

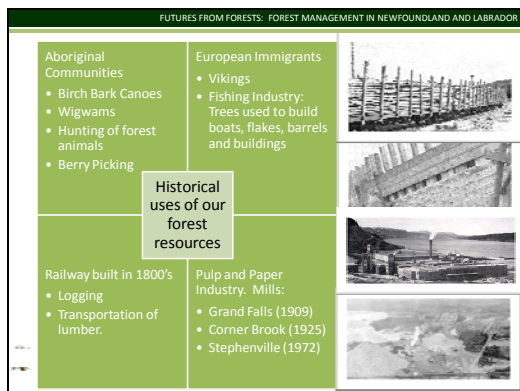
PRESENTATION 2 – FOREST MANAGEMENT IN NEWFOUNDLAND AND LABRADOR

Slide 1



- Futures from Forests binder contains **discussion questions** and **suggested activities** to accompany this presentation
- Student worksheet** “Forest Management in Newfoundland and Labrador” accompanies this PowerPoint presentation
- Case Study “A Step Back in Time” can be used as an extension activity following or prior to this presentation

Slide 2



•Photos:

- 1 – Wigwam
- 2 – Reproduction birch canoe
- 3 – Reproduction of Viking dwellings in L’anse aux Meadows
- 4 – Wooden Ship Building, Grand Bank. Published in Newfoundland Royal Commission on Forestry, 1955.
- 5 – Logs being transported by train at Parson’s Siding, going to Bonavista. Published in Newfoundland Royal Commission on Forestry, 1955.
- 6 - Corner Brook Mill, circa 1948
- 7 – Grand Falls Mill, circa 1935

Slide 3

FUTURES FROM FORESTS: FOREST MANAGEMENT IN NEWFOUNDLAND AND LABRADOR

Exploitation:

- Up until early 1900's
- Forests used for lumber, firewood, pulpwood
- Little concern about soil erosion, water pollution or wildlife depletion
- When trees were gone, loggers moved elsewhere

Utilitarian Approach

- Began in 1930's
- Renewable resources should be managed so they will never run out
- Forests should be re-seeded after logging

A paradigm shift in forest management

Eco-system based management

- Began in 1970's but was encapsulated by the Forestry Act of 1990
- Often called sustainable forest management
- Ensures that forest resources are used without negatively affecting the physical and biological environments

Eco-system based management involves recognition that forests have a number of values, including:

- Wildlife
- Scenic beauty
- Flood and erosion control
- Timber

- Paradigm shift (sometimes known as extraordinary science or revolutionary science) was the term first used by Thomas Kuhn in his influential book *The Structure of Scientific Revolutions* (1962) to describe a change in basic assumptions within the ruling theory of science. In simple terms, it is a change from one way of thinking to another.
- A simple example of a paradigm shift is seen in the significant change in thinking that occurred after the invention of the telescope. Scientific theory moved from the Ptolemaic system (earth at the centre of the universe) to the Copernican system (sun at the centre of the universe)
- For further lesson ideas, see *Sustaining Ecosystems* (Science 1206: An alternate Resource) prepared by Dan Murphy, Western School Board.

Slide 4

FUTURES FROM FORESTS: FOREST MANAGEMENT IN NEWFOUNDLAND AND LABRADOR

Economic Values

- Industry (Pulp and paper, lumber, value-added, eco-tourism etc.)
- Subsistence (Firewood collection, hunting, berry picking etc.)
- Employment

Other Forest Values

- Recreation (Hiking, camping etc.)
- Cultural, spiritual or historical values
- Ecological Values (Maintenance of biological diversity)

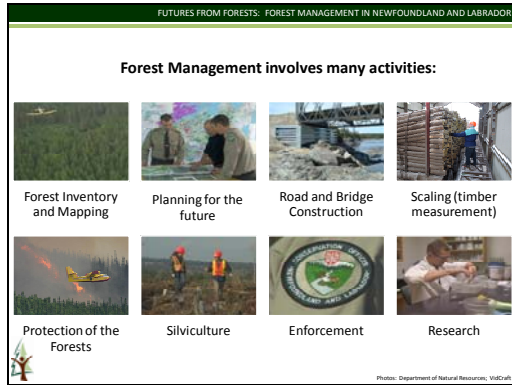
Role of the Forest Manager

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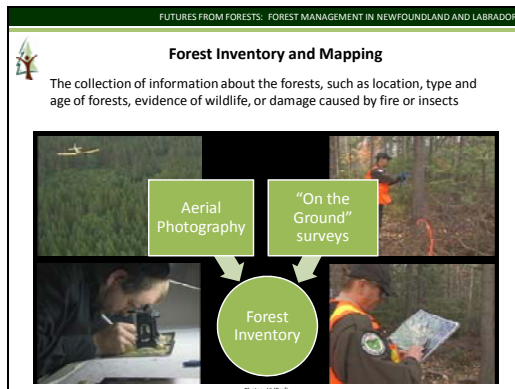
Photos and Graphics: WebCrib

- Discussion Questions:**
- Can you think of any other forest values not mentioned in this list?
 - Which of the values shown in the slide do you think is most important? Explain your response

Slide 5



Slide 6



- Aerial Photography – 5,000 photos are taken from a plane each year, following a 10 year cycle of re-inventory. These photos are interpreted through stereoscopes (photo, bottom left), identifying forests, bogs, ponds, roads etc. New technology, such as 3-Dimensional Goggles, may make this process faster in future!
- “On the Ground” surveys involve Conservation Officers going into the forest to measure and record such things as tree species, size, age, insect damage, soil types, number of songbirds, evidence of wildlife etc. These surveys may be on permanent sample plots, temporary sample plots, or ‘ground truth plots’, which are plots that are chosen if the photographic interpretation proves difficult

Slide 7

FUTURES FROM FORESTS: FOREST MANAGEMENT IN NEWFOUNDLAND AND LABRADOR

Planning for the Future

- Provincial Sustainable Management Strategy
- District Level Planning (1 & 5 Year Plans)
- Public Involvement is important!

Newfoundland and Labrador is divided into 24 Forest Management Districts.

Photos and Maps: Department of Natural Resources, Model Forest of Newfoundland and Labrador

- The maps show the division of the province into 24 Forest Management Districts.
- Grey shows unalienated Crown Land (land owned and managed by the 'Crown', or government), green (on island portion of province) represents land controlled by Corner Brook Pulp and Paper Ltd. under long term license but still owned by the Crown, pink represents wilderness reserves/heritage rivers/protected areas, and yellow depicts National Parks. The bright green area in Labrador is land owned by the Nunatsiavut Government and light green area is lands that are co-managed by the Nunatsiavut government and the government of NL

Slide 8

FUTURES FROM FORESTS: FOREST MANAGEMENT IN NEWFOUNDLAND AND LABRADOR

Planning for the Future

Forest managers make decisions based on criteria and indicators developed by the Canadian Council of Forest Ministers:

- Conservation of Biological Diversity (Biodiversity)
- Maintenance of Forest Ecosystems (Healthy Forests)
- Conservation of Soil and Water Quality
- Contribution to Global Ecological Cycles (Carbon, Water)
- Economic and Social Benefits (Employment, Recreation, Spiritual values etc.)

Photos: Ron O'Connell of YACraft, and Department of Natural Resources

- For further information, see http://www.ccfm.org/english/coreproduct-s-criteria_in.asp

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FUTURES FROM FORESTS: FOREST MANAGEMENT IN NEWFOUNDLAND AND LABRADOR

Planning for the Future

Part of the planning process is establishment of the Annual Allowable Cut. The AAC:





- Sets out the maximum amount of softwood and hardwood timber to be harvested each year in the province
- Is established at five year intervals for each Management District based on levels that would allow sustainable use of the resource in the future
- Is designed to ensure enough timber will be available for harvesting in the future
- Is calculated using computer software models that help forest managers to incorporate environmental and wildlife values and objectives

Photos: Department of Natural Resources and Corner Brook Pulp and Paper

- The actual harvested area for 2007 was less than 1% of our productive land base. Productive land is land that is capable of producing a commercial timber harvest. Corner Brook Pulp and Paper, the largest operator in the province, harvested approximately 6,700 hectares of their 830,000 hectares of productive forest land (0.807%) in 2007.
- These figures represents the productive forest land base only and if we include the total forested land base (stream buffers, parks, private land, protected water supply areas, view sheds, etc) we are harvesting less than 0.5% (half of one percent) annually.

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FUTURES FROM FORESTS: FOREST MANAGEMENT IN NEWFOUNDLAND AND LABRADOR

Timber Scaling



- The measurement of timber to determine its volume or weight
- Traditionally undertaken using scale rods, diameter sticks and logger's tapes
- New technology, such as camera scaling, is used by Corner Brook Pulp and Paper
- Scaling is undertaken for a number of reasons, including:
 - paying loggers for amount of wood cut
 - determining Crown stumpage (amount to be paid to government for the harvest of timber on Crown land)
 - Ensuring the annual allowable cut is not exceeded

Photos: Corner Brook Pulp and Paper

- The first photo shows the traditional method of scaling using measuring sticks.
- Computerized scaling is used by Corner Brook Pulp and Paper. The photos show the log truck being photographed by the Green Cameras, and then the photo is sent electronically to the scaler so that the volume of wood can be determined using modern computer programs. This system has a number of advantages over the traditional stick measurements, including the following:
 - More cost-effective
 - More precise
 - Better consistency between scalers
 - Every load image is stored and can be retrieved at anytime for checking or re-measurement

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FUTURES FROM FORESTS: FOREST MANAGEMENT IN NEWFOUNDLAND AND LABRADOR

Resource Road and Bridge Construction

Roads and bridges are built and maintained in the province in order to allow access to the forests for:

- Harvesting of trees and extraction of timber
- Silviculture (replanting of seedlings, pre-commercial thinning etc.)
- Forest Protection (fire fighting, insects control etc.)
- Wildlife Management
- Public use of the Forest

Photos: Department of Natural Resources, Victoria

•For more information, see <http://www.nr.gov.nl.ca/forestry/programs/roads/>

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FUTURES FROM FORESTS: FOREST MANAGEMENT IN NEWFOUNDLAND AND LABRADOR

Resource Road and Bridge Construction

Bridge building follows guidelines to ensure environmental protection:

- Protecting fish habitat and water quality through use of culverts
- Building of bridges outside of the stream bed using longer lasting materials
- Use of temporary stream crossings that can be removed after completion of the work
- Use of metal bin-wall abutments and regeneration of exposed soil near bridge to reduce risk of soil erosion

Photos: Department of Natural Resources

•For further information, see <http://www.nr.gov.nl.ca/forestry/programs/roads/>

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FUTURES FROM FORESTS: FOREST MANAGEMENT IN NEWFOUNDLAND AND LABRADOR

Forest Protection

Fire

Insects

Illegal Activity

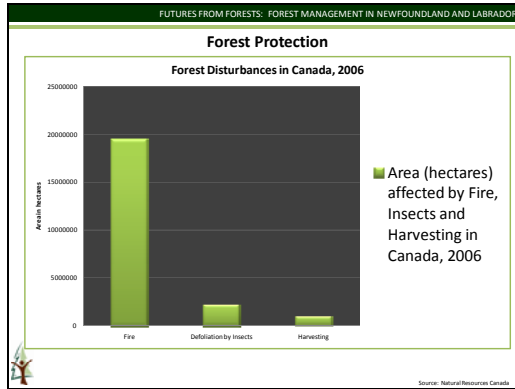
Protection from what?

Photos: Department of Natural Resources

•Discussion Questions:

- Should all fires be suppressed? Why/why not? Under what conditions?
- How should insect outbreaks be treated? What might be the advantages of using sprays or insecticides? What might be the disadvantages?
- What kinds of illegal activities might forest managers/conservation officers be required to deal with?

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- Many people believe that harvesting is the most significant threat to our forests. This graph shows that fire and insects affect a far greater area of our forests than harvesting.
- Statistics by province can be found at <http://canadaforests.nrcan.gc.ca/statsprofile>

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Forest Protection
Fire:

- Panel 1:** Fires occur naturally in the Boreal. They enrich the soil, limit disease and release nutrients.
- Panel 2:** Black Spruce cones open to release seed when heated to high temperatures such as in a fire.
- Panel 3:** Prescribed Burns are used in some Forestry Management Districts in NL. These deliberately lit fires are carefully monitored.
- Panel 4:** Fire suppression is used when fire affects people, property and valuable timber stocks.

Photo: Natural Resources Canada, Department of Natural Resources

- Fire is the dominant means of forest succession in black spruce dominated forests such as those in central Newfoundland.
- Prescribed burns are most often used in areas where the ground needs to be prepared for re-planting. Reasons for using a fire may include killing off vegetation that competes with the planted seedlings and removal of logging debris from the ground.
- For more information on prescribed burns, see http://www.nr.gov.nl.ca/forestry/protection/fire_stats.stm#burns

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Forest Protection
Insect Monitoring and Control

- Text Box 1:** Insects are a natural part of the forest ecosystem:
 - provide food for birds
 - help with decay process
 - play vital role in forest cycle by killing old trees and allowing new trees to grow
- Text Box 2:** Examples of insects that sometimes occur at epidemic levels include:
 - Hemlock looper
 - Spruce budworm
 - Balsam fir sawfly
- Text Box 3:** Research and monitoring determines where insects are attacking and how forests are being affected.
- Text Box 4:** Insect infestations can kill forests and negatively impact forestry industry.

Photo: © Connell of Viscraft and Natural Resources Canada

- Insects are the main cause of forest succession in balsam fir dominated forests such as those in western Newfoundland

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FUTURES FROM FORESTS: FOREST MANAGEMENT IN NEWFOUNDLAND AND LABRADOR

**Forest Protection:
Controls used in Newfoundland and Labrador**

Chemical insecticides are no longer used. Products are approved by Health Canada

Biological insecticides are based on bacteria or viruses found naturally in the ecosystem. Many are also used extensively in agriculture

BTK, a biological insecticide used in NL, kills larvae of spruce budworm and hemlock looper but has no impact when eaten by fish, earthworms, frogs, birds, mammals or humans



Photo: Ron O'Connell of VioGraft

- BTK is most commonly used to control defoliating caterpillar pests.
 - After being applied, BTK has to be eaten by the insect to be effective, and therefore must be sprayed when the insects are feeding most actively and when they are most susceptible to the insecticide.
 - Two applications may be necessary to give the best control because the caterpillars may hatch at different times.
 - As BTK is sensitive to sunlight, it breaks down quickly in the environment. Several days of sunlight or heavy rain can cause the BTK spray to become non-effective.
- For further information, see http://www.nr.gov.nl.ca/forestry/protection/ins_control_07/

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FUTURES FROM FORESTS: FOREST MANAGEMENT IN NEWFOUNDLAND AND LABRADOR

Silviculture: The science and practice of growing forest trees

Includes such practices as:



Pre-Commercial Thinning: the removal of trees from a young forest to provide more space, nutrients and light for remaining trees

Site Preparation: the use of herbicides, prescribed burning, or scarification (tilling) to prepare the ground for replanting of seedlings

Replanting with seedlings grown at Wooddale provincial tree nursery in central NL or a satellite nursery in Happy Valley-Goose Bay.

Photo: VioGraft, Department of Natural Resources

- During the 2008 replanting program in NL, 27 trees were planted for every person living in the province!
- Replanting is not always necessary as NL has more natural regeneration than any other province. Once harvested or killed by insects or fire, our forests naturally start re-growing!
- For further information on silviculture, <http://www.nr.gov.nl.ca/forestry/management/silviculture>
- The first photo shows tree cookies (cross sections) of trees of the same age, same species and same geographic region. The smaller one was only able to grow to this size because it was competing with so many other trees for nutrients, light etc. This is why foresters remove smaller, weaker trees during pre-commercial thinning operations.
- The middle photo shows a scarifier, a piece of equipment that tills and turns the soil to prepare the ground for planting

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FUTURES FROM FORESTS: FOREST MANAGEMENT IN NEWFOUNDLAND AND LABRADOR

Silviculture

Around 20% of harvested areas in province need to be replanted.

What happens to the other 80% of harvested areas?

What went wrong with the 20% that needs replanting?

An example of undesirable natural regeneration



- Natural regeneration. This province has more natural regeneration than any other part of Canada!
- Natural regeneration poor or the natural regeneration that occurs is an undesirable species.
- Balsam fir on the Northern Peninsula where there is a large moose population. Moose love to eat fir! Replanting spruce (which moose tend not to eat) may be desirable

Photos: Department of Natural Resources

•**Discussion Question:** Can you think of any other reasons why natural regeneration may be undesirable? (Ideas: more hardy species, insect resistant trees etc.)

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FUTURES FROM FORESTS: FOREST MANAGEMENT IN NEWFOUNDLAND AND LABRADOR

Enforcement

Our forest resources may need protection from human activity too!

Department of Natural Resources enforces legislation including:

Conservation Officers have authority to enforce this legislation and can take enforcement action when encountering violations



- Forestry Act
- Wildlife Act
- Endangered Species Act
- Snowmobile/ATV Regulations
- Fisheries Act

Photos: Department of Natural Resources

•The photo in the bottom right hand corner shows a section of moose, believed to have been poached, found cut up in quarters and buried under the snow.

•**Discussion Question:** Can you think of any activities that are infringements of the acts listed in the slide above?

•For further information, see www.nr.gov.nl.ca/forestry/legislation


•The College of the North Atlantic offers a Forest Resource Technician Course for students wanting to pursue a career as a Conservation Officer. For further information on this course, see <http://www.cna.nl.ca/programscourses/program-details.asp?cProgCode=684>

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FUTURES FROM FORESTS: FOREST MANAGEMENT IN NEWFOUNDLAND AND LABRADOR


Research and Development

Erioderma Pedicellatum is a lichen that grows on trees. It is most often found on the stems of balsam fir trees in wet and scrubby forest types. Each individual lichen is called a thalli.



Erioderma Research

While relatively common in Newfoundland, Erioderma is considered by COSEWIC to be of "Special Concern" because of the low numbers found globally. This is in part because it is highly sensitive to air pollution.




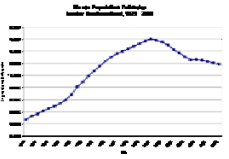
Photos: Department of Natural Resources, Salmonier Nature Park (Department of Environment and Conservation)

- **Erioderma** (*Erioderma pedicellatum*)
- **COSEWIC** – Committee on the status of endangered wildlife in Canada – see <http://www.cosewic.gc.ca/>
- It grows mainly on the stems, and less often on the branches, of balsam fir trees. It has been found less frequently on stems and branches of black spruce, and rarely on the stems of white birch and red maple, the latter mainly in Nova Scotia. In Scandinavia, it occurs mostly on the branches of Norway spruce.
- Over twelve thousand "thalli" (individual lichen) have been located at over two hundred sites throughout the southern half of Newfoundland. Each thalli is usually between one and five centimetres in diameter, and an individual thalli is usually in a visible state for about ten years.
- Although relatively common in Newfoundland, it is considered to be of Special Concern here due to its low numbers globally. (In New Brunswick and Nova Scotia, it is listed by COSEWIC as Endangered.) There are less than one hundred known in Nova Scotia, two in Alaska, and one in Scandinavia. It is highly sensitive to air pollution, to which its global decline is attributed.



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FUTURES FROM FORESTS: FOREST MANAGEMENT IN NEWFOUNDLAND AND LABRADOR

Research and Development

Research into moose over-browsing

Graph: Department of Environment and Conservation; Photos: Natural Resources Canada, Department of Natural Resources, Ed Viscusi

- **Extension Activity:** "Moose Invasion" Case Study in Futures from Forests Binder
- For further information, see http://www.pc.gc.ca/pn-np/nl/terranova/natcul/natcul8_e.asp
- Moose (*Alces alces*), native to North America, were first introduced to the island portion of the province in 1878 with the release of one male and one female at Gander Bay. In 1904 there was another release of two males and two females at Howley.
- The graph shows the increase in moose population on the island since 1975.

•A joint research project between Terra Nova National Park, Memorial University and the Department of Natural Resources is investigating the impact of moose on forest succession in eastern Newfoundland. The bottom photos show moose exclosures that are designed to keep moose out. By measuring vegetation growth patterns inside and out of the fenced area, scientists are able to determine the impact that moose are having on forest regeneration.

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•Photos:

- Top Left – Briquettes are made by compacting sawmill waste and can be used as a energy source in existing fireplaces
- Top Right – Wood Pellets are made by compacting sawmill waste (sawdust, chips etc.) and can be burned in specially designed wood pellet stoves. This heating method is considered to be environmentally friendly as very little smoke is produced and the stoves are very efficient at producing heat
- Bottom Left – Slow growing trees, such as those found in this province, produce strong wood. By measuring the strength of our lumber compared with lumber from trees grown elsewhere, there may be opportunity to market our wood as a specialty product in areas that may require strong lumber, such as earthquake zones.
- Bottom Right – SapWorld is producing wines made out of birch sap. Birch trees are tapped and the sweet sap that runs briefly in the spring is collected and used to make wine, vodka and other specialty products. Further research into the health benefits of

birch sap is being undertaken by SapWorld

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