

Comments on the proposed Old Growth Forest Policy submitted on Dec 8, 2021 on behalf of the Halifax Field Naturalists and the Nova Scotia Wild Flora Society

by

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Context

A draft "Old-Growth Forest Policy for Nova Scotia" was released by the Nova Scotia government on Nov 9, 2021 with a general invitation to Nova Scotians to give their feedback on proposed updates to the policy by Dec 8, 2021.

Who we are

The Halifax Field Naturalists (HFN), founded in 1975, seeks to “educate ourselves and the public at large in the natural history of Nova Scotia.” Current membership is 111 paid up members. We have a website at www.halifaxfieldnaturalists.ca.

The Nova Scotia Wild Flora Society (NSWFS), founded in 1990, is dedicated to the appreciation and conservation of wild flora and habitat in Nova Scotia. Currently we have 47 paid up members. We have a website at www.nswildflora.ca.

Both groups are Halifax based for in-person and now some virtual meetings, but we have members from all over the province, and our field trips occur throughout Nova Scotia. Whenever possible, meetings and field trips of HFN and NSWFS are open to the public at large. In the last several years we have seen rising interest in our activities, reflecting the increased appreciation generally today of nature and of the many and special opportunities we have in Nova Scotia to enjoy nature.

Many of our members are involved as individuals in trail organizations and in specific conservation efforts. As naturalist societies, we are often asked to support conservation efforts by visiting specific sites and documenting the flora and fauna, and by writing letters of support.

COMMENTS & RECOMMENDATIONS

Abbreviations

OG: old growth

OGFP 2021: the current draft policy

OFP 2012: the existing Nova Scotia's Old Forest Policy published in 2012.

OFP Layer: this refers to the map showing “all all the forest areas on publicly owned land within the Province that were accounted for in the achievement, early in 2020, of protection of at least 8% of the area of each ecodistrict as old-growth forest area and old-growth restoration opportunities.” It is available as a layer in the [NS Provincial Landscape Viewer](#) Once in the Viewer, Select the layer at Forestry>Forestry>Old Forest Policy. It is also available at <https://nsgi.novascotia.ca/gdd/>

Comment 1. The draft Nova Scotia Old Growth Forest Policy is weak on conservation of old forest species

We note that the goal given in OFP 2012 under section 1.0 Rational is "to maintain old forests and associated biodiversity in the forested landscape". In OGFP 2021 a change in title is introduced - from "Old Forest Policy" to "Old Growth Forest Policy" - and conservation of old forest biodiversity is not explicitly cited in the text as a goal.

The inclusion or not of this goal is important because habitat or components of habitat for many old forest species can, in many cases, be conserved in patches or sweeps of forest that do not meet the age criteria for Old Growth under either the OFP 2012 or the 2021 OGFP definition. Thus there are many old forest species commonly associated with and benefitting from Old Growth, but it is not age *per se* that is required but rather old rotting wood, large old fallen deadwood, or large snags, super-canopy trees/a high degree of canopy closure.*

* Many examples are cited in the very informative L&F/NRR pamphlet [A Field Guide to Forest Biodiversity Stewardship](#) by P Neily & G Parsons, 2019. Refer also to....[The living dead: acknowledging life after tree death to stop forest degradation](#) by Simon Thorn et al., in *Frontiers in Ecology & Environment* 03 September 2020; [Declining old-forest species as a legacy of large trees lost](#) by G.M. Jones et al. in *Diversity and Distributions* 05 December 2017; [Environmental drivers of forest biodiversity in temperate mixed forests – A multi-taxon approach](#) by F Tinya et al., in *Science of the Total Environment* 795 (2021) 148720.

We might recommend that the age criterion could be overridden when a forest stand contains more than certain threshold values for these non-age features. However, that would greatly complicate the assessment process, making a less functional definition of OG than provided in OFP 2012:

A forest stand where 30% or more of the basal area is in trees 125 years or older, at least half of the basal area is composed of climax species, and total crown closure is a minimum of 30%.

OGFP 2021 introduces major changes in this definition:

Old-growth forest areas are herein defined according to the vegetation types, and the old-growth ages in the table below, as well as the history of past human interventions that have affected ecological continuity...no forest areas that have received a silvicultural treatment or timber harvest within 30 years of the date of approval of this Policy will be designated to be protected, provided there is documentation of the treatment...A forest area is considered to be old growth if it is larger than 1.0 hectare in area and 20% or more of the basal area is greater than or equal to the reference age for that forest type.

FEC Forest Group ^a	FEC Vegetation Types ^a	Old-Growth Age ^b
Tolerant Hardwood	TH1, TH2, TH3, TH4, TH5, TH6, TH7, TH8	140
Spruce-Hemlock (red spruce dominant)	SH3, SH4, SH5, SH6, SH7	125
Spruce-Hemlock (hemlock dominant)	SH1, SH2	140
Mixedwood	MW1, MW2, MW3	125
Spruce-Pine	SP4, SP5, SP7, SP9	125
Wet Coniferous	WC1, WC2, WC5, WC8	100
Coastal (black spruce or balsam fir dominant)	CO1, CO4	100
Coastal (red spruce, white birch, or red maple dominant)	CO3, CO5, CO6	125
Highland (balsam fir or white spruce dominant)	HL1, HL2	100
Highland (yellow birch dominant)	HL3, HL4	140
Cedar ^c	CE1	110
Wet Deciduous	WD3, WD4, WD6, WD8	115
Floodplain	FP1, FP2, FP3	125
Karst	KA1, KA2	125

Thus there is a change from a single age of 125 years old for six “Climax Species” (OFP 2012) to a range of ages (OGFP 2021) going from 100 to 140 years old depending on the Forest Group. The inclusion of a broader range of species or Forest Groups as contributing to the criteria for OG, the reduction of minimum age for some Forest Groups, the change from 30% or more of the basal area to 20%, and the change in the minimum area requirement from “a stand” (usually 2 ha min) to 1 ha are welcome changes as they effectively allow a broader range of forest stands likely to contain features supportive of old forest species to be classified, and hopefully, protected as OG. However the increase in minimum age for three Forest Groups (Tolerant Hardwood, Spruce-Hemlock/hemlock dominant Highland/yellow birch dominant) has the opposite effect.

There is another issue related to the 140 year age requirement for those stands: there are many old forest stands in NS that developed following blowdown of Old Growth in the Saxby Gale (1869) and the Nova Scotia storm (1871) and thus have maximum possible ages today circa 140 years, the age proposed as the minimum age for three of the forest groups in the draft Old Growth Forest Policy, up from 125 years in the existing policy. Many of these stands would be excluded under the proposed policy. More details are given in the Appendix to this document. **The simplest way to solve that issue is to lower the minimum age to 100 years.**

A major virtue of the OFP 2012 definition is its simplicity and functionality as cited by Berry et al., 2018*. The definition in OGFP 2021 is more complicated conceptually and functionally.

[Amy Berry](#), [Amanda Lavers](#), and [Lisa Mitchell](#) Old forest policy and regulatory frameworks in Nova Scotia and New Brunswick with a comparison to British Columbia, *The Forestry Chronicle* Volume 94, Number 01, January 2018

As a simple fix that would retain the functionality of OFP2012 but accommodate the broader range of species as in OGFP 2021 AND allow more old forest stands with features supportive of old forest species to be included, we make the following recommendation.

Recommendation 1: Define an Old Growth stand as follows

An Old Growth stand is any forest stand (polygon) or circumscribed area of 0.5 ha and greater with 20% or more of the basal area greater than or equal to 100 years of age.

Comment 2: The goal of including a minimum of 8% of Crown land in each ecodistrict in the Old Forest Policy Layer is arbitrary and insufficient to properly conserve Old Growth Forests and associated species dependent on old forests.

There is no scientific justification offered for the 8% goal. How much land and which land should be protected to ensure adequate conservation of Old Growth Forests and associated species dependent on old forests is not readily answered, but we should at least err on the precautionary side. Moessler et al., 2003 offered a target based on landscape level considerations:

...Forest resource inventory data suggest that between 1% (Lynds and LeDuc 1995) and 5% (Anonymous 2002, Fig. 1) of Nova Scotia, and perhaps less than 2–3% of New Brunswick, exists as forest older than 100 years.

Based on the frequency of stand-replacing or catastrophic natural disturbances such as fire and wind in the AFR [Atlantic Forest Region], the length of time required to develop OG, and the areal distribution of temperate-zone forests in the AFR capable of developing these late-successional forest types, we estimate that 40–50% of the pre-settlement forested landscape may have been occupied by OG forest.

Although the question of how much area should be kept in OG forest types is largely an issue of social and economic policy, given our estimates of the extent of OG in the pre-settlement forest, **it seems reasonable to suggest that at least 20–25% of our forest be maintained in these late-successional OG forest types*, perhaps 10–12% within protected areas and 10–12% within the working forest.**

It is difficult to justify these amounts based purely on what science would prescribe as a minimum for maintaining a tree species according to population genetics theory. Our arguments for maintaining these amounts are based largely on our understanding of what might be necessary to maintain a viable metapopulation structure capable of continuous dispersal across a fragmented landscape in which the forest must adapt to anticipated rapid climatic changes.

Furthermore, the OG forest structure required to maintain the population viability of forest-dependent wildlife, such as the American marten, and some of the larger mammals that are endangered or have been extirpated in the Maritimes (wolves, eastern cougar, wolverine, lynx**) requires much larger areas than that prescribed by population genetics theory for the trees themselves.

- A. Mosseler, J.A. Lynds, and J.E. Major. *Environmental Reviews* 11: S47–S77 (2003)

*Age-wise, Mosseler defined late-successional, temperate-zone old-growth forest types as having “Average age of dominant species approaching half the maximum longevity for species (approximately 150+ years for most shade-tolerant trees)” and “Some old trees at close to their maximum longevity (ages of 300+ years).” **The Lynx still occurs in N.B. And Cape Breton.

Recommendation 2: The goal of the OGFP should be to conserve 25% of our forests by area as Old Growth, half on Crown lands and half on private lands.

Comment 3: Given the global and local climate and biodiversity crises, we should move as quickly as possible towards this goal of conserving 25% of our forests by area as Old Growth.

The climate and biodiversity crises are strongly linked. It is our old forests and the associated species that are most threatened today and these are the forests storing the most carbon. Obviously we want to retain as much of them as we can.

Currently about 50 % of old forests which DNR includes in the Old Forest Layer are 40 -79 year old stands in Protected Areas. These are described as “restoration opportunities.”

Age classes in the OFP Layer (Fig 3 in **Implementation of Nova Scotia Interim Old Forest Policy for Crown Land “A Status Report”** Prepared by Bruce Stewart and Peter Neily March 2008)

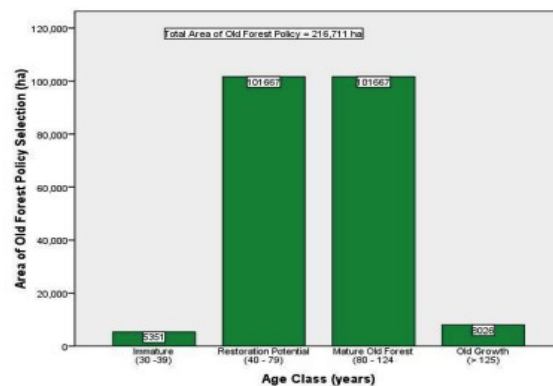


Figure 3. Age class distribution of forests selected under NSDNR Interim Old Forest Policy as determined from 162 randomly established Permanent Sample Plots measured between 1999-2003 (NSDNR, 2004).

Under both OFP 2012 and now OGFP 2021 the inclusion of these younger forests (all are in existing Protected Areas) in the OFP Layer counts towards the ‘Minimum of 8%’. That means that except where forest stands meet the criteria for classification as OG, forests older than 40-79 years in the working Crown land forest can be harvested.

If the criteria for “restoration opportunities” took into account the need to find more habitat for old forest biodiversity generally, and to accelerate transition to true old growth, then more suitable habitat would be found in the working Crown lands, much of which will otherwise be harvested, i.e. those opportunities will be lost and we will see ongoing net loss of patches of Old Growth, old forest habitat, and carbon storage. Surely this is not acceptable in 2021.

Recommendation 3. Implement a Precautionary Old Forest Protection Plan that requires a minimum 25% of forest to be in the oldest development stages (Late Mature and Multi-aged/old forest) in each ecodistrict, with at least half of that area on Crown lands. If the total for an Ecodistrict that is currently in the oldest development stages is less than 25%, then there should be no logging on those Crown lands.

A benefit of this approach is that we have already classified and mapped the development stages for all of our forests, although some updates may be required and obviously should be ongoing. Perhaps there are better approaches, but those would take much more time to work out and then implement. So this is a *Precautionary Plan*, one that is introduced to address our climate and biodiversity crises without delay, while working on a more refined plan.

These are our major recommendations that, if implemented, would build on the laudable features of our current Old Forest Policy, notably its simplicity and functionality, while addressing some of its deficiencies, and specifically address the need to take action now to address the climate and biodiversity crises. They are also consistent with the perspectives of Bill Lahey expressed in the Independent Review of Forest Practices in Nova Scotia:

I have concluded that protecting ecosystems and biodiversity should not be balanced against other objectives and values as if they were of equal weight or importance to those other objectives or values. Instead, protecting and enhancing ecosystems should be the objective (the outcome) of how we balance environmental, social, and economic objectives and values in practising forestry in Nova Scotia. Bill Lahey, 2018

We are also supportive of a broader range of comments cited in feedback on the Old Forest Policy received by Nature Nova Scotia:

Key feedback included:

- Agreeance that, at the policy states, protected areas are not enough to adequately safeguard old forests, requiring greater measures on other crown lands
- Concern that the conservation of biodiversity is not a goal in the current draft, as stated in the 2012 policy
- Concern over the short consultation period and lack of opportunities for Nova Scotians to get involved
- Concern that the old growth forest scoring protocol, the pre-treatment assessment (PTA) protocol, and the monitoring protocol, are not included with the policy, limiting public consultation
- Concern over the raising of the minimum tree age for some species to 140, and that the minimum forest size must be 1 ha
- Concern that working lands cannot be considered old forests, despite tree age, simply because they are working forests
- Concern over the fact that the Minister can still remove old growth forest areas from the policy's protection if a development project is proposed
- Recommendation to prohibit the logging of old forests on all Crown lands
- Recommendation to have a third-party oversee the identification and mapping work, to avoid a conflict of interest where the same department in charge of harvest activity is also in charge of old forest protection
- Recommendation to include clauses around repercussions for failure to follow the policy, to act as an enforcement measure
- Recommendation to make (an improved) Old Forest document into law, rather than policy

Appendix: On the significance of historic blowdowns and Pit and Mound topography

by David Patriquin

Increasing the minimum age to be classified as OG from 125 to 140 years for three of the forest groups (Tolerant Hardwood, Spruce-Hemlock/hemlock dominant Highland/yellow birch dominant) as proposed in OGFP 2021 would likely eliminate from potential protection many old stands that developed following a massive storm or storms that crossed Nova Scotia approximately 140+ years ago and blew down many Old Growth stands of the day.

Today, where there are now old stands with some trees >125 years old on these sites, these old forests are growing where there had previously been Old Growth. So the historical continuity of the old forests of today with Old Growth and Old growth processes that go back 100s of years, or perhaps even millennia.

The reason we know there had been a blowdown of Old Growth in the past – or if not Old Growth by the existing definition of OG, at least there was blowdown of very big, old trees (likely over 100 years) – is the presence of a pronounced **‘Pit and Mound’ topography.**^{*}

Writing about Old Growth forest in Maine, Joe Rankin, citing Andrew Whitman at the Manomet Center for Conservation Sciences and Shawn Fraver, a professor at the University of Maine’s School of Forest Resources, provided [this succinct description](#):

One other telltale feature of an old growth forest is the forest floor itself, said Whitman and Fraver. It’s not, by any means, level. Instead it’s characterized by dips and mounds. Not coincidentally they’re more or less the size of a large tree’s root ball and its accompanying soil. This “pit and mound” topography occurs when old big trees are blown down, their roots upended. The mound is created by the exposed root ball, the hollow is where it once was. Gradually, over decades, the root rots and both the mound and pit are colonized by mosses, ferns, wildflowers and young trees.

“It could take an old field a thousand years to get that pit and mound topography,” said Whitman. “In managed forests you rarely get that, because large trees are cut before they can fall down”

The lack of pit and mound topography is a good indication that the land was once smoothed by the plow, even if it was a century or two ago.*

^{*}In Nova Scotia, pit and mound topography, even if it exists, can be difficult to distinguish on ground where there are a lot of erratics (big boulders dropped by receding glaciers).

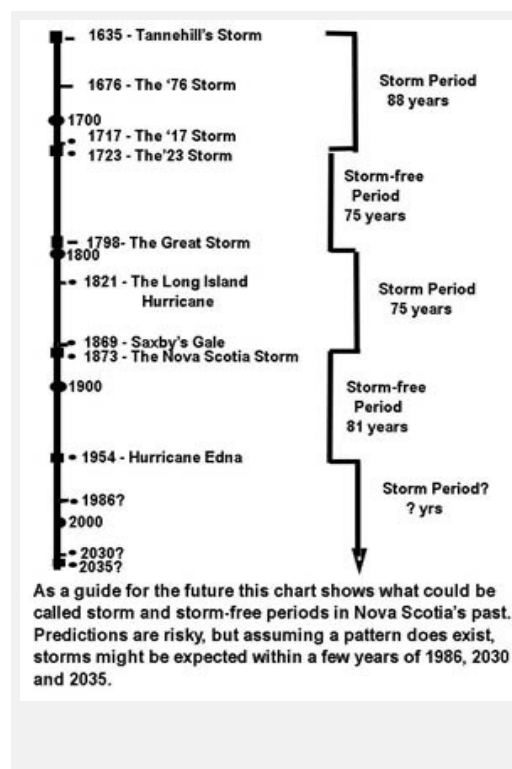
The mounds, rather than the pits or dips between the mounds, are also the preferred habitat for old growth species such as hemlock and yellow birch, so we see them growing on the tops of mounds, not between them. And upturned stumps resulting from a massive tree falls or much more limited tree fall producing gaps provide cavities for wildlife, mineral soil for seedlings, and often vernal pools; these habitats are transitory, lasting perhaps 5-30 years or so – thus maintenance of such habitats is dependent on more windfalls.

We can estimate the age of a mound – and hence the time of the disturbance that blew the big tree over – from the ages of the oldest trees growing on those mounds today. For example if a tree on a mound is 140 years old, then that mound must be *at least* 140 years old. We should add some years to the observed age which is determined on a core taken at breast height to account for the time it took to grow to that height, also the tree might have started to grow only after a few years following the disturbance. So, as a guesstimate, if we add 10 years to the 140-year old tree, we can guess that the event that blew over the big tree to form the mound occurred about 150 years ago. Such a tree today would have started to grow circa 1871.

In a very enlightening article titled [Woodlands shaped by past Hurricanes](#), Nova Scotia forester David Dwyer wrote in 1979:

“Many of our forest stands in Nova Scotia are a result of past hurricanes. Mounds on the forest floor -the result of uprooted trees – indicate this. The age of trees growing on these mounds give a good indication of when the storm occurred. These stand ages compare well with the written records of past storms...”

A common age of forest stands in Nova Scotia is 100 years. The origin of many of these stands is the blowdown resulting from Saxby’s Gale.[1869] No doubt the Nova Scotia Storm of 1873 is a contributing factor too. George MacLaren writes in his Pictou Book that the storm of August 24, 1873 “... was probably one of the most severe and destructive that has visited our coast in years”. He calls it “The Big Blow.”



Dwyer wrote in 1979, so those “100 year old stands” that survive today are circa 142 years old max. Most trees in a multi-aged stand in which the oldest trees are 142 years would be less than 142 years old. The Old Forest Scoring Procedure calls for “a minimum of 3 sample plots per stand and measuring the age of one tree at each plot. This should be selected from the most common climax species, and should be larger in diameter than 2/3’s of the basal area...For example, if 9 trees have been tallied, then count back 3 trees from the largest tree tallied.” View [Old Forest Scoring – Cruise Procedures](#) for details. It’s a bit complicated but it is clear that if the absolute oldest tree in the stand is 140 years, there is a good likelihood that the “Age of oldest 30% of the basal area” so determined will be less than 140 years and so many such stands would not be categorized as Old Growth.

So it is quite feasible under the existing protocol that a stand that has had no harvesting or other interference for hundreds of years, and that today has at least some trees close to 140 years old but not older because the prior stand was blown down in the Saxby Gale or the Nova Scotia Storm, would not qualify as old growth because of this age requirement – even though it could have all of the other features that characterize Old Growth in spades.

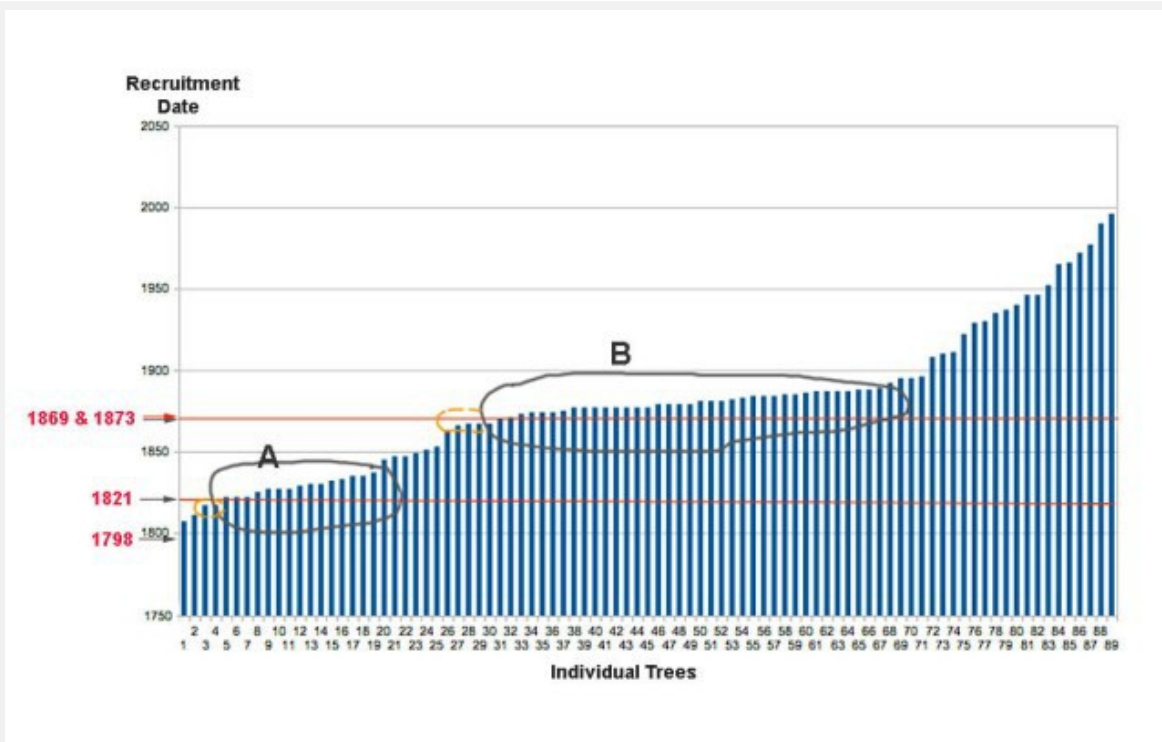
A specific example. The only actual raw data or close to raw data from L&F/NRR's many assessment of forest stands for OG status that are publicly available is a set of data obtained in connection with their assessment of stands in the Lawlor Lake area of Guysborough County in March 2018:

***Old Forest Assessment in the Lawlor Lake Area of Guysborough County, Nova Scotia** by Peter Bush. May 9, 2018. Forest Technical Note No. 2018-01 Nova Scotia Department of Natural Resources.

Executive Summary

The Department of Natural Resources (DNR) assessed 27 forest stands in the Lawlor Lake area of Guysborough County in March 2018 in response to public concern about forest harvesting and forest product utilization. DNR used the old forest scoring system, outlined in the Old Forest Policy (2012) to assess these stands. The assessment looked at 12 stands that were recently partially harvested and 15 stands that were planned for partial harvest in the area. DNR found that 2 of the 12 recently partially harvested stands were old growth forest (OGF), and a further 8 were considered old forest that did not meet the criteria for old growth. Of the planned harvest stands (not treated), 11 of the stands were OGF; 1 was old forest; 1 was mature forest, and 2 were immature. Old forest scoring age for all the stands surveyed had a mean of 134 years, with a range of 45- 167 years. The Old Forest Policy currently has 27,825 ha (15.7% of the Eastern Interior Ecodistrict) of conserved OGF and restoration opportunities. An examination of the Pre-treatment Assessment indicator currently used to flag potential stands for old forest scoring found that 5 of the 13 OGF stands in this study would have been flagged if used. The Old Forest Policy and its associated tools (old forest scoring) provides a science-based approach to evaluate OGF and appropriate policy mechanisms to conserve that forest when it is found.

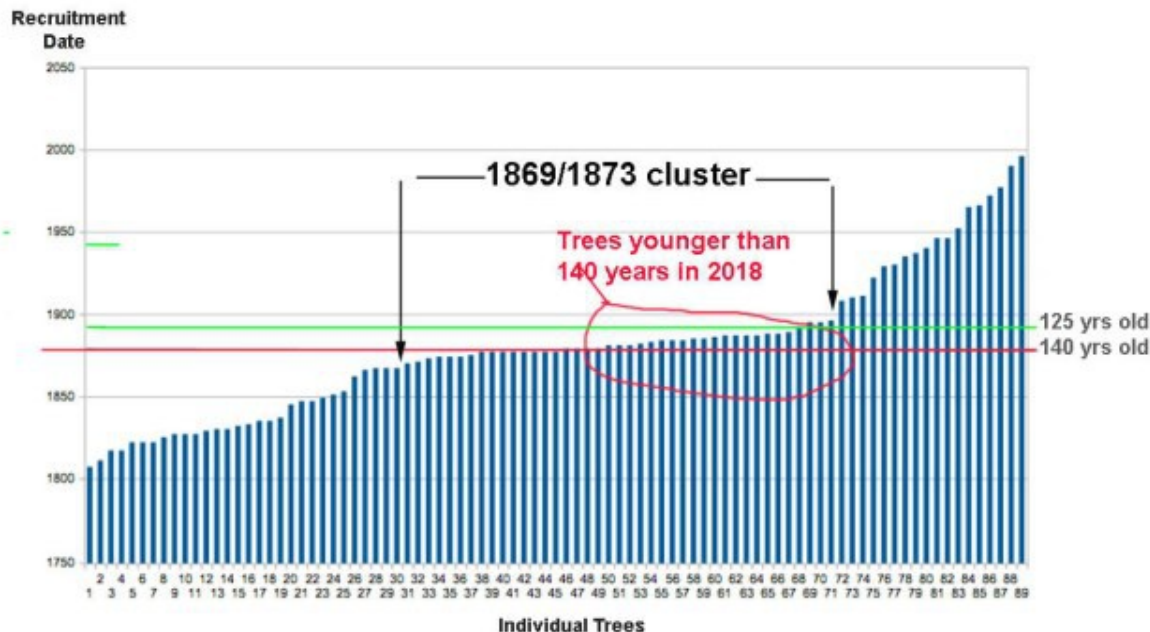
The mean age of 134 years made me wonder if these were stands blown down by some of the storms cited by David Dwyer. In **Appendix 4 of the report**, the ages of all 89 trees that were aged are given, also the related Estimated Recruitment Dates – calculated as 2017 (last ring in tree counts) minus age. So I plotted those numbers sequentially going from the earliest to most recent recruitment date:



ABOVE: Recruitment Dates of individual trees in the DNR Lawler Lake study (from Bush 2018) ordered left to right from earliest Recruitment Date to the most recent. Dates in red correspond to storms cited by Dwyer 1979. The envelopes circle plateaus suggestive of a suite of recruitment associated with (A) the 1821 storm, and (B) the 1869 and 1873 storms together. The orange circles to the left are trees that would be included if a few years were added to the recruitment dates to allow the time required to breast height. All of these trees were hardwoods – yellow birch, sugar maple, red maple.

The plot is pretty suggestive of periods of a lot blowdown and periods of less blowdown as postulated by Dwyer (see Dwyer's diagram above), and of two major blowdown periods (A&B) corresponding to known storms.

Then I looked at how many of the trees in the B cluster – trees that grew following the 1869 and 1873 storms – would be rated as OG (Old Growth) when the age criterion is 125 years (as **currently**) and when it is 140 years (as proposed in the [draft Old Growth Forest Policy](#) for some stands):



Most of the trees in the 1869-1873 cluster are at least 125 years old, but about half are not 140 years or older. So if the critical age were raised from 125 to 140 years, many of these hardwood stands – would not be rated as OG and so not protected. Yet they are all part of the same age cluster.

Is that what we want? I don't think so.

The simplest way to solve that issue is to **lower the minimum age to 100 years**. It makes sense in order to protect more habitat supportive of old forest species; and it makes sense technically, given the history of massive blowdowns in our forests.

A concluding comment

It is odd that Pit and Mound topography is a [commonly cited](#) and [extensively researched](#) feature of Old Growth forests in northeastern North America, yet Pit and Mound topography and the associated processes are not cited as features of OG in the [Old Forest Policy 2012](#) or in the draft [Old Growth Forest Policy 2021](#) or in associated documents such as the [Story Map](#) and the [Scoring Protocol](#). They clearly should be.



Pit and Mound topography in **Old Growth** hemlock/yellow birch forest by Sandy Lake (Bedford, NS).