



Forest Co-Op
Fibre Optimization Project @ *Squeezing Value from Trees*

November 1, 2011

Craig Robinson, RPF, ArborData Consulting Ltd.

ArborData consulting Ltd. data... easy

Technical Team and Partners



Canadian Wood Fibre Centre
 Working together to optimize wood fibre value – creating forest sector solutions with FPInnovations



David Archibald (Confederation College)

Dianne Miller (Forest Co-op)

Janet Lane (Domtar)

Dr. Art Groot (Canadian Wood Fibre Centre)

Frank Addante (OMNR, FRI)

Todd Domney (Sumac)

Craig Robinson (ArborData)

Dr. Jim Thrower, Consulting Biometrician

Additional Information by **Alex Rapoport**,
HALCO



Forest Co-Op Fibre Optimization Project

Funding Support



Ontario Centres of
Excellence
Where Next Happens

Ontario Centres of Excellence



Ontario

Northern Ontario
Heritage Fund

Fonds du patrimoine
du Nord de l'Ontario

Northern Ontario Heritage
Fund Corporation



Forest Co-op
Serving the Forest Sector
Since 1997

Forest Co-Op Fibre Optimization Project

Outline

- Quick Background
- Client Needs
- What levers can you pull, or do you want to pull - understand your inputs and cost/profit drivers
- Presenting a Solution
- Return on Investment



Forest Co-op
Serving the Forest Sector
Since 1997

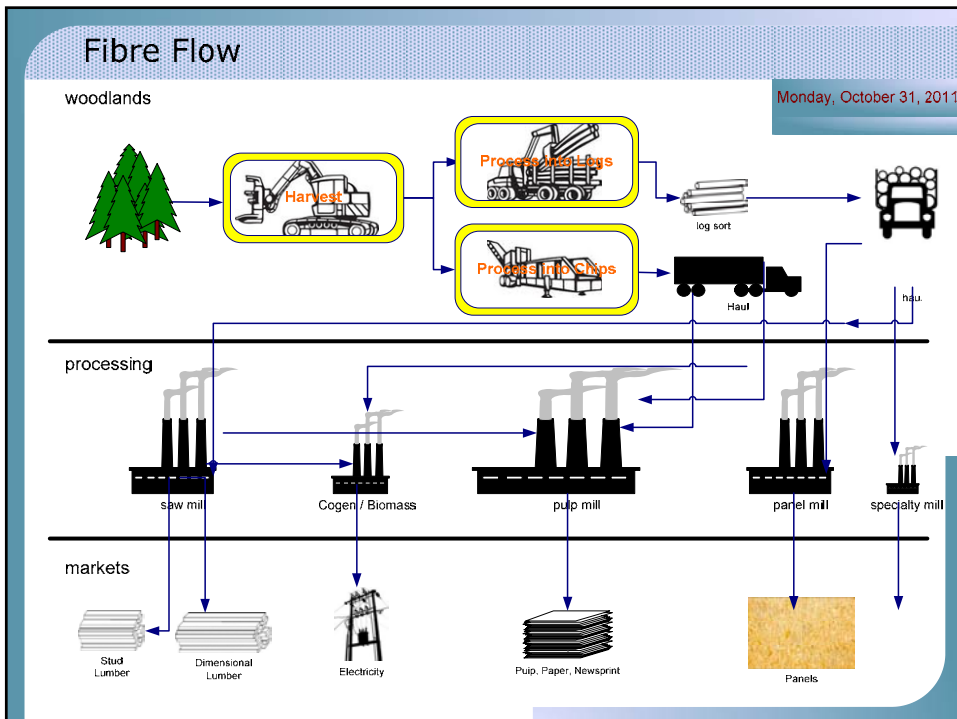
Forest Co-Op Fibre Optimization Project

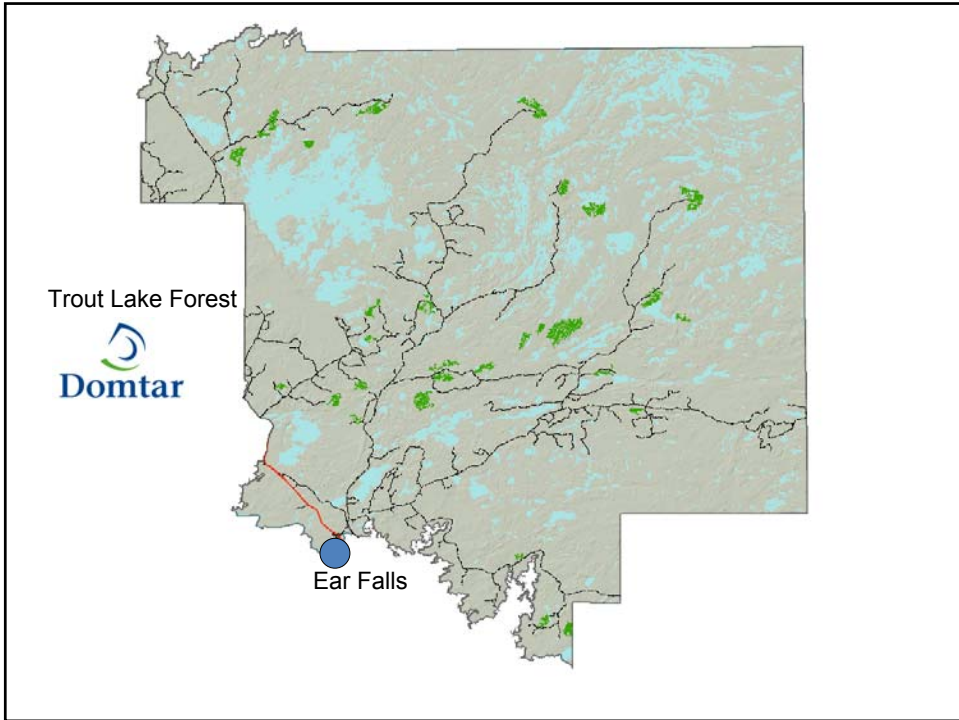
Backgrounder

- Test and demonstrate the value and return on investment (\$\$\$) of implementing operational forest inventories and analysis tools for improved fibre allocation and utilization;
- Collect and analyze block level inventory data;
- Demonstrate value, lower costs or increased revenue, resulting from making better decisions as they relate to allocation, harvesting silviculture, transportation, milling and markets.



Forest Co-Op Fibre Optimization Project





Understand The Business

What is significant?

- **Pulpmill**
 - no wood room – moving to in bush chipping
 - Some examinations of juvenile wood and in-bush chipping
 - Haul distance from portions of Trout Lake to Dryden is long
 - Contractor operations
- **Sawmill**
 - sawlogs are based on a minimum log volume, in the bush
 - Have used the optimizers to extract up to 15% high value sorts from the line

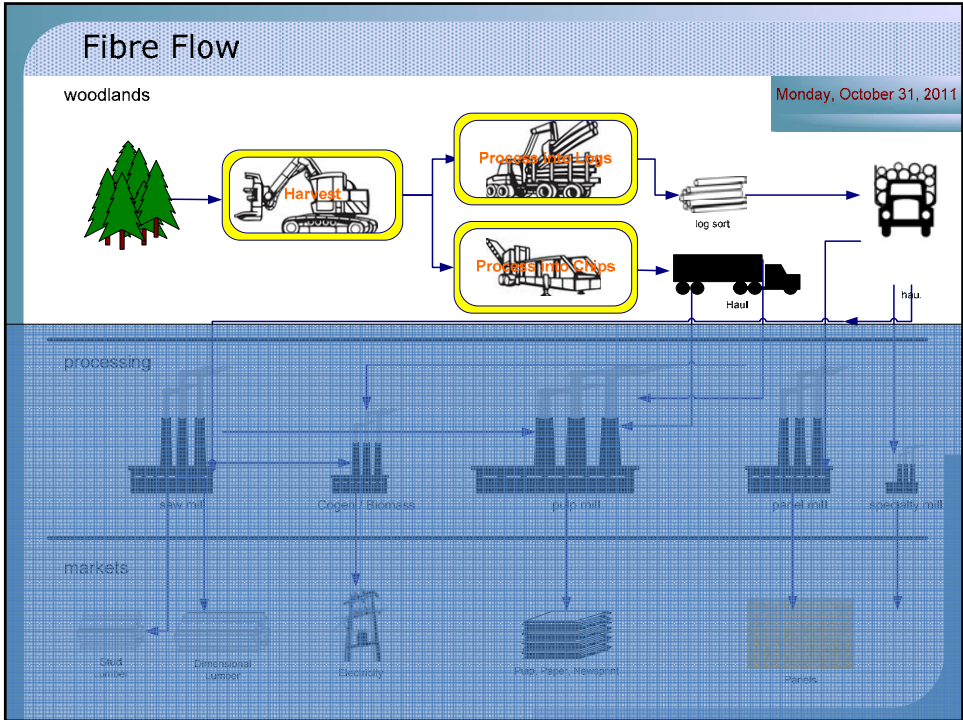


Forest Co-Op Fibre Optimization Project

Understand the Levers



Forest Co-Op Fibre Optimization Project



Increasing Piece Size

Harvest Cost Matrix

Trees / m³

> 7

7 to 8

8 +

< 120

\$19.31 \$21.45 \$25.39

120 to 180

\$18.18 \$20.20 \$23.23

180+

\$17.06 \$18.95 \$21.79

Increasing Density/Volume per Ha

Harvest Volume (m³/ha)

	> 7	7 to 8	8 +
< 120	\$19.31	\$21.45	\$25.39
120 to 180	\$18.18	\$20.20	\$23.23
180+	\$17.06	\$18.95	\$21.79

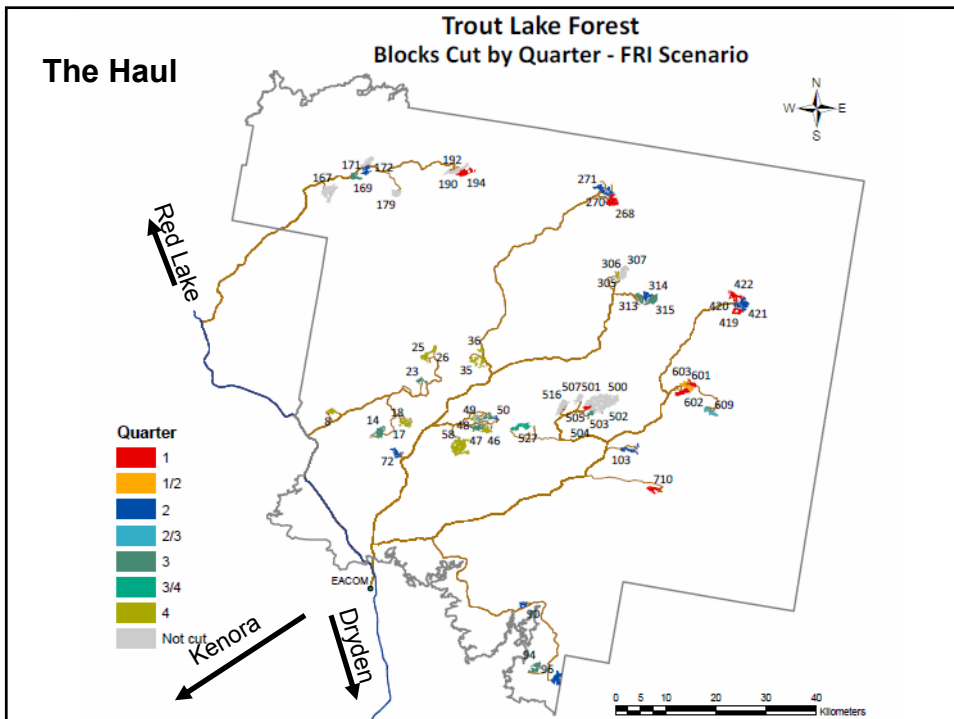
Log Sorts

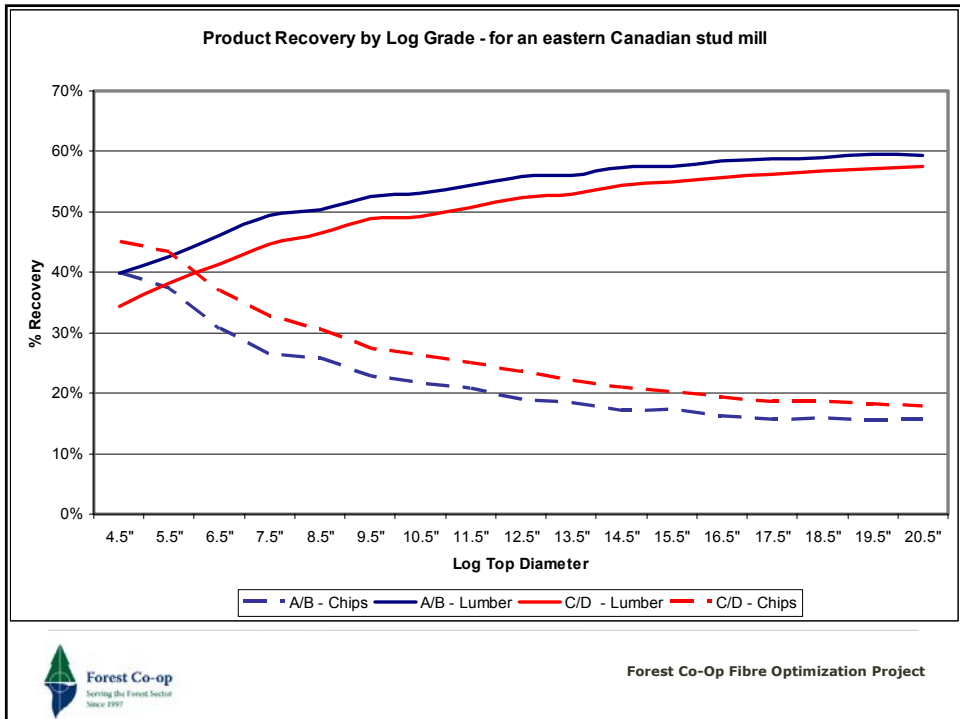
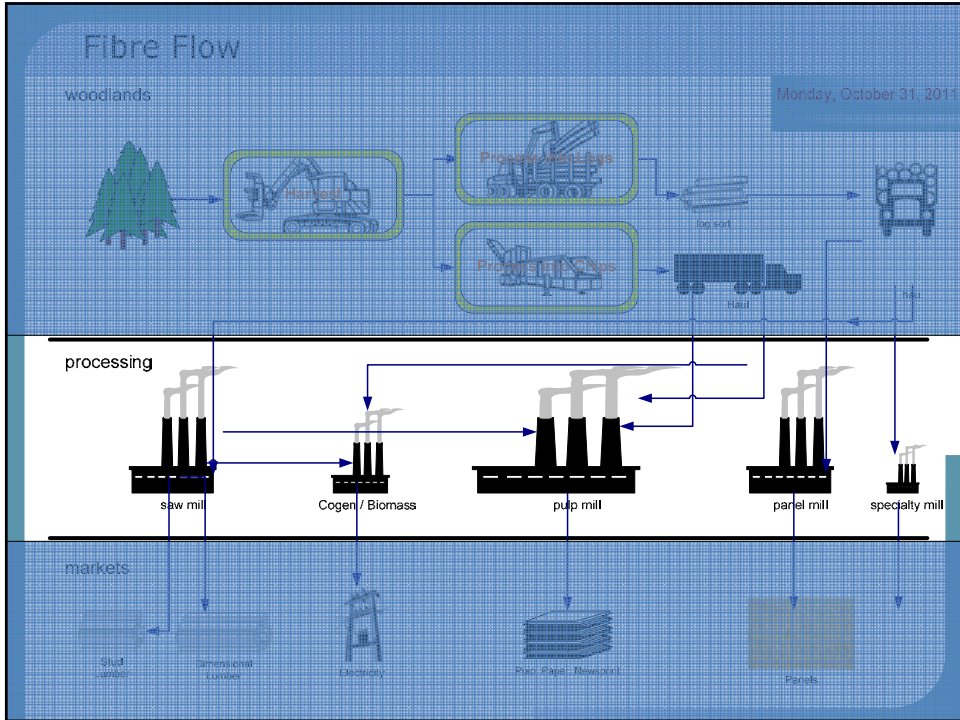
Table 5 : Log sort definitions

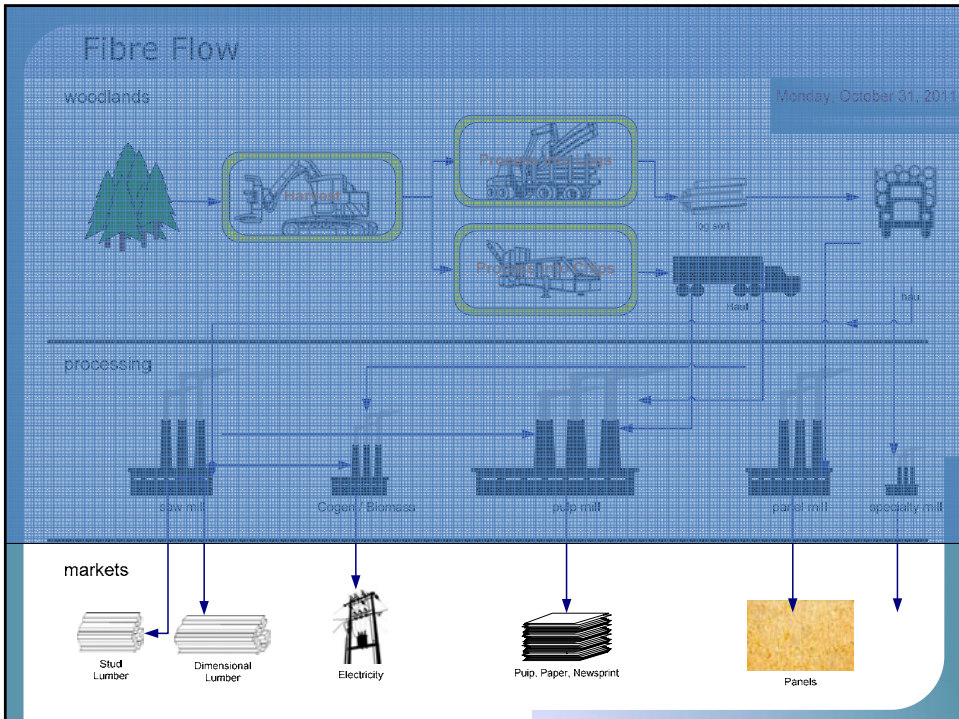
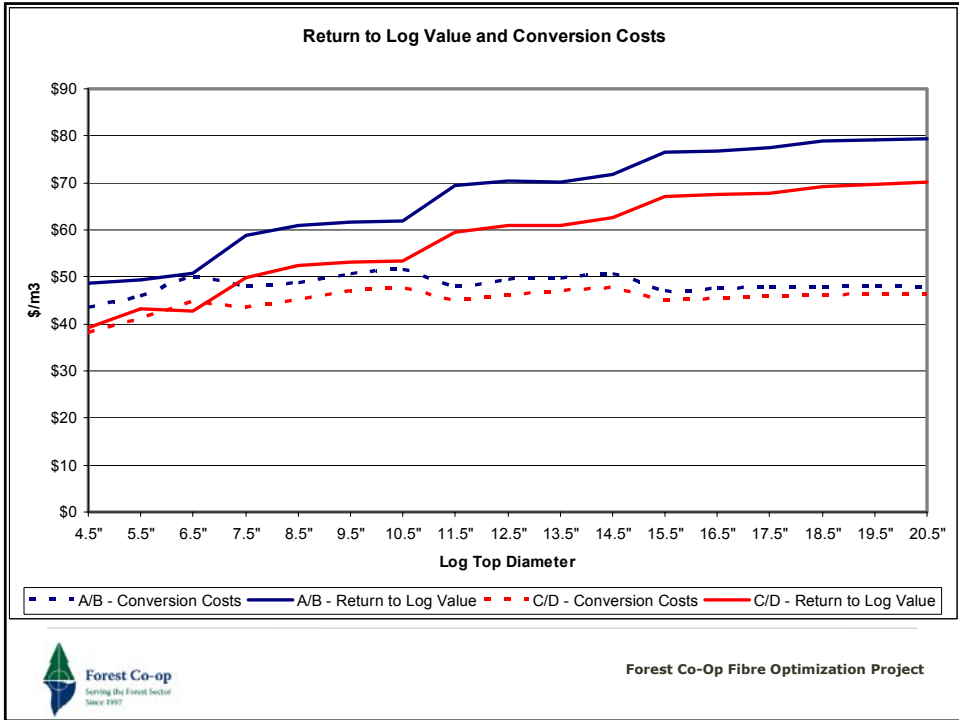
Sort	Description	Species	Top Diam (cm)	Grade	Length (m)
SW_LS_AB	SW - large sawlog, AB grade	Sb,Sw,Pj,Bf,La	> 24.1	A, B	2.5
SW_LS_CD	SW - large sawlog, CD grade	Sb,Sw,Pj,Bf,La	> 24.1	C, D	2.5
SW_SS_AB	SW - small sawlog, AB grade	Sb,Sw,Pj,Bf,La	11.4 to 24.1	A, B	2.5
SW_SS_CD	SW - small sawlog, CD grade	Sb,Sw,Pj,Bf,La	11.4 to 24.1	C, D	2.5
SW_Pulp	SW - pulp (< 11.4cm)	Sb,Sw,Pj,Bf,La	< 11.4	A,B,C,D	Any
	SW - pulp (Y grade)	Sb,Sw,Pj,Bf,La	> 5	Y	Any
HW_LS_AB	HW - large sawlog, AB grade	Pt,Pb,Bw	> 24.1	A, B	2.6
HW_LS_CD	HW - large sawlog, CD grade	Pt,Pb,Bw	> 24.1	C, D	2.6
HW_SS_AB	HW - small sawlog, AB grade	Pt,Pb,Bw	11.4 to 24.1	A, B	2.6
HW_SS_CD	HW - small sawlog, CD grade	Pt,Pb,Bw	11.4 to 24.1	C, D	2.6
HW_OSB	HW - osb	Pt,Pb,Bw	10 - 11.4	A,B,C,D	2.6
	HW - osb (Y grade)	Pt,Pb,Bw	> 10	Y	2.6
HW_USize	HW - undersize (< 10cm)	Pt,Pb,Bw	< 10	A,B,C,D,Y	Any
Biofibre	Biofibre	All			



Forest Co-Op Fibre Optimization Project







Product Pricing

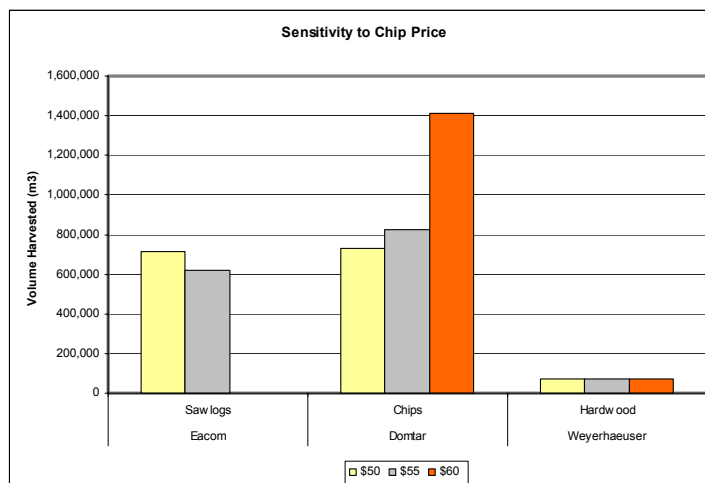
Table 9 : Stud lumber values (\$/Mfbm)

Size & Grade	Length (inches)				
	60	72	84	88	96
1x3 – All Grades	107	134	161	161	161
1x4 – All Grades	107	134	161	161	161
2x3 – Stud	178	178	178	267	311
2x4 – Stud	191	191	191	287	335
2x6 – Stud	191	285	285	285	350
2x3 - Economy	87	87	87	130	153
2x4 - Economy	93	93	93	141	164
2x6 - Economy	93	93	93	140	172



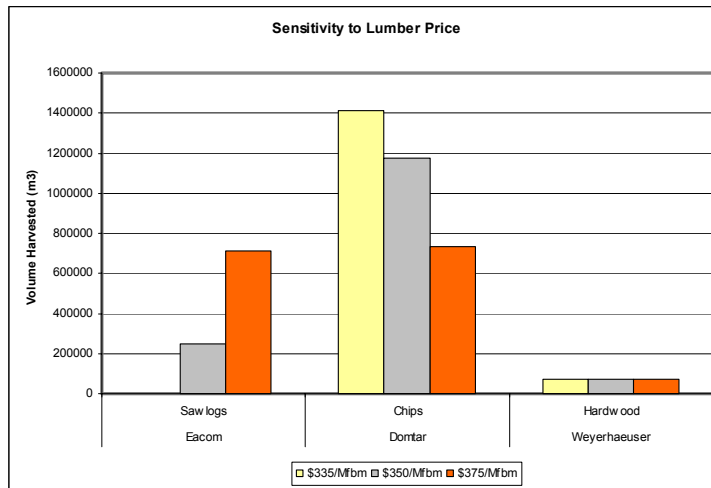
Forest Co-Op Fibre Optimization Project

Sensitivities – Chip Price

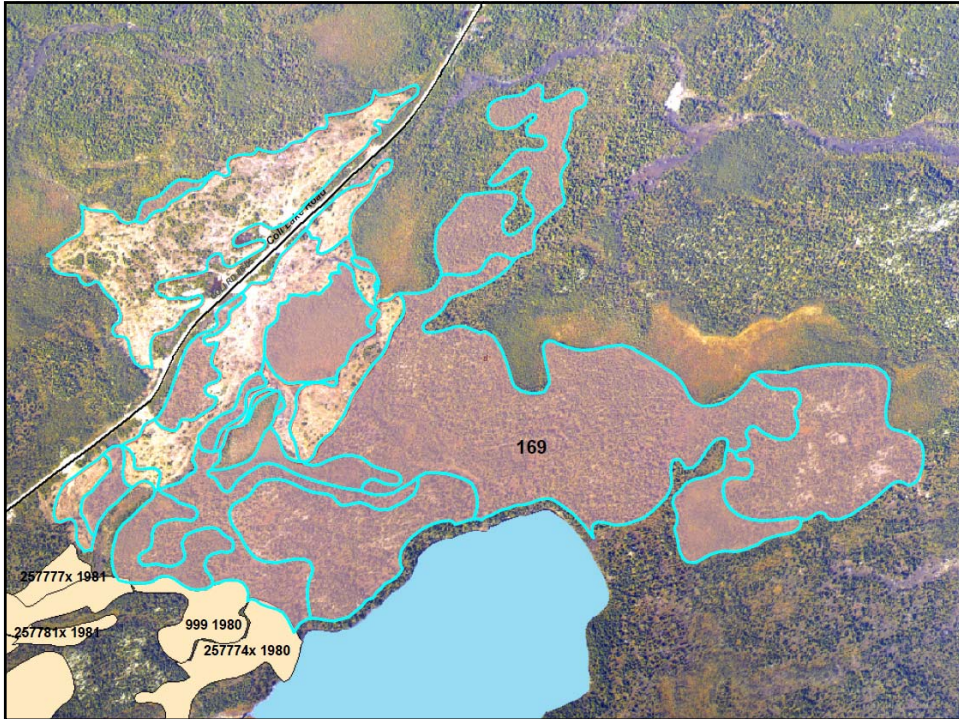


Forest Co-Op Fibre Optimization Project

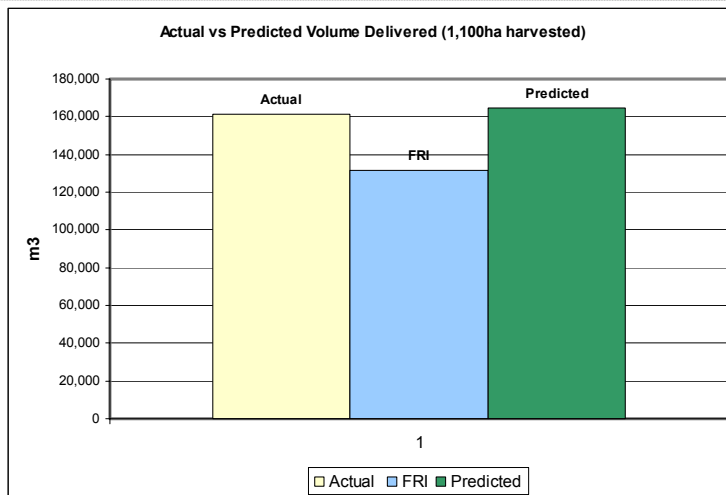
Sensitivities – Lumber Price



How is the inventory?



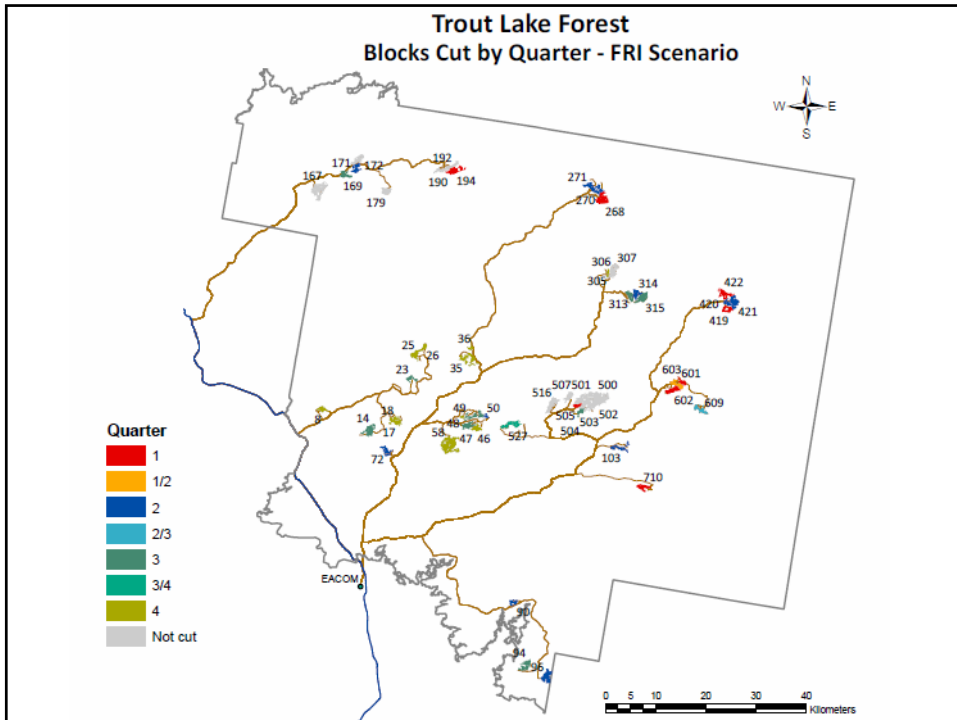
Predicted vs. Actual



Scenarios

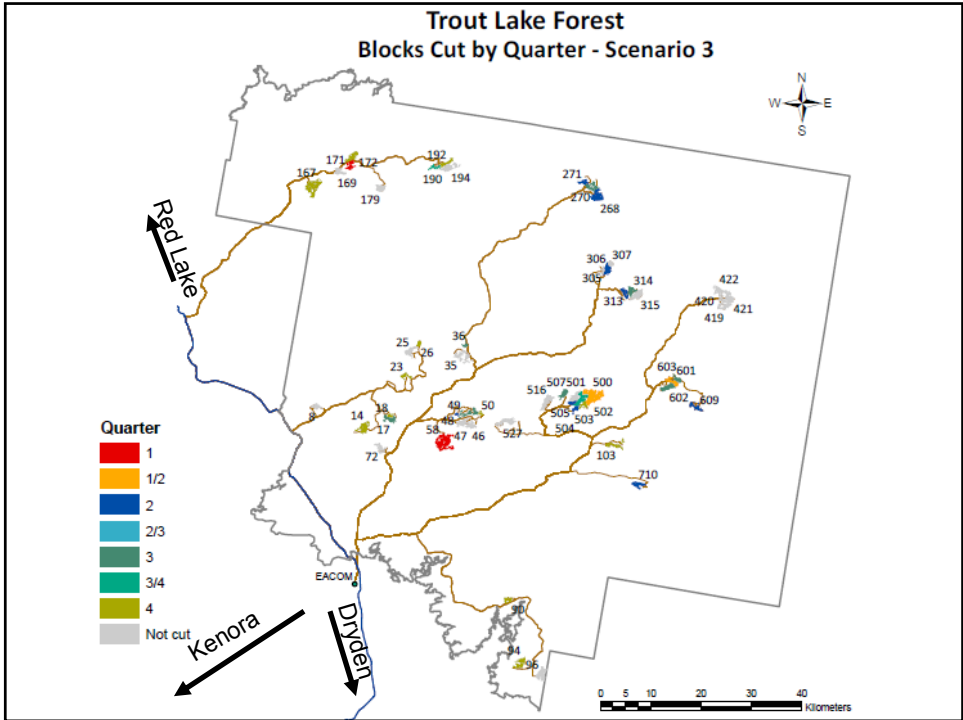
Base Case

- FRI Volumes for harvest blocks
- Volume produce on average 70% sawlogs (EACOM)
- Balance of softwood is chipped for Domtar
- Hardwood is going to Weyerhaeuser - Kenora

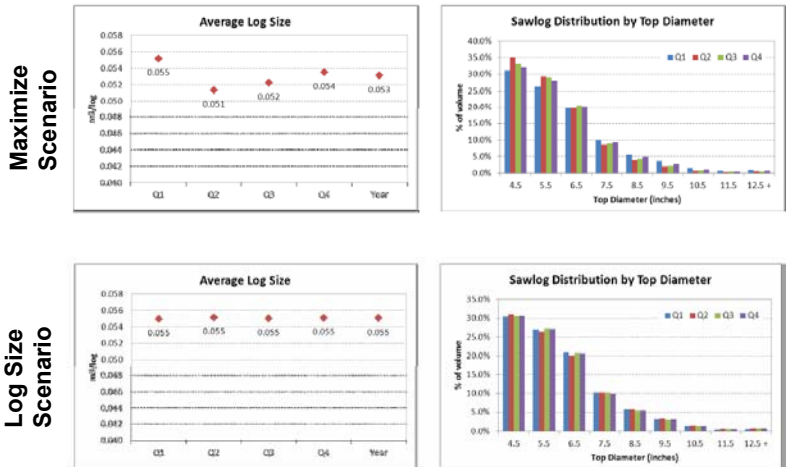


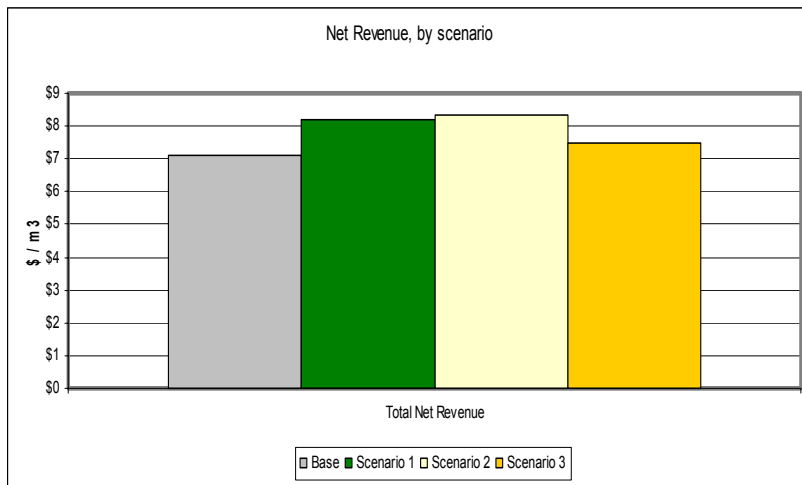
Optimization - Scheduling Scenarios

- Using operational inventory
- Using Remsoft's Allocation Optimizer
 - Scenario 1: Maximize Profit
 - Find best allocation to maximize profit
 - Maintain constraints on minimum mill deliveries
 - Scenario 2: Manage Log Size
 - Maintain an average log size of 0.055 m³/log by quarter
 - Scenario 3: More Destinations
 - Add in specialty mill in Red Lake for large softwood sawlogs, and a cogen plant in Red Lake

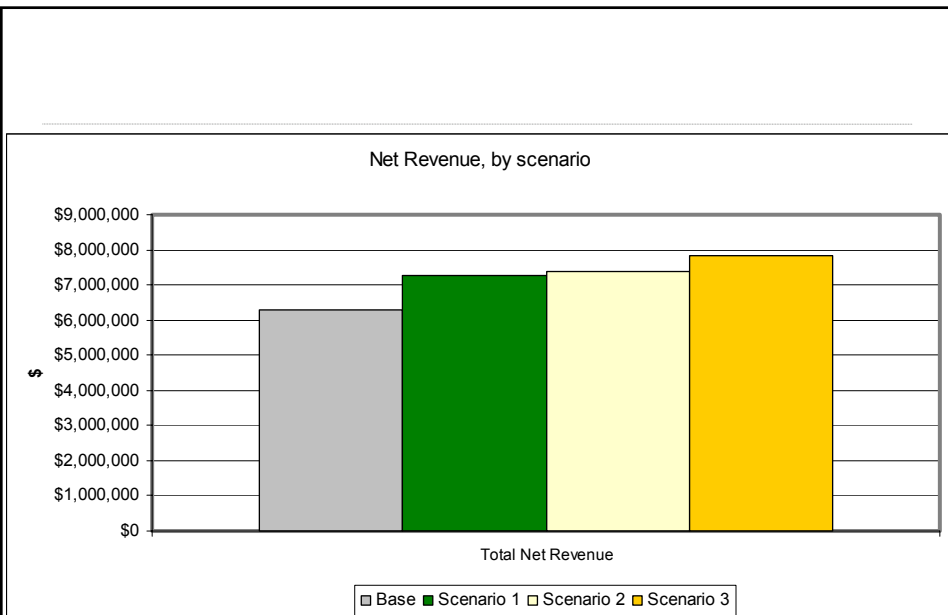


Managing Log Size at the Destination





Forest Co-Op Fibre Optimization Project



Forest Co-Op Fibre Optimization Project

Return on Investment

- Is this worth my investment?
 - Assume:
 - A 1,000,000 ha forest
 - Harvest of 5,000 ha/yr
 - Consider the next 5 years harvest and forest products processing
 - Sample 10 years of harvest allocation (50,000 ha)



Forest Co-Op Fibre Optimization Project

Return on Investment

Year	Investment	Benefit	Cash Flow
0	\$ (610,000.00)		\$ (610,000.00)
1	\$ (25,000.00)	\$ 876,150.00	\$ 851,150.00
2	\$ (25,000.00)	\$ 876,150.00	\$ 851,150.00
3	\$ (25,000.00)	\$ 876,150.00	\$ 851,150.00
4	\$ (25,000.00)	\$ 876,150.00	\$ 851,150.00
5	\$ (25,000.00)	\$ 876,150.00	\$ 851,150.00

Internal Rate of Return = 138%



Forest Co-Op Fibre Optimization Project

Concluding Statements

- Variability
- Price Sensitivity
- Understand Driving Factors
- Environmental Considerations
- Integration
- Harvest Allocations within FMP's
- Contractor and Operational Changes
- Flexibility
- Road Building



Forest Co-op
Serving the Forest Sector
Since 1997

Forest Co-Op Fibre Optimization Project

Thank You



Forest Co-op
Serving the Forest Sector
Since 1997

Forest Co-Op Fibre Optimization Project