

**Mount Allison  
Dendrochronology Lab**

WOOD FROM THE GOVERNMENT HOUSE, HALIFAX, NOVA SCOTIA:  
Final report

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**Abstract**

Eighteen large eastern white pine (*Pinus strobus*) samples were salvaged from the Government House in Halifax Nova Scotia during refurbishing of the structure in winter of 2008. The group of samples covers a time span of growth from 1442 to 1802. The cut dates of the wood samples is well confirmed by the evidence surrounding the construction of the Government House, and so this 360 year old chronology that straddles the 15th to 19th centuries ends up being the more reliable chronology of white pine wood preserved to date in Atlantic Canada. Data from these samples from within the walls of Government House have produced a very valuable set of data on white pine growing environments throughout a time period when no other dendrochronological data had existed. The strength of this chronology cannot be under-valued, as it will most likely be a key piece of evidence in many dendrochronological studies for many years to come.

## Introduction

The Government House in Halifax, Nova Scotia, is a prominent architectural and cultural feature in the province (Pacey and Comiter, 1994). Constructed from 1799 to 1805, the exterior is made of stone (Figure 1), but its structure is supported by large timbers. A few years ago, extensive renovations were initiated and they are expected to last until approximately November 2009. A sample of a sizeable beam was salvaged from the renovations by Ron Jeppesen of the Nova Scotia Department of Transportation and Infrastructure Renewal who wished to have the species identified. The piece seemed to have features of Douglas-fir (*Pseudotsuga menziesii*), a tree common in western Canada but absent from the Maritimes. Additionally, because some of the rings were tight, it was difficult to count the years precisely. The sample was then given to Bruce Lohnes, Area Supervisor at the Nova Scotia Department of Natural Resources. He contacted and then passed the sample on to the Mount Allison Dendrochronology Lab (MAD Lab) which had the expertise to undergo both analyses on the sample.



Figure 1: The Government House in Halifax under renovations, January 2008.  
Photo: B.E. Phillips

## Analysis

A shard of wood was cleanly cut out from the sample with a chisel. Fragments were then cut with a razor blade on a wooden block under a dissecting microscope to expose the radial section of the wood. The best pieces were glued on a metal stub and taken to the Mount Allison Digital Microscopy Facility (<http://www.mta.ca/dmf/>) where they were prepared for viewing under a Scanning Electron Microscope (SEM). Observations of

anatomical structures revealed characteristics typical of the eastern white pine (*Pinus strobus*) (Figure 2), a common tree in Nova Scotia and considered as one of the most valuable softwood lumber species in Canada.

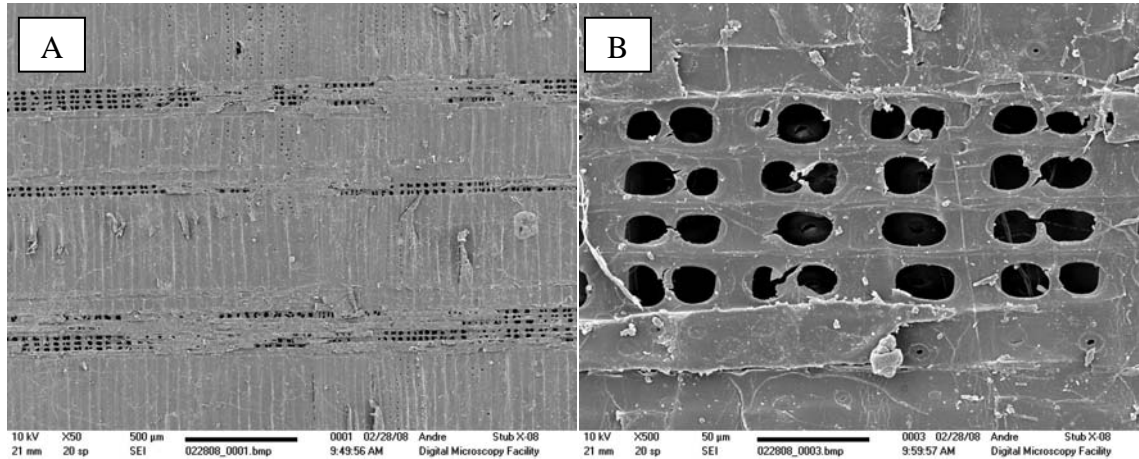


Figure 2: (A) Radial view showing rays with window-like pits, characteristic of white pine. (B) Close-up of a ray with associated pits.

After, the sample was prepared for ring counts by resurfacing it with a band saw and sanding it with increasingly finer-grade sandpaper to expose the annual rings. The rings were counted and measured under a dissecting microscope magnified up to 63 times and a total of 282 rings were found in the initial sample (Table 1). This indicated that the sample was one of the longest white pine series from a historical building encountered by the MAD Lab in the Maritimes.

Given this information, an appraisal of other wood that might be salvaged from the scrap pile on the site was done and additional sampling was conducted. In the end, 18 sound samples of white pine were able to be salvaged.

To measure each ring within these samples, we used a 24 inch movable Velmex stage connected to a digital encoder able to measure each ring in each sample to an accuracy of 1/1000 mm. Four paths were measured on the first sample and two or three on the remaining samples. This number of paths was decided on depending upon the wood condition and availability of viable paths on each individual disk. Ring-width series were produced from those measurements and a mean standardized ring-width curve was created to be compared with master chronologies from Nova Scotia. Two white pine master chronologies were available to compare: one made from a dated structure in Port Medway, western Nova Scotia (O'Neill *et al.*, 2006) and another one generated from live trees at Sporting Lake, western Nova Scotia (MAD Lab archive #06AKL400). Figure 3 illustrates the mean standardized ring-width curve of the initial Government House sample compared to the two master chronologies. The ring patterns were in

good agreement and therefore suggested that the white pine trees used to build the Government House were local.

Table 1 – Sample path numbers, start and end dates of the final crossdated chronology along with each sample’s overall correlation to the master chronology created from all sample paths. End dates represent either the year in which the samples were cut, or the final year on the edge of the construction altered sample. \* Note: all values over 0.3281 are significant above the 99<sup>th</sup> percent confidence interval.

Sample	Years	Start date	End date	Correlation to Master*
08AS000a	227	1516	1742	0.496
08AS000b	282	1517	1798	0.376
08AS000c	202	1517	1718	0.486
08AS000d	250	1517	1766	0.435
08AS001	96	1708	1803	0.377
08AS002	48	1721	1768	0.281
08AS003	122	1613	1734	0.352
08AS004	97	1668	1764	0.254
08AS005	231	1541	1771	0.262
08AS006	78	1660	1737	0.265
08AS006a	40	1751	1790	0.458
08AS007	139	1602	1740	0.362
08AS008	152	1628	1779	0.413
08AS008a	322	1481	1802	0.467
08AS008b	305	1481	1785	0.379
08AS009	131	1631	1761	0.444
08AS010	68	1700	1767	0.257
08AS011a	134	1631	1764	0.358
08AS011b	170	1632	1801	0.338
08AS012a	311	1472	1782	0.509
08AS012b	306	1473	1778	0.509
08AS013a	312	1486	1797	0.487
08AS013b	312	1486	1797	0.589
08AS014a	234	1442	1675	0.545
08AS014b	268	1442	1709	0.480
08AS015a	121	1680	1800	0.429
08AS015b	134	1667	1800	0.411
08AS017a	312	1491	1802	0.486
08AS017b	304	1491	1794	0.551
			Average	0.477

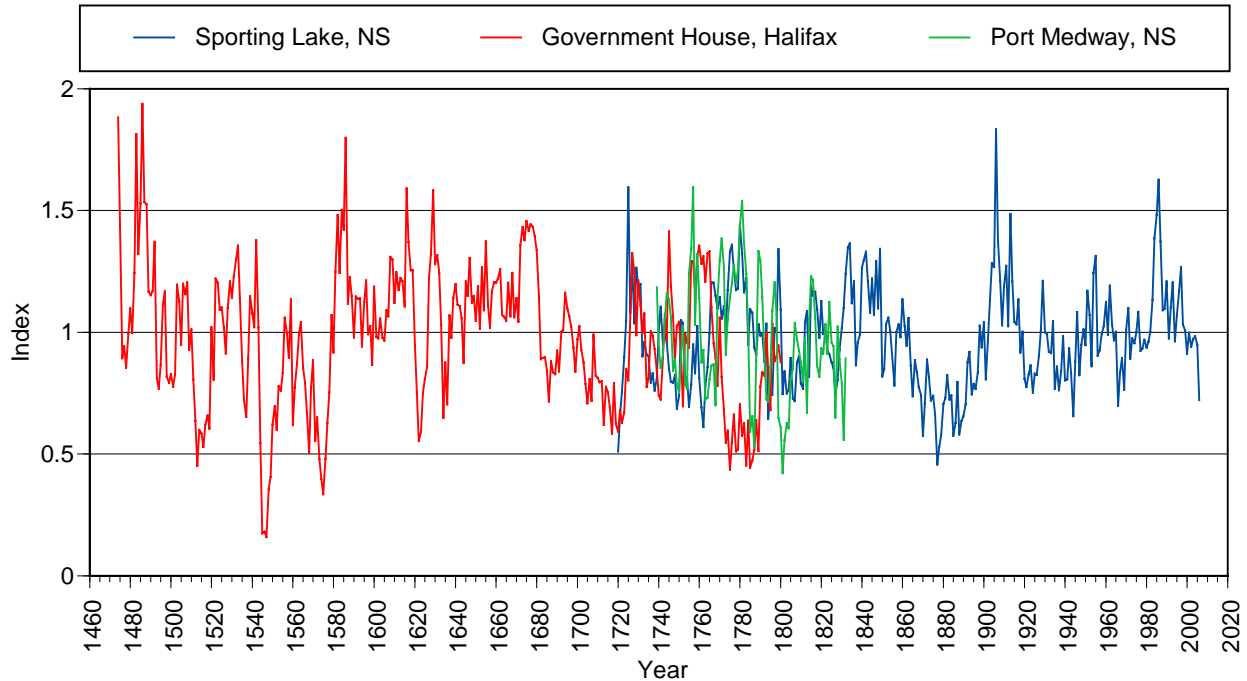


Figure 3: Mean standardized ring-width curve of the first sample from Government House (in red) compared to white pine master chronologies from Port Medway (green) and Sporting Lake (blue).

In the final analysis, 29 paths from the 18 samples were able to construct a well replicated chronology from Government House (Figure 4). The chronology spans the time frame from 1442 to 1802. The majority of the samples had end dates prior to the early 1800s, but this is understandable as many of the samples were shaped for construction purposes and the perimeter wood was lost during this process. The chronology is easily the longest and most replicated chronology of white pine from this time period in existence in Atlantic Canada. As most white pine trees from this time period were protected as “the king’s pine” no other sets of examples exist in this quantity and quality. The good fortune of having disk samples of 300 year old trees preserved and protected from the elements for the last 200 years by the people of Nova Scotia, is a dendrochronological marvel. The repercussions of this fact means that many other archeological objects that were built of white pine in early Nova Scotia, and even pre-European contact First Nation’s objects, now have a chance to be calendar dated. Studies of the past environments of Nova Scotia from 1442 to 1800 have also suddenly got a tremendous boost now that this valuable data set to the scientific community has come to light. The boundaries of potential investigation also has a geographic component that stretches as wide and far as each pine tree that was harvested and shipped around the world from the 15<sup>th</sup> to 19<sup>th</sup> centuries from the forests of Nova Scotia.

## Government House Chronology

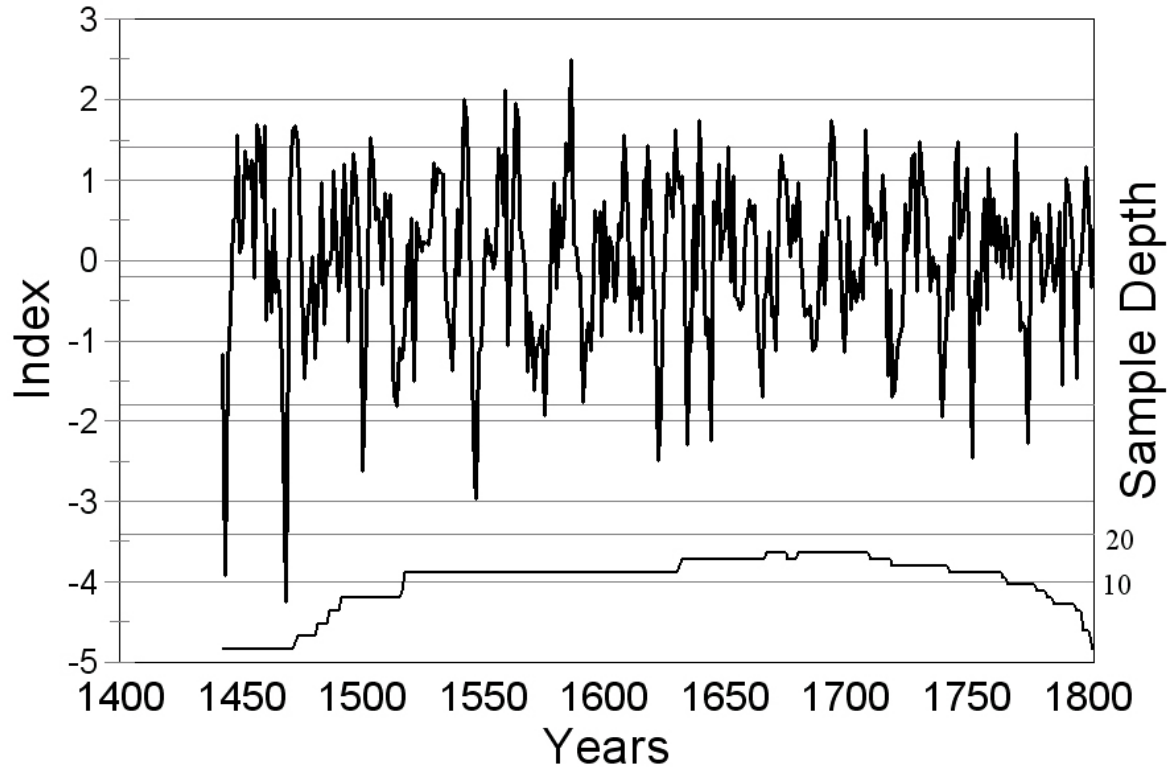


Figure 4: Pre-whitened ring-width curve of all white pine samples from the Government House.

### Conclusion

Eighteen samples of white pine from the Halifax Government House were salvaged from renovations and standard dendrochronological preparations and analysis were conducted. The group of samples covers a time span from 1442 to as late as 1802 when trees were cut during the final phases of the Government House construction. The cut dates of the wood samples is well confirmed by the evidence surrounding the construction of the Government House, but what is surprising is the age and species of wood that was used in the construction. The beam samples that were preserved within the walls of Government House have produced a very valuable set of data that will be able to be used for many years to come, on projects that have yet to be identified.

## **Bibliography**

- O'Neill, N., A. Robichaud and C.P. Laroque (2006). *A dendroarchaeological analysis of Old Meeting House, Port Medway, Nova Scotia*; MAD Lab Report 2006-33, Mount Allison University, Department of Geography, 11 pp.
- Pacey, E. and A. Comiter (1994). *Landmarks: Historical Buildings of Nova Scotia*. Nimbus Publishing, Halifax, 208pp.