

# Net Present Value Analysis Tapping vs. Timber Production



Michael Farrell

Cornell Maple Program

## Landowner concern over sawtimber value

Northern Forest Landowner Survey (Maine, New Hampshire, New York, Vermont)

- 60% of respondents who own at least 2,000 acres indicated that “concern over the loss of timber value” was the primary reason why they have not leased their trees to a maple producer
- 12% of those with less than 200 acres indicated reduced sawtimber value as a reason for not tapping
- 50% of landowners who would otherwise want to lease taps have not done so in part because of concern over the possible loss in sawtimber value

## Policy differences between states and provinces

- State agencies and USFS limits tapping due in part to concern over sawtimber value
- Foresters/loggers have inherent bias against tapping
- 3 studies carried out in Quebec to determine economics of leasing vs. timber production, all found leasing taps more beneficial
- New Brunswick and Quebec studies conclude leasing taps is more beneficial to government

# Dumont (1997) study in Quebec

## Methodology - Criteria and indicators

- Amount of economic activity generated
  - ◆ Value of delivery
  - ◆ Number of jobs
  - ◆ Paid salaries
- Direct economic gain to government
  - ◆ Rental fee from allotment of land

## Criteria and indicators (continued)

- Indirect and inferred impact on the economy
  - ◆ Increased employment
- Socio-economic development
  - ◆ Average annual salary per job

## Results of provincial average

Indicator Measured	Lumber Production	Maple Syrup Production	Unit of measure
Value of delivery	331 (255 to 605)	1244 (750 to 1375)	\$ / ha / yr
Total number of jobs	0,003	0,012	People / year / ha
Total salaries paid	97 (74 to 117)	211	\$ / ha-yr

Indicator Measured	Lumber Production	Maple Syrup Production	Unit of measure
Direct revenue from allocation of land	20 (16 to 22)	30	\$ / ha-yr
Increased employment	1,94	3,2	jobs
Average annual salary per employee	28 279 (19 615 to 37 851)	17 590	\$ / year

# EcoRessources

Consultants

[img: Climate changes; Food processing; Energy]

**The economic benefits of the maple industry  
in Quebec and in Canada**

**Final report**

**Federation of Quebec maple syrup  
producers (FPAQ)**

**November 2010**

**Chapter 7 shows that  
maple production  
provides much greater  
revenues to the  
government than  
timber production**



# Net Present Value (NPV) Analysis

- The many variables involved do not allow for a definitive answer in every situation
- Microsoft Excel spreadsheet allows the user to input values specific to his/her situation
- NPV analyses compare costs and revenues that appear over different time horizons
- Individual tree analysis allows for methodical and thoughtful management of stands
- Accepted to *Northern Journal of Applied Forestry*

# Variables for Net Present Value Analysis

## Tree & Forest Variables

- Initial Tree Diameter
- Merchantable Height
- Growth Rate
  - -Diameter and Height
- Species (“sugar” or “red”)
- Effect of tapping on growth rate (diameter and height)
- Height of tapping zone
- Butt Log Market
- Number of defects in sawlogs
- Density of maples per acre

## Economic/Financial Variables

- Discount Rate
- Log Scale Utilized
- Stumpage Rates
  - Tapped and Untapped
  - Red and Sugar Maples
  - Future Increases/Decreases
- Lease Payments
  - Current Rates
  - Future Increases/Decreases
  - Diameter to add 1<sup>st</sup> & 2<sup>nd</sup> tap
- Property and Income Taxes
- Time Horizon of Investment Period

# Tree Size and Quality

Variable	Conditions that favor leasing taps	Conditions that favor immediate cutting	Conditions that favor long-term timber production
<b>Tree size and quality</b>	small initial tree diameter < 13" dbh	large merchantable trees above 16" dbh	medium size tree 13-16" dbh
	defects in main stem	no defects in trunk	no defects in trunk
	many lower branches	some dieback visible in top	tall straight tree
	tree has been previously tapped	tree has never been tapped	tree has never been tapped
	tree is a red maple	tree is a sugar maple	tree is a sugar maple

# Forest Attributes

<b>Variable</b>	<b>Conditions that favor leasing taps</b>	<b>Conditions that favor immediate cutting</b>	<b>Conditions that favor long-term timber production</b>
<b>Forest attributes</b>	dense stand of maples, easily accessible	maples are widely scattered, not easily accessible	maples are widely scattered, not easily accessible
	large percentage of red (soft) maple in stand	small percentage of red (soft) maple in stand	small percentage of red (soft) maples
	stand is located near many large sugarmakers	no commercial sugaring operations nearby	no commercial sugaring operations nearby

# Tapping Method

<b>Variables</b>	<b>Conditions that favor leasing taps</b>	<b>Conditions that favor immediate cutting</b>	<b>Conditions that favor long-term timber production</b>
<b>Tapping method</b>	low height of tapping zone	large height of tapholes/staining	large height of tapholes/staining
	no metal objects used in collection	metal objects used in collection	metal objects used in collection
	log buyer is familiar with the people who tap	no records or knowledge of practices	no records or knowledge of practices

# Growth Rate

<b>Variable</b>	<b>Conditions that favor leasing taps</b>	<b>Conditions that favor immediate cutting</b>	<b>Conditions that favor long-term timber production</b>
<b>Growth Rate</b>	slow growth rate  if tapping has minimal impact on growth rate	slow growth rate  if tapping significantly reduces growth rate	fast growth rate  if tapping significantly reduces growth rate

# Log Scale & Stumpage Rates

Variable	Conditions that favor leasing taps	Conditions that favor immediate cutting	Conditions that favor long-term timber production
<b>Log Scale Utilized</b>	Doyle or Scribner	International 1/4"	International 1/4"
<b>Stumpage Rates</b>	low current prices for maple	high current prices for maple	low current prices for maple
	relatively high prices paid for tapped logs	uncertainty on future prices	high future prices predicted
	low price differential for tapped logs	high price differential for tapped logs	high price differential for tapped logs

# Lease Rates & Taxes

<b>Variable</b>	<b>Conditions that favor leasing taps</b>	<b>Conditions that favor immediate cutting</b>	<b>Conditions that favor long-term timber production</b>
<b>Lease Rate</b>	high lease rates at or above \$.50/tap	low lease rate	low lease rate
	contract includes annual fee increases	no annual increase in lease fees	no annual increase in lease fees
<b>Taxes</b>	ability to gain ag assessment by leasing	ability to qualify for 480-A	ability to qualify for 480-A
	high initial assessment	low initial assessment	low initial assessment
	high tax rate	low tax rate	low tax rate



# Discount Rate & Time Horizon

<b>Variable</b>	<b>Conditions that favor leasing taps</b>	<b>Conditions that favor immediate cutting</b>	<b>Conditions that favor long-term timber production</b>
<b>Discount rate</b>	low discount rate	high discount rate	low discount rate
	landowner interested in long-term profits	landowner needs cash flow immediately	landowner interested in long-term profits
<b>Time Horizon</b>	long time horizon of investment period	short time horizon of investment period	long time horizon of investment period

# Tapped Butt Log Ready for Sawing



Portable bandsaw mill is optimal for sawing tapped logs



# Uihlein Forest Education Center







[www.naturalformfurniture.com](http://www.naturalformfurniture.com)

# Website Address

<http://maple.dnr.cornell.edu/produc/tvs/index.htm>

# Questions??

Michael Farrell

Director of The Uihlein Forest

Cornell University Department of Natural Resources

157 Bear Cub Lane

Lake Placid, NY 12946

mlf36@cornell.edu

<http://maple.dnr.cornell.edu>

Office: (518) 523 9337    Cell: (518) 637 7000