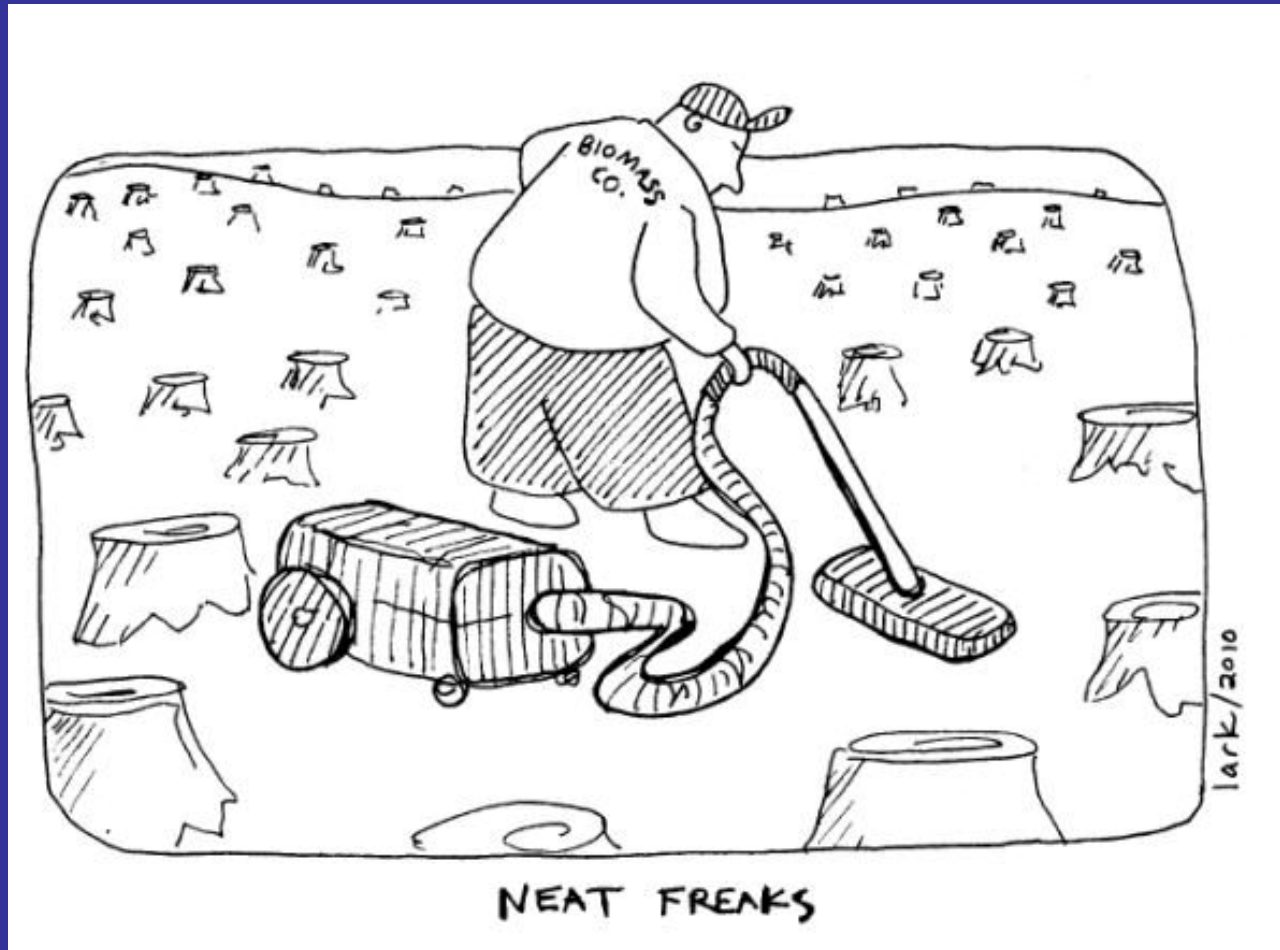


Establishing ecologically sustainable forest biomass supply chains: A case study in the boreal forest of Canada



Evelyne Thiffault
Canadian Forest Service

David Paré
Canadian Forest Service

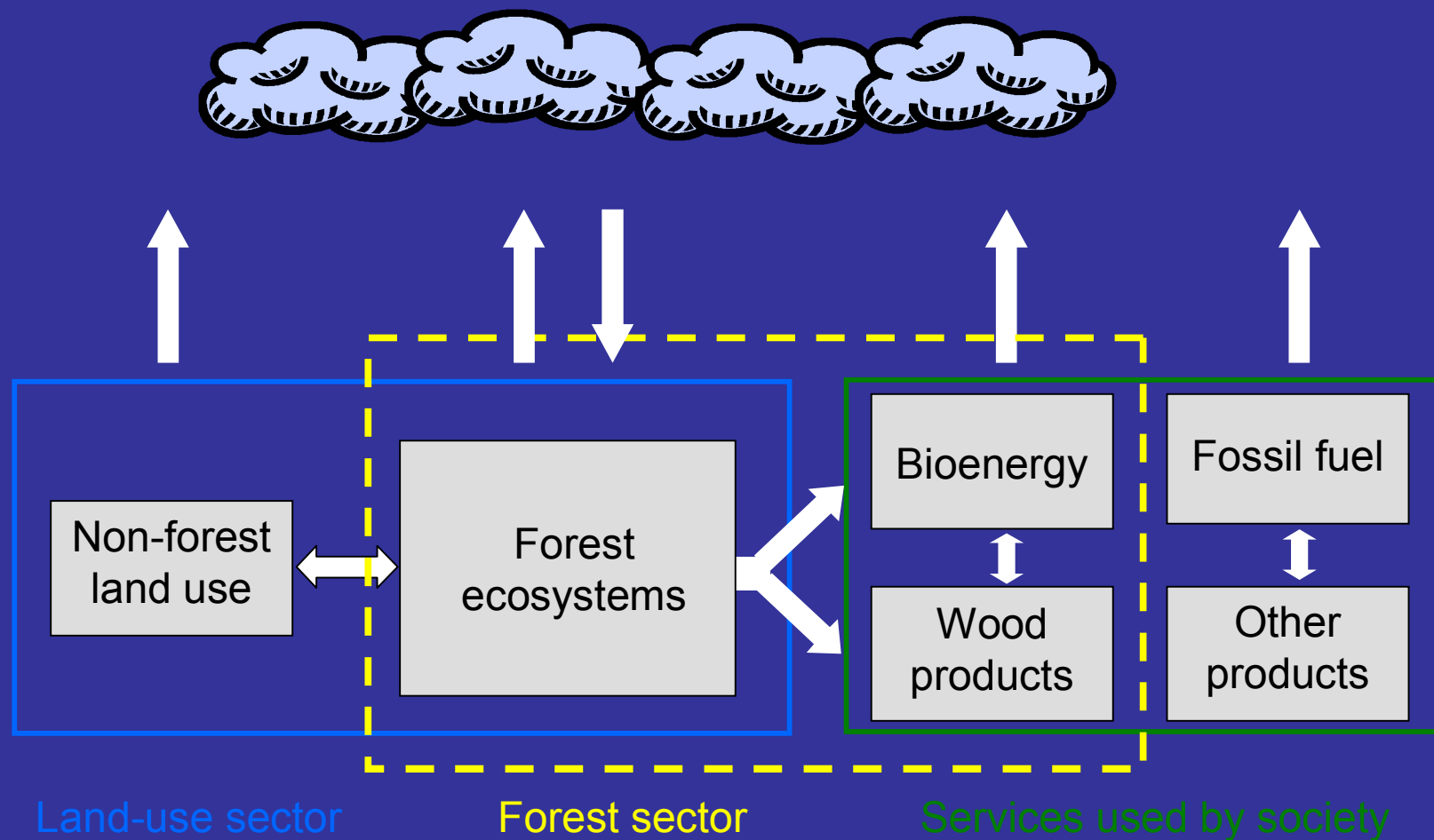
Sylvain Volpé
Denis Cormier
FPInnovations

Perttu Anttila
Metla

Dark side of the Force...

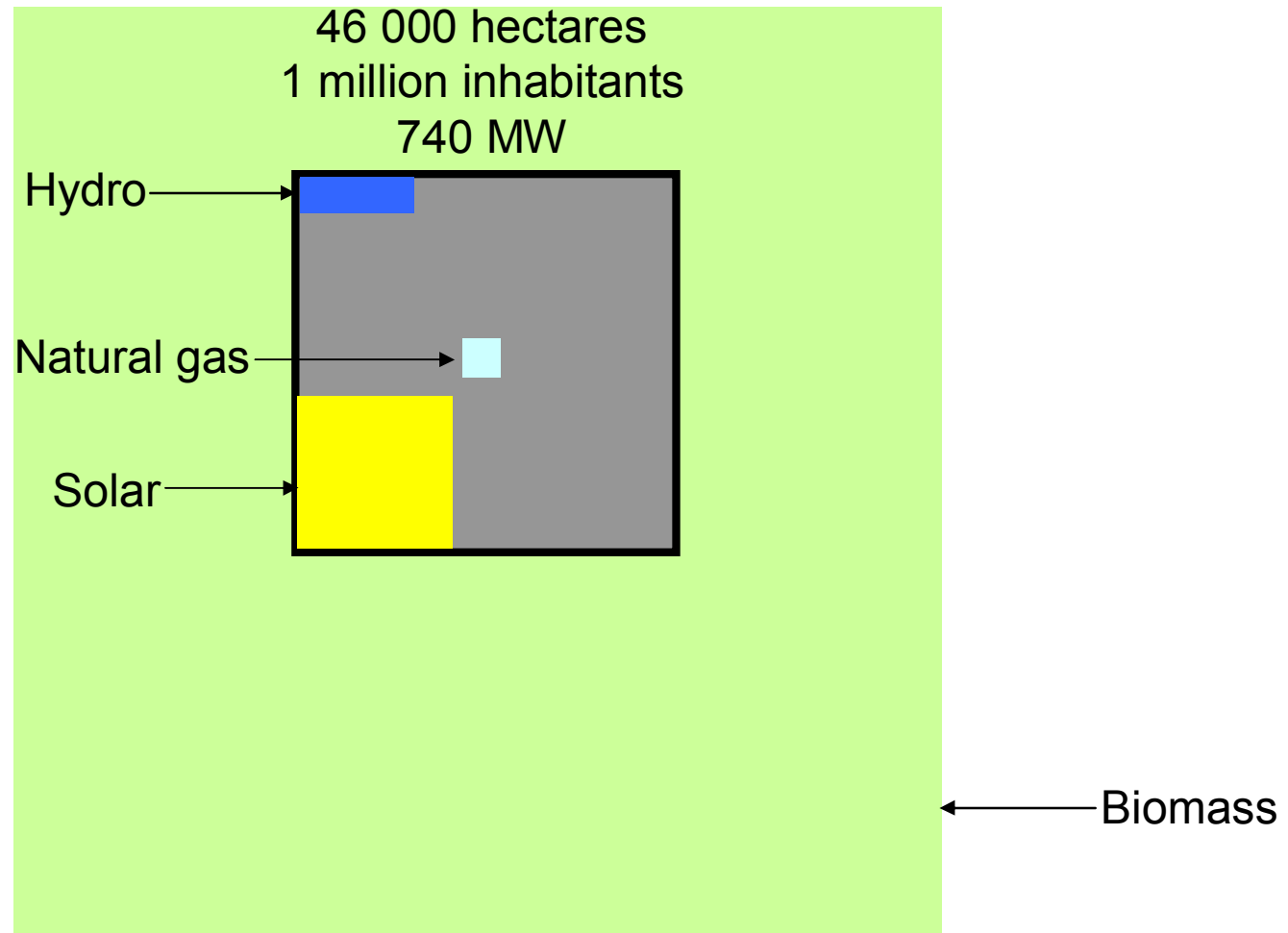


Minimise net emissions to the atmosphere



Area required to produce electricity

San José, California



Source: Science 329: 786-787



0 250 500 1 000
Kilometers

Harvest residues: tree tops and branches



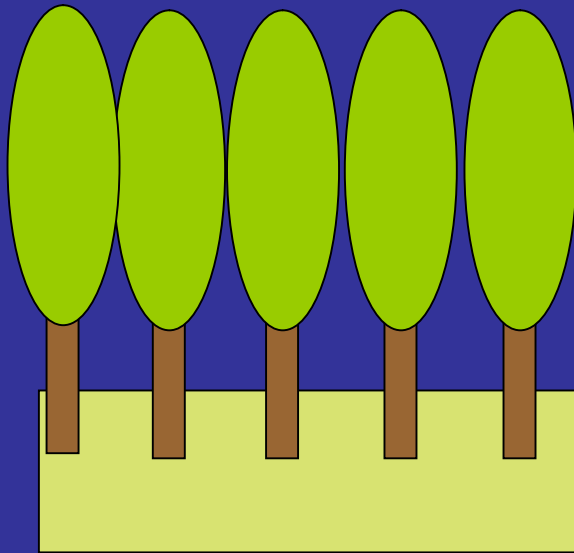
Dead trees from naturally disturbed stands



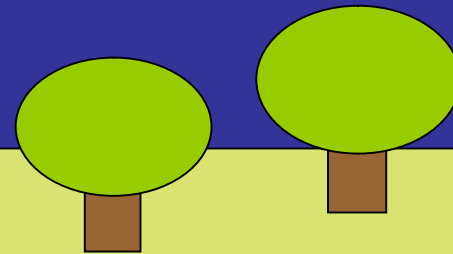
Canadian Forest Service

Short rotation woody crops

Poplar trees

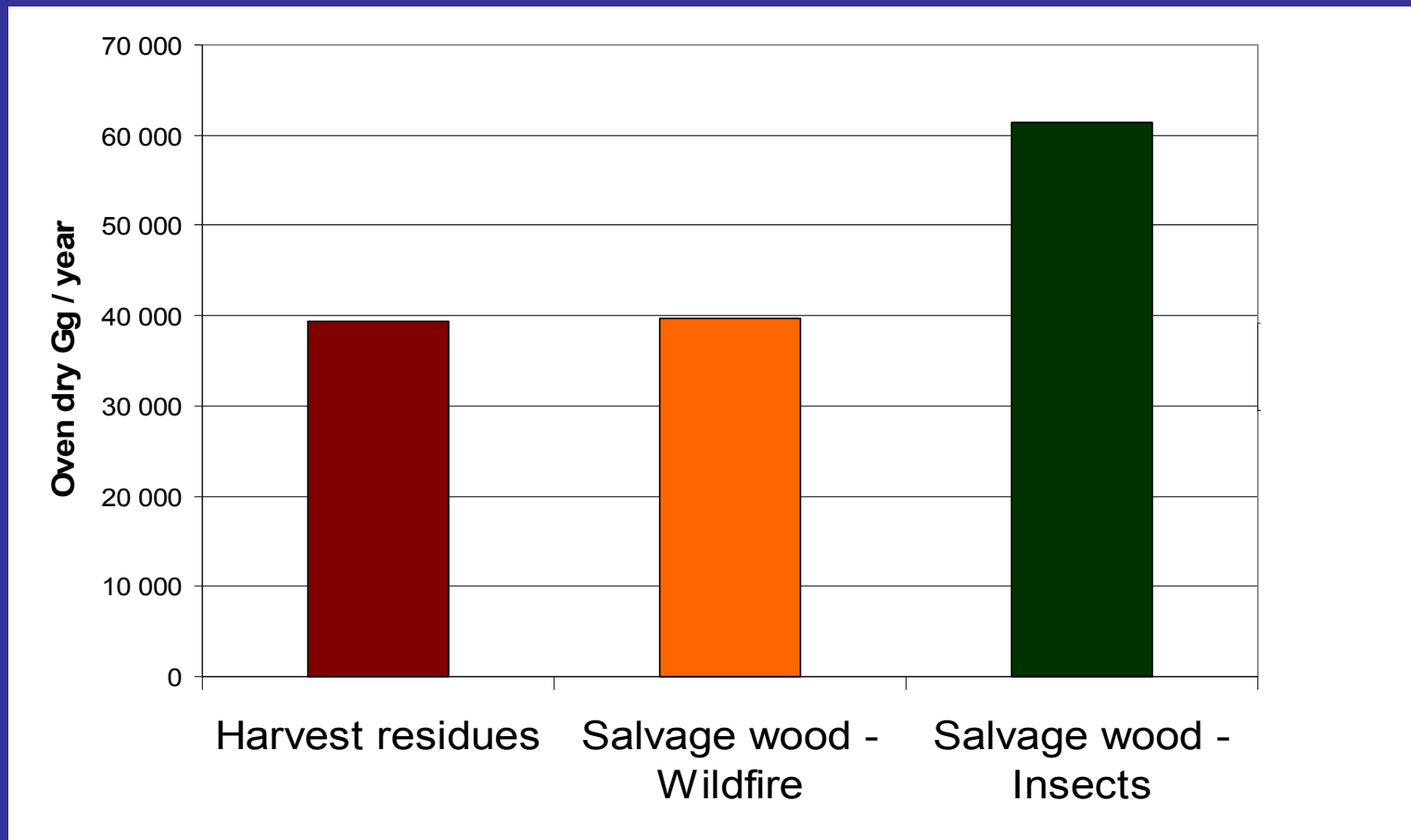


Not so popular trees



Forest biomass availability in Canada's managed forests

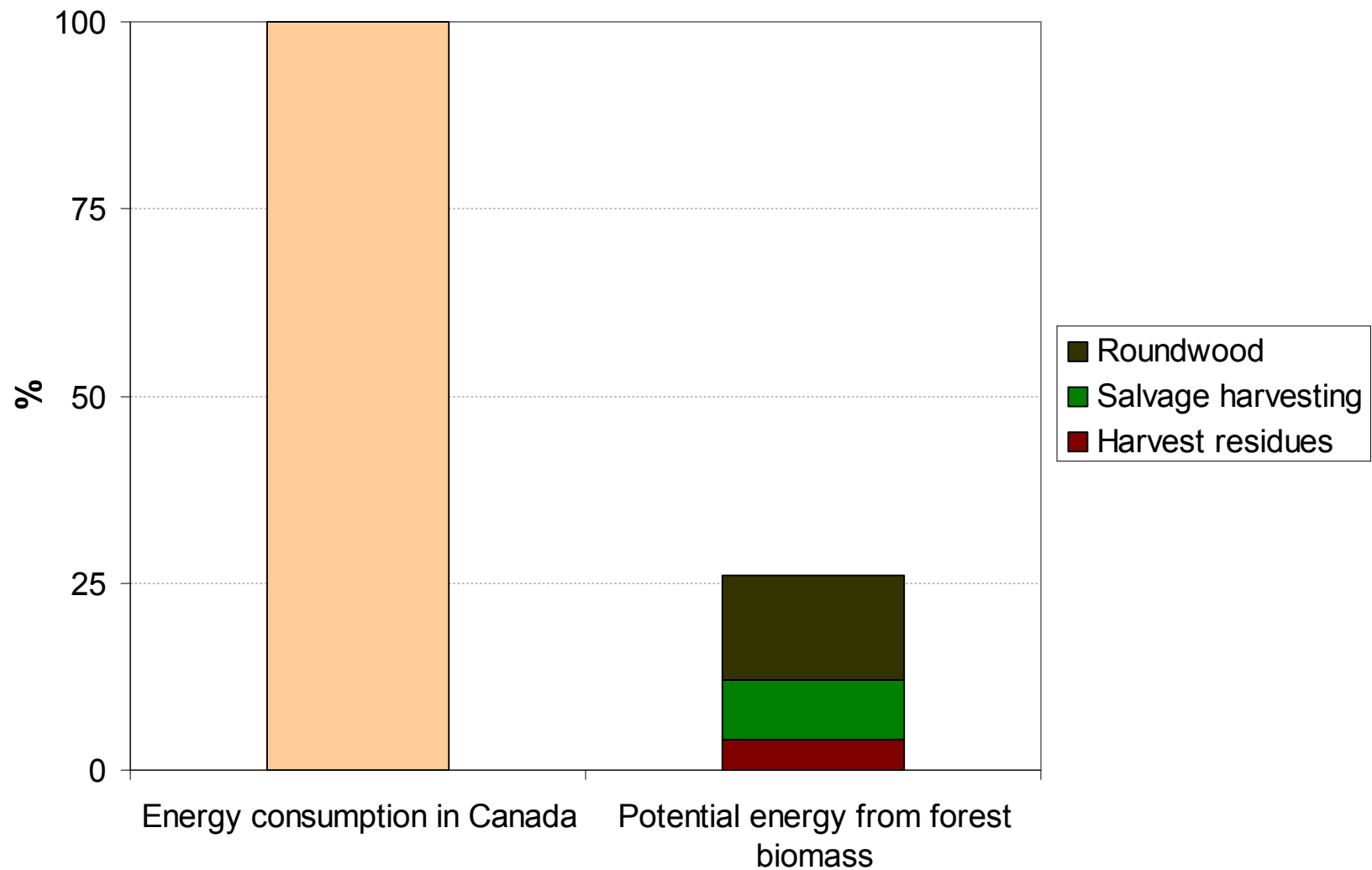
Dymond et al. 2010 For. Ecol. Manage. 260: 181-192



1 Gg = 1000 metric tons

Potential of forest biomass as an energy supply in Canada

Paré et al. 2011 For. Chron. 87: 71-76.



Forest bioenergy can contribute to energy demand and mitigate climate change.

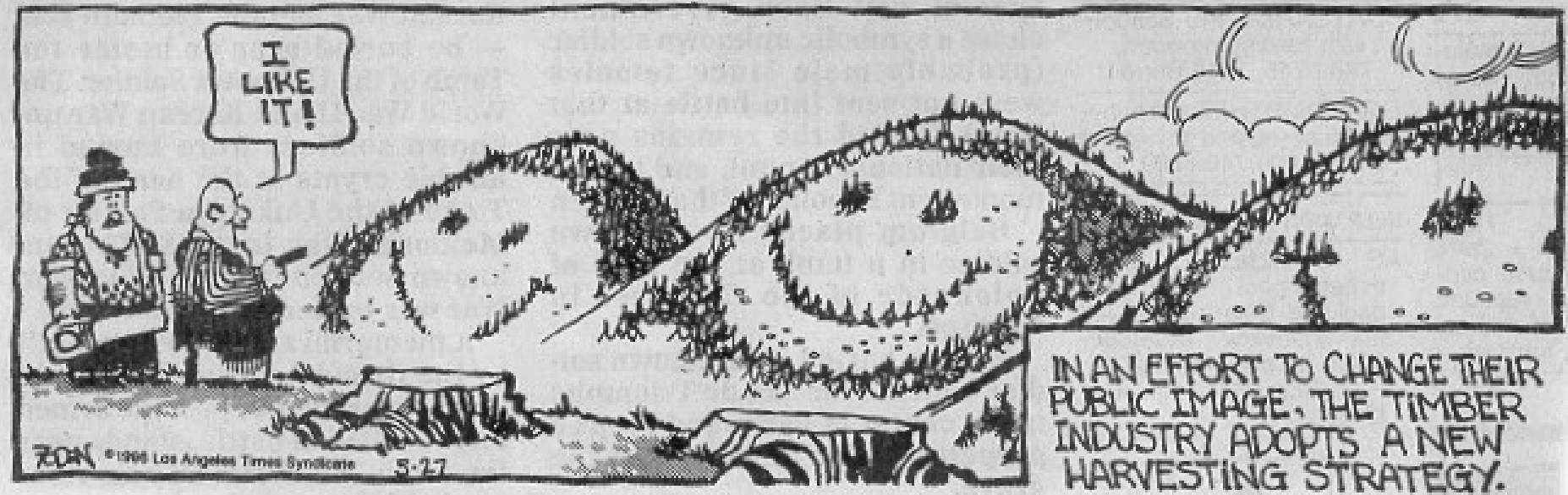
Canada's forests have a high potential for bioenergy – but are not a panacea.



Social license for forest management is hard to get...



Against The Grain



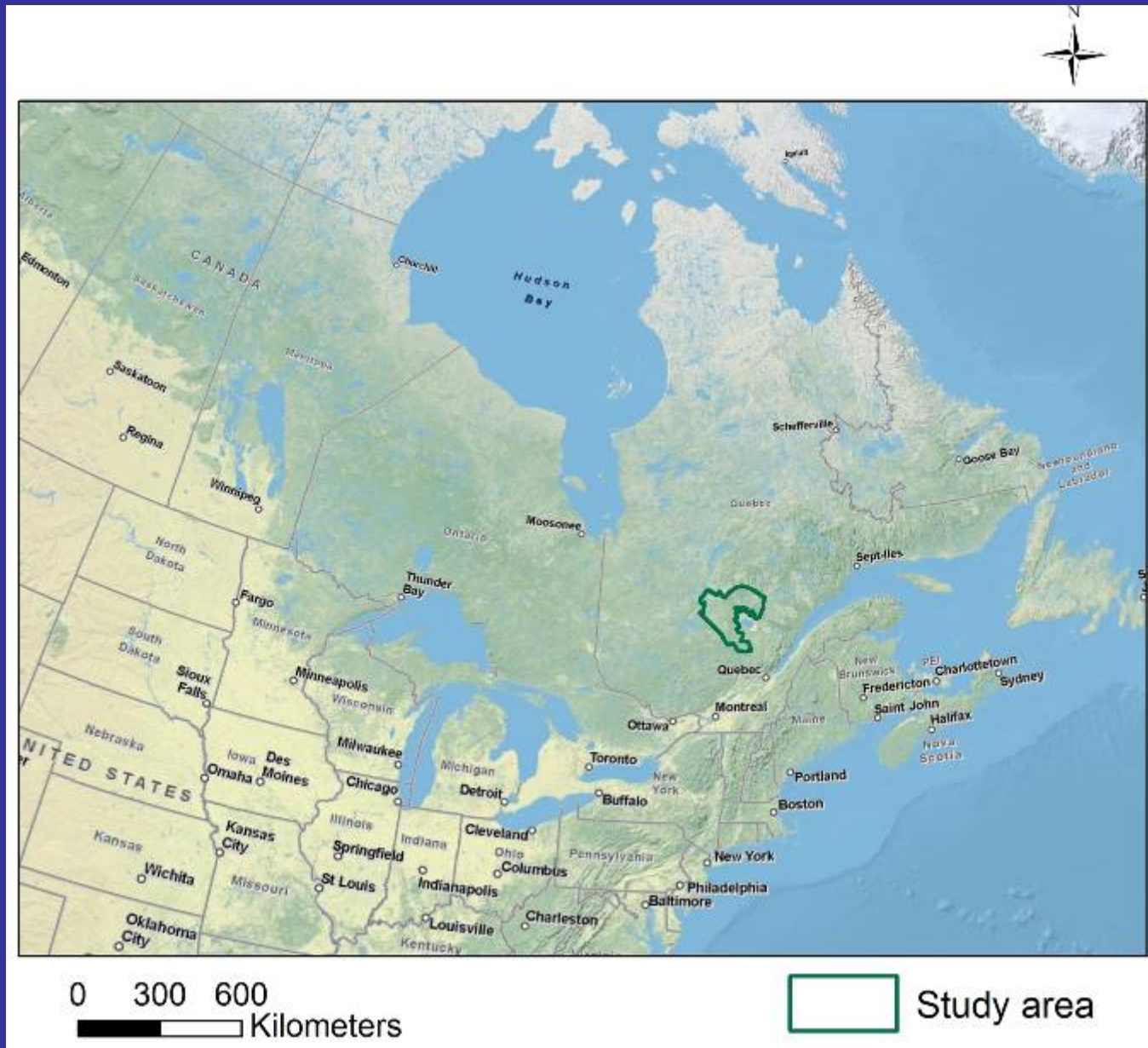
In an effort to change their public image, the timber industry adopts a new harvesting strategy.

Public concerns with forest biomass harvesting: Maintaining forest ecological services

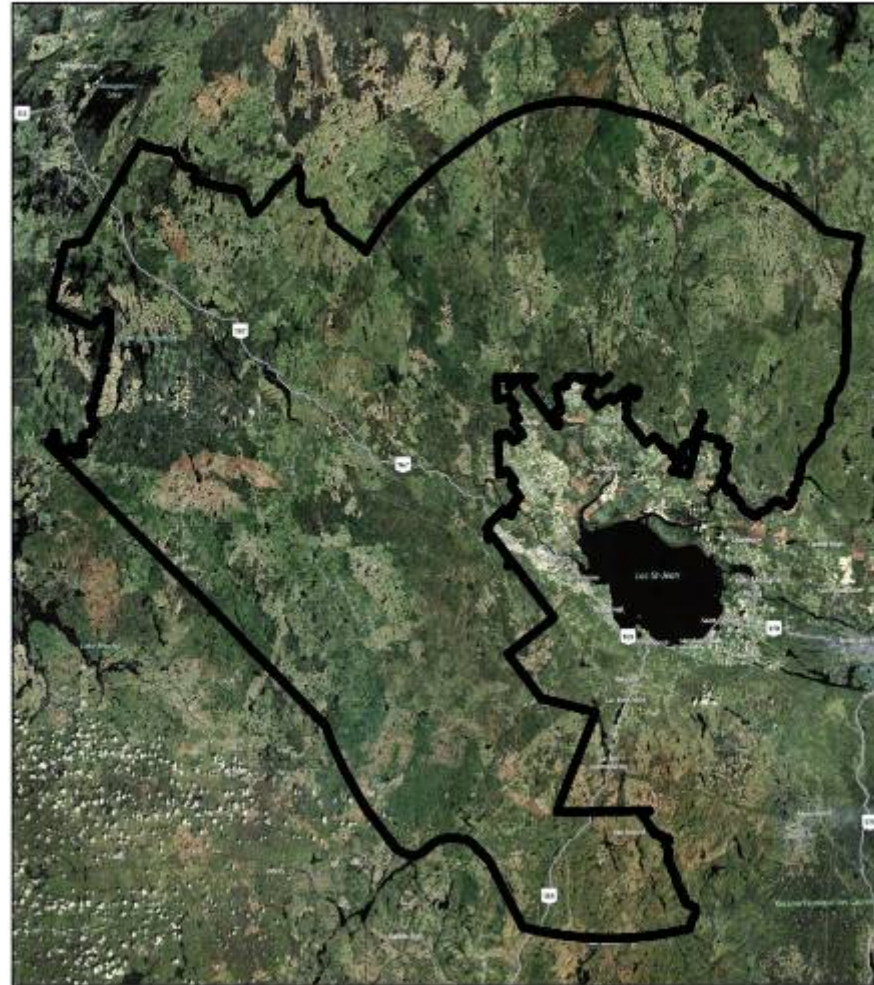


Case study: Establishing ecologically sustainable forest biomass supply chains

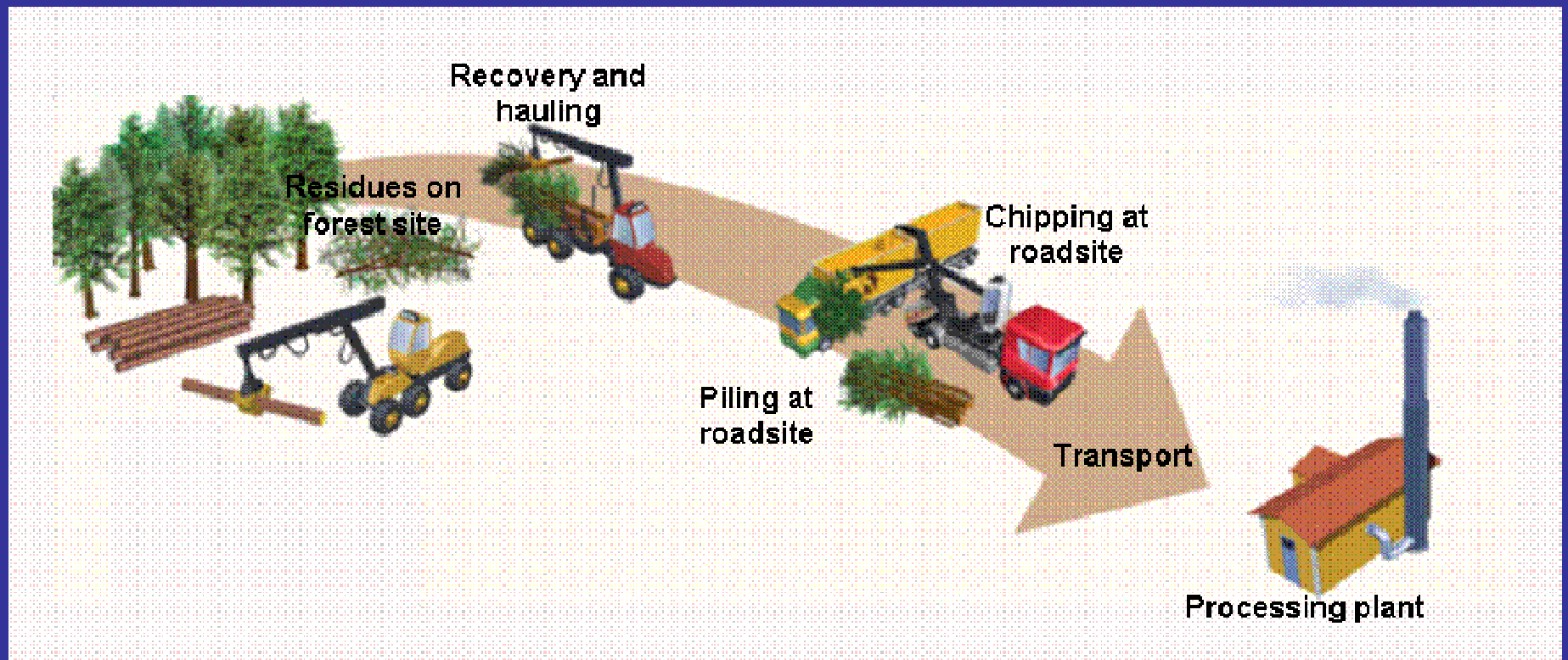
Thiffault et al.



Study area



0 15 30
Kilometers

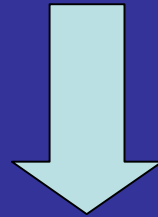


forestenergy.org

- Availability of harvest residues
- Cost of procurement
- C emissions

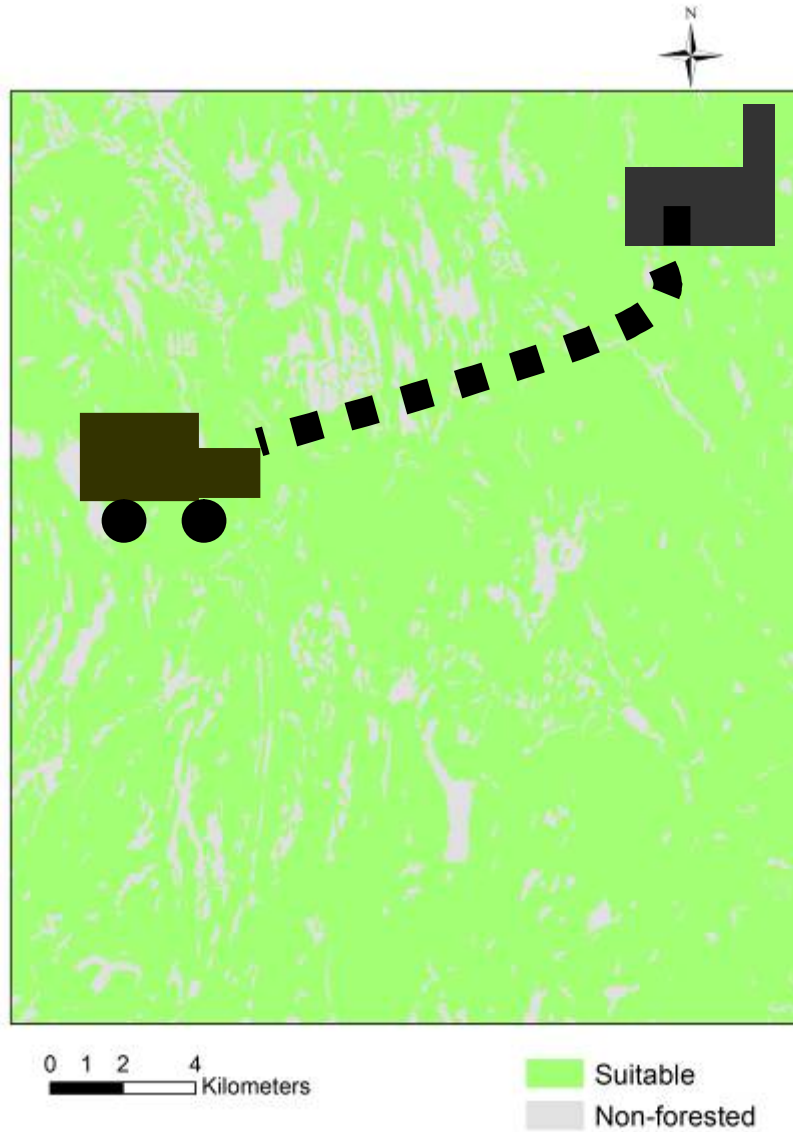
Ecological concerns with intensive forest biomass harvesting:

- Soil erosion
- Soil nutrient and organic matter depletion
- Sedimentation in water bodies
- Destruction of habitats associated with woody debris

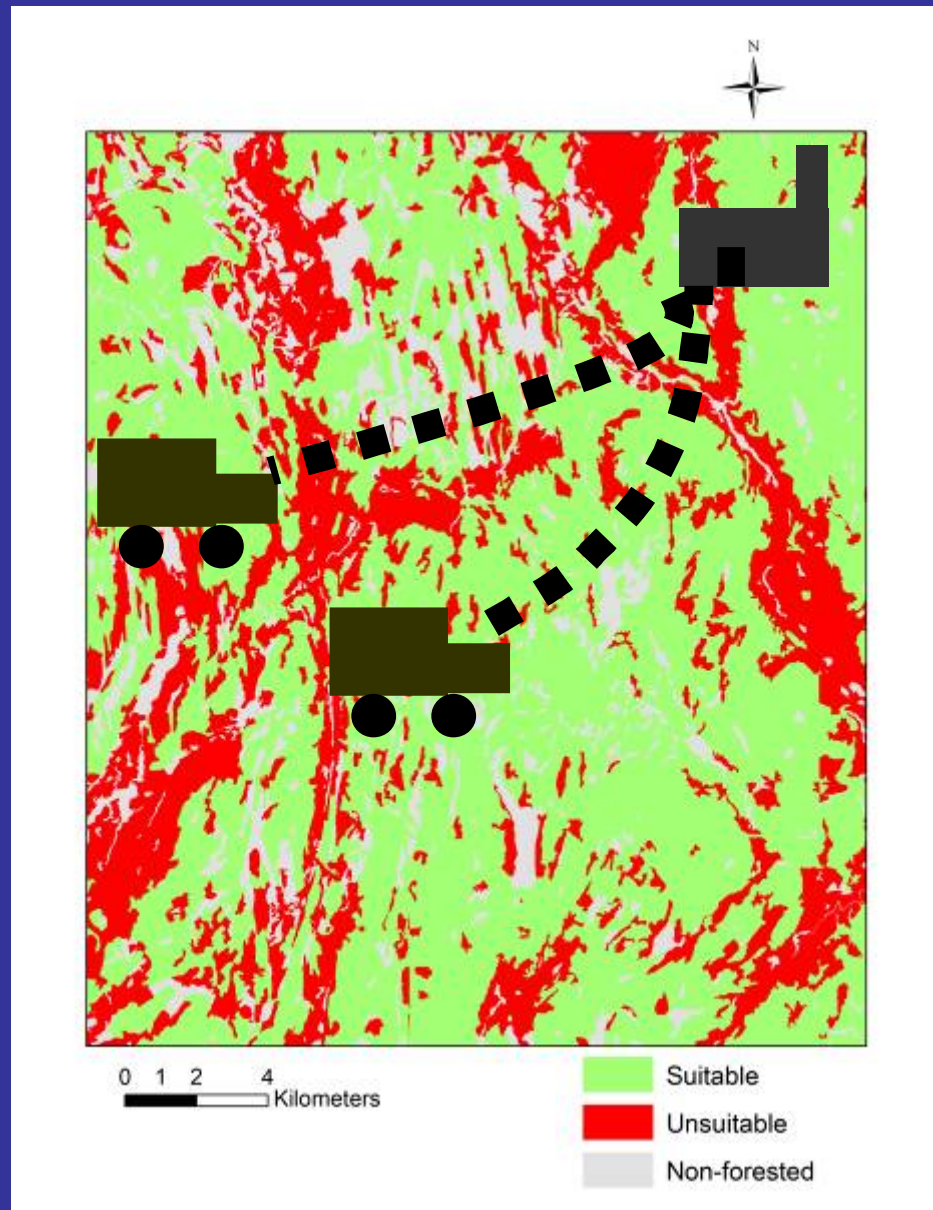


Spatial constraints to residue removal

High tolerance to ecological impacts



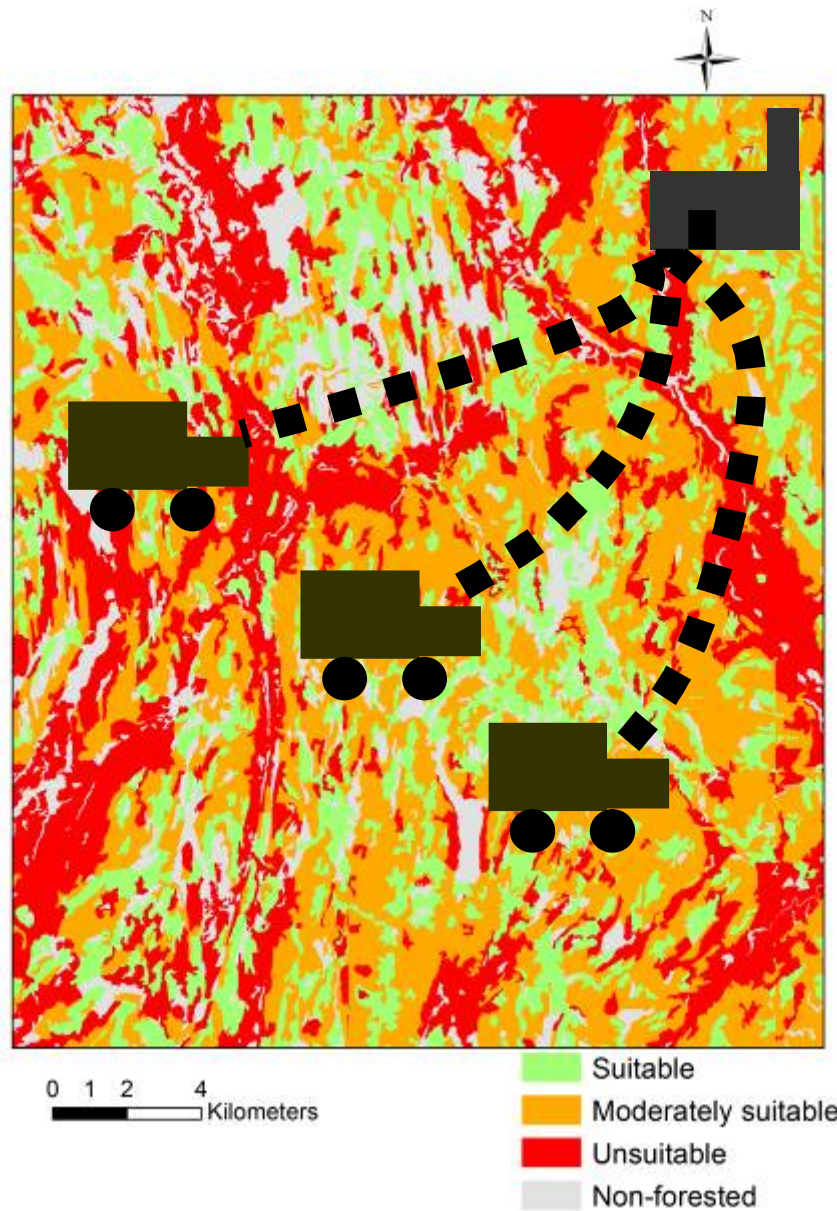
Moderate tolerance to ecological impacts



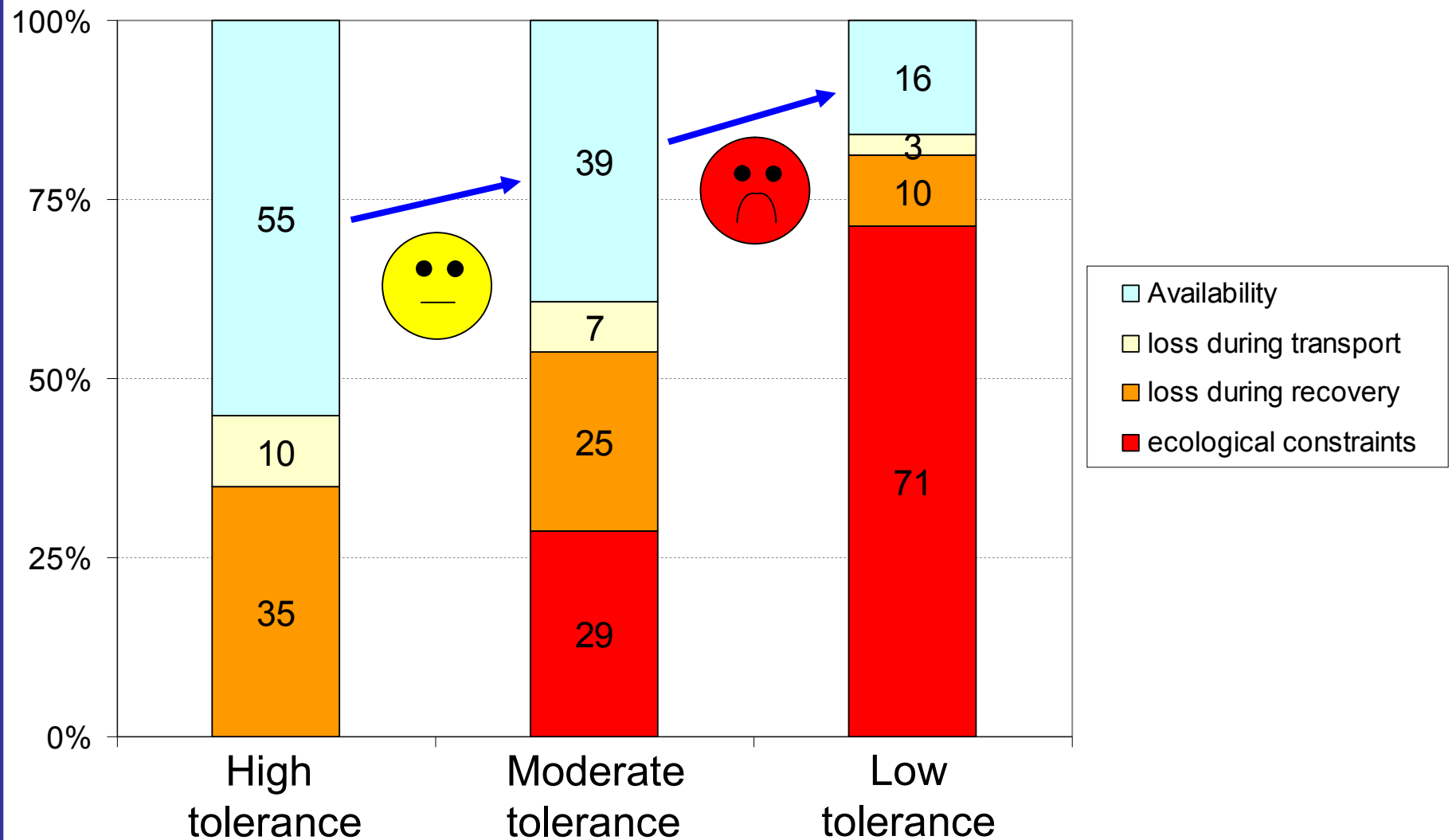
Longer driving distance to supply the same amount of residues



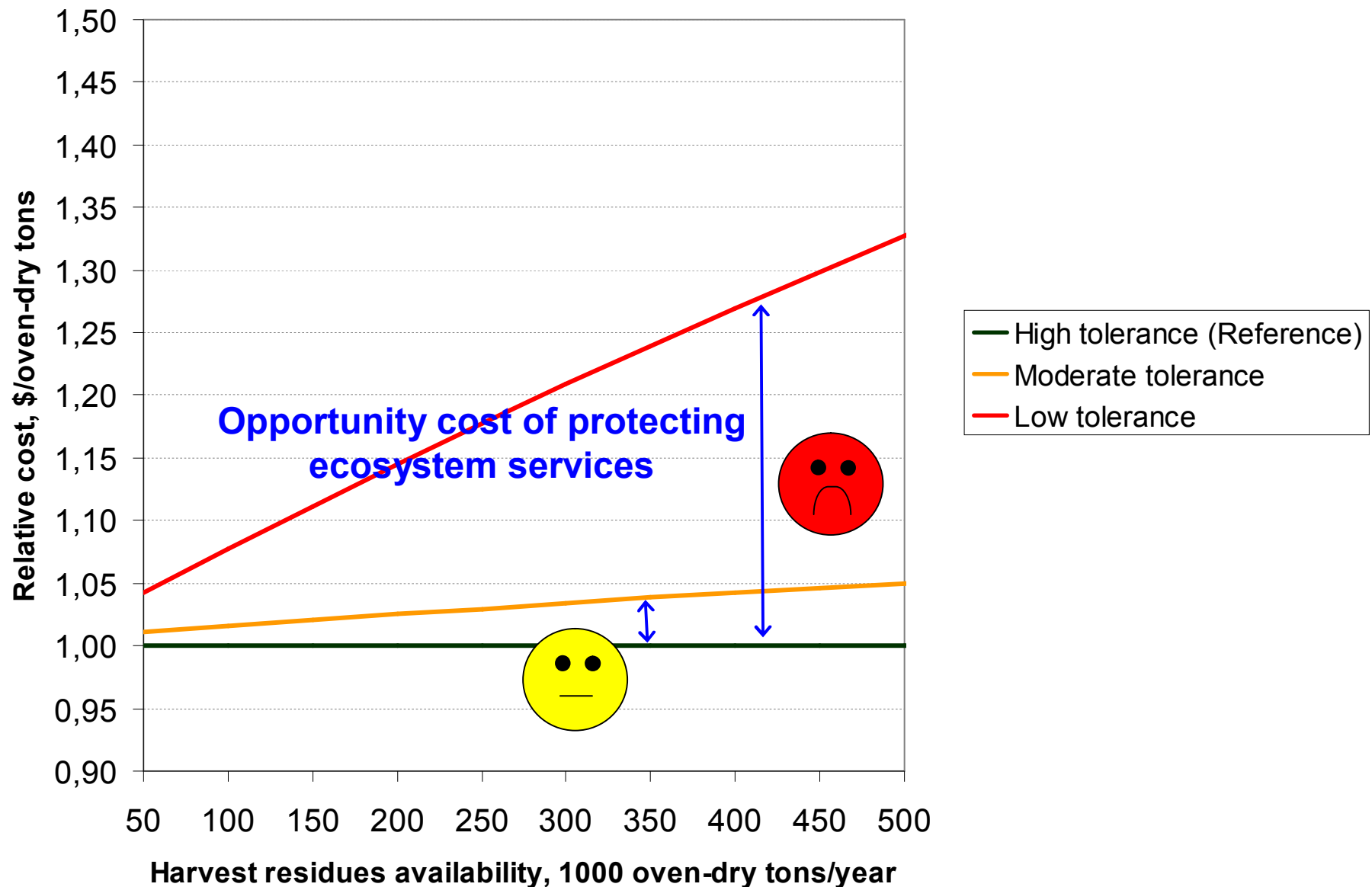
Low tolerance to ecological impacts



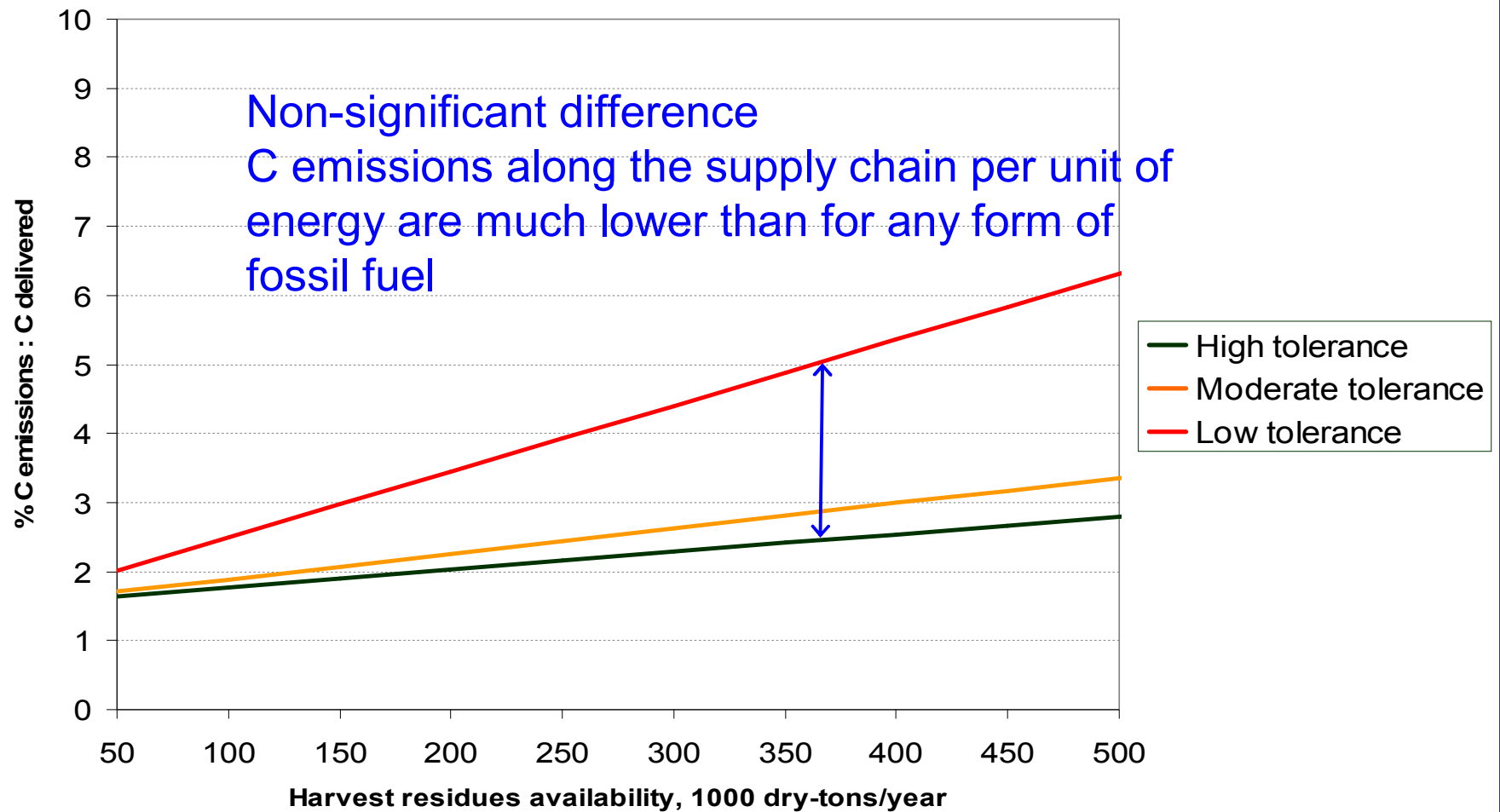
Harvest residue availability According to tolerance to ecological impacts



Cost of procurement of harvest residues according to tolerance to ecological impacts



C emissions along the supply chain of harvest residues



High (but not too strict) standards of ecosystem protection do not have significant impacts on availability and costs of forest biomass.

Something to mull over...

Agricultural Intensification:

Will land spared from farming be land spared for nature?

Matson and Vitousek 2006, Conservation Biology 20: 709-706

How can intensive systems be designed so that they have fewer and smaller impacts on ecosystems?

Best method to protect ecosystem services on a regional or global level:

Intensification on the best lands

More lands « saved for nature »



Canadian Forest Service

BUT:

Off-site effects of intensive systems:
Reduce capacity of surrounding ecosystems to provide ecological services



2009 © Jacques Morissette

Canadian Forest Service

Intensive systems:

- Purposefully developed so that they spare land for nature
- Increased precision and efficiency in production
- Have to be considered as parts of a greater system



...Good side of the Force!

