Planning for Minimizing Impact on Peatlands

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January 21, 2016

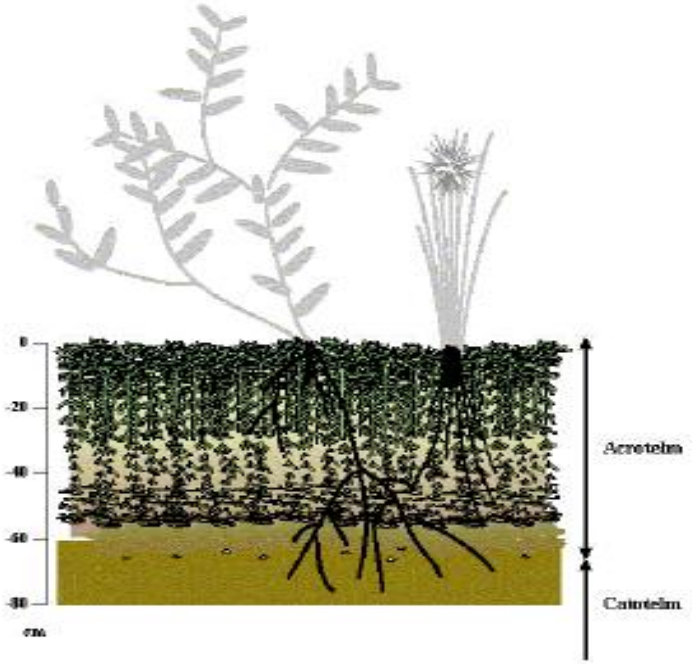
Overview

- Ecological Context
  - Peatlands and Disturbance
- Disturbances
- Planning
  - Methods
  - Tools
  - Techniques

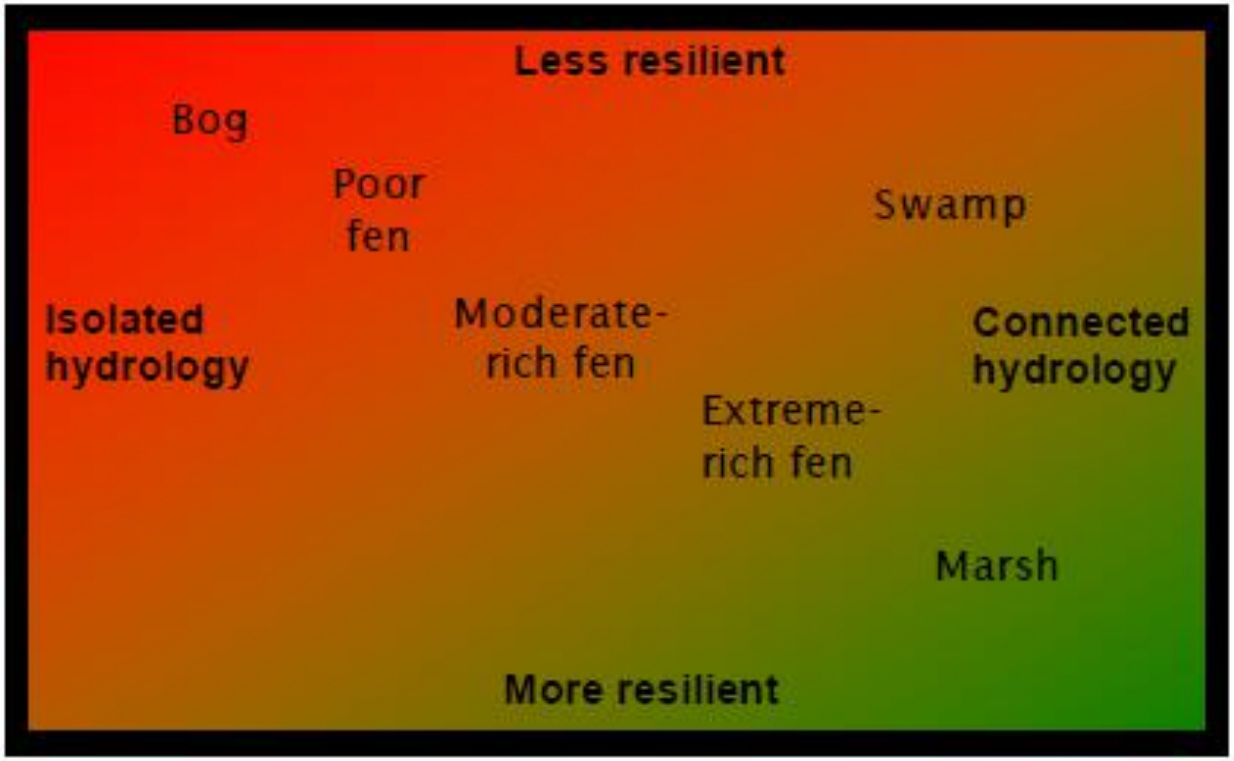
Ecological Context

Peatlands

- Encompass ~23% of the boreal region
- Bogs and fens
- Peatlands provide:
  - Wildlife Habitat
  - Freshwater source
  - Hydrologic stability
  - Carbon Storage
- Understanding hydrology is important for planning construction and restoration projects



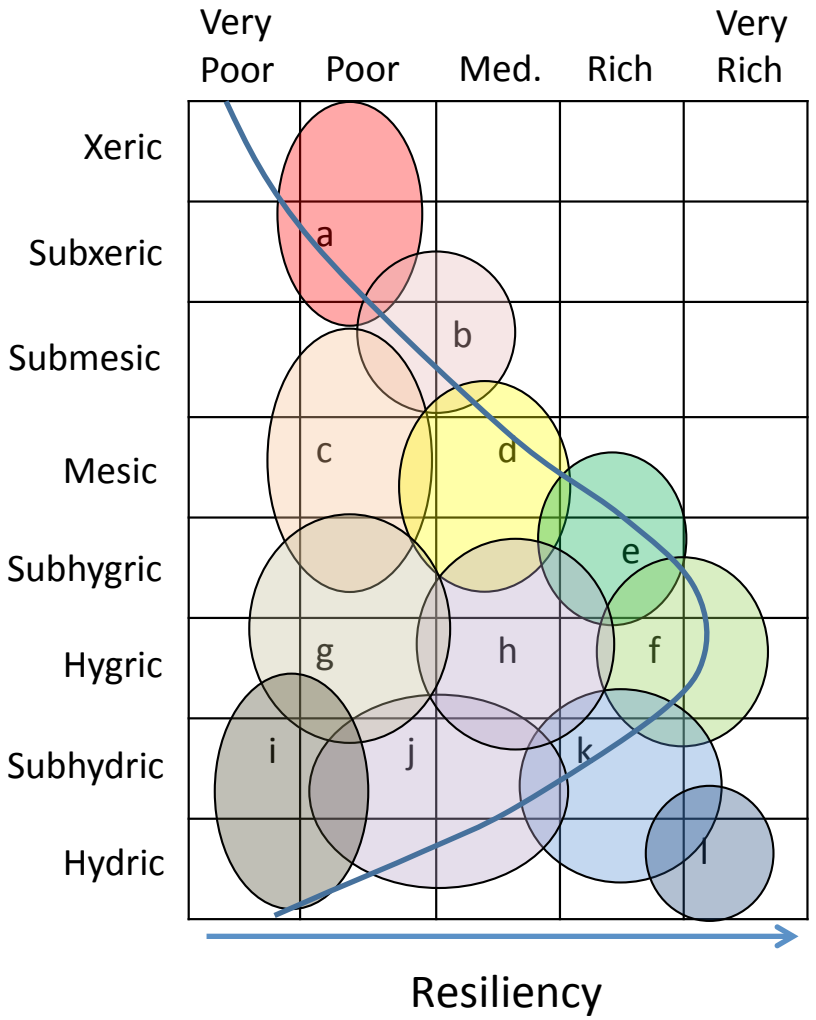
Peatland Resiliency



Adapted from Trettin et al. (1997) in Graf (2009)

Disturbance-Ecosystem Linkage

- Resiliency increases with moisture and nutrients
- Ease of reclamation may decrease with moisture due to competition
- Other factors to consider
  - Disturbance history
  - Stand age
  - Adjacent propagules



In-situ Oil Sands Disturbances

Exploration

- Temporary facilities
- Wellsites, access roads, seismic lines
- Encompasses the majority of the disturbed footprint (2/3)
- Individually low severity, low to high frequency, small size

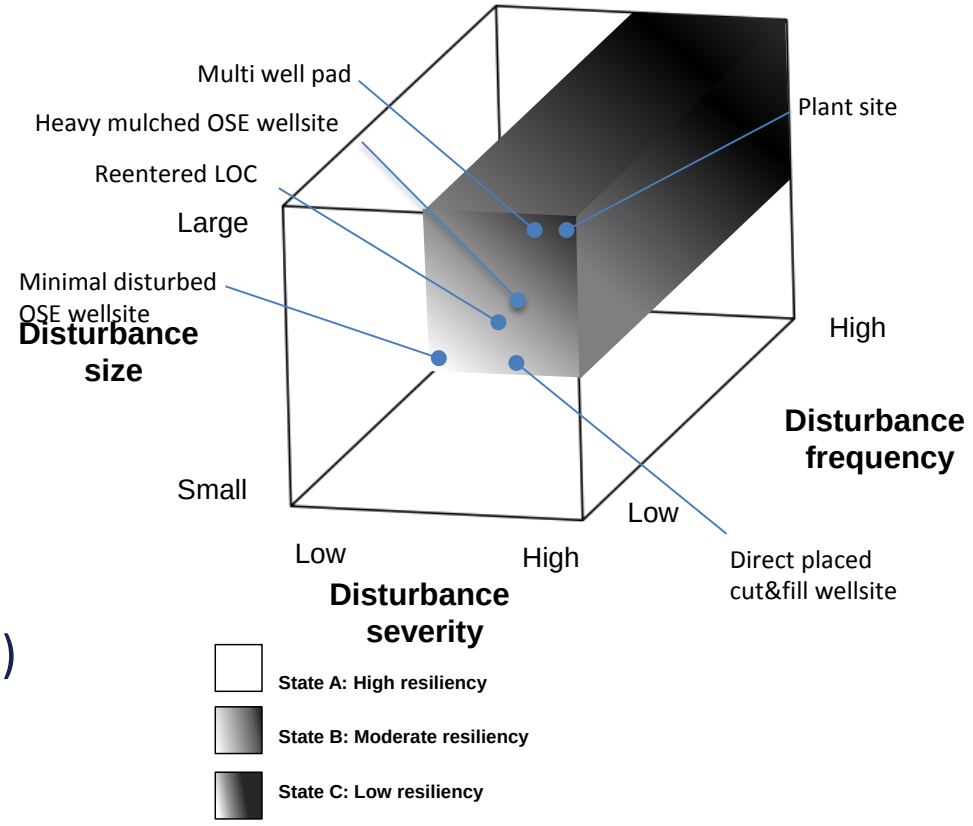
In-situ Oil Sands Disturbances

Commercial/Production

- More permanent facilities
- Pads, plants, borrow pits, access roads, pipelines
- High severity, low to mid frequency, small to large size
- EPEA approval

In-situ Oil Sands Disturbances

- Multiple factors determine resiliency
- Disturbance severity plays significant role in resiliency
- Hydrology limiting factor
- Propagules also limiting factor if soil physical and chemical properties are non-limiting
- Adapted from Turner et al. (1998)



In-situ Oil Sands Disturbances

Commercial/Production

Site level

Landscape level

Planning

Two Key Eco-footprint Considerations

- Avoid and minimize size and intensity of disturbance
  - Methods
  - Techniques
  - Tools
- Conserve resiliency of existing soil, vegetation and hydrologic systems
- We can do this at the **planning stage**

Planning

Asking Key Questions

- What type of peatland or ecosite are you disturbing?
- How will the disturbance affect the peatland?
- What do you want out of restoration?
- What to you need to achieve what you want?
- What do you currently have to achieve what you want?

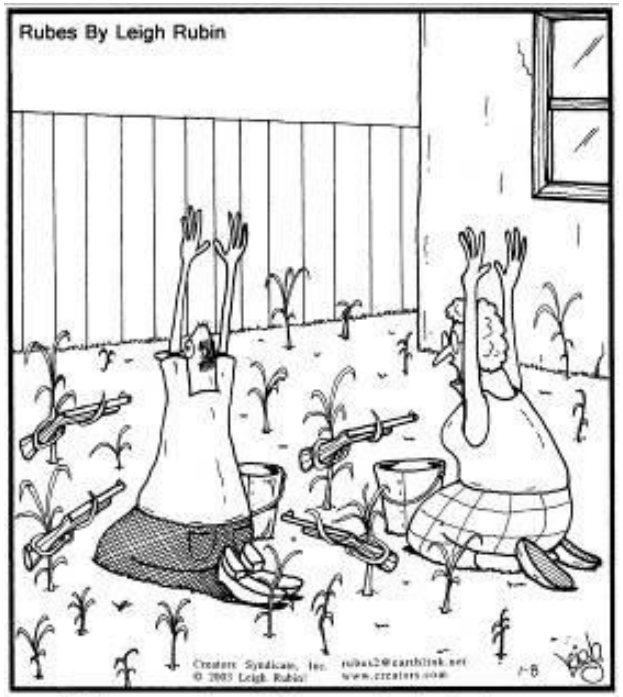
Planning

Plan to avoid and minimize disturbance, and conserve the resiliency of an area.

Plan to Minimize or Avoid Disturbance

Advantages

- Cost effective
- Hydrology preserved
- Keeps roots intact
- Reduces restoration period

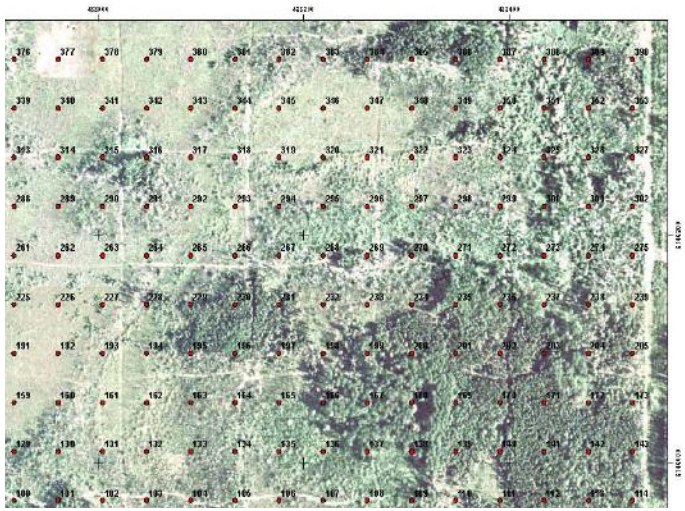


"We never should have waited this long ... Now the weeds have *completely* taken over."

Methods

Take Stock of What You've Got

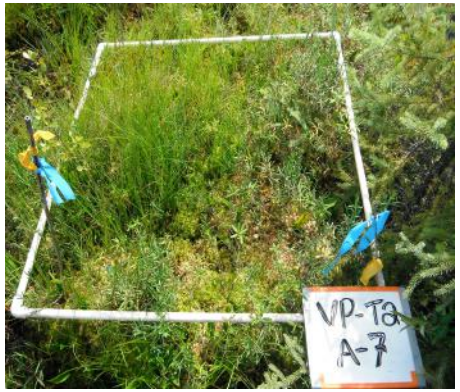
- Environmental Impact Assessments
- Pre-disturbance Assessments
- Environmental field reports
- Aerial and satellite imagery
- AVI maps
- Site visits



Methods

Pre-disturbance Data Collection

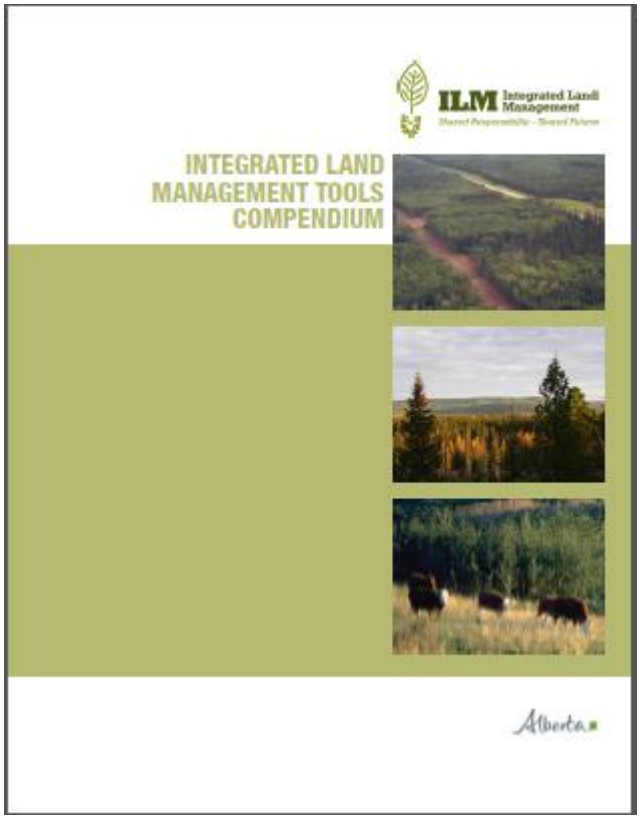
- EPEA regulated sites
- Type and amount of data required should be based on disturbance type and environmental sensitivity
- Data collected should determine what and amount of materials are available for conservation for use in restoration
- Water level can be used for planning construction and restoration



Tools

What resources do we have to avoid/minimize disturbance?

- Integrated Land Management Tools Compendium
- Sharing roads



Tools

Does technology pay off in peatlands?

- Aerial and self-leveling rigs

Cenovus.com (2014)

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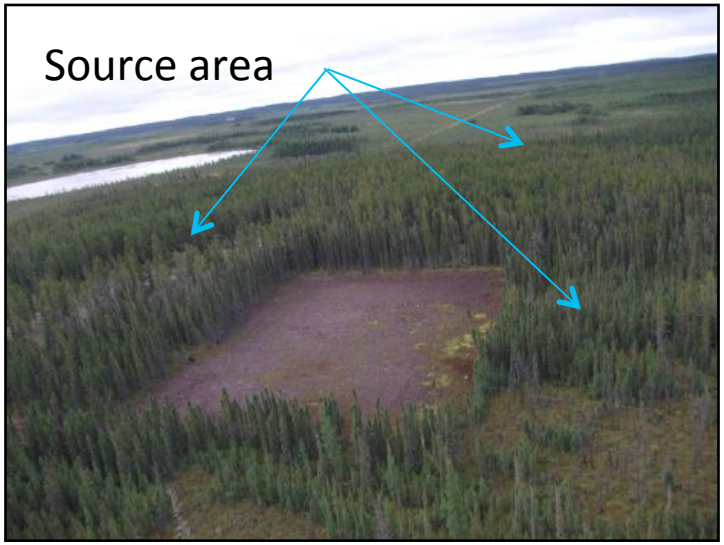
Techniques

Save Existing Restoration Material and Stack Dollars

- Native propagule sources
- Keep the rooting zone intact



Techniques

Put your Money Where the Moose Aren't

- Shrubby peatlands typically do not require additional planting
- Treed peatlands dominated by coniferous trees may require planting

Techniques

Timber Management Planning

- Hand fell or blade down trees
- Avoid mulching where feasible
  - If mulching, ensure to hold the mulcher above ground so you **do not damage** the **root zone**
  - Stay above hummocks to preserve microtopography and roots
  - Do not spread mulch thick
  - Single pass mulching to ensure woody material left on-site

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Techniques

Site Construction

- Timing
  - Plan for frost (entry and exit)
  - Make sure frost is in ground to prevent site from subsiding and damaging roots
  - Allow site to freeze for a few days after harvesting trees and before bringing additional equipment on-site

Techniques

Site Construction

- Leave stumps in place
  - Minimizes disturbance and allows organic soil to freeze better
  - Grubbing increases mortality of propagules
- Keep seed cones on or above surface
  - Allows for natural tree regeneration
  - Buried cones do not release seeds for germination

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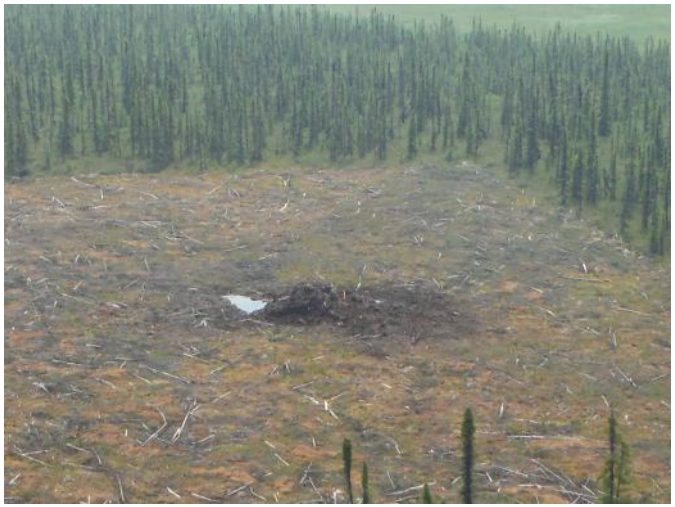
Techniques

Well Centres

- Ideally no subsidence and no mound
- Plan to put like material back
  - Peat from on-site
  - Peat from nearby commercial site stockpile
  - Mineral soil (less ideal on deep peat sites)



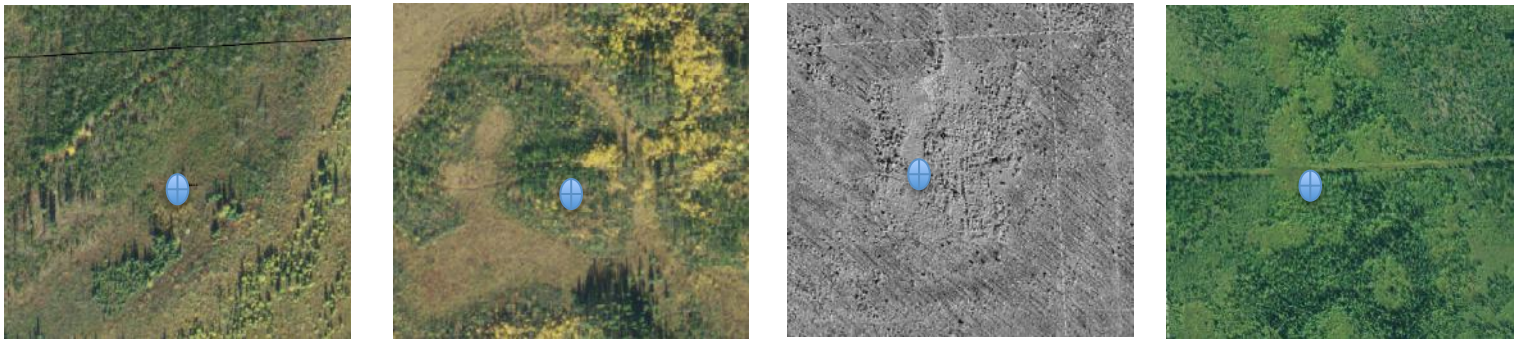
Techniques

Mineral Pad Construction

- Protect water flow
- Source suitable pad material
- Salvage restoration material to use on other locations requiring restoration
  - Seed cones
  - Woody material
  - Live peat moss (upper 5 to 10 cm)

Summary

Plan to minimize disturbance at all stages of development.



Questions?

Thank You!

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