down fuels eight years following the 1999 windstorm. This elevated risk is further enhanced by conifer succession, particularly increased balsam fir and spruce budworm infestations (see figure 7).

Figure 7. Balsam Fir Establishment. BU 302.

Management Considerations

After reviewing monitoring findings, the Forest Interdisciplinary Team (FIDT) identified two Management considerations to carry forward during Fiscal Year 2008.

- Review Activity Limit Code E listed on Table G-WS-8 (Forest Plan p. 2-16) and O-WS-10 as it relates to slash retention following the prescribed burning activity.
- Review S-VG-4 and G-VG-2 (Forest Plan p. 2-26) as it relates to fuel treatments within red and white pine stands with over story below 60% canopy closure.