### Exotic and Invasive Alien Species Workshop

January 22-23, 2008 Pepsi Center, Corner Brook, NL

Department of Natural Resources Forest Ecosystem Management Division Silviculture and Research Section



## History of Silviculture in the Province

### ✓Pre - 1970

Silviculture consisted of post-war plantation research trials to test a number of exotic species from Europe

- > While many were failure some were highly successful
- > Planting of exotics continued on a small scale

> where the thinning of natural regeneration (primarily balsam fir) was the dominant treatment

## History of Silviculture in the Province

- ✓ Program Began in 1978
- ✓ Delivered by 3 agencies:
  - > Crown
  - > Abitibi
  - > CBPP



# The Role of Introduced Species in Forest Reforestation Provincial Tree Nurseries

✓ Wooddale

✓Goose Bay







### Reforestation

✓218 million seedlings planted in Newfoundland and Labrador to date



### Tree Species Shipped Historically

✓ Norway Spruce + miscellaneous species accounts for less than 4 % of all historical shipments

> > Misc is more than just exotics, other species such as bF, eL, various hwds are lumped in this category

✓ Overall they account for a small component of the of total planting program



### Tree Species Shipped in 2007

 ✓ Norway Spruce + European Larch accounts for 3.1 % of all shipments in 2007

✓ Small component of total planting program



### **Research Program**

✓ Targets operational silvicultural issues

✓ Program aimed at "continuous improvement" of silvicultural practices

- > Species trials
- > Treatment response trials
- > White Pine / Red Pine conservation

✓ Investigates new equipment, techniques, etc. and carries out a variety of field trials



## **Dimensions of Introduced Species**

#### ✓ Forms

- > Plants
- > Animals
- > Fungi
- > Insects

 $\checkmark$  Species that were intentionally introduced

 $\checkmark$  Species that were accidentally introduced

- $\checkmark$  Species that showed up
- ✓ Direct and Indirect Impacts
- ✓ Impacts
  - >Positive
  - »Negative

Plants

Norway Spruce
Japanese Larch
European Larch



Norway Spruce at Back River Nursery, Salmonier Line

### Trees - Norway Spruce

- ✓ Norway Spruce has enjoyed a high level of success in Atlantic Canada over many years.
- ✓ While out-plantings have been relatively limited, its success is readily apparent in many locations.
- ✓ Has many positive characteristics:
  - It grows much faster than our native spruces (perhaps in the order of 50% more) on good sites
  - Does not interbreed with native spruces
  - > It is not invasive



### Trees - Japanese Larch

- ✓ Suitable for marginal lands
- While out-plantings have been relatively limited, its success is apparent in many locations.

#### / Has many positive characteristics:

- Grows much faster than our native larches on medium to good sites
- > Does not interbreed with native larches
- » Not invasive

Japanese Larch at Bottom Brook Arboretum



European Larch near Clarenville

### Trees – European Larch

✓ Suitable for marginal lands

While out-plantings have been relatively limited, its success is apparent in many locations

Has many positive characteristics:

- Grows faster than our native larches on medium to good sites
- > Better survival than Japanese Larch
- > Does not interbreed with native larch.
- > Not invasive

# Animals

- ✓ Moose
- ✓ Red Squirrel
- ✓ Snowshoe Hare

### Moose

- ✓ Introduced in NF in 1904
- ✓ Both direct and indirect impacts on our ecosystems through browsing
- Heavy damage in PCT areas during winter yarding
  - buds and twigs high in carbohydrate and protein
- ✓ Change in Successional pattern
  - Heavy browsing on balsam fir seedlings often result in the elimination of fir (some areas have been referred to as "savanas") giving way to other vegetation types
  - > Yellow birch on the Avalon





### Red Squirrel

- Red squirrels were first introduced in the Roddickton area from Labrador
- They were subsequently released to other areas of the Province as a possible prey base for the marten
- Red squirrels have had a significant impact on softwood cone crops and also cause significant twig and branch damage
- Significant impact on white pine reforestation effort
- Their voracious appetite for seeds is also seen as having a negative impact on the recovery of the Red Crossbill.



# Snowshoe Hare

- Snowshoe hare can be quite problematic in plantations
- They select White Spruce and Norway Spruce over other species.
  - They have been know to leave the cover of the edge of the forest and move into the center of young plantations where they are highly vulnerable to predators to browse young nS and wS.
- As they are a "very active member of the boreal food chain", the full impact of snowshoe hare on our total ecosystem is likely very complex and significant.

# Fungi

✓ White Pine Blister Rust

✓ Scleroderris Canker (European strain)



### White Pine Blister Rust

- Introduced to North America in ~ 1908
- Affects wP through needle infection spreading to branch and main stem cankers
- Introduction coincident with trans-Island railway and large-scale harvest of wP
- Responsible for decimating wP regeneration throughout much of the Island and severely impacting the ability of this species to recover
- Has had a huge impact on the (white pine) sawmilling industry



### White Pine Blister Rust

Branch and stem canker damage causes severe mortality in young trees

#### $\checkmark$ In response, the DNR has:

- > Mix planting with other species
- Management trials
- Established Gene Preservation Gardens







- ✓ Introduced to NL around 1940 in planting stock at the Back River Nursery on Salmonier Line
- ✓ Affects hard pines (2-3 needle) only
- ✓ Destroys plantations if not caught early
- ✓ Outbreaks
  - 1981 red pine plantation at Torbay (burned to prevent spread)
  - A 2<sup>nd</sup> outbreak in 1996 destroyed another plantation on the Tilton barrens
  - We now have an other outbreak in a red pine plantation (shown opposite) on the Bay d'Espoir highway (2007)
- ✓ A quarantine zone was established on the Avalon in 1980 which was effective for 25 years.

Insects

✓ Balsam Wooly Adelgid

✓ European Pine Shoot Moth



### Balsam Woolly Adelgid

- ✓ Introduced to NL from Europe via NS early 1930
- Damage is concentrated in the upper crown causing gouting of branch nodes and deformed tops
- ✓ BWA damage has had a considerable impact on the Province's silviculture program.
- ✓ It has had a negative impact in many (balsam fir) PCT areas resulting in poor tree development and significant losses of fibre growth potential.
- "Millions" of dollars have been spent on stand conversion projects (balsam fir to spruce)
- ✓ More planting in hardest hit sites





## European Pine Shoot Moth

- Recently appeared on the radar in NL in the past few years
- ✓ Infestations of this insect have spread through out much of Central NL causing widespread deformity, in red pine plantations/trees less than 25 years of age
- Feed on needles and mine current years shoot. By late summer, they move out of shoots and hollow out a new bud where they overwinter until the next growing season.
- Each year a generation of new shoots may be destroyed depending on the severity of the infestation.
- ✓ Is the current problem a result of warmer than normal winters?

# In Closing

 ✓ Maintaining healthy ecosystems is fundamental to maintaining a long-term, a sustainable forest industry.

✓ The real impacts of introduced species – long-term and shortterm, direct and indirect, negative and positive, can be far reaching and complex.

"Everything is interconnected!"