



# **Landscape level management frameworks: incorporating terrestrial values**

Landscape Planning & Design: From science to implementation workshop  
Winnipeg, MB  
April 15, 2008

Margaret Donnelly  
Sustainable Forest Management Network  
University of Alberta



## Overview

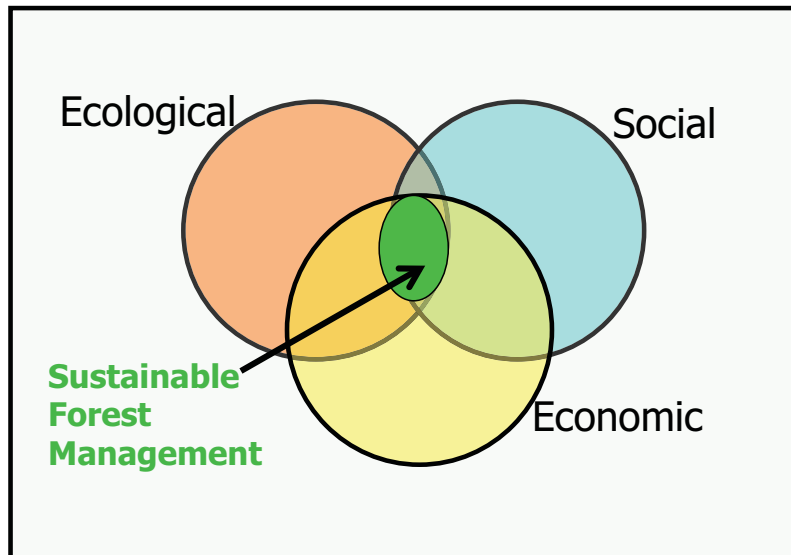
- Why use a landscape-based approach ?
- Landscape management objectives
- General principles
- Landscape level management recommendations



## Why use a landscape based approach ?

“ Forest management is not rocket science, it is far more complex ”

(Thomas & Bunnell, 2001)



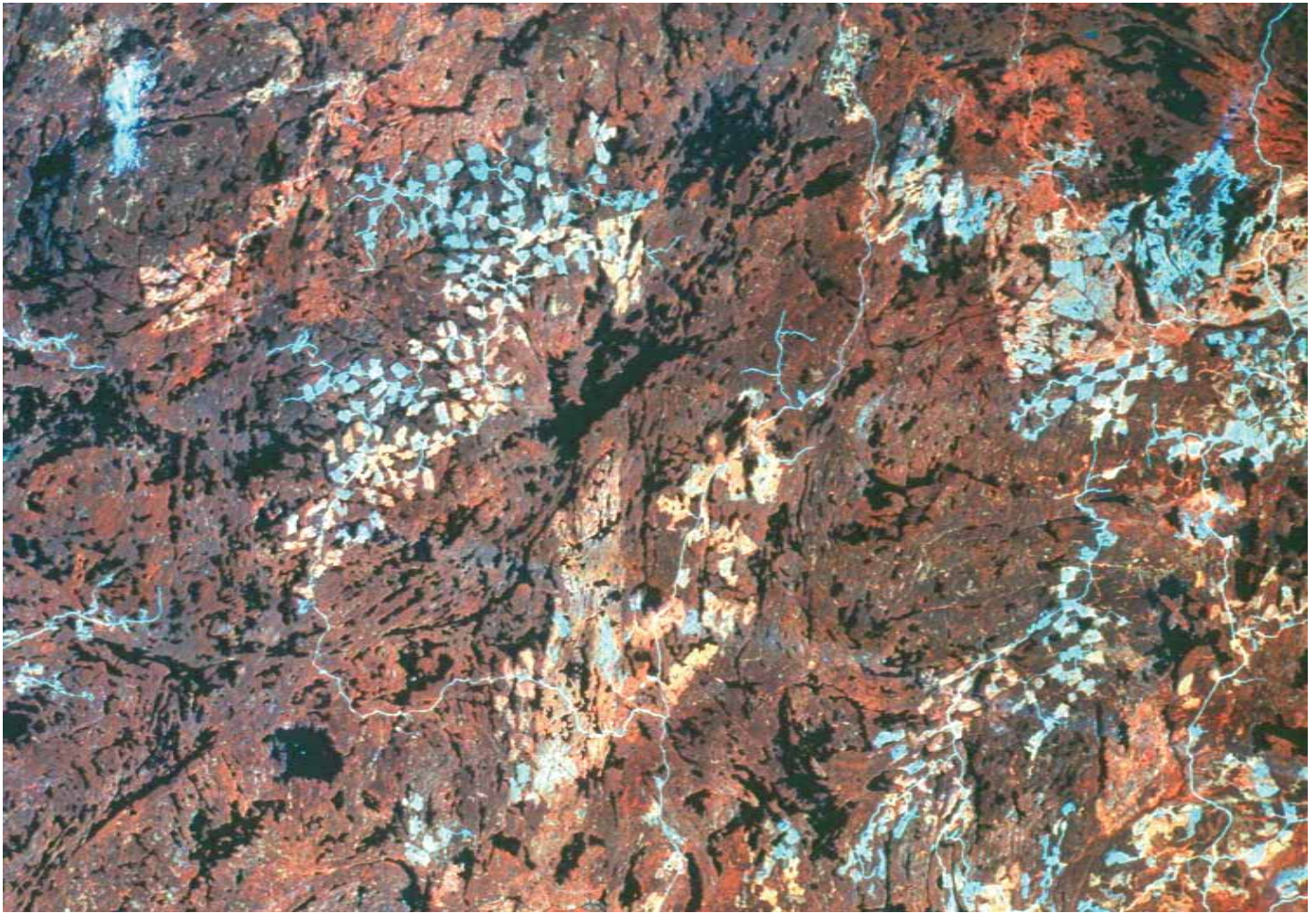


## Why use a landscape based approach ?

- “ Shift the emphasis from the FRAGMENTS to the management of the MATRIX in which they are embedded. If the biota in the fragmented landscape is to persist then the management of the matrix becomes all important. Ameliorating the matrix may be the most important way to manage fragments” (Crome, 1994)

Fragments = what is removed (& regenerated) via forestry activities

Matrix = what remains after harvest, includes areas not devoted primarily to conservation of natural ecosystems, processes & function



(Rempel, 1991)



## Why use a landscape based approach ?

- Conservation of biodiversity
- Integration of multiple strategies at multiple scales
- Many ecosystem attributes and processes operate at much larger spatial scales than that of individual harvest cutblocks.





## Why use a landscape based approach ?



- Maintain integrity of aquatic systems – hydrological & geomorphic processes
- Integration of forest operations with other land use practices and industries
- Reduce risk and uncertainty



## Landscape management objectives

- To ensure long-term ecosystem productivity
  - Maintain ecosystem integrity & resilience
  - maintain ecosystem processes and function
- To provide goods and services
  - Biodiversity conservation
  - Timber and non-timber values
  - Social & cultural values





## Landscape management objectives

- Incorporate considerations of time & space
  - present & future generations
  - Distribution of values in managed & unmanaged landscapes
- Integration of stand and landscape level approaches – eg. Riparian management, maintenance of forest structure & patterns
- Reduce risk & uncertainty by providing range of strategies & conditions in case some don't work well or don't work for all species



## General Principles

### A landscape-based approach is consistent with SFM

- Maintain variability in forest at multiple scales especially in terms of
  - species composition & seral classes
  - Landscape patterns
  - Availability of habitat structural elements
- Landscape design approach should include variety of harvest & silvicultural techniques, management intensities to promote habitat variability

# General Principles

Landscape issues are at least as important as stand-level issues

- Rottenbury et al (1995) make management decisions at landscape scale first, then stand level
- Drapeau et al (2000) suggest great attention should be paid to landscape-scale changes in forest cover (species composition, amount of mixedwood, older seral classes)



# General Principles

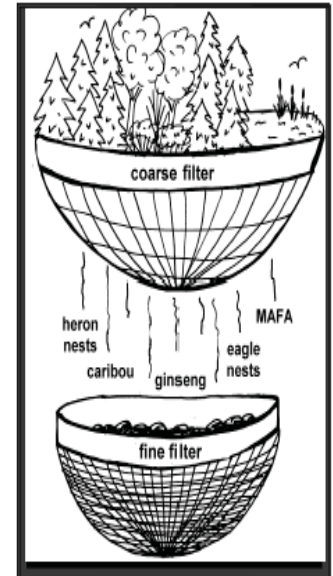


Can't manage for all species in all places at all times

What benefits one species may not benefit others ...

**Coarse filter:** forest patterns, composition & structure to provide range of habitats & seral classes

**Fine filter:** indicator or focal species & rare/special habitats, Sp@ risk, regionally significant species





## General Principles

Trade-offs are necessary:

- between individual species & socio-economics,
- try to balance trade-offs across landbase & SFM values



Don't do the same thing everywhere, variability is the key

- manage to maintain forest heterogeneity
- no single approach is sufficient
- Maintain variability at stand & landscape scales

# General Principles

Maintenance of structural elements is as important as stand age

- Availability of habitat structural elements important to species rather than habitat age (although related)
- Promote availability of habitat elements in regenerating stands through modified harvest & silvicultural practices





## General Principles

### Incorporate consideration for species at risk

- Be aware of COSEWIC, provincially & regionally important species & recommended management approaches
- Ensure maintain special habitats for species or communities that require
  - Older forest & related habitat structural elements
  - Early successional, post-fire habitats
  - Non-disturbed or core habitat areas
- May require fine filter focus



# General Principles

Be aware of short-term vs. long-term effects

- Cumulative effects may be more pronounced on common sp in long-term but short-term effects may be greatest on uncommon species – declines go unnoticed dt lack of data
- Best addressed thru biodiversity conservation strategies
- adaptive management & monitoring frameworks to reduce risk & uncertainty





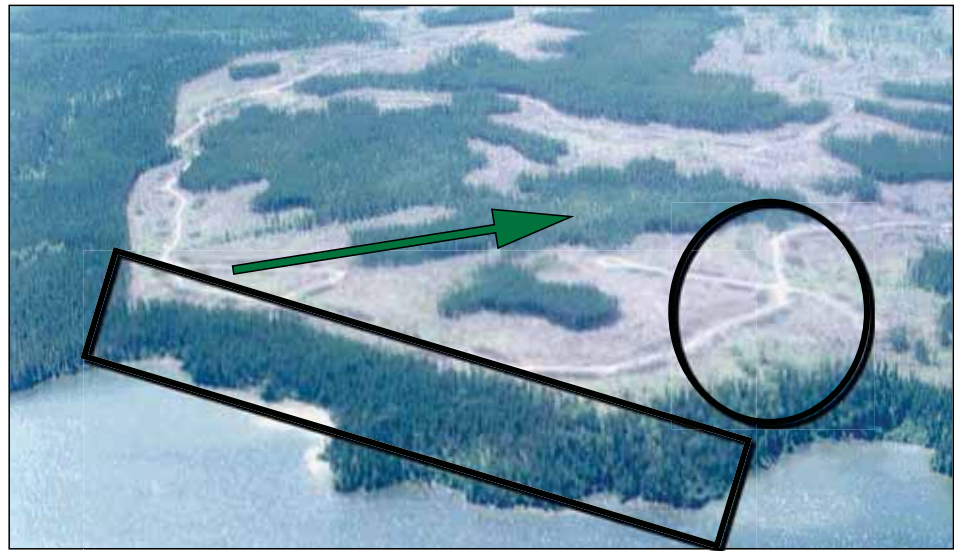
# General Principles

Integrate stand level practices with landscape level planning

eg. Riparian Management & buffer design considerations

Buffers may meet objectives for some species but not all

Forest interior species vs. Edge loving or tolerant species)



(J. Morissette, 2005)

# General Principles

Integrate stand level practices with landscape level planning

Riparian Management & buffer design considerations

- Do other opportunities exist for providing interior habitat?
- Connectivity at landscape scale
- Opportunities to maintain riparian habitats as part of network of representative ecosystems
- Instances where riparian buffers could be large enough (ie. Leave blocks) to provide habitat for interior forest species



# Landscape level management recommendations

Promote landscape design concepts & planning approaches designed to maintain forest diversity similar to natural forest landscapes including:

- Maintenance of areas of old forest & late successional stages in managed landscapes
- Explore alternative management strategies to maintain forest species composition especially mixedwood forests & uneven-aged forests



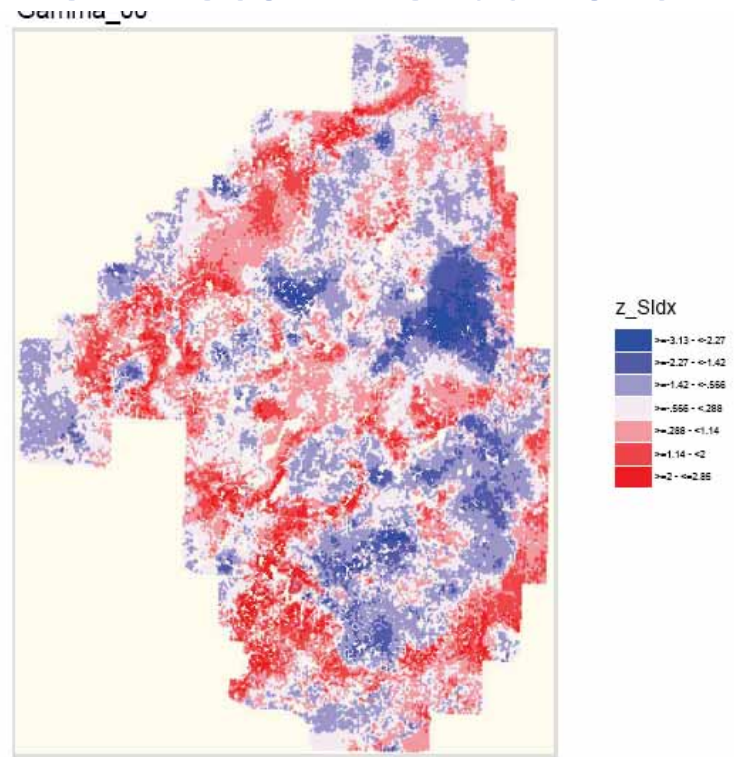
# Landscape level management recommendations

- Maintain habitats derived from fire events or insect/disease infestation
- Develop management scenarios that promote habitat variability at landscape scale
- Attempt to manage forest age class structure & species composition to more closely resemble a natural forest
- Maintain benchmark, non-harvest areas or special sites



# Landscape level management recommendations

- Conduct landscape level ecosystem representation analysis to provide coarse filter approach
- Establish a network of representative ecosystems (managed & unmanaged)
- Maintain critical habitats, special sites & biodiversity 'hotspots'



Species richness using Simpson's biodiversity index Duck Mountains (Rempel, 2006)



## Conclusions

- although we may still have many questions about relationships between many species and potential forest management effects we must move forward based on present knowledge & data
- Use management principles and practices based on a broader understanding of natural systems and dynamics should be pursued, maintain habitat diversity
- Continue to support research and monitoring through partnerships
- Embrace adaptive management & the reduction of risk and uncertainty