



MAD Lab Report 2007-20

Old-Growth Forest Exploration in Northern Nova Scotia: French River, Nova Scotia

By

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Abstract

Because of the agricultural nature of Nova Scotia, old growth forests are becoming a rarity. The department of Environment and Labour had proposed four areas in the Cape Breton Highlands which potentially contained old growth forest, and possibly some of the oldest live trees in the province. This study concentrates on one of these sites; Little River, located in the French River Wilderness Area. Finding old growth forest is crucial for protection. It is also necessary to study climate patterns throughout history by studying the widths of the tree rings. Samples were taken at this site using standated dendrochronological methods by extracting 5.1mm cores with an increment boring tool. The age of the trees was then discovered using mainly a Velmex light microscope system, with the aid of a WinDendro™ Image analysing system. All samples taken were of Eastern Hemlock (*Tsuga canadensis*) as this is the oldest live species left in the province. This site was determined to be old-growth, and thus in need of protection and suitable for climate predictions. At least one tree was found to be over 400 years; protection of this site is crucial.

Introduction

Dendrochronological analysis was carried out on a stand of hemlocks located in the French River Wilderness Area at Little River (Figure 1). This stand was one of four studied in the Cape Breton Highlands, summer 2007., as suggested by the Nova Scotia Department of Environment and Labor. The Little River stand was chosen to extend *T.canadensis* chronologies further back into the past. licence no. RL2007-10WA

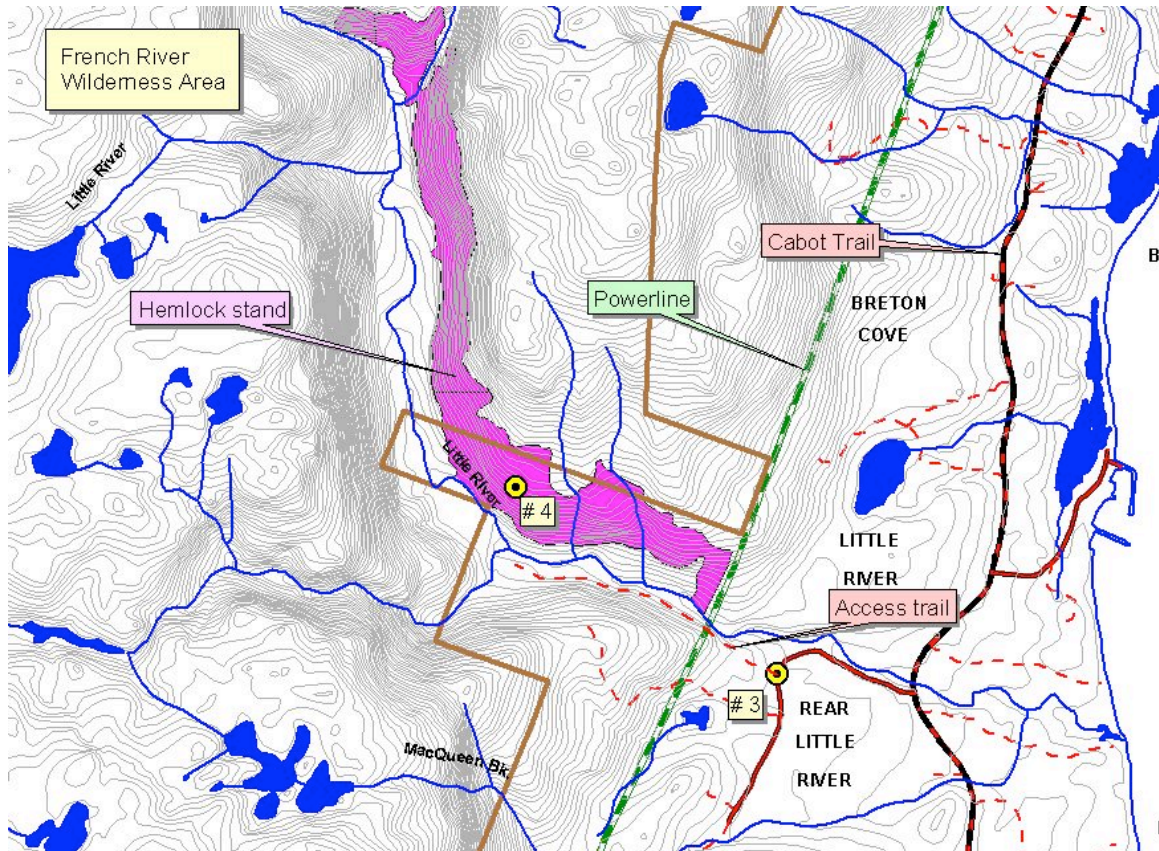


Figure 1: Detailed Map Showing the Location of the Hemlock Stand (Dave Williams, 2007)

Research Methods

40 samples were taken from the site (two cores from 20 trees) using a 5.1mm increment borer.

In the lab, samples were glued to slotted boards and then sanded to a fine grit so that rings could be clearly seen. Using both a WinDendro™ Image analyzing system (trees with larger ring widths) and a Velmex light microscope measuring system (for samples with small ring widths), the trees were both aged and ring widths were measured. Using a statistical program, COFECHA, the growth patterns were crossdated to create an average

growth pattern for the Little River hemlock stand (Table 1).

Table 1: Coordinates for the center of the hemlock stand.

Site	Easting	Northing	UTM Zone	Average Elevation (masl)
Little River	692634	5146620	20T	96

Results and Discussion

Analyzing cores from the Little River site gave chronologies which dated back to 15672. This means the oldest tree on site is currently 440 years old, while the youngest sample was found to be 102 years- still old growth. The trees at this site were on average significantly older than at the other three sites studied, with the average age being 242 years.. While 40 cores were taken initially, only 39 were used in the final analysis (Table 2). The cores must be in suitable conditions for crossdating; the core must follow the basic ring patterns of the area (some trees have been affected by insects, etc, which gives a distorted reading) and also must not be crumbled, rotten, etc. Further back in time, results are considered less accurate, as there are fewer samples at each age group. Average growth is given on the y-axis with an ARSTAN Index of 1.0.

Table 2: Data from Cores Obtained at the Little River Hemlock Stand

Seq	Series	Interval	No. Years	Corr with Master	Mean msmt	Max msmt	Std dev	Auto corr	Mean sens	
1	7AIL801a	1874	2006	133	0.742	0.95	2.15	0.418	0.77	0.271
2	7AIL801b	1905	2006	102	0.792	1.64	3.31	0.607	0.67	0.255
3	7AIL802a	1779	2003	225	0.569	0.48	1.48	0.268	0.79	0.275
4	7AIL802b	1694	2006	313	0.532	0.7	1.64	0.358	0.84	0.245
5	7AIL803a	1809	2006	198	0.594	0.84	2.39	0.453	0.81	0.282
6	7AIL803b	1773	2006	234	0.456	0.74	2.3	0.42	0.83	0.256
7	7AIL804a	1778	2006	229	0.755	1.11	3.16	0.48	0.74	0.234
8	7AIL804b	1790	2006	217	0.707	0.81	2.1	0.438	0.77	0.284
9	7AIL805a	1754	2006	253	0.636	0.84	3.58	0.595	0.84	0.277
10	7AIL805b	1708	2006	299	0.624	0.76	3.25	0.488	0.89	0.252
11	7AIL806a	1782	2006	225	0.7	0.82	2.58	0.365	0.73	0.272
12	7AIL806b	1711	2006	296	0.586	0.52	1.23	0.249	0.74	0.287
13	7AIL807a	1782	2006	225	0.604	0.75	1.94	0.374	0.78	0.276
14	7AIL807b	1807	2006	200	0.674	0.9	3.68	0.659	0.88	0.285
15	7AIL808a	1567	2006	440	0.389	0.39	1.2	0.19	0.74	0.286
16	7AIL808b	1691	2006	316	0.569	0.53	1.82	0.276	0.76	0.267
17	7AIL809a	1767	2006	240	0.492	0.61	2.65	0.443	0.86	0.306
18	7AIL809b	1730	2006	277	0.665	0.8	2.17	0.455	0.84	0.283

19	7AIL810a	1777	2006	230	0.516	0.7	1.73	0.358	0.76	0.27
20	7AIL810b	1866	2006	141	0.626	0.92	1.83	0.397	0.82	0.25
21	7AIL811a	1865	2006	142	0.621	1.41	3.11	0.562	0.76	0.228
22	7AIL811b	1835	2006	172	0.579	1.03	3.86	0.652	0.82	0.26
23	7AIL812a	1731	2006	276	0.535	0.68	1.74	0.325	0.77	0.268
24	7AIL813a	1741	2006	266	0.749	0.68	2.13	0.389	0.9	0.22
25	7AIL813b	1763	2006	244	0.693	0.55	2.35	0.415	0.94	0.236
26	7AIL814a	1731	2006	276	0.662	0.66	1.51	0.305	0.65	0.306
27	7AIL814b	1768	2006	239	0.735	0.76	1.84	0.378	0.74	0.277
28	7AIL815a	1694	2006	313	0.709	0.58	1.57	0.302	0.77	0.291
29	7AIL815b	1765	2006	242	0.649	1	2.84	0.539	0.83	0.254
30	7AIL816a	1782	2006	225	0.494	1.17	3.16	0.721	0.86	0.255
31	7AIL816b	1789	2006	218	0.649	1.24	3.57	0.648	0.85	0.242
32	7AIL817a	1806	2006	201	0.565	0.97	2.78	0.513	0.74	0.282
33	7AIL817b	1814	2006	193	0.419	0.85	3.33	0.578	0.83	0.281
34	7AIL818a	1618	2006	389	0.604	0.6	1.86	0.269	0.74	0.276
35	7AIL818b	1636	2006	371	0.604	0.66	2.81	0.445	0.83	0.278
36	7AIL819a	1831	2006	176	0.633	0.72	2.36	0.382	0.82	0.261
37	7AIL819b	1746	1999	254	0.616	0.55	1.42	0.265	0.76	0.259
38	7AIL820a	1790	2006	217	0.573	0.57	1.42	0.266	0.73	0.277
39	7AIL820b	1735	1993	259	0.095	0.77	2.16	0.379	0.79	0.253
Total	or	mean:	9466	383	0.75	3.86	0.408	0.795	0.27	3.01

Conclusion

Little River hemlock stand This site contains old growth forest, as defined by the Nova Scotia Inerim Old Forest Policy. This site contained trees that are over 300 years old, with the site record being 330. Protection of these trees as a valuable resource for both biodiversity and weather records is vital; luckily, they are currently located in a protected area. The French River hemlock stand was located in a fairly remote area; due to the age of the trees, it will be possible to expand climatic knowledge of this area into the past than ever before.