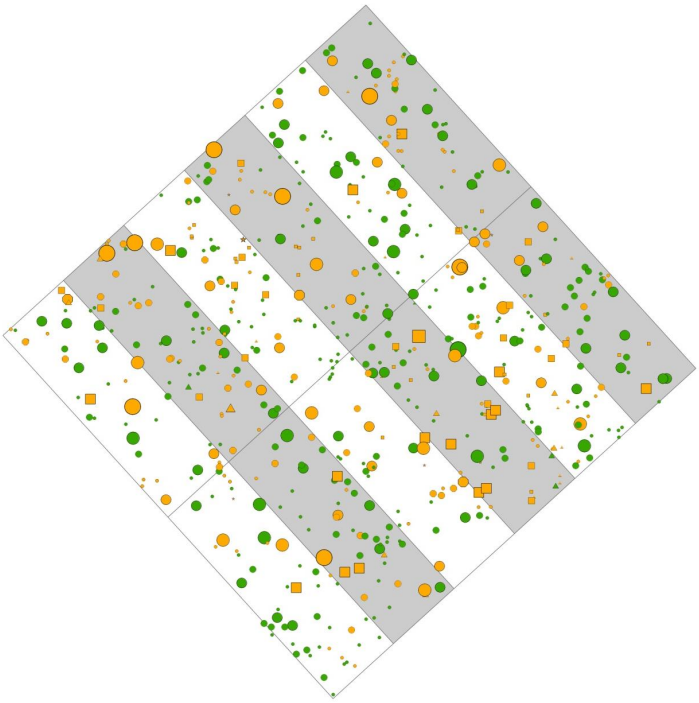
# Gounamitz 3 Marteloscope

## Site Description



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# Acknowledgments

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- Selection of sites :
  - Gaëtan Pelletier – NHRI
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  - Michel Caron – Acadian Timber
- Site layout :
  - Yvon Dubé, Civil engineering technologist
- Compiler development :
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  - John Leclair
- Tree classification and measurement :
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  - Sylvain Caron – 4BM
  - Philippe Poitras – 4BM
  - Eric Caron – 4BM
  - Lucien Sirois – 4BM
  - Ted Voisine – 4BM
- Tree cartography :
  - Marcel Cyr – CFDS
  - Gaëtan Therrien – CFDS
  - Jules Landry – CFDS
- Final report drafting and layout :
  - Caroline Pagé

# Table of Contents

# Introduction

## General Description of a Marteloscope

A marteloscope is a 1 hectare 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.).

The marteloscopes that are part of this network are subdivided into six corridors 16.7 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.

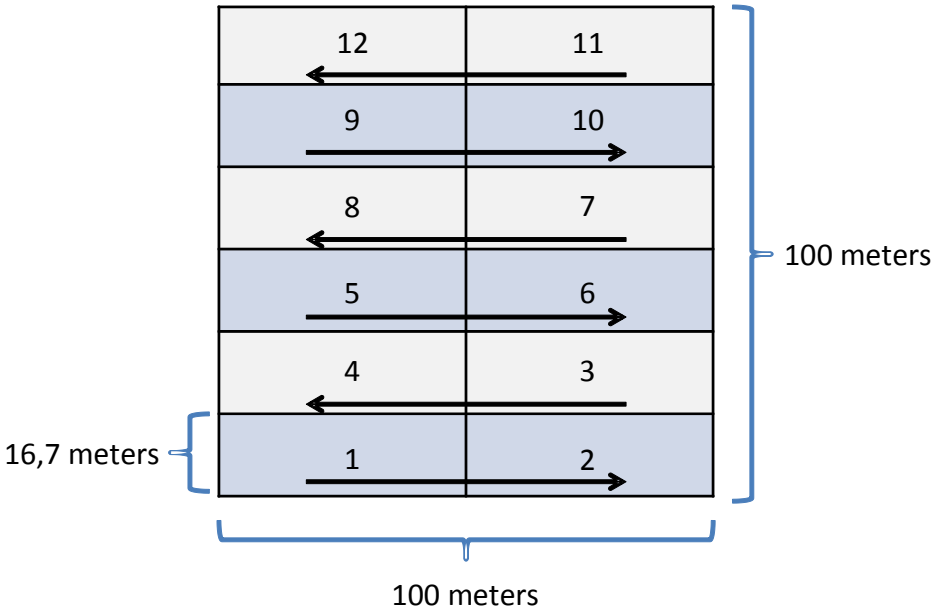



**Figure 1. Example of marteloscope design. The arrows indicate the recommended walking direction in order to easily see tree numbers.**

## Intended Uses of Marteloscopes

Marteloscopes 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

The latest documented harvesting operation for this stand is dated in 1996. At the time of treatment, the stand presented a basal area of 24 m²/hectare, and the basal area after cutting was 19 m²/hectare. Available documentation referred to a diameter-limit cutting prescription:

***For tolerant hardwoods of « Timber » quality, harvest of:***

| | |
|---|---|
| Yellow birch | 48 cm+ |
| Sugar maple | 48 cm+ |
| Other tolerant hardwoods | 34 cm+ |

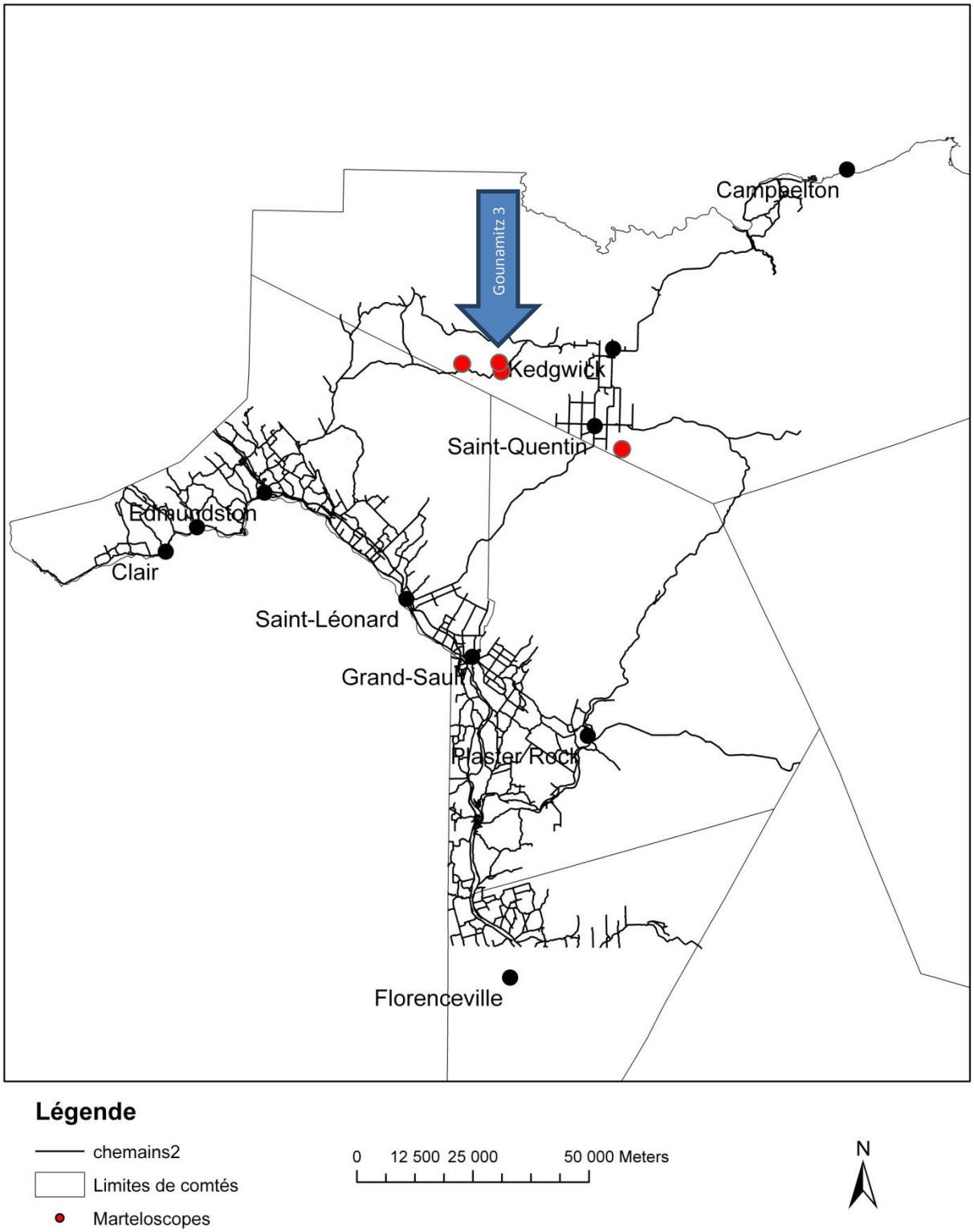
***For tolerant hardwoods of « Pulp » quality, harvest of:***

| | |
|---|---|
| Yellow birch | 48 – 60 cm |
| Sugar maple | 48 – 60 cm |
| Other tolerant hardwoods | 34 – 60 cm |

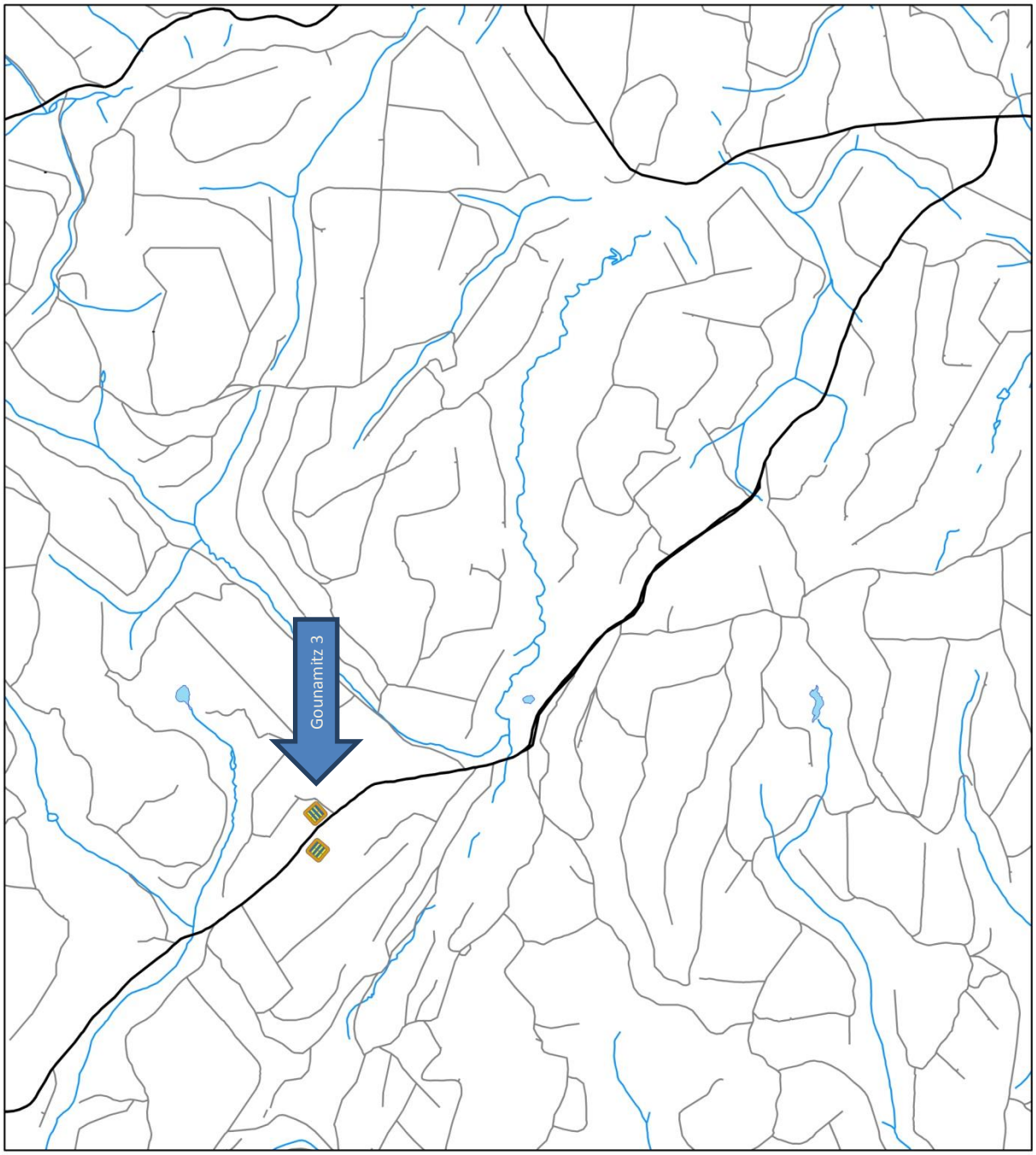
***For softwoods, harvest of:***

| | |
|---|---|
| Fir | 20 cm+ |
| Spruce | 30 cm+ |

## Location of the four marteloscopes installed in 2013



## Gounamitz 3 Marteloscope Location




**Légende**

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

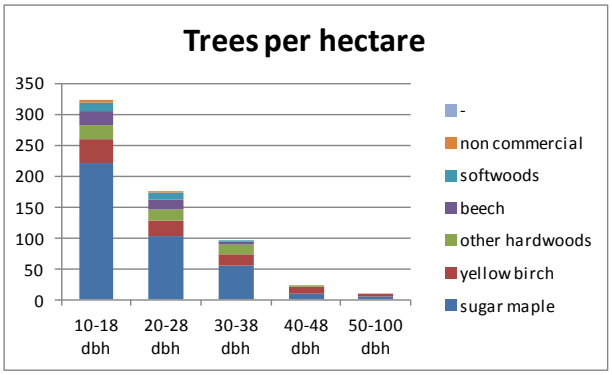
1:40 000

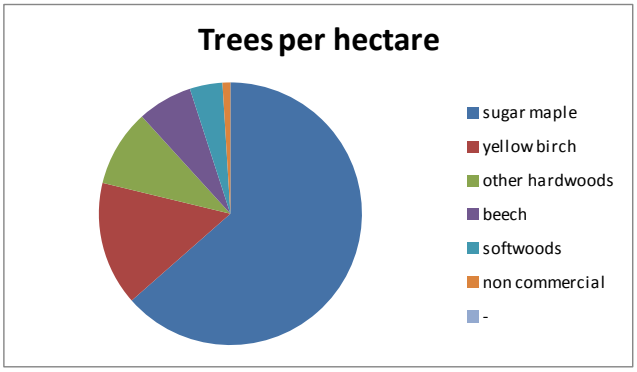
N

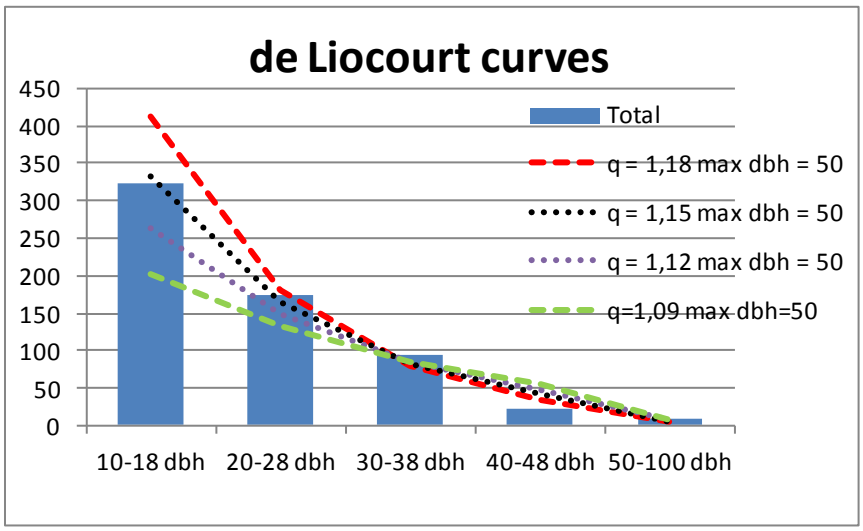
# Gounamitz 3 Marteloscope Initial Stand Conditions

## Trees per Hectare

| Trees per hectare | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Species** | **10-18 dbh** | **20-28 dbh** | **30-38 dbh** | **40-48 dbh** | **50-100 dbh** | **Total** | **Proportion** | **Qdbh** |
| sugar maple | 221 | 103 | 55 | 10 | 6 | **395** | **64%** | **22.7** |
| yellow birch | 38 | 24 | 19 | 11 | 3 | **95** | **15%** | **27.8** |
| other hardwoods | 24 | 18 | 16 | 1 | 0 | **59** | **9%** | **24.5** |
| beech | 21 | 18 | 3 | 0 | 0 | **42** | **7%** | **20.2** |
| softwoods | 14 | 10 | 1 | 0 | 0 | **25** | **4%** | **19.3** |
| non commercial | 5 | 1 | 0 | 0 | 0 | **6** | **1%** | **14.8** |
| - | 0 | 0 | 0 | 0 | 0 | **0** | **0%** | **0.0** |
| **Total** | 323 | 174 | 94 | 22 | 9 | 622 | | |
| **Proportion** | 52% | 28% | 15% | 4% | 1% | | | |

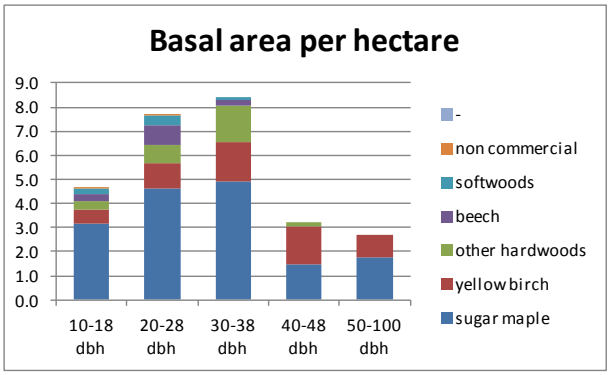


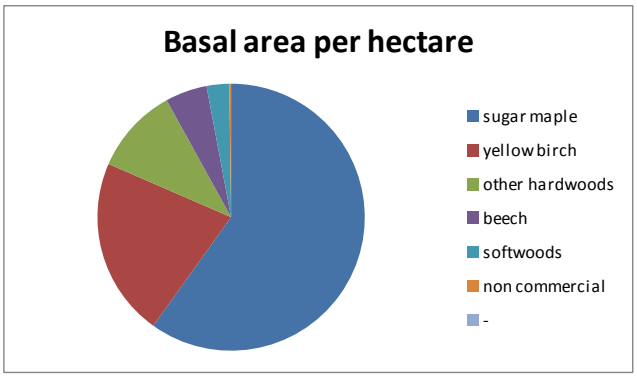



## Basal Area per Hectare

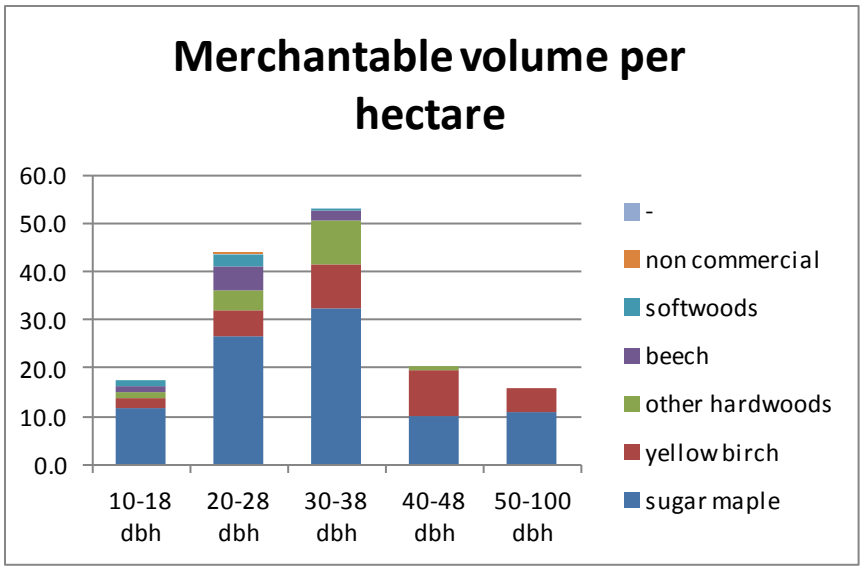
| Basal area per hectare | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Species** | **10-18 dbh** | **20-28 dbh** | **30-38 dbh** | **40-48 dbh** | **50-100 dbh** | **Total** | **Proportion** |
| sugar maple | 3.1 | 4.6 | 4.9 | 1.5 | 1.8 | **16.0** | **60%** |
| yellow birch | 0.6 | 1.1 | 1.6 | 1.6 | 0.9 | **5.8** | **22%** |
| other hardwoods | 0.4 | 0.8 | 1.5 | 0.1 | 0.0 | **2.8** | **10%** |
| beech | 0.3 | 0.8 | 0.3 | 0.0 | 0.0 | **1.3** | **5%** |
| softwoods | 0.2 | 0.4 | 0.1 | 0.0 | 0.0 | **0.7** | **3%** |
| non commercial | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | **0.1** | **0%** |
| - | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | **0.0** | **0%** |
| **Total** | 4.6 | 7.7 | 8.4 | 3.2 | 2.7 | 26.6 | |
| **Proportion** | 17% | 29% | 32% | 12% | 10% | | |



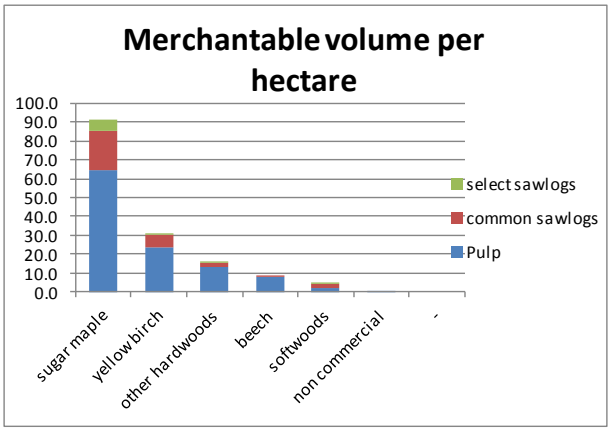



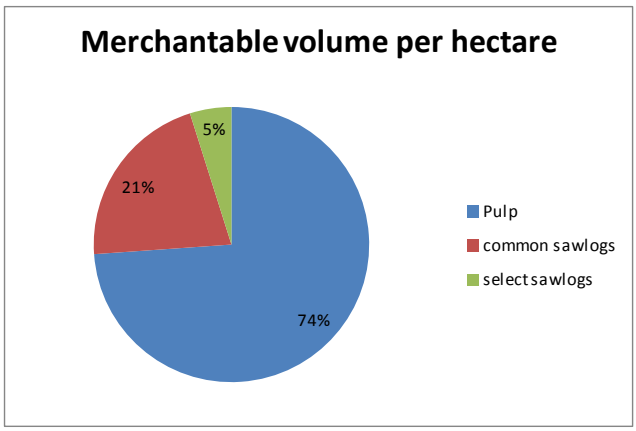

## Merchantable Volume per Hectare

| Merchantable volume per hectare | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Species** | **10-18 dbh** | **20-28 dbh** | **30-38 dbh** | **40-48 dbh** | **50-100 dbh** | **Total** | **Proportion** |
| sugar maple | 11.5 | 26.4 | 32.2 | 10.0 | 11.0 | **91.1** | **60%** |
| yellow birch | 2.1 | 5.4 | 9.4 | 9.5 | 5.0 | **31.3** | **21%** |
| other hardwoods | 1.4 | 4.4 | 9.1 | 0.8 | 0.0 | **15.7** | **10%** |
| beech | 1.4 | 5.0 | 1.9 | 0.0 | 0.0 | **8.3** | **6%** |
| softwoods | 1.0 | 2.6 | 0.6 | 0.0 | 0.0 | **4.1** | **3%** |
| non commercial | 0.0 | 0.3 | 0.0 | 0.0 | 0.0 | **0.3** | **0%** |
| - | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | **0.0** | **0%** |
| **Total** | 17.4 | 44.1 | 53.2 | 20.3 | 16.0 | 151.0 | |
| **Proportion** | 12% | 29% | 35% | 13% | 11% | | |



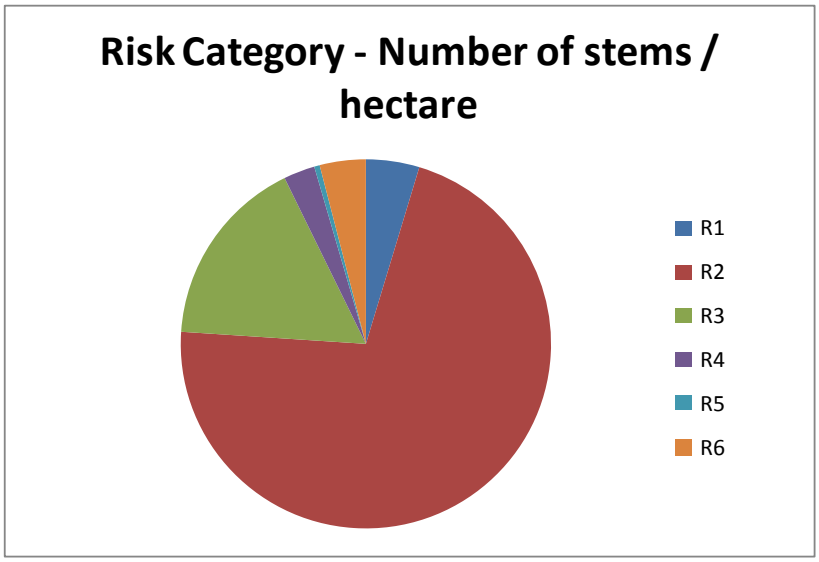

| Merchantable volume per hectare | | | | | |
|---|---|---|---|---|---|
| **Species** | **Pulp** | **common sawlogs** | **select sawlogs** | **Total** | **Proportion** |
| sugar maple | 64.4 | 20.9 | 5.8 | **91** | **60%** |
| yellow birch | 23.6 | 6.7 | 1.0 | **31** | **21%** |
| other hardwoods | 13.0 | 2.5 | 0.3 | **16** | **10%** |
| beech | 8.3 | 0.0 | 0.0 | **8** | **6%** |
| softwoods | 1.9 | 2.0 | 0.2 | **4** | **3%** |
| non commercial | 0.3 | 0.0 | 0.0 | **0** | **0%** |
| - | 0.0 | 0.0 | 0.0 | **0** | **0%** |
| **Total** | 111.5 | 32.1 | 7.4 | **151** | |
| **Proportion** | 74% | 21% | 5% | | |



## Number of Trees and Volume Distribution per Risk Class[1]

| Risk Category - Number of stems / hectare | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Species** | **R1** | **R2** | **R3** | **R4** | **R5** | **R6** | **Total** | **Proportion** |
| sugar maple | 20 | 317 | 52 | 1 | 1 | 4 | **395** | **64%** |
| yellow birch | 5 | 70 | 17 | 1 | 0 | 2 | **95** | **15%** |
| other hardwoods | 0 | 41 | 13 | 1 | 1 | 3 | **59** | **9%** |
| beech | 0 | 5 | 19 | 13 | 0 | 5 | **42** | **7%** |
| softwoods | 4 | 11 | 2 | 1 | 1 | 6 | **25** | **4%** |
| non commercial | 0 | 0 | 1 | 0 | 0 | 5 | **6** | **1%** |
| - | 0 | 0 | 0 | 0 | 0 | 0 | **0** | **0%** |
| **Total** | 29 | 444 | 104 | 17 | 3 | 25 | **622** | |
| **Proportion** | 5% | 71% | 17% | 3% | 0% | 4% | | |




| Risk Category - Volume / hectare | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Species** | **R1** | **R2** | **R3** | **R4** | **R5** | **R6** | **Total** | **Proportion** |
| sugar maple | 1.8 | 70.4 | 15.9 | 2.0 | 0.0 | 1.0 | **91.1** | **60%** |
| yellow birch | 0.5 | 22.4 | 8.0 | 0.2 | 0.0 | 0.2 | **31.3** | **21%** |
| other hardwoods | 0.0 | 11.5 | 3.7 | 0.0 | 0.0 | 0.5 | **15.7** | **10%** |
| beech | 0.0 | 0.5 | 2.3 | 4.1 | 0.0 | 1.4 | **8.3** | **6%** |
| softwoods | 1.2 | 1.9 | 0.2 | 0.0 | 0.1 | 0.8 | **4.1** | **3%** |
| non commercial | 0.0 | 0.0 | 0.3 | 0.0 | 0.0 | 0.0 | **0.3** | **0%** |
| - | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | **0.0** | **0%** |
| **Total** | 3.5 | 106.7 | 30.5 | 6.4 | 0.1 | 3.8 | **151.0** | |
| **Proportion** | 2% | 71% | 20% | 4% | 0% | 2% | | |

[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 Class[2]

| Form Category - Number of stems / hectare | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Species** | **F1** | **F2** | **F3** | **F4** | **F5** | **F6** | **F7** | **F8** | **Total** | **Proportion** |
| sugar maple | 135 | 164 | 9 | 0 | 14 | 12 | 39 | 20 | **393** | **64%** |
| yellow birch | 18 | 34 | 7 | 1 | 8 | 8 | 12 | 6 | **94** | **15%** |
| other hardwoods | 8 | 24 | 0 | 0 | 9 | 3 | 4 | 10 | **58** | **9%** |
| beech | 9 | 23 | 2 | 2 | 2 | 0 | 1 | 1 | **40** | **7%** |
| softwoods | 17 | 7 | 0 | 0 | 0 | 1 | 0 | 0 | **25** | **4%** |
| non commercial | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | **2** | **0%** |
| - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **0** | **0%** |
| **Total** | 187 | 252 | 18 | 3 | 33 | 24 | 58 | 37 | 612 | |
| **Proportion** | 31% | 41% | 3% | 0% | 5% | 4% | 9% | 6% | | |

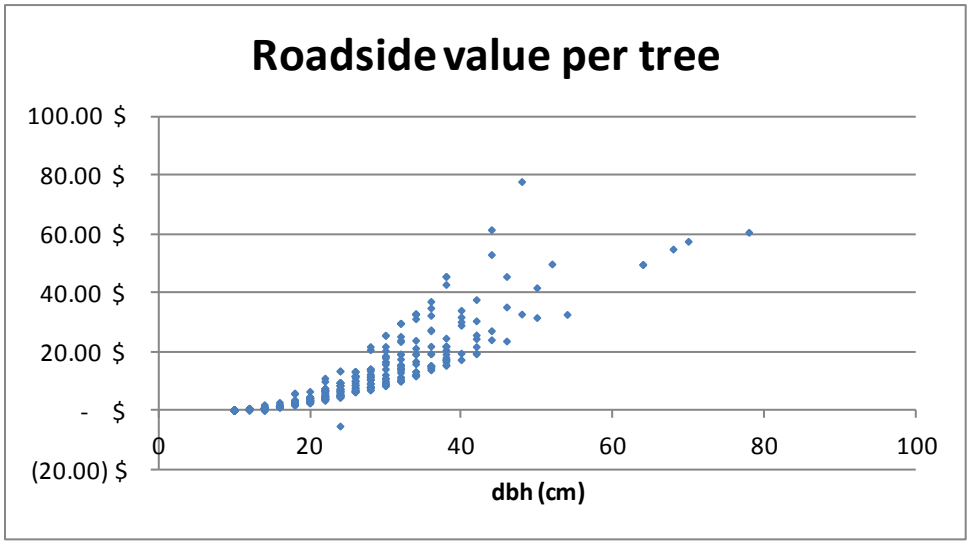
| Form Category - Number of stems / hectare | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Risk Category** | **F1** | **F2** | **F3** | **F4** | **F5** | **F6** | **F7** | **F8** | **Total** | **Proportion** |
| **R1** | 19 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | **29** | **5%** |
| **R2** | 138 | 184 | 13 | 0 | 26 | 11 | 44 | 27 | **443** | **72%** |
| **R3** | 15 | 47 | 4 | 2 | 5 | 11 | 13 | 7 | **104** | **17%** |
| **R4** | 4 | 7 | 1 | 1 | 2 | 0 | 0 | 1 | **16** | **3%** |
| **R5** | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | **3** | **0%** |
| **R6** | 10 | 3 | 0 | 0 | 0 | 2 | 1 | 1 | **17** | **3%** |
| **Total** | 187 | 252 | 18 | 3 | 33 | 24 | 58 | 37 | 612 | |
| **Proportion** | 31% | 41% | 3% | 0% | 5% | 4% | 9% | 6% | | |

## Economic Data

| Value | | | |
|---|---|---|---|
| **Species** | **Harvest cost** | **Mill price** | **Roadside value** |
| sugar maple | 1 473 $ | 4 303 $ | 2 831 $ |
| yellow birch | 483 $ | 1 407 $ | 923 $ |
| other hardwoods | 258 $ | 597 $ | 339 $ |
| beech | 144 $ | 310 $ | 166 $ |
| softwoods | 74 $ | 242 $ | 168 $ |
| non commercial | 5 $ | - $ | (5) $ |
| - | - $ | - $ | - $ |
| **Total** | 2 437 $ | 6 859 $ | 4 422 $ |

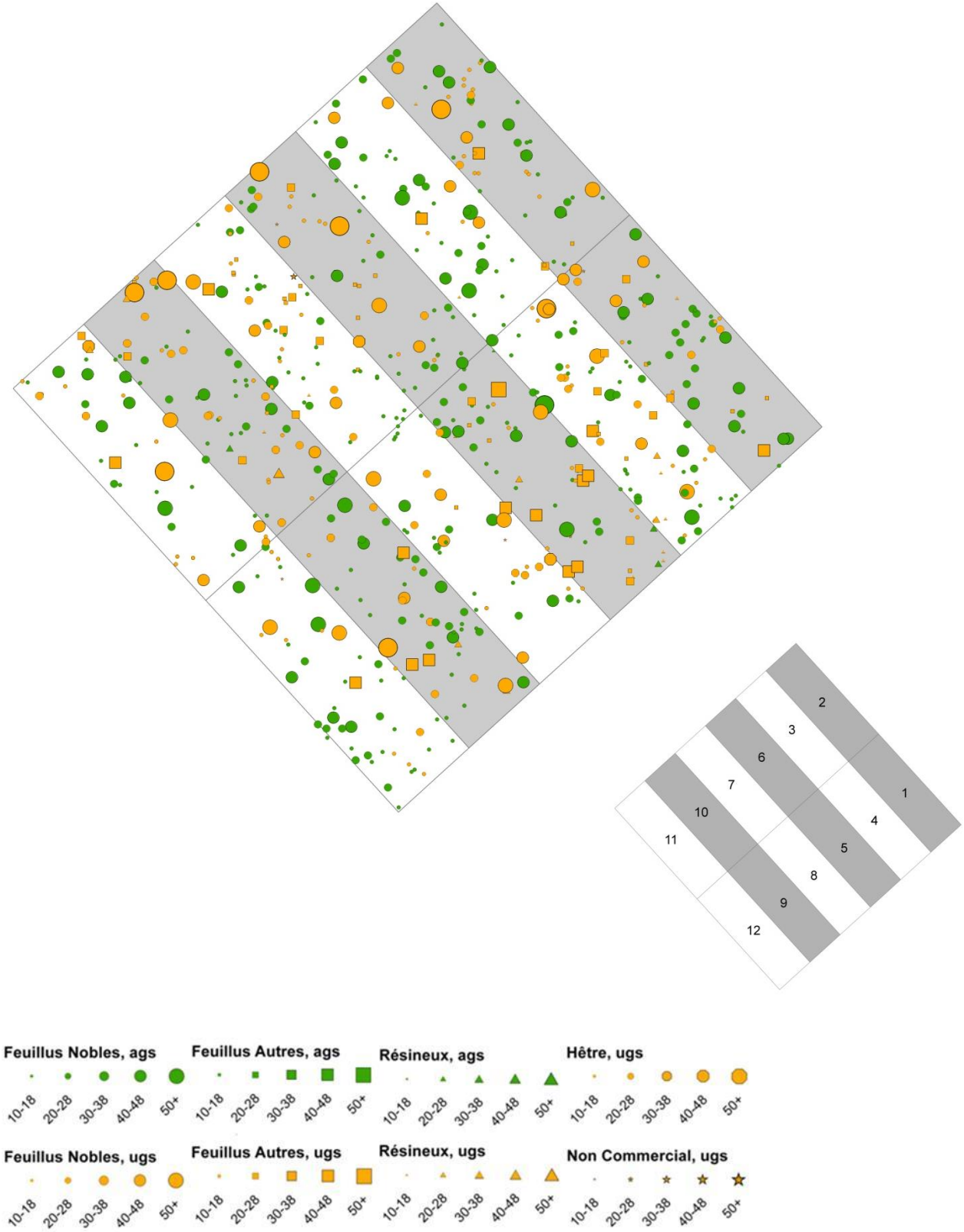
[2] Pelletier, G., D. Landry and M. Girouard (2013). A tree classification system for New Brunswick. Edmundston, New Brunswick, Northern Hardwoods Research Institute.

| Net value per hectare | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Species** | **10-18 dbh** | **20-28 dbh** | **30-38 dbh** | **40-48 dbh** | **50-100 dbh** | **Total** | **Proportion** |
| sugar maple | 191 $ | 749 $ | 1 218 $ | 387 $ | 285 $ | **2 831 $** | **64%** |
| yellow birch | 36 $ | 142 $ | 289 $ | 314 $ | 143 $ | **923 $** | **21%** |
| other hardwoods | 22 $ | 89 $ | 209 $ | 19 $ | - $ | **339 $** | **8%** |
| beech | 23 $ | 101 $ | 43 $ | - $ | - $ | **166 $** | **4%** |
| softwoods | 26 $ | 110 $ | 31 $ | - $ | - $ | **168 $** | **4%** |
| non commercial | - $ | (5) $ | - $ | - $ | - $ | **(5) $** | **0%** |
| - | - $ | - $ | - $ | - $ | - $ | **- $** | **0%** |
| **Total** | 298 $ | 1 185 $ | 1 790 $ | 721 $ | 428 $ | 4 422 $ | |
| **Proportion** | 7% | 27% | 40% | 16% | 10% | | |



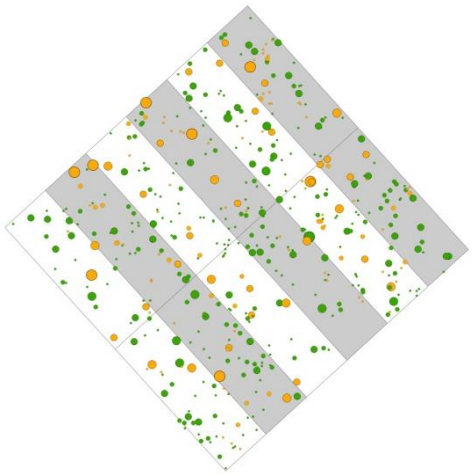

| Net value per cubic meter | | | | | | |
|---|---|---|---|---|---|---|
| **Species** | **10-18 dbh** | **20-28 dbh** | **30-38 dbh** | **40-48 dbh** | **50-100 dbh** | **Mean** |
| sugar maple | 17 $ | 28 $ | 38 $ | 39 $ | 26 $ | **31 $** |
| yellow birch | 17 $ | 26 $ | 31 $ | 33 $ | 29 $ | **29 $** |
| other hardwoods | 15 $ | 20 $ | 23 $ | 23 $ | - $ | **22 $** |
| beech | 16 $ | 20 $ | 22 $ | - $ | - $ | **20 $** |
| softwoods | 28 $ | 43 $ | 52 $ | - $ | - $ | **41 $** |
| non commercial | - $ | (17) $ | - $ | - $ | - $ | **(17) $** |
| - | - $ | - $ | - $ | - $ | - $ | |
| **Mean** | 17 $ | 27 $ | 34 $ | 36 $ | 27 $ | 29 $ |

# Tree Locations in Gounamitz 3 Marteloscope

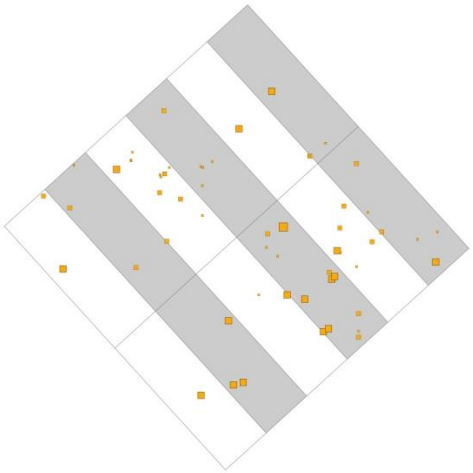


## Detailed Cartography per Species Group

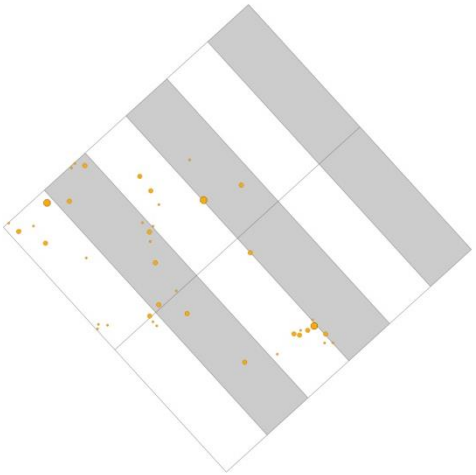
Tolerant Hardwoods



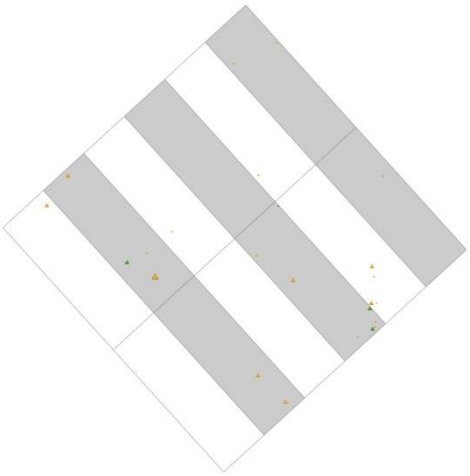
Other Hardwoods



Beech



Softwoods



## Aerial Photo