

A Rare, Fire-Dependent Pine Barrens at the Wildland-Urban Interface of Halifax, Nova Scotia.

Presentation to the Wildland Fire Canada 2014 Conference, Halifax, N.S. Oct 6-9, 2014

by Nick Hill¹ and David Patriquin²

1. Fern Hill Institute for Plant Conservation, Berwick, Nova Scotia 2. Biology Dept., Dalhousie University, Halifax, Nova Scotia (retired)

Summary

Given the appropriate geology and climate, fire barrens of high ecological integrity require space and fire, making them increasingly threatened systems. The Purcell's Cove Backlands (PCB), approximately 1350 ha on the Halifax south mainland, are an area of rough terrain with shallow soils and outcroppings of hard rock that have remained without roads or significant settlement except at their periphery until recently. There are many trails and several lakes are popular for swimming. There are frequent fires. The 2009 "Spryfield Fire" covered 800 ha and destroyed eight houses on a street recently developed in an area of Jack Pines. In 2013, we surveyed plant communities and wetlands of the Williams Lake Backlands which cover approximately 200 ha within the PCB.* The fire dependent/fire adapted nature of plant species in seven upland vegetation types and carbon dating of charcoal from a Jack Pine Tussock Sedge fen indicate that fires within PCB are part of a long-term fire regime that predates European settlement. One result is the presence of a fire-dependent Jack Pine/Broom Crowberry Barrens community that is nationally unique to Nova Scotia and globally rare. The recent frequency of fire in the PCB appears sufficient to maintain this community. However settlement that impinges on Jack Pine/Broom Crowberry Barrens has involved either their complete destruction or subjected residents to highly elevated fire risk. No further development within the PCB would help to reduce fire threats to habitations, conserve a rare pine barrens and provide several other significant social and ecological benefits.

LINKS

[PDF of slides for presentation](#)

(& Attached Below)

Hill, N. and Patriquin, D. 2014. **Ecological Assessment of the Plant Communities of the Williams Lake Backlands**. Report to The Williams Lake Conservation Company. [Link](#)

Regeneration of Forest and Barrens after the Spryfield Fire of April 30, 2009

Photo-essay by Richard Beazley and David Patriquin. [Link](#)

Nova Scotia Wild Flora Society: [Corema conradii](#)

Nova Scotia Wild Flora Society: [Pinus banksiana](#)

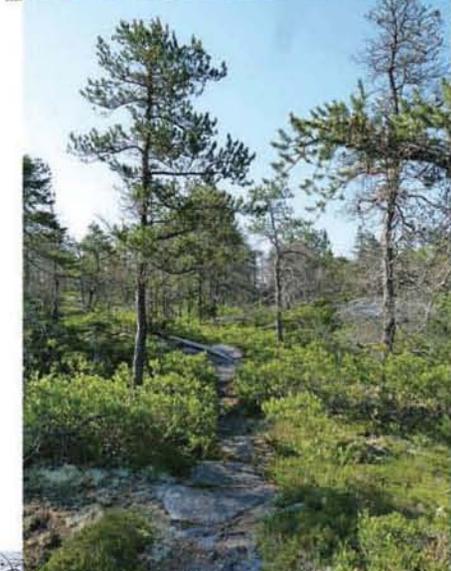
[The forest fires that nature intended](#)

Article in Chronicle Herald

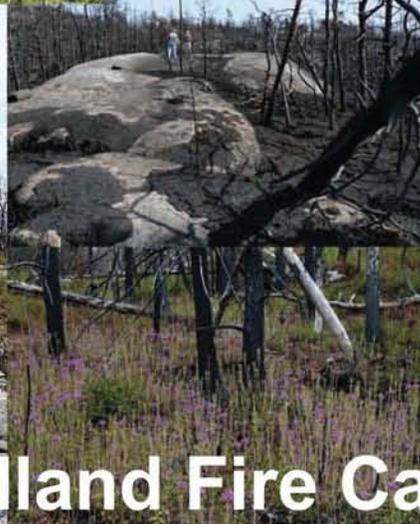
[The Backlands: Flora, Fauna and Geology](#)

Pages on the website for the Backlands Coalition

A Rare, Fire-Dependent Pine Barrens at the Wildland-Urban Interface of Halifax, Nova Scotia



Nick Hill & David Patriquin



Google Maps

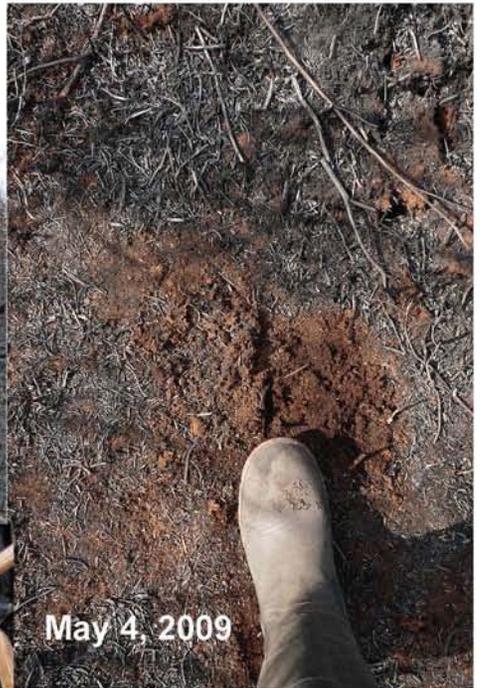


Wildland Fire Canada Conference, Halifax 2014

S1. We don't often think of the **Halifax region** as one of drylands and fire-dependent ecosystems, but we have our own version of the better known Pine barrens of NY, NJ area, and like the Long Island Central Pine Barrens, they lie right at the **Wildland-Urban Interface (WUI)**.



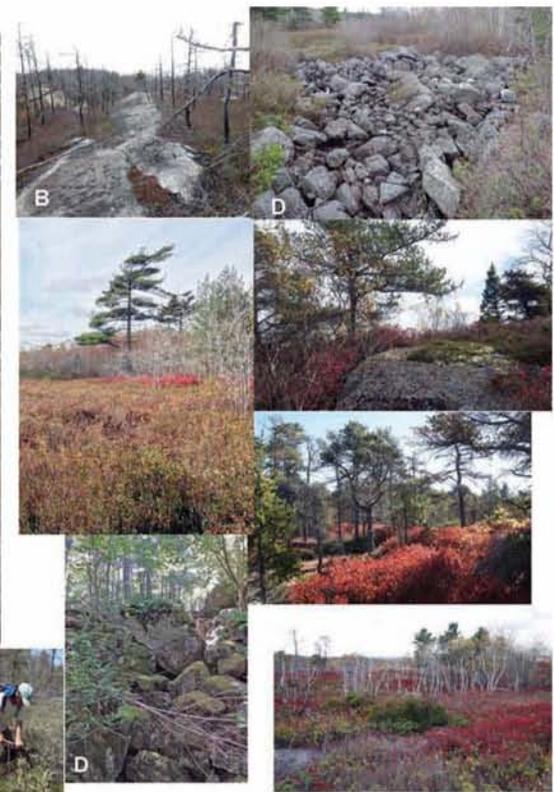
S2. The Purcell's Cove Backlands (PCB), approximately 1350 ha on the Halifax south mainland only a few km from where we sit, are an area of rough terrain with shallow soils and outcroppings of hard rock that have remained without roads or significant settlement except at their periphery until recently. There are many trails and several lakes are popular for swimming. There are frequent fires in this area.



Spryfield Fire 2009

- 800 ha burned (~60% of PCB)
- Destroyed 8 houses, damaged 10 others
- Crown Fire: Jack Pine cones opened
- All ground vegetation burnt

S3. The 2009 "Spryfield Fire" covered 800 ha and destroyed eight houses on a street recently developed in an area of Jack Pines. I have followed recovery of the vegetation subsequently, documented photographically. It followed well described post-fire succession in similar fire-dependent/fire-adapted forest and bushlands.



Ecological Assessment of the Plant Communities of the Williams Lake Backlands

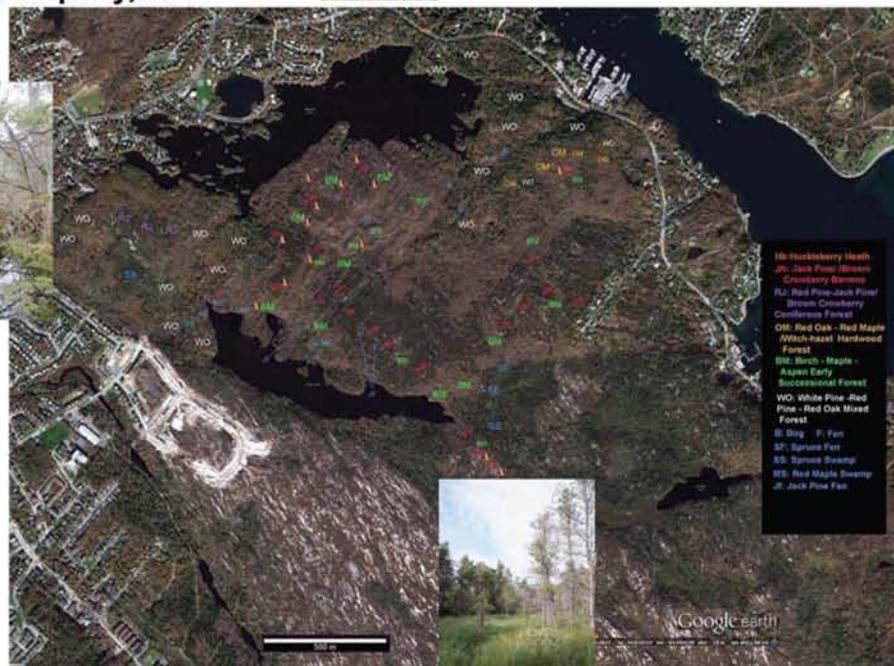
A REPORT to The Williams Lake Conservation Company, 2013*
by N. Hill & D. Patriquin 108 pp

Objectives

(i) to contribute to WLCC's understanding of the Williams Lake Watershed & how it influences water quality of Williams Lake;

(ii) to characterize the area in relation to efforts to see it formally protected

(iii) to document wetlands and other features that should be protected in the event some of the area is developed.



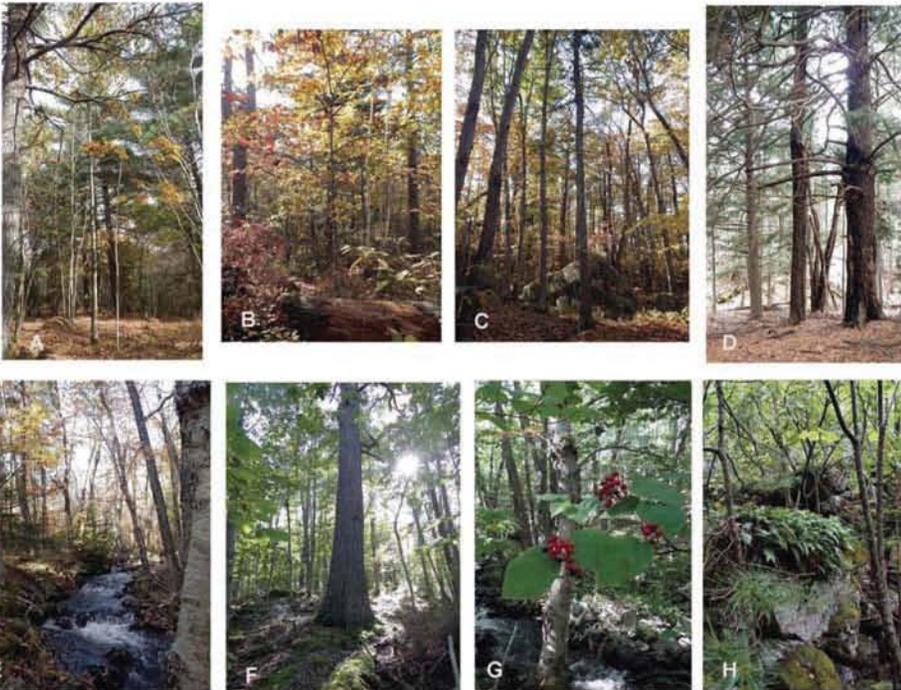
*Link: versicolor.ca/fire

S4. In 2013, Nick Hill, my co-author, and I surveyed plant communities and wetlands of the **Williams Lake Backlands** which cover approximately 200 ha within the PCB. It is representative of most of the larger area, the exception being the riparian forests surrounding the lower MacIntosh at the SE end of the PCB. It is a **rough, mosaic landscape** as conveyed by Google Earth Oct 29. At that time, most deciduous trees have lost leaves. The reddish hues are associated with black huckleberry; yellowish with red oak, and most of the dark green with Jack Pines. Bottom right, shows some of the **ground truthing for vegetation, and sites of fires since 2007** which cover about 20% of the area

Upland Plant Communities

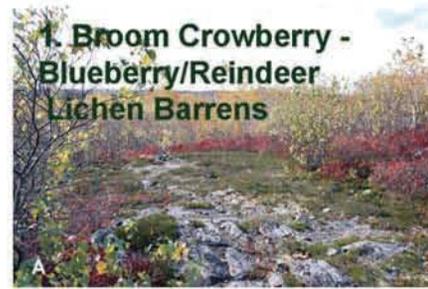
The plant species in 7 upland associations are **Fire-Dependent--Fire Adapted--Fire Tolerant.**

7. White Pine -Red Pine - Red Oak Mixed Forest



Fire-sensitive and intolerant species occur only by larger stream corridors and close to older residences

S5. A variety of evidence indicates that the **plant communities in this area have been subjected to and are adapted to regular fires.** One piece of that evidence comes from the composition of the upland plant communities. Of particular note is the presence on outcrops of **Jack Pine/Broom Crowberry Barrens**



Jack Pine/Broom Crowberry Barrens

S6. The PCB include some of the best representatives of this **nationally unique & globally rare** ecosystem. The Jack Pine/Broom Crowberry Barrens share many features of Pitch Pine Barrens on hard surfaces to the south, but are characterized by a **unique combination of the boreal Jack Pine, and the Coastal Plain Broom Crowberry.**

This combination occurs only on scattered outcrops along the Atlantic coast of Nova Scotia from the Aspotogan Peninsula to Canso, and to very limited extent in Maine, where Jack Pine is replaced by Pitch Pine.

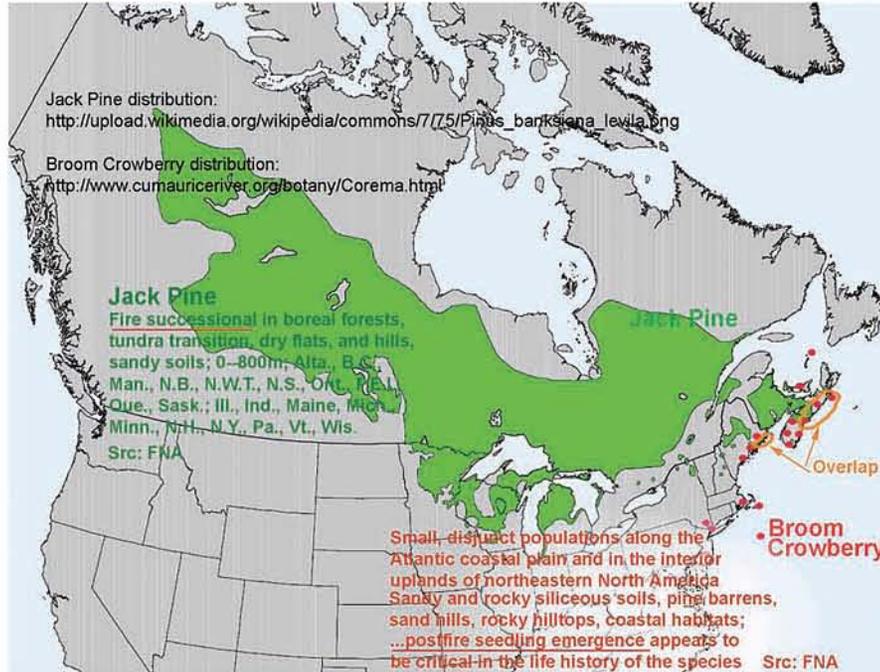
Jack Pine is not rare in Nova Scotia, but it is rare on the Atlantic coast.

Broom Crowberry is not rare in Nova Scotia, but it has a **very restricted distribution globally and is threatened or endangered outside of Nova Scotia.** This is the only area where populations are considered secure (S4). However

populations in Nova Scotia are declining. We have lost most of its sand barren habitats in the Annapolis Valley, now we are losing the rock barren habitats.

Broom Crowberry fruits have fleshy structures termed **elaiosomes** which facilitate dispersal of seed by ants. They carry the seed to nests in the ground and feed upon the fat- and protein-rich elaiosomes while leaving the seeds intact. Such burial may be a factor contributing to survival of seeds after fires that destroy the vegetative plant.

The Jack Pine/Broom Crowberry Barrens also host **several, rare fire-dependent or fire-stimulated species** including **Golden Heather** (*Hudsonia ericoides*) **Burnt Sedge** (*Carex adusta*), **Mountain Stitchwort** (*Minuartia groenlandica*).

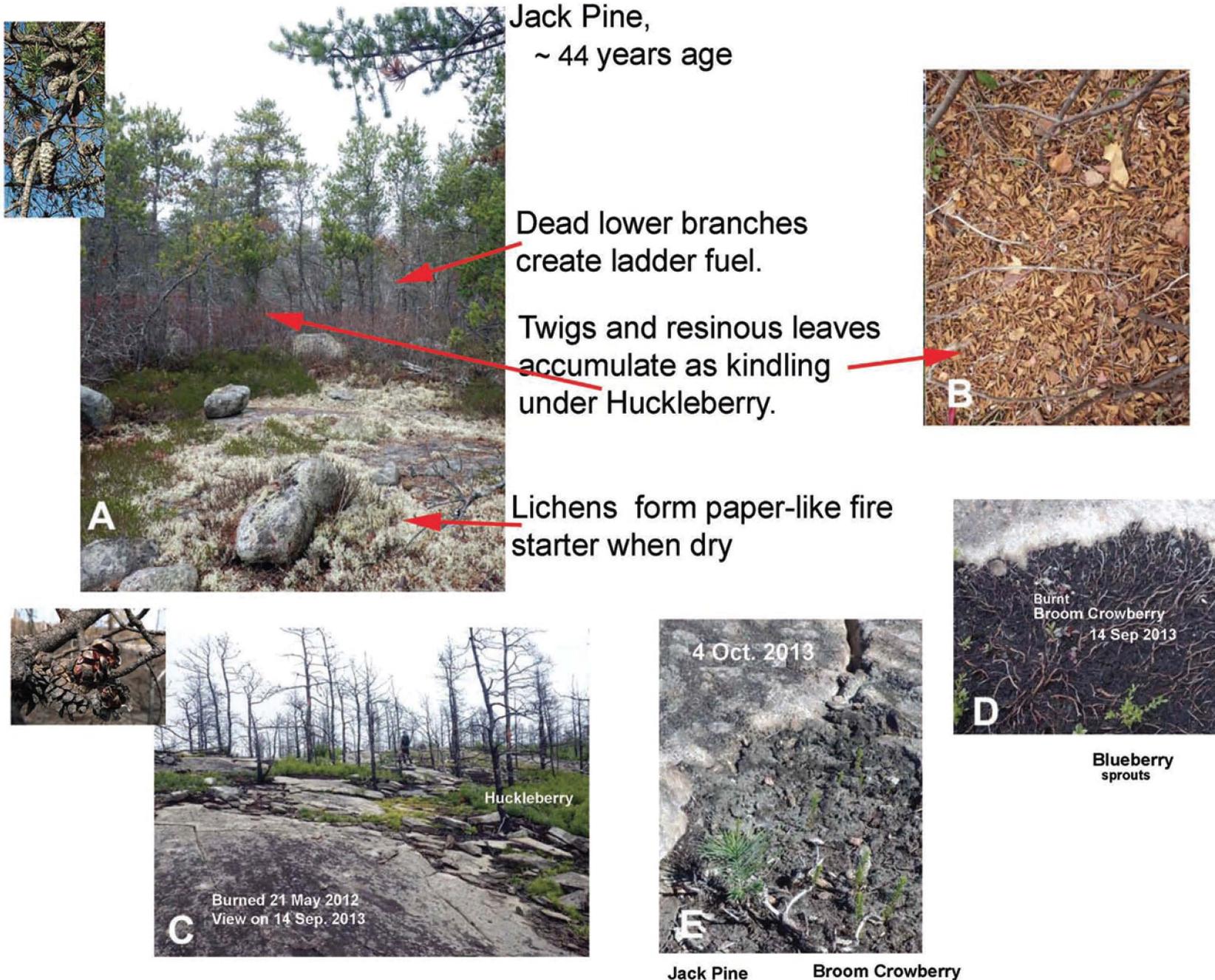


Patches on high, windswept outcrops of hard rock within a few kilometres of the Atlantic coast, from the Aspotogan Penin. east to Canso. A few on coastal barrens (within 500 of coast).



"A nationally unique and globally rare ecosystem for which Nova Scotia would seem to have the primary global responsibility for conservation"

Fire Ecology



S7. These are **fire-stimulating as well as fire-dependent and fire-adapted ecosystems**. We saw some of these features on the field trip yesterday. The Jack Pines are mostly serotinous (i.e., with closed cones which require the heat of a fire to open). There is rapid recovery of vegetation after fires. Jack Pine in this locale becomes reproductive at 4-5 years of age and ready to burn in its teens. Huckleberry deposits a highly flammable litter, and lichens in the more open areas are highly flammable. The more open areas drain dry very quickly after rain. We consider them to be “**matchsticks**” for fires in the PCB, which is also suggested by the modeling of fires **in the area** by Ellen Whitman and colleagues (Ellen Whitman, personal communication): “...large fires generally occurred much more often around the barrens, with some escaping downslope towards Purcell’s Cove Rd., as has happened in the past two fires in that area.”

Fire Record in a Fen



Table 6.1

| Site: | Site 1 | Site 2 |
|------------------------------------------|-----------------------------------------------------|------------------------|
| Horizons with darkened debris (extruded) | 13-22 38-44 38-43 46-50 66-70 75-78* | 0-15 30-40 50-60 |
| Total length of extruded chunks | 90 | 85 |
| Depth to rock base | 83 | 75 |

*Charcoal fragments carbon dated

1250 years BP



Above: Fire-adapted/dependent Jack Pines in a wet Tussock Sedge Fen.

Below: the peat record reveals several layers of charcoal (see black stripes below right) that extend to the base of the metre long core which is laid out below at left.

S8. It is commonly assumed locally that fires in the PCB are man-made and are a product of European colonization. We cored a fen to look for a possible pre-colonial record of fire. Distinct layers of charcoal were found. Charcoal removed from the deepest layer in one core was dated at **1250 BP**.

Major Threats to Conservation of Jack Pine/Broom Crowberry Barrens in Purcell's Cove Backlands

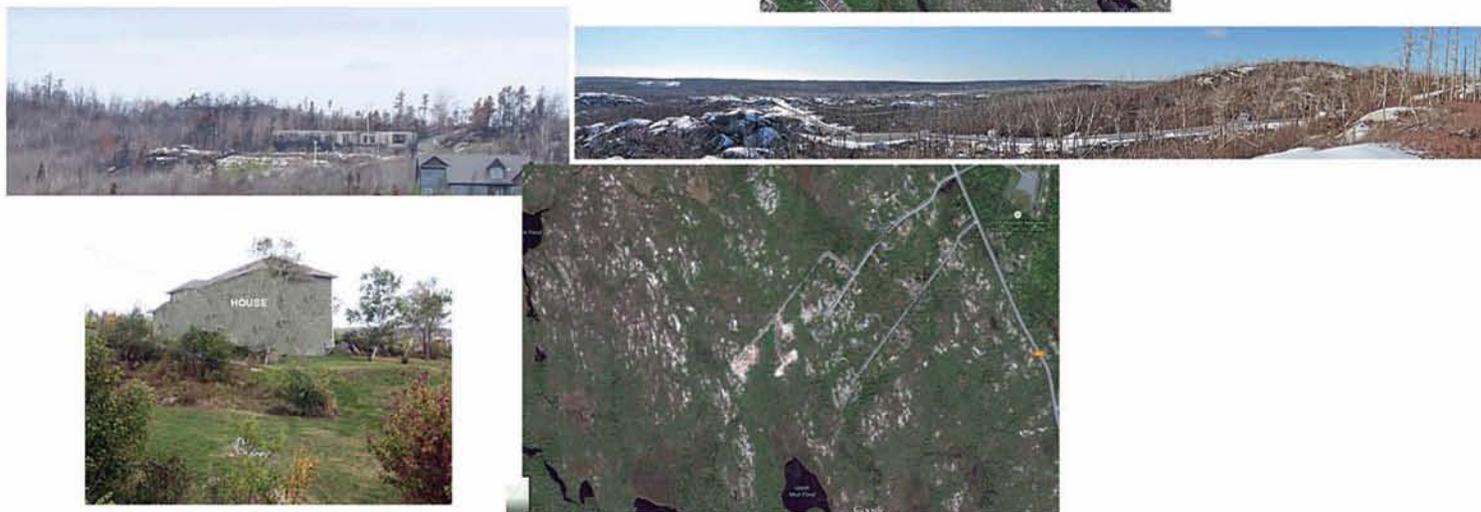
Fire Control - *apparently OK at current levels in PCB, possibly excessive for some other sites in N.S.*

Development

High Density - *Eliminates fire hazard*
- *Obliterates habitat*

Low Density/Integrative

- *High Fire Hazard --- Fire --- Rebuild with more buffer --- More loss of habitat*
- *Venues for exotic species*
- *Habitat Fragmentation*



S9. Major threats to conservation of JackPine/Broom Crowberry Barrens in Nova Scotia are likely **fire control** and **development**. For the PCB, the recent frequency of fires has apparently been adequate to maintain healthy communities. This may not be the case at other locales in N.S. where fire suppression is more effective and/or ignition events are fewer. The greatest threat to the PCB is development. Two types of development have occurred; neither appears to be compatible with conservation of the native communities, especially as the total area is so limited.

