

Need for Biodiversity Landscape Planning before finalizing HPF and Ecological Matrix components of the Triad, and for caution in selection of HPF sites in acid-stressed watersheds

A response to the **High Production Forestry Phase 1 – Discussion Paper**

From the **Conservation Committee of the Halifax Field Naturalists***

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Submitted to

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- **Mark Pulsifer**, as Team Lead for the Forest Management Guide Project, & as Team Lead for the Old Forest Policy Project at Nova Scotia Lands & Forestry

cc: Healthy Forest Coalition

Board and Members of the Halifax Field Naturalists

Nature Nova Scotia

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Highlights

In lieu of detailed Biodiversity Landscape Plan, which is still in a research phase at L&F but is considered essential to reverse losses in biodiversity and ecosystem services on forested lands in Nova Scotia, we urge L&F (i) to require 100-150 m watercourse buffers on Crown lands where currently 20 m is specified, and to increase main river Crown policy 100 m buffers to 200 m, with *no harvesting* in the buffer zone and in enclosed wetlands; and (ii) to complete revisions to the Old Forest Policy *prior* to finalizing plans for the HPF and Ecological Matrix components of the Triad OR to introduce appropriate precautionary measures. An example of a precautionary measure for old forests: prohibit logging on all existing multi-aged/old forest stands on Crown lands unless they exceed 30% of any 5×5 km square in a 5×5 km grid of NS; and where existing multi-aged/old forest stands are less than 30% of the cover, to prohibit logging on sequentially earlier development classes accordingly to bring the percentage up to 30%. Such measures would remain in place until a full Biodiversity Landscape Plan is available.

We request that High Production Forestry sites *not* be located in watersheds that would be classified by aquatic scientists as currently highly acid-stressed. Clearcutting of selected high nutrient sites within such watersheds could result in a flush of nutrients, particularly calcium, most of which is not retained within the watershed. Over the medium to longer term, the lowering of nutrient reservoirs would result in further acidification of already highly acid-stressed waters with further negative impacts on aquatic organisms. As well, we are concerned that selection of fertile sites within an overall excessively acidified landscape (due to acid rain combined with inherently poor buffering capacity and to some extent to past clearcutting) will selectively remove important reservoirs of calcium-sensitive flora and fauna that remain in those landscapes.

We urge some restraint in prescribing salvage harvesting in the FMG (Forest Management Guide) protocols where blowdown exceeds a certain percentage, e.g. 25%. In particular, we ask that some consideration be given to not conducting salvage harvesting, or restricting it to a portion of a stand (e.g. 50%), where there is a pronounced pit and mound topography. This is to preserve structural features and processes characteristic of relatively undisturbed old forests in our windy province. This consideration is particularly relevant to old hemlock stands as they succumb to HWA.

Introduction: who we are

The Halifax Field Naturalists (HFN), founded in 1975, cater to and promote public interest in the natural history of Nova Scotia and attempt to practice, responsible, science based advocacy.

Please see the document, “Impacts of forestry in Nova Scotia on conservation of biodiversity: Concerns and Questions A Submission to Nova Scotia Department of Natural Resources From the Conservation Committee of the Halifax Field Naturalists, April 26, 2017 for some background on the Halifax Naturalists and some of our previous communications with DNR/L&F in the period leading up to the Independent Review of Forest Practices (the “Lahey Report). In that document, we identified “LANDSCAPE LEVEL IMPACTS OF FORESTRY PRACTICES ON BIODIVERSITY” as a major concern. DNR responded to that document on Aug 24, 2017.*

HFN participated subsequently in the Independent Review as a member of the Healthy Forest Coalition (HFC), and many HFN members made submissions as individuals to the Independent Review. Conservation Committee member David Patriquin also maintains a blog/website on forests and forestry in NS at nsforestnotes.ca independently of the HFC and HFN.

In broad terms we were pleased with the recommendations of the Lahey Report and look forward to those finally being implemented.

One of us (DP) participated in a stakeholder workshop on the Forest Management Guide in August of 2019 as a representative of the Healthy Forest Coalition at which time he raised concerns about the apparent lack of Landscape Level Planning for Biodiversity Conservation or “BLP” (Biodiversity Landscape Planning) in the design of the Triad.

Biodiversity Landscape Planning

In simplified terms, as we understand it, BLP involves (i) the identification/mapping of existing **patches** (or “core” relatively undisturbed areas of natural habitat); the **matrix** or “background ecological system” which provides a high degree of connectivity between the patches; and **corridors** which are strips of natural habitat that provide connectivity between patches through otherwise highly human-disturbed habitat; and (ii) the modification or enhancement of the patches, matrix and corridors as necessary to achieve a desired level of conservation of a particular species, or of a set of species, ecosystems and associated ecosystem services.

*Documents available at <http://halifaxfieldnaturalists.ca/hfnWP/wp-content/uploads/2017/04/HFNdocNSDNR26Apr2017.pdf> and <http://halifaxfieldnaturalists.ca/hfnWP/wp-content/uploads/2017/09/DNR-Responses-to-Questions-from-Halifax-Field-Naturalist-2.pdf>

In the context of Nova Scotia in particular, Prof Karen Beazley, a recognized expert in landscape ecology, has commented* (bolding ours):

Practices that aim to sustain a steady or growing volume of biomass or income would result in significantly different practices than those that aim to sustain sufficient forest habitat to support viable populations of native species, including allowing for spatially contiguous forest land cover to allow for adaptation, movement and dispersal in response to climate and other environmental changes over short and long terms. Such ecological sustainability would require ~ 60-65 percent of NS land base to be managed for biological diversity (biodiversity) conservation objectives (see Beazley et al. 2005; Reining et al. 2006).

Nearly continuous forests dominated by older-age classes is/was the predominant natural land cover in Nova Scotia as indeed in other regions of the Acadian Forest. Accordingly, forest management should consider the spatial context of the entire land base, and account for cumulative losses of forest cover, especially of older age classes, to date. Given the current state of the forest in NS, arguably the most ecologically responsible and highest objective for all public forests would be to manage them for older-age class recovery. Further, as forest is/was the predominant ecosystem, forest management should be synonymous with biodiversity conservation, not solely with timber or biomass harvesting. Native biodiversity in NS exists predominantly in forests

In general, forest management planning in NS needs to address serious issues of fragmentation of the forest by roads and harvest practices (Beazley et al. 2006; Fudge et al. 2007). Planning should take into account the bigger picture, beyond the stand level and even beyond the landscape level, to the broader region, including connections to New Brunswick and the rest of continental North America (Beazley et al. 2005).

* Karen Beazley, Response to Workshop on DNR's Framework for Ecosystem-Based Forest Management (including DNR's Work on Natural Disturbance Regimes), Mar 18, 2018, available at <https://dalspace.library.dal.ca/bitstream/handle/10222/74962/Karen%20Beazley%20submission%20to%20Nova%20Scotia%20Forest%20Practices%20Review.pdf>

Watercourse and bog buffers of 20 m are inadequate and not based in ecosystem science. Buffers of such narrow widths may in some cases serve to reduce erosion into streams, but that is only one function. Leaving trees in narrow strips in clearcut situations is likely to result in blow down. At a minimum, they should be wide enough to retain a buffer function after anticipated blow down and other edge effects accrue (e.g., 100 m). Beyond this minimal buffer function, buffers should also provide habitat and connectivity for riparian species.

Harvesting should be done in a spatial pattern that retains well-connected, large patches of suitable habitat for a wide suite of forest species, sufficient to maintain viable populations and movements pathways over time. Current wildlife guidelines around patches and buffers do not achieve this.

A basic concept of the Triad, as we understand it, is that the **Ecological Matrix Zone**, where forestry management is conducted according to a revised FMG and is “ecological forestry”, will provide landscape connectivity of natural habitat, at least on crown land; sites in the **HPF (High production Forestry) Zone** are distributed though the Ecological Matrix, with connectivity provided around them; and the **Conservation Zone** provides core patches.

Given the current state of our forests with now less than 1% Old Growth (compared to perhaps 10-15% in the 1950s and perhaps as much as 50% in pre-Columbian times), and the high proportion of endangered species in NS that are forest-dependent (36.5%) and wetland-dependent (53.8%)* and the comments of Prof. Beazley cited above, it seems very clear that the primary focus of Biodiversity Landscape Planning on Crown lands (and ultimately all lands in NS) should be on (i) the riparian zone, and (ii) old forests.

As Prof Beazley has commented in regard to the riparian zone, “Watercourse and bog buffers of 20 m are inadequate and not based in ecosystem science. Buffers of such narrow widths may in some cases serve to reduce erosion into streams, but that is only one function. Leaving trees in narrow strips in clearcut situations is likely to result in blow down. **At a minimum, they should be wide enough to retain a buffer function after anticipated blow down and other edge effects accrue (e.g., 100 m). Beyond this minimal buffer function, buffers should also provide habitat and connectivity for riparian species.** (bolding ours).

So at an absolute minimum, taking into account landscape level requirements for protecting the ecological integrity of watercourses and bogs on Crown lands, L&F should be basing their calculations of wood supply and sighting of HPF sites on a 100 m, not 20 m buffer.

*Biodiversity: Species at Risk in Nova Scotia, document at https://novascotia.ca/natr/biodiversity/pdf/Biodiversity_Species_at_Risk_May31.pdf

Prof Lahey comments as follows on watercourse protection:

68. I have concluded that the adequacy of the watercourse protection provisions currently prescribed in the Wildlife Habitat and Watercourse Protection Regulations should be independently studied. The regulations should be amended in accordance with the outcomes of this study. One of the issues to be considered is whether a wider buffer is needed to ensure effectiveness in particular conditions. Another highly relevant variable is the method of harvesting: generally, a wider riparian zone may be called for next to clearcutting with minimal retention than next to other kinds of harvest. One obvious option would be a general increase of the riparian zone required next to all watercourses. An alternative is to require different zones next to watercourses of different classes. Another option to consider is a tiered system in which the restrictiveness of the riparian zone increases with proximity to the watercourse. For example, in a review that increased the width of riparian zones overall, a no- harvest zone could apply immediately adjacent to the waterbody, and a partial-harvest-only zone could apply farther away from the watercourse, with its width depending on the severity of the abutting harvest. For example, the regulation could be amended to include the following elements, taken from the paper on special management zones written for this Review by Professor Malcolm Hunter and Laird Van Damme:

- Special management zones next to watercourses adjacent to clearcuts could be either 30 m where the watercourse is so narrow that the forest canopy is unbroken above it or 40 m where the watercourse is wider.
- The machine exclusion zone could be a no-cut zone, providing an area to retain large old trees and snags next to water.
- On a case by case basis, wider special management zones (up to 100 m) could be considered on larger lakes and rivers to account for recreational and aesthetic issues or wherever other considerations, such as habitat for species at risk, require much wider special management zones.

Providing landscape connectivity by increasing the buffer zone beyond 100 m is probably the biggest bang for the buck you can get, i.e. the integrity of the aquatic systems is protected, AND terrestrial, in most cases, forest, connectivity is increased at the same time.

Thus we urge L&F to require 100- 150 m watercourse buffers on Crown lands where currently 20 m is specified, and to *increase* main river Crown policy 100 m buffers to 200 m, with *no harvesting* in the buffer zone and in enclosed wetlands.

In regard to Old Forest, Prof Lahey concluded:

Conclusion 72. During the course of this Review, there was considerable discussion and much coverage in the media of clearcuts of areas said to be or to include old-growth forests. Defining what is and what is not an old-growth forest is difficult. But it is clear that, however defined, there is currently little of it in Nova Scotia's forests outside of ecological reserves: as little as 0.9 per cent of the wider forest, according to the most recent State of the Forest Report. In my view, it is also clear that DNR "targets" for the protection and restoration of old-growth forest conditions outside of those reserves are not ambitious enough.

From the Recommendations

13. DNR should work with interested parties, including representatives from the academic community, to assess the work that is underway for landscape-level planning, including

a. the implications of changes to forest practices as a result of this Review on the objectives and methodology for landscape-level planning

b. to the extent that landscape-level planning will rely on mapping of natural disturbance regimes, aligning it with its revised and peer-reviewed mapping of Nova Scotia's natural disturbance regimes

c. reviewing the methodology and basis for setting forest condition targets at the landscape scale (e.g., what percentage of a landscape should have old forest)

17. Steps should be taken to improve the abundance and conservation of old forests, including the following:

a. Implementation of ecological forestry, with emphasis on long-rotation stand development and multi-aged stand structures.

b. Accelerated and improved data collection on the existence of old forests across all unprotected Crown lands. This could include improvements to the pre-treatment assessment process, targeted field assessments, and advanced applications of spatial modelling (GIS) and data capture technology such as LiDAR.

c. Reconsideration of the area-proportion targets in the Old Forest Policy, as well as potential inclusion of other tree species in the climax group (e.g., red oak, red maple). This will require a targeted research program that, like other DNR initiatives, should become an inclusive process with participation of a suitable range of scholars and experts from various walks of life.

d. Addition of old-forest restoration targets alongside the old-forest protection targets in the policy.

e. Development of a silvicultural manual for old-forest restoration.

In light of the comments of Prof Beazley cited above, it seems very clear that “reconsideration of the *area-proportion targets*” should result in a substantial increase in the proportion of forested land to be conserved as Old Forest and/or allowed to become Old Forest under the Old Forest Policy (i.e. the proportion of land would be well above the currently protected 8% Old Forest layer polygons).

Such a change, as well as increasing watercourse buffers on crown lands, would have big impacts on the calculations of the amounts and the specific sighting of lands suitable for high production forest management, and on the “strategic, long-term wood supply analysis” which takes into account also, wood from both the HPF and the Ecological Matrix zones of the Triad.

Thus, logically, items 17 c and d in the Lahey recommendations should be completed *prior* to the final designation of sites for HPF.

However, as currently scheduled, the revision to the Old Forest Policy is still, according to the [L&F Landscape Ecology page](#), in a research phase, with revisions to be finalized by the end of 2020. That’s well after the envisaged completion of the High Production Forestry piece of the Triad (“Timeline: Finalize definition and determine criteria in early 2020”) and the Forest Management Guide, which applies to the Ecological Matrix (“Timeline: Final guide in Spring 2020”).

Also, recommendations by Prof Lahey, also by the Biodiversity Advisory Committee around the development of a full Biodiversity Landscape Plan all relate to research with no precise timeline.

Also, Prof Lahey recommended an independent review of the Wildlife Habitat and Watercourse Protection Regulations, and this item is not amongst the priorities identified on the L&F Ecological Forestry webpage.

The acknowledged need for Biodiversity Landscape Planning combined with unavoidable delays in completing the related research calls for either a delay in finalizing the design of the Triad until the appropriate research can be completed and recommendations implemented OR for precautionary measures that err on the side of biodiversity conservation (rather on ensuring a particular wood supply from Crown lands) to be introduced and maintained until a full blown Biodiversity Landscape Plan is developed.

Our request that L&F require “100- 150 m watercourse buffers on Crown lands where currently 20 m is specified, and to increase *main river Crown policy 100m buffers to 200 m*, with no harvesting the buffer zone or enclosed wetlands” is an example of a precautionary measure that could be taken.

In regard to old forest, a fairly simple approach could be adopted, e.g. to prohibit logging on all existing multi-aged/old forest stands on Crown lands unless they exceed 30% of any 5×5 km square in a 5×5 km grid of NS; and where existing multi-aged/old forest stands are less than 30% of the cover, to prohibit logging on sequentially earlier development classes accordingly to bring the percentage up to 30%.



Above: Distribution of forest in 5 development stages across Nova Scotia, compiled from [NS Landscape Map Viewer](https://nsgi.novascotia.ca/plv/). Purple = Multi-aged/Old Forest.

Such steps would be consistent with Prof Lahey's view that protecting ecosystems and biodiversity should be the prime objective of the management of Crown land forests.

"In other words, 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 practicing forestry in Nova Scotia."

From a forestry perspective, our requests/recommendations may seem particularly biased towards conservation. However, we need to take into account the global and local crises related to climate warming and biodiversity losses that have been highlighted subsequent to the Independent Review process. The feds are now seeking 30% protected area by 2030, and there are calls to manage an additional 20% as "climate stabilization areas" by 2030*. In that context, our requests/recommendations could be viewed as modest, especially considering that we are referring only to Crown lands. Also, the closure of the NP Mill, and the global slowdown due to COVID-19 afford an opportunity to change course that will not substantially affect the market as it exists independently of government subsidies.

* A Global Deal For Nature: Guiding principles, milestones, and targets

E. Dinerstein et al., *Science Advances* 19 Apr 2019: Vol. 5, no. 4,
<https://advances.sciencemag.org/content/5/4/eaaw2869>

On Forest Nutrient Budgeting and Selection of Sites for HPF

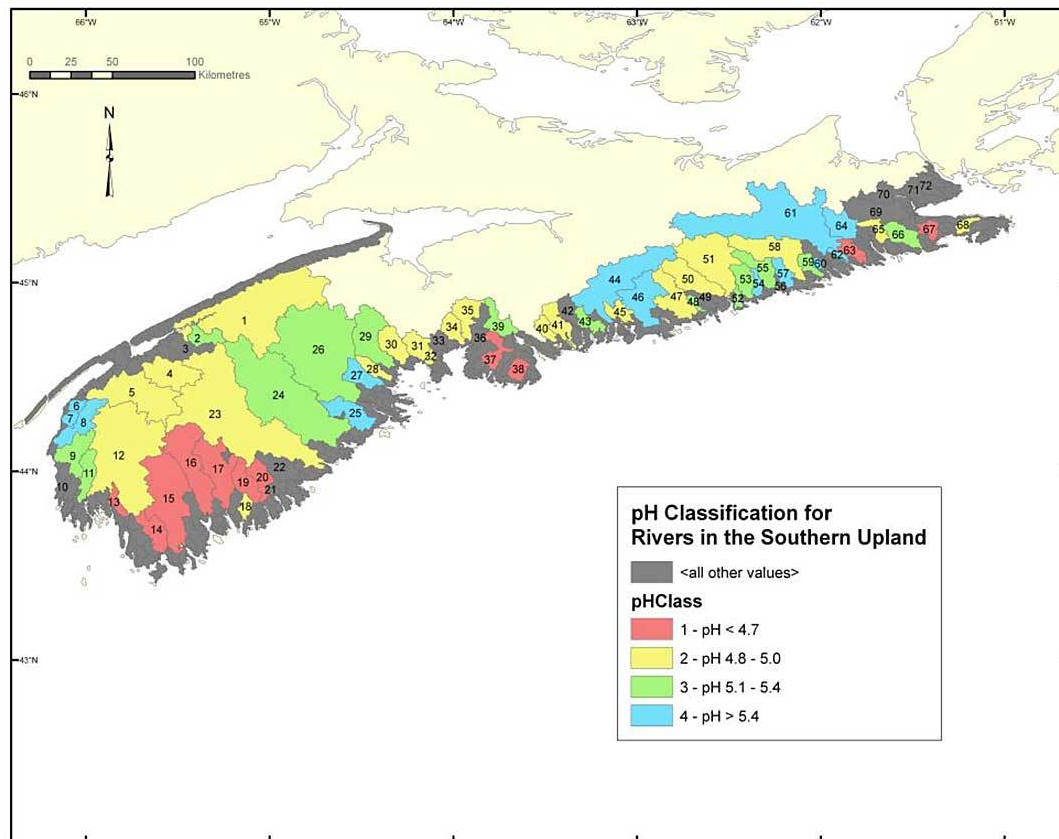
"First and foremost, the HPF zones should include land capable of supporting rapid tree growth, and thus must have the fertility, and drainage characteristics conducive to such growth" – From High Production Forestry Phase 1 – Discussion Paper

We have some concerns about the selection of highly fertile sites for HPF, especially in highly acidified landscapes such as those predominating in SW Nova Scotia. Clearcutting of selected high nutrient sites within such watersheds could result in a flush of nutrients, particularly calcium, most of which is not retained within the watershed. Over the medium to longer term, the lowering of nutrient reservoirs would result in further acidification of already highly acid-stressed waters with further negative impacts on aquatic organisms.

As well, we are concerned that selection of fertile sites within an overall excessively acidified landscape (due to acid rain combined with inherently poor buffering capacity

and to some extent to past clearcutting) will selectively remove important reservoirs of calcium-sensitive flora and fauna that remain in those landscapes.

Thus we request that HPF sites not be located in watersheds that would be classified by aquatic scientists as currently highly acid-stressed.



Classification of mean annual pH for rivers in the Southern Upland region
(Fig 16 in DFO. 2013. Recovery Potential Assessment for Southern Upland Atlantic Salmon. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2013/009)

Salvage Harvesting

We urge some restraint in prescribing salvage harvesting in the Forest Management Guide where blowdown exceeds a certain percentage, e.g. 25%. In particular, we ask that some consideration be given to not conducting salvage harvesting, or restricting it to a portion of a stand (e.g. 50%), where there is a pronounced pit and mound topography. This is to preserve structural features and ecological processes characteristic of relatively undisturbed old forests in our windy province. This consideration is particularly relevant to old hemlock stands as they succumb to the Hemlock Woolly Adelgid.



Above: Pit and mound topography in Eastern hemlock/yellow birch forest by Sandy Lake (Bedford, Nova Scotia).