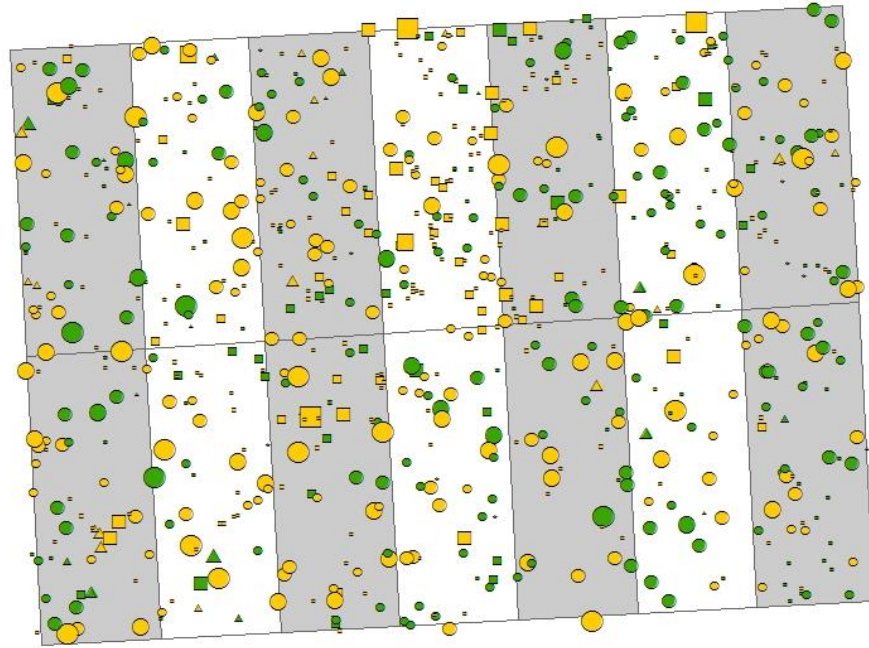


Horseback 2 Marteloscope

Site Description



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November 27th, 2014

Acknowledgments

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- Selection of sites :
 - Daniel Soucy – NBDNR
 - Michel Caron – Acadian Timber
- Site layout :
 - Yvon Dubé, Civil engineering technologist
- Compiler development :
 - Marie-Pier Arsenault
 - John Leclair
- Tree classification and measurement :
 - Sylvain Caron – 4BM
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 - Eric Caron – 4BM
 - Lucien Sirois – 4BM
 - Ted Voisine – 4BM
 - Dominique Frenette – 4BM

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Introduction

General Description of a Marteloscope

A marteloscope is a training area for tree marking. It is coupled with a computer “compiler” that allows the analysis of the nature and intensity of each marker’s tree selection, following various criteria.

All trees having a diameter at breast height (dbh) greater than 9 cm were identified, numbered and located on a map. These data help characterize initial stand conditions (stand volume, basal area, tree species distribution by form class, vigor, lumber potential, etc.) as well as the exact site design. The associated computer tool provides a summary of harvest choices made by participants (volume selected, categories of wood selected, etc.).

This marteloscope is subdivided into seven corridors 20 meters wide to facilitate the complete coverage of the area by the markers (Figure 1). Each tree number has been painted at breast height in order to be clearly visible by markers when moving in the direction indicated by the arrows in each corridor.

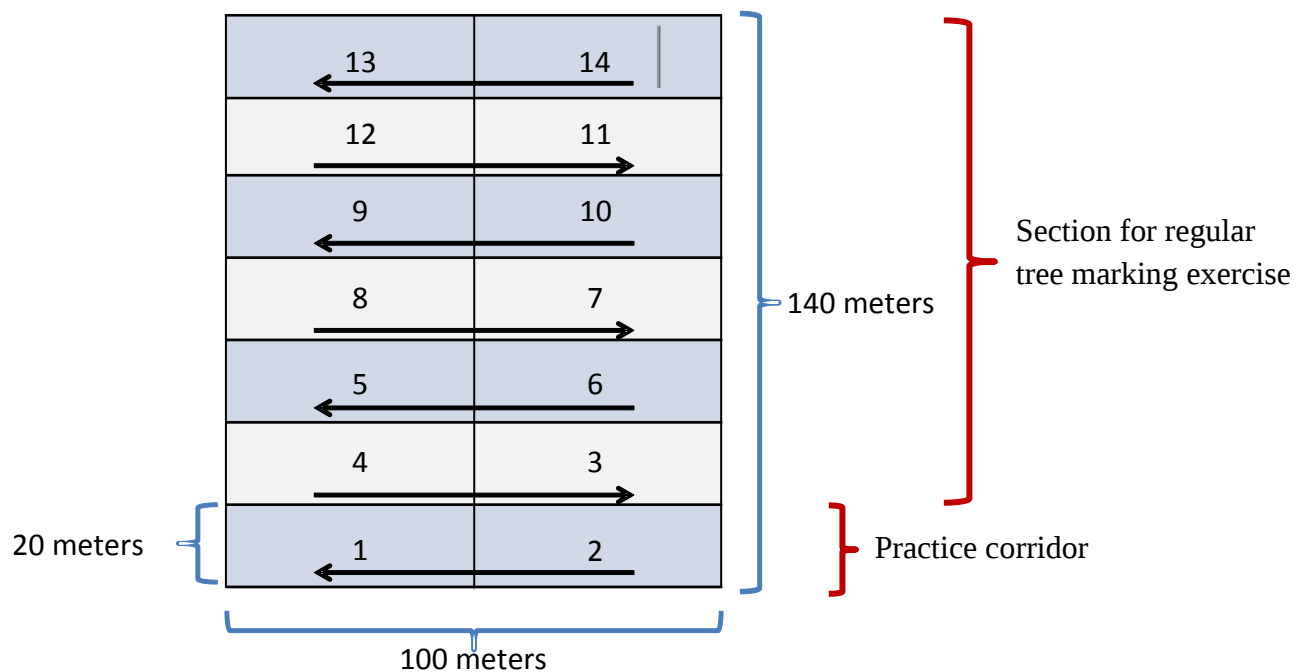


Figure 1. Layout of the Horseback-2 marteloscope. The arrows indicate the recommended walking direction in order to easily see tree numbers.

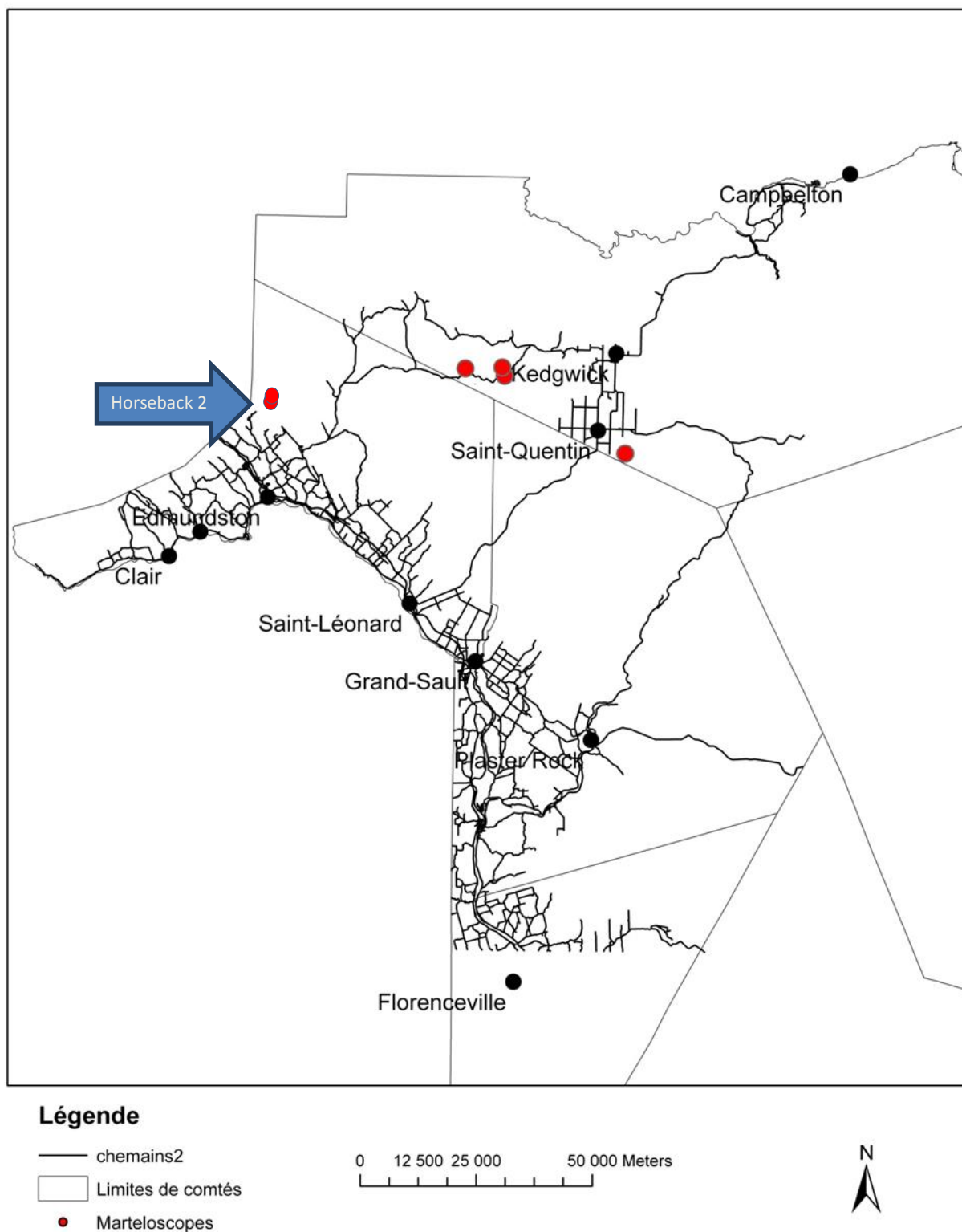
Intended Uses of Martelosopes

Martelosopes are set up in order to fulfill two particular needs:

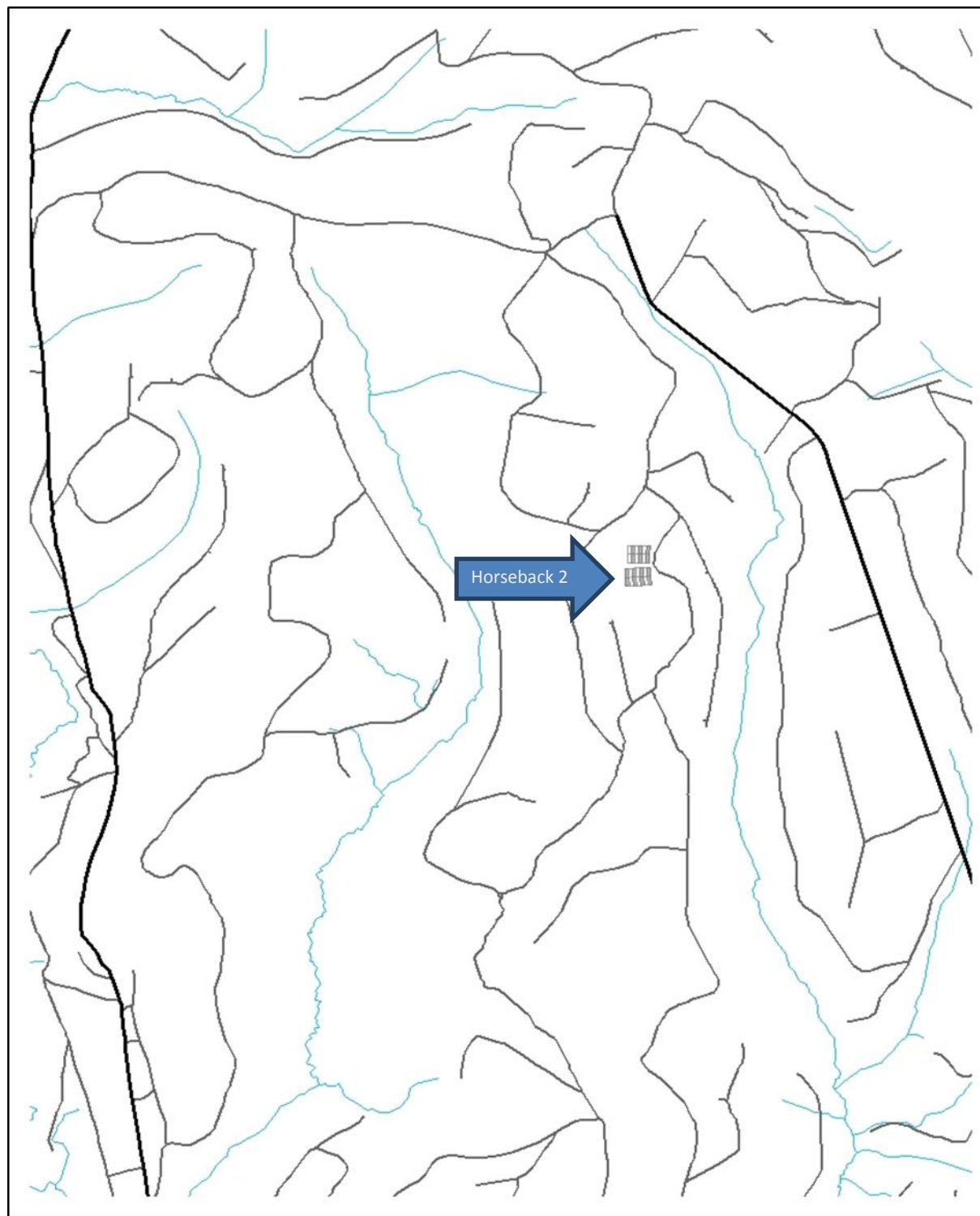
1. Training and standardisation:
 - a. Students from forestry programs.
 - b. Workers conducting tree surveys and classification.
 - c. Harvest equipment operators.
 - d. Harvest operations supervisors.
2. Fundamental and applied research:
 - a. Discussion basis for various stakeholders in forest management.
 - b. Development of decision support tools for uneven-aged stand management.
 - c. Evaluate modifications to silviculture prescriptions.
 - d. Development of remote sensing tools.

Site History

No site history available



Horseback 2 Marteloscope Location



Légende

- Chemains Principaux
- Chemains Secondaires
- Ruisseaux
- lacs et rivières

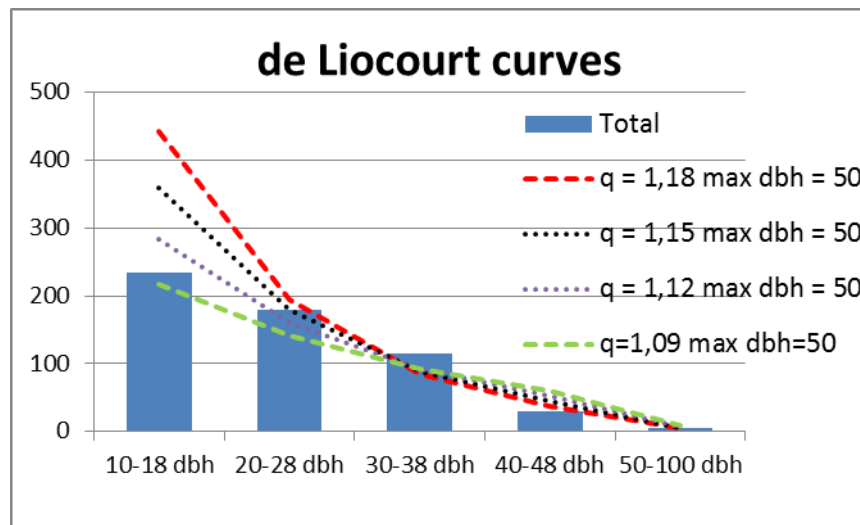
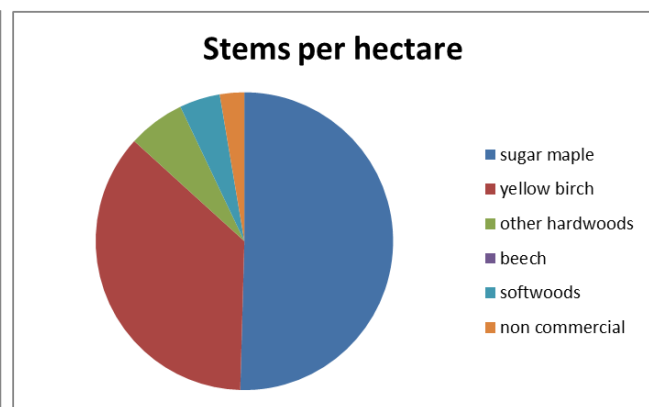
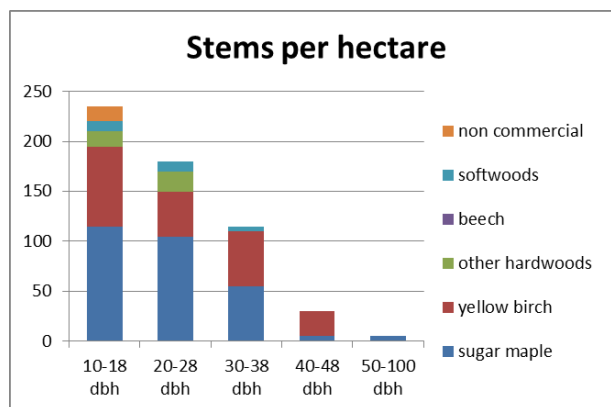
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Horseback 2 Marteloscope Initial Stand Conditions – Practice corridor

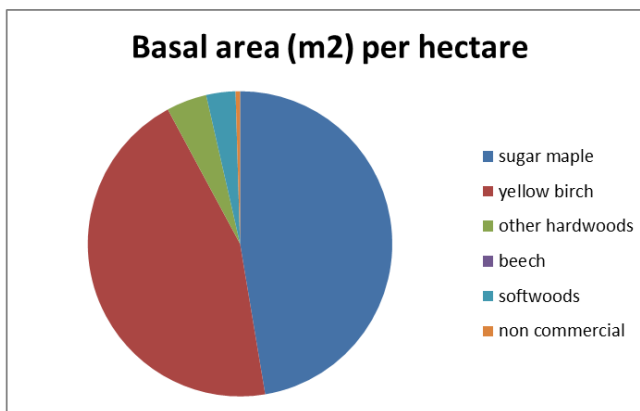
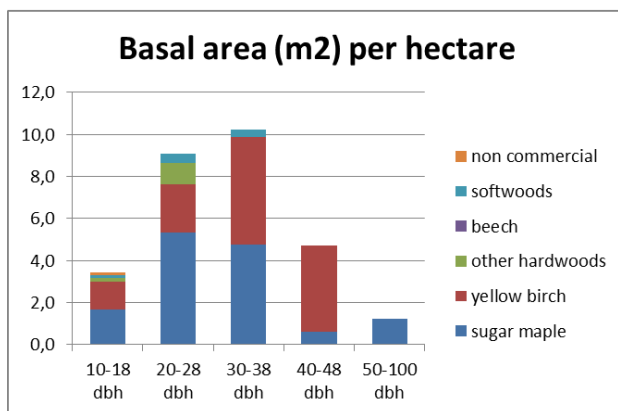
Trees per Hectare

Stems per hectare						Total	Proportion	dbh
	10-18 dbh	20-28 dbh	30-38 dbh	40-48 dbh	50-100 dbh			
sugar maple	115	105	55	5	5	285	50%	22,7
yellow birch	80	45	55	25	0	205	36%	25,9
other hardwoods	15	20	0	0	0	35	6%	20,0
beech	0	0	0	0	0	0	0%	0,0
softwoods	10	10	5	0	0	25	4%	20,0
non commercial	15	0	0	0	0	15	3%	10,7
Total	235	180	115	30	5	565		
Proportion	42%	32%	20%	5%	1%			



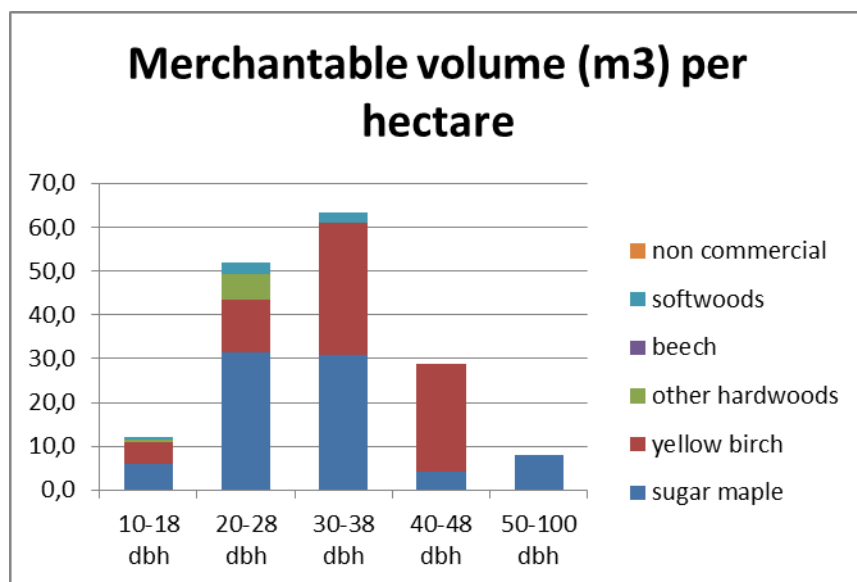
Basal Area per Hectare

Basal area (m2) per hectare							
	10-18 dbh	20-28 dbh	30-38 dbh	40-48 dbh	50-100 dbh	Total	Proportion
sugar maple	1,7	5,3	4,7	0,6	1,2	13,6	47%
yellow birch	1,3	2,3	5,1	4,1	0,0	12,8	45%
other hardwoods	0,2	1,0	0,0	0,0	0,0	1,2	4%
beech	0,0	0,0	0,0	0,0	0,0	0,0	0%
softwoods	0,1	0,4	0,4	0,0	0,0	0,9	3%
non commercial	0,1	0,0	0,0	0,0	0,0	0,1	0%
Total	3,4	9,1	10,2	4,7	1,2	28,7	
Proportion	12%	32%	36%	16%	4%		

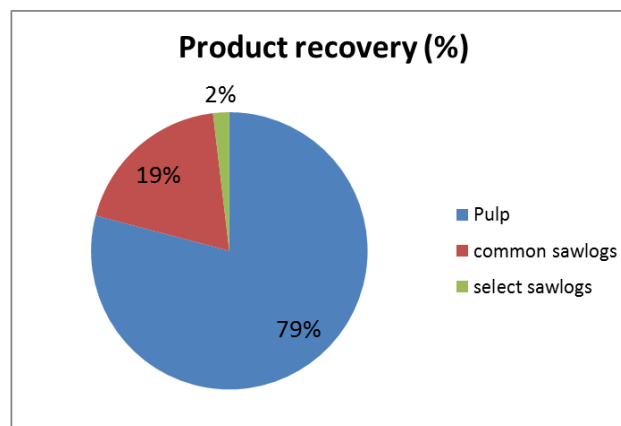
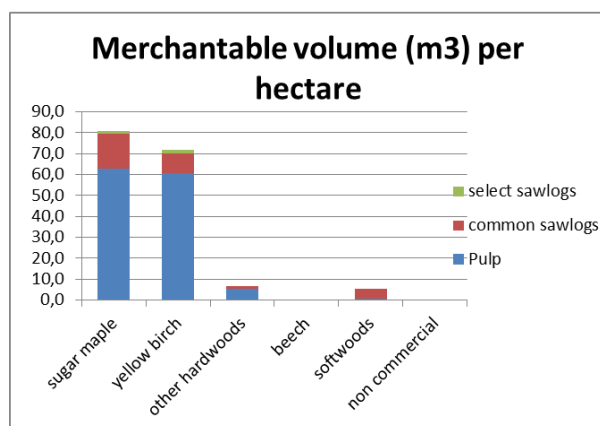


Merchantable Volume per Hectare

Merchantable volume (m3) per hectare							
	10-18 dbh	20-28 dbh	30-38 dbh	40-48 dbh	50-100 dbh	Total	Proportion
sugar maple	6,1	31,5	30,8	4,2	8,0	80,6	49%
yellow birch	4,8	12,0	30,2	24,7	0,0	71,7	44%
other hardwoods	0,7	5,9	0,0	0,0	0,0	6,6	4%
beech	0,0	0,0	0,0	0,0	0,0	0,0	0%
softwoods	0,4	2,6	2,3	0,0	0,0	5,4	3%
non commercial	0,0	0,0	0,0	0,0	0,0	0,0	0%
Total	12,0	52,0	63,4	28,9	8,0	164,3	
Proportion	7%	32%	39%	18%	5%		

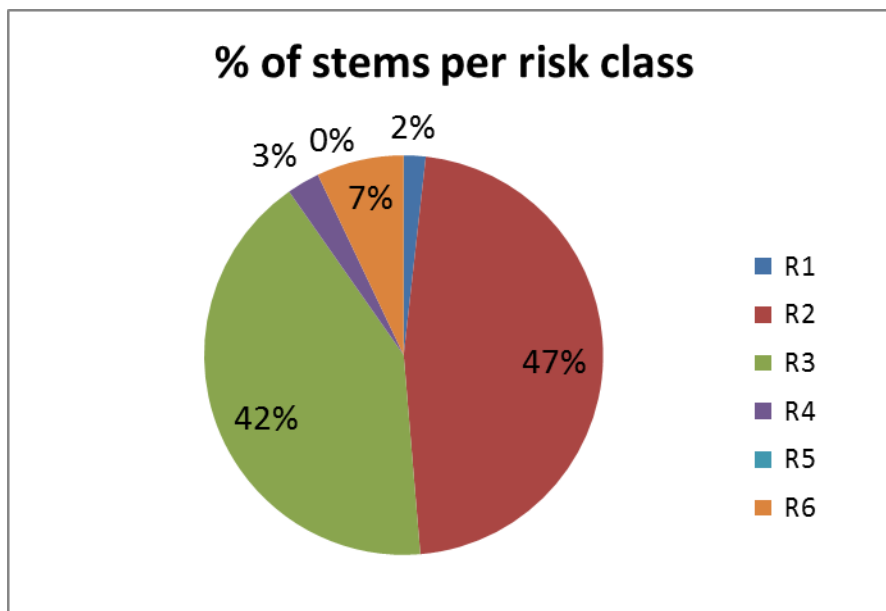


Product recovery (m3) per hectare					
	Pulp	common sawlogs	select sawlogs	Total	Proportion
sugar maple	62,8	16,5	1,3	81	49%
yellow birch	60,8	9,1	1,8	72	44%
other hardwoods	5,5	1,1	0,0	7	4%
beech	0,0	0,0	0,0	0	0%
softwoods	0,8	4,6	0,0	5	3%
non commercial	0,0	0,0	0,0	0	0%
Total	129,9	31,2	3,1	164,3	
Proportion	79%	19%	2%		



Number of Trees and Volume Distribution per Risk Class¹

Risk class - Volume (m3) per hectare							Total	Proportion
	R1	R2	R3	R4	R5	R6		
sugar maple	0,0	40,6	35,0	0,2	0,0	4,8	80,6	49%
yellow birch	0,5	25,4	38,2	4,2	0,0	3,3	71,7	44%
other hardwoods	0,0	4,1	2,5	0,0	0,0	0,0	6,6	4%
beech	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0%
softwoods	1,7	0,0	3,5	0,0	0,0	0,1	5,4	3%
non commercial	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0%
Total	2,3	70,1	79,3	4,4	0,0	8,2	164,3	
Proportion	1%	43%	48%	3%	0%	5%		



Risk class - Volume (m3) per hectare							Total	Proportion
	R1	R2	R3	R4	R5	R6		
sugar maple	0,0	40,6	35,0	0,2	0,0	4,8	80,6	49%
yellow birch	0,5	25,4	38,2	4,2	0,0	3,3	71,7	44%
other hardwoods	0,0	4,1	2,5	0,0	0,0	0,0	6,6	4%
beech	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0%
softwoods	1,7	0,0	3,5	0,0	0,0	0,1	5,4	3%
non commercial	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0%
Total	2,3	70,1	79,3	4,4	0,0	8,2	164,3	
Proportion	1%	43%	48%	3%	0%	5%		

¹ Pelletier, G., D. Landry and M. Girouard (2013). A tree classification system for New Brunswick. Edmundston, New Brunswick, Northern Hardwoods Research Institute. « R5 » & « R6 » represent dead trees with or without recoverable products respectively.

Number of trees and Volume Distribution per Form Class²

Form class - Number of stems per hectare									Total	Proportion
	F1	F2	F3	F4	F5	F6	F7	F8		
sugar maple	65	130	5	0	10	0	40	35	285	50%
yellow birch	10	105	5	5	15	0	40	25	205	36%
other hardwoods	10	25	0	0	0	0	0	0	35	6%
beech	0	0	0	0	0	0	0	0	0	0%
softwoods	25	0	0	0	0	0	0	0	25	4%
non commercial	0	10	0	0	0	0	0	5	15	3%
Total	110	270	10	5	25	0	80	65	565	
Proportion	19%	48%	2%	1%	4%	0%	14%	12%		

Risk and Form class combinations- Number of stems per hectare									Total	Proportion
	F1	F2	F3	F4	F5	F6	F7	F8		
R1	5	5	0	0	0	0	0	0	10	2%
R2	70	135	0	0	0	0	45	15	265	47%
R3	30	110	10	5	15	0	30	35	235	42%
R4	0	10	0	0	0	0	0	5	15	3%
R5	0	0	0	0	0	0	0	0	0	0%
R6	5	10	0	0	10	0	5	10	40	7%
Total	110	270	10	5	25	0	80	65	565	
Proportion	19%	48%	2%	1%	4%	0%	14%	12%		

MSCR classification & acceptable growing stock classification

² Pelletier, G., D. Landry and M. Girouard (2013). A tree classification system for New Brunswick. Edmundston, New Brunswick, Northern Hardwoods Research Institute.

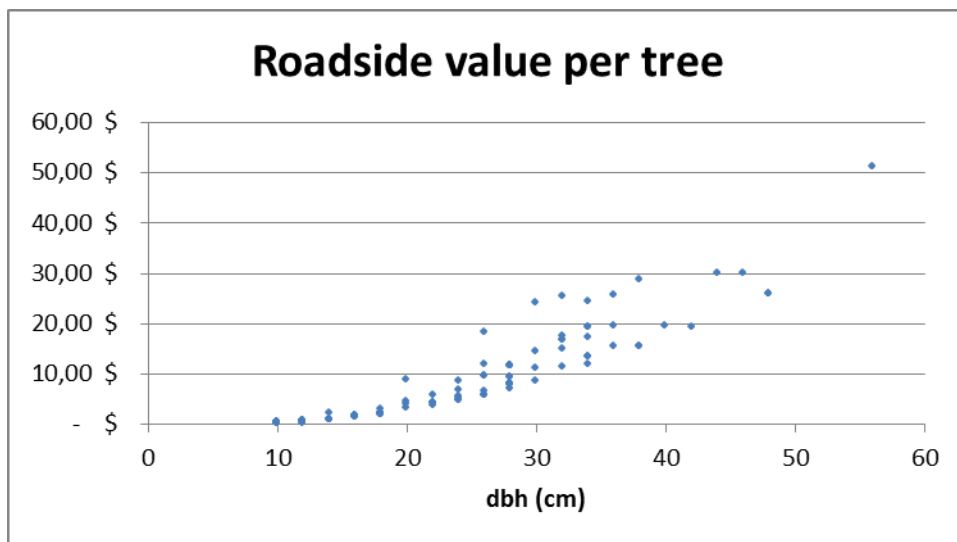
MSCR class - Number of stems per hectare							
	M	S	C	R	Dead	Total	Proportion
sugar maple	25	35	15	195	15	285	50%
yellow birch	20	20	20	125	20	205	36%
other hardwoods	5	5	0	25	0	35	6%
beech	0	0	0	0	0	0	0%
softwoods	10	0	0	10	5	25	4%
non commercial	0	0	0	0	15	15	3%
Total	60	60	35	355	55	565	
Proportion	11%	11%	6%	63%	10%		
MSCR sawlog class - Number of stems							
	M	S	C	R	Total	Proportion	
sugar maple	10	15	0	80	105	54%	
yellow birch	0	5	5	45	55	10%	
other hardwoods	0	0	0	15	15	3%	
beech	0	0	0	0	0	0%	
softwoods	10	0	0	10	20	4%	
non commercial	0	0	0	0	0	0%	
Total	20	20	5	150	195		
Proportion	4%	4%	1%	27%			
Acceptable growing stock (AGS) per hectare							
	10-18 dbh	20-28 dbh	30-38 dbh	40-48 dbh	50-100 dbh	Total	Proportion
sugar maple	70	65	25	0	0	160	56%
yellow birch	30	15	35	0	0	80	39%
other hardwoods	0	0	0	0	0	0	0%
beech	0	0	0	0	0	0	0%
softwoods	0	5	0	0	0	5	20%
non commercial	0	0	0	0	0	0	0%
Total	100	85	60	0	0	245	43%
Proportion	43%	47%	52%	0%	0%		

Economic Data

Value per hectare			
	Harvest cost	Mill price	Roadside value
sugar maple	1 297 \$	3 517 \$	2 221 \$
yellow birch	1 112 \$	3 021 \$	1 909 \$
other hardwoods	116 \$	265 \$	149 \$
beech	- \$	- \$	- \$
softwoods	92 \$	356 \$	264 \$
non commercial	- \$	- \$	- \$
Total	2 617 \$	7 160 \$	4 543 \$

Net value per hectare							
	10-18 dbh	20-28 dbh	30-38 dbh	40-48 dbh	50-100 dbh	Total	Proportion
sugar maple	95 \$	832 \$	941 \$	97 \$	255 \$	2 221 \$	49%
yellow birch	73 \$	261 \$	921 \$	654 \$	- \$	1 909 \$	42%
other hardwoods	10 \$	138 \$	- \$	- \$	- \$	149 \$	3%
beech	- \$	- \$	- \$	- \$	- \$	- \$	0%
softwoods	11 \$	134 \$	120 \$	- \$	- \$	264 \$	6%
non commercial	- \$	- \$	- \$	- \$	- \$	- \$	0%
Total	189 \$	1 365 \$	1 982 \$	751 \$	255 \$	4 543 \$	
Proportion	4%	30%	44%	17%	6%		

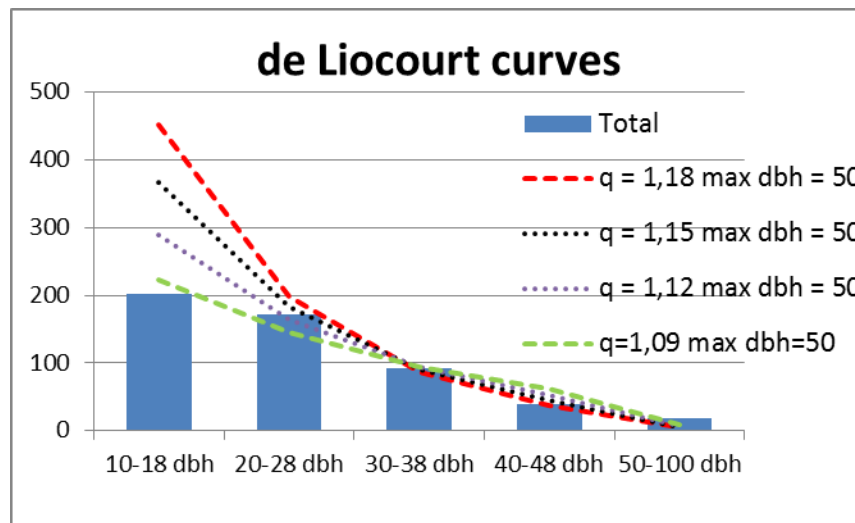
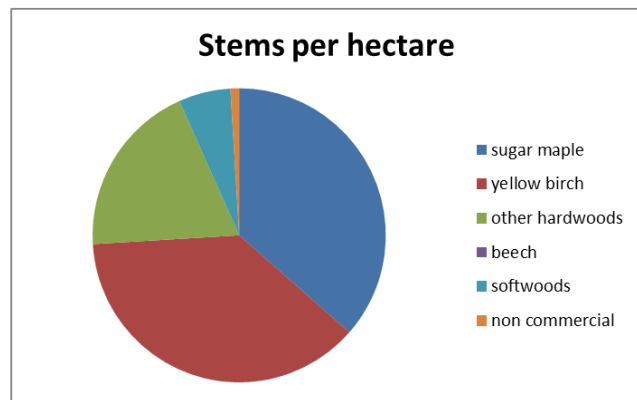
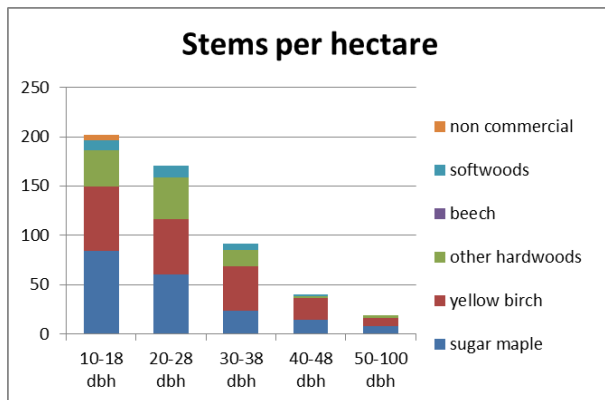
Net value per cubic meter						
	10-18 dbh	20-28 dbh	30-38 dbh	40-48 dbh	50-100 dbh	Mean
sugar maple	16 \$	26 \$	31 \$	23 \$	32 \$	28 \$
yellow birch	15 \$	22 \$	30 \$	26 \$	- \$	27 \$
other hardwoods	15 \$	23 \$	- \$	- \$	- \$	22 \$
beech	- \$	- \$	- \$	- \$	- \$	
softwoods	26 \$	51 \$	52 \$	- \$	- \$	49 \$
non commercial	- \$	- \$	- \$	- \$	- \$	
Mean	16 \$	26 \$	31 \$	26 \$	32 \$	28 \$



Horseback 2 Marteloscope Initial Stand Conditions – Section for regular tree marking exercise

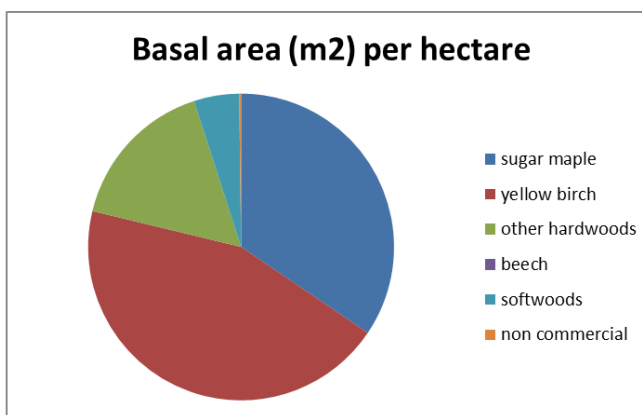
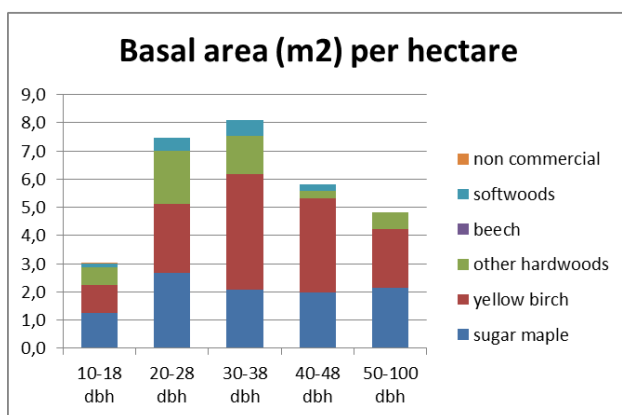
Trees per Hectare

Stems per hectare						Total	Proportion	dbh
	10-18 dbh	20-28 dbh	30-38 dbh	40-48 dbh	50-100 dbh			
sugar maple	84	61	23	14	8	191	36%	23,1
yellow birch	65	56	45	23	8	197	38%	26,3
other hardwoods	38	43	17	2	3	101	19%	22,7
beech	0	0	0	0	0	0	0%	0,0
softwoods	10	12	7	2	0	30	6%	22,6
non commercial	5	0	0	0	0	5	1%	12,0
Total	202	171	92	40	19	523		
Proportion	39%	33%	18%	8%	4%			



Basal Area per Hectare

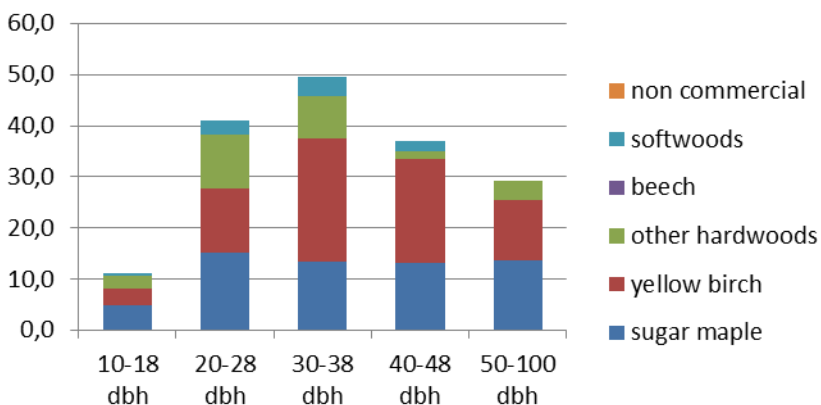
Basal area (m2) per hectare							
	10-18 dbh	20-28 dbh	30-38 dbh	40-48 dbh	50-100 dbh	Total	Proportion
sugar maple	1,3	2,7	2,1	2,0	2,1	10,1	34%
yellow birch	1,0	2,5	4,1	3,4	2,1	13,0	44%
other hardwoods	0,6	1,9	1,4	0,3	0,6	4,8	16%
beech	0,0	0,0	0,0	0,0	0,0	0,0	0%
softwoods	0,1	0,5	0,6	0,2	0,0	1,4	5%
non commercial	0,1	0,0	0,0	0,0	0,0	0,1	0%
Total	3,0	7,5	8,1	5,8	4,8	29,3	
Proportion	10%	26%	28%	20%	17%		



Merchantable Volume per Hectare

Merchantable volume (m3) per hectare							
	10-18 dbh	20-28 dbh	30-38 dbh	40-48 dbh	50-100 dbh	Total	Proportion
sugar maple	4,8	15,1	13,5	13,2	13,6	60,2	36%
yellow birch	3,3	12,6	24,0	20,2	12,0	72,1	43%
other hardwoods	2,6	10,5	8,2	1,6	3,6	26,5	16%
beech	0,0	0,0	0,0	0,0	0,0	0,0	0%
softwoods	0,5	2,8	3,8	2,1	0,0	9,2	5%
non commercial	0,0	0,0	0,0	0,0	0,0	0,0	0%
Total	11,2	41,0	49,5	37,1	29,2	168,0	
Proportion	7%	24%	29%	22%	17%		

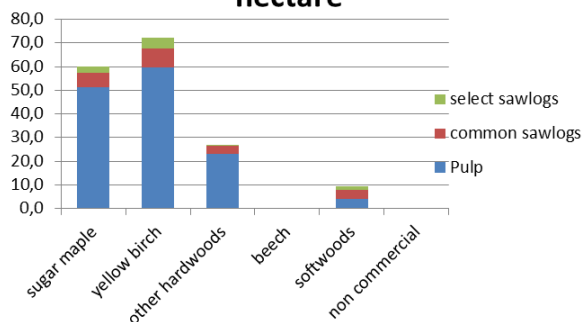
Merchantable volume (m3) per hectare



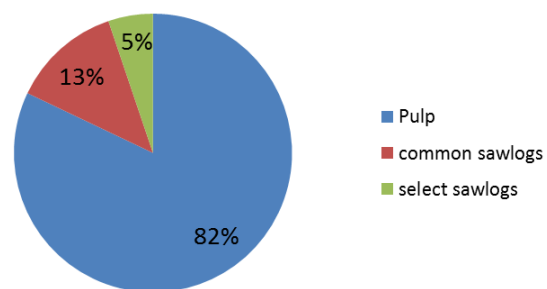
Product recovery (m3) per hectare

	Pulp	common sawlogs	select sawlogs	Total	Proportion
sugar maple	51,4	6,0	2,8	60	36%
yellow birch	59,6	8,2	4,3	72	43%
other hardwoods	23,0	3,3	0,2	26	16%
beech	0,0	0,0	0,0	0	0%
softwoods	3,8	3,9	1,4	9	5%
non commercial	0,0	0,0	0,0	0	0%
Total	137,9	21,4	8,7	168,0	
Proportion	82%	13%	5%		

Merchantable volume (m3) per hectare



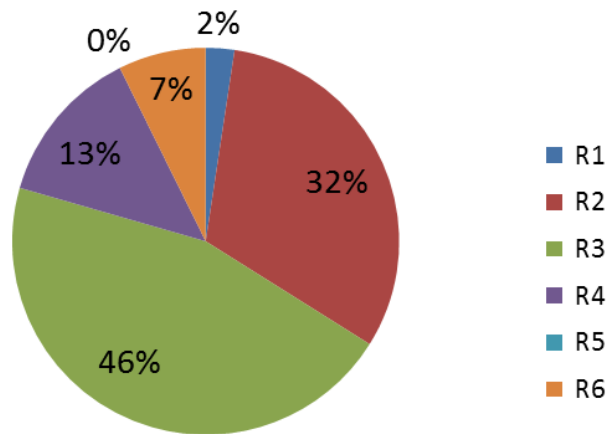
Product recovery (%)



Number of Trees and Volume Distribution per Risk Class³

Risk class - number of stems per hectare							Total	Proportion
	R1	R2	R3	R4	R5	R6		
sugar maple	3	59	93	26	0	9	191	36%
yellow birch	3	79	79	20	0	16	197	38%
other hardwoods	1	24	50	20	0	6	101	19%
beech	0	0	0	0	0	0	0	0%
softwoods	6	3	13	2	0	7	30	6%
non commercial	0	0	3	2	0	1	5	1%
Total	13	165	238	69	0	38	523	
Proportion	2%	32%	46%	13%	0%	7%		

% of stems per risk class



Risk class - Volume (m3) per hectare							Total	Proportion
	R1	R2	R3	R4	R5	R6		
sugar maple	0,3	14,1	26,7	13,5	0,0	5,6	60,2	36%
yellow birch	0,2	32,1	30,4	6,0	0,0	3,4	72,1	43%
other hardwoods	0,2	6,5	12,8	5,7	0,0	1,3	26,5	16%
beech	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0%
softwoods	4,0	0,5	2,4	0,0	0,0	2,3	9,2	5%
non commercial	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0%
Total	4,7	53,3	72,2	25,2	0,0	12,6	168,0	
Proportion	3%	32%	43%	15%	0%	8%		

³ Pelletier, G., D. Landry and M. Girouard (2013). A tree classification system for New Brunswick. Edmundston, New Brunswick, Northern Hardwoods Research Institute. « R5 » & « R6 » represent dead trees with or without recoverable products respectively.

Number of trees and Volume Distribution per Form Class⁴

Form class - Number of stems per hectare										
	F1	F2	F3	F4	F5	F6	F7	F8	Total	Proportion
sugar maple	32	106	5	3	7	4	28	7	191	36%
yellow birch	39	87	5	8	16	3	25	14	197	38%
other hardwoods	36	43	2	0	8	5	6	3	101	19%
beech	0	0	0	0	0	0	0	0	0	0%
softwoods	24	5	0	0	0	0,83333333	0	0	30	6%
non commercial	0	3	0	2	0	0	1	0	5	1%
Total	131	243	12	13	30	13	59	23	523	
Proportion	25%	46%	2%	2%	6%	3%	11%	4%		

Risk and Form class combinations- Number of stems per hectare										
	F1	F2	F3	F4	F5	F6	F7	F8	Total	Proportion
R1	8	4	0	0	0	0	0	0	13	2%
R2	52	77	2	0	9	3	17	7	165	32%
R3	42	123	6	6	13	4	33	13	238	46%
R4	13	25	4	7	6	3	9	3	69	13%
R5	0	0	0	0	0	0	0	0	0	0%
R6	17	13	0	0	3	3	1	2	38	7%
Total	131	243	12	13	30	13	59	23	523	
Proportion	25%	46%	2%	2%	6%	3%	11%	4%		

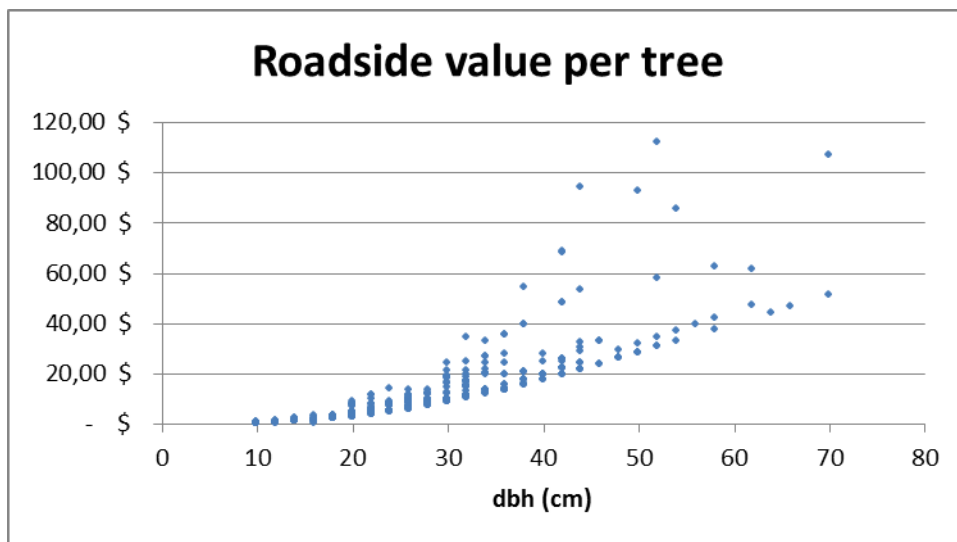
⁴ Pelletier, G., D. Landry and M. Girouard (2013). A tree classification system for New Brunswick. Edmundston, New Brunswick, Northern Hardwoods Research Institute.

MSCR classification & acceptable growing stock classification

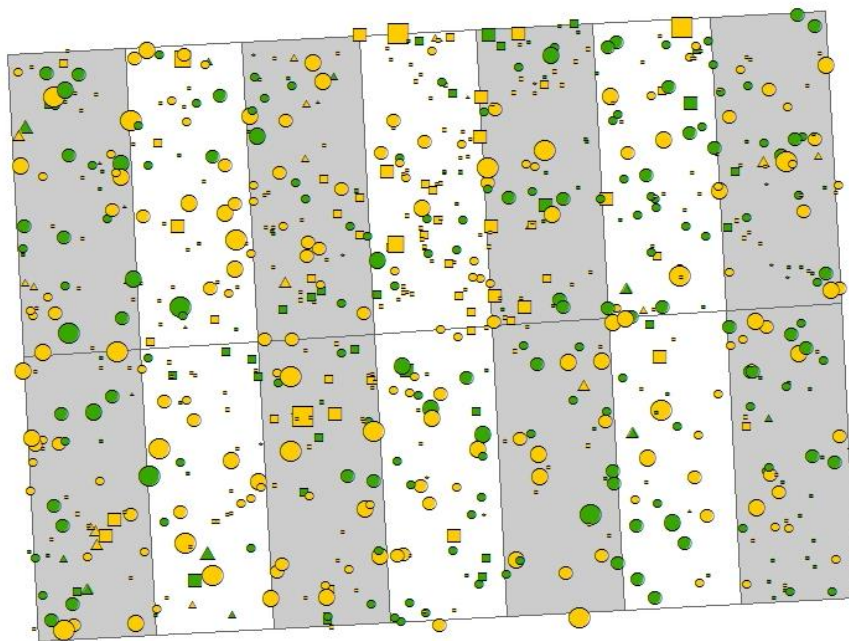
MSCR class - Number of stems per hectare							
	M	S	C	R	Dead	Total	Proportion
sugar maple	23	18	31	105	0	178	37%
yellow birch	29	19	23	107	0	178	37%
other hardwoods	22	20	13	41	0	95	20%
beech	0	0	0	0	0	0	0%
softwoods	7	4	5	8	0	24	5%
non commercial	0	0	0	1	0	1	0%
Total	81	62	71	262	0	475	
Proportion	17%	13%	15%	55%	0%		
MSCR sawlog class - Number of stems							
	M	S	C	R	Dead	Total	Proportion
sugar maple	3	2	7	29	0	40	28%
yellow birch	2	5	5	43	0	55	12%
other hardwoods	0	8	3	21	0	31	6%
beech	0	0	0	0	0	0	0%
softwoods	6	2	4	7	0	18	4%
non commercial	0	0	0	0	0	0	0%
Total	10	16	18	100	0	144	
Proportion	2%	3%	4%	21%	0%		
Acceptable growing stock (AGS) per hectare							
	10-18 dbh	20-28 dbh	30-38 dbh	40-48 dbh	50-100 dbh	Total	Proportion
sugar maple	23	28	8	0	1	58	31%
yellow birch	9	31	19	8	3	70	36%
other hardwoods	0	1	0	0	0	1	1%
beech	0	0	0	0	0	0	0%
softwoods	0	3	3	0	0	5	17%
non commercial	0	0	0	0	0	0	0%
Total	32	62	29	8	3	134	26%
Proportion	16%	36%	32%	21%	17%		

Economic Data

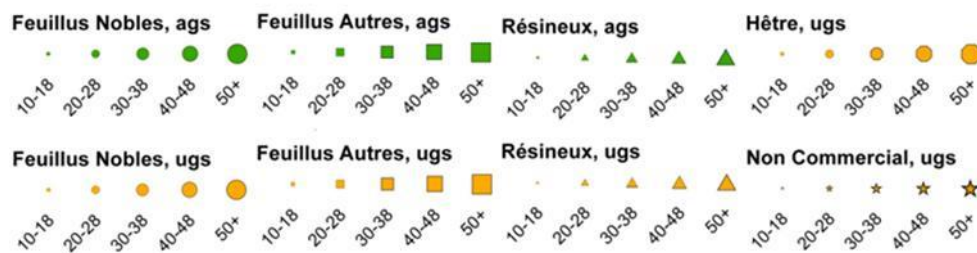
Value per hectare							
	Harvest cost	Mill price	Roadside value				
sugar maple	927 \$	2 573 \$	1 646 \$				
yellow birch	1 102 \$	3 169 \$	2 067 \$				
other hardwoods	435 \$	1 071 \$	636 \$				
beech	- \$	- \$	- \$				
softwoods	146 \$	569 \$	423 \$				
non commercial	- \$	- \$	- \$				
Total	2 610 \$	7 382 \$	4 772 \$				
Net value per hectare							
	10-18 dbh	20-28 dbh	30-38 dbh	40-48 dbh	50-100 dbh	Total	Proportion
sugar maple	75 \$	350 \$	387 \$	360 \$	474 \$	1 646 \$	34%
yellow birch	51 \$	285 \$	722 \$	599 \$	410 \$	2 067 \$	43%
other hardwoods	44 \$	266 \$	201 \$	38 \$	88 \$	636 \$	13%
beech	- \$	- \$	- \$	- \$	- \$	- \$	0%
softwoods	12 \$	107 \$	169 \$	135 \$	- \$	423 \$	9%
non commercial	- \$	- \$	- \$	- \$	- \$	- \$	0%
Total	182 \$	1 008 \$	1 479 \$	1 132 \$	971 \$	4 772 \$	
Proportion	4%	21%	31%	24%	20%		
Net value per cubic meter							
	10-18 dbh	20-28 dbh	30-38 dbh	40-48 dbh	50-100 dbh	Mean	
sugar maple	16 \$	23 \$	29 \$	27 \$	35 \$	27 \$	
yellow birch	15 \$	23 \$	30 \$	30 \$	34 \$	29 \$	
other hardwoods	17 \$	25 \$	25 \$	23 \$	24 \$	24 \$	
beech	- \$	- \$	- \$	- \$	- \$		
softwoods	24 \$	39 \$	44 \$	64 \$	- \$	46 \$	
non commercial	- \$	- \$	- \$	- \$	- \$		
Mean	16 \$	25 \$	30 \$	30 \$	33 \$	28 \$	



Tree Locations in Horseback 2 Marteloscope

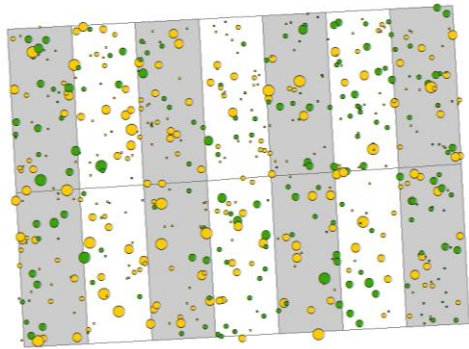


14	11	10	7	6	3	2
13	12	9	8	5	4	1

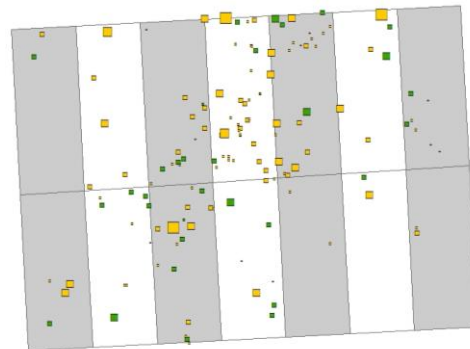


Detailed Cartography per Species Group

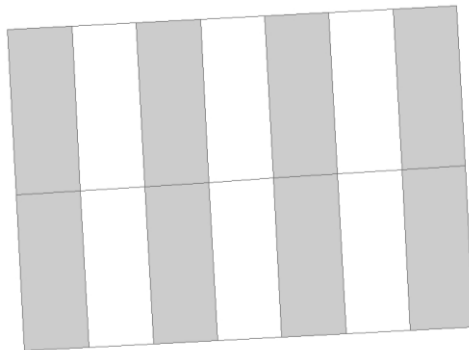
Tolerant Hardwoods



Other Hardwoods



Beech



Softwoods

