

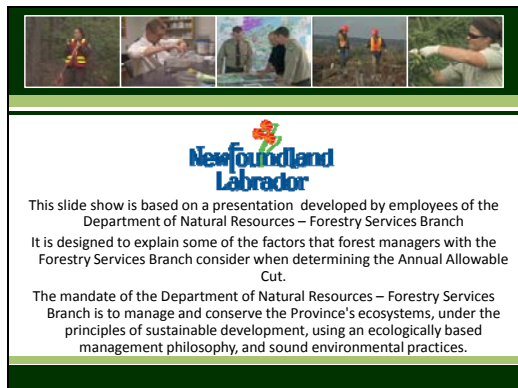
PRESENTATION 5 – AGE CLASS STRUCTURE

Slide 1



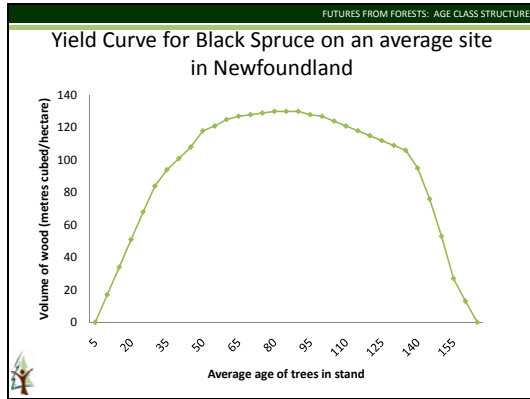
- Futures from Forests binder contains **discussion questions** and **suggested activities** to accompany this presentation
- Student worksheet** “Age-Class structure” accompanies this PowerPoint presentation

Slide 2



Please Note: This presentation is technical in nature and represents an industry perspective on forest resources. It concentrates on forest resources for optimal harvesting purposes and does not attempt to consider all the other forest values including wildlife habitat, cultural/spiritual values, recreation etc.

Slide 3



•This graph shows the volume of wood that is obtained from harvesting trees at different ages. The chart will be explained in the following slides, but for now, point out:

- Black Spruce has been chosen for this graph as a large percentage of the wood we harvest in Newfoundland and Labrador is Black Spruce.

- X Axis shows average age of trees in a stand of trees

- Y Axis shows volume of wood in metres cubed per hectare

- An easier way to think of this is how much wood you would get per hectare if you harvested the trees for lumber or firewood

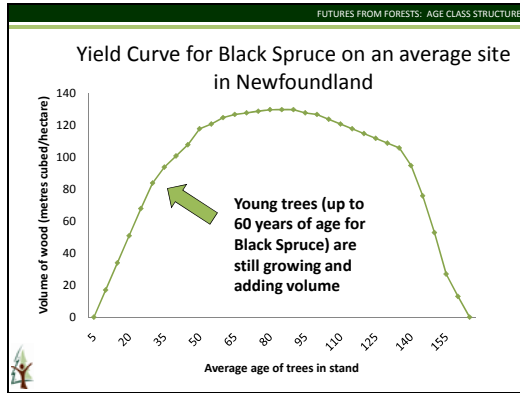
•**Discussion Question:**

- Why would forest managers want to know the information found in this graph?

- How do forest managers find out about the type/number/volume of trees we have in the province?

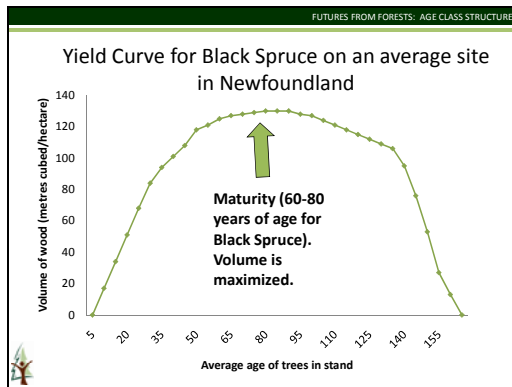
- Forest inventory** is the collection of this information. It is collected through aerial photos and through 'on the ground' surveys. Once the age and size of trees is determined through forest inventory and aerial photography, the volume of each forest stand on the landscape is calculated.

Slide 4



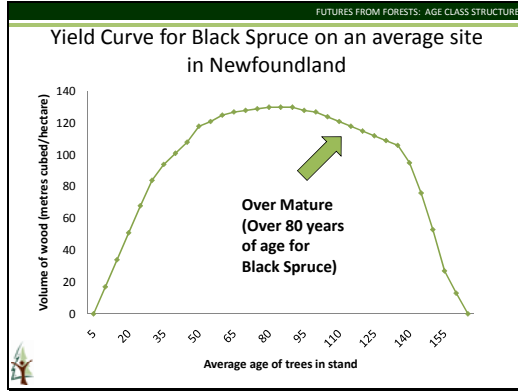
- When trees are young, not a lot of volume is obtained if a tree is harvested.
- An easier way to think of this is with collection of wood for lumber or firewood. If you harvest trees in a young stand, the trees are smaller in both diameter and height and so you would gain less firewood even if you cut the same number of trees than in a mature forest stand.

Slide 5



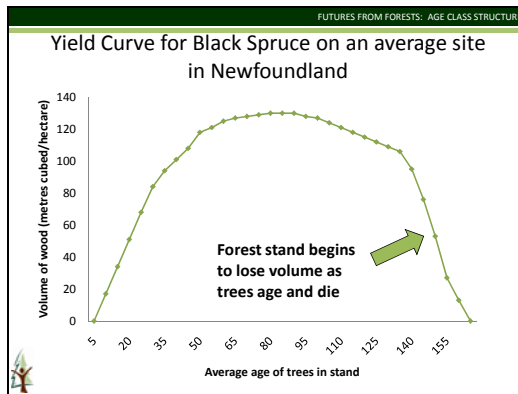
- Black Spruce reaches maturity at approximately 60 years of age. It maintains its volume till around 100 years.
- It is important to note that the period from around 60 years to 100 years is not a static time for trees contrary to what the graph may suggest. Lots of trees are dying through natural competition but then the remaining trees grow larger as more space, nutrients and light are available. Forest stands are very dynamic even though there is no gain in overall volume in the forest stand.
- Harvesting of forest stands usually occurs at this stage so maximum volume from the forest is obtained (when it is at its full potential for size and before some trees may die)
- Once the age and size of trees is determined through forest inventory and aerial photography, the volume of each forest stand on the landscape is calculated
- Rotation** is the name given to the number of years required to establish and grow trees to a specified size, product, or condition of maturity

Slide 6



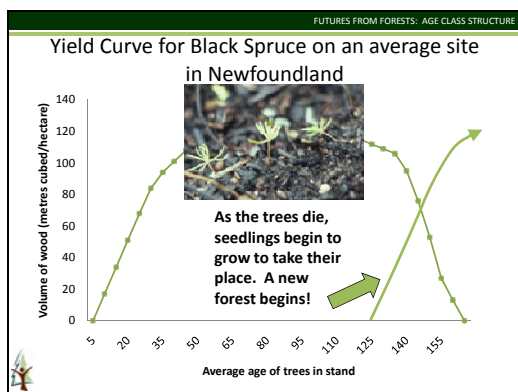
- **Over mature** forests for Black Spruce are those over 80 years of age.
- After reaching maturity, forest stands begin to lose volume.
- **Discussion Question:** Why do you think over mature forest stands begin to lose volume? (Suggested answers: Mortality continues because of competition, insects and disease. The remaining trees are too sparse or too weak to pick up the extra space.)

Slide 7



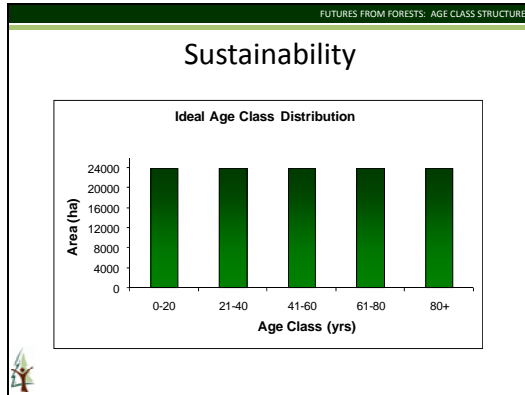
- Note that the volume of the forest stand decreases
- Possible causes of death in older forests:
 - Fire
 - Insect outbreaks
 - Wind storms
 - Unusual snow/ice conditions
 - Rot/fungi
 - Flooding
- **Discussion Question:** What are the benefits of having over-mature trees in a forest?

Slide 8



- As old trees die, light and nutrients allow younger seedlings to grow. This ongoing process allows forests to be called a renewable resource.

Slide 9



•One measure of sustainability when harvesting is having a forest with an even age class distribution. This allows for an equal amount of forest to be harvested each year over time. The premise is: if we have an equal amount of forest at various ages, or stages of development, and only harvest at the mature or over mature stage, than we will always have younger forest developing into later stages, and hence, sustainability. So, one measure of sustainability could be a **balanced age class distribution**.

•The Department of Natural Resources – Forestry Services Branch aims to maintain 20% of forest stands as old growth forests (over 80 years of age).

•**Discussion Questions:**

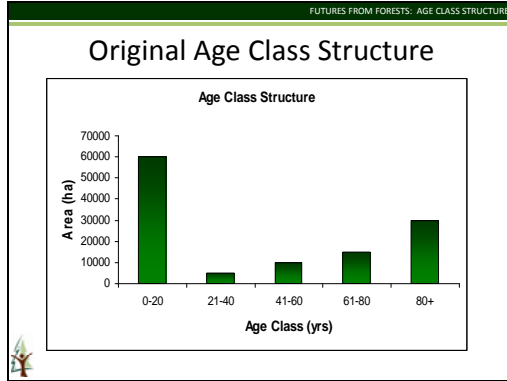
- Why would our forest managers aim to maintain at least 20% of forest stands as old growth (over 80 years of age)?
- What are the benefits of maintaining this older forest?

Slide 10

The figure is a complex block with a title "Current Problem with Age Class Structure in Newfoundland and Labrador". It contains two main sections. The first section is titled "Skewed age class distribution" and lists three causes: "Past management practices", "Repeated insect attacks", and "Forest fires". The second section is titled "Older trees need to be harvested first" and is accompanied by a small image of a forest.

•Past management practices, repeated insect attacks, and forest fires have skewed the age class distribution in Newfoundland and Labrador so that there is a disproportionate amount of forest in the youngest and oldest age classes. This presents problems for forest managers because older timber needs to be harvested in a timely manner, before being lost to fire, insect, disease, or blow down. However, if harvested too quickly, the younger forest will not have enough time to grow to the late successional age classes and therefore will not reach their full productive capacity or provide the specialized habitat niche of old forest required by some species. Sustainability could be jeopardized.

Slide 11



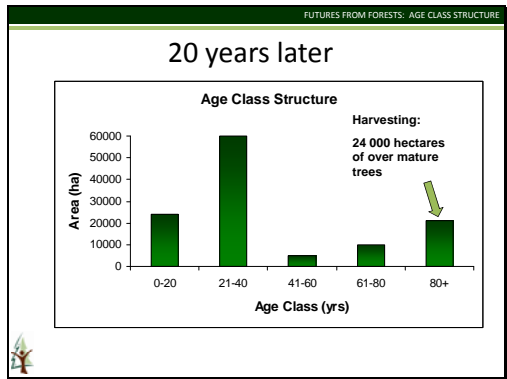
- The following example illustrates an option for balancing the age class of a hypothetical forest with a skewed age class distribution similar to Newfoundland and Labrador's.

- Let's assume our pretend forest has a total of 120 000 hectares of productive forest land. With 5 age classes we would need 24 000 hectares in each class to balance the age distribution.

- However, our current distribution in hectares is:

0-20	21-40	41-60	61-80	80+
60 000	5 000	10 000	15 000	30 000

Slide 12

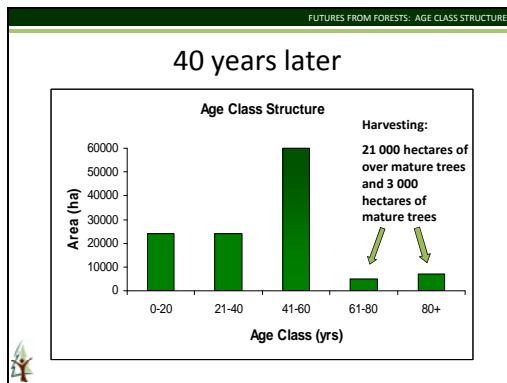


- We choose a harvest strategy of oldest first, but restrict our harvest over a 20 year period to a maximum of 24 000 hectares (the amount required to balance each age class). Remember, there was initially 30 000 in the over mature category.

- Our age class distribution after 20 years would be:

0-20	21-40	41-60	61-80	80+
24 000	60 000	5 000	10 000	21 000

Slide 13

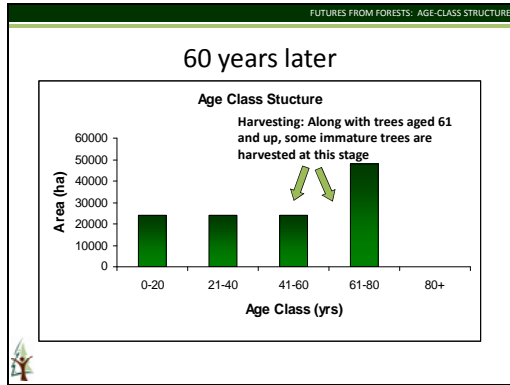


- Throughout our second 20 year period, along with the over mature, 3 000 hectares will have to be harvested in the mature category.

- Our age class distribution after 40 years would be:

0-20	21-40	41-60	61-80	80+
24 000	24 000	60 000	5 000	7 000

Slide 14

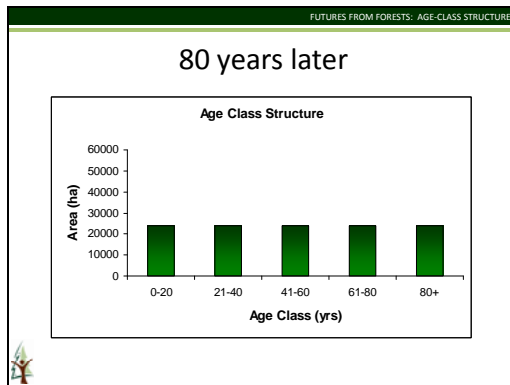


•In the third 20 year period, 12 000 hectares of 41-60 age class will have to be harvested in order to maintain the 24 000 rule. Remember 41-60 is considered immature.

•Our age class distribution after 60 years would be:

0-20	21-40	41-60	61-80	80+
24 000	24 000	24 000	48 000	0

Slide 15



•There is no over mature forest left to be harvested during the next 20 years so all harvesting will have to occur within the 61-80 (mature) age group.

•Our age class distribution after 80 years would be:

0-20	21-40	41-60	61-80	80+
24 000	24 000	24 000	24 000	24 000

Slide 16

Annual Allowable Cut

The Forestry Services Branch (Department of Natural Resources) determines how much forest can be harvested each year. This is called the Annual Allowable Cut (AAC).

The AAC for softwood is based on a 60-80 year rotation age.

Broken up into 5 age classes:

- 0-20 regeneration
- 21-40 immature
- 41-60 immature
- 61-80 mature
- 80+ over mature

•Once all other values are met, the Forestry Services Branch determines how much forest can be harvested and sets an annual allowable cut (AAC).

•Forest modeling software is used to determine AAC.

•**Rotation** is the name give to the number of years required to establish and grow trees to a specified size, product, or condition of maturity

Slide 17

