Dr. Greg King & Michael Boyd

A Dendroarchaeological Analysis of the Robertson Spruce Lodge:

Cooking Lake, AB | February 2024

AUGUSTANA
Tree Ring Lab

Figure 1. Robertson Spruce Lodge as it appeared in 2021.

Introduction

Based on concerns regarding recent declining water levels in Cooking Lake, a study was launched to investigate historic water levels, aiming to extend records into the early 1800s, prior to European settlement. This project links natural and human history by examining and connecting information of tree rings and local history.

The Augustana Tree Ring Lab, in partnership with Strathcona County resident and local history researcher Michael Boyd, conducted tree-ring sampling at several different properties around Cooking Lake. This included sampling living trees as well as several log cabins believed to be built in the late 19th century. The goal of the project was to construct a long-term chronology of tree-ring widths from around Cooking Lake to determine if they contained valuable information about the regional environment prior to European settlement.

As a landowner and thus a stakeholder in this project, we would like to provide you with the results of our findings on your property.

Site Information

Site Name: Robertson Spruce Lodge

Contact Info: Gordon Chase

ATRL Site Code: RC

Sampling Date: Spring/Summer 2021

Latitude: 53° 24' 56.7" N

Longitude: 113° 7' 22.6” W

Species: White Spruce

Historical Context

Builder/original owner: Walter Scott Robertson

Location: 296 22106 South Cooking Lake Road

Legal Description: SW 24-51-22-W4

Dimensions (excluding additions): Length: 9.2 m Width: 5.7 m Height: 4.1 m (estimated)

Walter Scott Robertson was born in St. John, New Brunswick in 1841. He settled in Edmonton in 1883 and operated a general store. He was appointed deputy sheriff of Edmonton in 1884 and was subsequently appointed Edmonton's first sheriff when Alberta

became a province in 1905. During summers, his family, along with several others, would camp in the Beaver Hills around Cooking Lake – located only 20 miles SE of Edmonton but at that time a long day's travel. Initially they camped in tents, but at some point after acquiring land in 1890 at what is today the hamlet of South Cooking Lake, Sheriff Robertson had a house built from spruce logs, which he named Spruce Lodge. In the early 1900's Robertson owned a steam launch, "The Merrymaker" which transported passengers from the train station at North Cooking Lake to other resorts around the lake. The property was subdivided in 1917 and his children all built summer homes there. Today the Robertson family no longer own any of the properties, the last being sold in the 1990's.

According to local newspapers the "Spruce Lodge" was first mentioned in 1896. However, the date of construction for the building is a bit murky. Research from various sources has suggested multiple possible dates for the construction of Spruce Lodge including 1893, 1896 and 1898 or based on the description of a photo of Robertson and family at Spruce Lodge from Provincial Archives of Alberta (Figure 2), the early 1880s.

The original cabin is a single story, two room structure, built of round spruce logs with a stone and brick fireplace. A veranda was later added on the east side facing the lake. Wood framed additions to the west and south sides were also made sometime prior to 1922.

Figure 2. Photograph of the Robertson family at the Spruce Lodge from the Provincial Archives of Alberta

Tree-Ring Methods

Twenty-seven cores were sampled from the existing building (see Figure 1) using a combination of a standard 5.1 mm increment borer and a ⅝" dry wood drill corer. The sampling process has no negative effects on the structural integrity of the building. Logs were selected for sampling according to their integrity (the absence of rot) and the presence of bark (indicating the outside of the tree has not been removed). Samples were always taken at the larger end of the log as this would be the oldest part of the tree.

Samples were stored in envelopes or core holders and taken back to the Augustana Tree Ring Lab in Camrose for analysis. The samples were glued onto slotted mounting boards and labeled with the appropriate code to indicate site along with tree or wall and log number. The samples were sanded with progressively finer sandpaper (80 to 600 grit) in order to reveal individual tree-rings. Each core was then scanned to create a digital image which was measured on the computer. This process produced measurements indicating the annual growth rates of the individual trees to 0.001 mm (Figure 3).

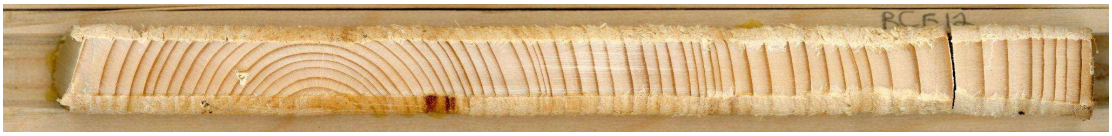

Figure 3. Example of a core sampled from a wooden cabin as part of this project.

Prior to further analysis, it was important to determine the tree species used in the construction of the cabin. Based on the presence of bark and beetle galleries as well as an examination of wood anatomy, it was confirmed that all of the samples were white spruce (*Picea glauca*).

The process of analyzing archeological data requires two steps. The first is to crossdate (pattern-match) the ring widths of the samples from the cabin to each other. A good match suggests that the materials for construction were collected from the same regional area. The second is to match cabin logs against a set of existing tree ring measurements collected by the Augustana Tree Ring Lab from living white spruce trees located on former islands around the edges of Cooking Lake that avoided major fires in the early 1900s. This

established a “master” chronology demonstrating overall tree-growth patterns through time and allows us to provide an accurate date for the cabin timbers.

Tree-Ring Results

Based on our analysis of twenty-five timbers (two were not datable), it was determined that the last complete year of growth of the trees was predominantly 1896. However, if we only consider timbers that have an intact outer edge, which allows us to know we have not lost any material, then 90% of the timbers have a last complete ring of 1896 and none have dates later than this (Figure 4). This suggests that the trees used in the construction of the cabin were cut down during the mid-late summer of 1897 and that although most trees were 60-80 years old when harvested, two trees were closer to 175 years in age.

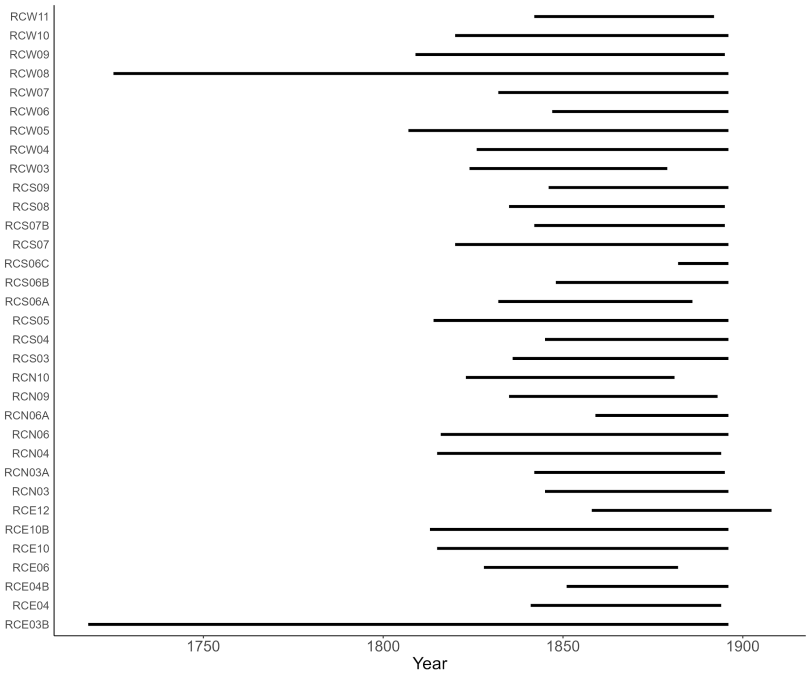

Figure 4. Segment plot showing the length of each sample from the Robertson Spruce Lodge

These results were based on our ability to show that all of the timbers from the structure contain a common signal as there appear to be several “marker” years we can use to align the cores (Figure 5). We assessed the strength of this signal by calculating an overall correlation between all of the timbers which at 0.58 is quite strong.

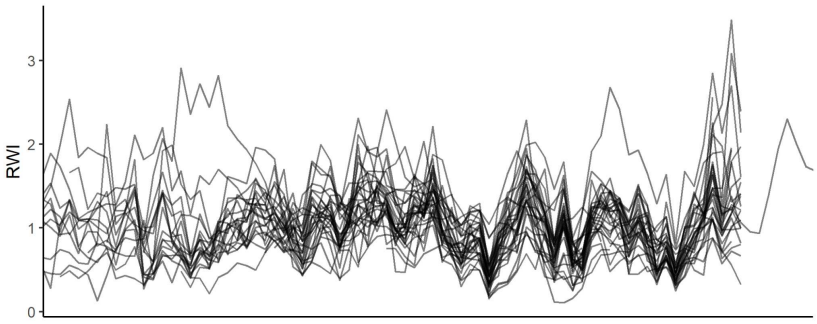

Figure 5. Plot showing a line for each sampled Spruce Lodge timber with darker lines revealing overlap between samples and a common signal.

Although we could internally crossdate the samples from the Spruce Lodge, we still needed to absolutely crossdate the rings to anchor it in time with trees that were living at the time of sampling to provide a known calendar date. We were able to collect a total of 40+ living and recently dead trees from various locations around Cooking Lake. With the living samples we were able to generate a 50+ year overlap period which we could use to anchor the cabin timbers (Figure 6). When we evaluate the statistical comparison between all of the living trees and the historic timbers, we see a very good intercorrelation between all of the series of 0.65 – this means that across the entire time period, there is a similar ring width response. This means we can confidently assign calendar dates to the Spruce Lodge timbers and know they were harvested locally.

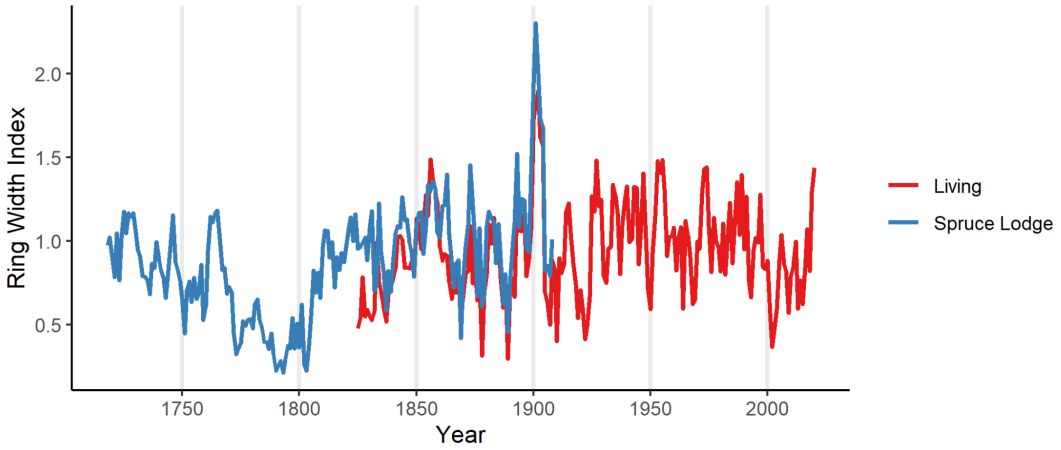

Figure 6. Overlap of the living (red) and Spruce Lodge (blue) chronologies reveals similar growth patterns, indicating that we can confidently assign calendar dates to the timbers.

Conclusions

In summary, the results yielded from this study showed that based on cores collected from twenty seven timbers from the Spruce Lodge, the wood dated to the end of the growing season of 1897. This means it was built no earlier than fall of 1897, despite what some sources may indicate. This still makes it one of the oldest remaining buildings still standing in Strathcona County. The tree ring data showed that the average age of trees harvested for cabin construction were 67 years old, while the oldest tree sampled was 176 years old with an inner ring date of 1718!

The data collected from this cabin and including that data into a longer regional master chronology are important to the local history of South Cooking Lake and could be used to support other historical research in the area. For example if other wooden structures in the region are found, it could be possible to place them in this chronology and thus determine construction dates. Furthermore, this data can be used in ongoing environmental research to learn about climatic trends in the past, enabling a better understanding about past climates and to compare these trends to the current climate.

This research was conducted at the Augustana Tree Ring Lab in Camrose, Alberta. Any questions regarding the findings of this report or follow-up questions can be directed to:

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Thank you for your permission to collect samples and participation in this study!