

## Landscape Design and Planning

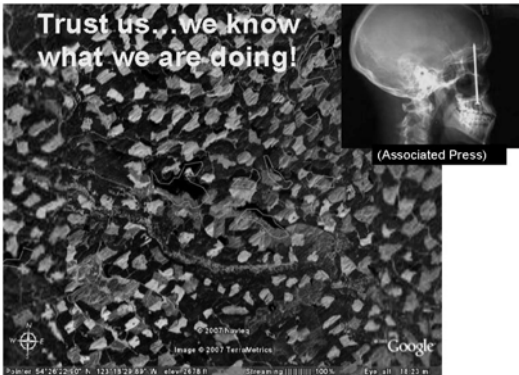
### Think Back to our Discussion re: the Evolutionary Phases of Forest Management

- Unregulated Exploitation
- Regulated (Systematic) Exploitation
- Wise Use
  - Sustained Yield Forestry
- Integrated Resource Management
- Sustainable Development
  - Ecosystem Management
  - Sustainable Forest Management

Landscape Design fits in here



Trust us... we know  
what we are doing!



### Why Bother? What's the Buzz about Landscape Design?

- The goal of landscape design (as envisioned in North America at least) is to better emulate natural landscape patterns
- As a part of ecosystem management, the emulation of natural landscape patterns is thought to provide improved ecosystem function, habitat benefits, and to be aesthetically (and intellectually) pleasing in comparison with some traditional harvesting practices.

### Why Bother? What's the Buzz about Landscape Design?

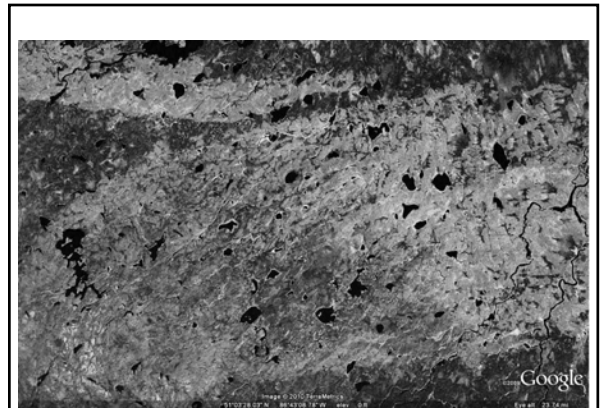
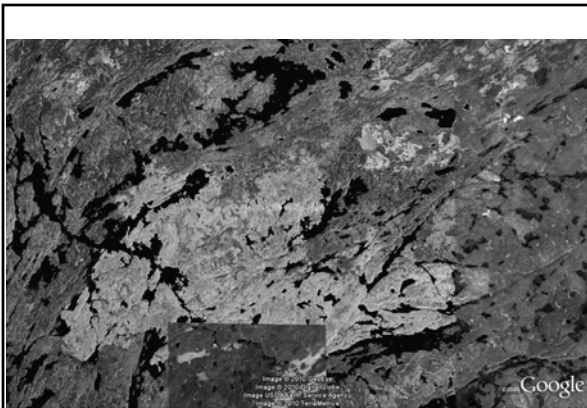
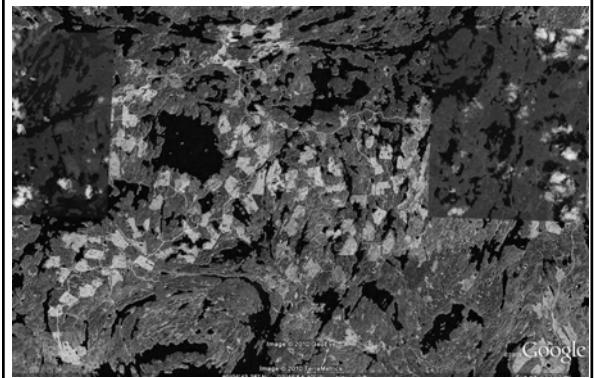
- it is also part of a precautionary approach based on the "assumption" that there will be *benefits* even if we can not quantify or even articulate them
- What landscape design is **NOT** is efficient from a timber harvesting perspective
- Also what it is not is **EASY** to implement especially in the context of a fully engaged forest

### Why Bother? What's the Buzz about Landscape Design?

- If you scrape away the rhetoric then primarily the concept is linked to the provision of wildlife habitat
- wildlife species require not just specific vegetation types and age classes to meet habitat requirements but also specific patch sizes and proximities and orientation of those patches in respect of one another
- Not all species have the same habitat requirements!

## Why Bother? What's the Buzz about Landscape Design?

- In a fire driven ecosystem and in the context of clearcut silviculture the primary component of landscape design is emulating natural disturbance patterns
- Other components such as preventing forest fragmentation, ensuring travel and migration corridors, and ensuring proximity of critical habitat elements are also vital components of landscape design





## Evolution of Landscape Design Policies / Practices

1. No consideration of landscape design; harvest areas governed by licensing arrangements; cuts expanded from a central (camp) location until they got too far away and then the camp moved
2. Patch harvest strategies (i.e. moose management guidelines) cuts were limited in size (avg 100 ha); planned regular boundaries interspersed with residual patches and corridors

## Evolution of Landscape Design

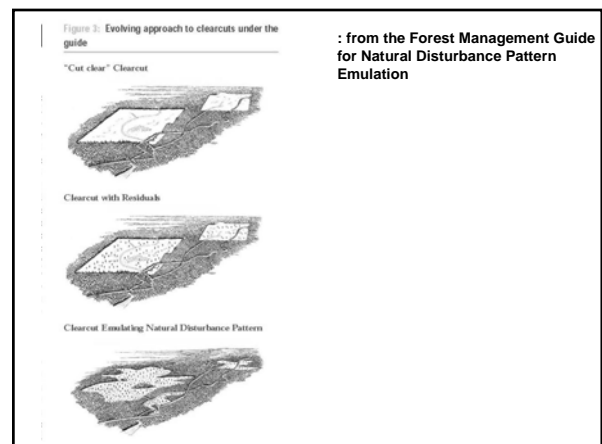
### 3. Emulation of Natural Disturbance Patterns

- Drivers; wildlife habitat
- Current science regarding ecological form and function
- **It sounds good** 😊; unfortunately the latter statement is true. A lot of the embracing of landscape design has been driven by relatively uninformed NGOs and members of the public who like the sound of the concept in principle

## Multiple scales apply in Landscape Design

- Landscape design, (especially in the context of a fire driven ecosystem) is extremely influenced by scale
- Ground level, stand level, and disturbance level components are all required
- What characteristics of forest fire disturbance can we emulate through forest harvesting disturbances

Scale	Fire	Harvest	Emulation Strategy
Ground	Dead trees standing	Potential to cut everything in stand especially where wood is favourable	Leave snag trees for wildlife and to provide vertical structure
Stand	Irregular boundaries	Straight line boundaries are easiest and most efficient	Design harvest using natural stand boundaries where feasible
Disturbance	Variety of sizes but most disturbances are large	Pattern has evolved through policies. Limited by merchantability and marketability of what is on the ground	Provide for a variety of sizes of harvest. Link up old harvest blocks to make larger disturbance areas. Educate the public





### Landscape Level Planning in Ontario

- The MNR describes ecosystem planning as a coarse and fine filter approach
- Conceptually higher level "coarser filter" policies are applied initially and result in things like landscape design
- Finer filter policies are used to refine management to meet the needs of particular species or ecosystem elements

### Landscape Level Planning in Ontario

- Landscape level planning ~ landscape design is the product of four sets of guidelines which are applied in Forest Management Plans in N. Ontario:
  - Forest Management Guide for Natural Disturbance Pattern Emulation
  - Forest Management Guidelines for the Provision of Marten Habitat
  - Forest Management Guidelines for the Conservation of Woodland Caribou
  - Timber Management Guidelines for the Provision of Moose Habitat

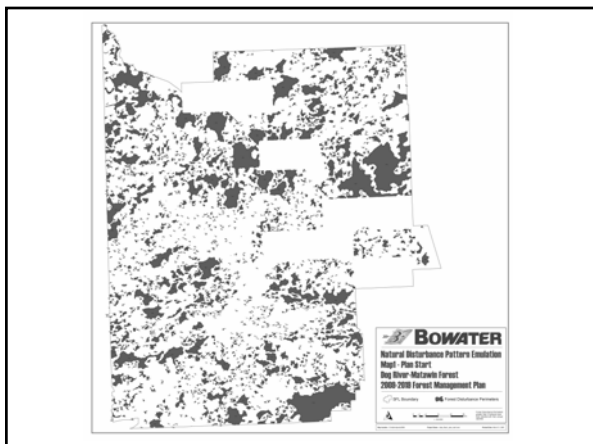
### FOREST MANAGEMENT GUIDE FOR NATURAL DISTURBANCE PATTERN EMULATION ~ 2001

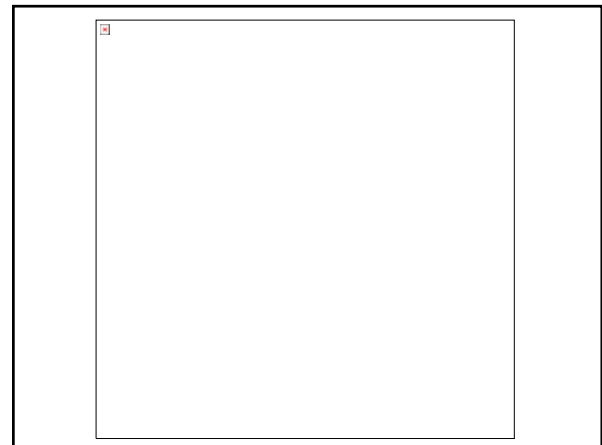
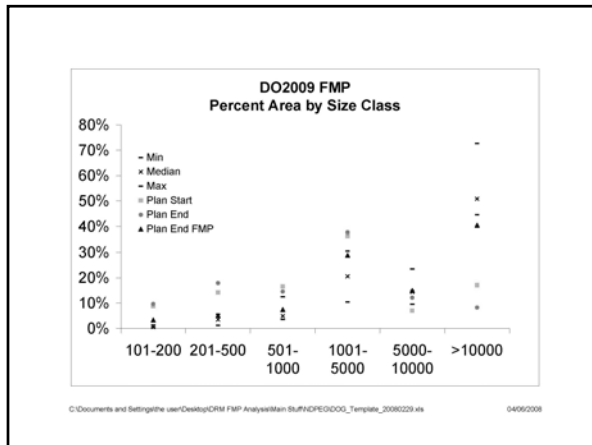
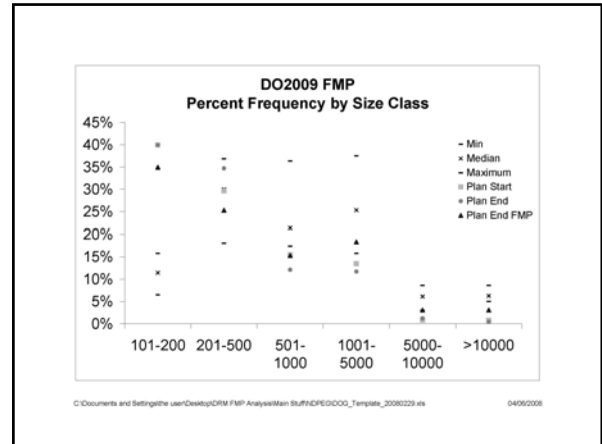
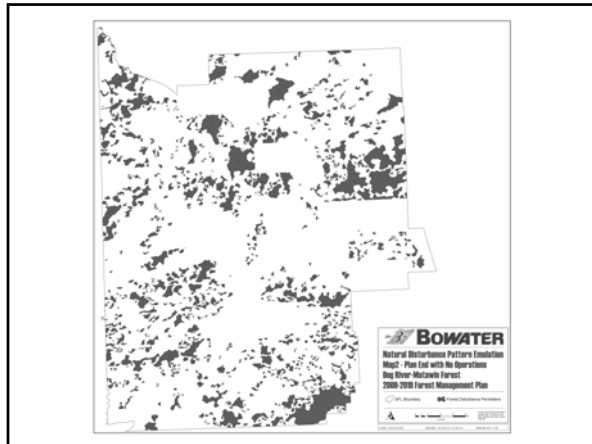
"The purpose of this guide is to provide direction for forest management practitioners in the development and implementation of forest management plans such that managed forest landscapes will resemble more closely the landscapes recently created naturally by fire ...."

### FOREST MANAGEMENT GUIDE FOR NATURAL DISTURBANCE PATTERN EMULATION ~ 2001

Four Elements of the NDPEG.

1. Demonstrate movement towards the "natural disturbance template"
2. Manage planned clearcut sizes (Northern Ontario ~ 80:20 Ratio of smaller, [i.e. < 260 ha], to larger clear cuts)
3. Sliding scale of spatial distribution of disturbances of various sizes
4. Stand level retention of timber as insular area, peninsular areas & snag trees





Size class (ha)	Number of planned disturbances	Median distance (m)	Minimum average	Actual Average
10-260	271	370	200	550
261-520	36	430	250	737
521-1040	29	910	450	1675
1041-2500	26	790	1,050	1820
2501-5000	14	2910	1,950	3708
5001-10000	7	450	3,800	4558
10001-20000	5	11510	7,550	21430
>20000	2	N/A	10,000	25480

### Challenges with the NDPEG

- Historical harvest pattern is already etched across entire landscape of forest making it impossible to change without significant loss of wood supply
- Standards are at odds with one another i.e. need to increase number of larger disturbances to approach the natural disturbance benchmark but also need more small cuts to meet 80:20 size ratio requirement.

## NDPEG Bottomline

- Not a problem to satisfy guideline on a relatively “green field” forest
- On a forest with a long history of forest management, the pattern is set and changing it is difficult or impossible without a major loss of wood supply

## Forest Management Guidelines for the Provision of Marten Habitat ~ 1996

- meant to be applied across most of Northern Ontario
- Somewhat superceded by the Caribou guidelines in areas where Woodland Caribou are present
- Guidelines are designed to provide for habitat for those species which “require” large contiguous patches of conifer dominated forest (species like, pine marten, great grey owl, black backed woodpecker)

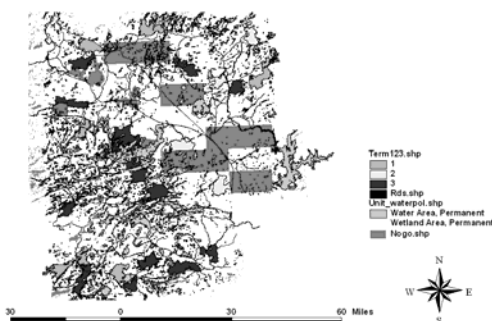
## Forest Management Guidelines for the Provision of Marten Habitat

- Main effect of the guidelines is to require that 10%-20% of the capable habitat on the forest in “suitable” condition
- Suitable = Conifer dominated, 50% Crown Closure of Conifer, Min 15 m tall / 80 years, arranged in Core Habitat Areas of 3000 – 5000 hectares in size
- Also stand level requirements for retention of snag trees/woody debris

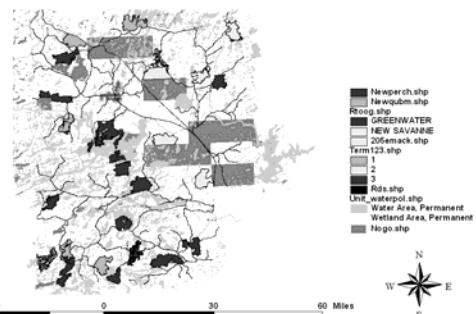
## Forest Management Guidelines for the Provision of Marten Habitat

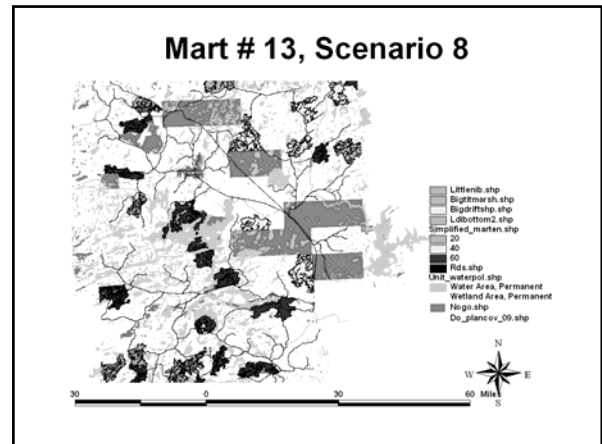
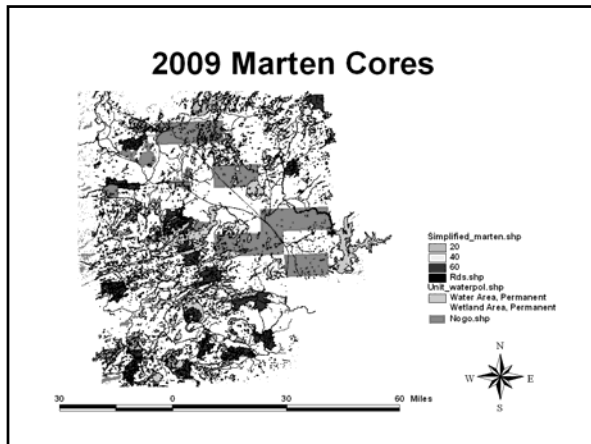
- Not able to meet the guideline for % suitable habitat on the Dog
- Cores improve Marten habitat over time (3.3% – 5.5% - 6.8%) ... But it took 16% of forest to achieve this!
- Determination of the final Marten cores based on negotiation and a subjective balancing of objectives; need a cooperative relationship between industry and MNR

## 2005 Marten Cores



## Mart # 7, Scenario 4





### Forest Management Guidelines for the Provision of Marten Habitat

**Bottomline Re: Pine Marten Guidelines**

- Once again, like the NDPEG, not a big problem in a green field forest but a huge issue for a forest with long management history
- Reduced the harvest on the Dog by 15% + and increased wood cost by forcing operations to widely dispersed areas of previously bypassed timber

### Timber Management Guidelines for the Provision of Moose Habitat~1988

“The purpose of these guidelines is to assist resource managers in maintaining or creating through timber management the diversity of age classes and species of vegetation that provide habitat for moose.”

- Net effect of Moose Guidelines was to broadly disperse the harvest into small patches of very best timber leaving patches of poorer timber on a fragmented landscape

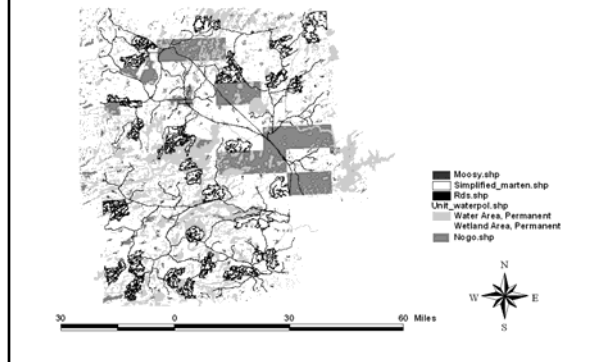
### Timber Management Guidelines for the Provision of Moose Habitat ~ 1988

- Average clear cut size = 100 ha
- Design 400 meter cover to cover distance through the use of alternating blocks, corridors, shelter patches
- Return harvest when cut areas are 2 meters
- Specific protection of salt licks, calving areas, aquatic feeding areas, Late Winter Habitat

### Timber Management Guidelines for the Provision of Moose Habitat ~ 1988

- In many areas of the Dog, mature habitat (esp mature conifer stands) is quite scarce
- Competition between wildlife and timber harvest for these areas
- Concern raised by MNR that *late winter habitat* being eradicated in certain areas
- No specific direction in the moose guidelines so planning team made a do-it-yourself solution; effectiveness unknown
- 100 ha patches of conifer reserved from harvest on a 5 km grid

## 2009 Habitat Patches



## Non-Spatial Assessment Collides with Spatial Policies

- Wood supply and habitat supply are analyzed using the Strategic Forest Management Model which is an aspatial optimization model
- As you near the end of the rotation, the results of aspatial analysis become more and more difficult to “fit” in the real world
- Difficult becomes virtually impossible when there are spatial ideals and objectives superimposed on the aspatial “solution”