Submission to Nova Scotia Forest Practices Review – Professor William Lahey

By John LeDuc, Dec.30, 2017

Part 1 – Context and Issues Discussion

The terms of reference for the Review of Nova Scotia Forest Practices begin by recognizing that there is a wide diversity of interests related to forestry and forestry practices in Nova Scotia. The people of Nova Scotia, beginning with the Mi'kmaq, are people of the sea and the forests. Our long collective relationship with the forest has consistently reflected a range of values and interests which include various degrees and mixes of utilitarianism, conservation, and protection. The complexity of our relationship with the forests embraces the ecological complexity of the forests itself and the type and level of intensity of human uses we place on the forests. The type of forests which dominate the province's landscape (Acadian Forest) is a result of the ecological conditions of the Nova Scotia peninsula – almost an island, mid latitude, a high diversity of bed rock and landform types, and a mix of northern, mid latitude, and southern life forms.

Our complex forests, under natural conditions, are characterized as being diverse and relatively long lived with natural disturbances of wind and insects (and only very occasionally natural fire). They create gaps and patches of younger forest within a dominant mosaic of mostly closed canopy conditions. The forests primary functions are ecological – to photosynthesize the sun's rays and grow; to absorb tons of carbon dioxide from the atmosphere and create oxygen; to absorb or hold millions of gallons of water within its mass structure; to build forest soils which support successive progeny; to develop complex relationships with other living things from deep within the soil to the tree tops; to create and support biological diversity and conditions for thousands of organisms to exist.

The forests of Nova Scotia also provide important resources for people. For thousands of years the Mi'kmaq utilized the forest and its organisms (animals, plants etc), its clean waters, and its shelter to sustain life and to build communities and spiritual relationships. Nova Scotians now use the forests as a source for building materials, for paper and other manufactured products, for heat, for clean water, for food, for recreation, for tourism, as real estate value, and to connect with nature. Forests in Nova Scotia, and globally, are recognized as a major source of wealth and at the same time are critical for sustaining the diversity of life and the earth's natural processes which we all depend on.

The issue of"getting the right balance" between intensive utilization of the forests, use of the forests in moderation, and maintenance and enhancement of ecological functions and diverse values is of provincial and international concern. The United Nations, IUCN, other international

governmental organizations, civil society, science organizations, and Indigenous people organizations have all sounded science supported alarm bells over the inter generational negative impacts from large scale industrial management of forests.

Specific global concerns, which are also concerns in Nova Scotia, include: simplification of forest ecosystems mainly due to domination of clearcut/short rotation management particularly with respect to loss of older age classes, forest structure, and tree species diversity; fragmentation of forests particularly due to road systems and clearcutting patterns; loss of biodiversity at the ecosystem, species and genetic levels; impacts on water quality, quantity and flow regime; loss or reduction in capability of forest soils to sustain biological productivity; and loss or reduction of carbon storage function.

Major economic and social concerns include: the creation of employment and economic dependency based on single dominant use and over exploitation of forest resources; lack of incentives for forest land conservation and for small private landowners to conduct lower impact ecological forestry; loss or reduction of potential to accrue a fuller range of economic, social and environmental benefits from the forests associated with less intensive, longer rotation, more diversity, forest management approaches; and loss or reduction in potential to accrue benefits from other forest uses such as tourism, recreation, and health.

Within the context of these concerns, the existing forest management system makes a major contribution to the economy of the province. A 2016 study by Gardner Pinfold Consultants of the Nova Scotia Forest Industry showed that there is $2.1 billion in total economic impact, 11,500 Nova Scotians employed directly and indirectly by the forest industry, and $800 million contribution to GDP. It also showed that the forest products industry ranks 3rd in NS exporters in Goods Producing Sector and is economically important to many rural areas and towns in the province.

An answer to finding the right balance to these issues was sought from the 2010 public and stakeholder component of the multi–year, multi-stage – Natural Resource Strategy process. The chair of the Steering Committee for the process, the late Hon. Constance Glubes , concluded in A Natural Balance- Report of the Steering Committee on Natural Resources.(2010)

"*The status quo is not an option. Unless there is change, Nova Scotia's natural resources will continue to be destroyed. We urge Cabinet to act on the recommendations contained in this report - to seize this opportunity to make a substantial change in how government operates, with an aim to creating a future for natural resources."*

The primary result of Justice Glube's report was that change was required in forest governance and specifically major changes were required in how the Department of Natural Resources operates and makes decisions. Although there has been some progress, the proof on the

ground resulting from the forest policy choices made by DNR clearly demonstrate that the issues and concerns raised by the public and Justice Glube have not been adequately addressed and in some cases deepened.

Since this time under DNR's authority, FSC certification was dropped for a portion of crown lands in western Nova Scotia and the commitment to move all crown lands under FSC certification was also dropped – effectively removing an important check and balance and management system with higher environmental and conservation standards.

Critical review of the DNR forest management system by the science community (particularly non-forest industry aligned) , woodlot owners, ENGO's and conservation community , shows a continued misuse of science and a bias in the pre harvest treatment assessment which limits options for forest management in favour of clearcutting and intensive management. For example the DNR produced document "Nova Scotia's Natural Disturbance Regimes" is being used to assign a natural disturbance class to landscapes and forest stands with the intent of prescribing or supporting harvest operations which mimics or copies the natural disturbance regime. The science is overwhelming clear that natural fire (vs. Human caused fire) plays a small role in the forest ecology of the province. Yet DNR misrepresents this science by classifying about one half of the province as frequently disturbed by natural fire in order to support the continual development of large clearcuts and short rotations – which according to DNR mimics the natural forests (not accurate). DNR claims to be implementing an ecosystem based management system based on natural characteristics and processes of the Acadian Forest but the reality on the ground does not match this claim.

DNR has been widely criticized (including by the Auditor General) for the ineffective exercising of its responsibilities in protecting species at risk. DNR has also been criticized for muzzling scientists, from other departments, for publically presenting published research which showed certain harvesting practices were a threat to particular endangered species.

Recently DNR eliminated the Provincial Parks Division with no public announcement and re-wrote parks/conservation planning positions to become forestry positions. Nova Scotia once had a very effective nationally recognized Provincial Parks Division that brought important park and conservation planning skills to the provincial government in line with other provinces and in fitting with our exceptional outdoor recreation and scenic land base and thriving tourism industry. The Parks Division also, was historically responsible for providing input into outdoor recreation and tourism resources on provincial crown lands ensuring different disciplines and interests were effectively represented in crown land decision making within the department. Provincial parks were a subject area for the Natural Resources Strategy Steering Committee lead by Justice Glube, who made many excellent recommendations to help guide the Provincial

Parks division's expertise and skills in conservation and park planning. The elimination of the Parks Division was not one of them.

It was clear that DNR and industry were not supportive of the government commitment from the natural resource strategy process to reduce clearcutting by 50%. Government's surprise reversal of this commitment, following a change in DNR Ministers, and after the long public consultation process, was a clear indication that DNR was not willing to change from the "status quo". Many interests considered that DNR was also undermining the intention of the clearcut reduction target through manipulation of both the standard definitions of "clearcuts" and the procedure to estimate clearcuts.

In numerous cases DNR has developed plans which harvest the forest directly adjacent or in very close proximity to protected area boundaries. There is no early stage process between DNR and NSE and Parks Canada for reviewing and modifying, if required, proposed harvest plans next to provincial protected area boundaries. Harvesting next to boundaries can result in dramatic edge effects and other ecological impacts on protected areas. DNR's proposed harvest plans adjacent Kejimkujik National Park were met with considerable public opposition that resulted in much media attention and ultimately in a modification of harvest plans. DNR's public response that they didn't need to modify harvests next to protected areas because "the buffers are within protected area boundaries" has no basis in science and has been widely criticized. This position does not conform to DNR's own Code of practice –Guidelines for Crown land which state:

Protected Areas Guidelines
Forest management activities bordering areas that have been protected under federal and provincial policies and legislation, and municipal bylaws need to consider possible impacts to the integrity of the specific areas designated for protection.
4.2.2 Forest practices bordering protected areas will be designed and conducted in consultation with protected area managers.

To date there have been at least 15 protected areas where crown land harvest plans abut protected areas and the Code of Conduct guideline was ignored.

One of the basic issues in forest governance over harvest practices is the calculation of wood supply available now and in the future and the development and promotion of existing and new industries to utilize the calculated available wood. Wood supply calculation is a challenging task with a degree of uncertainty that is difficult to avoid including actual vs predicted contribution from private lands, loss due to unpredicted insect or storm events, policy uncertainty due to public concerns over harvest practices, etc. DNR's promotion of new industries such as biofuels and biomass burning based on a wood supply model that requires the domination of short rotations, clear cuts, and intensive management of the Acadian forest while limiting potential

for longer lived diverse forests and conservation is a major problem for the province. Investments and commitments by industry, communities, and individuals based on existing wood supply assumptions are done so with a large degree of uncertainty and can put governments between a "rock and a hard place" if supply changes and tax payer dollars are sought to support industry so established. This is a major reason why it is so important to insure forest governance accounts for the wide variety of interests in our forests and creates certainty for investment, conservation, and environmental protection in wood supply calculation.

There have been some changes in DNR's forest governance such as the establishment of the Harvest Map Viewer allowing for public input into proposed harvest plans and the publishing of various guides for biodiversity and woodlot management. At the same time, the protected area system has moved forward, under the authority of Nova Scotia Environment, with the government committed to increase the amount of protected land to a target of 13%. FSC certification has been maintained for eastern Nova Scotia crown lands and selected private lands mainly at the initiative of Port Hawkesbury Paper. The company utilizes tools such as the Acadian Forest Restoration Guide Document, and High Conservation Value assessment to manage their crown lands to FSC standards. They implement a variety of harvest and silviculture methods at a standard higher than other crown lands not under FSC.

How DNR has responded (or not responded) to the multi stage public and stakeholder natural resources process has contributed to the intensification of conflict over forest management. DNR has, to date, not been able to provide the government with workable solutions to forest land use conflicts. This, unfortunately, has lead to a broad public dissatisfaction and distrust of government and the forest industry. The dissatisfaction is real and is re-enforced by each new clearcut. Calls for more public education or the need for an attitude shift (i.e.: Ivany Report) by the public are a recipe for more distrust, conflict, and uncertainty.

Part 2 –State of the Forests

It is very important to understand the present condition of Nova Scotia's working forest land base. Our working forest essentially includes forested land outside of protected areas and outside of lands converted to agriculture and development uses (urban, residential, industrial etc.) The complex and diverse Acadian forest is now dominated by early succession shade intolerant tree species which are the target of harvesting by mostly the clearcut method. The clearcuts then return the forest to an early succession pioneer state managed for a few favoured tree species and harvested as young small trees (50 years.) This forest management approach of short rotations with a few favoured tree species has the most negative impact on other values, interests, and uses.

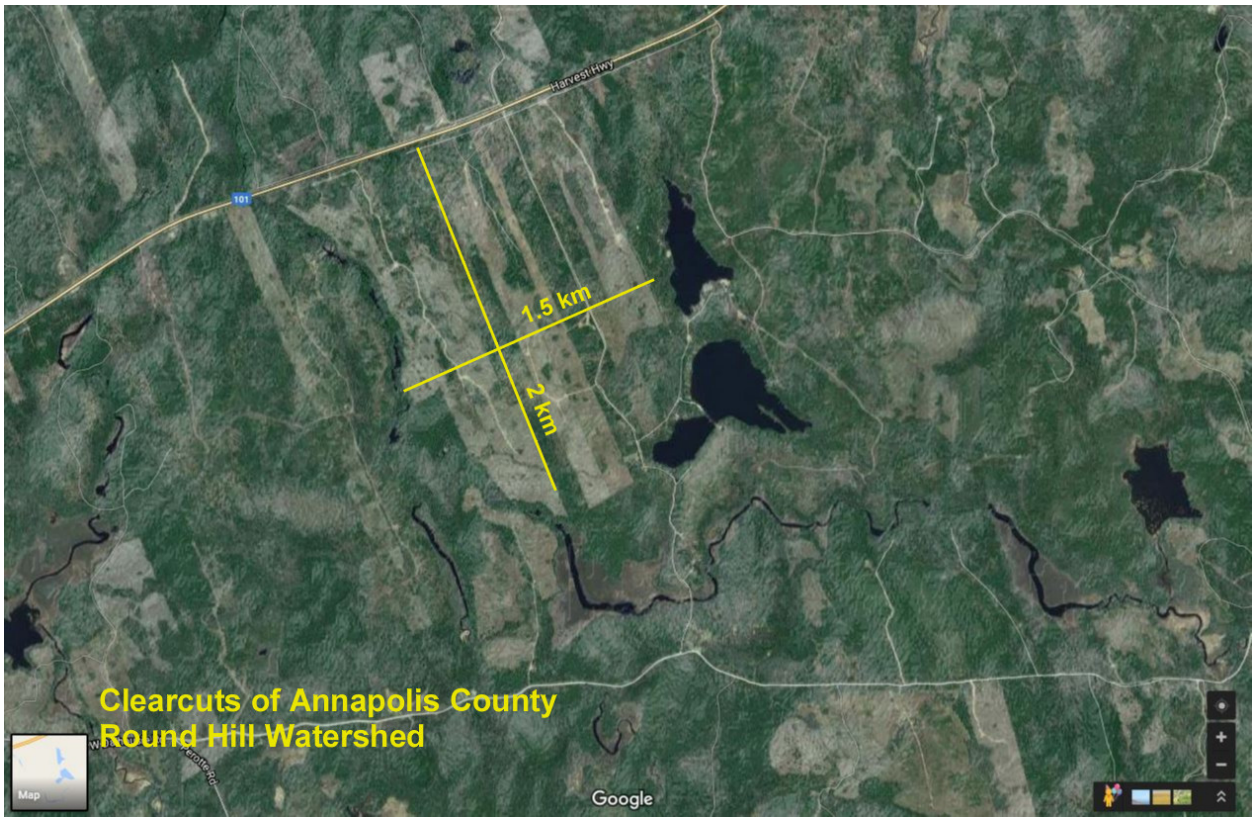
A broader more balanced forest management approach recognizes that the Acadian forest is Nova Scotia's advantage. Underneath the pioneer forest will grow a diversity of shade tolerant forest with high value (ecological and economic) trees .Longer rotations with tree decadence of pioneer species to build soil health, stand structure, carbon and nutrient stores, and biodiversity is required to secure these high values.

Short rotations and the production of many young small trees are driven, in part, by the need to maintain a flow of fibre to the pulp and paper industry or to chip for biomass and export. Pulp and paper mills in Nova Scotia are subsidiaries of very large international companies subject to global market conditions and opportunities. The closure of the Resolute (former Bowater) mill in Liverpool and the recent closure of Port Hawkesbury Paper's twin mill in Linn Oregon illustrate the level of risk a jurisdiction takes when it does not insure economic diversity is the priority imperative. While accruing economic benefits, the province, and both present and future citizens (tax payers), assume a large risk when we dedicate the majority of our naturally diverse and longer lived forest landscapes to a dominate forest management paradigm of short rotations, large clearcuts, and less tree species diversity. At the same time climate change will increase the economic and environmental risk to the province as these conifer dominate managed forest have a low resilience to the effects of climate change (drought, severe weather events, insect and disease damage, competition etc). Many studies have shown that maintaining forest diversity including age class diversity is the key for forests to adapt to climate change.

Economic and environmental risks associated with current harvest practices are not assumed evenly when a few large forest industries dominate the economy and the environment. For example, crown lands in Annapolis County are being heavily clearcut with the wood products shipped 300 km to the Northern Pulp mill in Pictou, to sawmills in other counties, or being chipped for export. Annapolis County accrues very few benefits but assumes the impacts from the clearcut harvesting including impacts on water, loss of biodiversity, loss of scenic and quality recreation opportunities in the working forest, loss of potential to secure a more diversified forest industry based on longer rotations and diversity of tree species, and impacts on highways from a constant flow of heavy logging trucks. For context- In less than a year (Dec 20, 2016- Oct 26, 2017) the total area approved in Annapolis County for harvesting on crown land (1,922.3 ha or 4,614 ac.) was greater than the total area of Halifax Peninsula (1,874 ha or 4,498 ac). This does not include the amount and pace of forest harvesting occurring on private land in the county.

There are hundreds of small watershed in the province where clearcuts are the dominate land use with few or no reserves of older forest or other conservation measures for biodiversity other than a narrow buffer strip on streams. One of many examples in Annapolis County is the

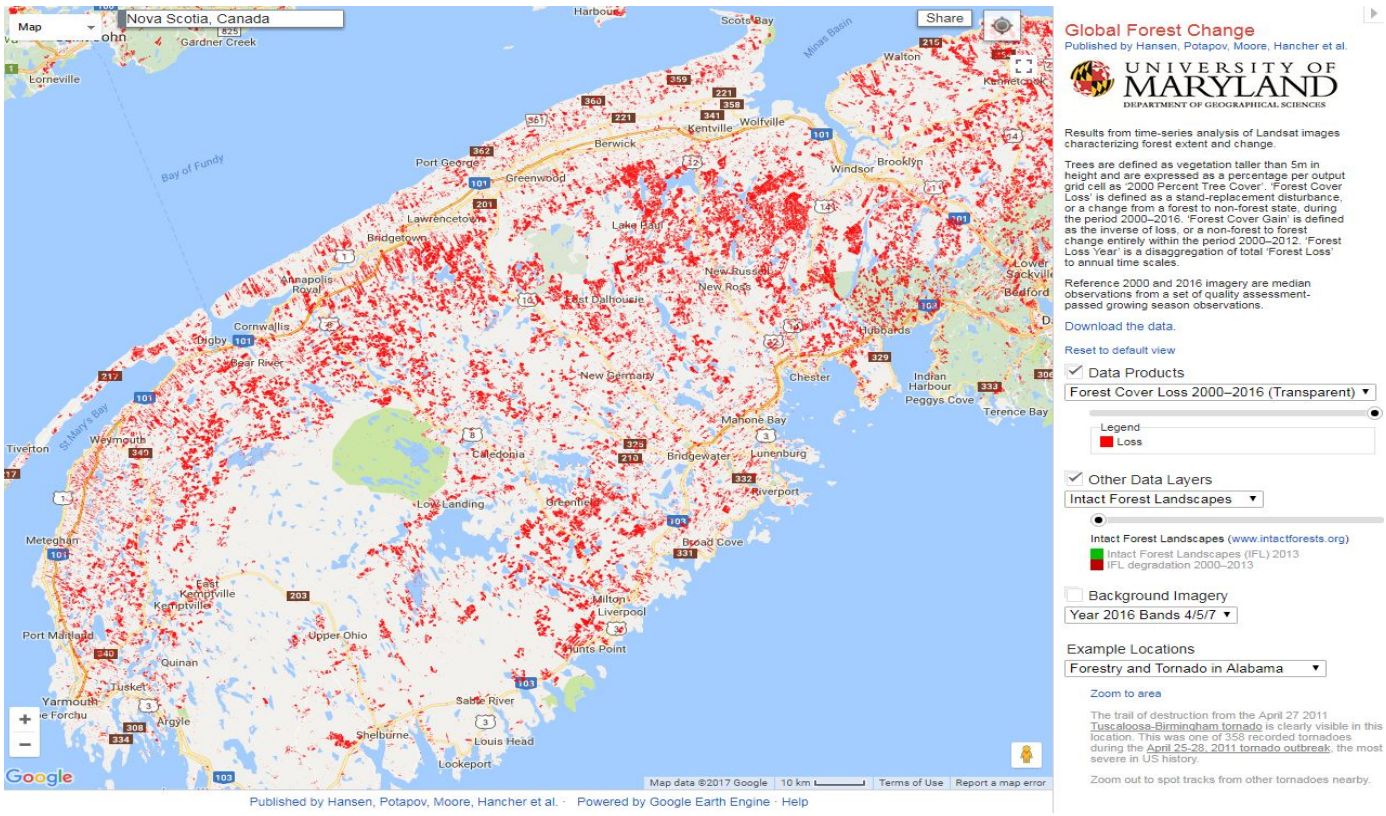
Round Hill River watershed where most of the watershed has been clearcut over the past 15 years with no conservation reserves or no attention (pre-assessment and monitoring) for potential impacts on biodiversity, remnant Atlantic Salmon population, water quality and quantity, tourism and recreation values. The assumption that minimum buffer strips on streams mitigate most of the concerns and needs of other interests and values is simply false and not supported by science. Below is an image of clearcuts in the Round Hill River Watershed. Since this Google Earth image was taken there have been several additional large forest patches cut.

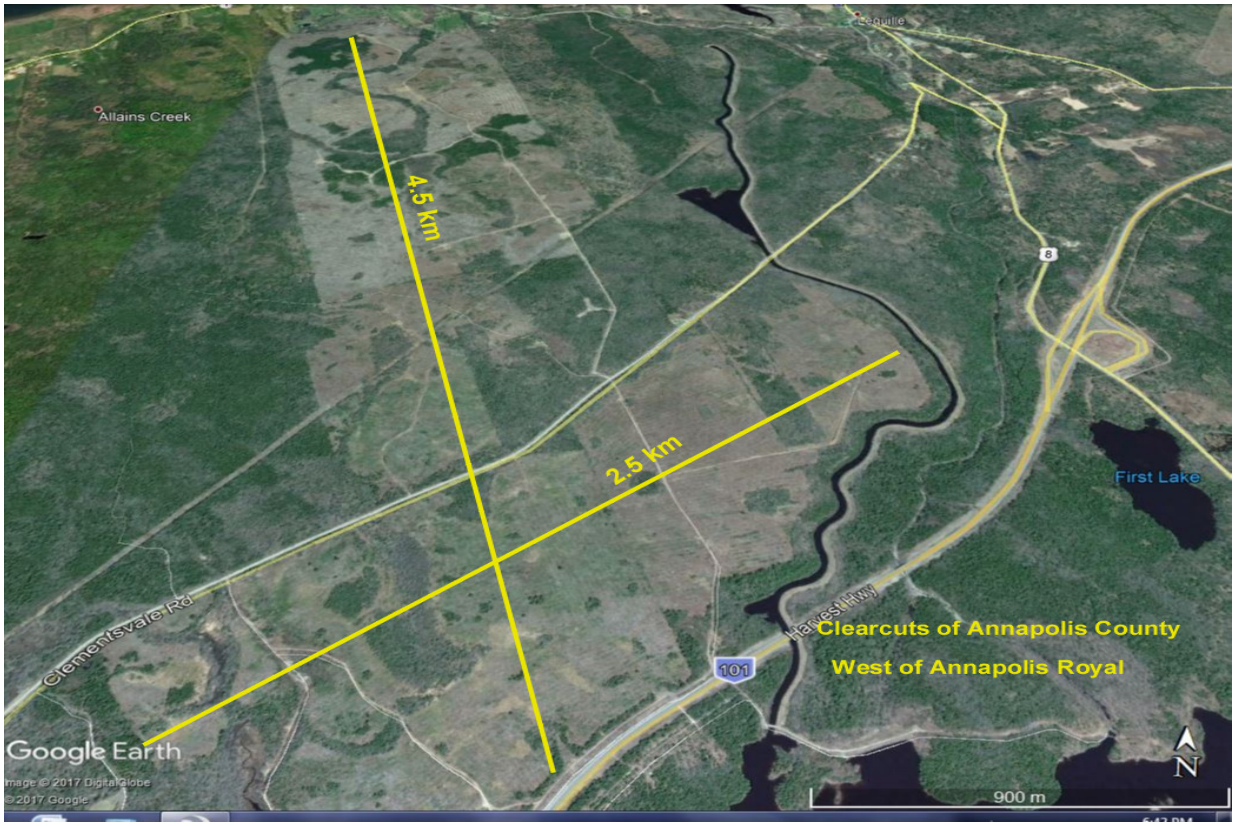


The forests of Nova Scotia have become less diversified from an age class and succession state. In 1958 about 25% of the provinces forests were over 80 years old – today forest over 80 years old occupy just over 1% of the forest land base while forest over 100 years old are found on about 0.15% of the land base. The many ecological values of old forests are well documented in the science and the protection of remaining old forest areas is a global conservation priority. The current approach by DNR to protecting old forest in the crown land working landscape is inadequate and restrained by arbitrary targets which do not capture all remaining old growth forests or near old growth forest on crown land.

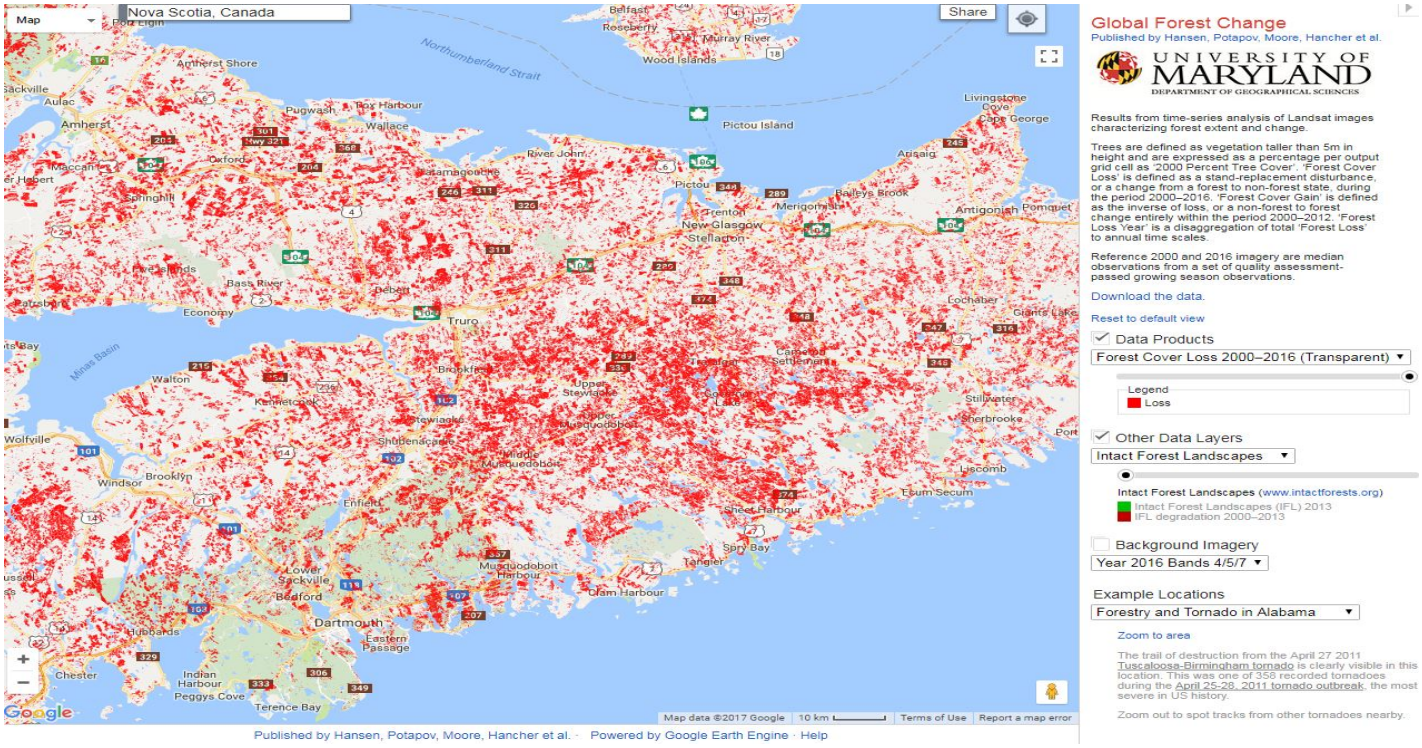
The following are a few images, for brevity, showing loss of intact forests, and land use domination of clearcut short rotation forestry in Nova Scotia.

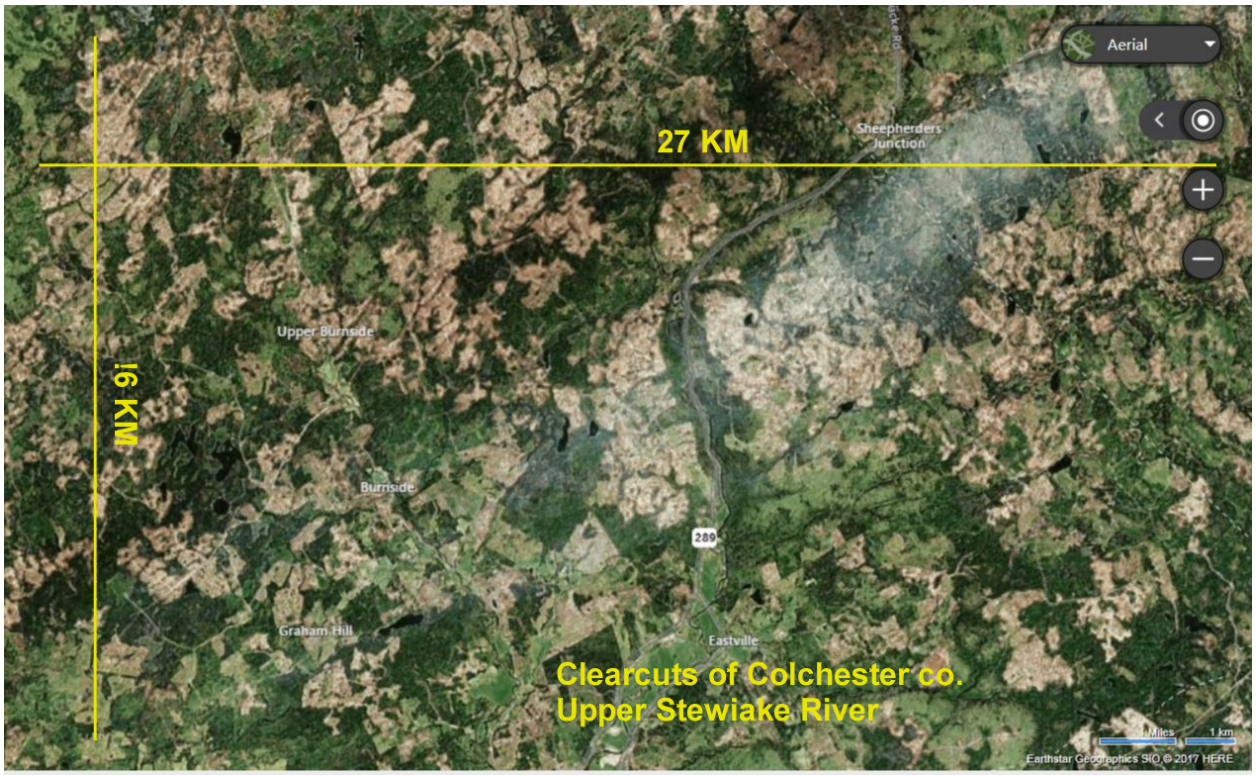
Western Nova Scotia (red patches are intact forest cover loss -2000- 2016)



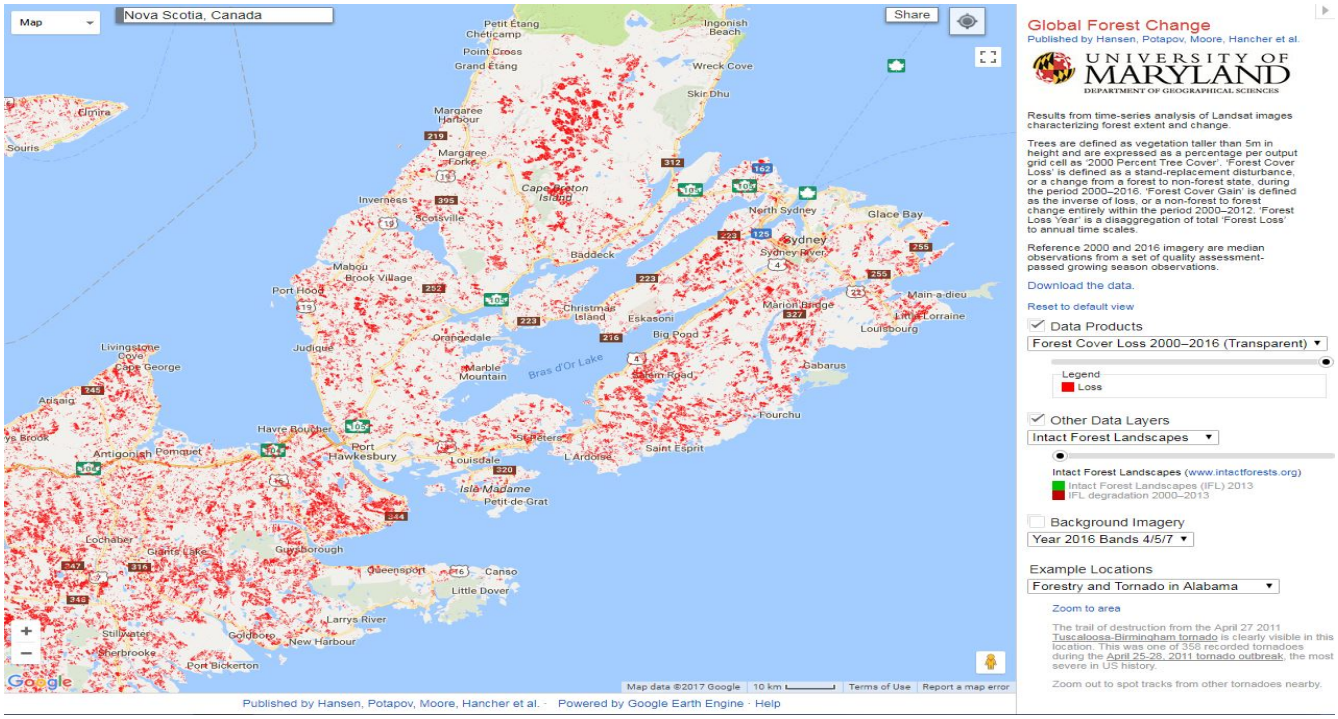


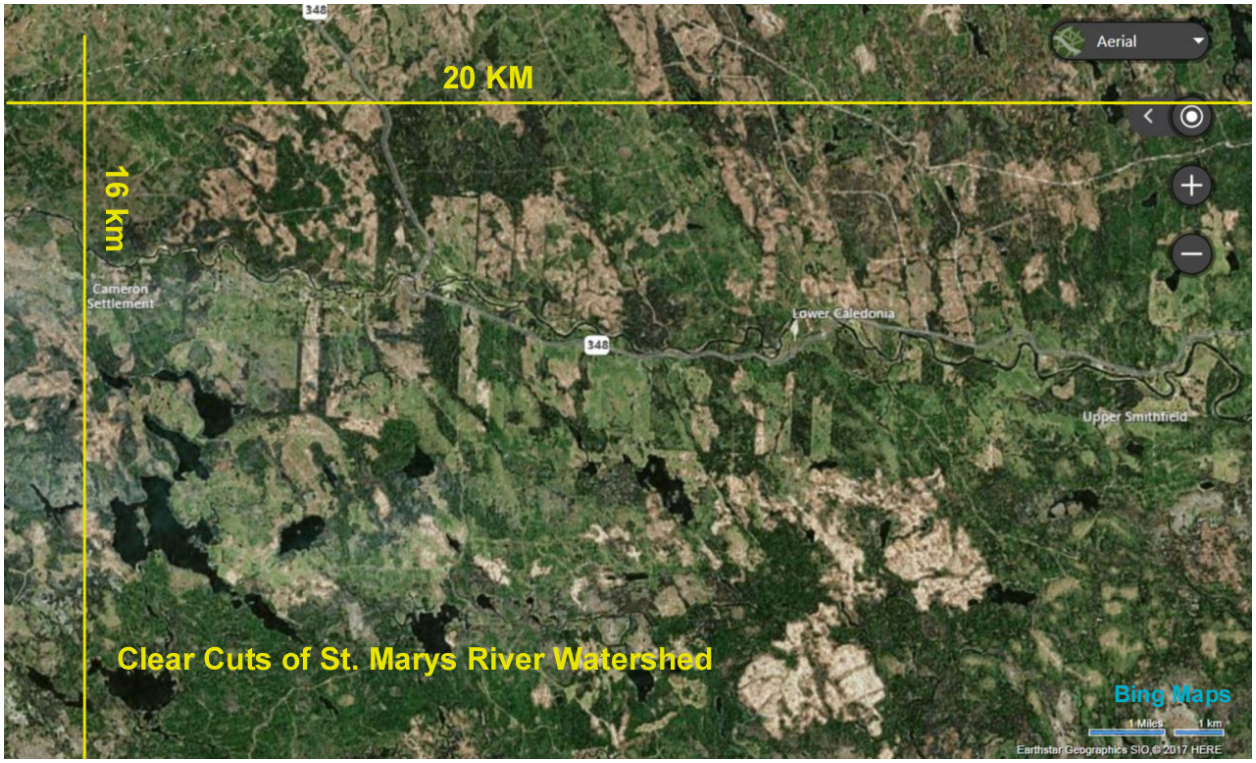
Central Nova Scotia





Eastern Nova Scotia and Cape Breton





Part 3 –Governance Challenge

It is clear - How we exercise our governance over the forests of Nova Scotia, with all its complexity, through laws, polices, use of science, and ultimately forest allocation and harvesting practices, requires a broadened understanding by all interests as a foundation for constructive change. A new pathway in governance is required in order to secure the full range of economic, environmental, and social benefits from our forests. Change must insure there is a progression from the limitations of "the status quo" towards a new forestry for Nova Scotia.

The pathway to a new forestry for Nova Scotia requires a major reduction in intensive forest management (short rotations, clearcutting, etc.) and a major increase in less intensive management which supports longer rotations, shade tolerant forests, greater protection of carbon stocks, water quality and quantity, biodiversity conservation, and non -fibre economic uses (tourism , recreation, etc.) It requires a commitment to diversity – diversity of interests, values, disciplines, economic opportunities, and biological diversity. It also requires changes in governance.

New Brunswick, with the adoption of its 2014 Forest Strategy, has chosen a governance pathway which benefits large scale industrial forestry over other values, interests, and uses. The strategy, strongly supported by large industry and unions, increases clearcutting on crown lands, opens up conservation zones for harvesting including old growth forests, and gives greater regulatory authority for the forest company licence holder. The strategy has created a major land use conflict which has moved solidly into the political arena, with civil society holding demonstrations, over 180 forest related scientists signing letters opposing the strategy, municipalities, tourism, private woodlot owners, and other interests actively opposing it due to impacts on water, flood risk , tourism, fishing etc. As well Mi'Kmaq First Nations are taking the government to court over it. The strategy has been roundly criticized for a lack of effective and principled public and stakeholder consultation, a lack of procedure fairness, and a lack of effort to reach any level of consensus. This is not the model for Nova Scotia.

Nova Scotia's governance approach must have a foundation based on the results of the multi-stage public consultation phases of the natural resources strategy. It also must be informed and shaped by the results of the current forest practice review. Gaining consensus from the varied interests in forest management is the pathway to achieving certainty, social licence, and resolution of critical land use problems for the government and society. However in the context of the current history of forest management in Nova Scotia this is not an easy task.

For example, at the present time the potential for success is low for a non- government forum to build consensus through principled negotiations between industrial forestry interests and interests representing less intensive management of the Acadian forest and conservation. At

this time there is little incentive for industrial interests to enter into a process of consensus building where changes in their working forest practices and a reduction in short term wood production would be likely outcomes. Likewise, due to the level of existing intensive forest management, interests representing less intensive forestry and conservation feel they have little room to compromise. There are only limited opportunities left in the forest landscape for less intensive management/restoration and decision making in government is clearly not fair and balanced. There is little indication that either party would be interested in a principled consensus process without clear indication from government that it intends to change the "status quo". The challenge of governance is to build the foundation towards change which would then increase the potential over time for successful consensus building on issues governing the management and conservation of Nova Scotia's working forests.

Part 4 - Recommendations

Government Organization

Government needs to modernize its organization of ministerial and departmental responsibilities with respect to natural resources. DNR has been challenged to achieve its forest conservation, park, biodiversity, and crown land use planning responsibilities and is in a constant conflict of interests due to its priority on intensive management of the forest. DNR's command and control approach to fulfilling its responsibilities has proven over time to be problematic for the province. This conflict of interests restricts its ability to effectively and efficiently plan and manage for the full range of interests and values associated with provincially owned land including alternative forestry options, water quality and quantity, climate change adaptation and mitigation, biodiversity, tourism, outdoor recreation and health. DNR is not able to resolve complex land use issues for the government resulting in the issues morphing into major governance issues as seen by the public. At the same time, there is a need and an opportunity to enhance the role of professional forestry programs in land and resource stewardship and increase the value the public places on having a professional forest management agency. In this regards the following recommendations are provided for consideration.

- Create a new department of Environment and Conservation by adding responsibility for biodiversity, wildlife, parks, and crown land planning to the existing Nova Scotia Environment Department. Currently NSE has responsibility for provincial protected lands, enforcement including conservation related enforcement, climate change, air, water, and watershed protection making it the modern and natural home for these directly related responsibilities. This would allow for the more effective and efficient planning and management for the provinces ecosystems, landscapes, provincial public lands, and for climate change mitigation and adaptation.

- Create the Nova Scotia Forest Service with a primary focus of serving private woodlot owners, forest protection (forest fire, insects), forestry planning, forest certification, and providing operations services for provincial public lands. In concert with other recommendations made here, this will elevate public understanding and support for forest management and the important role professional staff play in providing these services.

Private Land Woodlots

With about 55% of the province in small private ownership and about 30,000 individual private land parcels occurring on some of the most productive lands, private land must play a greater role in forest management and conservation. Participation by private woodlot owners is doomed to failure if heavy handed regulatory approaches are taken to access wood fibre from their lands. Similarly, while private woodlot owners generally accept some conservation restrictions (ie. water course protection), they do not accept heavy handed conservation restrictions imposed on them.

Many surveys and studies have shown that respecting private land owner's diverse range of values and interests in owning forest land is the key to improving participation in forest management and conservation. Many private landowners have little interest in clearcutting and intensive management while others do. A Forest management system which includes options and support systems for less intensive approaches to woodlot management and incentives for conservation is an important way to secure overall greater landowner participation. The current DNR system and pre harvest treatment assessment process limits the options for private landowners and encourages intensive forest management approaches. Recommendations include:

- Establish a carbon credit program and trading system for private woodlot owners to secure income benefits by contributing to climate change mitigation. Principles include retaining older forests, cutting less per year then the annual growth rate, utilize selection harvest methods, and minimize disturbance to forest soils.

- Establish a conservation property tax rate which eliminates property tax for woodlots or portions of woodlots where landowners agree to maintain the forests in a natural condition to protect high conservation values including old growth forests, species at risk habitat, wetlands, unique and vulnerable ecosystems.

- Government should place a greater emphasis on private land forestry and on improved services to private land owners that matches landowner needs for knowledge and

support funding (silviculture, management plans etc.) particularly in less intensive management and conservation options.

- Government, in partnership with woodlot owner associations, should redesign the forest management system, including the PTA process and regulations for wood buyers, to insure it provides for a full range of forest management options including less intensive forestry and conservation.

- Government should increase support for private land conservation organization including Nova Scotia Nature Trust and Nature Conservancy of Canada in order to provide private landowners with an option to permanently protect their land through sale or easement. Government funding would be matched on a 50/50 basis by private land conservation organizations thus doubling tax payer investment in forest land conservation.

Forest Practices

Forest practices and the forest management system require a degree of reform. The current system is restrictive in its options for both crown and private land, considered by many to be too limiting with respect to sivilculture funding, wood buyer regulations, regional wood lot owner and forest management group activities, management planning, and stand management. Recommendations include:

- Government, working in partnership with private woodlot owner groups , ENGO's, science community, and industry, should redesign the forest management system and pre harvest treatment assessment process to broaden options which include less intensive management, greater species diversity, longer rotations, and more flexibility for conservation (ie.; old growth forest, species at risk, recreation and tourism values etc)
- Government should curtail the use of the DNR forest disturbance regime approach in its present form as it has little basis in science and many people, including scientists, believe it has been misused to propagate the intensive management, simplification and loss of the complex Acadian forest. There is no benefit in maintaining this planning tool in its present form. It should be re-developed through a peer and public review process.

- Government should greatly reduce clearcutting on crown land including two stage clearcuts or partial cuts, and shelterwoods where the second entry is less than 10 years. Criteria for clearcut reduction and definitions should be developed through a principled negation process with ENGO's scientist, and industry.

- Remaining uncut forest patches greater than 40 years old in the crown land working landscape should be identified and forest management options for these patches presented for public discussion. A process should be established to allow more direct and detailed input, discussion, and principled negotiations on options for these remaining uncut patches of the working forest on crown land with ENGO's , the science community, industry, and other interests. Values discussed should not be limited and should include economic values, carbon sequestration, connectivity, biodiversity, watershed protection, and tourism and recreation values of the working forest. These remaining patches should not be harvested until a fair and principled process takes place.

- All remaining Old Growth Forest patches greater than 125 years on crown land should be reserved and protected from harvesting. As well, large Ancient Legacy trees scattered through younger forest stands should be reserved and protected from harvesting. This will help maintain existing and important age diversity, structure, carbon storage, and biodiversity elements in the stand. Throughout the province many forest stands have scattered large Ancient trees many 200-400 year old. Many are shade tolerant remnants of the pre-settlement forest and include large Yellow Birch, Sugar and Red Maple, Beech, Eastern Hemlock, Red Spruce, and White Pine. They are genetic storehouses and treasures of forest resilience surviving storms, hurricanes and insects over centuries. (see Appendix A and B)

- Government should seek FSC certification for all crown lands. Currently most crown lands in Cape Breton and a portion of eastern Nova Scotia are certified by FSC considered the high standard in forest certification. It makes little sense to have a large portion of crown land FSC certified and the remaining not. This will bring a much needed third party review process with an open public consultation component to remaining crown lands increasing public confidence in due process.

- Government should update its Wood Supply model, through a peer review process, to incorporate longer rotations in a higher portion of the working forests, greater species diversity, reduced clear cutting, increase in conservation restrictions, retention of older and mature forests for carbon credits and biodiversity values.

<u>Community Forests</u>

The Medway Community Forest Co-op is Nova Scotia's first community forest and operates on crown land through an agreement. The crown land agreement is too restrictive to meet

community values, opportunities and innovations. Forest operations are tied to production targets and subject to the restrictions of the forest management system including the pre harvest treatment assessment. Recommendations include:

- The DNR agreement with MCFC should be re-negotiated with production targets and the DNR forest management system relaxed to allow greater professional autonomy and innovation in management planning, stand prescriptions, conservation, and recreation planning.

- Consideration should be given to creating a permanent Research Forest as a component of the MCFC agreement lands and in joint partnership with Mersey Tobeatic Research Institute. Long term Research Forests have proven to be invaluable in the US Forests Service system. With climate change, biodiversity loss, and the need to study and understand forest treatments over time in the Acadian Forest research forests can be critical to making science informed decisions. Research Forests can attract science and research funding and build partnerships with universities, institutions and industry.

- Consideration should be given to expanding the area within the MCFC agreement to allow for a greater range of forest management options, to secure a wider range of benefits to the community, to increase conservation of significant habitats, and to accommodate consideration of establishing a Research Forest. Priority consideration should be given to expanding the southern boundary to capture more of the Fisher Lake Drumlin Landscape and known hotspots for species at risks.

- The community forest / research forest model described here should be established on crown lands for Cape Breton Island, Eastern, Central, and Northern Nova Scotia.

Protected Areas

Where government and private landowners have decided not to harvest the forest is an important component of governance over forest harvest practices. Successive governments, including the current government, have advanced the designation of protected lands surpassing the EGPA goal of protecting at least 12% of the provinces land base. Currently 12.30% of the province is considered protected to the international standard adopted in EGSPA. The current government continues to move protected areas forward and has committed to protect 13 % of the province. However progress on the remaining lands has been slow even though the lands were the subject of two rounds of public consultation. Areas subject for inclusion in the 13% target are being re-reviewed by both DNR and NSE. In this context the following recommendations are made for consideration.

- Government should accelerate its process to achieve the government's 13 % target for protected areas and thus insure the public that the commitment will be fulfilled. This is important in the context of public confidence in both the forest practice review process and the protected area process.

- Government should insure that few remaining outstanding old growth forest areas of high conservation value on crown land are included in the protected area system and not stranded and then lost.

- Government should develop a procedure to insure impacts from crown land harvesting adjacent to and near protected areas are minimized.

In closing, I would like to thank you for the opportunity to provide input to the forest practice review process. I would like to stress that embracing the principle of diversity – diversity of interests, values, disciplines, economic opportunity, and biological diversity - is the key to evaluating the effectiveness of forest harvest practices and in designing a new forestry pathway which more fully integrates environmental sustainability and economic prosperity essential to the well being of the province.

I look forward to your report and recommendations.

Yours Sincerely and Best Regards,

(signed)

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Appendix A- The forests of Nova Scotia contain uncommon scattered large Ancient trees of high ecological value like this Yellow Birch over 300 years old in Annapolis County.

Appendix B – Old Forests in Nova Scotia indicate the biological potential of the Acadian Forest and are reservoirs of invaluable and untapped scientific knowledge. A hemlock stand in Cape Breton maintains trees over 530 year old (Mt Alison U). Below is an Ancient Eastern Hemlock stand in Annapolis Co. with trees over 300 years old. (DBH -107 cm, height - 22m)

Two Examples of Governance Problems Regarding Forest Management Practices – Supplement (Feb 8, 2018) to Submission by John LeDuc to Nova Scotia Forest Practices Review, Professor William Lahey, Dec.30, 2017.

1. Soil and Water Impacts of Widespread Clearcutting

Extensive mechanized clearcutting and accompanying road networks throughout the province are having a detrimental impact on forest soils and on water, both surface and ground. Nova Scotia's forest soils are largely limited in nutrients, acidic, and often shallow to begin with. Soil erodes into streams following intensive forestry practices, and nitrogen and mineral nutrients are leached through the groundwater. Research shows that these losses continue for years following clear-cutting and require a long time (over 80 years) for soil to recover. As well studies in central Nova Scotia found that there was a 50 percent reduction in carbon storage following the clear-cutting of spruce forests, with the soil containing the lowest mineral carbon contents after 30-40 years.

Disturbance of the organic layer impacts nutrient cycling and availability. Approximately half of upper soil volume is made up of pore space filled with air and water. Compaction and rutting from mechanized harvesting can compress these pores between soil particles, preventing air from getting to tree roots and halting much of the biological activity. Water no longer can slowly filter through the soil, but instead forms pools or runs off, taking soil particles and nutrients with it. Research has shown that the more intense the harvesting, the longer the recovery time. If harvesting and leaching occur faster than the recovery time, the soil experiences nutrient capital depletion, eventually lowering productivity.

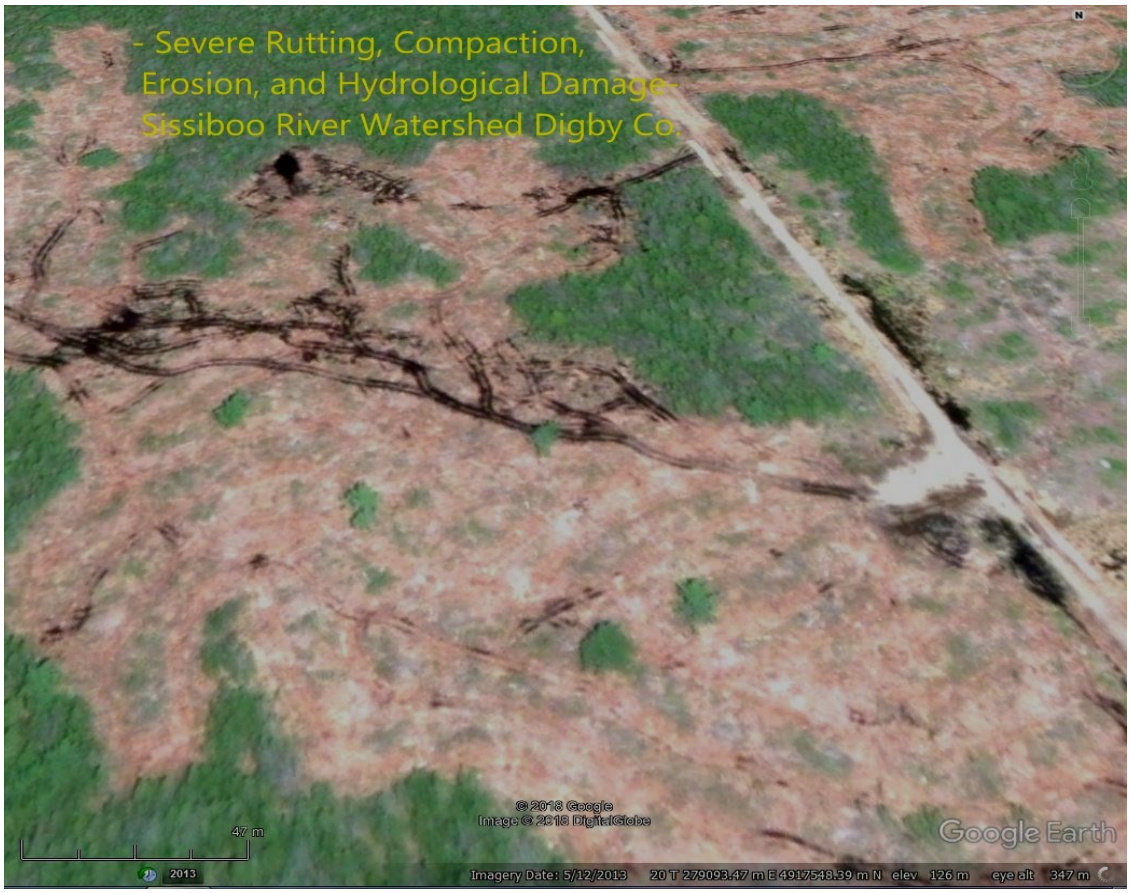
Clearcuts are the dominate land use in most of the provinces watersheds. Even a cursory review of satellite imagery and watershed mapping will demonstrate this. Extensive clearcuts alter the hydrological cycles in the province. The near total removal of the canopy over large areas removes the tree/transpiration process where tons of water are intercepted, absorbed, and transpired by the forests. Instead precipitation will fall on the open ground creating erosion, welling up of the ground water, and increasing surface water at volumes often beyond the physical capacity of streams. In dry conditions removal of the canopy eliminates the water storage function of forests and results in increase drying of the land and low water levels. Spring runoff from clearcuts is accelerated in volume and timing due to the rapid melting of snow open to full sunlight in clearcuts. When there has been extensive removal of forest vegetation, important forest nutrients can leach out of the forest and pollute streams. Water quality is most impacted by exposed, disturbed, or compacted soils where particles are apt to be washed away with the rain.

Mechanized clearcut harvesting particularly, but not exclusively, on imperfectly drained soils in Nova Scotia is often characterized by severe rutting, compaction of forest soils, erosion with accompanying nutrient loss, and hydrological impacts such as disruption of infiltration rates and lateral flows, excessive ponding, and loss of a portion of the productive forest land base.

One can estimate from satellite imagery that many of the provinces watersheds have been over 50 % clearcut in the last 20 years. The cumulative impacts of intensive forest harvesting on the province's watersheds and forest soils are not currently being addressed by the regulatory process in any type of open and transparent process .The following photos are just a few examples of the many occurrences of clearcuts and machinery impacts on forest soils and water throughout Nova Scotia.


Forest Harvest land damage - Severe Rutting,
Soil Erosion, Compaction, and Hydrological damage.
West Dalhousie Annapolis co.
© 2018 Google
Image © 2018 DigitalGlobe
50 m
2010
Google Earth
Imagery Date: 7/30/2011 20 T 322713.57 m E 4951137.07 m N elev 221 m eye alt 477 m


Forest Harvest Road Washout
Round Hill River Watershed
Annapolis County
© 2018 Google
Image © 2018 DigitalGlobe
53 m
2011
Google Earth
Imagery Date: 4/28/2013 20 T 311041.64 m E 4955165.19 m N elev 151 m eye alt 380 m


- Severe Rutting, Compaction,
Erosion, and Hydrological Damage-
Sissiboo River Watershed Digby Co.
© 2018 Google
Image © 2018 DigitalGlobe
47 m
2013
Imagery Date: 5/12/2013 20 T 279093.47 m E 4917548.39 m N elev 126 m eye alt 347 m
Google Earth


Severe Rutting, Erosion and
Hydrological Damage
Silver River Watershed
Digby Co.
Image © 2018 DigitalGlobe
© 2017 Google
57 m
2011
Imagery Date: 4/26/2013 20 T 278197.40 m E 4906619.71 m N elev 118 m eye alt 381 m
Google Earth

Forest Road Erosion –Scrag Lake , Annapolis Co.

Forest Harvest Rutting- St Margaret's Bay, Halifax Co.-

Forest Harvest Rutting- various locations in Nova Scotia (Healthy Forest Coalition)

Recommendations:
-Nova Scotia Environment Dept should improve, through public consultation, its regulatory and monitoring programs to insure water and forest soils are protected from potentially harmful forest management activities. This should include a required environmental assessment for industrial forest harvests including road building.
-Nova Scotia Environment Dept should prepare and report, through a public consultation process, integrated cumulative impact assessments of forest harvesting and road building on the provinces watersheds. This assessment should include water quality, quantity, hydrological conditions, forest soils, forest ecosystems (including wildlife and fish) and climate change mitigation and adaptation impacts. These assessments should inform the improvement of forest management policies and practices and the regulatory process.

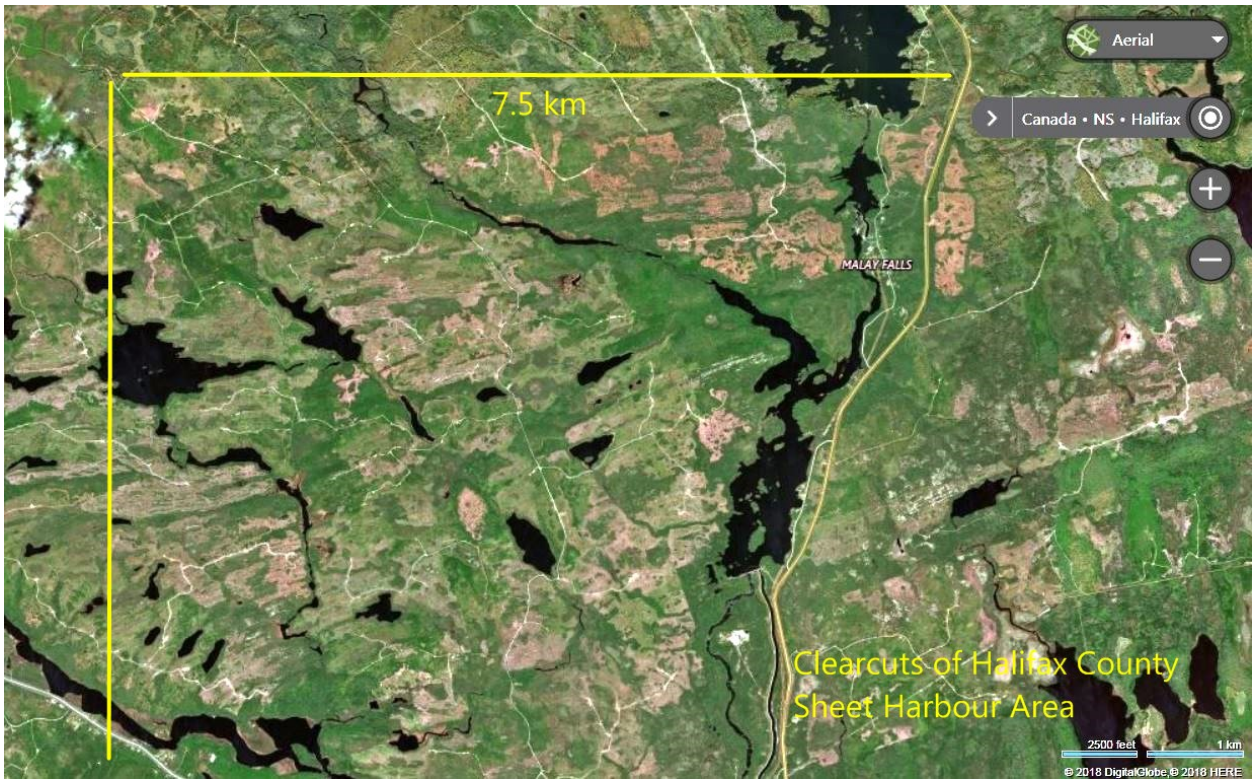
2. Ecosystem Planning?

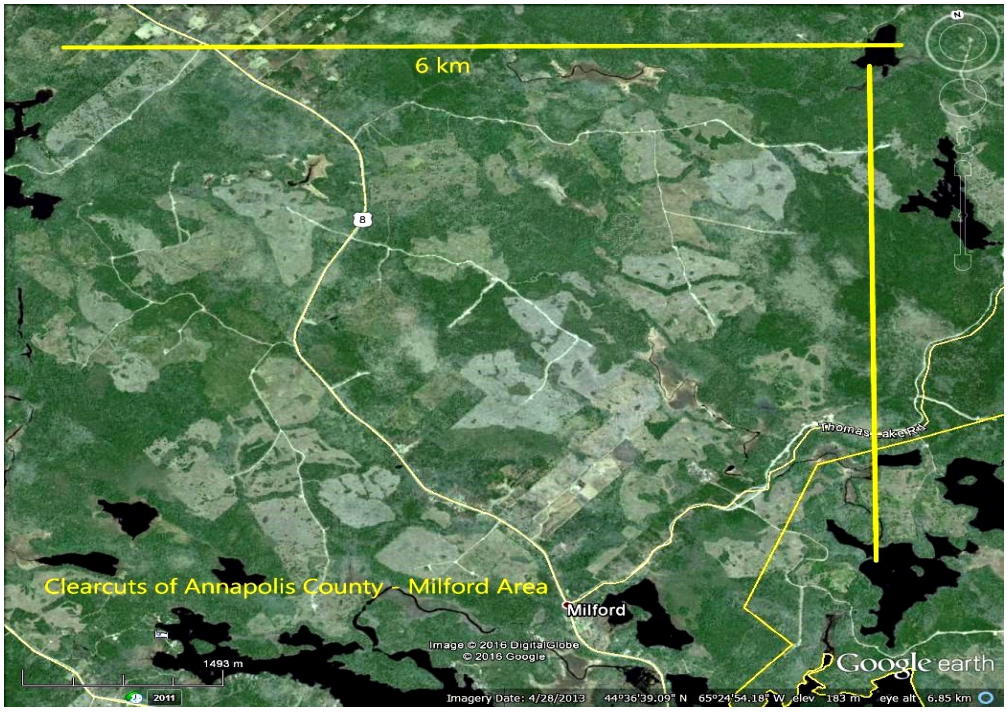
The Department of Natural Resources website describes its approach to forest management as 'Ecosystem Based Integrated Resource Management". Specifically DNR states to the public:

"*Forest ecosystem based management provides a holistic way of managing resources with emphasis on the natural environment. In addition to producing traditional resources, forests are part of the provincial identity and supply great social and environmental wealth. These values are all produced by healthy functioning ecosystems. Ecosystems, with their focus on interconnectedness, describe the fundamental units of nature and provide a logical framework for understanding, planning, and managing natural resources. Ecosystem based planning takes its cues from nature, adopting a habitat based approach to conserve biodiversity and productivity by maintaining natural conditions and processes. "*

It is very unfortunate that the public presentation of DNR's forest management system does not match with the reality on the ground. It is also unfortunate that this has been going on for years illustrating a deep rooted institutional and governance problem for the province. There simply is no science informed basis for an ecosystem management approach for the Acadian Forest that result in wide spread large clearcuts dominating the provinces landscapes. Any objective flyover of the province, review of satellite imagery, or on site tours will reveal the disconnect between DNR's description to the public of how they govern the forests with the reality on the ground. The reality on the ground includes: simplification of forest ecosystems mainly due to domination of clearcut/short rotation management particularly with respect to loss of older age classes, forest structure, and tree species diversity; fragmentation of forests particularly due to road systems and clearcutting patterns; loss of biodiversity at the ecosystem, species and genetic levels; impacts on water quality, quantity and flow regime; loss or reduction in capability of forest soils to sustain biological productivity; and loss or reduction of carbon storage function.
The DNR forest management system has created major economic and social concerns including: the creation of employment and economic dependency based on single dominant use and over exploitation of forest resources; lack of incentives for forest land conservation and for small private landowners to conduct lower impact ecological forestry; loss or reduction of potential to accrue a fuller range of economic, social and environmental benefits from the forests

associated with less intensive, longer rotation, more diversity, forest management approaches; and loss or reduction in potential to accrue benefits from other forest uses such as tourism, recreation, and health. For context – this (below photos) is the reality on the ground – in every landscape.





The reality on the ground is that large remaining areas are continuing to be allocated by DNR for large scale mechanized clearcuts even as forest practices are under review. For example an area of crown land between Tobeatic Wilderness Area and Silver River Wilderness Area (blue areas on map) is currently being heavily clearcut with 870 acres approved for clearcut last year (white area) and 564 acres (yellow areas) planned for clearcutting this year. As well a large portion of the area between the two wilderness areas was previously clearcut.

If one considers the DNR description of their ecosystem management process – one can see the disconnect with the reality on the ground. There is no natural disturbance regime of the Acadian Forest that would mimic this scale and frequency of clearcutting. Much of the area was subject to human caused fires in the recent past and has been recovering towards a climax conifer dominated mixed wood forest. A good portion of the area is imperfectly drained which will certainly result in rutting, erosion, compaction and hydrological impacts flowing into both wilderness areas. The area provides habitat for mainland moose (species at risk) which the Tobeatic Wilderness Area protects. Ironically the proposed massive clearcuts on crown land are adjacent to Nature Conservancy of Canada (NCC) lands which have been acquired and protected through private fundraising in part to provide habitat for mainland moose and to maintain intact forest. To my knowledge DNR has not approached or consulted on potential impacts to the two Wilderness areas with NSE Protected Area Branch. Here is an opportunity lost for the government and provincial crown land management to collaborate with other

departments, NCC, ENGO's etc to develop a plan for the area between the two wilderness areas which provides for timber production and ecological values with social license achieved. Ecosystem based integrated management could be achieved if principles of shared decision making and principled negotiations were adopted. Instead we have another example where DNR's command and control forest management system excludes other legitimate interests and internalizes decision making over all values of provincial crown lands.

Recommendations:
The above illustrates a specific example concerning DNR's forest management system and provides additional information in support of the recommendations on forest governance and forest practices made in the authors main submission (Dec 30) to the NS Forest Practices Review Process .

John LeDuc
Bridgetown NS
Feb. 7 2018

March 20, 2018

Dear Professor Lahey,

I apologize for the lateness of this letter concerning Old Growth Forests (OGF) with respect to the timing of your review of forest practices in Nova Scotia. However the topic of OGF management particularly on crown land by DNR is currently receiving considerable public attention and I wanted to insure that you received information on some of the critical concerns.

The Interim Old Forest Policy was established by DNR in 1999 and implementation was initiated. A status report of progress was released by DNR in 2008. The final policy document was released to the public in 2012. (See attached). The purpose and intended direction of the Old Forest Policy is clearly stated in the document as:

"The Old Forest Policy will conserve the remaining old growth forests on public land and ensure that a network of the best old forest restoration opportunities is established. This network will support, and be supported by, broader sustainable forest management initiatives that address maturity and community representation across ecological landscapes."
"DNR staff will identify old growth and the best old forest restoration opportunities on at least eight percent of publicly owned forest land in each of the province's 38 forested ecodistricts "

The development of the Old Forests policy is commendable and it has resulted in the identification of important old forests areas some of which have become fully protected through NSE Protected Areas Program.

However, the implementation falls short of conservation requirements because of the approach DNR has developed to implement it. The policy and associated guidelines did not benefit from being developed through a collaborative process with the science and ENGO, community, NSE, and the general public. As a result there are many issues with the policy and the implementation of it.

One of the key issues was made clear in a recent article in the Chronicle Herald http://thechronicleherald.ca/novascotia/1553175-video-province-admits-old-growth-forest-may-have-been-cut-for-fuel concerning harvesting of older forests in Guysborough where a Regional Manager from DNR stated "that because the province has already protected about 16 per cent of the land in that particular ecodistrict as old forest — above the required eight per cent — the department is able to allow some cutting in areas that could qualify as old forest. "

So – how has DNR managed to rationalize the harvesting of old forests when we know that they only occupy a very small percent of the forests of the province? The answer lies in the policy and its application - DNR counts as old forests any stand over 40 years old with a 50 % climax species within protected areas. About 50 % of old forests which DNR counts are 40 -79 year old stands in Protected Areas. As well, most of the remaining old forests counted by DNR are between 80 and 125 years old - again mostly in protected areas. There has only been a small per cent of old forests identified, scored and included outside of protected areas which meets the definition of old forests – (125 yrs 50 % climax species).

I would encourage you and your staff to examine the "old Forests layer" on the Provincial Landscape Viewer and you can see the majority of what is being counted is younger forest in protected areas. I would also encourage you to examine the 2008 DNR report (see attached) which rationalizes the application of the selection process to implement the old forests policy on crown land.

The procedure for selecting old forests is outlined in the Old Forest Policy and includes several steps. DNR is first required by policy (step 1) to apply the Old forests score system to stands in existing protected areas to determine how much and what quality (i.e.> 125 yrs) is available to contribute to protecting 8% in each of DNR's ecodistricts. However DNR decided not to identify and score old forests in protected areas despite the fact that the 1995 paper Old Forests of Nova Scotia (Lynds and Leduc) identified over 38,500 ha of potential old forest in protected areas.

DNR rationalized this by stating in the 2008 report:

"The 1999-2003 provincial forest inventory (NSDNR, 2004) indicates that only 0.3 percent of the province is over 105 years of age. Therefore it was assumed that no ecodistrict had sufficient old growth in protected areas to meet the policy target, and a search of protected lands for old growth was not necessary to verify this"

The policy next required DNR (step 2) to look at crown land outside of protected areas for stands greater than 125 years old for inclusion. DNR included and scored a number of stands but basically did not conduct an extensive inventory and rationalized it by stating in the 2008 report:

"As with step 1, it was assumed that no ecodistrict had sufficient old growth to meet the policy targets, and a full inventory of all lands was not required to verify this."

It is very important to understand that these decisions had the effect of playing down the existence of potential old forests on crown land. At the same the decisions were made by DNR knowing that the NSE Protected Area Branch had a province wide inventory of potential old forests sites on crown and private land known as the SOUF layer (Significant Old and Unique Forests). The SOUF layer was a GIS layer which was designed as a starting point to look for old forests on crown and private land. The SOUF layer was used in the Colin Stewart Forest Forum process to help identify conservation values and was accepted by both ENGOs and industry participants as a science based tool to aid in that process. It would have been an easy step for DNR to collaborate with NSE and utilize the SOUF layer to select the most promising stands for old forest scoring in step 2. The SOUF layer indicated that about 2% of crown contained forest stands which were potential contributors to the maintenance of old forests on crown land. You can verify this by contacting NSE – Protected areas Branch.

The Old Forest Policy was designed so that If DNR did not find the 8% old forest target in steps 1 and 2 they were then directed (step 3) to include any stand greater than 40 yrs of age with 50% climax species in protected areas. This is where more than 80 % of the old forest target was achieved –by counting forest over 40 years old in protected areas. As well the younger forests in protected areas were never scored or field evaluated but simply identified and counted through a desk top GIS program.

If the 8% target per ecodistrict could not be met with step 3 (>40 yrs in protected areas) then DNR staff were directed to step 4 –identify the best old forest restoration opportunities on crown land focused on stands 80-125 yrs with 50 % climax species. A variety of these stands were identified but with most of the targets reached by including younger stands in protected

areas the pressure was off DNR to include many sites in the 80-125 yr category as potential old forests thus keeping them available for wood supply.

Not conducting a credible inventory and scoring system in step 2 for stands greater than 125 yrs on crown land effectively provided DNR with the rationale or cover to meet the 8% policy directive by counting younger forest in protected areas. Those in the science community, ENGO's and staff at NSE are aware that a credible and principled process for step 2 would have identified many stands which would have qualified. As well, if patches of stands in the 80-124 age class were identified back in 1999 when the interim policy was first implemented they would be 20 yrs older now with some either beyond or approaching 125 yrs. The result is that many of the old forest on crown land have been lost. Remaining old Forests stands on crown are continuing to be at risk as the example from Guysborough County currently receiving media coverage attests.

Below is a chart from the 2008 DNR report summarizing the age class distribution of stands which they counted as contributing to the 8% old forest target.

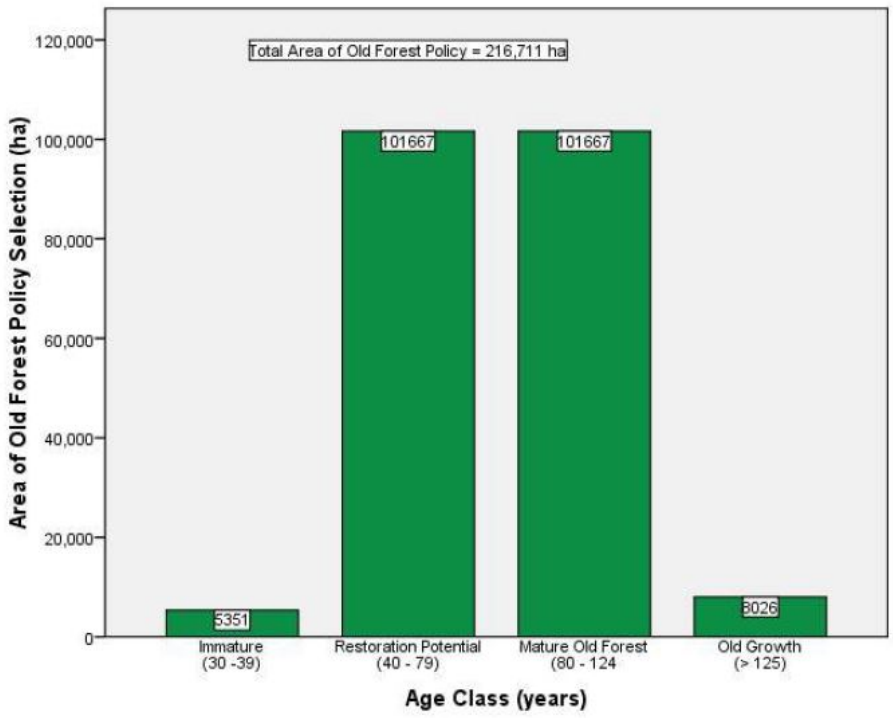


Figure 3. Age class distribution of forests selected under NSDNR Interim Old Forest Policy as determined from 162 randomly established Permanent Sample Plots measured between 1999-2003 (NSDNR, 2004).

Another issue relates to the 8 Ecodistricts where the 8% target hasn't been reached. This is problematic – for example the Valley Slope Ecodistrict (on the south side of the Annapolis Valley) which runs from Bear River to Hantsport) has just two small areas of old forest.

Remembering that the Interim Old Forest Policy was initiated in 1999 and seven year ago the Natural Resources Strategy, with respect to Ecodistricts where the target was not reached, stated on page 36 "*Work continues in those Ecodistricts to identify and select the best sites."*

The problem is that DNR continues to allocate many harvest blocks on crown land in this Ecodistrict without first meeting the 8 % old forest target. Some of these blocks would have had trees over 100 years old and would qualify as old forests or old forest restoration sites.

In summary, the DNR Old Forest Policy, with its good intentions, has become another example of "the fox guarding the hen house". As you are most aware - forest practices in Nova Scotia have become a major governance issue. Many of their polices and instruments of forest governance such as the Old Forest Policy, Natural Disturbance Regime approach, PTA, definition of clearcut etc. do not stand up to the test of third party scrutiny. Despite having many resources DNR has difficulties effectively managing for both wood production and forest conservation and other values. Building trust through principled decision making and solving complex problems for the government in resource management requires changes in how the province governs our forests. With respect to old forests specific recommendations include:

- The Old Forest Policy should be the responsibility of NSE –Protected Areas – the lead conservation agency for the province.
- The Old Forest Policy should be reviewed and improved through a collaborative process with the science community, ENGO's and Industry.
- There should be an immediate moratorium on all remaining forest stands on crown land that have indications they have old growth characteristics until they can be field evaluated under a new governance model.

Thank you and all the best,

John LeDuc

March 20, 2018

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