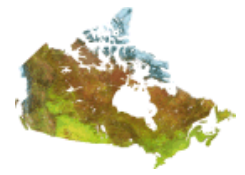


A Forest Sector Transportation Model of the Canadian Prairie Provinces

Brian Peter and Kurt Niquidet
Industry, Trade & Economics Program
Canadian Forest Service, Pacific Forestry Centre

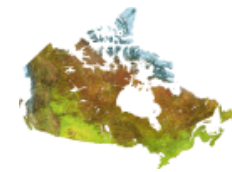




Outline:

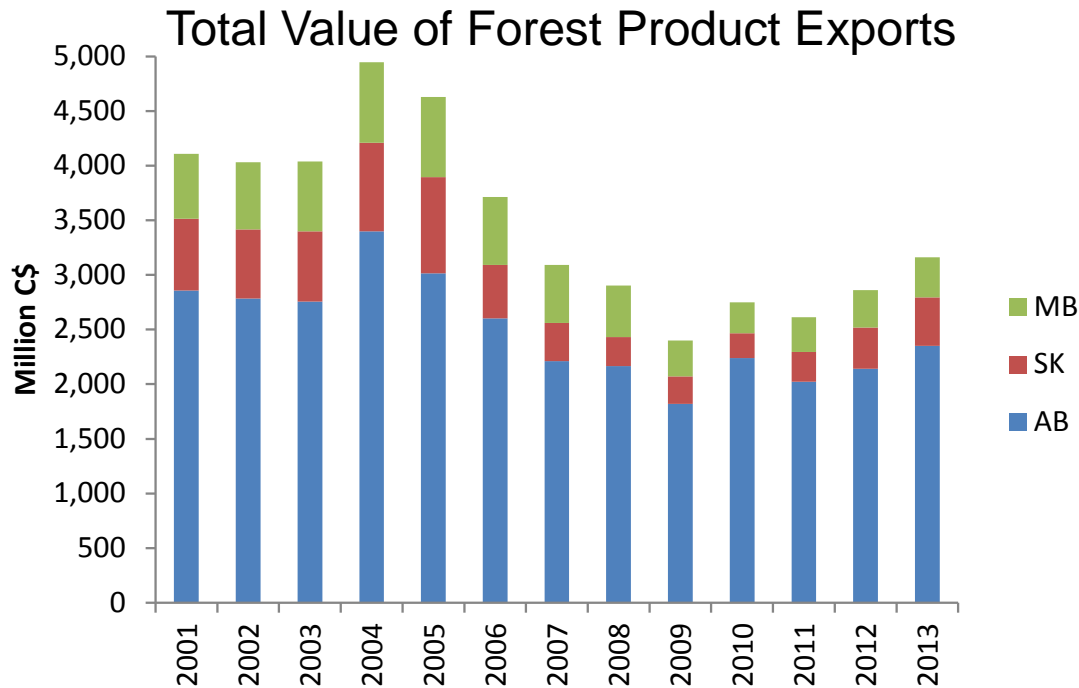
1. Prairie forest sector overview
2. Model structure
3. Some preliminary results
4. Going forward...

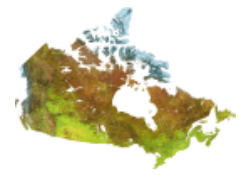




Prairie Forest Sector Overview:

The sector directly employs an estimated 23,000 people, and exports over C\$3 billion in products.

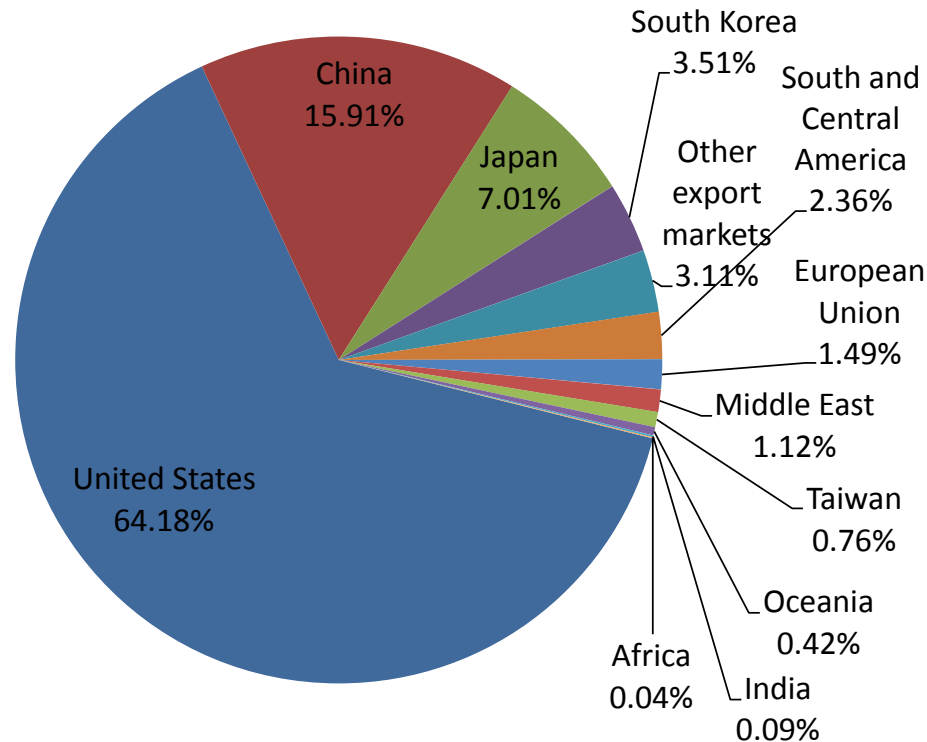


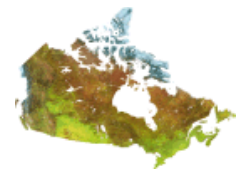


Prairie Forest Sector Overview:

Reliance on the US market is high although markets in Asia are also significant.

Forest Product Export Markets (2013) for AB,SK,MB



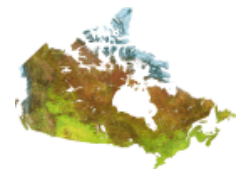


Prairie Forest Sector Overview:

Some critical factors going forward include:

- Forest product markets (i.e. US housing market, Asia demand, ongoing declines in newsprint)
- Potential for new products and innovations to contribute to forest sector transformation
- Timber supply risks from natural disturbances



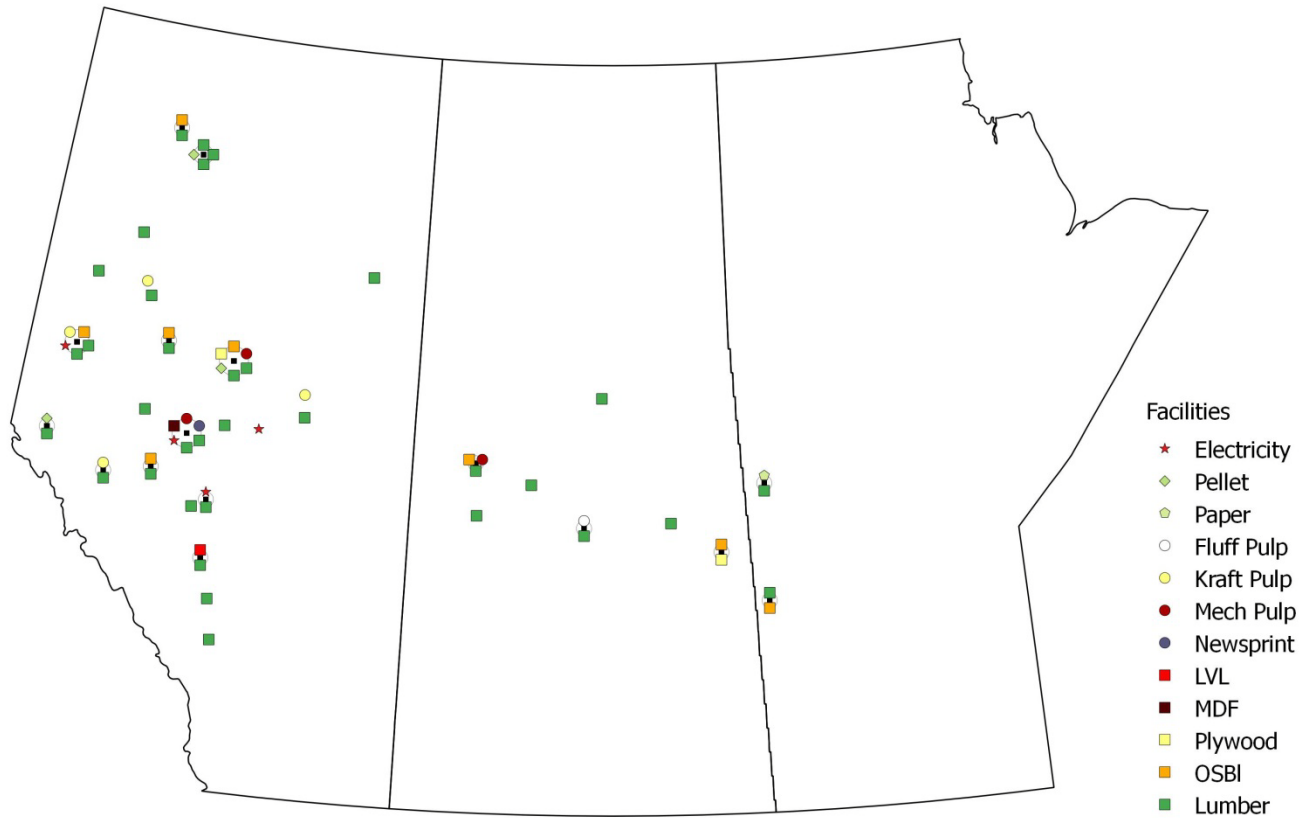
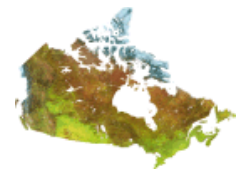


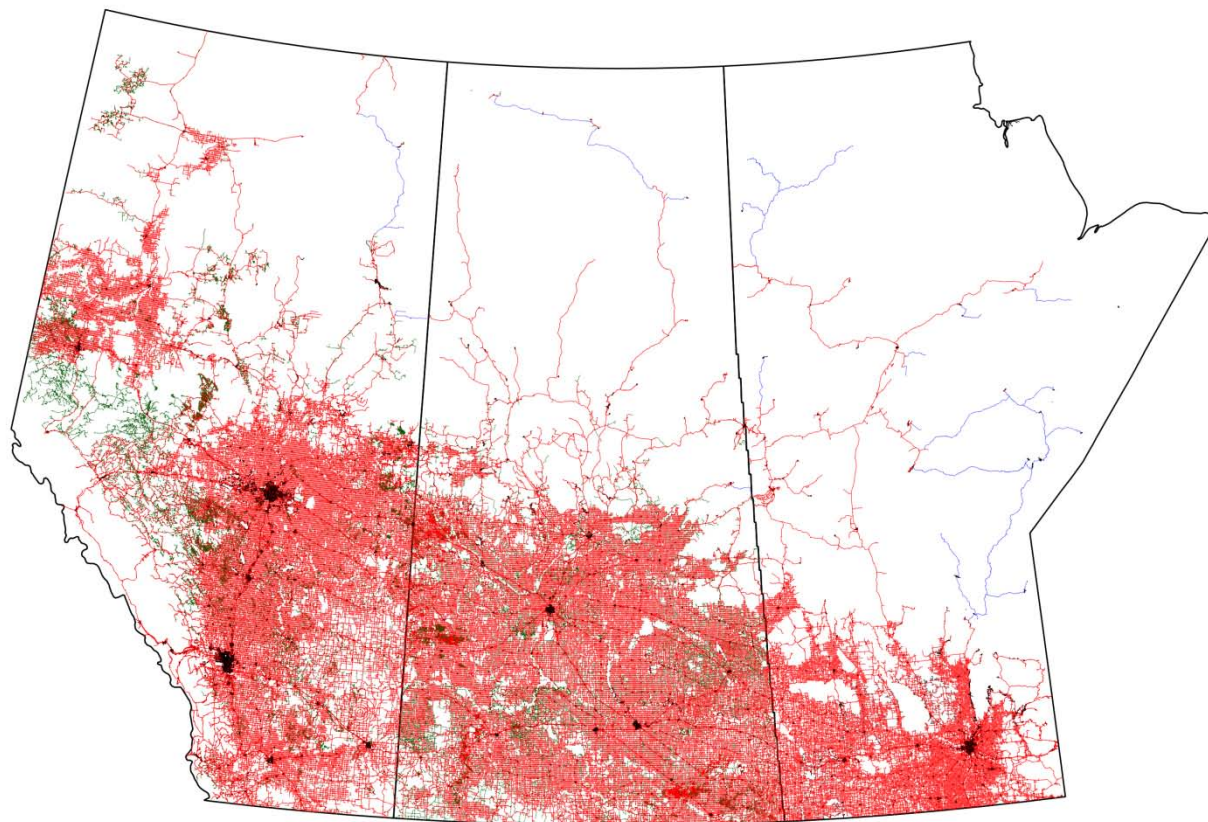
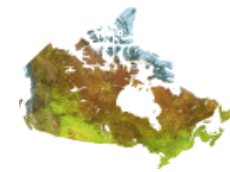
BOTTOM LINE: THE FOREST SECTOR IS CHANGING!

Objectives:

- Create a model that can be used to illustrate sector-level impacts of changes to processing capacity, fibre supply, markets and forest policy.
- Take the lessons learned in our BC and Alberta models, and design a useful yet practical model that can be easily updated and expanded to other provinces.
- Use GIS to obtain spatial parameters and better illustrate results.









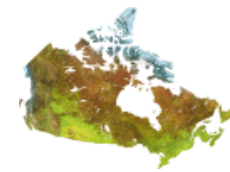
What the model does (objective function):

Optimize the transport of wood fibre (timber and residual co-products) to available processing facilities so that total sector profit is maximized.

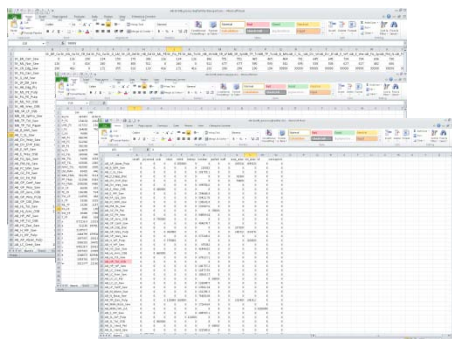
Given:

- ✦ end-product prices,
- ✦ costs to harvest and transport logs
- ✦ costs to transport co-products
- ✦ product and residual co-product recovery factors
- ✦ processing capacity of each facility
- ✦ annual allowable cut in each fibre supply area

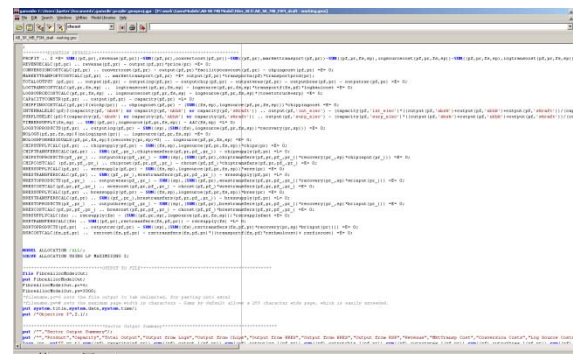




Spreadsheets

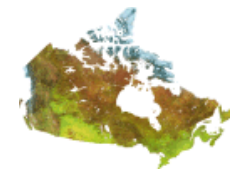


GAMS Code

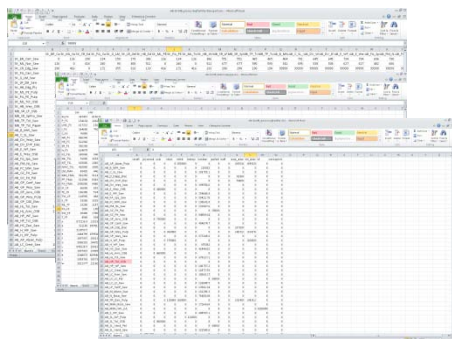


MINOS (5.1) Solver

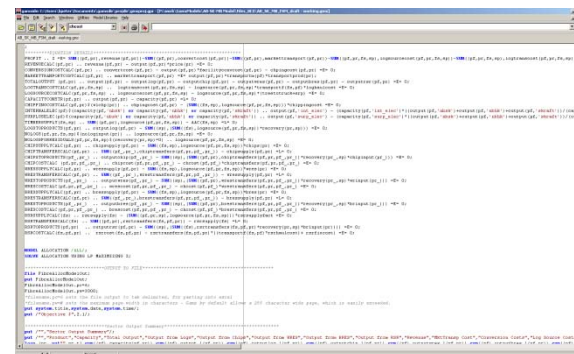




Spreadsheets

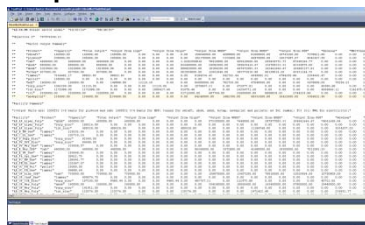


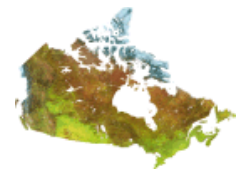
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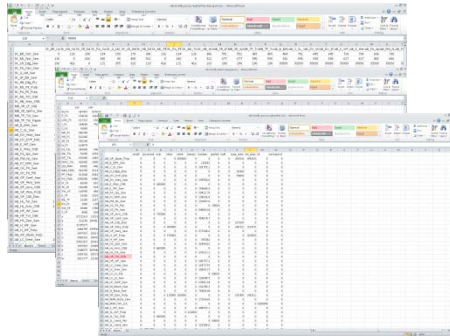
MINOS (5.1) Solver

Output files

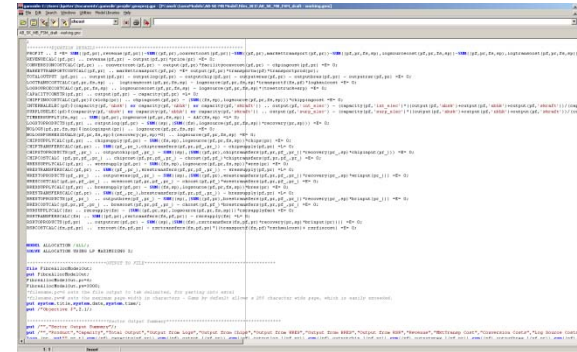




Spreadsheets

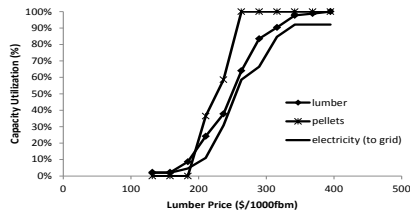


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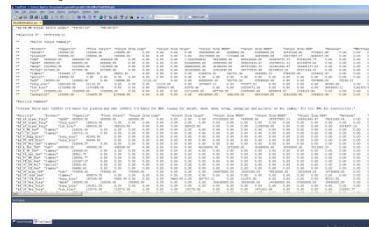


MINOS (5.1) Solver

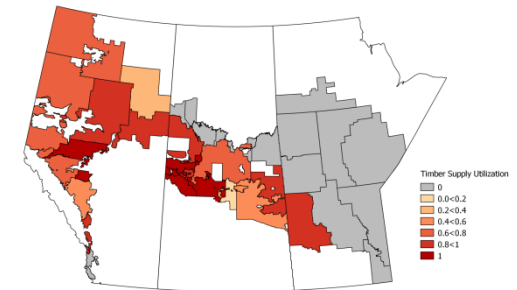
Spreadsheets / Graphs

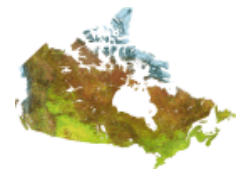


Output files



GIS Maps

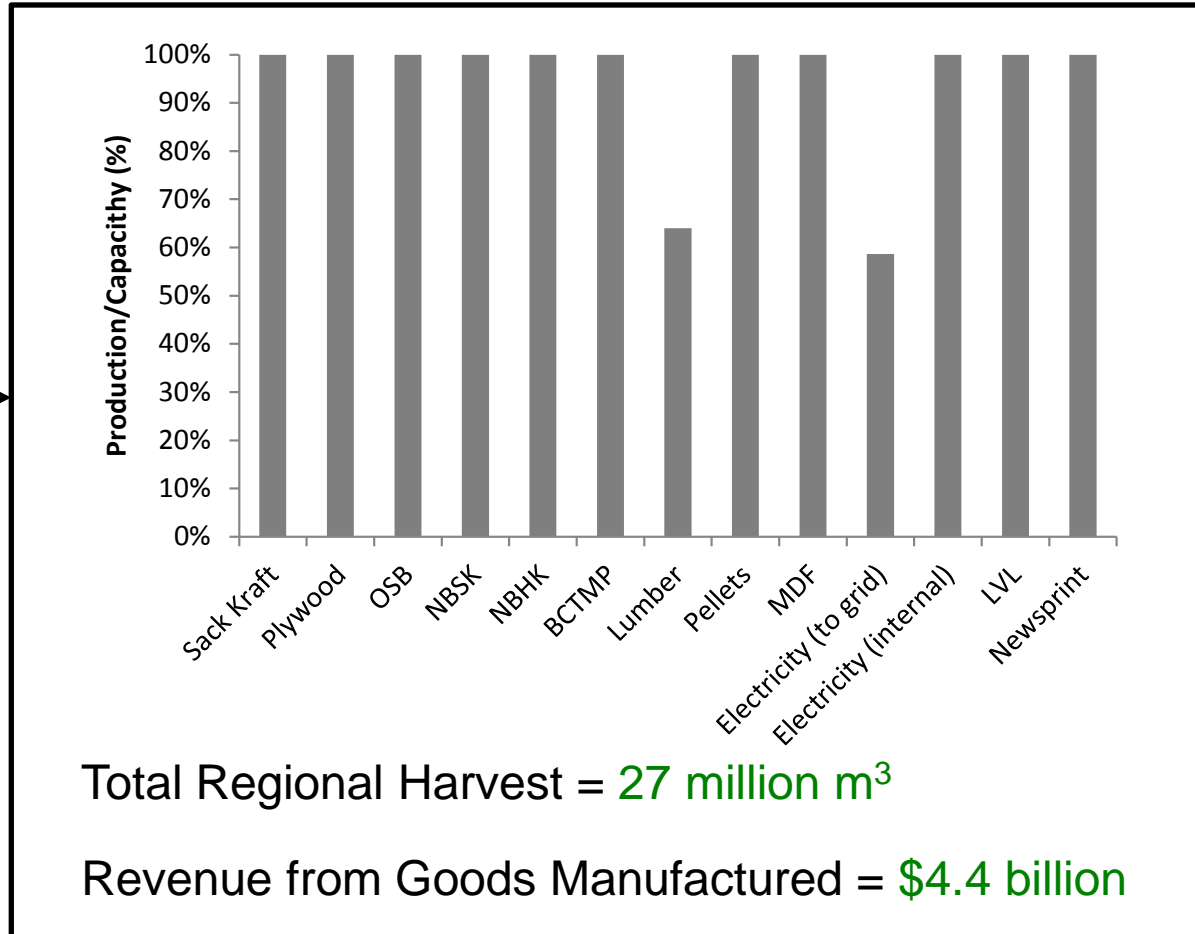


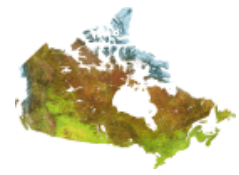


Some Preliminary Results:

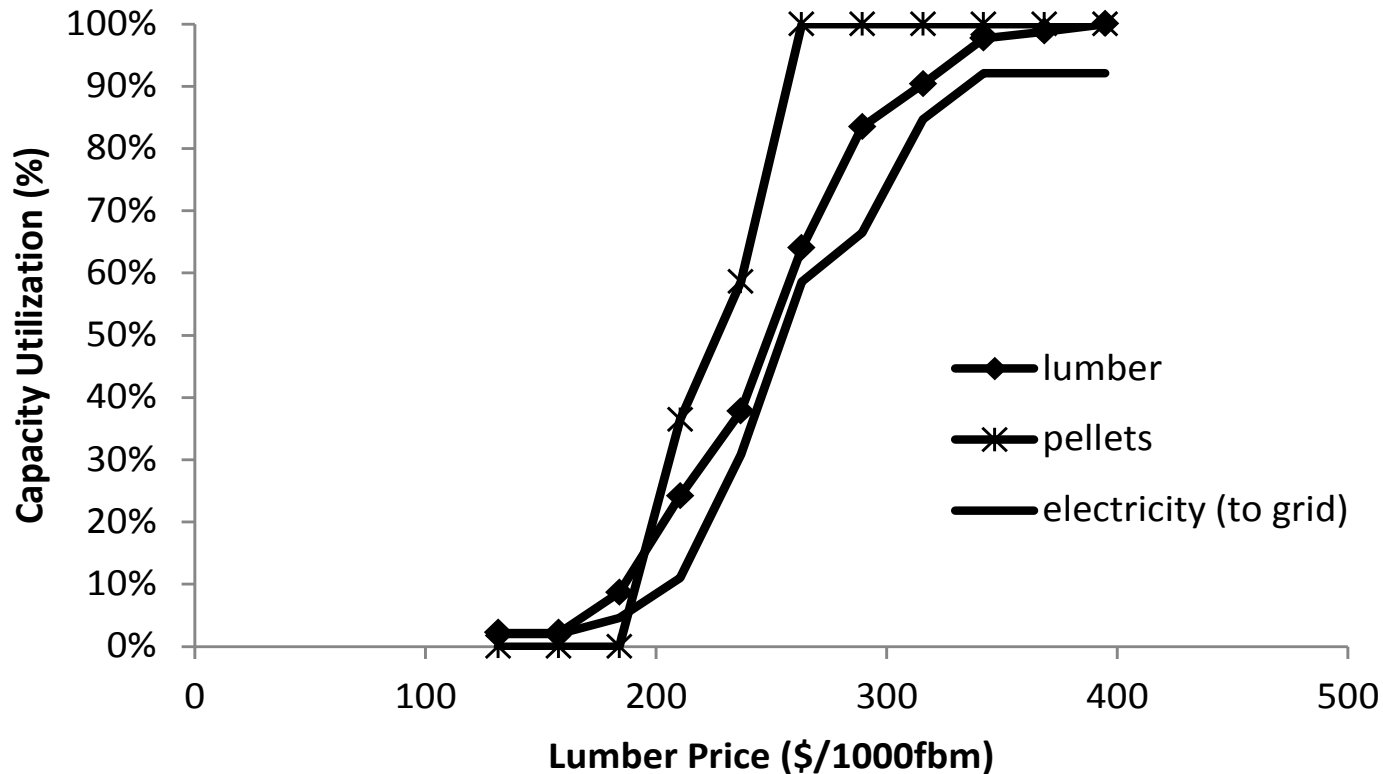
2010 Prices

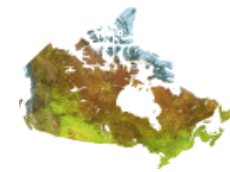
sack kraft	US\$/t	\$ 965.00
plywood	C\$/MSF	\$ 335.00
osb	US\$/MSF	\$ 212.30
nbsk	US\$/t	\$ 955.00
nbhk	US\$/t	\$ 856.00
bctmp	US\$/t	\$ 642.00
lumber	US\$/MBF	\$ 255.14
pellets	US\$/t	\$ 99.14
mdf	US\$/MSF	\$ 522.54
electricity	C\$/MWh	\$ 50.95
lvl	US\$/CF	\$ 15.70
newsprint	US\$/t	\$ 606.00





Some Preliminary Results:

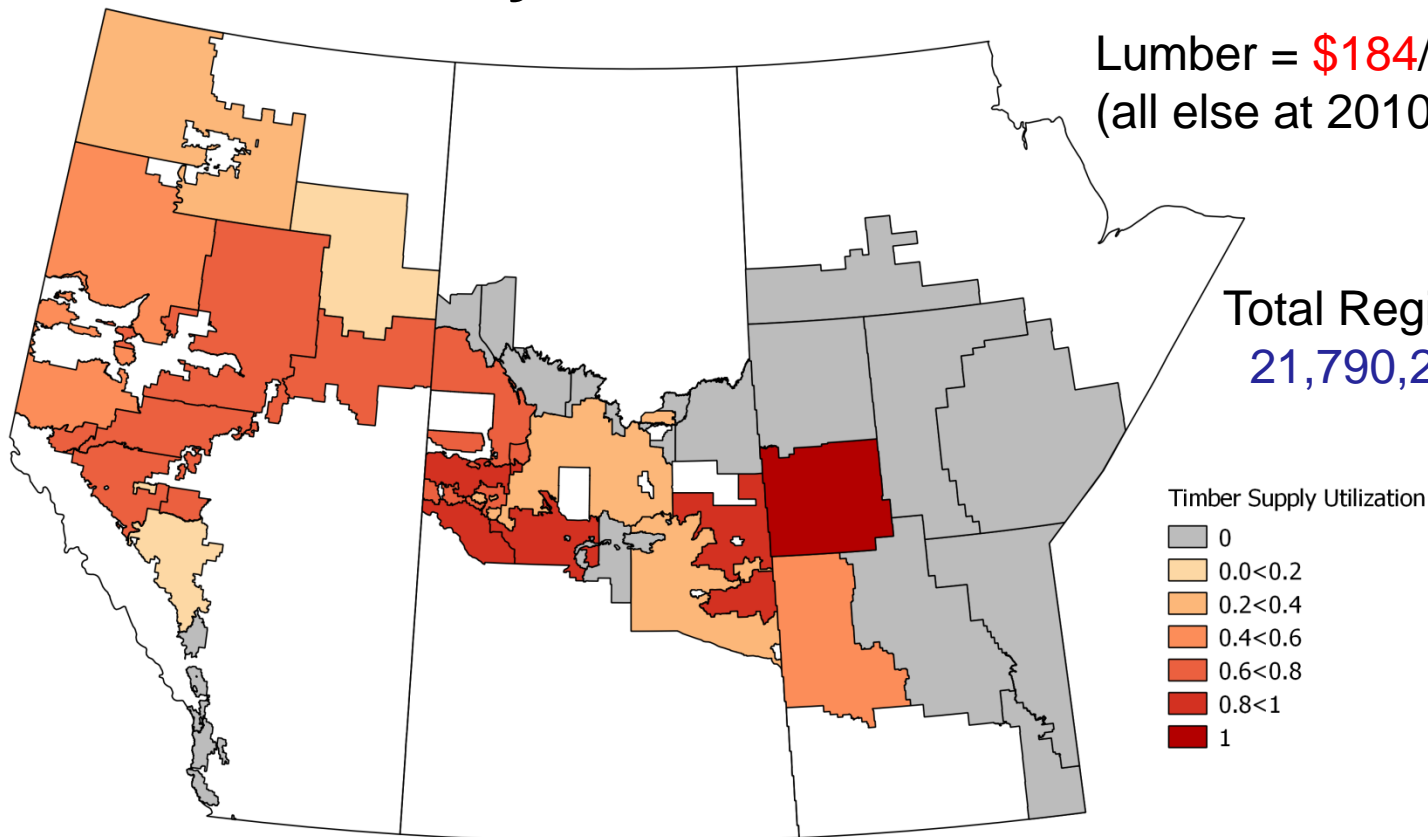


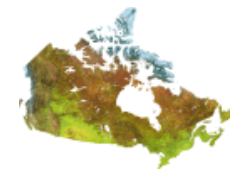


Some Preliminary Results:

Lumber = **\$184**/1000fbm
(all else at 2010 prices)

Total Regional Harvest =
21,790,220 m³

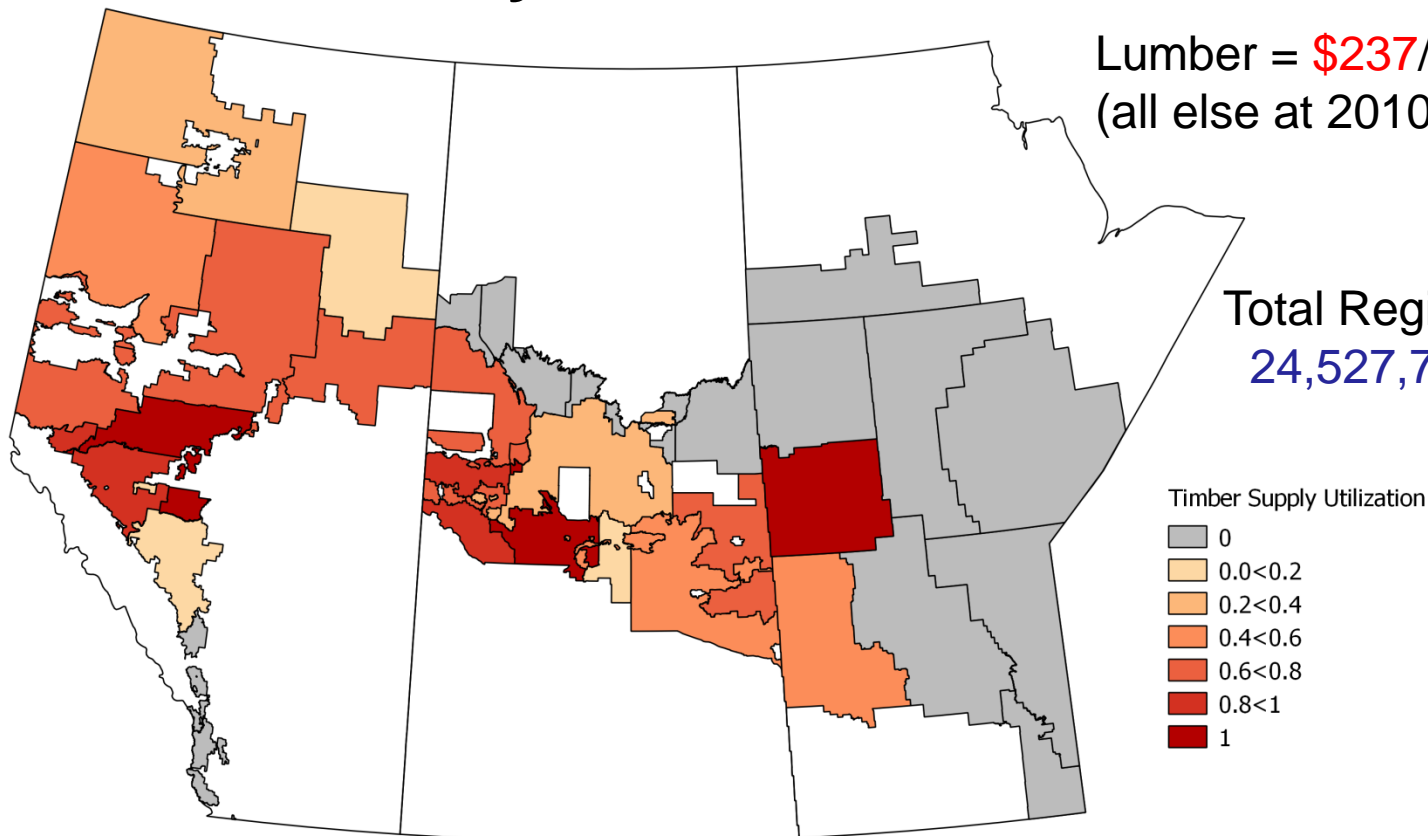


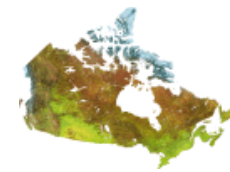


Some Preliminary Results:

Lumber = **\$237**/1000fbm
(all else at 2010 prices)

Total Regional Harvest =
24,527,722 m³

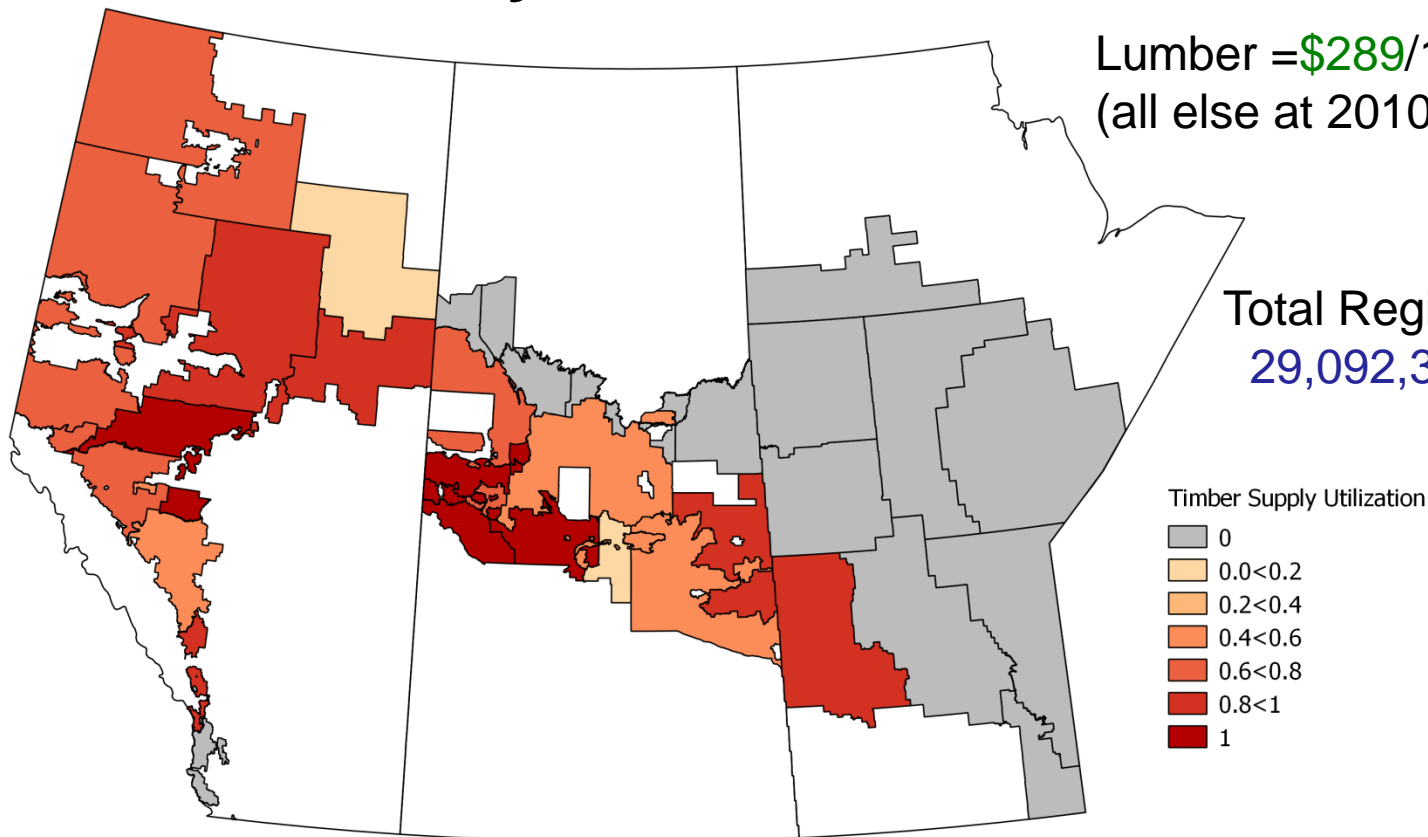


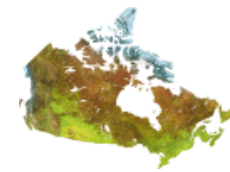


Some Preliminary Results:

Lumber = **\$289**/1000fbm
(all else at 2010 prices)

Total Regional Harvest =
29,092,326 m³

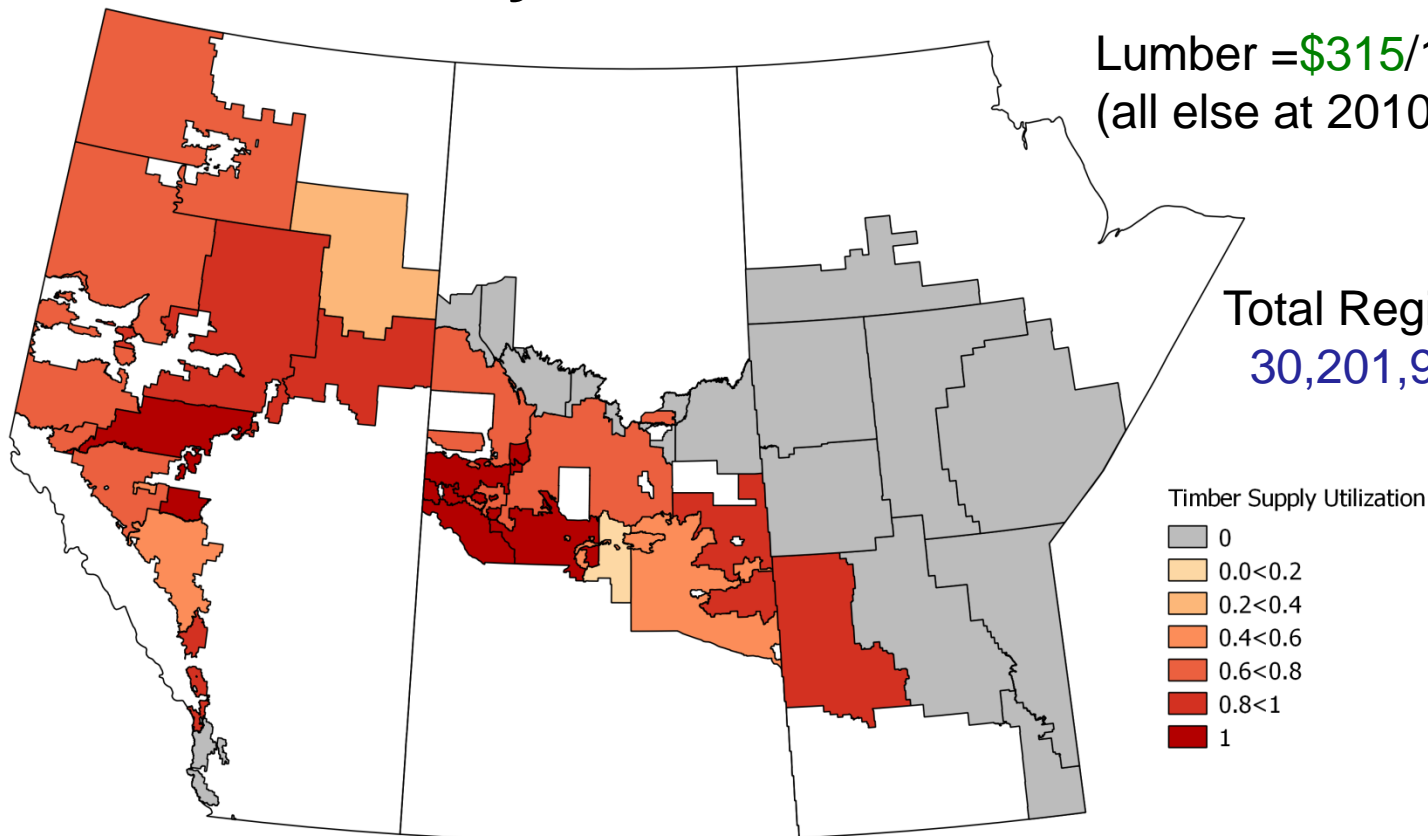


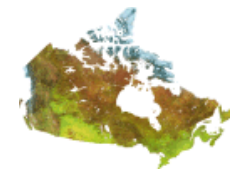


Some Preliminary Results:

Lumber = **\$315**/1000fbm
(all else at 2010 prices)

Total Regional Harvest =
30,201,901 m³

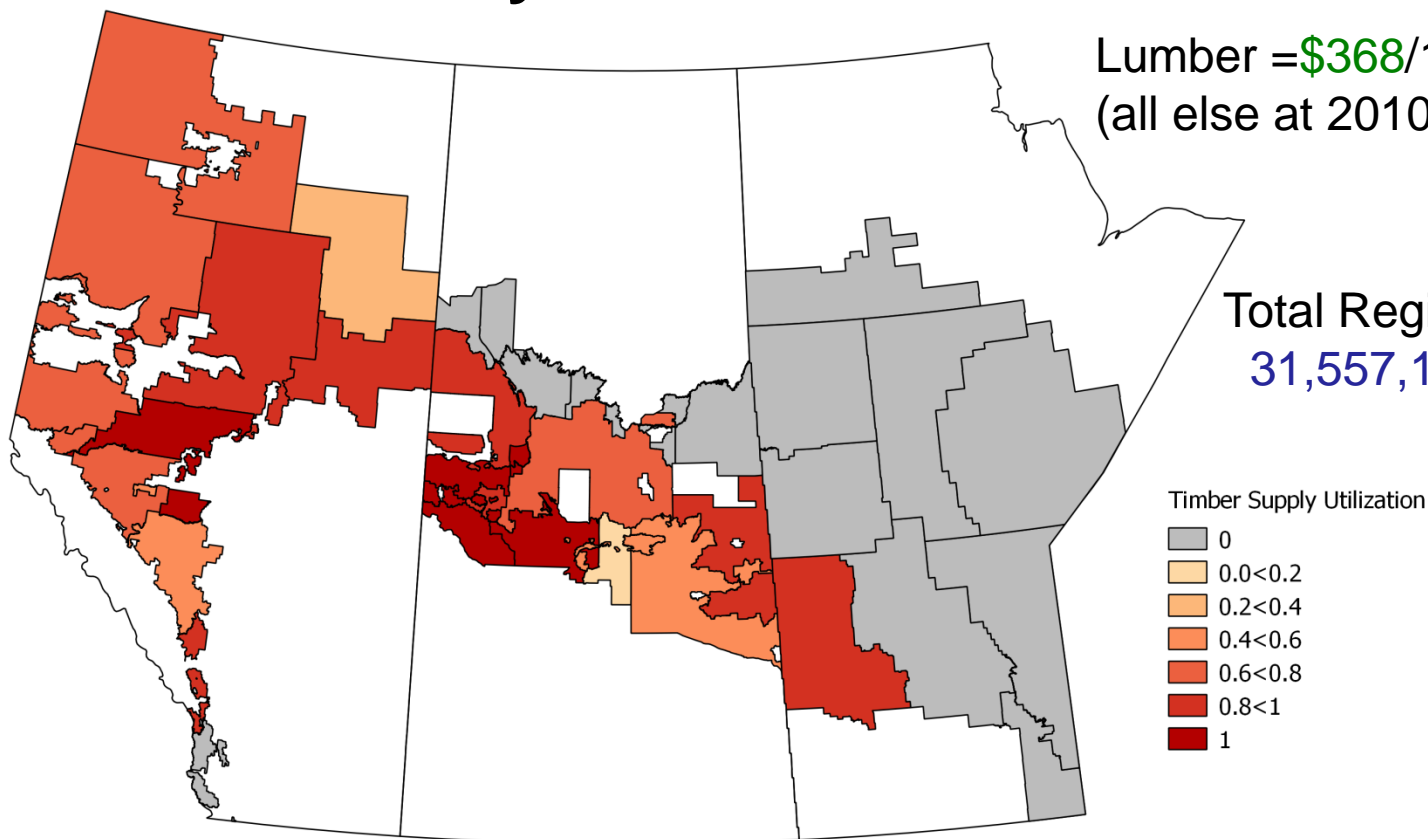


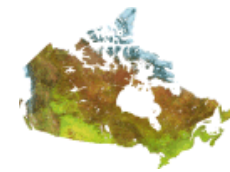


Some Preliminary Results:

Lumber = **\$368**/1000fbm
(all else at 2010 prices)

Total Regional Harvest =
31,557,137 m³

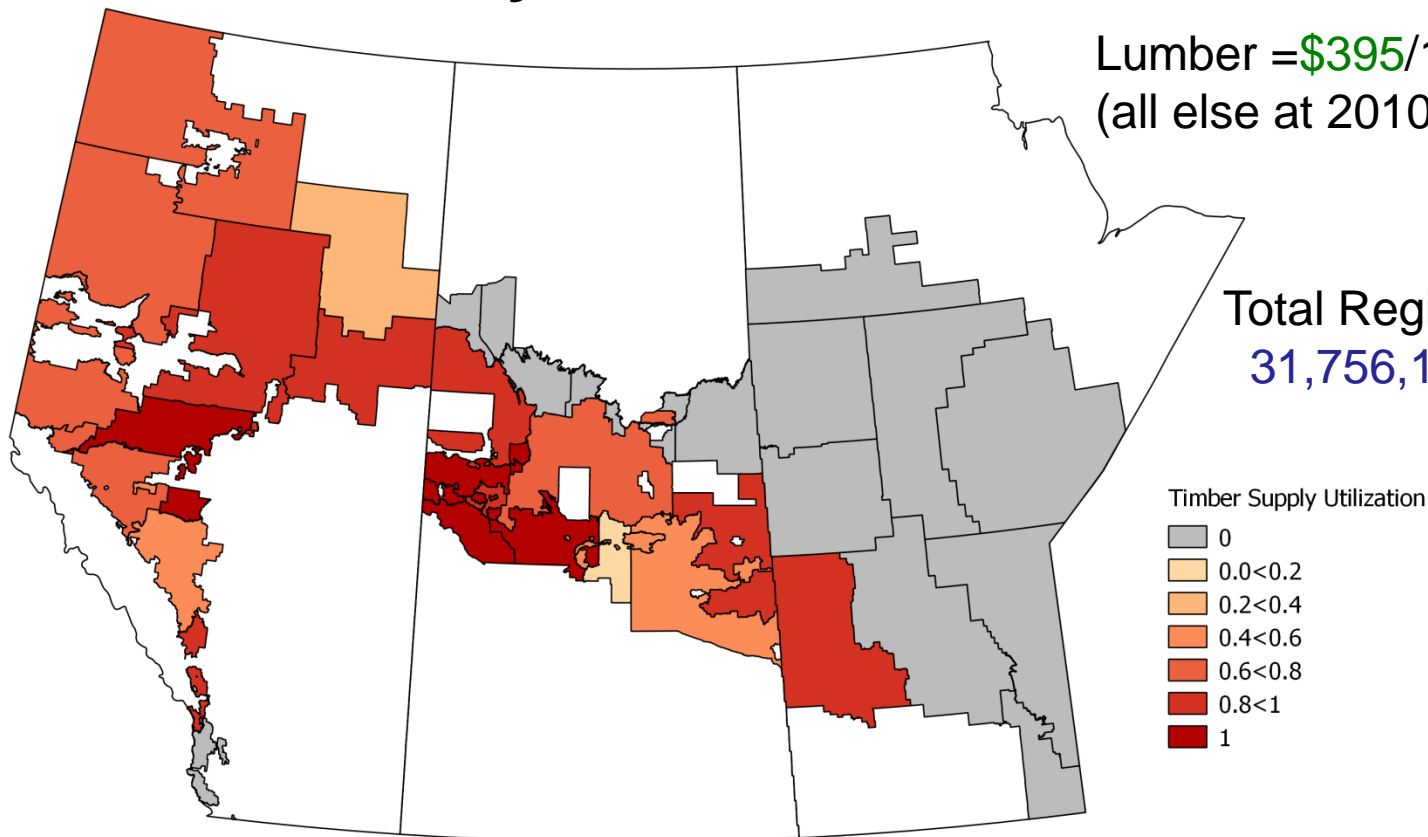


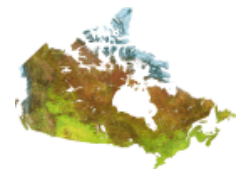


Some Preliminary Results:

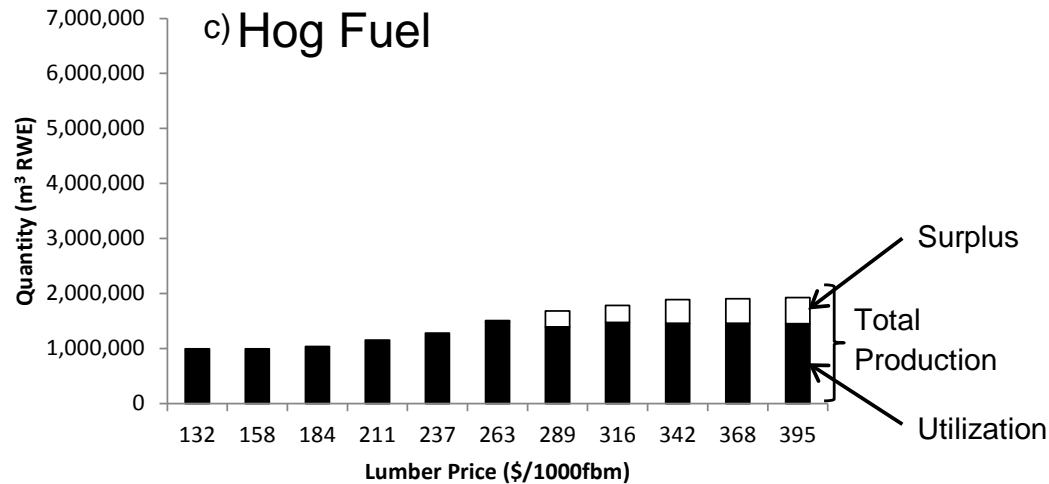
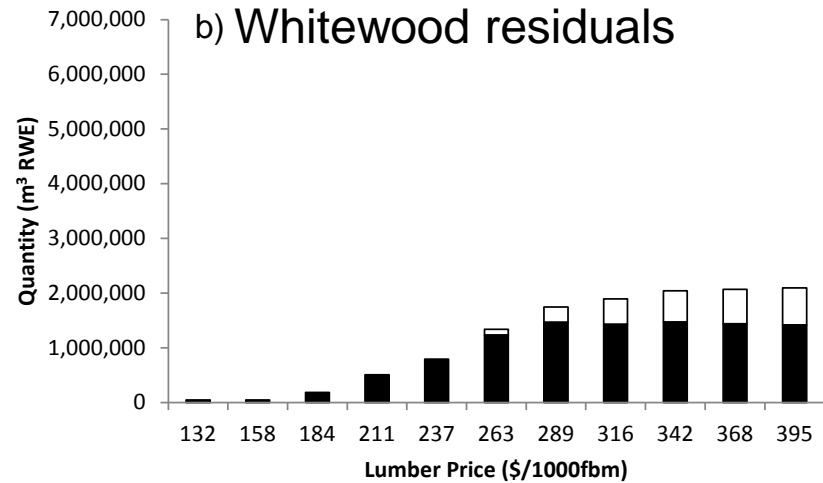
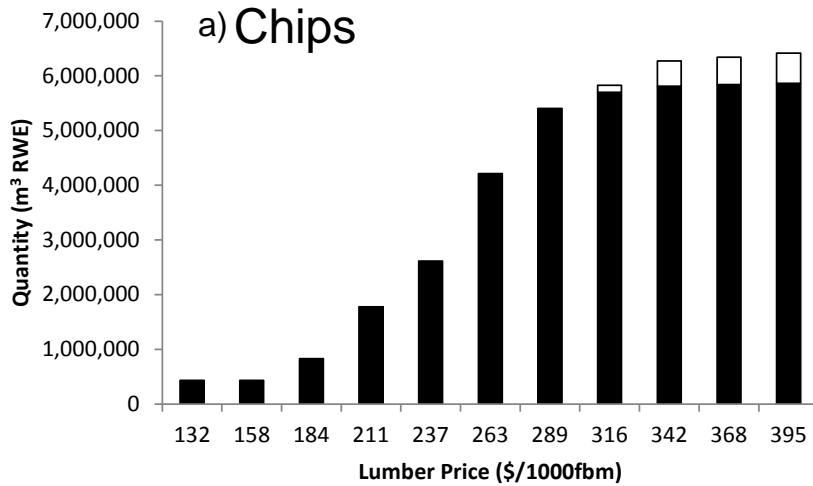
Lumber = **\$395**/1000fbm
(all else at 2010 prices)

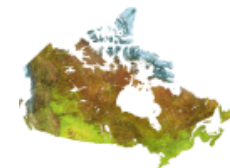
Total Regional Harvest =
31,756,128 m³





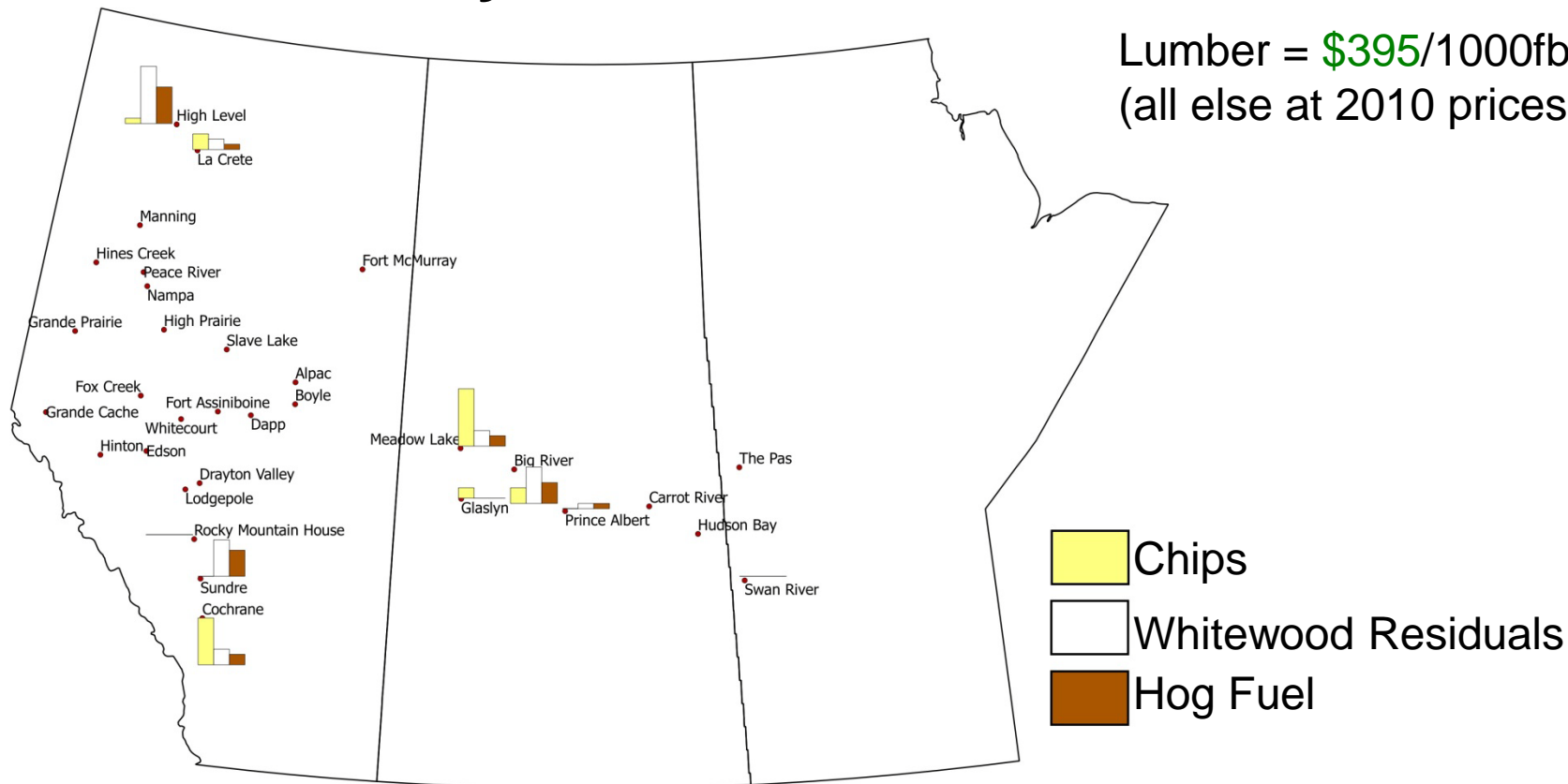
Some Preliminary Results:

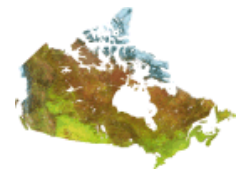




Some Preliminary Results:

Lumber = **\$395/1000fbm**
 (all else at 2010 prices)





Going forward, we expect to use the model to examine:

- ✦ Changes to manufacturing capacity
 - e.g., shut-downs, start-ups, bioenergy
- ✦ Changes to fibre supply
 - e.g. pests, fire, climate change, roadside residuals
- ✦ Changes to policy
 - e.g. transportation restrictions
- ✦ Research questions
 - e.g. better ways to model facility shutdowns/startups
- ✦ Helpful for maintaining our understanding of the sector

