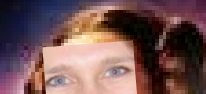


BIOMASS WARS

A new Hope



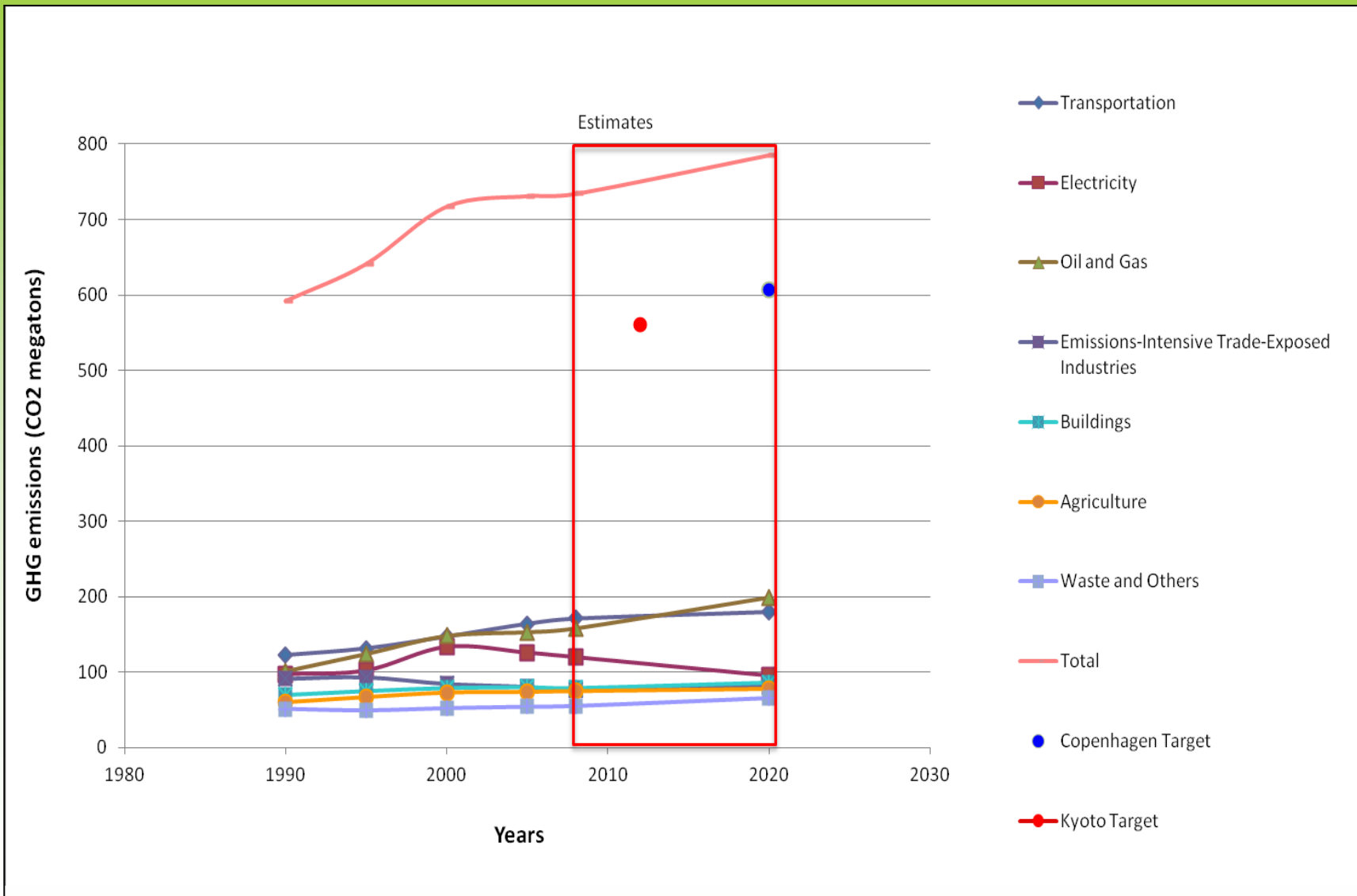
Evelyne Thiffault, Canadian Forest Service

Alternate titles:

The Ecologist Strikes Back
The Return of the Soil Scientist

(David Paré, Pierre Bernier, Brian Titus, Louis-Vincent Gagné, Canadian Forest Service)

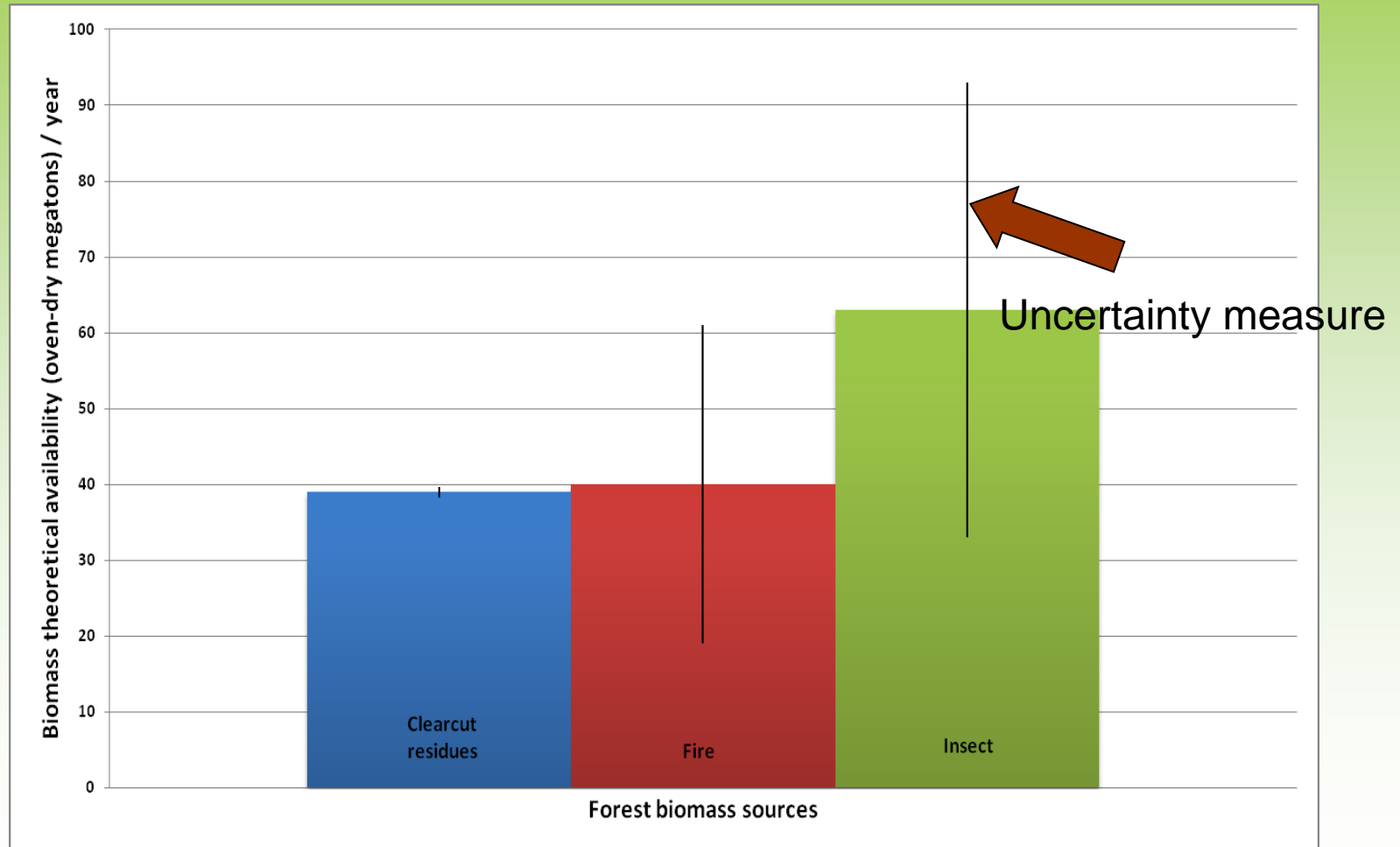
GHG emissions in Canada



Forest biomass availability in Canada's managed forests

Dymond et al. 2010 For. Ecol. Manage.

Annual estimates for 2005-2020



Forest biomass and nutrient calculator for Canadian tree species

Available at: <https://apps-scf-cfs.rncan.gc.ca/calc/en/calculateur-calculator>

Tree-level biomass from diameter and/or height

Species

Diameter cm (at 1.3 m)

Height (optional) m

Calculate

Per hectare biomass from basal area

Species

Species basal area m²/ha

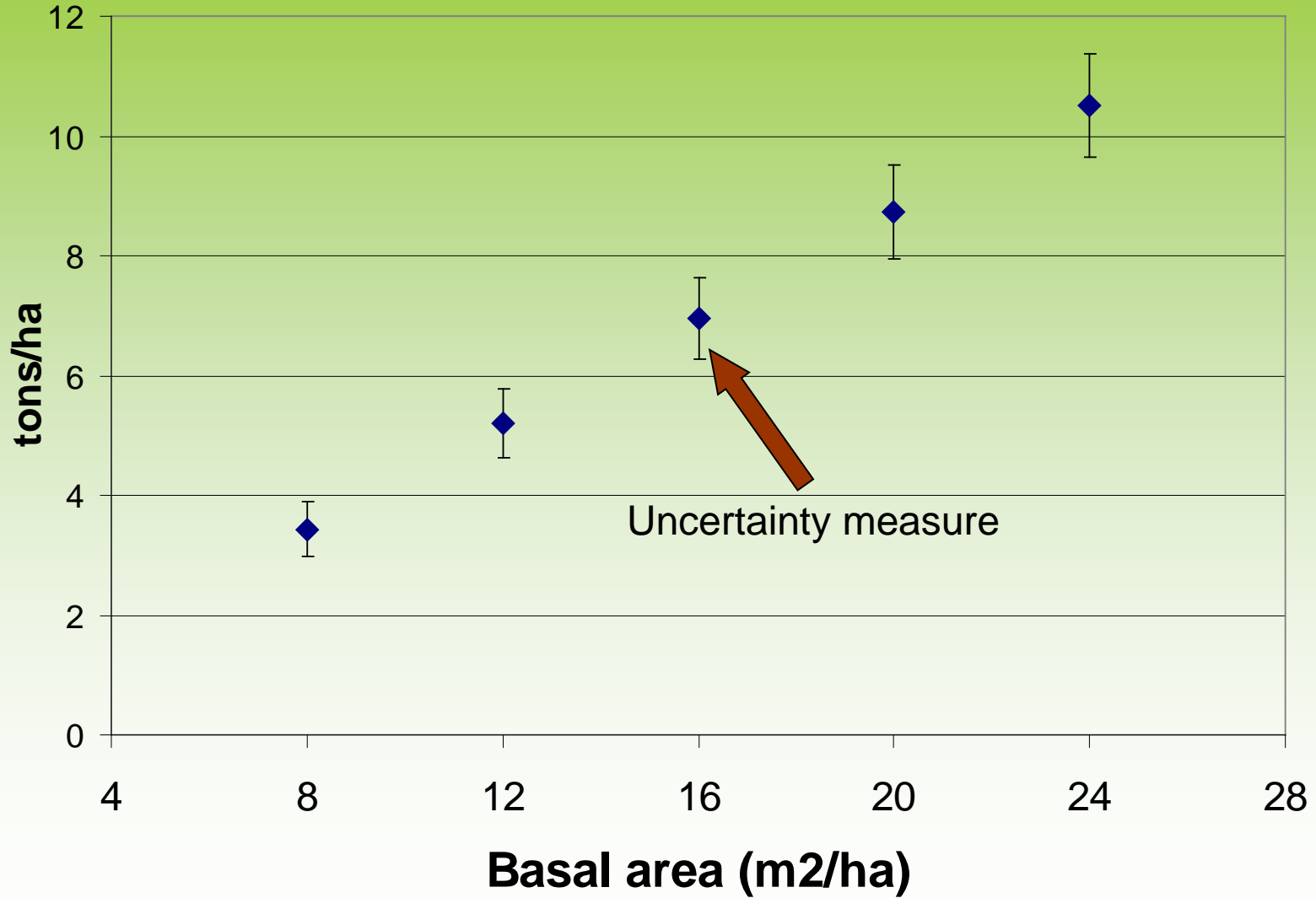
Total basal area m²/ha

Calculate

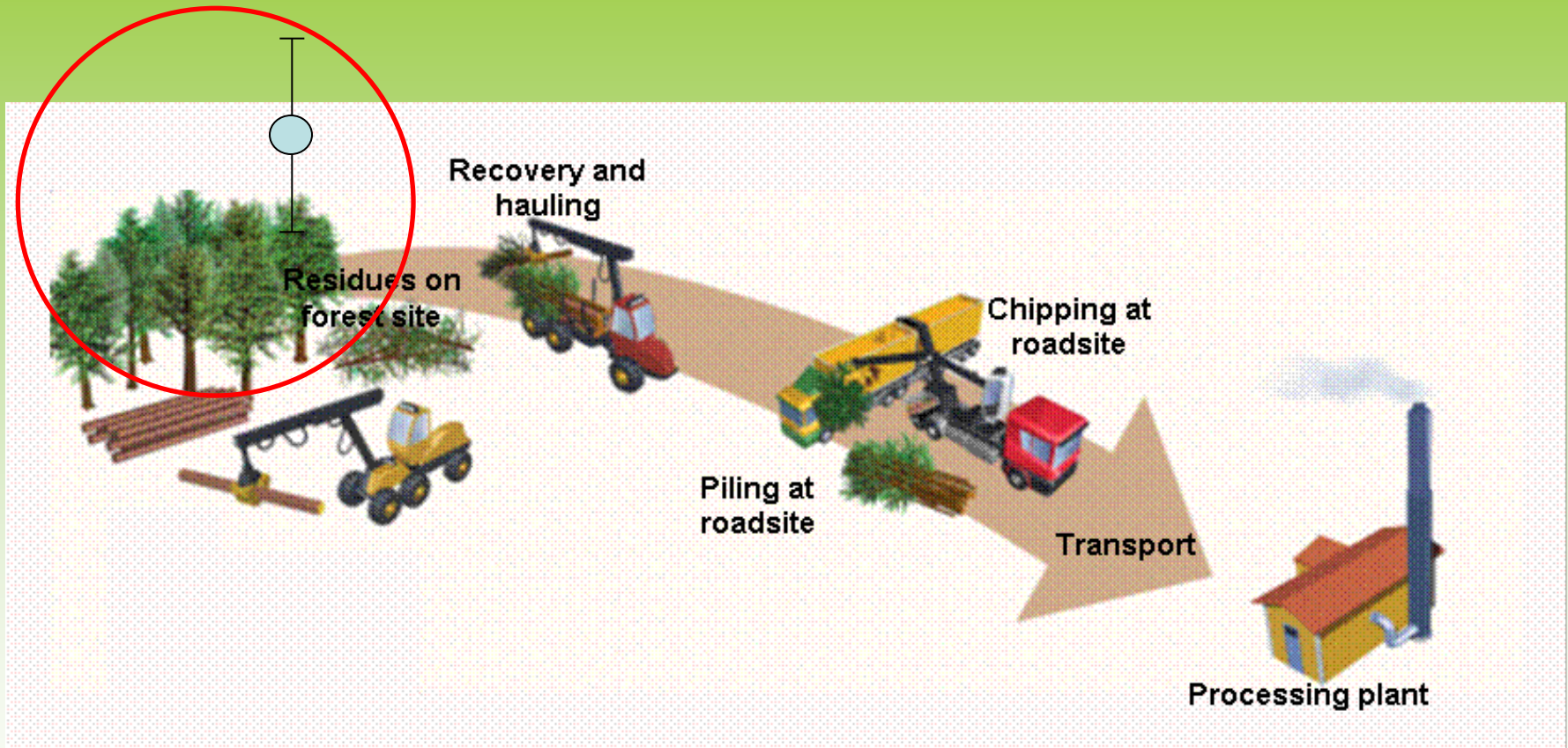
Biomass in branches

Black spruce stands

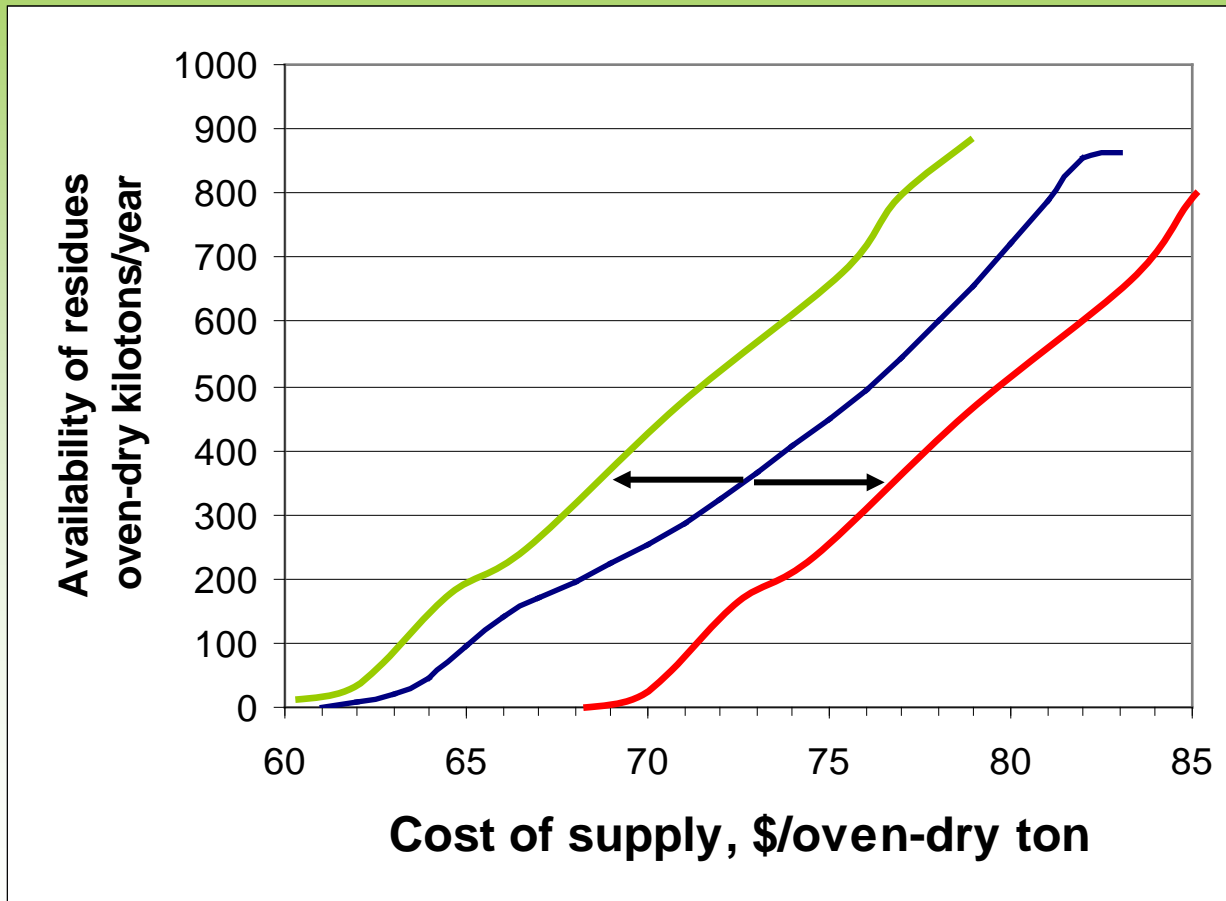
Paré et al. In preparation



How does the uncertainty in biomass inventory propagates through the supply chain?

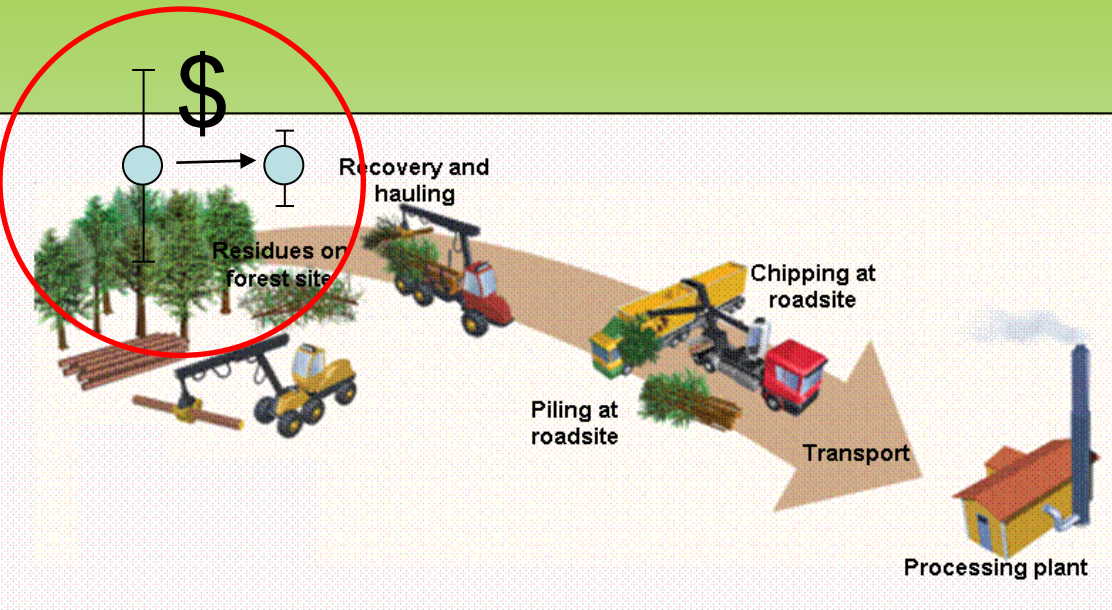


How does it influence supply-cost curves?

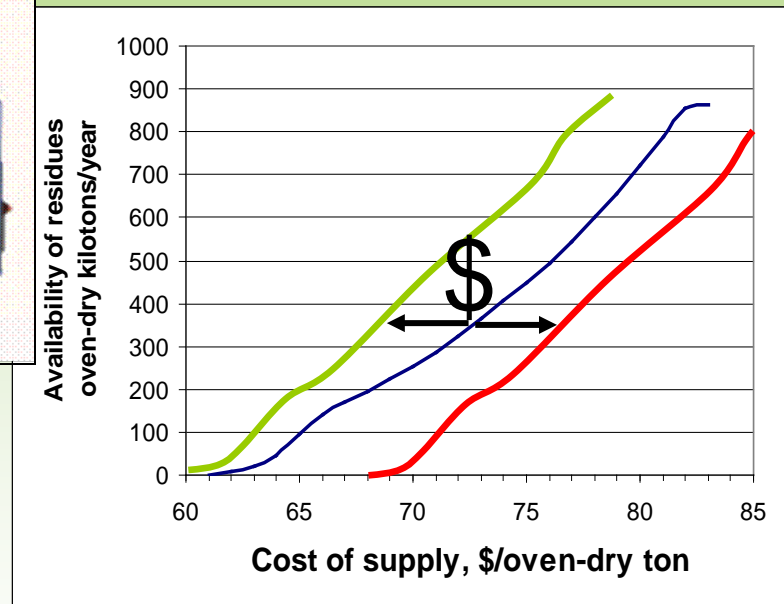


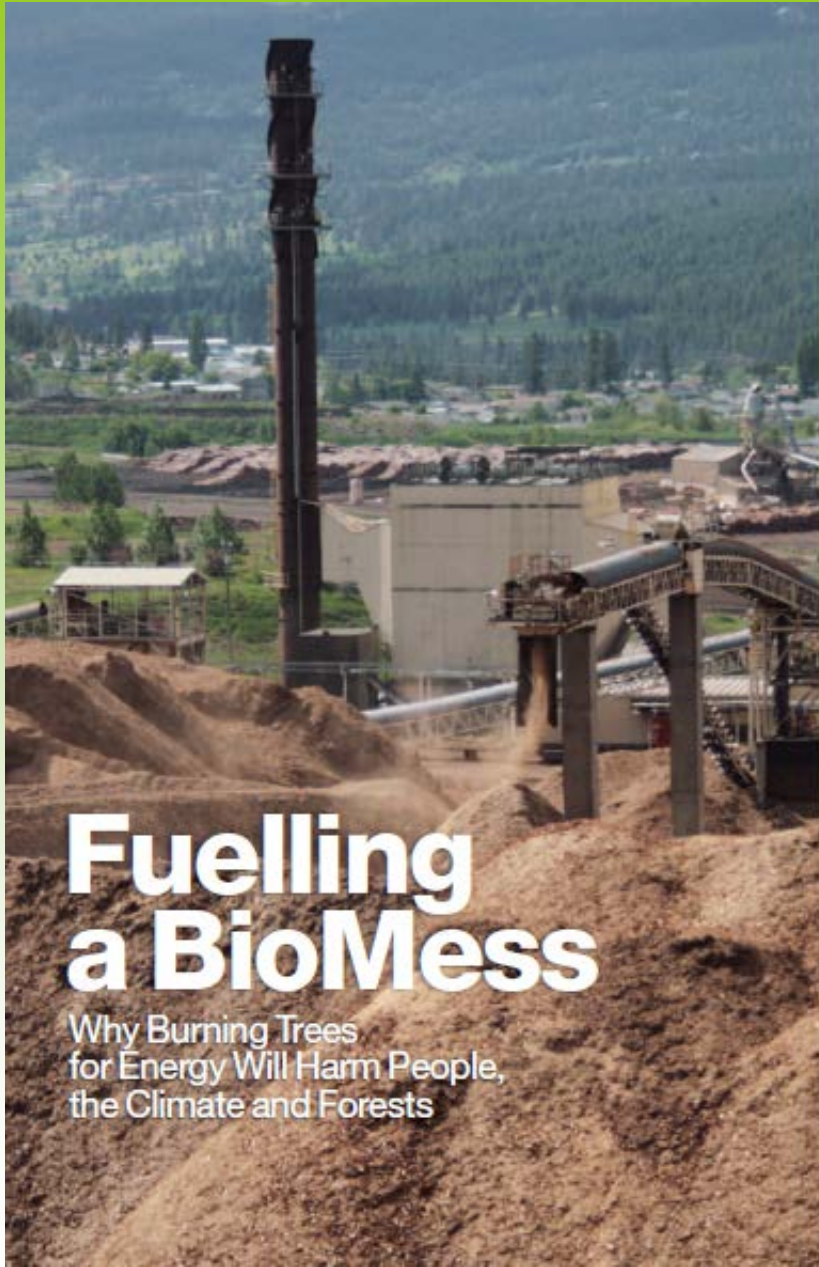
What is the cost/benefit of reducing sources of uncertainty?

Investment in better inventory



Reduction in cost of supply





Fuelling a BioMess

Why Burning Trees
for Energy Will Harm People,
the Climate and Forests

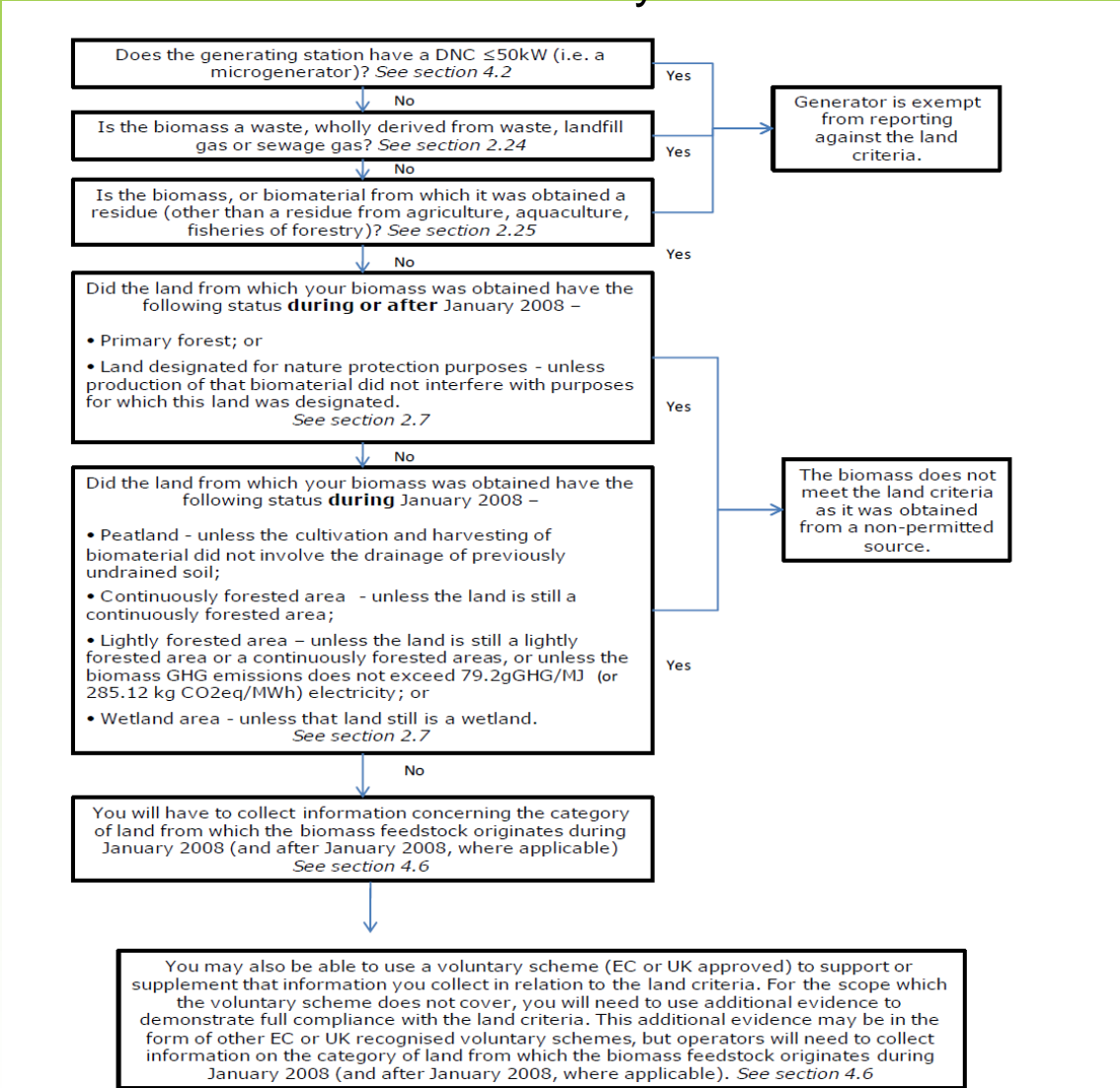
GREENPEACE

www.greenpeace.ca

Renewables Obligation: Sustainability Criteria for Solid and Gaseous Biomass

United Kingdom government policy, December 2011

Decision tree for Sustainability: Land Criteria



Did the land from which your biomass was obtained have the following status **during or after** January 2008 –

- **Primary forest**; or
- Land designated for nature protection purposes - unless production of that biomaterial did not interfere with purposes for which this land was designated.
See section 2.7

No

Did the land from which your biomass was obtained have the following status **during** January 2008 –

- Peatland - unless the cultivation and harvesting of biomaterial did not involve the drainage of previously undrained soil;
- Continuously forested area - unless the land is still a

Yes

The biomass does not meet the land criteria as it was obtained from a non-permitted source.

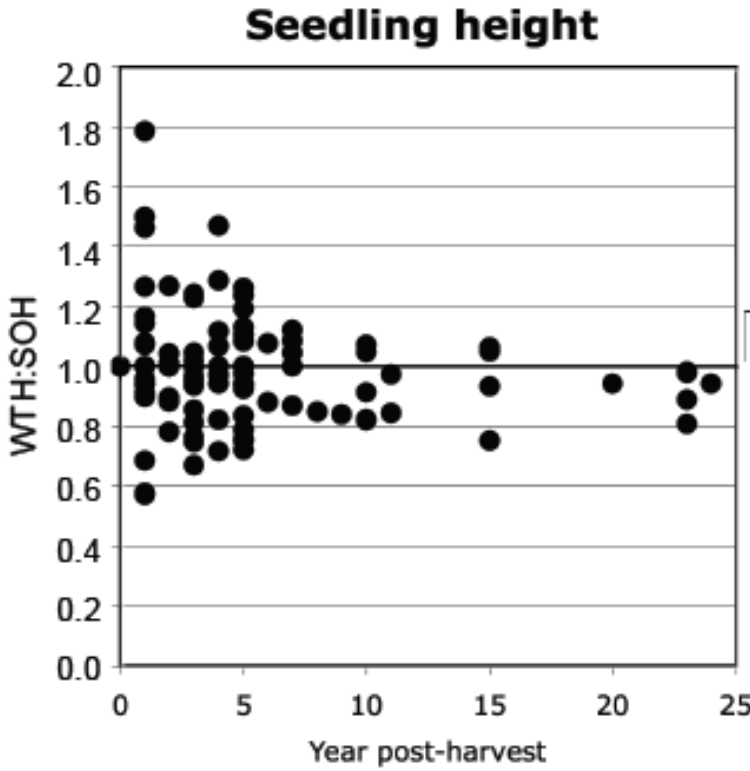
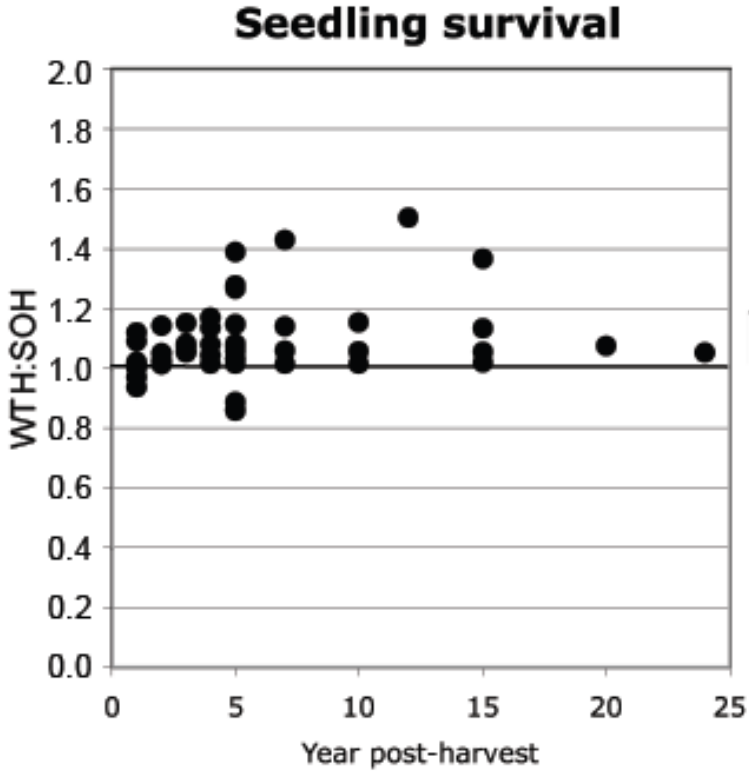
Primary forest:

forest and other wooded land of native species, where there is no clearly visible indication of human activity and the ecological processes are not significantly disturbed

= A good proportion of Canadian forests!

Empirical knowledge on the effects of forest biomass harvesting on ecosystems

Thiffault et al. 2011. Environmental Reviews



Functional relationships between « risks of damage» to ecosystems and site properties

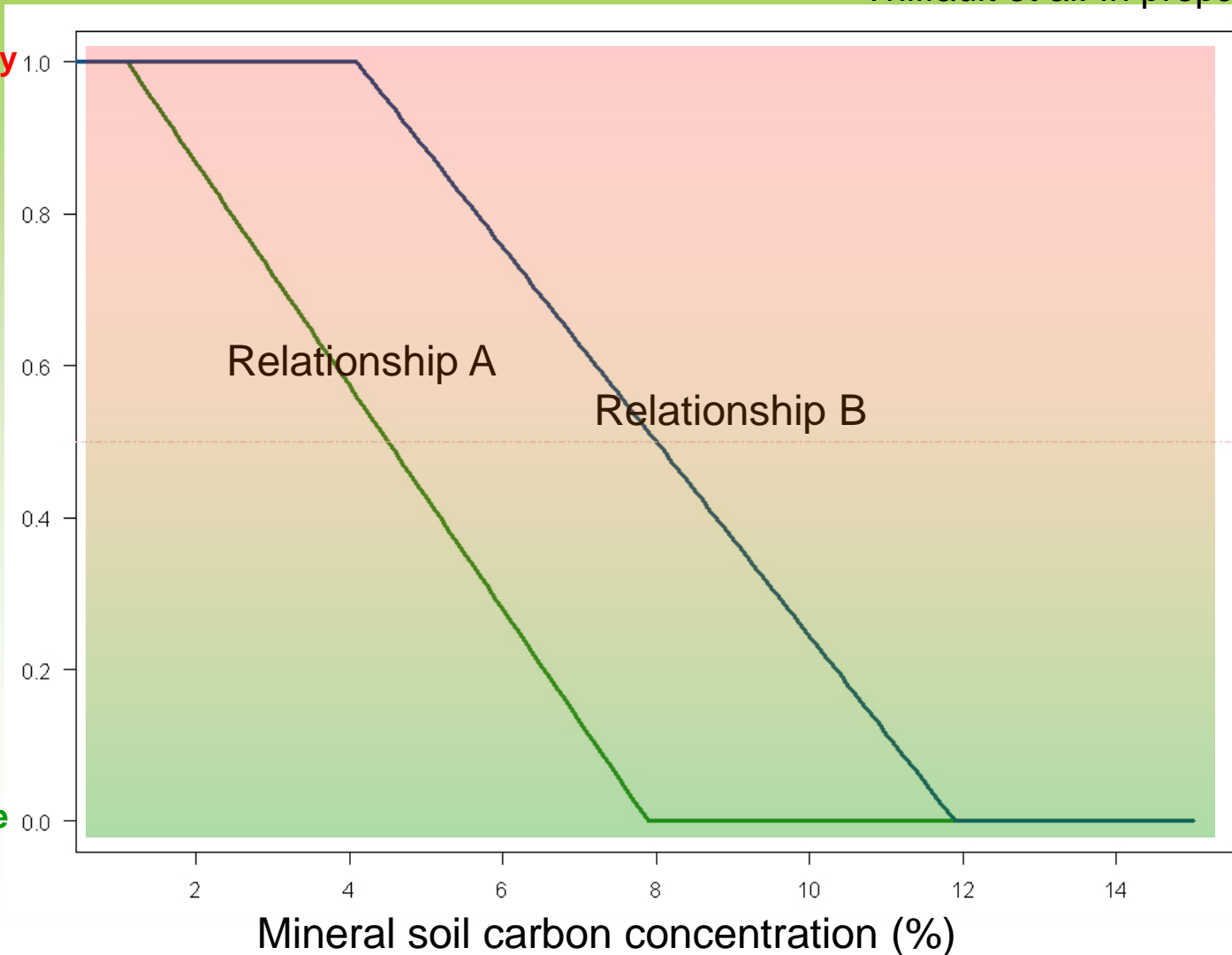
Rating of risk to soil fertility with forest biomass harvesting according to two scenarios

Thiffault et al. In preparation

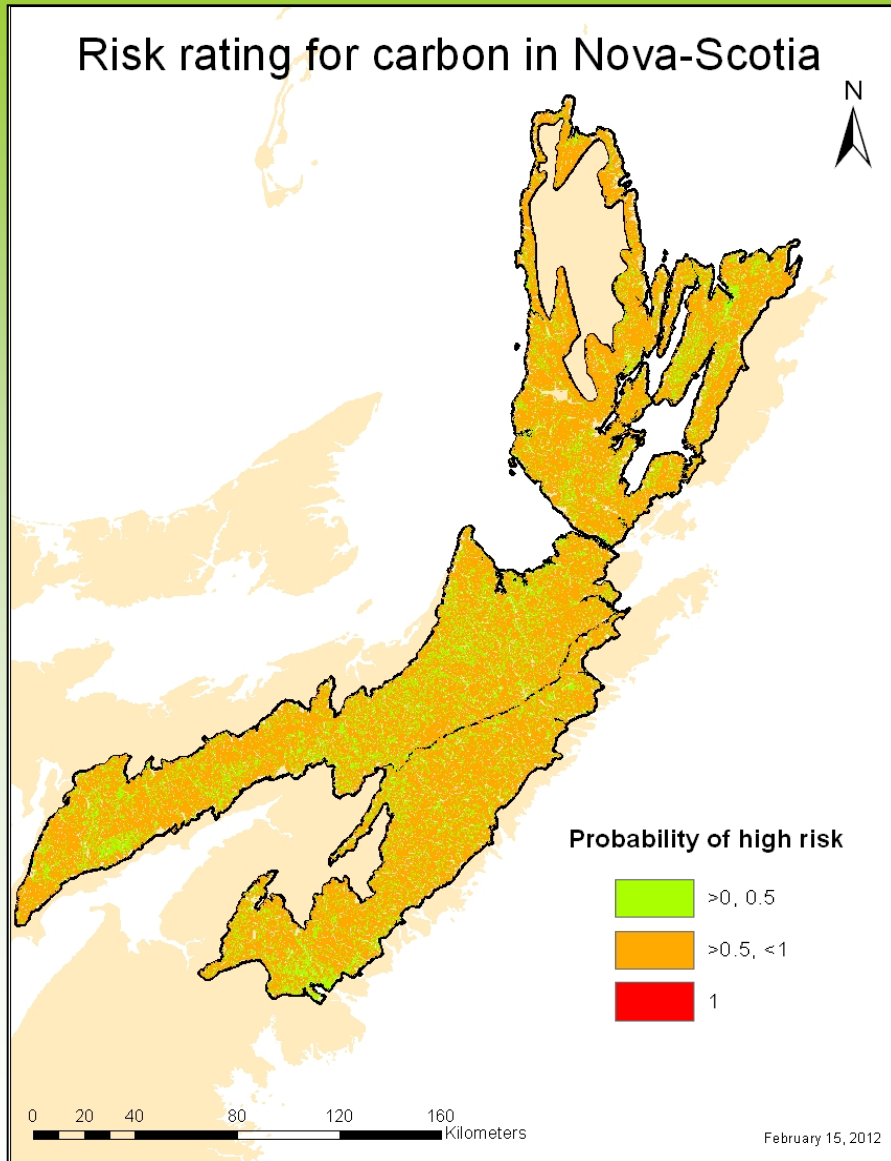
Damage to fertility

No damage

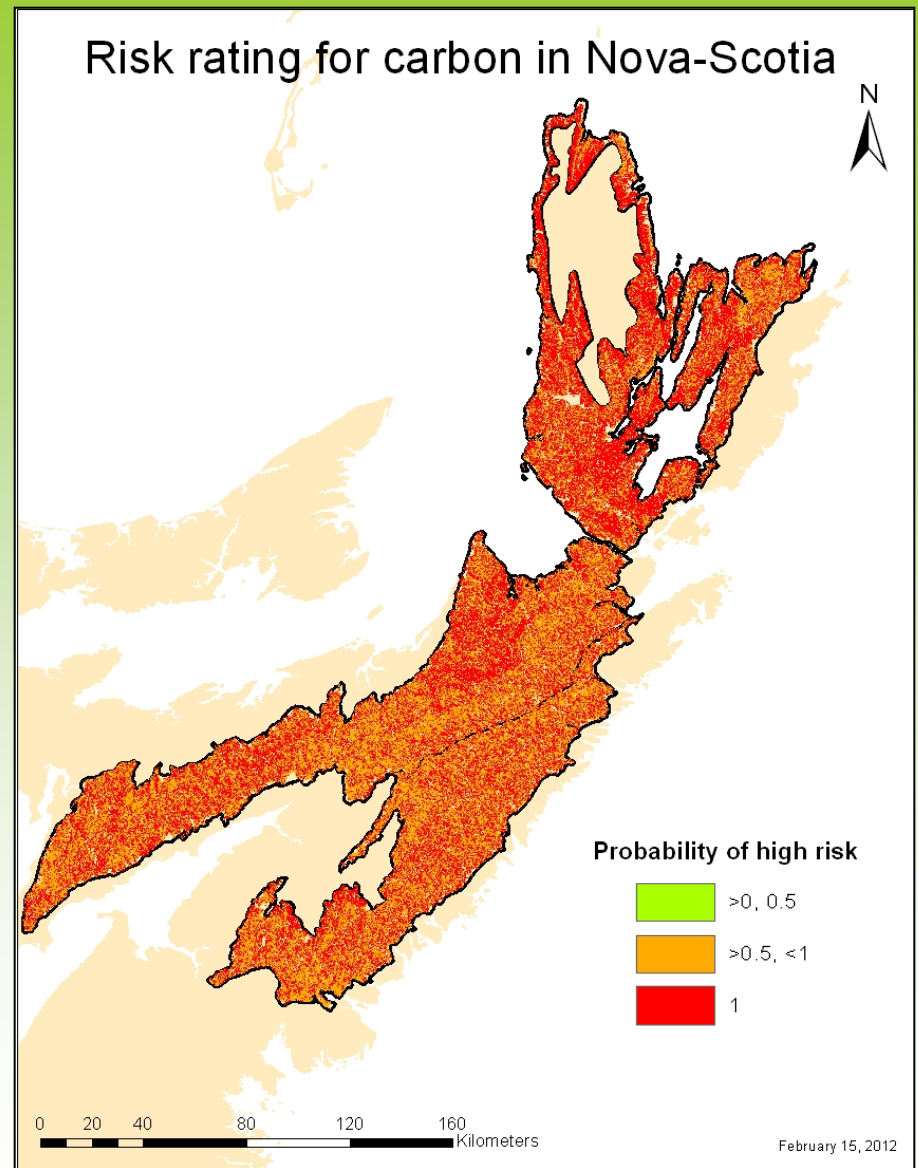
Probability of high risk



Relationship A

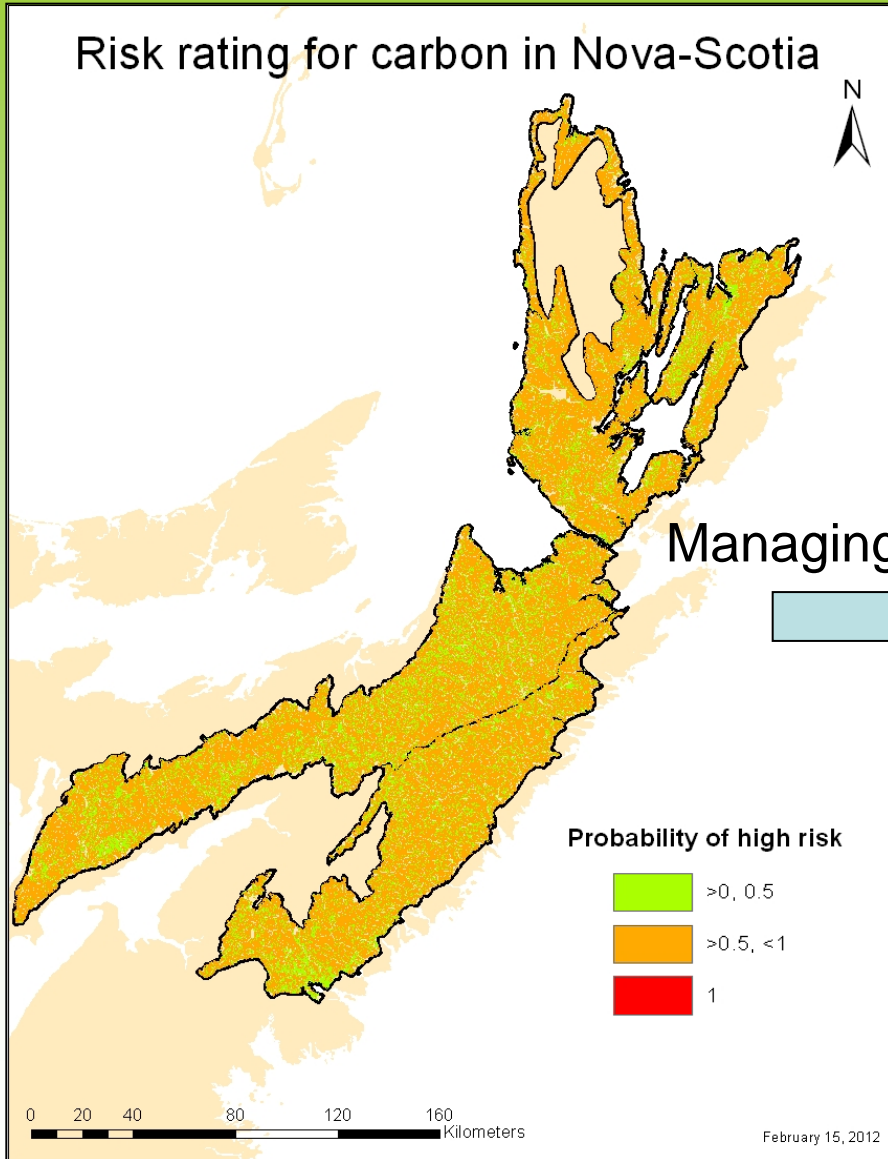


Relationship B



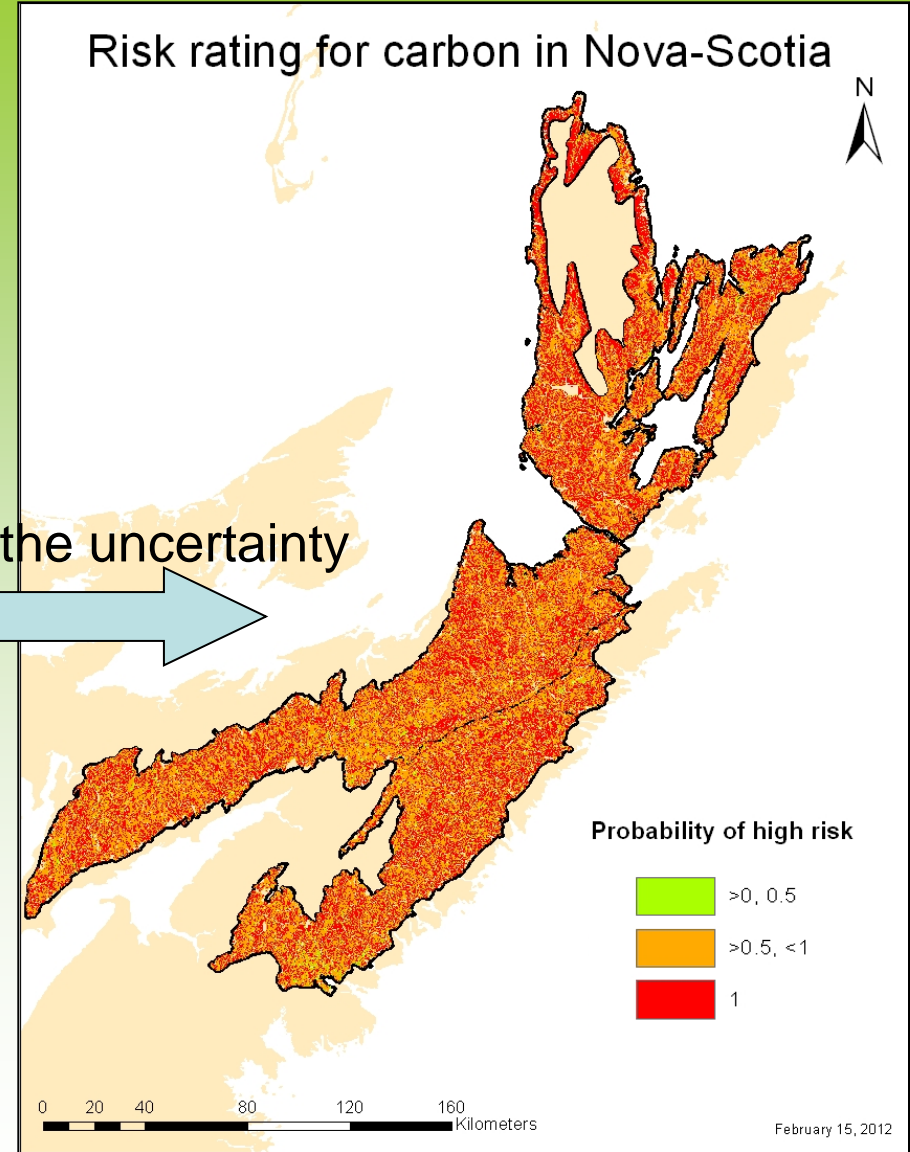
Relationship A

Mean value of carbon

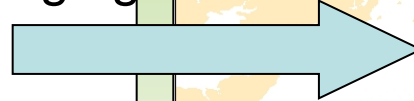


Relationship A

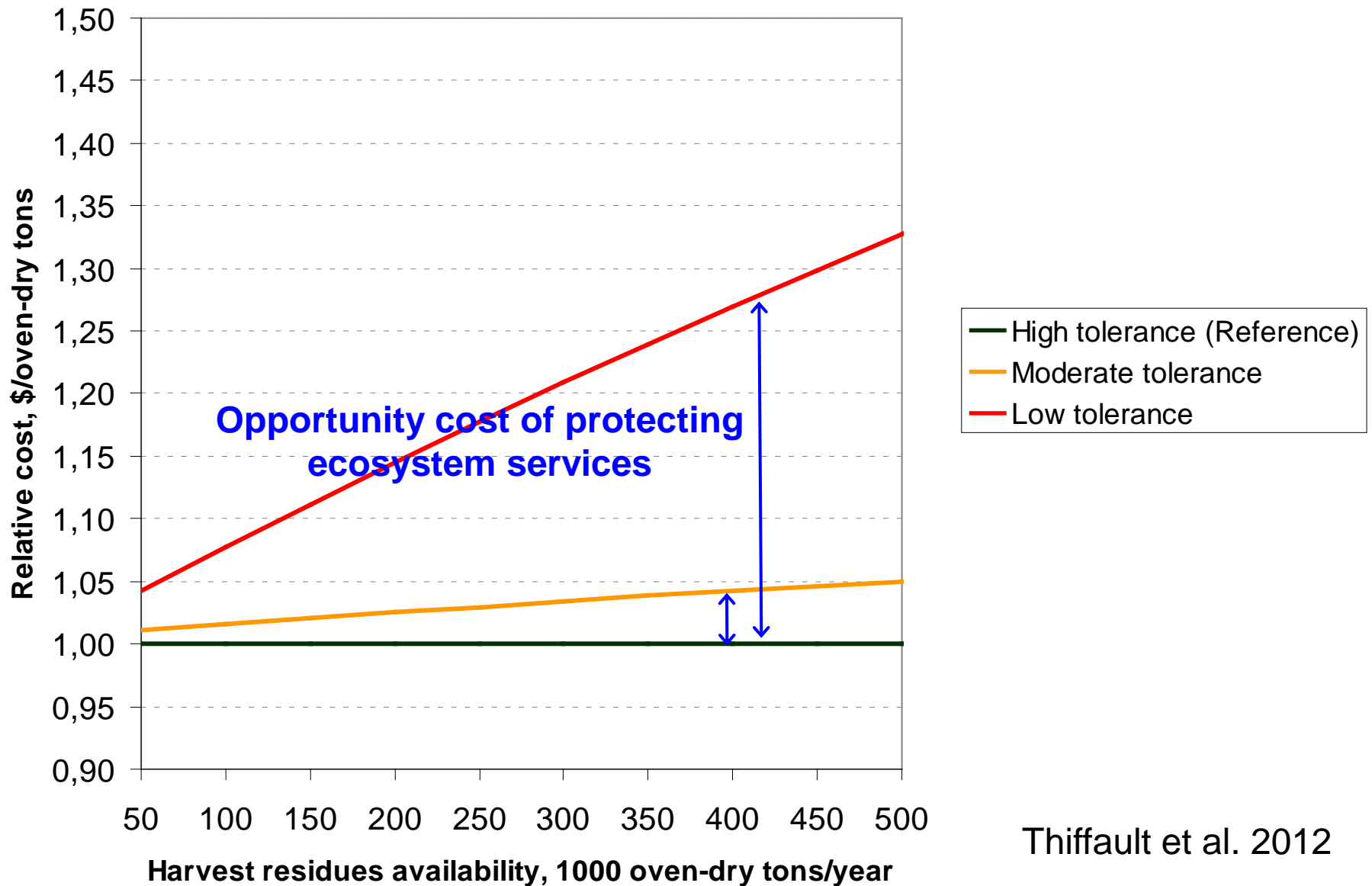
Minimum value of carbon



Managing the uncertainty

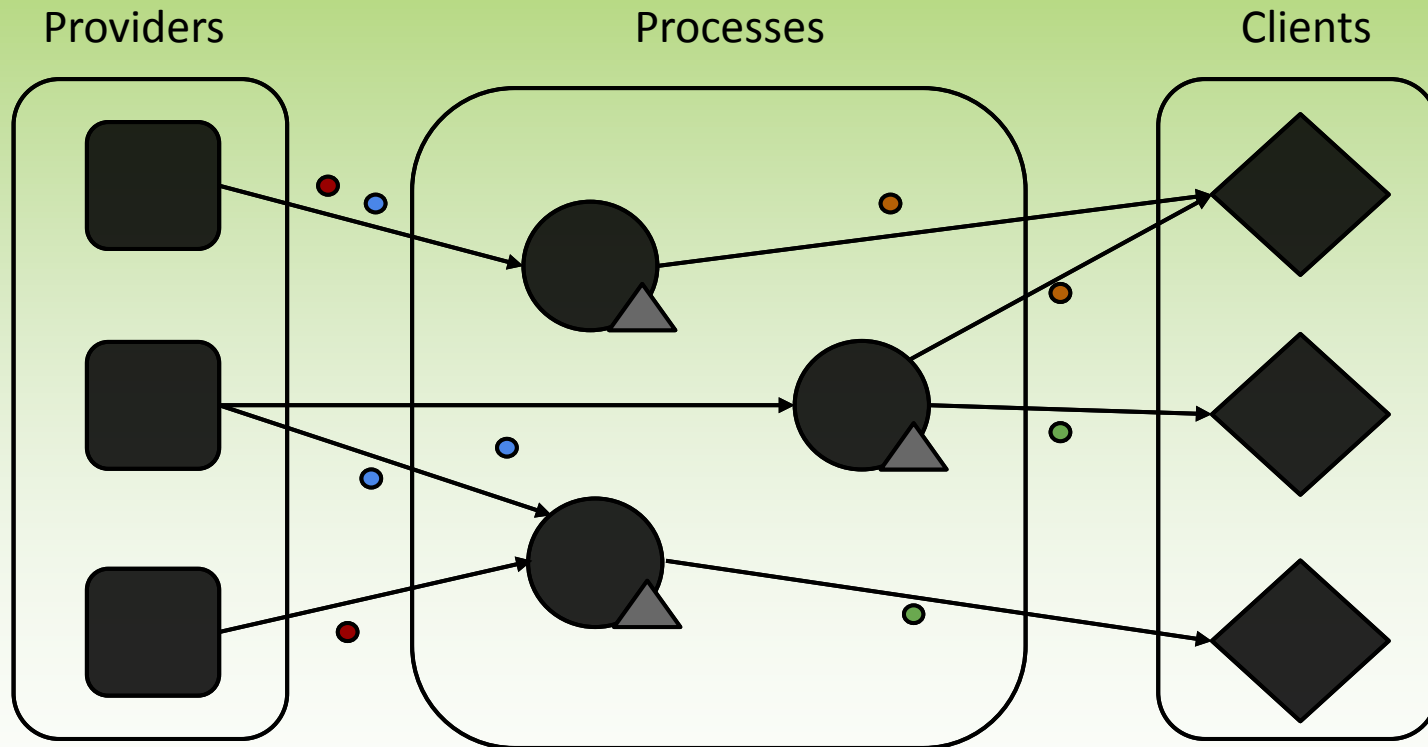


Cost of procurement of harvest residues according to tolerance to risk of damage



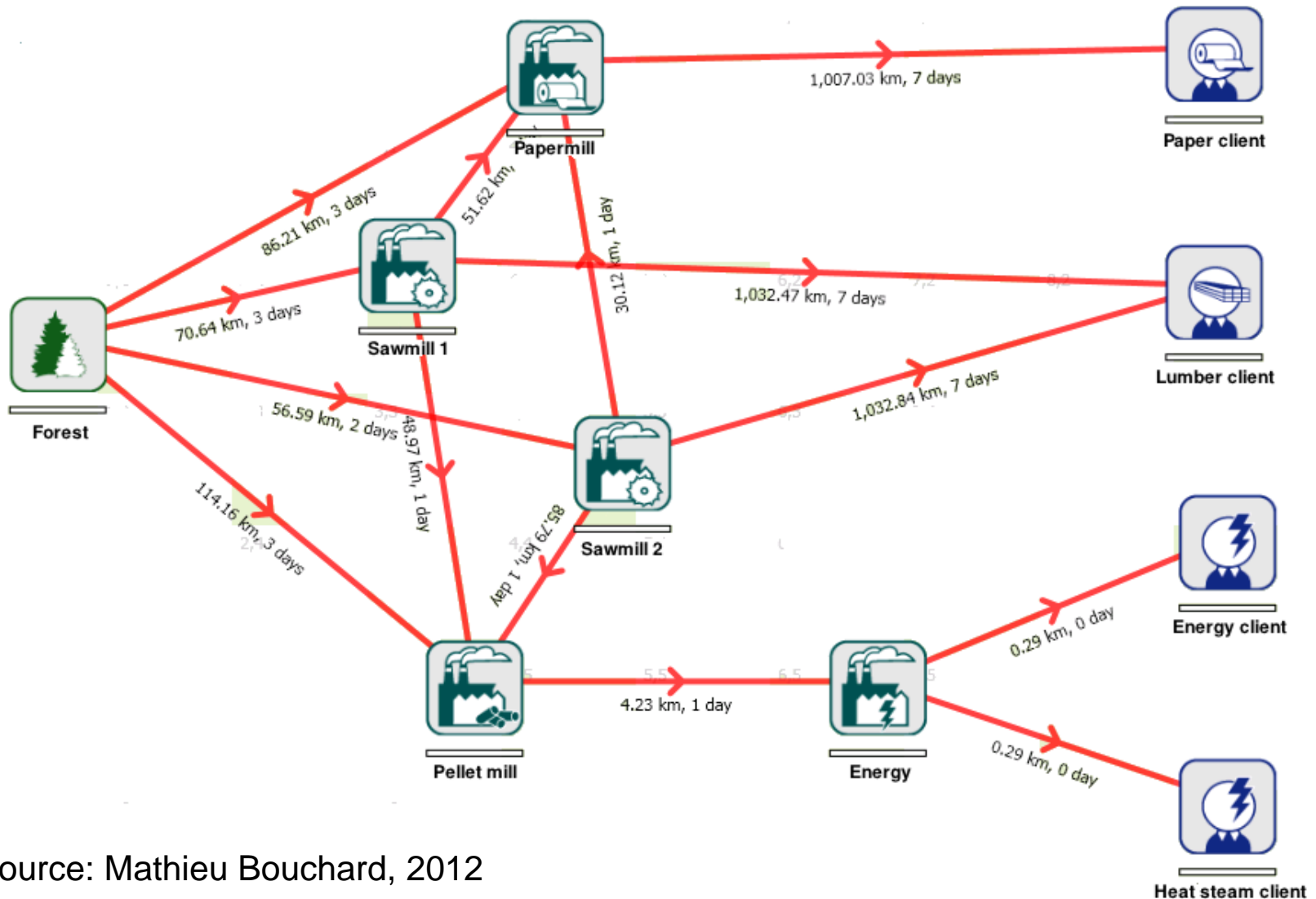
Integration of ecological aspects into value chain modelling

Generic value chain model in industrial engineering



Silvilab/Logilab value chain optimisation model

FORAC consortium, Laval University

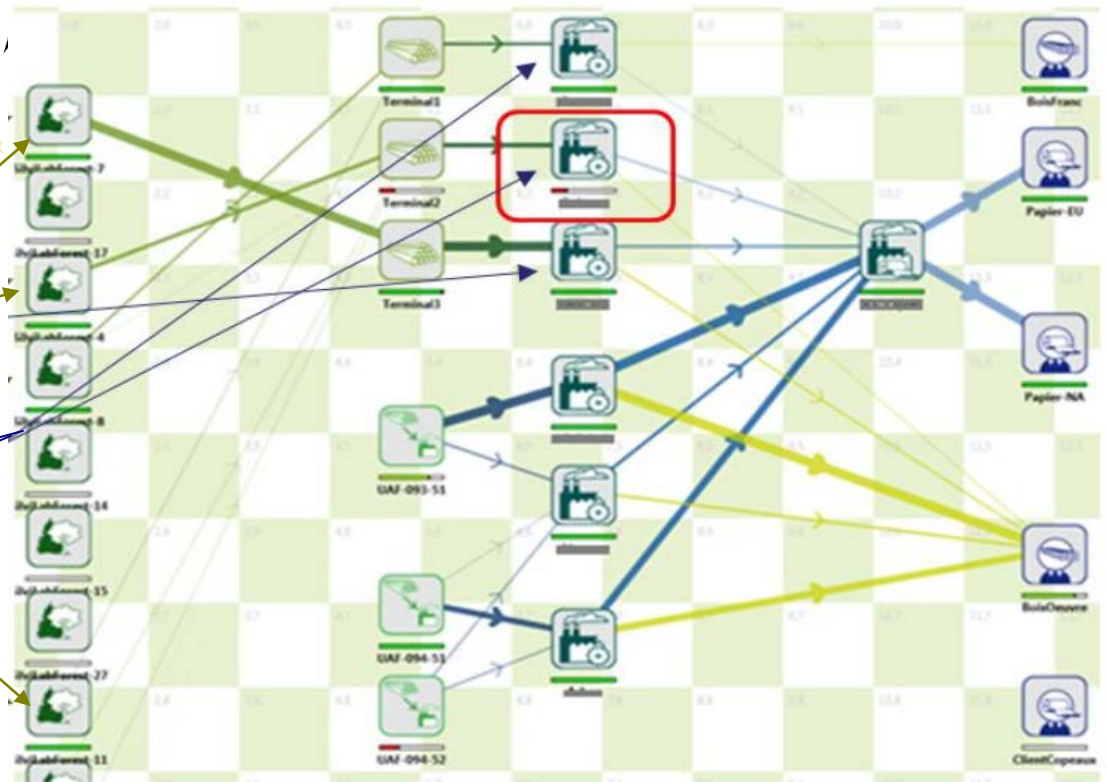
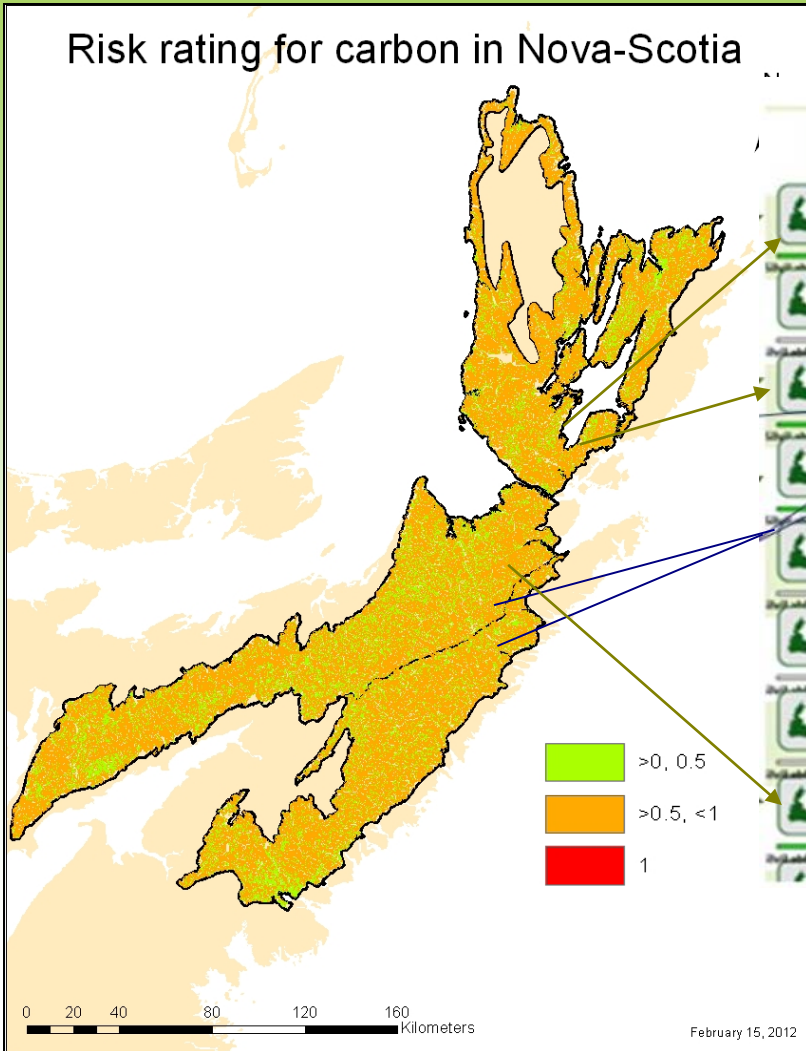


Source: Mathieu Bouchard, 2012

Bridging ecological knowledge with value chain modelling

Volumes of wood
Costs
Products
Carbon (carbon debt anyone?)

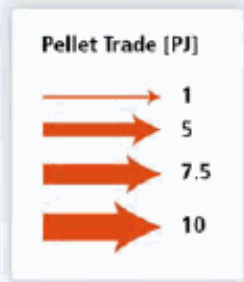
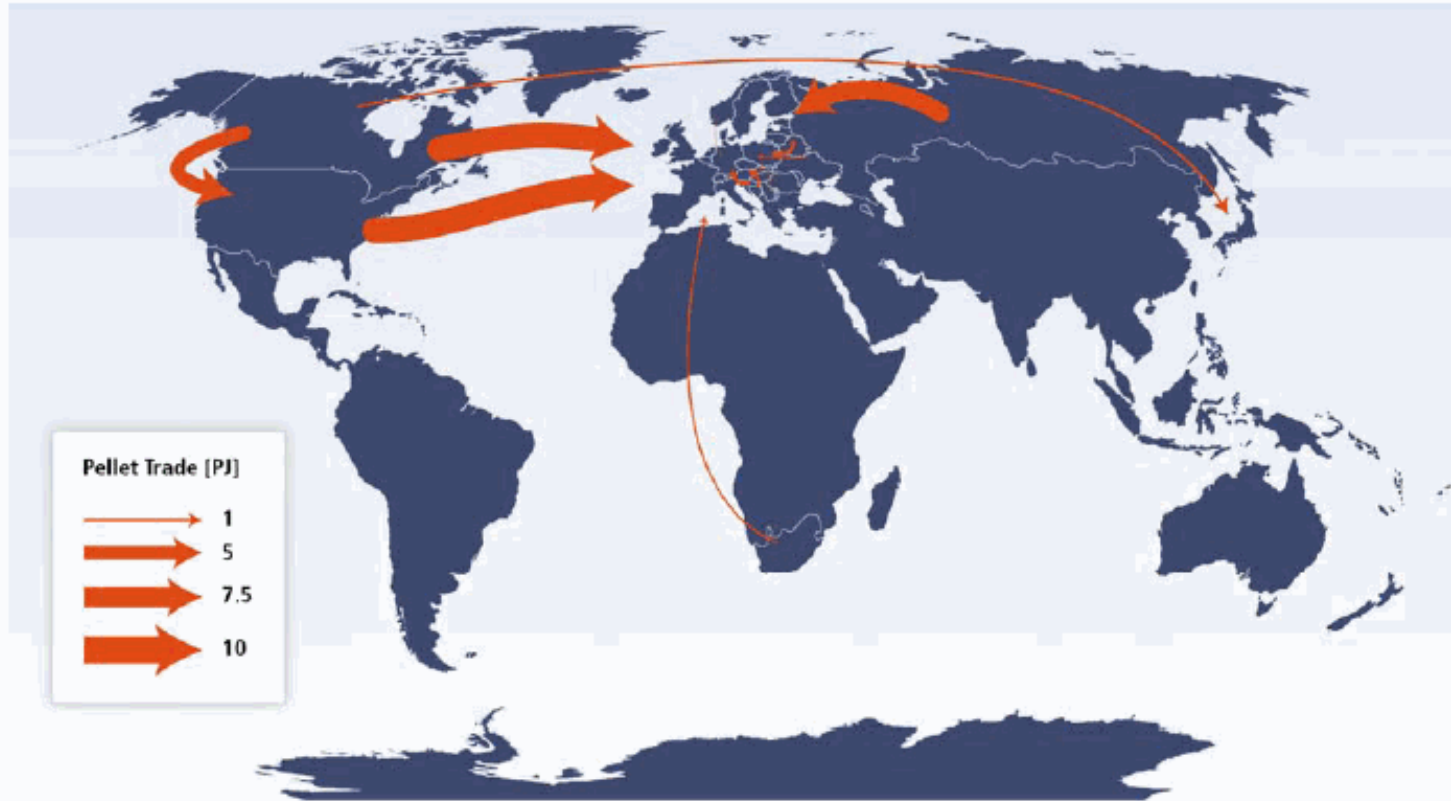
Risk rating for carbon in Nova-Scotia



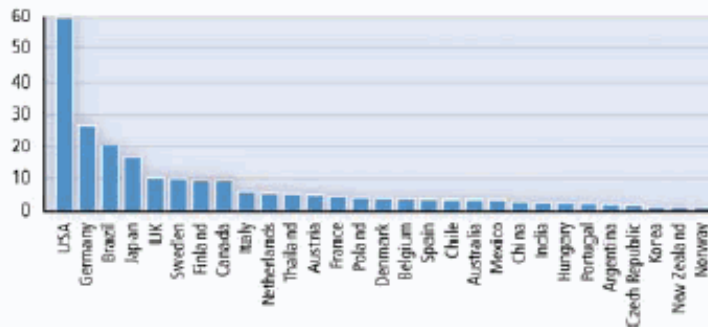
Export routes for solid biomass products

Junginger et al.

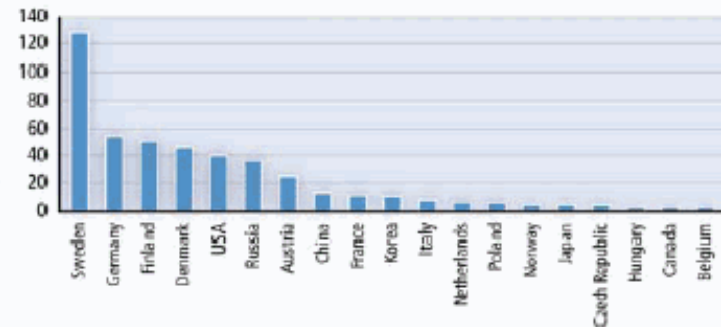
2009 Major Pellet Trade Flows

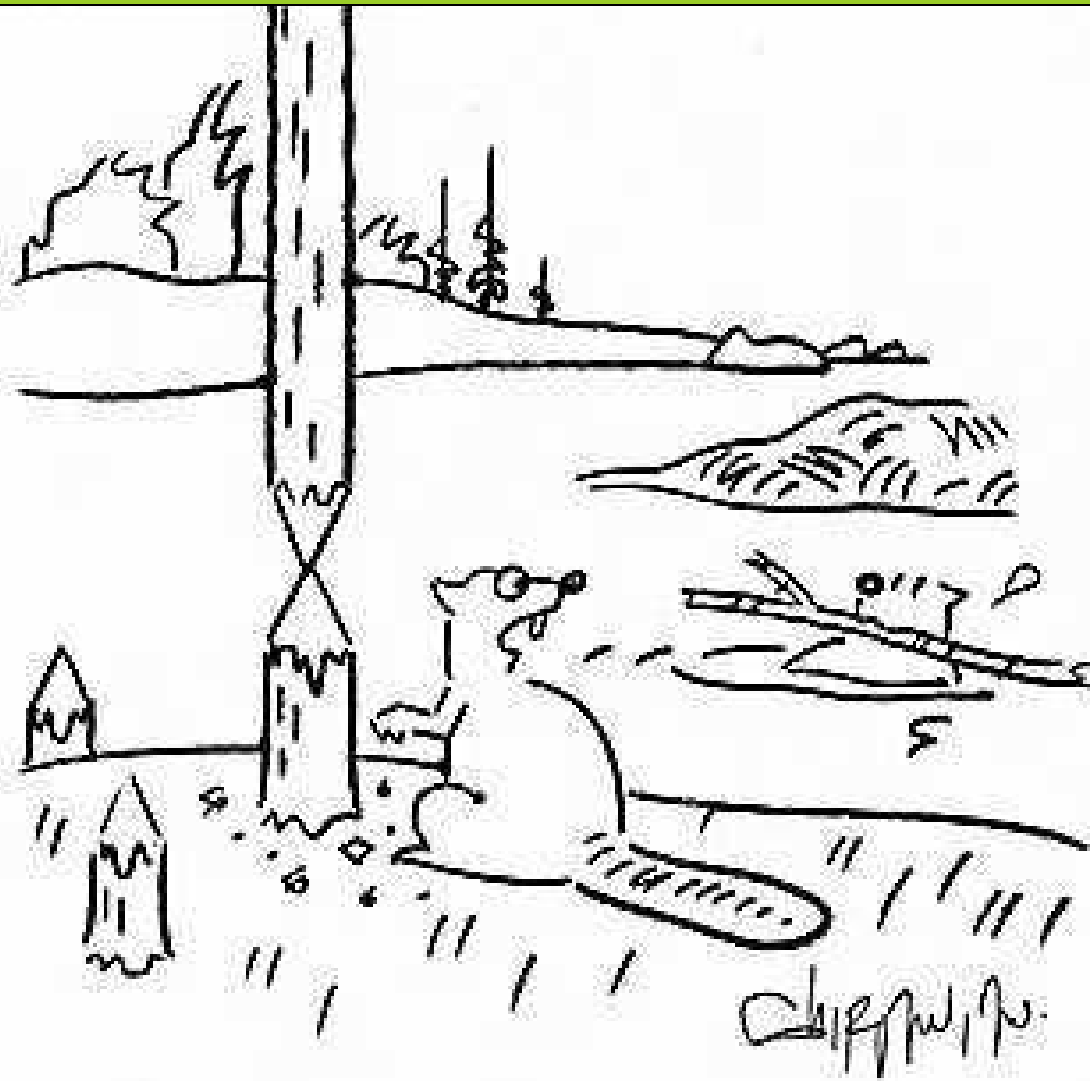


2008 Biomass Power [TWh]



2008 Biomass Heat [PJ]





"It's the last bite that worries me."

SUMMARY

- Estimate, manage and follow uncertainty sources in biomass inventories.
- Develop, improve and spatialize functional relationships between risks of ecosystem damage and site properties.
- Integrate ecological tools with industrial engineering tools.

