

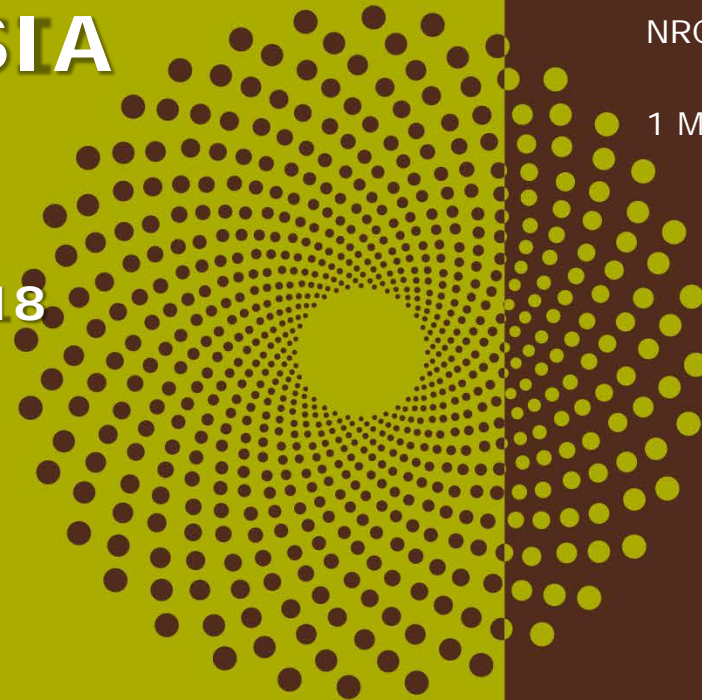
The Silviculture Toolkit NRCan-CFS & COSIA

CLRA Annual Conference 2018
Red Deer

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Outline

- **About COSIA and Cenovus**
- **Why silviculture?**
- **Why a 'toolkit'?**
- **What did we develop? (Katalijn)**



cosia[®]

CANADA'S OIL SANDS
INNOVATION ALLIANCE

COSIA's vision is to enable responsible and sustainable development of Canada's oil sands as a global energy source while delivering accelerated improvement in environmental performance through collaborative action and innovation.



Integrating environment into all we do



Minimizing our land footprint



Reducing our air emissions



Using less water

“The status quo isn’t good enough when it comes to environmental performance.”

-Harbir Chhina, Executive Vice-President, Oil Sands Development

Why Silviculture?

Silviculture – many definitions

“the art and science of growing trees”

“the theory and practice of controlling forest establishment, composition, structure, and growth (Spurr 1979)

“the art and science of controlling the establishment, growth, composition, health, and quality of forests...[for] diverse needs and values...” (Adams et al. 1994)

Why Silviculture?

Directed management with defined objectives

- implies human purpose
- objectives vary: timber supply – ecological goods and services

Key considerations:

- rate at which values are generated
- control/predictability of forest composition, structure, process
- manipulation of successional processes
- anthropogenic disturbances and potential for novel ecosystems

Disturbance, recovery and the ecology 'theater'

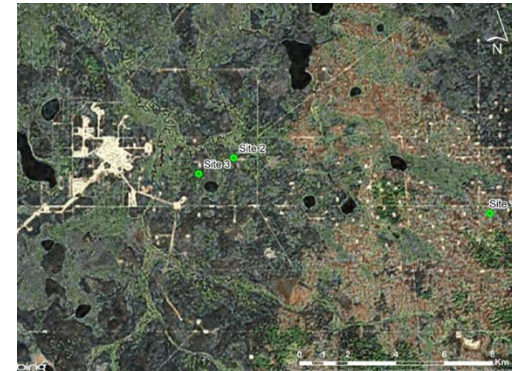
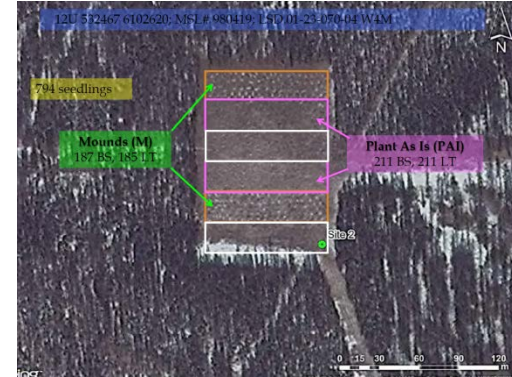


Vs.

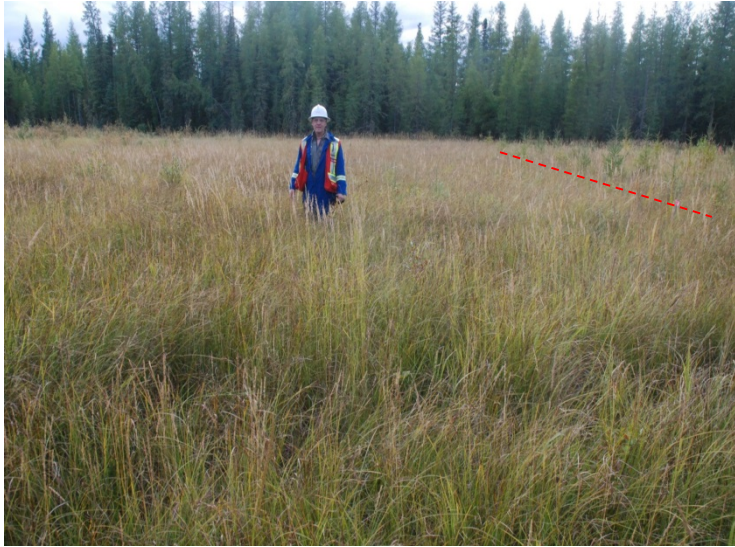


Pilots and Demonstration

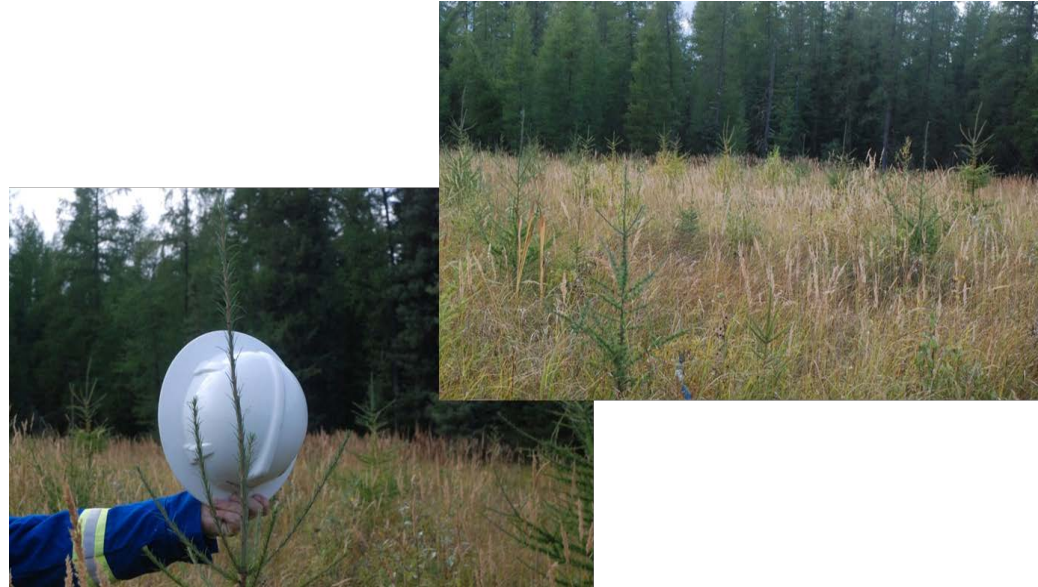
- Est. 2008
- Test basic silviculture
- Wet, low productivity forest



Active restoration (silviculture) works!



2014 Photo: control stagnant under passive revegetation since 1997



2014 Photo: site treatment (2008) resulted in excellent forest regeneration

Silviculture works



Boreal succession

“Without an adequate theoretical and/or empirical knowledge of succession, successful land management is generally a matter of luck...”

Kimmins, J.P. 1987 Forest Ecology, MacMillan Inc., New York



Why Knowledge Extension?

Recognition of an issue

- in general, lack of long-term site level feedback to the manager
- evidence of arrested succession
- need for active restoration treatment – 40 to 60% of legacy features

Evidence of knowledge gaps

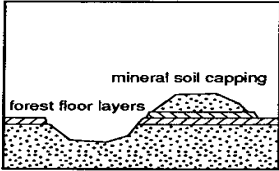
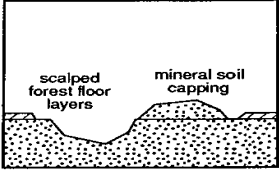
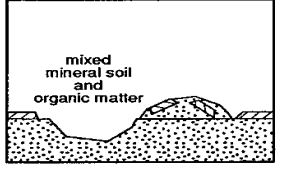
- inappropriate planting timing
- planting stock production oversights
- species allocation and microsite selection
- heavy mulching, misinterpretation of mulching
- failure to identify limiting factors

Workforce capacity

- oil and gas - high number of worker hours per ha
- cyclic industry – challenges for staff turnover and development
- massive future restoration effort

Mounding literature

S U M M A R Y

<i>Inverted humus mounds</i>	<i>Mineral mounds</i>	<i>Mixed mounds</i>
		
<ul style="list-style-type: none">- good on nutritionally poor sites;- good for rich sites with fine textured soil;- not recommended for drought-prone sites or sites with deep, loose duff.	<ul style="list-style-type: none">- best for cold, but slightly drought-prone sites.- not recommended for nutritionally poor sites.	<ul style="list-style-type: none">- best for slightly drought-prone, nutrient-poor sites,- not recommended for sites with abundant competing vegetation;- avoid creating large chunks of organic matter that cause air pockets.

NOTE: None of these mound types is recommended for sites with a significant risk of summer drought.

Reference:

Mounding for Site Preparation, FRDA Memo No. 100, July 1989;
<http://www.for.gov.bc.ca/hfd/pubs/docs/Frm/frm100.pdf>