Natural Heritage System (NHS): Science or science fiction?

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NHS background

- Natural Spaces Program (2005)
  - Methodology piloted in eco-district 6e6 and 7e5
- A guide to designing NHS

http://www.forestry.utoronto.ca/imaa/NHSGuide/index.html
Working Together toward a NHS for Prince Edward County and Surrounding Communities

NNS design and planning method applied
Principles of conservation and landscape planning

Prioritize conservation efforts over multiple biodiversity features.

Based on measurable objectives and quantitative targets

Require diverse spatial information
  - Standard across the area of interest

Tools: Mathematical optimization
  - Learn from science and experiences elsewhere in the world
Do we have a system

- **Yes**
  - Conserve
  - Conserve + buffer
- **Somewhat**
  - Conserve and restore
- **No**
  - Some natural fragments
  - Build a system
Southern Ontario: Woodland Loss

Scale & implementation

Upland woodland- scrubland loss from pre-settlement to 1978, by municipality. Figures represent percentages.

Natural Heritage Information Centre (MNR)
Why not “box”? There are ways to move outside of the box (if we want)
- And yet meet both local and regional scale needs
Eco-district

Eco-region

Ecological boundaries / landscape units

Watersheds and sub-watersheds

Political boundary
What and how much?
There are numerous conservation objectives

There are numerous conservation features

There are different ways to look and use data

Necessary to define relevant conservation objectives and relevant conservation features
Number of conservation features and targets, in data reach (and science reach) regions, can exceed hundreds of conservation features and targets.
Vegetation
- Overall landscape diversity
- Structure, composition
- Successional stages
- Plant diversity

Vegetation as
- Habitat
- Food sources
- Providing ecological function
- Providing ecological goods and services
  - Biomass
  - Carbon
Vegetation information

Do we have it?
- 2d – Polygons
- 3d (structure / composition)
- 4d – time / succession
Species at Risk

- We tend to sample public and easy accessible lands

Common species

- Ensure common stays common
- E.g. Ash was no of interest to us a few years ago
Species conservation

- Viable populations and habitats
- Conservation decisions would be easier if we identified and mapped
  - keystone species
  - flagship species
  - umbrella species
  - indicator species
Ecological functions

- Hydrological functions
- Landscape and patch functions
Quantitative way to prioritize conservation efforts over multiple biodiversity features.
Explicit and transparent (% or ha)
Targets should be defined based on persistence
However, they are sometimes defined by socio-political feasibility
Often used to protect minimum amounts
Can setting a target have bad impacts for biodiversity?

- Protecting 30% of each vegetation type, does not mean the rest of it can be destroyed.

- Is 30% protected enough to make a difference?
- Is it enough to sustain a species?
- Biodiversity outside NHS need to be protected by existing and future policies and best-management practice.
Conservation lands

- building blocks (nodes) of NHS
- ~44 different "conservation lands"
  - E.g. Significant wetlands, ANSI...
  - Protected areas in S. Ontario ~ 1%
    - 12% of land base protected areas (the Earth Summit 1992)

Fiction

- All catalogued and managed in one database
- Classified and grouped (IUCN)
Achieve objectives and targets at minimal “cost”
  • Minimize the amount of active agriculture lands
    • Simple but confident with it
  • Danger
    • Ecologists deriving monetary cost
    • Cost based by summing up ranks

Fiction:
  • Standard “Cost” surface that is conservation based
  • How much money we need to ensure a certain conservation outcome
  • How about determining the budget we need to conserve and restore NHS
Communicating Science

- It is about the process
  - Not the tools
- Optimization
  - Not NHS modeling
- How Marxan supports PPS
- “Hexagons”
  - Hexagon size
- How the results support implementation
Core, linkages & corridors

- 90ties approach
- We should focus on making corridors and linkages by restoring, making existing patches bigger, or creating new patches (stepping stones).
The good things

- There is no way back in terms of the process and methods
  - Accommodate quickly to any new tool
- The process
  - is transparent, adaptable
  - repeatable
  - forces integration
  - long-term thinking

- Information gaps, priorities and needs
The good things

- The process engages stakeholders
- It is evidence based approach
- Gives an opportunity to explore and assess different options
- Diverse conservation objectives combined
- Diverse views brought together
- Results and success measurable
Science

- The tools are there
  - More are coming
- Science evolves
- Research potential
  Link with universities (3 questions – 3 students)
Science fiction

- Standard and integrated information
- Pulling our resources together
- Sharing the vision
- Strategically linking the scales
- Funding research strategically
Protecting individual elements is not sufficient.
An effective network system is needed.
Sustainable use of the lands within and between the NHS elements
- Forestry and agriculture
- Leisure and recreation
- Urban development
- Transportation
- Natural resources

Integration with natural resources management
Integration with land use planning
Cross-organizational integration
Beyond the science

- Fragmentation of conservation community
- Coordination and integration
- Strategic investment in inventory, and information
- Link our needs and scales
- Mobilize our forces