IEA Bioenergy

Governance of sustainable forest management and bioenergy in Ontario, Canada

Strategic Inter-Task study, commissioned by IEA Bioenergy

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IEA Bioenergy Task 43 – Biomass Feedstocks for Energy Markets

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The demand for wood pellets and forest biomass for the purposes of energy conversion have been propelled by expansion of renewable energy policy in the European Union and energy demand from South East Asia, opening up opportunities for trade.

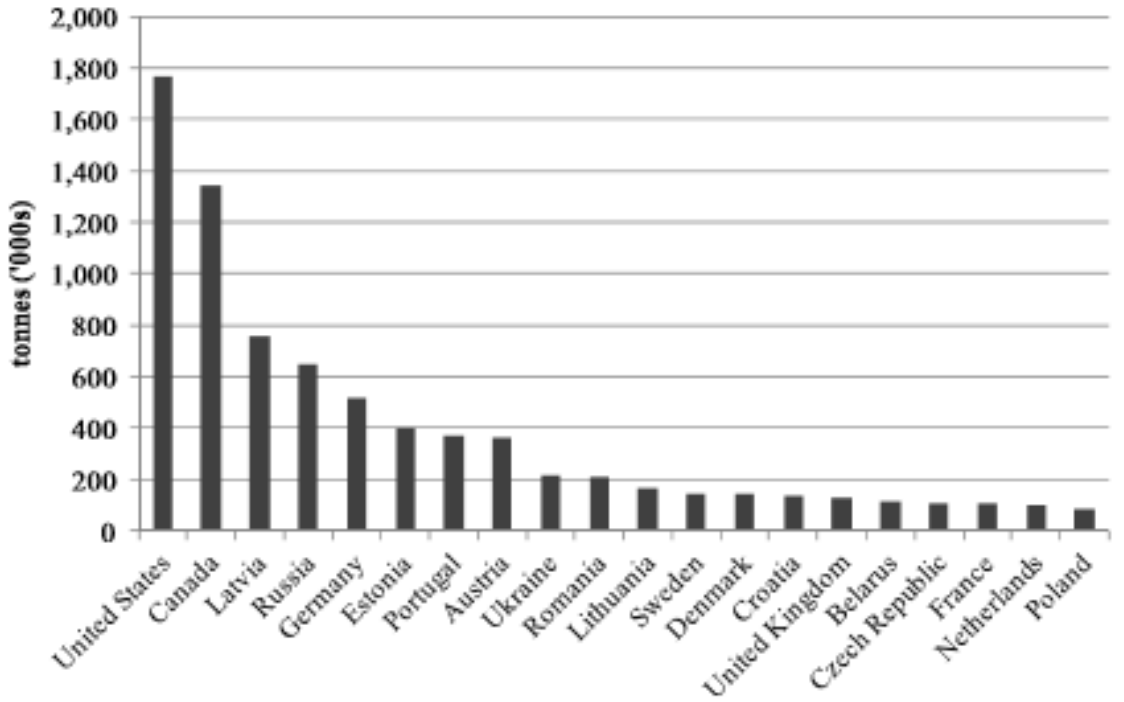


Fig. 1. Top twenty origins of wood pellet shipments to EU-27 countries, 2012. *Source:* Eurostat (accessed 06.01.2014).

Since 2005, wood pellet imports to the EU has been rising with supplies mainly drawn from Canada and the United States.

Sources: ETP 2010, OECD/IEA 2010

Canada is a prime export location due to its abundant forest resources, developed forest management framework, and strategic locations such as Ontario and British Columbia.

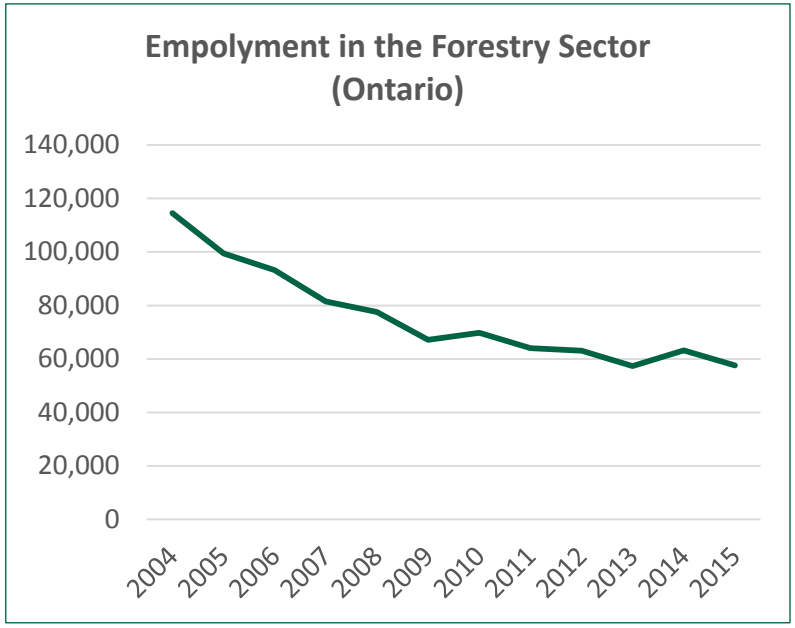
Nationally,

- 9,984,670 km^2
- 400 M hectares of forest land, 78% is Provincial Crown land
- 140 M m^3/a harvested

In Ontario,

- 71 million hectares of forest land
- 44% of Crown forest managed for forestry (27.8 million ha)
- 12.6 M m^3/a harvest

Moreover, a forest bioenergy economy could strengthen a weakening forest industry hampered by prolonged cyclical decline in the forest products industry and structural changes in international markets for forest products.



Developing Ontario's biomass supply could:

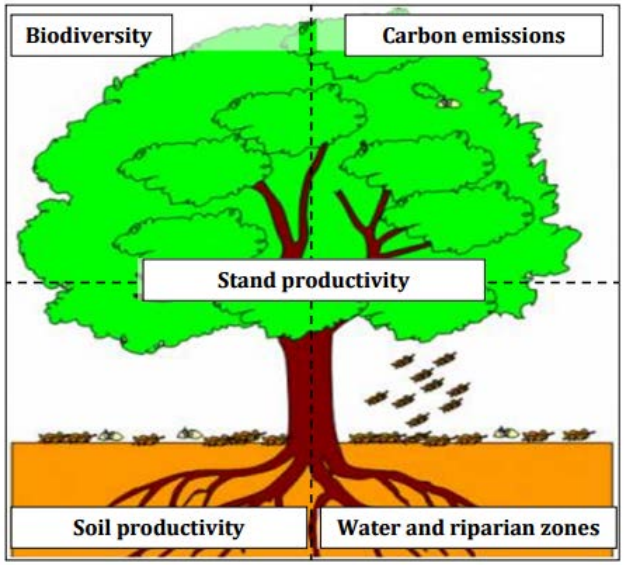
- Spur new business opportunities
- Incentivize innovation in the sector
- Provide additional volume for fixed harvest costs
- Offset reforestation costs
- Benefit forest health
- Create new revenue streams

Sources: NRCan, Labour force survey (Statistics Canada)

However, sustainable development across Canada must be conducted to benefit current and future generations. Concerns over the potential adverse effects from intensive biomass harvest have been well studied:

Author	Issues
Thiffault et al. 2011	Negative impacts of biomass harvesting on soil nutrient pools and acid-base status.
Jang et al. 2015	Impact on soil physical properties and productivity
Caputo et al. 2016	Effects of biomass harvest on water and greenhouse gas regulation
Jonsell 2008	Coarse woody biomass (CWD) removal effects on biodiversity
Lewandowski 2016	Effects of biomass harvest on soil carbon

General concerns emphasize long-term risks to:



Therefore, a review of Ontario's regulations and ability to achieve long-term sustainable results on the ground is timely.

Sources: Thiffault et al. 2015, Forest Biomass Harvesting: Best Practices and Ecological Issues in the Canadian Boreal Forest

The objective of this study is to evaluate existing biomass harvesting policy in both supply chain and forest management governance to identify successful policy designs and areas for improvement

Objectives:

- Provide information on the extent of Ontario's forest resources, forest management and governance structure.
- Identify existing and future forest supply chains in Ontario for biomass harvest.
- Analyze how selected biomass criteria were addressed by provincial and forest certification guidelines and how requirements are designed.
- Compare how provincial and certification regulatory designs differ within other biomass-producing regions.
- Review how selected chain of custody controls manage unacceptable sources and support the sustainability of biomass supply chains.
- Appraise governance designs and provide recommendations to improve compliance and effectiveness.

Policy background for forest management and biomass harvest in Ontario:

Federal level

Species at Risk Act (SARA, 2002)
Migratory Bird Convention Act (1994)
Fisheries Act (1985)
Canadian Environmental Assessment Act (2012)
Canadian Environmental Protection Act (1999)
Pest Control Products Act (2002)
Fertillizers Act (1985)
Timber Regulations (1993)
First Nations Land Management Act (1999)
National Parks Act (2000)

Federal level policies apply to all forestry operations and are managed by the province's resource ministries.

Provincial level

Crown forest sustainability Act (1994)

Endangered Species Act (ESA, 2007)

Ontario Tenure Modernization Act (2011)

Public Lands Act (1990)

Professional Forester's Act (2000)

MNRF's approval under the Environmental Assessment Act (Declaration Order MNR-75).

Directive FOR 03 02 01
(Forest Biofibre – Allocation and Use)

Acts: legislation that offer general regulations and authorization tools for timber harvest.

Forest Manuals:

1. Forest Management Planning Manual (2009)
2. Forest Operations and Silviculture Manual (2000)
3. Scaling Manual (2007)
4. Forest Information Manual (2009)

Forest manuals: provide mandatory rules and standards for forest management planning.

Forest Guides:

Landscape Guides:
- Forest Management Guide for Boreal Landscapes (2014)
- Forest Management Guide for Great-Lakes St. Lawrence Landscapes (2010)

Stand and Site:
- **Forest Management Guide for Conserving Biodiversity at the Stand and Site Scales (2010)**

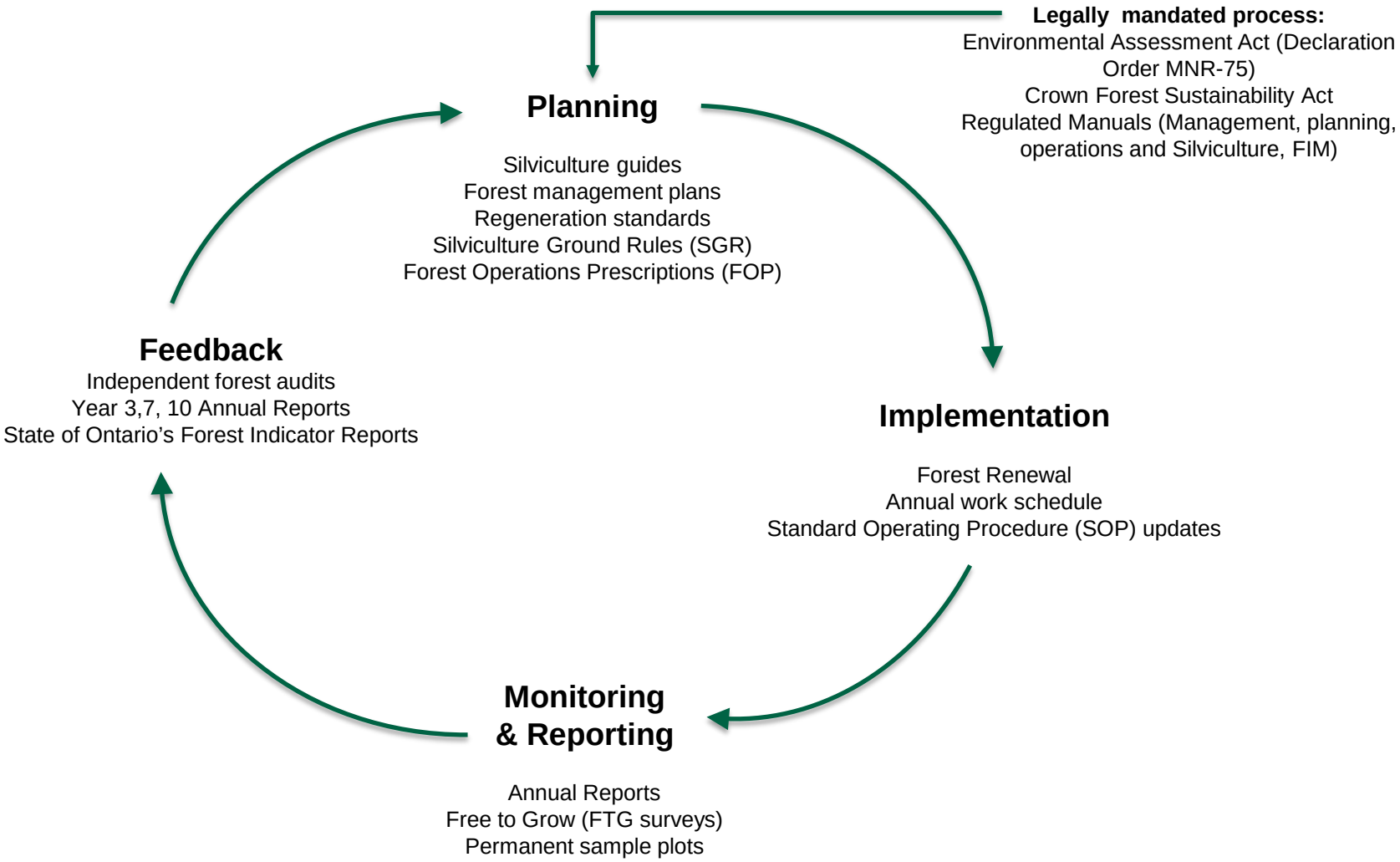
Silvicultural:
- Forest Management Guide to Silviculture in the Great Lakes-St. Lawrence and Boreal Forests of Ontario (2015)
- Silvicultural Guide to Managing Southern Ontario Forests (2010)

Tourism:
- Management Guidelines for Forestry and Resource-Based Tourism (2001)

Cultural:
- Forest Management Guide for Cultural Heritage Values (2007)

Guides: documents that contain direction enforced through mandatory standards and guidelines, and voluntary suggestions of practice (BMPs).

Ontario also utilises an adaptive management framework:



Sources: Adapted from OMNRF, Joe Maure

Should SFM monitoring standards require monitoring soil quality in every harvested stand?

Operational BMP (e.g. northern Sweden)

- Harvest in winter
- Minimize interventions
  - E.g. consider one-pass harvesting
- Retain nutrient-rich crown biomass on-site
- Maintain protective roadbed

Rather… Smith et al. (1999. FEM 122:1-5) recommend:

- Monitor all sites for operational BMP compliance (**Compliance monitoring**)
- Test BMP effectiveness at a limited number of locations with site-specific indicators (**Effectiveness monitoring**)
- Intensively measure a small number of benchmark sites to validate research recommendations and adapt BMPs (**Validation monitoring**)

Timber allocation in Ontario: Forest licences

1. Sustainable forest licences

- 20 year renewable licences
- Greatest areal allocation
- Harvest and use of all Crown trees within the licence area
- Harvest operations must be consistent with approved forest management plan
- Held by companies or shareholders

2. Forest Resource licences (FRL)

- Short term (up to 5 years)
- Can harvest timber
- No direct management responsibilities but harvest operations must follow an approved management plan
- Can share costs with SFL holders for roads, etc.

3. Supply agreements to the crown (Legacy commitments)

- Volume-based
- Legal arrangement to the Crown and a mill specifying the volume, forest management units, and time period for use
- SFL and FRL must agree and make specified trees available to the supply agreement holder

All harvest requires the use of a Forest Management Plan that must involve:

- Public consultation including input from local citizens, first-nations and stakeholders
- Modelling and determination of expected management consequences on yield, growth rate and regeneration
- Preparation by a registered professional forester (RPF)

Direction provided by the Forest Management Planning Manual and Forest Information Manual

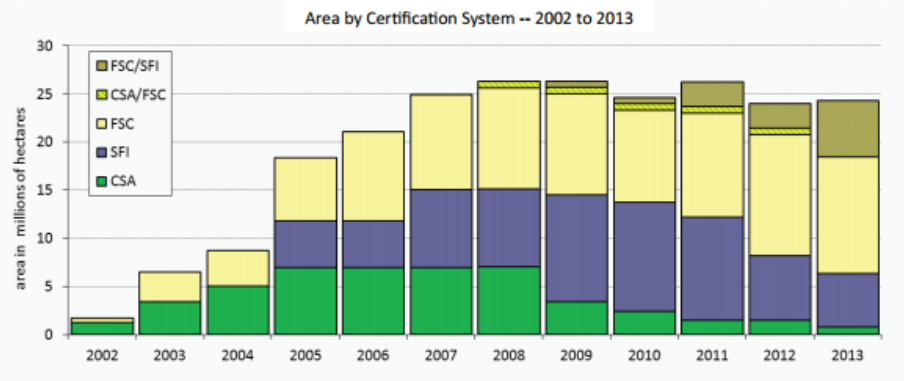
Forest certification in Ontario:

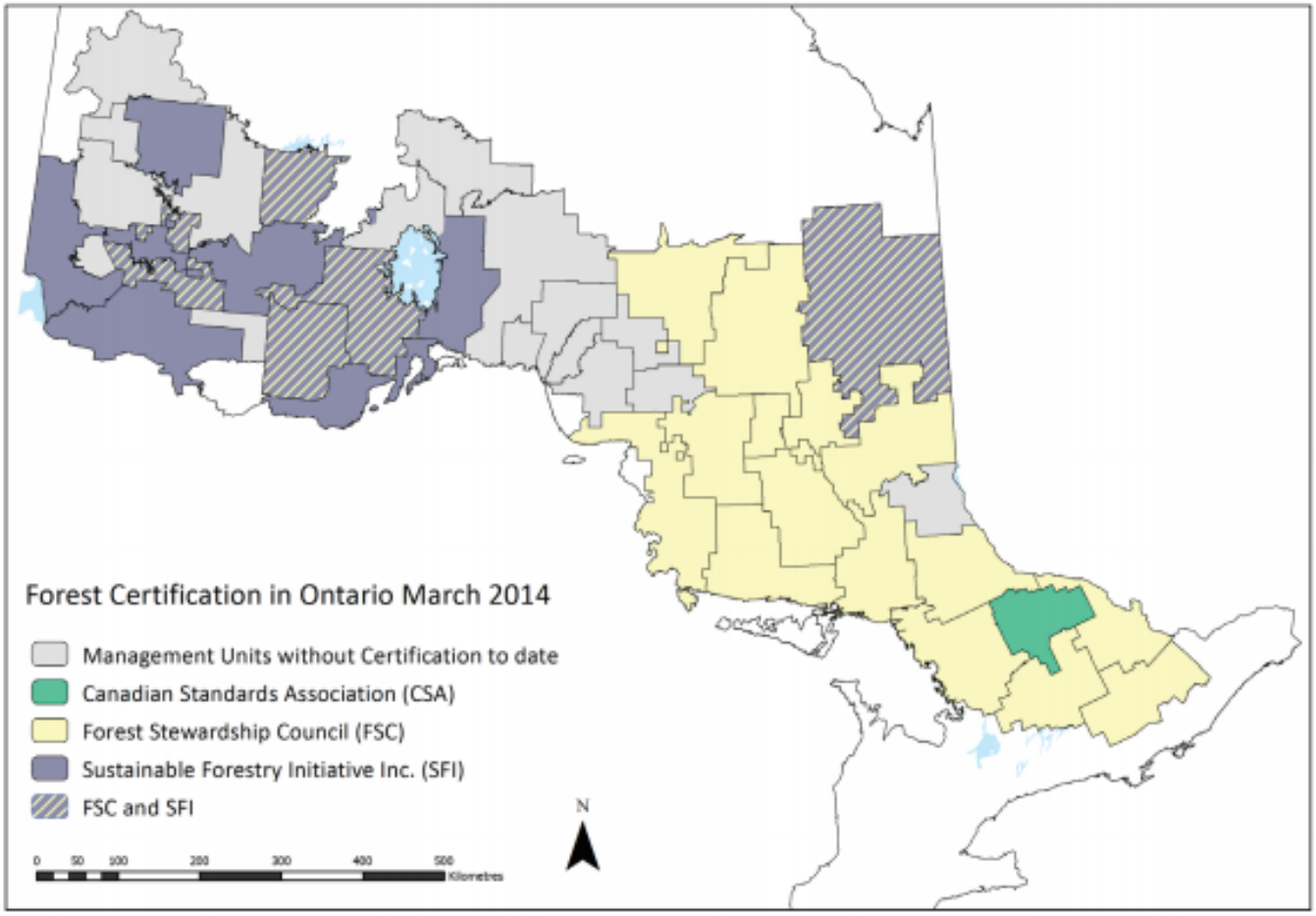
Three common forest certification systems are active in Ontario- the Canadian Standards Association (CSA), Forest Stewardship Council (FSC), and Sustainable Forest Initiative (SFI). Each certification program produces optional product labels and assesses forest management to their respective standards via third party assurance.

Canadian Standards Association	Forest Stewardship Council	Sustainable Forestry Initiative
• National forest management standard but provides guidance at the defined forest area level • Criteria and indicators developed by the Canadian Council of Forest Ministers • PEFC endorsed Consists of 7 criteria: Criterion 1: Biological diversity Criterion 2: Ecosystem condition and productivity Criterion 3: Soil and water Criterion 4: Role in global ecological cycles Criterion 5: Economic and social benefits Criterion 6: Society's responsibility Criterion 7: Aboriginal relations	• Regional forest management standard guided by FSC's International Generic Principles and Criteria 1. Compliance with Laws and FSC Principles 2. Tenure and Use Rights and Responsibilities 3. Indigenous People's Rights 4. Community Relations and Worker's Rights 5. Benefits from the Forest 6. Environmental Impact 7. Management Plan 8. Monitoring and Assessment 9. High Conservation Value Forests 10. Plantations	• A North American (USA & Canada) forest management & fiber sourcing standard • Comprised of a hierarchical system of objectives, performance measures, and indicators • PEFC endorsed Comprised of 13 principles: 1. Sustainable Forestry 2. Forest Productivity and Health 3. Protection of Water Resources 4. Protection of Biological Diversity 5. Aesthetics and Recreation 6. Protection of Special Sites 7. Responsible Fiber Sourcing Practices in North America 8. Legal Compliance 9. Research 10. Training and Education 11. Community Involvement and Social Responsibility 12. Transparency 13. Continual Improvement

Geographical Distribution of forest certification in Ontario

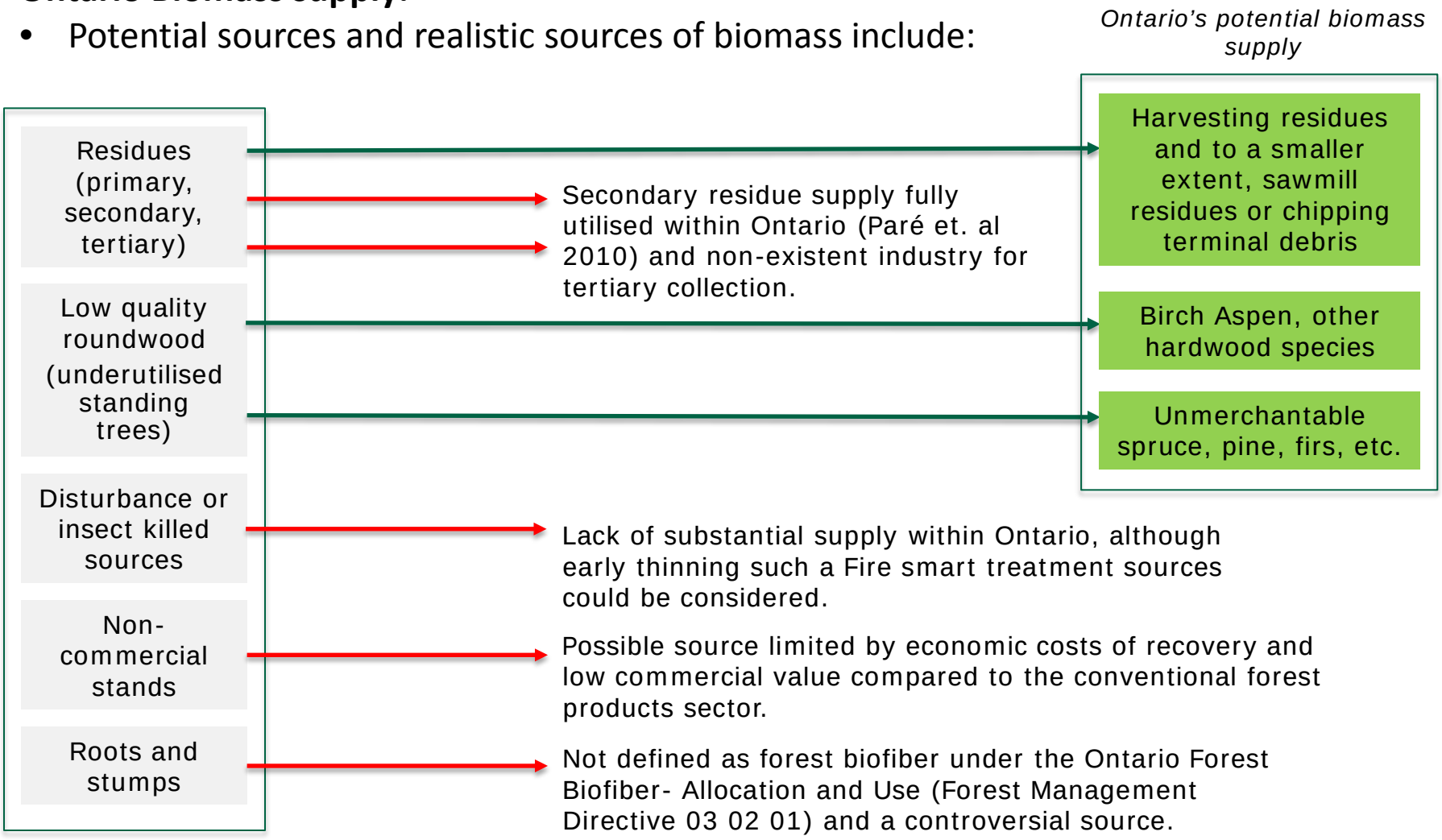
- The most common certification systems employed are the FSC and SFI certification programs, with a trend of increasing dual certification.
- FSC is the most dominant in both the Great Lakes St. Lawrence Region and in the North-Eastern Boreal Forest Region.





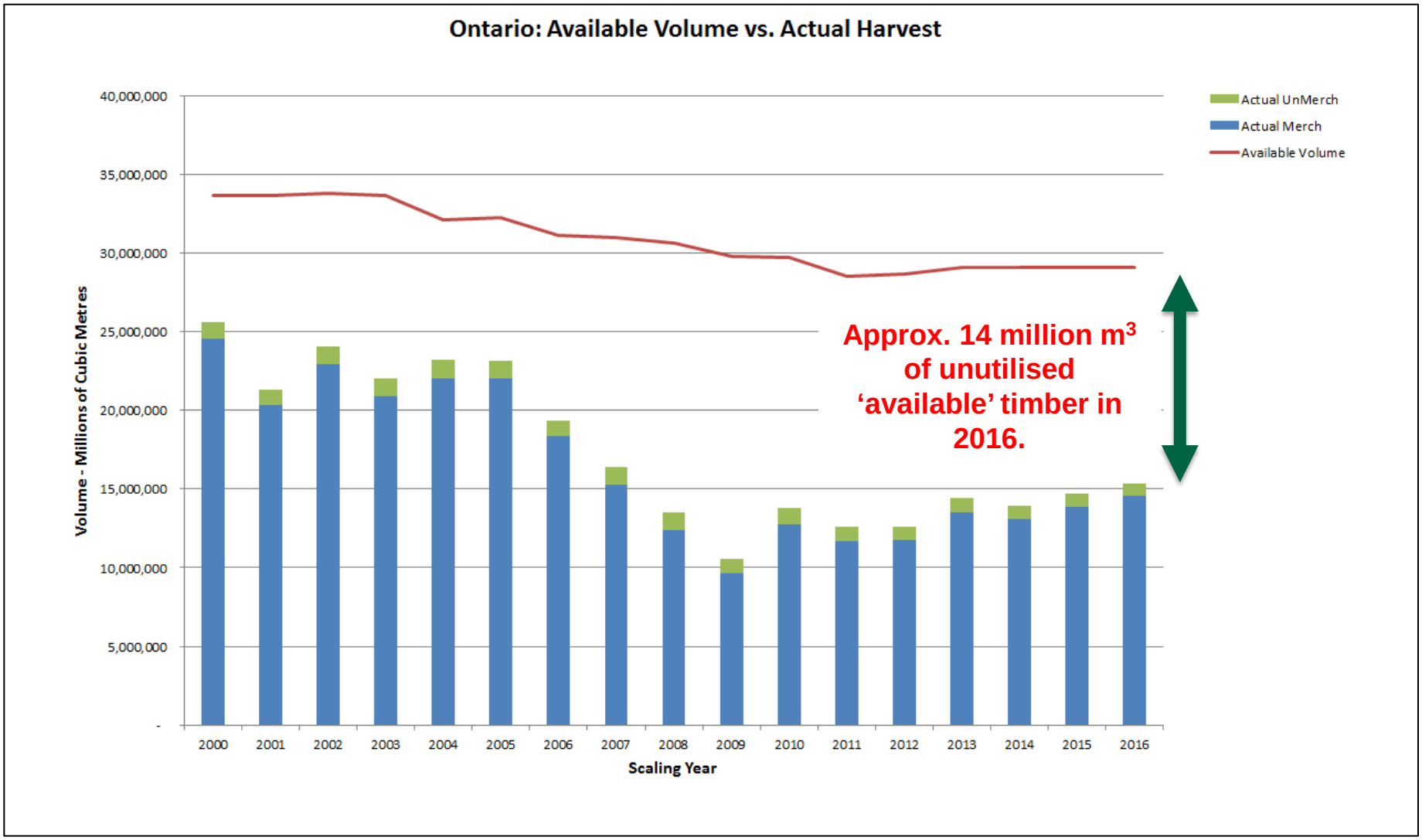
Ontario Biomass supply:

- Potential sources and realistic sources of biomass include:



- Considering the financial and operational feasibility and size of supply, the most likely sources for future biofiber supply in Ontario are residues and unmerchantable wood.

Ontario Biomass supply – Annual Allowable Harvest Volume and Actual Harvest:



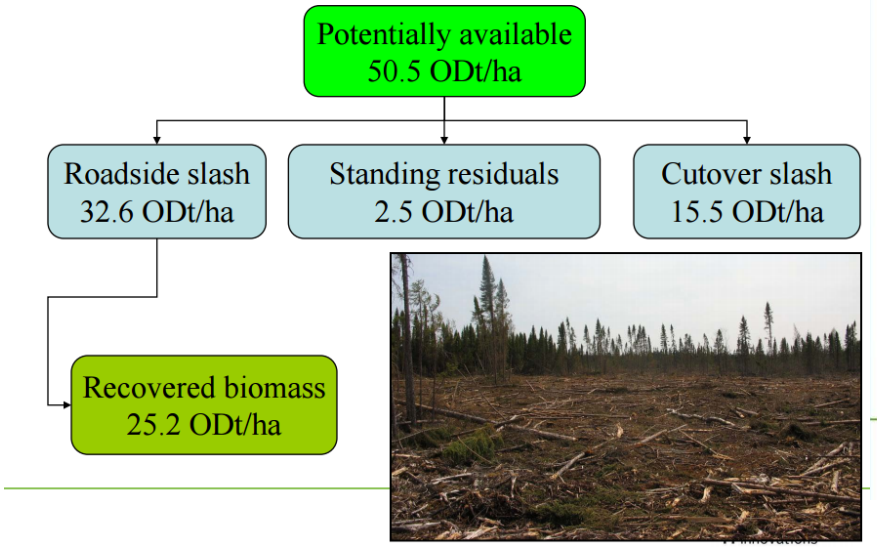
Source: Pers. Comm. OMNRF 2017

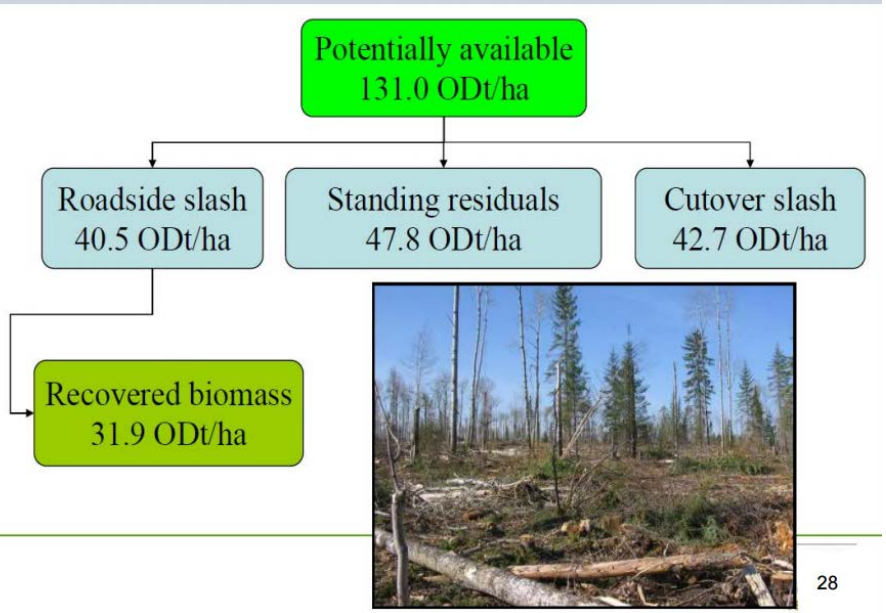
The recovery of biomass is affected by:
-supply accuracy
-financial constrains
-supply quality (moisture content, bark and needle content, contamination with sand and grit)
-public perception
-integration with existing logistics (to lower transportation and feedstock costs) and harvest method

For example, two research sites studied by FPInnovations showed variable levels of biomass available, retained and recovered

- Immense amount of biomass left on-site but actual yield must be established after sustainability and economic considerations
- Higher cost involved with CTL chips than FTH chips due to distribution of biomass (and cost of forwarding)
- Direct recovery unlikely due to overhead
- **In Ontario, biomass harvest most likely to occur where there is integration with primary product supply chains to lower recovery and transportation cost, and where harvest residues are suitable for pellet production/ high unutilized volumes.**

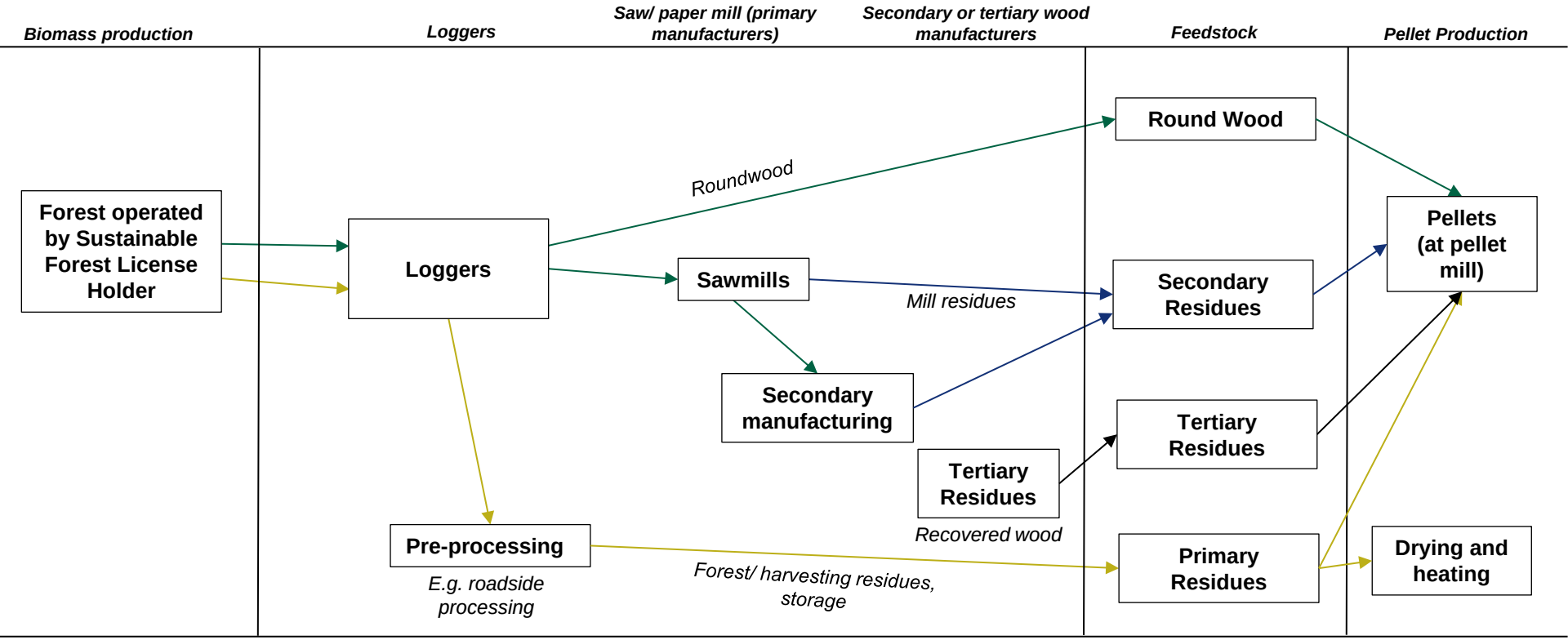
Biomass recovery on full-tree site, Kapuskasing, ON
Black spruce stand





Sources: FPInnovations, Joe Maure 2017

Example supply chain configuration in Ontario:



Legend:

- ***Roundwood, lumber, boards***
- ***Harvesting Residues***
- ***Secondary Residues***

- In Ontario, there are typically smaller trees and more hardwood compared to Western provinces. While harvest residues are not ideal for pellet production, they are the most abundant source.
- Therefore, existing supply chains are unlikely to change significantly under a biomass harvest scenario.
- Mabee et al. 2011 projects approximately 4.5 million tonnes (odt) of feedstock available for bioenergy conversion, 1/3 hardwood from the Great Lakes St. Lawrence Region and 2/3 softwood from the Boreal Forest region.
- Harvest imposes increased requirements for storage and possible change in machinery (e.g. grinders or chippers).

Sources: Mabee et al. 2011, FP Innovations 2015

Policy analysis: methodology

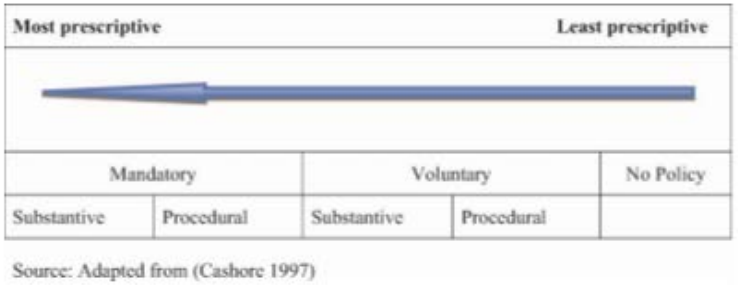
- Policy prescriptiveness was conducted based on McDermott's (2007 & 2009) policy analysis framework that identifies 'behavioural' conditions for setting

- The approach is comprised of three comparisons: 1) Policy type and 2) Threshold boundaries:

Table 2. Classification matrix of major policy approaches

	Voluntary	Mandatory
Procedural	Systems-based flexible Plan-based flexible	Systems-based moderately flexible Plan-based moderately flexible
Contingent	Policy contingent on government policies flexible	Policy contingent on government policies less flexible
Substantive	Policy specification (threshold) flexible	Policy specification (threshold) inflexible

Adapted from Cashore (2004); Cashore and McDermott (2004).



Source: Adapted from (Cashore 1997)

- Other variables incl. number of classification categories were used to illustrate reasons for policy differences between government and forest certification schemes.

- Mandatory substantive policies are the most prescriptive whilst voluntary procedural policies are the most flexible (perhaps most variable).

- Our research expands on the comparative methodology through the addition of three biomass-relevant sustainability criteria (riparian buffer, residual retention, skidding, and high value conservation forest), and the use of latest revisions for certification and provincial standards.

Results (summarized):

	Stand and Site Guide	FSC (IGI)	SFI	CSA
Residual Retention	New clear cut harvest areas shall contain 0.5 hectares within each 50 hectare circle or hexagon across the block. Wildlife trees within clear-cut operations must be retained at a rate of 25 stems/ha with a minimum of 5 large living trees standing on the landscape.	The organization shall effectively maintain the continued existence of occurring native species and genotypes, and prevent loses of biological diversity especially through habitat management in the management unit. Thresholds for habitat features that should be considered include guidelines for retention of trees, woody debris, and other vegetation representative of the natural stand.	Maintenance of post-harvest conditions (e.g. retained downed woody debris) are listed as indicators for restoration of post-harvest conditions to maintain site productivity.	Coarse woody debris and in-stand recognition is a core indicator for Ecosystem Diversity, but no threshold values are established. Documentation and planning requirements.
Riparian buffers	5 gradient-based AOC (area of concern) prescriptions ranging from 30 m to 90 m. Within the AOC, no machine or felling of trees are permitted within the inner 3 meters of the bank.	The organization shall protect or restore natural watercourses, water bodies, riparian zones, and their connectivity. The organization shall avoid negative impacts on water quality and quantity and mitigate those that occur.	Operations must meet and exceed all jurisdictional water quality laws within Canada and US EPA programs. Operations must implement plans, BMPs, maps and protection measures based on soil type for riparian areas.	Planning and identification requirements including the development of operational guidelines, mapping, and considerations for best management practices. Appropriate mitigation strategies for when disturbed area is at threshold level.
Skidding Requirements	Must mitigate erosion and monitor road/ road networks. Additional AOC prescriptions specify right of way widths based on species or environmental value being protected.	In addition to measures related to soil in Principle 6 and Principle 10, Measures are implemented to reduce compaction, erosion, and land slides.	Implement forest management practices to protect and maintain forest soil productivity. Identification of soils vulnerable to compaction, criteria for site preparation and road construction and skidding layout are listed indicators.	When monitoring of operations reveals that soil disturbance exceeds thresholds, direct measures of soil condition should be performed.
High Conservation Value Forest	Protections under the Endangered Species Act, including prohibitions on killing, harassing, capture or possession of any endangered, threatened of extirpated species. Habitat regulations preventing damage or destruction of habitat.	The organization shall maintain and/or enhance the High Conservation Values in the Management Unit through applying the precautionary approach. The organization shall perform assessment of values using best available information, and develop effective strategies to maintain identified values through engagement with affected stakeholders.	Program participants shall protect threatened and endangered species, Forests with Exceptional Conservation values and old-growth forests.	Operations must identify sites of special, biological, geological, heritage or cultural significance within the defined forest area and implement management strategies appropriate to their long-term maintenance.

Comparison with other governance measures:

	Ontario Stand and Site (selected requirements and AOC prescriptions)	Swedish Forestry Act	Norway Living Forests Standard
Residual retention	Any point within a planned clear-cut harvest will have a minimal of 25 ha mapped residual. Implementation of the harvest plan will ensure that any point within a new clear-cut harvest area will have at least 0.5 ha of residual within a 50 ha circle (or hexagon) about that point.	The Government, or public authority designated by the Government, may issue regulations, with respect to nature conservation and cultural heritage preservation, the retention of individual trees and groups of trees.	In harvesting, an average of ten wind-resistant trees per hectare must be left standing as retention trees, preferably in clusters. Retention trees should be selected among the oldest trees in the stand.
Riparian buffer protection	No machine travel permitted in the inner 3 m of AOC. No felling of trees into lakes or ponds within the inner 3 m of the AOC. Within the inner 15 m of the AOC, at least 10 trees/100 m of shoreline spaced about 10m apart will be retained as a potential source of future aquatic coarse woody material.	-	Basic buffer zone width of 10-15 m.
Skidding requirements	Decommission main skid trails constructed on steep slopes by installing water bars, diversion ditches, straw bales, etc. at appropriate intervals or critical landform junctures to filter runoff water through surrounding vegetation.	-	In areas with soils with poor carrying capacity where there is a serious risk of damage to terrain during the summer months, log transport shall preferably take place on frozen or snow-covered ground. Terrain transport shall primarily not take place in areas set aside as areas of ecological importance.
High Conservation Value Forest	Habitat regulation provided by the ESA prevents the destruction (elimination) or damage (impairment) of habitat of any SARO listed species.	Forest owners must describe how their management satisfies nature conservation and cultural heritage preservation interests.	Planning and identification requirements. At least 5 % of productive forest areas shall be managed as areas of ecological Importance.

Sources: http://extwprlegs1.fao.org/docs/html/swe15989.htm, http://www.levendeskog.no/levendeskog/vedlegg/51Levende_Skog_standard_Engelsk.pdf

Evidence for results on-the-ground:

- Extensive monitoring and effectiveness validation are conducted at the federal and provincial levels.
- At the Federal level, the main monitoring programs operate under the Umbrella of the National Forest Information System (NFIS), which includes the plot-based National Forest Inventory (NFI), The Earth Observation for Sustainable Development of Forests (EOSD), and the National Forest Carbon Accounting Framework.

National Forest Inventory:

- Defined methods to collect detailed ecosystem data including tree ages, volume, species and land use (Canada's National Forest Inventory ground sampling guidelines 2008)
- Sampling grid of 20km x 20km cells covering Canada's entire land mass and aerial photography at grid intersections
- Over 20,000 sampling points across Canada
- Compilation of forest resource data from federal, provincial and territorial monitoring programs

Earth Observation for Sustainable Development of Forests:

- Spatial dataset and map generated by Landsat Satellite data covering over 80% of the country
- Comprises of 610 tiles at 25 meter resolution, each representing 15,000 square kilometers.
- Provides information for biomass estimates, forest fragmentation, and land cover classification
- Supports Canada's Species at Risk Act (2003) and Convention on Biological Diversity (1992)

- The scope of Ontario's provincial monitoring oversight incorporates trend monitoring (e.g. forest resource inventory, wildlife assessment program and ecological land classification), effectiveness monitoring mechanisms such as the growth and yield program, and a compliance component (Independent forest audits, Forest Operations Information Program, Silvicultural effectiveness monitoring) .

Monitoring requirements for forest certification:

FSC:
Under the Criterion 8.5.2, management should collect data and monitor the following indicators:

- Yield of all forest products harvested
- Growth rate, regeneration and condition of forest
- Composition and observed changes in flora and fauna
- Environmental and social impacts of harvesting and other operations
- Costs, productivity and efficiency of forest management

SFI:
Monitoring is required to promote continual improvement in the practice of sustainable forest management.

Participants shall establish a management review system to examine finding and progress in the implementation of the SFI forest management standard to implement improvements to practices and inform employees of changes. This requires a system to review commitments, programs and procedures to evaluate effectiveness.

CSA:
Effectiveness monitoring are part of SFM information requirements. Forest management shall-

- Make commitments to improve knowledge about the forest and SFM
- Establish systems to monitor conformance with CSA SFM standards in the defined forest area including periodic assessment of indicator conditions

Forestry guide revision and adaptive management

Revision of forestry policy and management guidelines are regulated under the Crown Forest Sustainability Act and the Declaration Order MNR 75: Environmental Assessment Requirements for Forest Management on Crown Lands in Ontario

Declaration Order MNR-75 now requires MNRF to review the guides at least once every 10 years.

Factors to be considered during review:

- Incorporation of latest scientific findings, results of relevant monitoring programs, changes to forest management and technology

- Review previous processes including forest management plans, FOIP reports, IDA reports, Issue Resolution Requests, Individual Environmental Assessment requests, and issues identified by stakeholders, auditors, and Ministry staff.

- Include consultation with practitioner, auditor, stakeholder, the aboriginal community, be posted for comment in the Environmental Registry, and where possible, be pilot tested under guidance from the Provincial Forest Technical Committee

- Update methods to monitor effectiveness of new requirements and regulation

Chain of custody results:

Methodology adapted from NEPcon 2012

	FSC CoC and CW Standard	SFI 2015-2019 CoC	PEFC ST2002:2013	Summary:
Categories for unacceptable sources	5 controlled wood categories: • Illegally harvested wood • Wood harvested in violation of traditional and human rights • Wood from forests in which high value conservation values are threatened by management activities • Wood from forests being converted to plantations and non-forest use • Wood from forests in which genetically modified trees are planted	3 controversial sources categories: • Forest-based products not in compliance with applicable state, provincial or federal laws, such as CITES requirements, labor regulations, and legally required management of areas with designated high environmental and cultural values • Forest-based products from illegal logging • Forest-based products from areas without effective social laws	Controversial sources are listed as: • Not complying with local, national or international legislation, including: requirements of CITES, management of areas with designated high environmental, and health and labor of workers. • Not complying with legislation of the country of harvest relating to trade or customs • Utilising genetically modified forest based organisms • Converting forest to other vegetation type including plantations	Standards generally comparable.
Volume Controls	Applicants must maintain material accounting record including inputs received, outputs, suppliers and buyers, and claim period. The organization shall prepare a report covering one period before the previous reporting period to demonstrate that demonstrate that output products sold with FSC claims correspond to quantities of inputs, existing inventory, and associated output claims.	The organization must maintain records for both incoming and outgoing material including the quantity of delivery, supplier/ organization identification, claim period, organization identification, chain of custody number, and quantity delivered.	The organization must maintain and produce documentation for delivery (incoming) and sold products, including identification of organization, product and quantity delivered, delivery period and formal claim on the material category.	All three systems use a similar volume matching method as a mechanism for matching volume flows throughout the supply chain.
Assurance Systems	Product management: ISO/IEC 17065 Accreditation Standard: ISO 17011	Product management: ISO/IEC 17065 Accreditation standard: ISO 17011	Product management: ISO/IEC 17065 Accreditation Standard: ISO 17011	FSC, CSA and SFI employ the same ISO standards for systems assurance.

Adaptive management and types of monitoring:

3 Types of monitoring may be conducted (in order of increasing cost and difficulty):

- Implementation monitoring: assessing the implementation of standards
- Effectiveness monitoring: determination of whether management goals have been achieved
- Validation monitoring: ascertaining the fundamental relationships between management and the landscape

In Ontario, implementation and effectiveness monitoring the most commonly conducted:

Validation monitoring:

Full tree harvest project (1991)

-Determine harvesting effects on long-term productivity of black spruce ecosystems.
-A total of 15 sites evaluated at Thunder Bay and Geraldton/Nakina (Northwestern Ontario).
-Conducted over a 20-year time frame, with some sites being monitored for 15 years.
-Evaluate structural characteristics and facilitate process-oriented studies such as recovery pattern to harvest intensity and microclimate profiles resulting from different harvest treatments.
-Determine site sensitivity and impacts of different harvesting methods and processes including full tree chipping.
-Weaknesses found in project funding and delivery (Morris and Duckert 1999).

Sustainable Forest Biomass Harvesting Project (GSLS) (2011)

-Trials at four sites across central and eastern Ontario.
-Harvest was conducted in the winter of 2012/2013
-At each location two harvest methods applied to compare with traditional tree-length harvest and full-tree harvesting methods under a shelterwood harvest prescription.
-Data collected on a 5-year basis to determine long-term effects.

However, are such efforts enough?

A study conducted by Berch et al. 2011 (developed from the 2008 *The Scientific Foundation for Sustainable Forest Biomass Harvesting Guidelines and Policies* conference) identified knowledge gaps within the following areas:

- **Relationships between harvest and productivity, population viability, and response curves for specific habitat elements.**

- **Long-term research on the impacts of biomass removal at varying spatial and temporal scales, including the trade-offs between biodiversity and productivity.**

- **A small number of journal publications on the consequences of biomass removal on biodiversity.**

Therefore, while iterative policy setting and continued monitoring efforts are crucial to the continued practice of sustainable forest management, expanded monitoring and research efforts to understand future and anticipated consequences of biomass harvesting are necessary.

Intensive forest biomass harvesting and biodiversity in Canada: A summary of relevant issues[1]

by Shannon M. Berch[2], Dave Morris[3] and Jay Malcolm[4]

ABSTRACT

Increasing interest in renewable fuels inspired a three-day workshop in Toronto in February 2008, entitled: *The Scientific Foundation for Sustainable Forest Biomass Harvesting Guidelines and Policy*. In this paper, we summarized the biodiversity-focused content of the workshop, including potential implications of intensification of biomass removal on biodiversity, knowledge gaps identified by workshop participants, and implications for policy development. Woody debris represents an important habitat resource for a wide variety of forest organisms, and the presence and continued supply of fresh to highly decayed dead wood represents a key concern in managed forest systems. A key challenge in sustainable forests management is to determine to what extent biomass harvests can increase fibre use while sustaining biodiversity, its functions, and the broad suite of ecosystem services that it provides. For knowledge-based planning and policy development, researchers must provide complex information to policy-makers and forest managers in a clear, effective way. In particular, full life-cycle analysis of intensive forest biomass harvesting taking into account environmental consequences is needed to inform sound evidence-based policy and decision-making. In the absence of complete scientific information, forest managers and decision-makers are well-advised to proceed with caution within a well-developed adaptive management framework.

Key words: forest biomass harvesting, biodiversity, research gaps, forest policy implications

RÉSUMÉ

L'intérêt sans cesse croissant pour des carburants renouvelables a suscité la tenue d'un atelier de trois jours à Toronto en février 2008, intitulé : *The Scientific Foundation for Sustainable Forest Biomass Harvesting Guidelines and Policy*. Nous résumons dans cet article les aspects portant sur la biodiversité abordés au cours de l'atelier, incluant les implications possibles de l'intensification de l'extraction de la biomasse au niveau de la biodiversité, les lacunes au niveau des connaissances telles qu'identifiées par les participants à l'atelier et les implications en matière de développement des politiques. Les débris ligneux constituent une source importante d'habitat pour une grande variété d'organismes forestiers et la présence et l'apport continu de bois à des stades divers de décomposition constituent un enjeu important dans les systèmes forestiers aménagés. Un défi de prime importance en aménagement forestier durable consiste à déterminer jusqu'à quel point la récolte de la biomasse peut accroître l'utilisation de la fibre tout en maintenant la biodiversité, ses fonctions et l'ensemble des services écosystémiques qu'elle assure. Pour ce qui est de la planification basée sur les connaissances acquises et de l'élaboration des politiques, les chercheurs doivent fournir des informations complexes aux législateurs et aux aménagistes forestiers de façon précise et efficace. Plus particulièrement, une analyse complète du cycle relié à la récolte de la biomasse forestière prenant en considération les conséquences environnementales, est requise pour permettre l'élaboration de politiques et la prise de décisions reposant sur des faits vérifiés. En l'absence d'informations scientifiques complètes, les aménagistes forestiers et les décideurs seraient bien avisés de procéder avec précaution à l'intérieur d'un cadre bien établi de gestion adaptative.

Mots clés : récolte de la biomasse forestière, biodiversité, marque de connaissances, implications des politiques forestières

[1]This paper is based on a presentation made at the workshop on The Scientific Foundation for Sustainable Forest Biomass Harvesting Guidelines and Policies, Toronto, Ontario 18–21 February 2008, and on discussions by workshop participants.
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Integration of Policy and Governance Values

The ESA (Endangered Species Act) was passed in 2007 to protect species at risk (SAR) within the province through automatic protection to any endangered, extirpated, and threatened species. Under the implementation of the ESA, management activities must fulfill an overall benefit requirement which stipulates that any beneficial actions for the species must be pursued in order to obtain permit for the activity. SAR habitat are also protected under special habitat regulation, that prevents the damage and degradation of species habitat.

- While the aims of the policy are to encourage protection and recovery of at-risk species, there are clear implications for biomass harvest especially for species that prefer seral sites for foraging, etc. Re-entry into the cut-over for recovery could be affected.

- This represents an substantially increased cost for biomass recovery and timber harvest in general in areas where at-risk species reside.

- At present, the Ontario government has allowed for a 5-year exemption to the Act for multiple industries, and instead register with the Ministry, and in certain cases, conduct mitigation activities to lower impacts on listed species and habitat.

- Shared policy perspectives may emerge from a long-term policy solution through the integration of the Endangered Species Act and the Crown Forest Sustainability Act, which provides potential authorization mechanisms for industry and a streamlining of requirements.

- However, both industry and ENGOs have criticized the program for heavy reliance on the precautionary principle, and overlap with existing forest management guidelines which already require consultation with the ministry for guidance on at-risk species and operational prescriptions to maintain biodiversity. Lack of support by third parties and firms (two predominant governance institutions), results in a loss of trust in the regulatory process.

- Future policy designs must consider alignment with broader governance values to produce shared policy positions to support successful implementation and results on the ground. The application of sound science to produce adequate guidelines, was one of the main criticisms in the ESA, and should be a key consideration.

Unresolved issues:

UN Convention for Indigenous Rights (UNDRIP)

- While not legally binding, UNDRIP introduces several human rights including language, identity, and free, informed and prior consent over resource extraction.
- The agreement may grant aboriginal groups veto rights particularly for asserted rights and titles especially for major resource projects.
- Such rights are incompatible with the Canadian Constitution and existing constitutional protections that provide a right to consultation, rather than a veto for the approval process.
- Social and economic sustainability have only recently been included in discussions on sustainable forest management, but are continued to be affirmed by international strategies such as the UNDRIP and within private regulation.
- Overall the unresolved status and implementation of the agreement illustrate the difficulties and necessity of multi-stakeholder engagement to realise normative legitimacy and trust in future regulation.

EU Sustainability criteria for biofuels

- Under existing RED requirements, Canadian biofuel production are disadvantaged as federal, provincial and certification schemes do not assess greenhouse gas emissions. It is probable that existing imports meet criteria through LCA analysis conducted by end users, likely to be based on incomplete or inaccurate data.
- The wording and lack of a singular EU biomass criteria may also hamper trade. Terms such as primary forest and requirements for continuously forested land contradicts the unique Canadian forestry practice characterized by natural disturbance, sustainable clear-cut, and harvest of old-growth stands.
- Gaps persist regarding which traditional forest certification schemes fail to facilitate trade to European markets.

Thank you!

Questions?

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