Burning intervals of oak savanna and woodland: Research into the frequency of fire at Pinery Provincial Park

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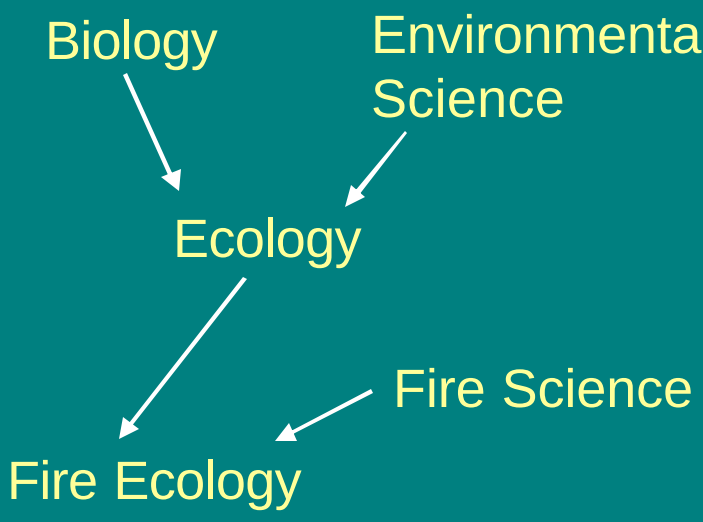


Site locations

Map of Carolinian Canada : Pinery Provincial Park (#6) and Rondeau Provincial Park (#1)

Background Information

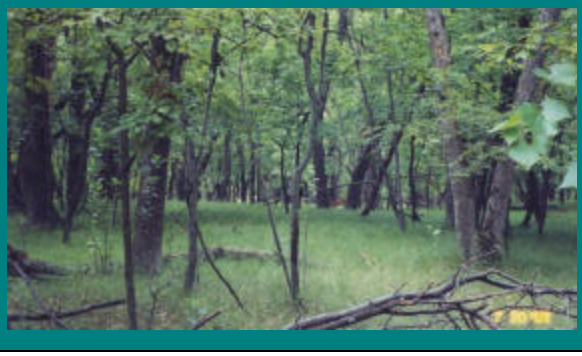
Savannas

*Ecosystems with a continuous layer of grass and a discontinuous layer of either shrub or trees

*Fire-dependent-many species fire adapted
-burning required for germination

*Great lakes region
-dry calcareous savanna
-dry sand savanna
(eastern and northern)

*Focus on south-eastern Ontario (eastern sand savanna)



Fire Ecology: Natural vs. Prescribed Fire

*Natural Fires

-Climate and fuel determine frequency and intensity

-low-moderate intensity surface fires

-high intensity crown fires

*Prescribed fires

-intentionally set to promote germination of fire-adapted species

-burns at irregular intervals on certain parts

Appropriateness of Fire

We know that in certain communities that burning is part of the disturbance/recovery cycle

- Jack Pine Forests
- Prairies and Savanna

- Benefits of Fire include:
  - Reduction of non-adapted invasives
  - provide suitable conditions
  - activate seed banks

Fire and frequency literature review

- ↑↓ Fire frequency results in: ↓ N levels, ↓ organic matter, ↓ litter depth
- ↑ in pH, ↑ bare ground
- Plant community responds with: ↑species richness, ↑ cover of native grasses, sedges, and forbs
- ↓ in number of woody species, especially shrubs, ↓

Unanswered questions about fire

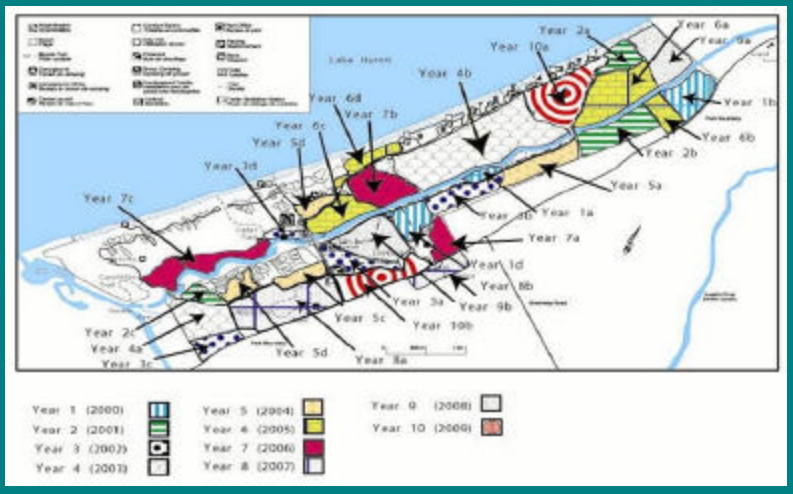
- HOW intensely? Fuels?
- HOW MUCH? Do we burn all sections at once, or small sections?
- HOW OFTEN? Frequency?
- Demands an experimental approach to management: Adaptive Management

Fire History

- To address the question of how often we can look to discover the fire history of a place thru:
  - Historical Records
  - Pollen Studies
  - Fire Scars

- Ontario Parks' management approach has been to mimic natural fire disturbance by developing prescribed burn plans
- *by burning small blocks within park on a yearly basis*

Pinery Provincial Park-burn plan



Hypothetical Diversity Response

Plant Community Ordination- Pinery

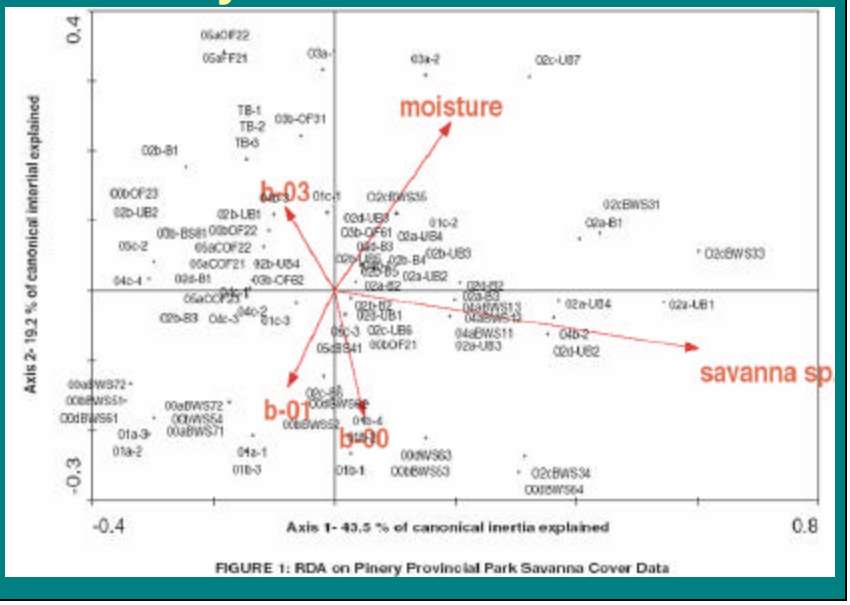
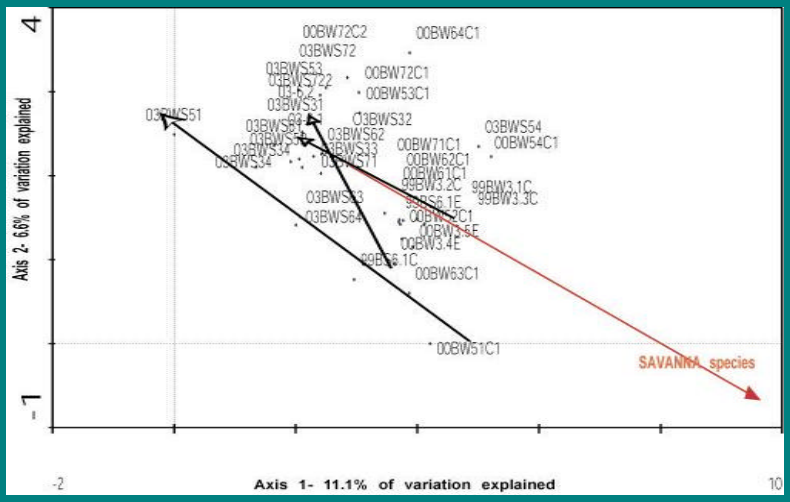


FIGURE 1: RDA on Pinery Provincial Park Savanna Cover Data

Plant Community Ordination- Pinery 1999/2000 to 2004



DCA on historic plots, with cover data

Pinery 2001-2003

- Total number of seeds declined
- Same number of plant species
- Total number of savanna species in the seed bank alone did not change
- Low correspondence between above ground and seeders
- Heaviest seeders were Carex pensylvanica, and Poa pratensis
- Greatest cover was in Carex pensylvanica

Results

- Community composition is shifting as a result of fire (short-term), with 2-3 year lag till sites show response
- Suggestion to follow savanna species and multivariate approach with years since burning stats using an adaptive management approach
- Limited potential for regeneration by seed bank, perhaps from core remnant sites

What happens now?

Management staff of both parks have to decide how to proceed

--need for long-term monitoring

-- need for continual influence of fire

-- conservation of these areas is crucial!

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