

Envirothon New Brunswick

Forestry Workshop

Part 1 of 2

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Outline

- Forest Inventory
- Forest Succession
- Tree Identification/Dichotomous Keys
- Invasive Species + Spruce Budworm
- Silviculture Treatments (if time permits)



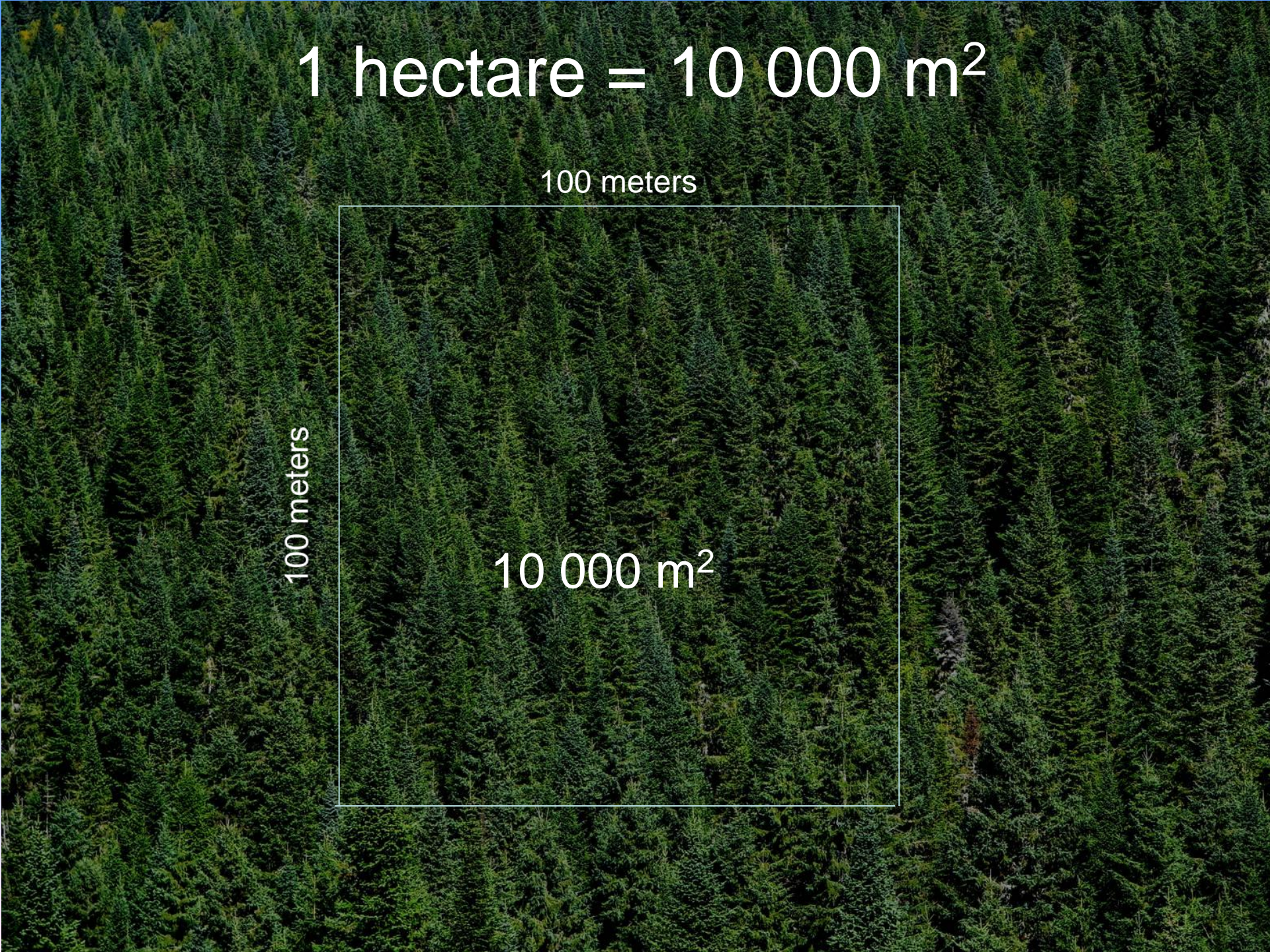
Forest Inventory

1 hectare = 10 000 m²

100 meters

100 meters

10 000 m²





Softwoods
Hardwoods
Roads
Streams
Buildings
Power lines
Beaver ponds
Fields
Cutovers
Wetlands
Lakes

Department Natural
Resources & Energy

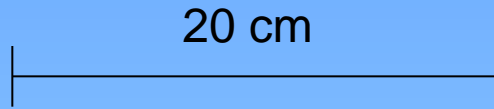
Scale of photo
1: 12 500
1cm = 12 500 cm
1cm = 125 m

Flight Line
& Photo #

Date

Map
Reference

Air photos



$$1 \text{ cm} = 12\,500 \text{ cm}$$

$$= 125 \text{ m}$$

$$20 \text{ cm} = 20 \times 125 \text{ m}$$

$$= 2500 \text{ m}$$

$$1 \text{ hectare} = 10\,000 \text{ m}^2$$

$$(100 \text{ m} \times 100 \text{ m})$$



Calculate distance A to B (m)

Direction going from A to B

Area (hectares) of woodlot

Forest inventory tools

Hypsometers (measure height of trees)



TruPulse200

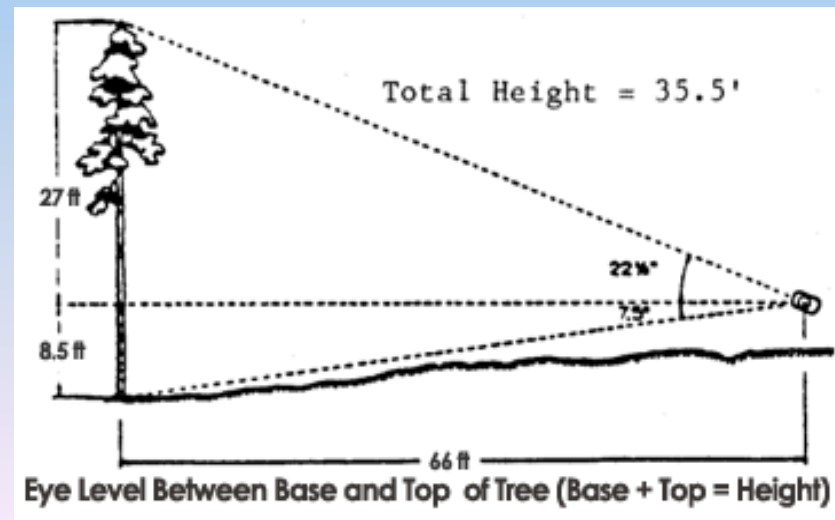


Haga



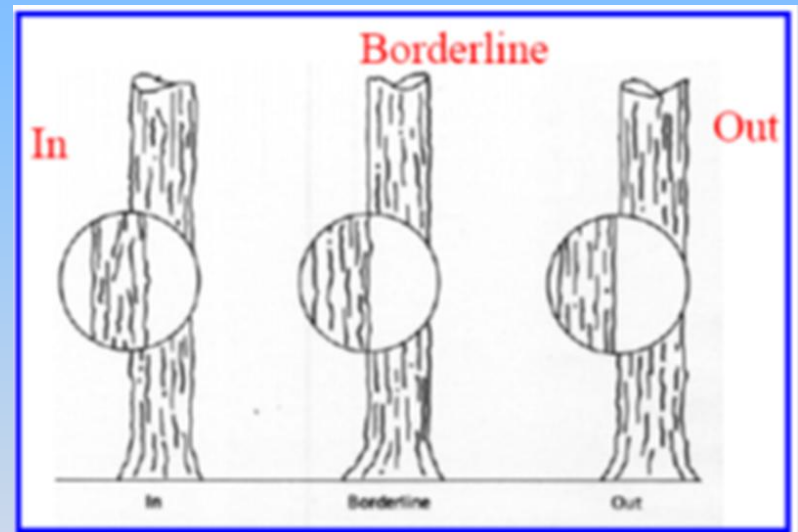
Vertex

Suunto



Forest inventory tools

- Basal Area (angle gauge and prism)



Other Forest Inventory Tools



Diameter Tape



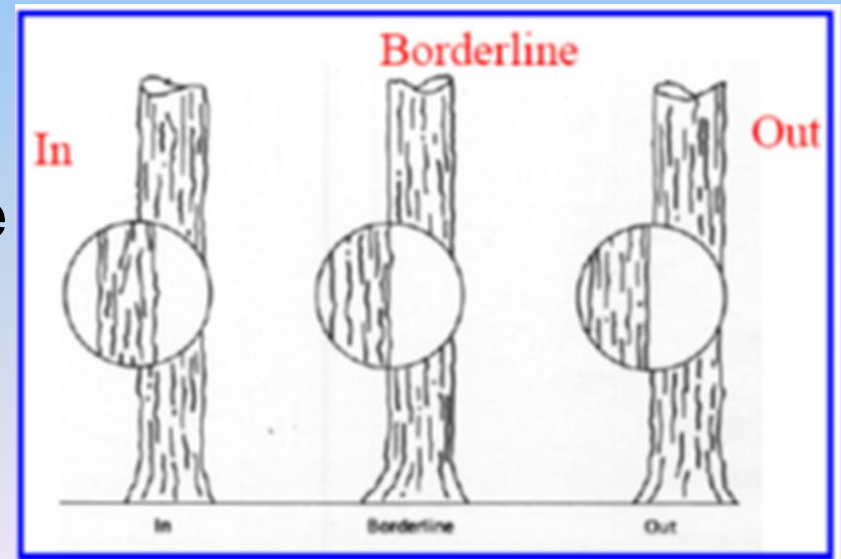
Increment borer



Calipers

How do we measure basal area?

- Prism or angle gauge
- Prism is calibrated to measure the amount of BA per hectare.
- Size of the tree doesn't matter (if its in the plot it represents the same amount of BA).
- Example: If 12 trees are in the plot there is 24 m² of BA/ha



Basal Area

- What is the basal area of a tree that has a diameter of 30 cm at breast height (1.3 m above ground)?



30 cm

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$$A = \pi r^2$$

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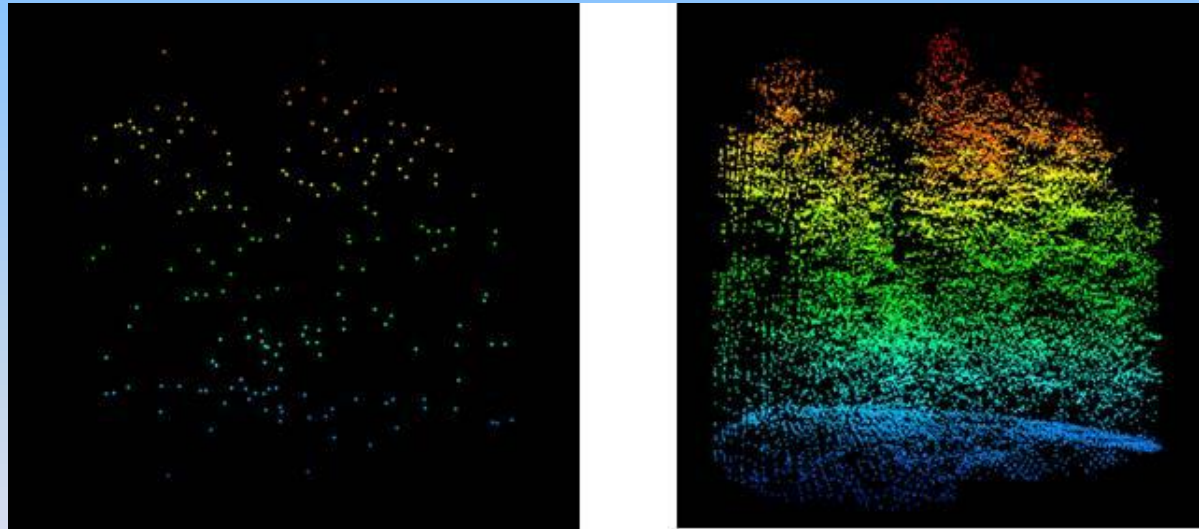
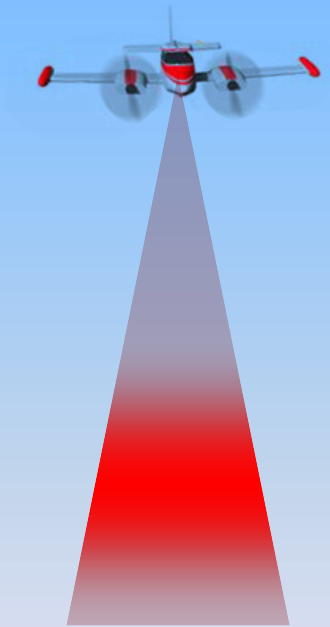
$$\begin{aligned} A &= 3.14 \times (15\text{cm})^2 \\ &= 3.14 \times 225\text{cm}^2 \\ &= 706.50 \text{ cm}^2 \\ &= .07065 \text{ m}^2 \end{aligned}$$

What is the basal area of a tree with a diameter of 20 cm.

How many trees would you need for 2 m² BA?

Forest Inventory in the Future

- LiDAR (Light Detection and Ranging)



Forest Succession (pre-colonization)



Late
Successional

Disturbance

Early
Successional

Mid
Successional

Late
Successional

Late successional:

Species are usually long lived, tolerant to shade and can often sustain itself

Disturbance:

Fire, insects, floods, other natural disasters, human

Early successional:

Species well adapted to colonizing disturbed sites
Shade intolerant, fast growing, generally shorter-lived

Mid successional:

Gradual replacement of early successional species

Cycle repeats:

Forest Succession (post-colonization)

The human factor

Compete with nature for the resource



Shipbuilding (1770 – 1920)



Napoleon Bonaparte
Continental blockade
1805-1815

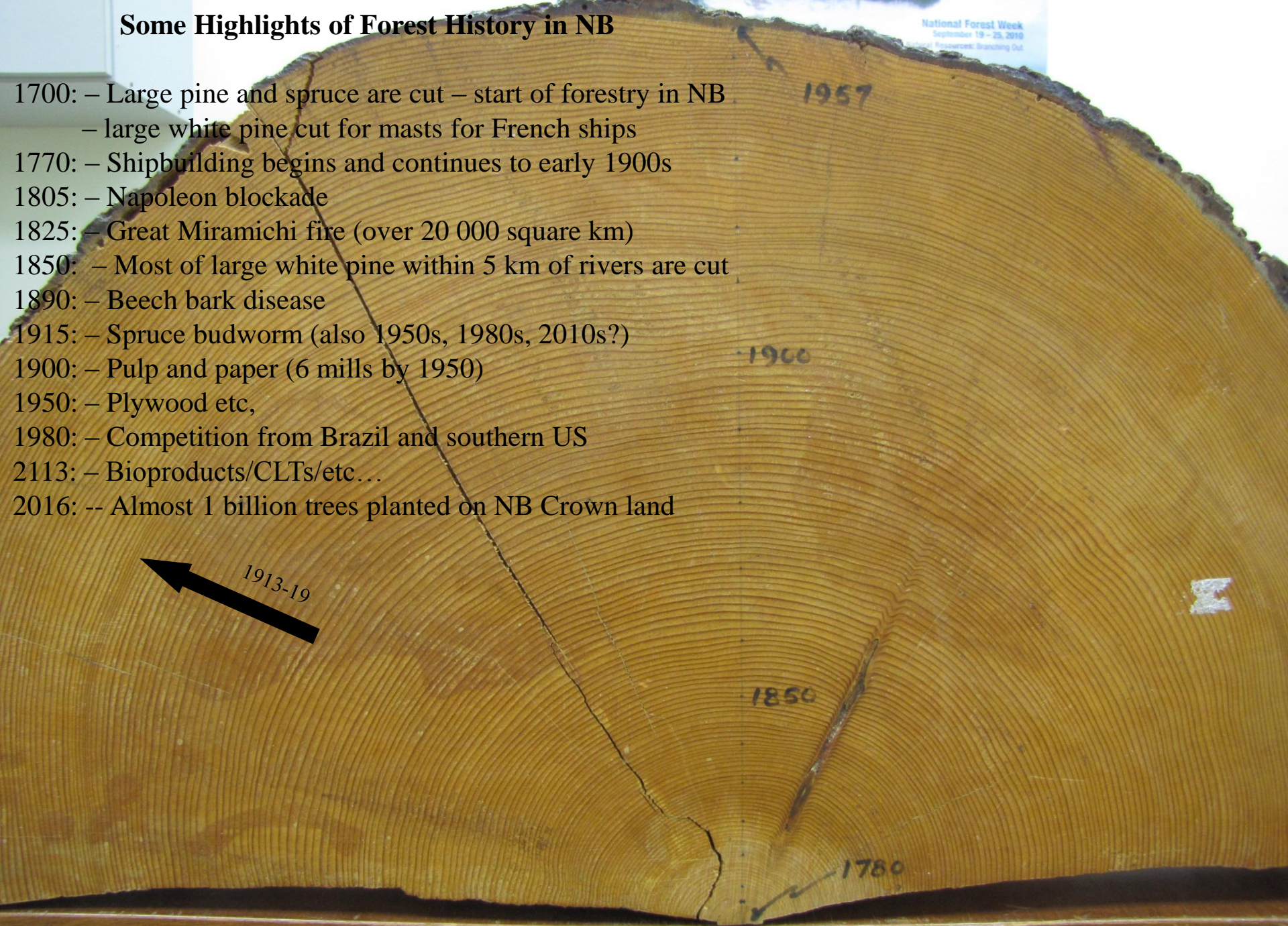


King's Broad Arrow

Some Highlights of Forest History in NB

National Forest Week
September 19 - 25, 2010
Resources: Branching Out

- 1700: – Large pine and spruce are cut – start of forestry in NB
 - large white pine cut for masts for French ships
- 1770: – Shipbuilding begins and continues to early 1900s
- 1805: – Napoleon blockade
- 1825: – Great Miramichi fire (over 20 000 square km)
- 1850: – Most of large white pine within 5 km of rivers are cut
- 1890: – Beech bark disease
- 1915: – Spruce budworm (also 1950s, 1980s, 2010s?)
- 1900: – Pulp and paper (6 mills by 1950)
- 1950: – Plywood etc,
- 1980: – Competition from Brazil and southern US
- 2113: – Bioproducts/CLTs/etc...
- 2016: -- Almost 1 billion trees planted on NB Crown land



Forest Regions of Canada



New Brunswick

- Mostly Acadian Forest Region
 - Red spruce, eastern hemlock, white pine, balsam fir
 - Sugar maple, yellow birch, red oak
- Species composition is changing
 - History
 - Forest management
 - Climate change
 - Insects and diseases

Tree Identification

Dichotomous key: A tool used in plant or animal identification. The dichotomous key is a series of questions, and each question is a choice between two characteristics. The identity of an organism is determined through the process of eliminating characteristics that do not apply to it.

- http://insects.about.com/od/d/g/def_dichotomous.htm