

Justin Serpa

Professor Wheate

GEOG 300

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Cost/Benefit Analysis of Truck Cycle Times to Local Sawmills

Research Question

This project was suggested by Colin Chisholm, assistant forest manager and guest speaker from the Aleza Lake Research Forest. His suggestion for a project was a closer look at “Truck Cycle Times to various local sawmills and cost benefit analysis”. The purpose of this project was to determine the cost effectiveness of taking lumber to various types of local sawmills based on ball-park cost and sale figures provided by Colin. He made it clear in his email that some people's entire careers are spent trying to understand these issues due to volatile markets. Taking this into consideration, this project attempts to simplify the scope of this large industry for the purpose of this project.

Study Area

The study area took place within the Aleza Lake Ecological Reserve based on the cut-block polygon that Colin provided. Three different types of local sawmills were looked at: a Canfor pulp mill located in Prince George, Dunkley lumber mill located south of Hixon and a peeler (plywood) mill in Quesnel.

Criteria

Factors that were considered were harvest costs (\$25/m³, this number is very complex and a rough estimate), round-trip travel time from Aleza Lake Ecological Reserve to a designated mill and back, including load and unload times, cost/recovery sales from the local sawmills and load size of the truck. As mentioned earlier, all of these numbers can vary in the real world.

Methods

While this study is not innately a spatial analysis type project, the use of GIS was an important factor in understanding the data visually. All of the data provided on the map was done in Microsoft Excel for simplification; however, this type of a project could have used a network analysis to determine the most efficient routes to the travel destination. This function would have factored in speed limits along the road among many other factors. I chose not to use this analysis because it is generally used for complex routing and my study area only involved one or two main highways which is not considered complex. An additional method that could have been applied to this study is looking at this from a mill owner's perspective rather than from the perspective of the lumber owner. Creating a buffer around each mill to determine how far a truck could travel from that mill before it is no longer making a profit is another example of an analysis for future projects.

Results

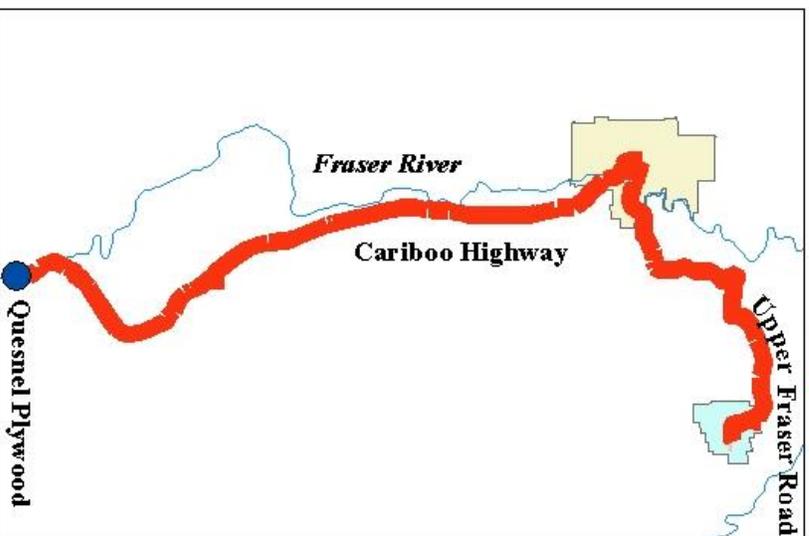
My results have been represented in three separate maps based on the type of sawmill that is being analyzed. The red “high profit” line shows that based on the factors described under criteria that a profit of \$71.00/m³ would be made from the peeler mill, despite the fact that it happens to be the furthest sawmill from the target logging area. The orange “medium profit” would make a profit of \$36.66/m³ from lumber while the pulp mill makes a measly \$1.11/m³. This demonstrates that, based on the sales/recovery costs of each product, that further travel time impacts your profit substantially. Sending lumber from Aleza Lake Ecological Reserve to the Canfor pulp mill is largely unprofitable in comparison to the other target mills. However, if this project was applied to reality, there are several factors that may alter the results. For example, a loading and unloading time of 60 minutes can be improved upon for greater efficiency, as well as unpredictable fluctuating costs and sales of products and services. Furthermore, this study used a baseline number of \$170 per hour for trucking costs. In reality, trucking costs are usually done through contracts based on cubic meters of product and travel distance or tonnage of each load. For simplification purposes, I chose to use a per hour basis for my data.

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● Plywood Mill
 High Profit

● Lumber Mill
 Medium Profit

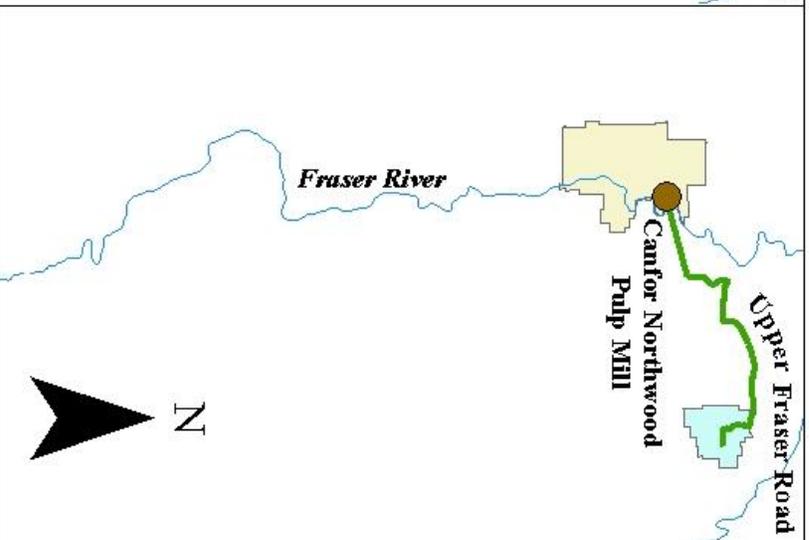
● Pulp Mill
 Low Profit



Plywood Sales: \$130/m³
Total Cost: \$59.00/m³
Travel Time: 300 minutes
Total Profit: \$71.00/m³



Lumber Sales: \$90.00/m³
Total Cost: \$53.33/m³
Travel Time: 240 minutes
Total Profit: \$36.66/m³



Pulp Sales: \$45.00/m³
Total Cost: \$43.88/m³
Travel Time: 140 minutes
Total Profit: \$1.11/m³

