

## **Dendrochronology of the Louisville Corduroy Road Logs, Louisville, NY**

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The remains of a corduroy road with no known history were found during a major reconstruction of Wilson Road (formerly Wilson Hill Road), where it runs northwest-southeast in the township of Louisville, NY, about 12km west of Massena. The corduroy road originally crossed a bog between the higher ground of Wilson Hill on the south bank of the St. Lawrence River and the higher topography to the north of Grass River. The bog was flooded nearly 50 years ago as part of the Wilson Hill State Fish and Game Management Area, with a dike and causeway constructed on top of the original road.

The road consists mainly of one layer of logs placed on two parallel “rails” of logs, except in two small areas where a second layer of logs was found below the main layer. Sections of the corduroy road were selected for archaeological excavation, under the direction of Corey McQuinn of the Hartgen Archeological Associates, Inc.; that included about 50’ of the road at 44° 55’ 06.91” N, 75° 02’ 40.77” W.

Logs were collected from the main layer, from the second layer, and from the two series of rail logs. Segments of seven logs – five from the main layer, one from the second layer, and one from a rail log – were brought to the lab by McQuinn for tree-ring dating. Several branch segments, found as part of the sandy fill in between the logs, were also brought for species identification.

### **Methods:**

2-inch cross-sections were cut from each of the seven segments at their widest diameter or where the most rings were present. One transverse surface of each sample was prepared with steel razor blades; the ring-widths were measured under a binocular microscope using a measuring table. Metadata was recorded describing the nature of each sample; e.g. its shape and size, whether it has a waxy (outer) edge with just bark removed, or whether there is an unknown number of rings cut or worn off, etc. The measured ring sequences were compared to each other by matching the patterns of ring widths over time, both visually and statistically (= “crossdating”), to find their relative positions in time. Two chronologies were built with two sets of samples that cross-dated securely; the two chronologies were compared and relatively dated to each other and then combined into one site chronology. The site chronology was compared with other calendar-dated site and regional hemlock chronologies from buildings and forests around the Louisville site, and across northeastern North America. The calendar dates of the samples’ rings and the chronology were determined by secure visual and statistical cross-dating.

**Results:**

The samples' descriptions, ring counts, and dates are listed at the end of this report. All the logs are of eastern hemlock (*Tsuga canadensis*) species with maximum diameters ranging from 0.15 to 0.32m, and ring counts of 112 to 199. The branches are of fir and spruce, indicating that the hemlock logs were probably brought in as logs, and the branches were gathered from the woods nearby.

The ring patterns of the seven hemlock logs match significantly with each other, but most closely fit in two groups: MCR-6, 7, 21, and 22; and MCR-3, 4, and 5. The two subchronologies match very well (Figure 1). Figure 2 shows the position of the logs' time series relative to each other. The outer rings of MCR-21, 3 and 5 appear to be waney edges – the same outer ring is nearly complete around the circumferences of these samples.

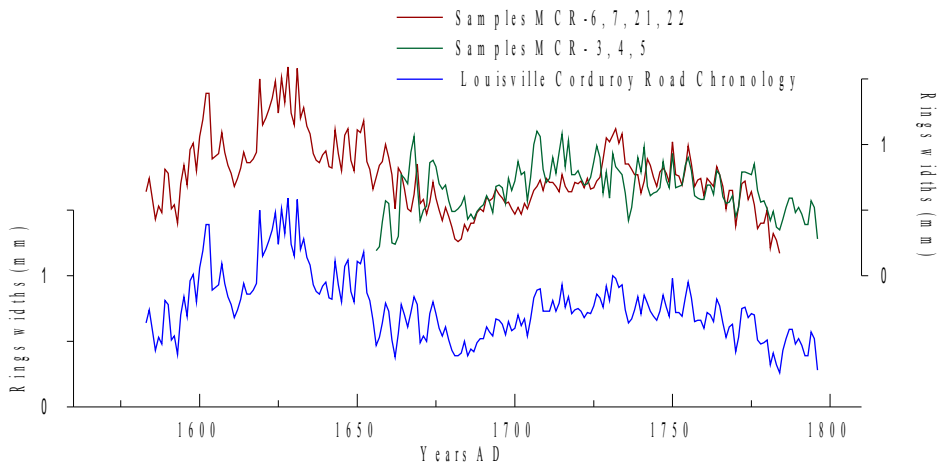


Figure 1. Shown at top are the average ring-widths of the two subchronologies; and at bottom, the Louisville Corduroy Road site chronology. The assigned AD years were determined by comparing the site chronology to other hemlock chronologies across the region (see text and Figure 3).

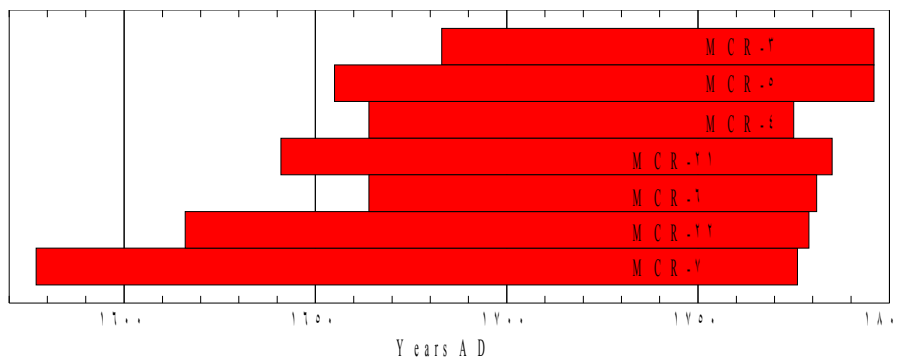


Figure 2. These are the lengths of the 7 samples' and their placement in time. Samples 3, 5, and 21 contain the waney edge (outer ring of the tree below the bark) and their end dates represent their felling date.

To place them in time, we crossdated the complete site chronology against a regional chronology built from forest hemlocks, one located north of Lake Ontario and one west of Lake George, north of Albany, NY (both found on the ITRDB website and built by ER Cook); and from our historic hemlock chronologies from buildings in Watertown, Schenectady/Albany, and along the southern shore of Lake Ontario. We also compared the site chronologies to other forest chronologies around the region from Ontario to New Hampshire and Pennsylvania. The crossdating of this chronology indicates that the road was originally constructed during the growing season of 1785, with additional logs added in late 1796 to early 1797 (Figure 3).

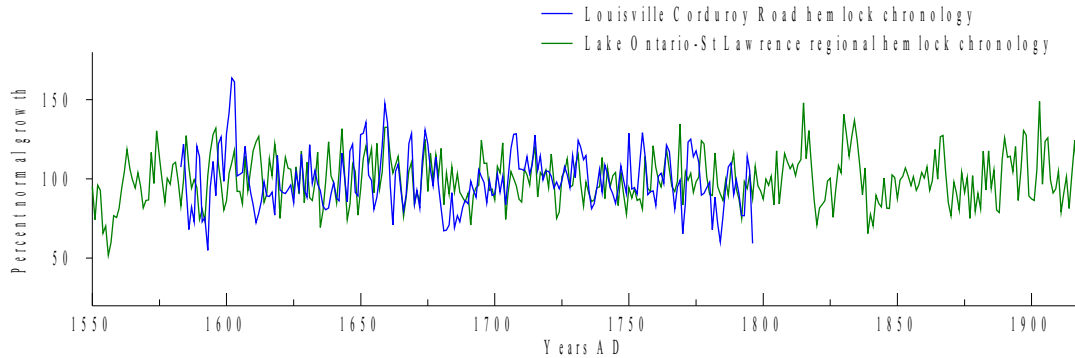


Figure 3. Here is the Louisville Corduroy Road hemlock chronology compared to the established regional hemlock chronology for the Lake Ontario & St Lawrence region. The ring-width sequences have been detrended to remove non-climatic variability, thus the Y-axis represents a percentage where “100%” is normal. Supporting statistics between the two chronologies include a 5.47 Student’s *t*-score, a 0.35 correlation coefficient, and a 62% trend coefficient; all are at or above the 95% confidence level.

I am 95% sure of these dates, not totally sure due to difficulty with matching the patterns in the Louisville Corduroy Road chronology with the other hemlock chronologies from around the region. The main reason for this is that there are very few forest hemlock chronologies available for lowland sites, and I think these trees came from not far from the site. The lowland hemlocks’ growth patterns can be very different than those of the hemlocks found on higher ground due to the effects of a changing level of groundwater. These trees may also have grown in a very local micro-climate regime with their response to the regional climate signal that is normal to this species dampened. The site chronology does crossdate well, both visually and statistically, with the chronologies from certain sites mainly in the St Lawrence / Lake Ontario basin (Figure 3), but the statistical values are not as high as is common between chronologies of upland hemlocks across larger areas. However, this chronology does not crossdate at any other dates with consistently significant values, and therefore we have a 95% level of security for these dates. This chronology will be compared with any future hemlock chronologies from across this region, and any change (less than 5% likely!) will be immediately reported.

**Possible historic contexts of the 1785 and 1796 dates:**

Immediately after the American Revolution, many people loyal to Britain were moving out of the United States into Canada: “When peace was established in 1783, many thousands of Loyalists, . . . left the newly created United States. They started their lives afresh under the British flag in Nova Scotia and in the unsettled lands above the St. Lawrence rapids and north of Lake Ontario” (from <http://www.linksnorth.com/canada-history/theunitedempire.html>). Perhaps this road was built to transport people and their belongings, getting around some of the St Lawrence rapids by boating up the Grass River that drains into the St Lawrence across from Cornwall, Ontario. Cornwall itself was settled in 1784. The corduroy road was north of a 90° turn in the Grass River, about 2.4 miles from the St Lawrence, its closest point west of Cornwall. Records indicate that over 40,000 people migrated out of the US into Canada from 1783 to 1812, although “(T)he settlement of the more inaccessible lands north and west of Lake Ontario and along the north shore of the upper St. Lawrence proceeded somewhat more slowly. About 5,000 Loyalists came to this area.” Conversely, this road could have been used to transport logs or other raw material from the northern Adirondack Mountains brought down on the Grass River to the St Lawrence without continuing all the way to Cornwall, perhaps due to the need of the lower Grass River for other transport or hydrologic power. These are just possibilities. Historic records indicate that this region of New York had started to be settled during the late 1700s, although many towns weren’t officially established until the early 1800s.

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**The Samples:**

Below are the samples, in numbered order, according to McQuinn’s list; “MCR” is the abbreviation used for our lab’s archives. The terms used in the descriptions are: p = pith present; +n = number of rings present but unmeasured before or after measured rings; vv = unknown number of rings missing from original log; v = the outer ring in the sample is close to the outer ring of the log; W = “waney edge” or outer ring of log present, only bark removed; B = bark present.

Number	Description	Absolute Dates
MCR-		
3	Whole log from road, 0.15m max diameter. N = p +1+115+1v	1683p – 1796+v
4	Whole log from road, 0.15m max diameter. N = p +112v	1664p - 1775v
5	Whole log from road, 0.20m max diameter. N = p+1+141W	1655p - 1796W
6	Whole log from road, 0.27m max diameter. p+1+162vv	1616+p- 1779vv
7	Whole log from road 0.32m max diameter. p+5+194v	1577+p- 1776v
21	Rail support of corduroy road, 0.20m max diameter, 0.14m is width of flattened side. p +143+1W	1641p – 1785+W
22	Log found under MCR-6, 0.15m max diameter. p+1+111+1vv	1664+p -1781+vv

**Louisville Corduroy Road chronology: contains MCR-3, 4, 5, 6, 7, 21, and 22.**

N= 214W 1583-1796W

**Subchronologies:**

**First construction contains MCR-6, 7, 21, and 22:**

N=202+1W 1583-1785+W

**Addition contains MCR-3, 4, and 5:**

N=141W 1656-1796W

Of the 5 branch segments contained in a bag labeled “NYPA 4047-51,” two are of spruce (*Picea* spp.) and three are of fir (*Abies balsamea*). None contain more than 20 rings.