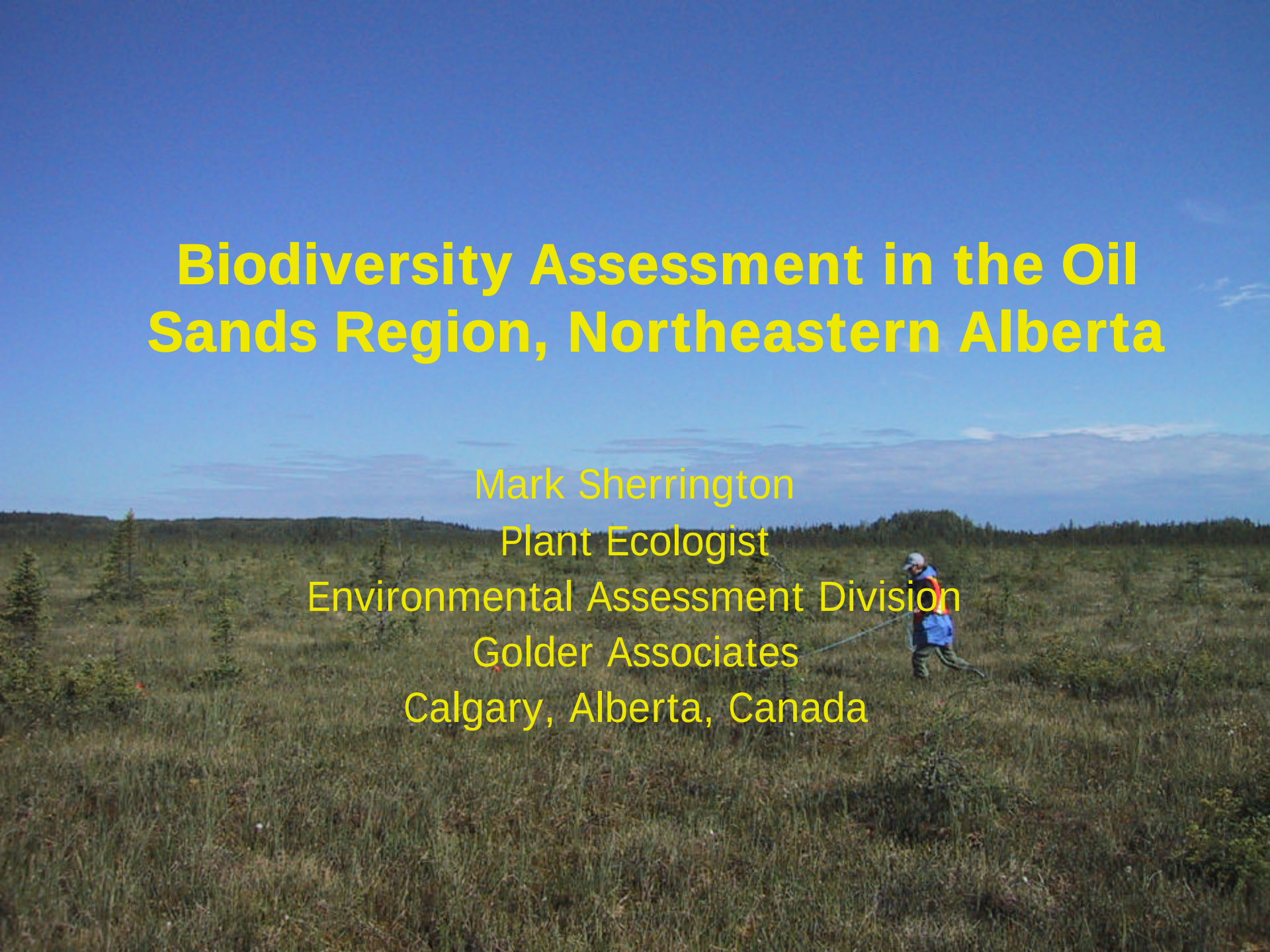
Biodiversity Assessment in the Oil Sands Region, Northeastern Alberta



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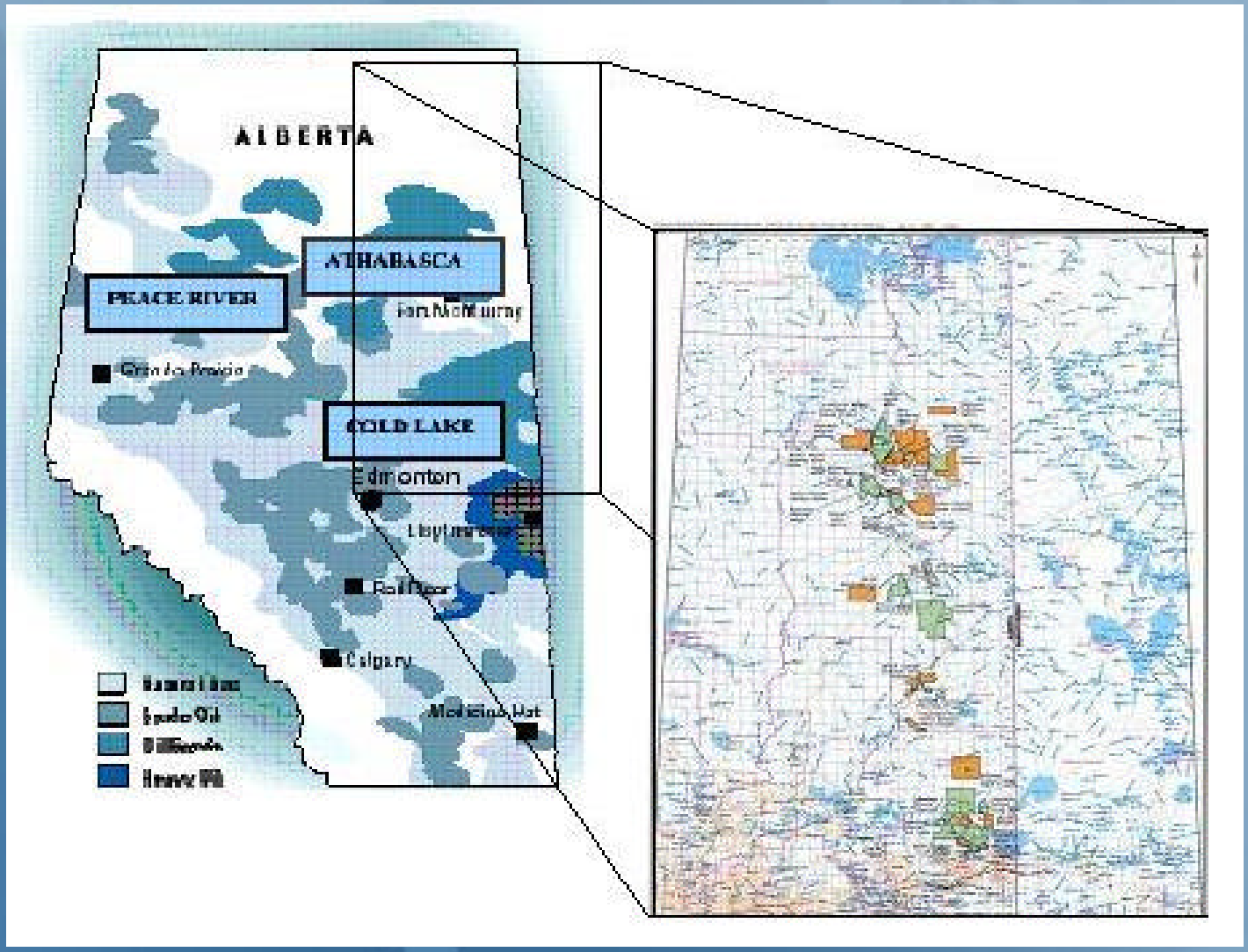
Location Map



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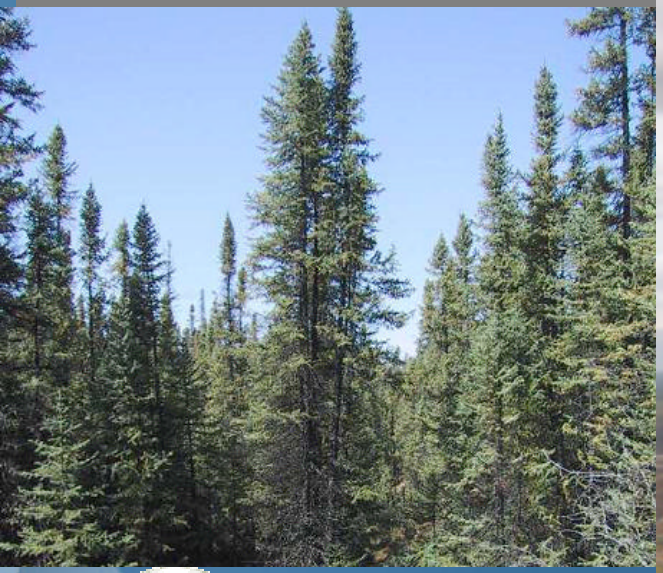
The Oil Sands Region



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What is Biodiversity?

The variety of life at all levels of organization

Genetic to Landscape Level

Encompasses all Ecological and Biological processes

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Assessment Approach

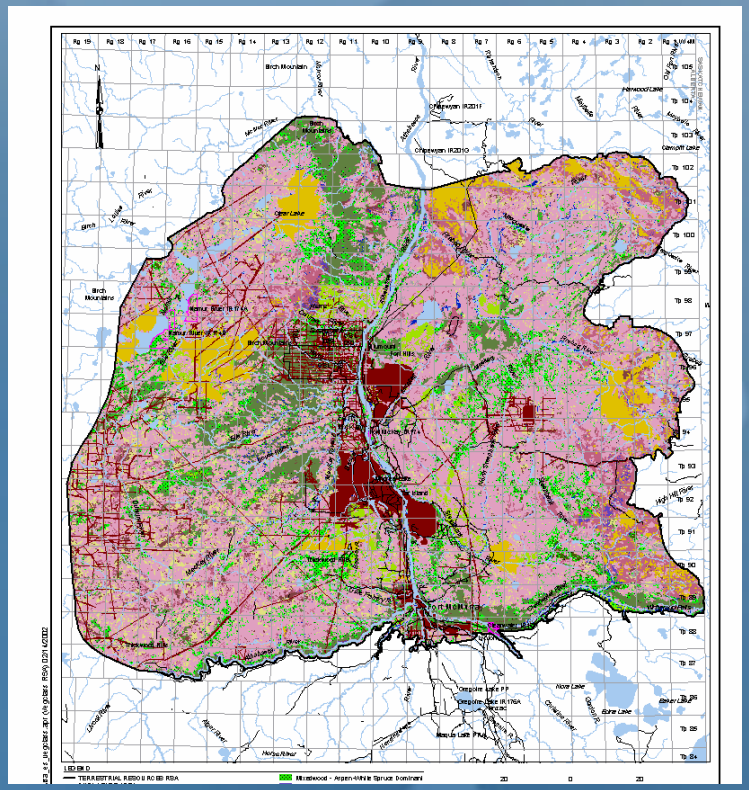
Two Key Questions:

- Application Case
- Planned Case

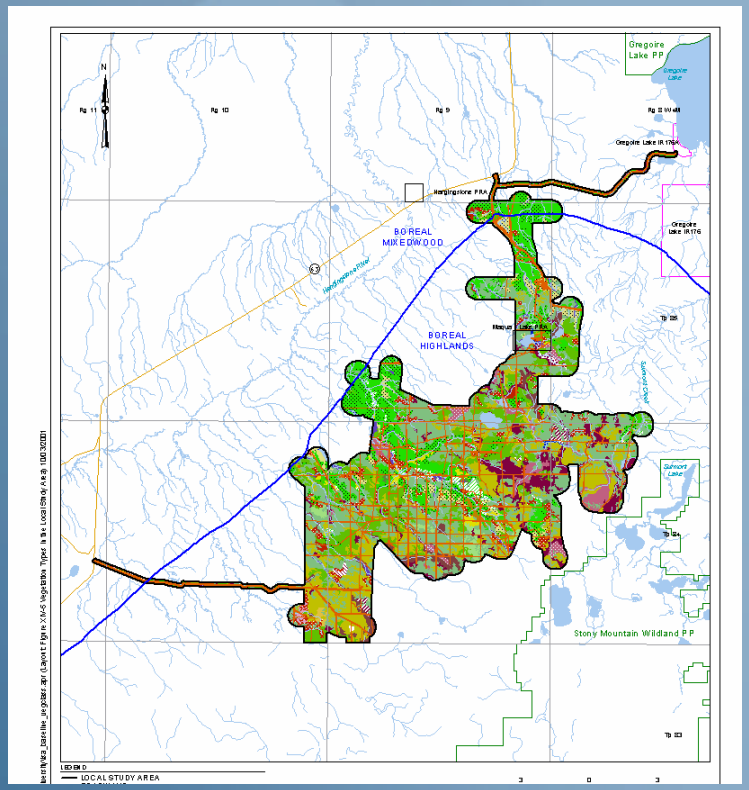
Regional Study Area and Local Study Area

- Baseline Case
- Application Case
- Planned Development Case

Regional Study Area (RSA) and Local Study Area (LSA)



RSA 2,275,000 hectares – broad ecological context



LSA 3,500 hectares - area of direct impact and buffer

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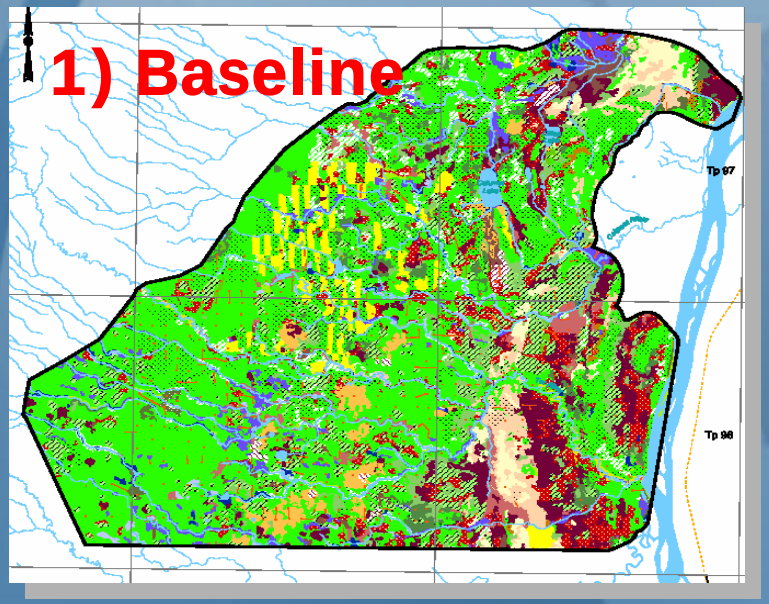
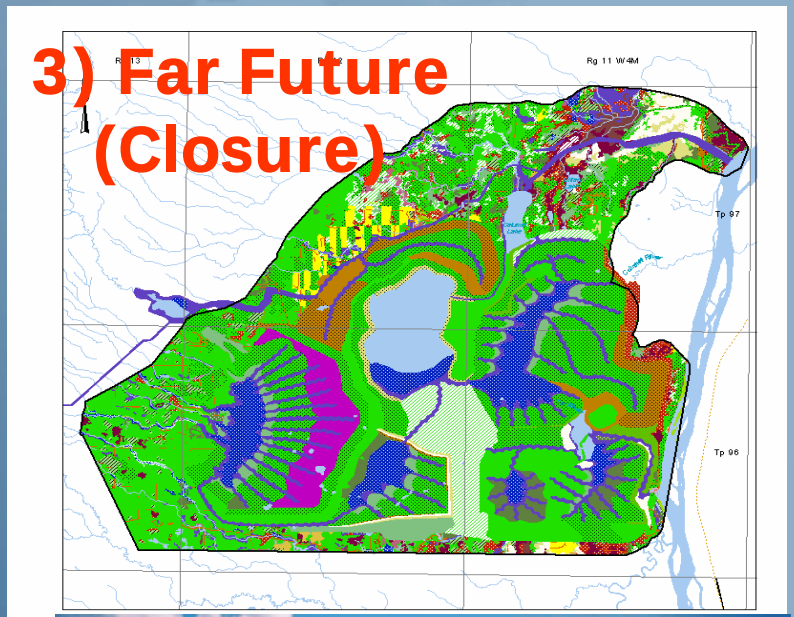
Assessment Scenarios





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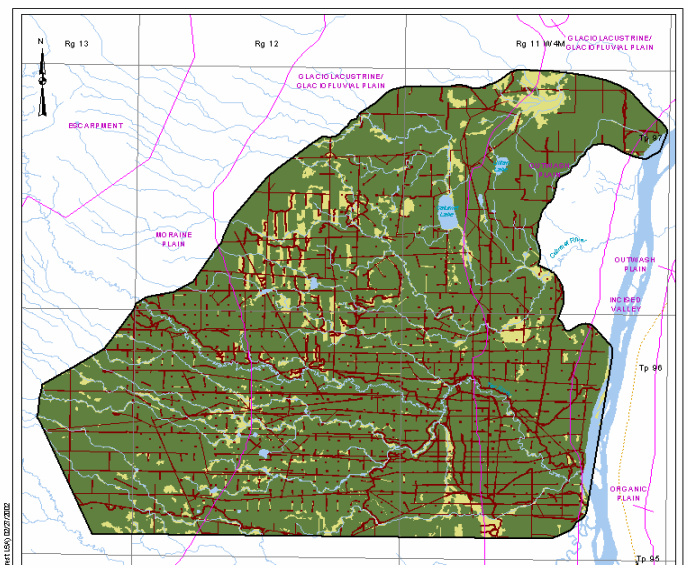
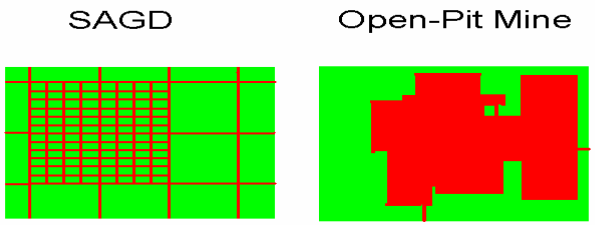
Landscape composition and structure strongly influences species-level biodiversity





- Fragmentation = landscape structure
- Heterogeneity = landscape composition
- Measure of the potential effect on biodiversity at the landscape-level

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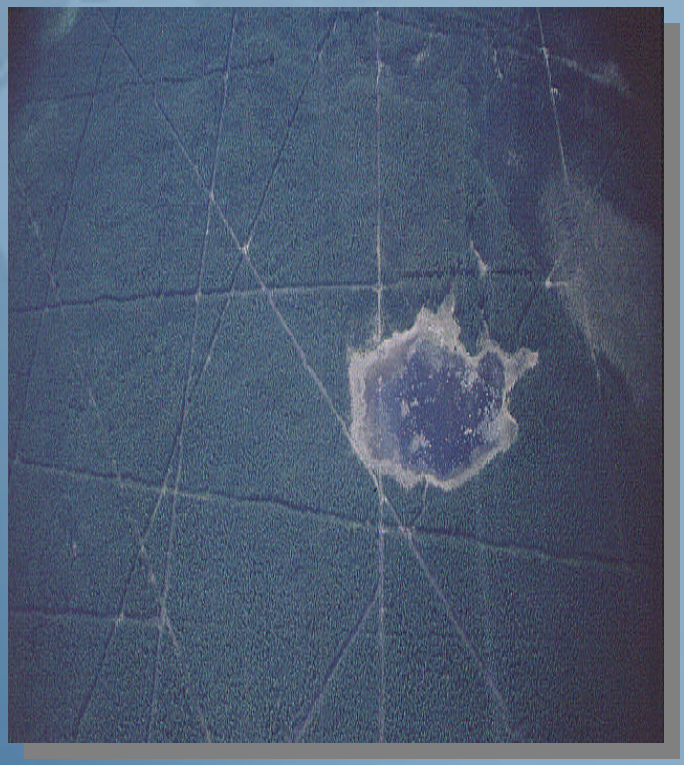
Landscape Fragmentation

- Disturbed vs Undisturbed Areas (Area measures)
- Forested vs Unforested Areas (Area and Connectivity measures)
- Riparian Zones (Area and Connectivity measures)
- Old Growth Forest (Area and Connectivity measures)



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Landscape Heterogeneity

- Patch Richness of vegetation types
- Evenness of distribution of vegetation types
- Distribution of Peatlands (Area)
- Distribution of Terrestrial Vegetation (Area)
- Distribution of Water and Disturbance (Area)

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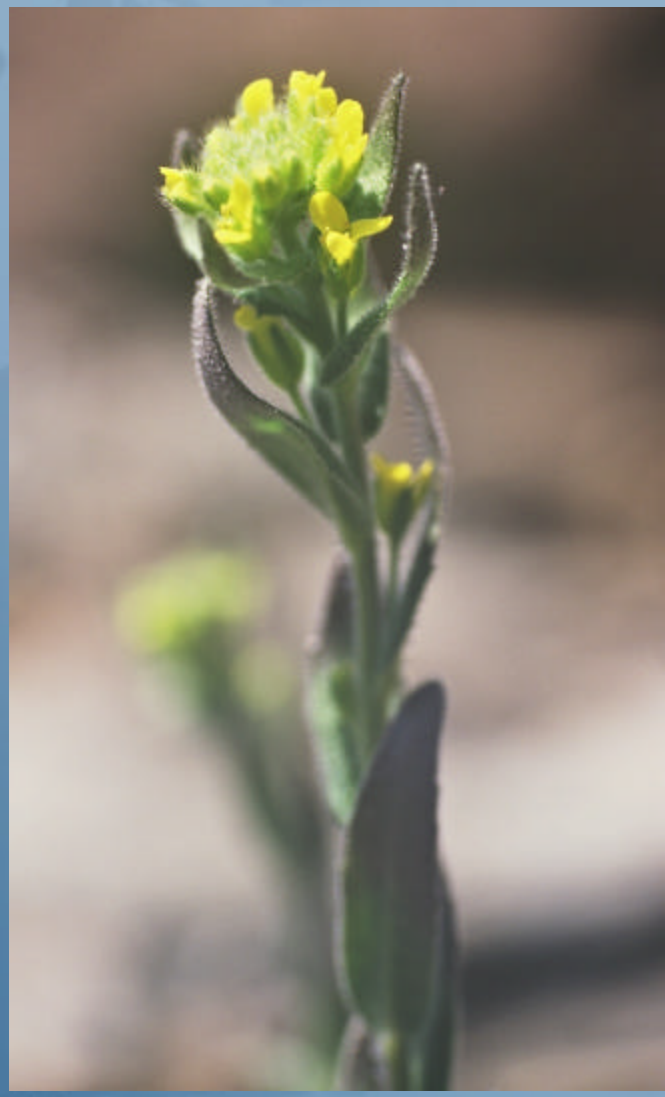
Ecosystem Level Biodiversity Assessment

Ranking Criteria for Biodiversity Potential

1) Abundance of type: uniqueness of regional vegetation classes based on relative abundance in the RSA.

2) Total species richness: total number of vascular and non-vascular plant species, terrestrial and aquatic vertebrates



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3) Species overlap: proportion (%) of plant species and terrestrial vertebrate species shared with other vegetation types (> 4 habitats shared)

4) Rare species potential: potential for ecosystems to support listed plant species

5) Structural complexity: measure of the number of layers comprising ecosystems

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Low Biodiversity Potential Type

a1 - lichen - jack pine

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High Biodiversity Potential Type

Treed fen (FTNN)

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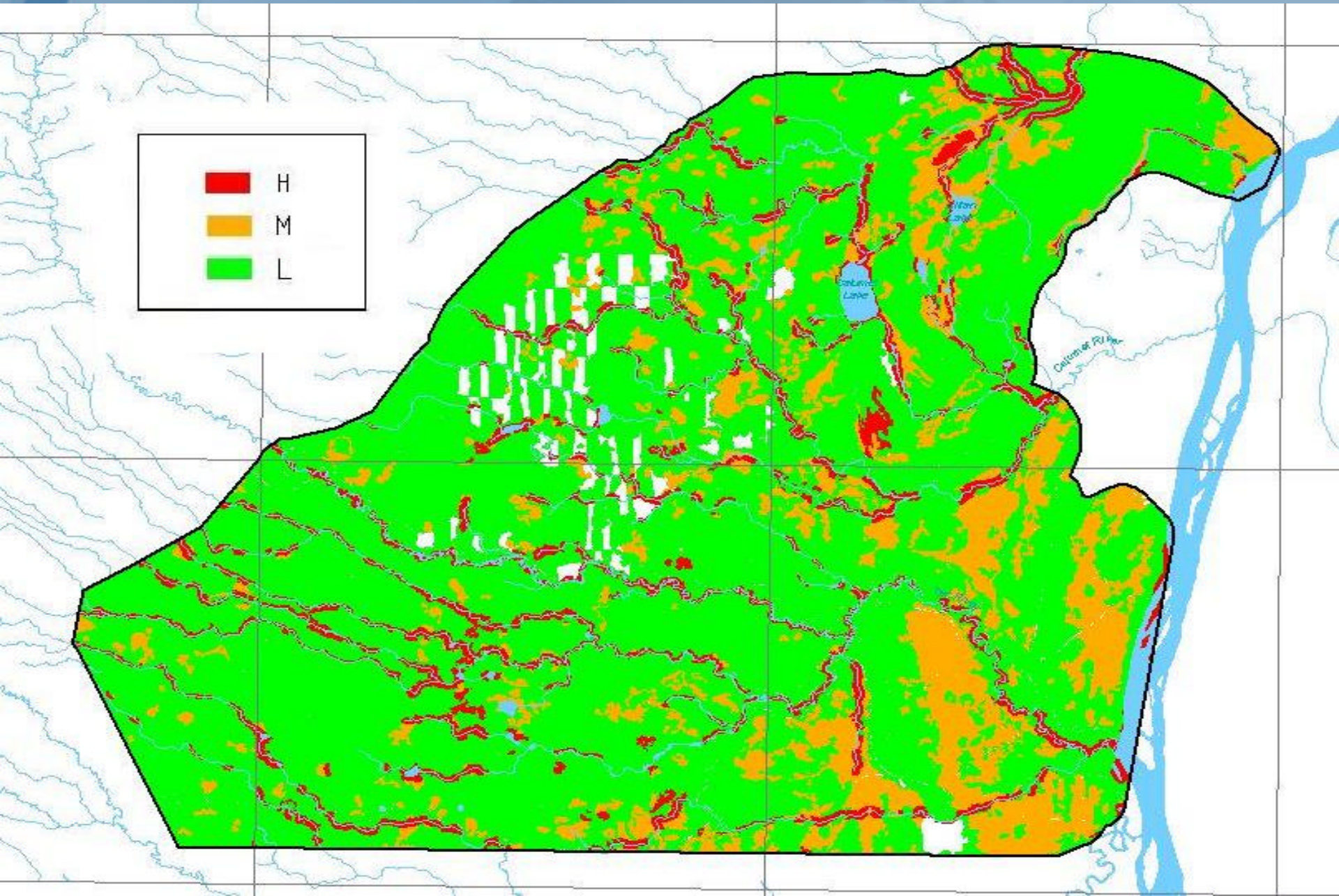
Biodiversity Potential Mapping



Residual Impacts

- Impacts remaining to biodiversity after mitigation
- Environmental consequence of a project on biodiversity is assessed on landscape-level and ecosystem-level parameters

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Summary

- Landscape structure affects ecosystem-level biodiversity (function)
- Biodiversity levels in the landscape following project closure is strongly influenced by the composition and configuration of the reclaimed vegetation types
- Wetlands and riparian zones have high biodiversity potential, thus are vital components of baseline and closure landscape for ecosystem function (e.g. habitat connectivity)

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