Weyerhaeuser Grande Prairie
FMA LiDAR Project and AFRIDS


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“It is increasingly becoming challenging to execute our operational plans and meet forecasted deliveries. Some examples of these challenges are extreme weather changes, truck driver shortages, timing constraints such as ungulate zone, swan, etc., oil and gas projects affecting our plans, and decreasing summer ground options. We need to make sure we have the right resources, at the right place, at the right time and be able to change plans quickly to deal with the Mountain Pine Beetle and warm winter conditions.”

Nathan Lakusta and Vashti Dunham, Weyerhaeuser
Goal

- To gain a better understanding of FMA Fiber in the 5-10 year planning horizon.

Objectives and Targets

<table>
<thead>
<tr>
<th>Information Product</th>
<th>Objective</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume</td>
<td>Improve volume forecast on a m³/ha basis</td>
<td>Accuracy within 10%</td>
</tr>
<tr>
<td>Tree Heights</td>
<td>Improve Tree height estimates and create tree height model</td>
<td>Accuracy within 1.5m</td>
</tr>
<tr>
<td>Wood Size</td>
<td>Improve wood size estimates and create wood size model</td>
<td>Undefined, but best possible given available data</td>
</tr>
</tbody>
</table>
Secondary Drivers

• Better understanding of volume logistics.
  – Summer vs. winter volumes
  – Volume in areas with timing constraints (e.g., ungulate, swan buffers, etc.)

• To gain a better understanding of Sawlog/Pulp splits.

• Ability to use outputs to help set contractor rates.
  – Potential to use diameter distribution to help set harvest rates. Currently the slope class model is being used to help establish harvest rates

• More accurate volumes estimates could have positive impacts on TDA revenue and could also support AAC calculations.

• Potential for biomass analysis.
  – Further statistical modeling could improve biomass volume estimates, which could support green energy projects
Project Challenges

- PSP locations were not as accurate as initially believed.
- Difficult to measure accuracy of diameter distribution. Need to run entire block through the mill in isolated trial. This has yet to be done.
- The LiDAR data acquired were flown over multiple years adding to the complexity of the modelling.
- Large datasets need to be compiled, understood, and transferred.
## Results (1)

<table>
<thead>
<tr>
<th>Information Product</th>
<th>Objective</th>
<th>Target</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume</td>
<td>Improve volume forecast on a m³/ha basis</td>
<td>Accuracy within 10%</td>
<td>Volume forecasts are more accurate than AVI. Based on 10 blocks of varying size 5/10 blocks were within 10% accuracy, 2 of which were under 1%. In another operating area the lidar volume estimates were within 30%, the model may need to be modified to account for steep slopes, growth, and marginal stands.</td>
</tr>
<tr>
<td>Tree Heights</td>
<td>Improve Tree height estimates and create tree height model</td>
<td>Accuracy within 1.5m</td>
<td>The tree height model is complete and preliminary data suggest it is far more accurate than current heights.</td>
</tr>
</tbody>
</table>
### Results (2)

<table>
<thead>
<tr>
<th>Information Product</th>
<th>Objective</th>
<th>Target</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wood Size</td>
<td>Improve wood size estimates and create wood size model</td>
<td>Undefined, but best possible given available data</td>
<td>Diameter distribution model complete, results yet to be tested.</td>
</tr>
</tbody>
</table>

*Weyerhaeuser is in the early stages of assessing the accuracy of the target measures. However, initial results are promising considering the poorly geo-referenced PSP location and age of the LiDAR data.*
AFRIDS Demo

AFRIDS is a web-based GIS decision support tool developed and owned by Lim Geomatics Inc.

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What’s Next?

• Compare all blocks harvested this year to LiDAR forecasted data, accounting for retention and crossing volume.

• Compare processor data to LiDAR and to AVI data to understand outages and improve forecasting.

• A four year plan is in place to improve the accuracy of the PSP locations used in this project.

• Adjust or “tweak” model to improve predictions on steep ground and marginal stands.
Lessons Learned

• LiDAR derivative products, such as slope class, enhanced contour lines, bare earth, and wet area mapping have been very beneficial to Weyerhaeuser’s planning process.
• Volume predictions for pure stands are more accurate than mixedwood stands.
Questions?

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