

Project 3.2: Valuation of tree improvement in Alberta - applying the BC model to Alberta

Fall – 2016

OVERVIEW

Investment in tree improvement (TI) in Alberta is currently at a crossroads to further investments and not at the forefront of the private forestry sector despite the demonstrated benefits of TI worldwide. According to private industry, the major roadblock for further investment in TI is the low amount of genetic gain currently recognized in the annual allowable cut (AAC) set by the provincial government. In order to better understand the key parameters that drive profitability in TI programs, we developed the “Tree Improvement Investment for Forestry in Alberta” valuation model (TIIFA).

Goals & Objectives

Our first objective was to develop a model that helps private industry to better evaluate whether or not investment in TI in Alberta is a profitable enterprise. Our second objective was to identify the key drivers that maximize wood volume and revenue in private TI programs in Alberta. Our third objective was to assess which of these drivers are the most promising ones to manipulate for private industry under current (2016) forest management policies in Alberta.

Outcomes & Deliverables

1. Besides the large effect of the annual discount rate, our sensitivity analyses using the TIIFA model revealed that not only genetic gain, but also the area on which improved stock is deployed represents a key parameter influencing the profitability of TI programs (Table 1).
2. Our results also showed that the benefits of TI programs largely outweigh the associated program costs, whether they were set at \$1, \$3 or \$5 million dollars per decade (Fig. 1).

Conclusions

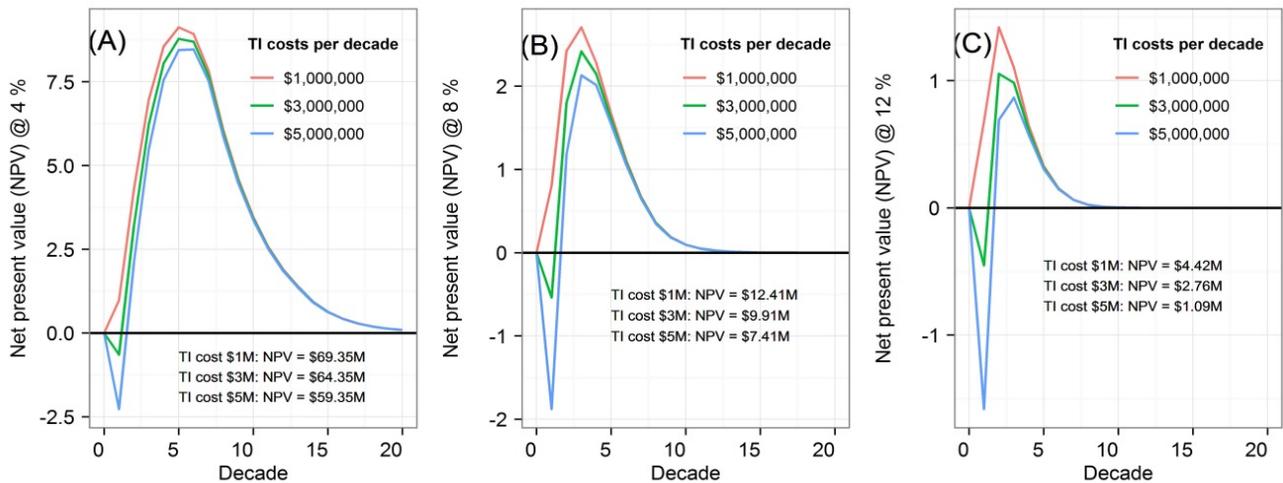
According the TIIFA model outputs, investments in tree improvement is a business decision worth consideration if tree improvement programs continue to grow over time and continuous investments are being made – either through selection and breeding in order to increase the genetic gain of the planting stock, by maximizing the area planted with improved stock, or both in combination. If maximizing the land area planted is the option selected, it is an interesting alternative approach to increasing the amount of merchantable timber as it does not require government approval and is therefore solely in the hands of private industry.

We conclude that despite the current levels of genetic gain recognized in the AAC for private industry, investment in TI still remains a profitable enterprise if the area is maximized on which improved stock is deployed.

Table 1. Sensitivity outputs of the TIIFA model run for the parameters genetic volume gain and area planted with improved stock expressed in net present values (million dollars) at 4, 8 and 12 % discount rates (A, B, C) as well as volume increase (million m³) due to TI (D). The costs associated with TI were set at 5 million dollars per decade. For all tables a planning horizon of 200 years was chosen. For tables A, B, and C dark grey represents net present values ≤ \$0 (not profitable); light grey > \$0 but ≤ \$5 million (profitable); no shading indicates net present values > \$5 million (most profitable).

		Increase in area planted per decade (over 200 years)			
		5 %	10 %	15 %	20 %
Genetic volume gain increase per decade (over 200 years)	A				
	1 %	7.53	17.33	23.7	27.76
	2 %	27.04	46.6	59.35	67.47
	3 %	43.45	71.53	90.64	102.82
	4 %	52.32	85.13	108.67	123.82
	B				
	1 %	-2.22	-0.76	0.58	1.71
	2 %	1.82	4.74	7.41	9.67
	3 %	5.81	10.16	14.18	17.56
	4 %	7.89	13.19	18.13	22.29
	C				
	1 %	-2.39	-1.96	-1.54	-1.14
	2 %	-0.61	0.25	1.09	1.89
	3 %	1.17	2.45	3.72	4.91
	4 %	1.88	3.44	4.98	6.43
	D				
	1 %	1.08	1.31	1.35	1.37
	2 %	1.79	2.24	2.33	2.36
	3 %	1.97	2.52	2.65	2.71
	4 %	2.02	2.6	2.77	2.84

Fig 1. Influence of tree improvement (TI) costs per decade at 4, 8 and 12 % discount rate (A, B, C) over a 200-year planning period. For this scenario a 15 % increase in area planted per decade was used as well as a 2 % genetic volume gain increase per decade.



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