Assessing Maine's Certified Sustainable Harvest

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An assessment of certified sustainable harvest in Maine's Unorganized Territory using the U.S. Forest Service's Forest Inventory and Analysis (FIA) Database.

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Project Summary

Forest sustainability certification is the most dominant conservation feature on the Maine landscape — outpacing easements, state and federal land acquisition, and the largest, most ambitious proposals for a Maine Woods National Park. Today, Maine leads the nation, with upwards of ten million acres of forestland, or more than 50% of its timberland, certified by either the Forest Stewardship Council (FSC) or the Sustainable Forestry Initiative (SFI). Despite the profound public policy implications of certification's unprecedented rise in Maine, few studies have directly assessed certification's ecological or silvicultural impact — in Maine or elsewhere. This void has spurred increasing scrutiny of certification's costs and benefits by *both* environmentalists and forest industry.

Our study takes a first step towards a more thorough understanding of certification's impacts on the forests of Maine. We reviewed the over-arching sustainability goals and specific criteria of the Forest Stewardship Council (FSC) and Sustainable Forestry Initiative (SFI) standards, then looked for specific areas of overlap with field-level indicators derived from the U.S.D.A. Forest Service's Forest Inventory and Analysis (FIA) Database. We predicted that growth and harvest would be balanced, or trending towards balance, on land certified as sustainable. Having rejected this hypothesis, we then compared ownership categories, certification systems, standards, and forest dynamics to illuminate patterns. Our results suggest substantive differences between study groups: From 1999 to 2012, total removals (harvest and land use changes) exceeded net growth across private certified land, whereas public lands were in balance. The imbalances on private land appear driven by intensive harvest of hardwood species generally, though the region's most valuable commercial species — red spruce and sugar maple — and its largest trees, or sawtimber, consistently showed the most significant imbalances. Of the species assessed, only balsam fir showed significantly more growth than harvest on private, certified land. Overall, FSC-certified lands showed a trajectory towards balance from 1999 to 2012; SFI remained unchanged, with removals exceeding growth throughout the study period.

While our results raise questions, they must be considered only a partial indicator of sustainability or compliance with certification standards. Confidential forest management plans may offer silviculturally sound explanations for the imbalances we observed. However, given the clear variation in management outcomes observed amongst our study groups, more research is needed in order to better understand certification's impacts on the forest.

Overview: *Certification in Maine*

- Pioneer, since 1993
- 10+ million acres certified; more than any other state
- Multiple, competing systems: Forest Stewardship Council (FSC) & Sustainable Forestry Initiative (SFI)



Ideal 'laboratory' for study of certification impacts

What about the Forest?

- **Green groups**: Has certification lived up to its promise? (*Rametsteiner and Simula 2003*, *Clark and Kozar 2011*)
- **Industry**: Increasing dissatisfaction with economics of certification (*Dodge 2012*)
- **Consumer**: Unwilling to pay price premium (*Correia* 2012)



What impact has forest certification had on the forest?

Certification was borne "of environmental groups dissatisfaction with government approaches as doing too little, and industry dissatisfaction with government as being too controlling, rather than any <u>evidence</u> that these new instruments would be more effective in addressing global forest deterioration."

Cashore et al. 2003

Methods: Forest Inventory and Analysis (FIA)

- U.S. Forest Service program
- Census: One plot/6,000 acres
- Tree and stand-level measurements on 5-year cycle
- Already in use/accepted by industry, researchers, green groups & public agencies — publicly available and repeatable.
- How can FIA data be used to assess specific criteria of forest certification?



FSC Criteria 5.6 (from 2010 Standard)

5.6. The <u>rate of harvest</u> of forest products shall not exceed levels which can be <u>permanently</u> sustained.

5.6.b. Avg. annual harvest levels, over rolling periods of no more than 10 years, do not exceed <u>calculated</u> sustained yield harvest level.



SFI Objective 1 (from 2010-2013 Standard)

Objective 1. To broaden the implementation of sustainable forestry by ensuring long-term forest productivity and yield based on the use of the best scientific info available.



Performance Measure 1.1. Program Participants shall ensure that forest management plans include <u>long-term harvest levels</u> that are <u>sustainable</u> and consistent with <u>appropriate</u> growth-and-yield models

Hypotheses:

 Net growth & removals will be in balance, or show a trajectory towards balance, on land certified as sustainable

2. Subtle differences in standards could result in differing outcomes

3. Public lands will see more conservative harvests than private certified lands

Methods:

FIA and Forest Certification

- Identify certified landowners (Public, FSC, SFI) in study area using public summaries of 3rd-party audits
- 2. Use GIS and public cadastral data to spatially locate certified parcels on map.



- 3. Overlay FIA 'grid' of field plots atop GIS shape files of certified land
- 4. Extract Growth and Harvest Data from FIA system
- 5. Test hypotheses; analyze results

Methods: Overlay certified land map with FIA plot grid



Certified Land and Overlapping FIA Plots

Legend

15 30 60 Miles

FIA Public Plots
Certified Timberland

Study Area: Unorganized Territory of Maine (Maine Revenue Service Designation, Nov. 2011)

Results - 1

- Null hypothesis rejected: Harvest exceeds growth on all private certified land groups in 2007, and all but FSC-certified land in 2012.
- Growth and harvest are balanced on public certified land (BPL and Baxter State Park Scientific Forest Management Area)
- Non-certified land shows balanced growth and harvest, but group partly composed of conservation and nonindustrial owners with markedly different management objectives
- FSC shows positive trajectory between 2007 and 2012 evaluations; SFI shows no statistical change

Figure at right: Net growth, total removal volumes, and net change. All species, growing stock on timberland, by study group. A) 2007, and B) 2012. Error bars 68percent confidence interval around estimate. Asterisk (*) denotes significant differences in net change.





Results - 2

A)

B)

- ✓ Sawtimber (large tree) harvest exceeds growth on all private certified land in both 2007 and 2012
- Sawtimber growth and harvest in balance on public certified land
- Net growth on large trees nearly double on public land as on private.
- ✓ FSC shows improvement from 2007 to 2012; no significant difference in removals from public land in 2012

Figure at right: Net growth and total removal volumes (bdft/acre) of sawtimber on timberland, by study group. A) 2007; B) 2012. Error bars 68-percent confidence interval around estimate. Asterisk (*) denotes significant differences in net change.





Results - 3

- On private, certified land, growth exceeded harvest for red spruce, and sugar maple, two of the region's most valuable commercial species, in both 2007 and 2012
- The only species to show a positive growth to removal ratio on private land was balsam fir in 2012.
- Sample sizes too small on public, certified land for statistically significant comparisons

Figure 1.12. Net growth and total removal volumes (ft³/acre/yr), by select species on C) private certified land in 2007 and D) private certified land in 2012. Error bars 68-percent confidence interval around estimate. Asterisk (*) denotes significant differences in net change.





Summary of Results

Hypothesis

1. Net growth & removals will be in balance on land certified as sustainable

Evidence

- Removals > Growth on all
- Cert. Priv. Land in 2007, 2012
- Driven by imbalances in sawtimber & hardwood harvest; sugar maple & red spruce;
- Low net growth a constant

Discussion*

• Results suggest growth and harvest not necessarily in balance on private, certified land. Why?

2. Subtle differences in standards could result in differing outcomes

• FSC shows trajectory towards balance (balanced in 2012); SFI remains unchanged. A) Difference in standardsdriving different outcomes, or,B) Standards attractinglandowners w/ diff. objectivesC) Other?

3. Public lands will see more conservative harvests than private certified lands • Public lands exhibit balanced growth & harvest; all growing stock and sawtimber

Different management objectives/financial pressures/land use history likely influence harvest?

Forest Sustainability Certification: And the verdict is...

- ✓ Growth and harvest only <u>partial</u> proxies for sustainability
- Words matter: Standards give landowners wide berth; unfair to judge conformity based on FIA data alone



- But...significant differences in management between SFI and FSC; public vs. private
- Consumer perceptions key do imbalances need explanation?
- ✓ More questions than answers

Study Limitations

Strengths

- FIA already in widespread use
- Publicly-available dataset; prospects for long-term study
- Uniform, peer-reviewed methods and queries
- Unbiased, representative sample
- Large sample sizes
- Growth/harvest fundamental to certification standards

<u>Weaknesses</u>

- Short study period
- Cadastral data lacking
- Public summaries inadequate
- FIA: Fuzzing and swapping
- Growth & harvest partial measure of sustainability or compliance with standards
- Narrow look at certification

Implications for the Northern Forest

- Forest certification is among the dominant conservation features across the Northern Forest region
- If harvest exceeds growth on certified private land, as our results suggest, are certifiers aware? What about policy makers? What might consumers think?
- More research and outreach is necessary to better understand the situation.



List of Products/Leveraged Grants

- MSc. Forest Resources: Thesis Completed in August, 2014.
 - Sherwood, David. 2014. Assessing Maine's Certified Sustainable Harvest. Master's Thesis, University of Maine. Orono, Maine.
- Leveraged Grants: Sustainability Solutions Initiative (SSI), University of Maine: SSI's Emerging Opportunities – Foundations for Future Research, Feb-Nov 2014.
 - Certification of sustainable forestry: A critical evaluation of forest management performance standards and audit protocols based on established science and stakeholder perceptions
 - Principal Investigators: Dr. Robert Seymour, University of Maine, Jessica Leahy, University of Maine, David Sherwood, University of Maine.

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