Advancement of Geographic Information Systems & Ecology Information in Ontario Parks Northeast

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The Problem…

- Ontario Parks Northeast: 111Parks, >3.4 million ha

- Taking too long to produce individual life science inventories.

- Need to change the way I communicate ecology to park planners & managers.
Traditional Approach
Meanwhile…Park Superintendents Use GIS Too

- Parks Information Retrieval Application (PIRA)
What Information Is Currently In PIRA?

- **GIS Layers**
  - Boundaries, Lakes, Rivers, Contours, Roads, Railways, Utility Corridors
  - Recreation Camps, Commercial Outposts, Resource Harvester Territories, Boat Caches, Incidental Cabins, Trails, Campsites, Portages

- **Hyperlinked Files**
  - Work Permits
  - Technical Drawings
  - Land Use Permits
  - Warden Observations & Trip Reports
  - Photos
Values & Pressures Analysis

- New Planning Manual Approach

- It makes sense to start populating PIRA with ecological data for use by planners and superintendents.
Which Condensed GIS Themes Could Be Given To Superintendents?
Ecosystem Representation Assessment

Where Is “Nature’s Best?”

Representation

Condition

- Diversity
- Ecological Functions
- Special Features
Landform/Vegetation Model

Northern Ontario Engineering Geology Terrain Study

Pancake Bay

Batchawana Bay

Forest Resource Inventory Provincial LandCover 2000

Pancake Bay

Batchawana Bay
“The conservation value of an area is inverse to the level of ecosystem modification” (Beechey, 1980).

Condition 2000
A Landscape Condition Model for Ecoregions 3E, 4E, 5E and Ecodistrict 6E-17.

- <1% Disturbed
- <5% Disturbed
- <10% Disturbed
- <25% Disturbed
- <50% Disturbed
- <75% Disturbed
- >75% Disturbed

Coarse Scale
400 ha hexagons
Ecodistrict 5E-13 (Batchawana)
Where is Nature’s Best?

Glaciolacustrine Dep/Dense Mixed Forest

Ecodistrict 6E-17 Landform/Vegetation Query Map

- Selected LV Association
- <5% Disturbed (Excellent)
- <10% Disturbed (Very Good)
- <25% Disturbed (Good)
- <50% Disturbed (Fair)
- <75% Disturbed (Poor)
- >75% Disturbed (Very Poor)
- Lakemargin
- Protected Area or Candidate Boundary
Vegetation of Ecodistrict 3E2
Rank-Abundance Chart

Irreplaceability
Significant Ecosystem Representations

Nagagamisis Provincial Park
Nagagami Lake Provincial Nature Reserve

- Significant Ecosystem Representations (ANSI Equivalents)
- Large, Potentially Significant Wetland
- Provincial Park
- Enhanced Management Area
- Roadless Area
- Old-growth (2007 FRI)

This map is illustrative only. Do not rely on it as being a precise indicator of routes, locations of features, nor as a guide to navigation. This map will contain cartographic errors or omissions.

Ontario Parks, Northeast Zone
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DRAFT
“A protected area is more than just the sum of its parts.” – John Thompson

<table>
<thead>
<tr>
<th>Representation</th>
<th>Condition</th>
<th>Diversity</th>
<th>Ecological Functions</th>
<th>Special Features</th>
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</thead>
</table>

**Ecological Integrity**
Sensitive Areas Examples

- Sensitive to Encroachment / Access
  - Roadless Areas
  - Wetlands
  - Floodplains
  - Cliffs/Steep Slopes
  - Eskers
  - Coldwater Fisheries
  - Rare-ish (irreplaceable) ecosystems
  - SAR Habitat

- Sensitive to Invasive Species
  - Elm, Ash, Beech Stands
  - Alvars, Precambrian Rocklands
  - Coldwater Fisheries
  - SAR Habitat
Landscape (Gamma) Diversity Model

- Potential Biodiversity Hotspots
  - Topography
  - Landform/Vegetation Model
  - Wetlands from FRI, LC2000, MAFA
  - Lakes/Ponds
  - Rivers/Creeks
  - 100 ha hexagons
  - Upper 20% Quantile
Fire History

Relatively complete and consistent
Fire Regimes of Existing Vegetation

Ivanhoe Lake
Natural Fire Regimes

- **Park Boundary**
- **Primary Road**
- **Secondary Road**
- **Tertiary Road/Trail**
- **Railway Corridor**
- **Utility Corridor**
- **Open Water**
- **Wetland**

**Short Description**
- Red: Short interval, high intensity fires
- Pink: Driven by adjacent upland vegetation fire regimes.
- Yellow: Variable return interval, variable intensity.
- Yellow: Variable. Short interval for low intensity fires; long interval for high intensity fires.
- Blue: Non-fire driven ecosystem. Very long return interval.
Forest Seral Stage Models

- Seral Stage Model created from Forest Resource Inventory (Watkins 2007).
- Forest age-class mosaics
- Old-growth forests
Significant Habitat

- Some off-the-shelf sources
  - NRVIS (LIO) Data
  - SAR - Areas of Prescribed Habitat

- Manually identified habitat based on field observations

- Habitat models
  - Ontario Landscape Tool
  - Species At Risk
  - Models created in-house (e.g., Waterfowl/Black Duck)
Fish Habitat from NRVIS

I’m certain there are spawning sites in the Spanish Forest.

Spawning sites mapped more frequently. Some species more than others.
Clearly, no consistency
Black Duck Nesting Habitat Model

- How much conservation responsibility within protected areas?
- College F&W student placement project.
Some Final Thoughts

• Suspending writing inventory reports

• Results sent directly to OPIAM, PIRA

• There is considerable amount of information that has already been mapped:
  • It isn’t consistent;
  • Parks are often gaps.

• Controls in PIRA Application are needed.
  • SAR and Rare Species data is sensitive.

• Mapping/GIS is only part of the story.
  • Communicating ecological functions or processes required to maintain ecological integrity through a spatial tool (GIS) presents both considerable challenges and opportunities.