Appendix C. Jack Pine/Broom Crowberry Barrens: their occurrence and status as a recognized plant association

The Jack Pine/Broom Crowberry Barrens represent a type of pine barrens and a plant association that is nationally unique (occurring only in Nova Scotia) and found elsewhere only sparingly in northeastern Maine. (Jack Pine, but not Broom Crowberry, occurs in New Brunswick.) In both Maine and Nova Scotia, The Jack Pine/Broom Crowberry/Barrens are restricted to rocky outcrops near the Atlantic coast, and are associated with fires historically.

Jack Pine/Broom Crowberry Associations in Nova Scotia

Under the NSFVT classification (Neily et al., 2011), the Jack Pine/Broom Crowberry Barrens fall within VT (Vegetation Type) OW1 (Jack Pine/Huckleberry/Black crowberry/Reindeer lichen) and are well described as such, except for the occurrence in the WLB associations of Broom Crowberry (without black crowberry), and the absence of the more fire-sensitive species listed under OW1 such as Hemlock and Bazzania (a liverwort). Of the 1500+ plots sampled for the whole province to develop the NSFVT classification, 8 were classified as OW1. Broom Crowberry is mentioned under OW1 as follows:

> …dwarf heaths like black crowberry and less often boom crowberry are characteristic, especially in coastal areas

Broom Crowberry is not listed under the characteristic plants for OW1, meaning that it was not present in any of those 8 plots but the authors were aware of its occurrence elsewhere.

Sean Basquill (Nova Scotia Dept. Natural Resources) commented in an e-mail:

> Jack pine / Corema is recognized as a subassociation in the CNVC*. It is limited to Nova Scotia. These plots were not included in the provincial forest ecosystem classification (the primary author preferred to only include government and AC CDC plots) otherwise we would have recognized it as a variant in that framework… All coastal jack pine woodland is rare to uncommon in NS (with or without Corema).

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*The CNVC is the Canadian National Vegetation Classification. The website is at http://cnvc-cnvc.ca/ Specifically, he is referring to Subassociation A301b Corema conradii. It is one of three subassociations in the Association A301 *Pinus banksiana/Gaylussacia baccata-Empetrum nigrum/Sibbaldiosis tridentate/Cladina spp. Woodland* (Jack Pine/Black Huckleberry – Black Crowberry/Three-toothed cinquefoil/reindeer Lichen Woodland). Source: S. Basquill, personal communication.

OWI in the larger context is described as "relatively uncommon… rare in New Brunswick… [and] not known from anywhere else in Canada.

In regard to Jack Pine/Broom Crowberry associations, Sean Basquill remarked

> I have seen Jack pine and Broom Crowberry together but not very often. Most occurrences are coastal and I found one inland in Cumberland County. I have four coastal plots where jack pine and Broom Crowberry co-occur…I would speculate that the Broom Crowberry expression of OW1 may be found as far west as the Aspotogan peninsula and east to Canso.

Jack Pine/Broom Crowberry Associations in Maine

Formal reports on the occurrence of Jack Pine/Broom Crowberry associations in Maine appear to be limited to that by Redfield (1889) on "Pinus Banksiana with Broom Crowberry Conradii" in which he comments:

> When Mr Rand a year or two ago mentioned to me the existence of *Pinus banksiana* upon Schoodic Peninsula, I was very desirous to visit the locality, and on the 24th of August last I was enabled to do so in company with Mr. Theodore B. White, a member of the Agassiz Club of New York. At that time I had not the benefit of Mr. Rand's notes as given above, and ignorant of the topography, we were obliged to make our search very much at random. From Winter Harbor, we drove by the road which crosses to the *eastern* side of the peninsula and then turns southerly till it terminates in a farm. Long before reaching this terminus we passed through a forest composed almost exclusively of *Pinus banksiana ,* the trees reaching to the height of at least twenty or thirty feet. Occasionally a spruce or arbor vitae appeared but for the most part this pine seemed to have displaced the usual coniferous growth of the Maine coast…. We continued to see more or less of this pine…We may therefore safely conclude that this peculiar species abounds over the whole peninsula.
>
> While gazing at the trees of *Pinus Banksiana* we were surprised at finding ourselves in the midst of a remarkable station of *Broom Crowberry Conradii*. This plant was growing most abundantly in the open, rocky glades among the pines, and seemed to cover every spot where there was sufficient earth to support it. One of these glades was about 250 feet in length by125 feet in width, and another of nearly equal extent was also covered more or less with patches of *Broom Crowberry*, and probably we did not see its utmost limits. Wherever the glades were closed by a more compact growth of pines the *Broom Crowberry* disappeared, and was replaced mostly by *Vaccinium pennsylvanicum*. In the localities of *Broom Crowberry* farther west and south which I have seen, the accompanying tree growth has usually been of *Pinus rigida*, but evidently this little shrub is equally at home with *Pinus banksiana*.

The Schoodic Peninsula lies within Acadia National Park in Maine. Current descriptions of the area (e.g. in Beginning with Habitat, n.d) refer to Pitch Pine/Broom Crowberry Associations, and do not mention Jack Pine. In e-mail correspondence we received the following comments:

> We have one documented occurrence of the pitch-pine broom crowberry woodland in Acadia, but not on Schoodic Peninsula (on Mount Desert Island). In our vegetation map report, there is a brief mention of a northern variant of this community being dominated by jack pine instead of pitch pine. Here's a link to our vegetation map report (http://www.usgs.gov/core_science_systems/csas/vip/parks/acad.html), and the passage I mentioned is in Appendix I, page 39 under the Globally section.
>
> Unfortunately the Acadia vegetation map and report were completed under the old U.S. National Vegetation Classification System, which is now obsolete. The latest USNVC doesn't mention anything about jack pine in the description of the pitch pine/ broom crowberry woodland (now called that Coastal Pitch Pine Rocky Woodland, with unique identifier CEGL006154). I searched the NatureServe Explorer (http://www.natureserve.org/explorer/servlet/NatureServe?init=Ecol) for jack pine woodland communities in Nova Scotia, and only turned up Jack Pine Heath Barrens (CEGL006641), and broom crowberry isn't mentioned in this community description.
>
> Jack pine and broom crowberry probably do co-occur on Schoodic Peninsula, but it's not common (I haven't seen it). I unfortunately don't have any data to back this claim up, and it's

not mapped by the USNVC that way (just as jack pine woodland or mixed conifer woodland). Jack pine and black crowberry do occassionally occur together on Schoodic Peninsula where the jack pine woodlands meet the exposed headlands. But again, they're not classified as a special community and I have no data to support that claim.

- Kathryn Miller, (Plant Ecologist, Northeast Temperate Network Acadia National Park)

Here are some photos of this community in Maine. I know of at least two locations of this community type (Pitch Pine/Jack Pine/Broom Crowberry) on Vinal Haven island.

- **Jeremy Lundholm** (Saint Mary's University, Halifax)

Interesting discussion. As you know, we have all the species referenced in the dialogue below in Maine, but very seldom are they in the same place. Things generally break out here with Pitch Pine and Broom Crowberry falling into our Pitch Pine Woodland type (http://www.maine.gov/dacf/mnap/features/communities/pitchpinewoodland.htm). This type generally occurs west of Penobscot Bay (i.e., southwest coast of Maine).

Meanwhile, Jack pine and Empetrum mixes fall into our Jack Pine Woodland type (http://www.maine.gov/dacf/mnap/features/communities/jackpinewoodland.htm), which is generally east of Penobscot Bay.

There are, as Jeremy mentions, a handful of sites around Penobscot Bay where both of these types intergrade, including Vinalhaven, Isle au Haut (part of Acadia National Park), and perhaps a few other places in Acadia NP. I think of these mixes as transitions rather than distinct types, but our state classification tends to be more coarse than that used in the Maritimes.

- Andrew Cutko (Maine Department of Agriculture, Conservation, and Forestry)

Thus whatever was the case in 1889 when Redfield reported his observations, it is clear that today Jack Pine/Broom Crowberry associations are very rare in Maine.

<u>Significance of Jack Pine/Broom Crowberry Barrens in the WLB and larger Purcell's Cove Backlands.</u>

The restriction of Jack Pine/Broom Crowberry Barrens to the Atlantic Coast of Nova Scotia, and coastal NE Maine can be attributed to the unique coincidence of several factors in those areas:

- Jack Pine, a boreal species, is close to the southern extent of its range while Nova Scotia is at the northern extremity of the range for broom crowberry, an Atlantic Coastal Plain species.
- Both species require or do best in rapidly draining, acidic, nutrient-poor environments and are shade intolerant.
- Both species have specific adaptations to drought and fire and are stimulated by recurrent fire and tend to be eliminated if fire intervals are very short (perhaps less than 10-20 years) or very long (100+ years), although they may persist in the most exposed barrens habitats in which other stressors limit competition in the absence of fire.
- Broom Crowberry is restricted to areas not experiencing a high level trampling, ATVs & deer grazing.

Between us (N. Hill & David P.), we have observed coastal or near coastal Jack Pine/Broom Crowberry barrens at Blandford Nature Reserve (on the Aspotogan Peninsula), on crown land in the Peggy's Cove area and in the Five Bridge Lakes Wilderness Area (Chebucto Peninsula), in Blue Mountain-Birch Cove Lakes Protected Wilderness Area, on the Crowbar Trail (Salmon River Wilderness Area) and in the Canso Barrens. The Jack Pine/Broom Crowberry barrens in the WLB and the larger Purcell's Cove backlands are the most locally concentrated and overall most healthy of any of these sites. The complex of patch sizes and ages since burns of Jack Pine/Broom Crowberry barrens in the WLB and larger Purcell's Cove backlands are likely factors in the overall health of these stands. The largest single patch of Jack Pine/Broom Crowberry Barrens in the Purcell's Cove Backlands appears to be the approximately 22 ha patch just north of the eastern half of Colpitt Lake (Fig. 3.3).

Clearly, the WLB and the larger Purcells Cove Backlands are key to the conservation of the nationally unique and globally rare Jack Pine/Broom Crowberry Barrens community for which Nova Scotia would seem to have the primary global responsibility for conservation.

Ecological Assessment of the Plant Communities of the Williams Lake Backlands

A REPORT

to

The Williams Lake Conservation Company

by

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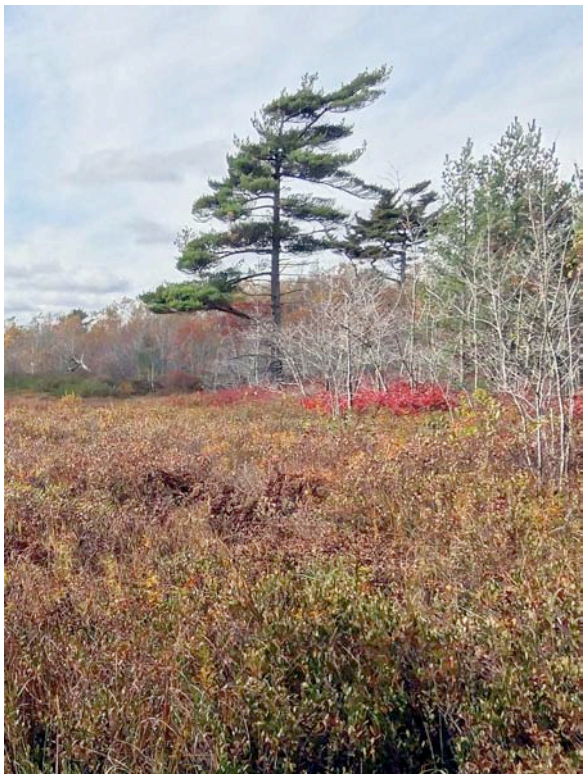
February 12, 2014



WILLIAMS LAKE
CONSERVATION COMPANY

www.williamslakecc.org

February 12, 2014

Halifax Regional Council provided funding to the Williams Lake Conservation Company in order to obtain a survey of the plant communities in the William's Lake Backlands. While the survey focused on these lands, many of the findings apply to the larger Purcell's Cove Backlands. It is noteworthy that the authors advance some novel perspectives on the ecological values of the area. The issues of fire management and wetland protection require attention and discussion by the larger community.

The funding from the municipality covered approximately two-thirds of the costs of carbon-dating a charcoal sample, one day of time for a specialist to document wetland mosses, travel costs and a portion of the hours put in by Nick Hill. The larger portion of his time was contributed as was the time put in by David Patriquin.

The survey has been reviewed by the executive of the Williams Lake Conservation Company and approved at a meeting held January 28, 2014.

Kathleen J Hall

ACKNOWLEDGMENTS

Our field studies were conducted between May 13 and November 8, 2013. Kathleen Hall of the Williams Lake Conservation Company facilitated our activities. Patricia Manuel (School of Planning, Dalhousie University), who has conducted research on the hydrology of the Williams Lake Backlands, contributed maps and accompanied us in the field on May 31st. She also gave us access to a report on vernal pools by her student, Huan Liu. We are grateful for feedback on various aspects of this study from Ellen Whitman, Sean Blaney, Sean Basquill, John Brazner, Marcos Zentilli, Kathryn Miller, Andrew Cutko, Burkhard Plache and Donna Crossland.

SUMMARY

The Williams Lake Backlands (WLB), covering approximately 200 ha, are the larger, undeveloped part of the Williams Lake Watershed which includes Colpitt Lake and Williams Lake. The WLB are part of "Purcell's Cove Backlands" (approximately the 1350 ha) which include the land between Purcell's Cove Road and Herring Cove Road from Williams Lake at the northwest end to Powers Pond at the southeast end. Lying only two kilometers from peninsular Halifax, the WLB are near pristine wilderness. We traversed various routes through the WLB on twelve separate days between May 13 and Nov. 8, 2013 to document plant communities and wetlands for the Williams Lake Conservation Company, a volunteer organization concerned with stewardship of the Williams Lake watershed.

The WLB present a mosaic of landscapes and plant communities associated with high variability on a fairly small scale in the topography, depth of soil/till, drainage and surface water storage and in the ages since disturbance of the associated plant communities. That variability in turn is related to the presence of glacially scoured hard granite outcrops of South Mountain Batholith, outcroppings of highly folded and metamorphosed Halifax Group black slates and siltstones of the Meguma Supergroup, a contact zone between the two rock types, and glacial till. Overall, the plant communities are those of nutrient-poor, acidic environments and of fire-, wind-, and pest-driven disturbance regimes within a moist temperate, coastal region. Exotic (non-native) species are found only close to roads and houses at the edge of the WLB. These are "old process" plant communities with a high degree of ecological integrity.

The fire dependent/fire adapted nature of the vegetation and carbon dating of charcoal from a core in a Jack Pine fen indicate that fires in the WLB are part of a long-term fire regime that predates European settlement. Indeed, the whole of the Purcell's Cove Backlands is one of the most fire-susceptible landscapes in Nova Scotia, the droughty, windswept high barrens acting as matchsticks. One result is the presence of an old process, fire dependent Jack Pine/Broom Crowberry Barrens community that is nationally unique to Nova Scotia, globally rare and of high conservation significance. In the northeastern U.S., this community transitions to the fire-dependent Pitch Pine/Broom Crowberry community which is well recognized as of high conservation value. The largest single patch of Jack Pine/Broom Crowberry Barrens within the Purcell's Backlands occurs within the WLB, and overall, the Jack Pine/Broom Crowberry Barrens in the Purcell's Cove Backlands are amongst if not the best, representatives of this community in Nova Scotia.

The water regime in the WLB has features of dryland systems, with intermittent stream courses probably accounting for a majority of the water flow. Critical components such as Mountain Holly washes, vernal pools and boulder fields are not currently protected under Nova Scotia wetland and stream course regulations but are vital to maintenance of the larger wetlands and water quality of both surface and groundwater in the area.

The undisturbed nature of this wilderness area, its mosaic of habitats with wetlands, lakes, streams, forest and barrens, and its location by the coast in the most urbanized area of the province make the WLB and the larger Purcell's Cove Backlands significant habitat for both breeding and migratory birds.

It is suggested that conserving the WLB and the larger Purcell's Cove Backlands as natural systems reduces fire risk to adjacent communities compared to allowing more intrusions into the backlands. Implementing strategies such as those promoted in the northeastern U.S. for living compatibly with fire-structured pitch pine ecosystems would enhance both fire protection for neighbouring communities and conservation of biodiversity in our backlands.

CONTENTS

APPENDICES

Photos posted online: http://versicolor.ca/wlbphotos