

USDA FOREST SERVICE
HURON SHORES RANGER STATION
5761 N SKEEL AVE
OSCODA, MI 48750

SUMMARY OF RED PINE BOLE CHAR DATA

On The Huron National Forest



Prepared by: Brian Stearns Date: 05/15/2012

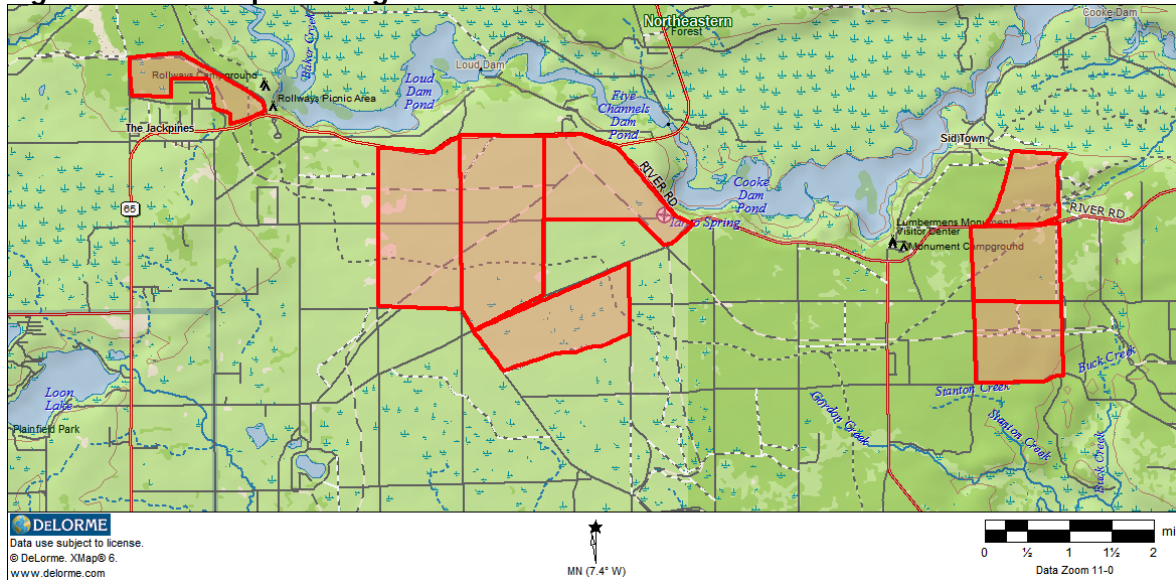
Assistant Module Leader

Huron-Manistee Interagency Wildland Fire Module

Purpose

The information in this summary is based on data gathered by the Huron Shores Prescribed Burning Program on the Huron-Manistee National Forest. The prescribed burn projects consisted of Brittle Landscape Prescribed Burn Project, Memorable Prescribed Burn Project, and South Branch Wickert Hills. Projects were conducted from 2004 to present day. All of the projects were located in the Tawas District of the Huron National Forest in Iosco County, Michigan (figure 1).

Figure 1. Area map showing the burn units



Background

The burn units are approximately 91% forested, consist of 98% ground cover, are almost entirely comprised of dry sandy plains, and major precipitation events occur when soils are frost-free. The onsite conditions are favorable for good water infiltration and sub-surface percolation. Average age of the overstory is 50-70 years, and is comprised of primarily red pine (*pinus resinosa*), northern pin oak (*quercus ellipsoidalis*), and some jack pine (*pinus banksiana*). All of the burn units have had some harvest activities to thin the stands. Surface fuels are comprised primarily of needle cast and Pennsylvania sedge (*Carex pensylvanica*). The pre-burn primary fuel models are the standard TU2, and TL6 with main fuel being grasses, sedges, blueberry, and needle cast. In Brittle burn blocks 4, 9, and 10 pockets of slash from logging activities existed typically 12' X 12'. The pockets of slash increased fire behavior within those areas. Fuel loading is displayed in table 1.

Table 1. Fuel Loading Information

PREBURN				POSTBURN			
Block #	BLK 4	BLK 10	Average	Block #	BLK 4	BLK 10	Average
1 hr	0.029	0.032	0.031	1 hr	0.029	0.018	0.024
10 hr	0.119	0.119	0.119	10 hr	0.119	0.079	0.099
100 hr	0.216	0.271	0.244	100 hr	0.216	0.222	0.219
1000 hr Solid	0.549	3.428	1.989	1000 hr Solid	0.476	2.746	1.611
1000 hr Rotten	1.796	4.078	2.937	1000 hr Rotten	1.598	2.423	2.011
Litter loading	7.297	9.035	8.166	Litter loading	1.992	1.485	1.739
Duff loading	6.882	11.426	9.154	Duff loading	4.206	8.475	6.341
Litter depth	1.54	1.84	1.69	Litter depth	0.35	0.30	0.32
Duff depth	0.84	1.23	1.04	Duff depth	0.50	0.92	0.71

Method of Data Collection

Huron Zone fuels / fire monitoring begins with pre-burn brown's transects, tree mortality inventory, and photo plots to determine the baseline fuel loading. The number of plots is based on acreage, and the locations of the plots are generated randomly. The method of collecting the data is standardized and is outlined in "Huron Shores Downed Woody Debris / Fire Effects Monitoring Plots Handbook". This handbook is designed as a quick reference for fire effects monitoring protocol on the Huron-Manistee. The sampling design is based on James K. Brown's "Handbook for Inventorying Downed Woody Material" (GTR-INT16, 1974), the National Park Service's "Fire Effects Monitoring Handbook." The tree mortality inventory for the Huron zone has been developed with resource specialists input from wildlife and forestry and focus on several variables including bole char (figure 2 is an example of the tree mortality data sheet). The information used in this summary was filtered to show only red pine data.

Figure 2. Example of Tree Mortality Inventory

PROJECT NAME _____										DATE _____					RECORDER _____	
TREATMENT:		PREBURN		POSTBURN		BURN + 1		BURN +		YRS						
Plot	Date	Tree #	Tree Sp	DBH	Tree Height	CBH	Crown Ratio %	Crown Class	Crwn Scorch (% Live)	Total Bole Char	Min. Bole Char	Live / Dead	Insect Activity	Decay	Cavity	Remarks
1	4/11/10	1	red pine (RP)	11	30	10	80	DOM	N/A	4	0.5	L	Y	N	N	Score form logging

Summary of Data

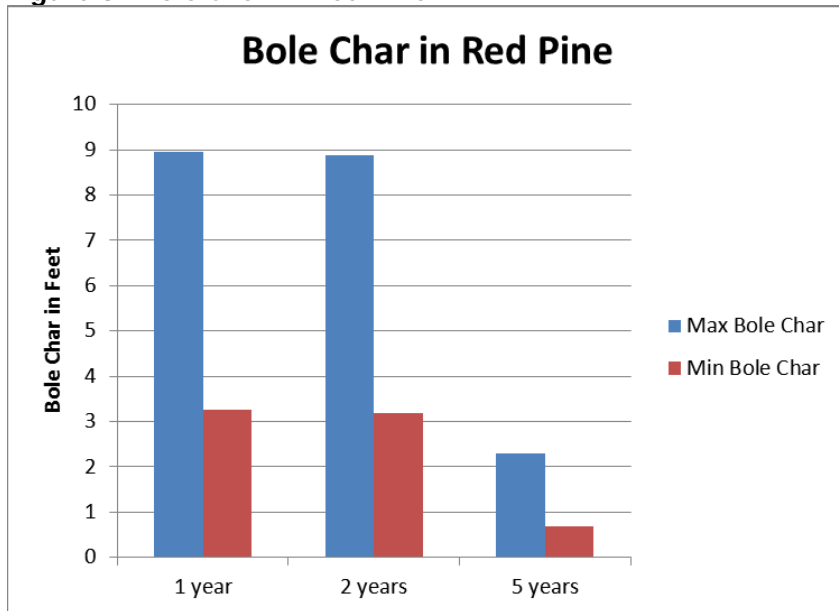
The bole char information has been presented with the burn day observations to illustrate the fire behavior and environmental conditions that contributed to the bole char (Table 2).

Table 2. Bole Char Data

Burn Date	Burn Name	Time of Burn	Day Since Rain	Rain (in)	Temp	Rh	Wind Spd	Direction	F.L.	notes	Est. Mortality	1 Year Total Bole Char (ft)	1 Year Min Bole Char (ft)
10/12/2004	North Mem. unit 3	est 16-18:00	3	0.07	65-56	52-66	1-5mph	se-s	1-4'	burn stopped for wildfire	Less than 1%	4.43	1.13
4/9/2005	North Mem. unit 3	17:30-19:30	2	0.08	55-66	33-48%	0-7mph	se-sw	1-5'	burn stopped for 12 hour limit	Less than 1%	4.43	1.13
4/16/2005	North Mem. unit 2	17:00-20:00	9	0.08	63-71	29-33%	1-5mph	se-sw	1-5'	Small crown fire	10%	18.8	9.47
4/30/2005	North Mem. unit 2&1	14:00-17:30	2	0.09	50-53	37-47%	0-7mph	e-s	1-6'		Less than 1%	12.77	3.13
4/24/2007	Brittle block 12	13:00-17:30	1	0.1	47-64	24-39%	0-7mph	nw / se-s	0.5-8'	wind shift ran head fire to the N.	Less than 1%	3.07	1.32
4/25/2007	South Memorable	16:30-2000	2	0.1	49-54	39-55%	0-6mph	nw-ne-e	1-6'		Less than 1%	9.53	1.99
8/11/2011	South Branch Wickert Hills	13:00-16:00	7	0.1	79-80	32-38%	0-4 mph	W-Nw	2-8'	Burn stopped due to fire intensity	5%	9.52	4.62

For some of the projects data was collected at 2 years post-burn and again at 5 years post-burn. Table 3 illustrates all of the post-burn bole char data. Most of the red pine had small amounts of char at or near the original post burn levels. The General observations recorded for bole char a 5 years post-burn was of the base of the bole (up to 1') where the bark was thickest still had significant bole char. Higher on the bole were the bark started to become thinner and scallier the bole char was less prominent.

Figure 3. Bole Char in Red Pine



Examples of 5 years post-burn conditions Brittle landscape Prescribed Burn (taken 3' apart)



The observations and data collected for the Huron Shores Fuels Monitoring Program is consistent with information found on Fire Effects Information System www.fs.fed.us/database/feis/. Additional questions or request for plot data should be directed to:

Brian Stearns
Huron Shores Ranger Station
5761 N. Skeel Ave.
Oscoda, MI 48750
989-739-0728 ext. 3111
bstearns@fs.fed.us

References:

Neary, Daniel G.; Ryan, Kevin C.; DeBano, Leonard F. 2005. Wildland fire in ecosystems: effects of fire on soils and water. Gen. Tech. Rep. RMRS-GTR-42-vol.4. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 250 p.

Benzie, John W. 2005. A Revised Manager's Handbook for Red Pine in the North-Central States. USDA Forest Service Gen. Tech. Rep. NC-33, 22 p. North Central Forest Experiment Station, St. Paul, MN.

James K. Brown's "Handbook for Inventorying Downed Woody Material" (GTR-INT16, 1974)

The National Park Service's "Fire Effects Monitoring Handbook." Fire Management Program Center

National Interagency Fire Center

Interagency Prescribed Fire, planning and implementation procedures reference guide. (September 2006)