Climate Smart Forestry in support of net zero emission goals

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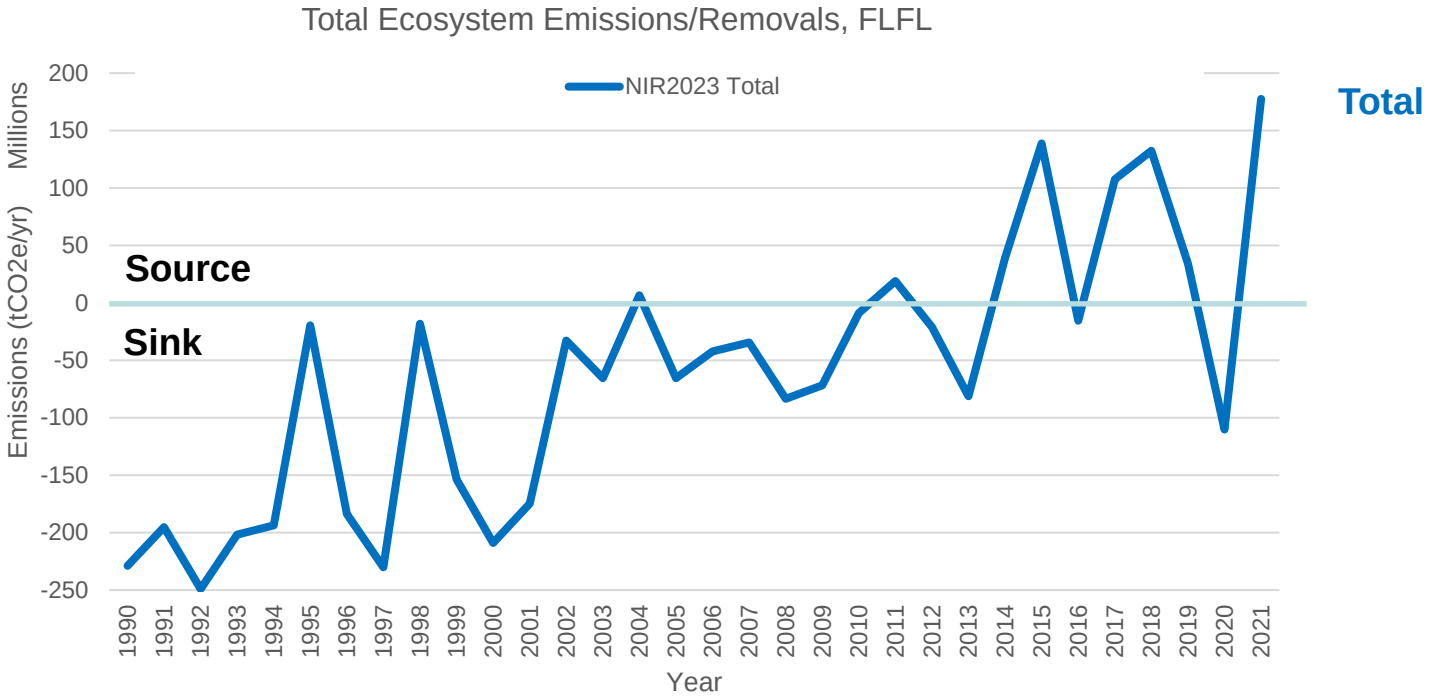
Canada

To limit global warming at ANY temperature we must reach net zero emissions globally

- To keep global average temperature increases below 1.5^{o} C **we need to achieve net zero in the early 2050s and net negative emissions** in the second half of this century.
- CO_2 removals from the atmosphere must be greater than emissions.
- Expectations are that the land sector, forests and wood product C storage will significantly contribute to these removals.
- But forests are at increasing risk from climate change impacts.

Forest Ecosystem Emissions and Removals – NIR2023

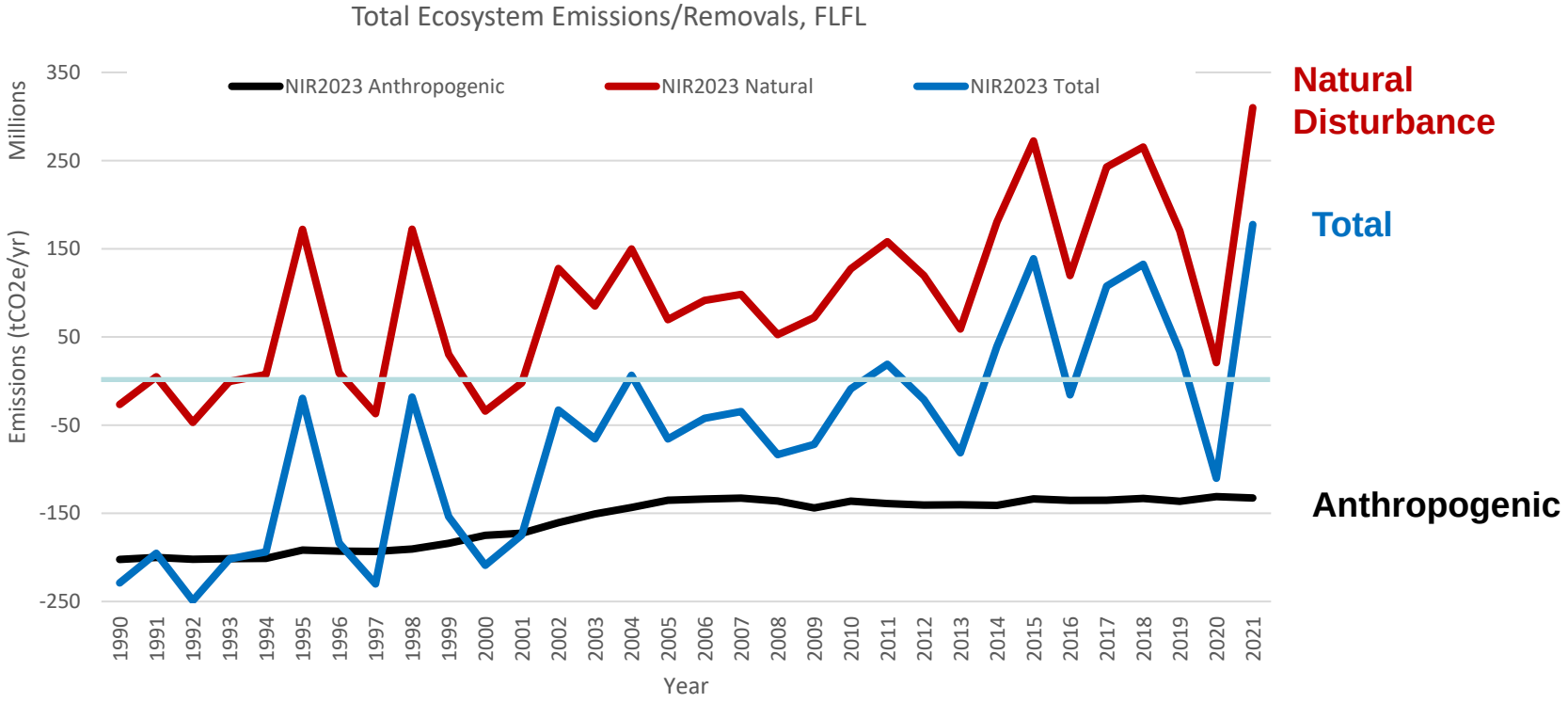
Includes impacts from human activities + severe natural disturbances like wildfire for Canada's Managed Forest (226 Mha), excluding emissions from HWP.



Source: Canada's NIR 2023 and CFS data

Disaggregation of Emissions and Removals – NIR2023

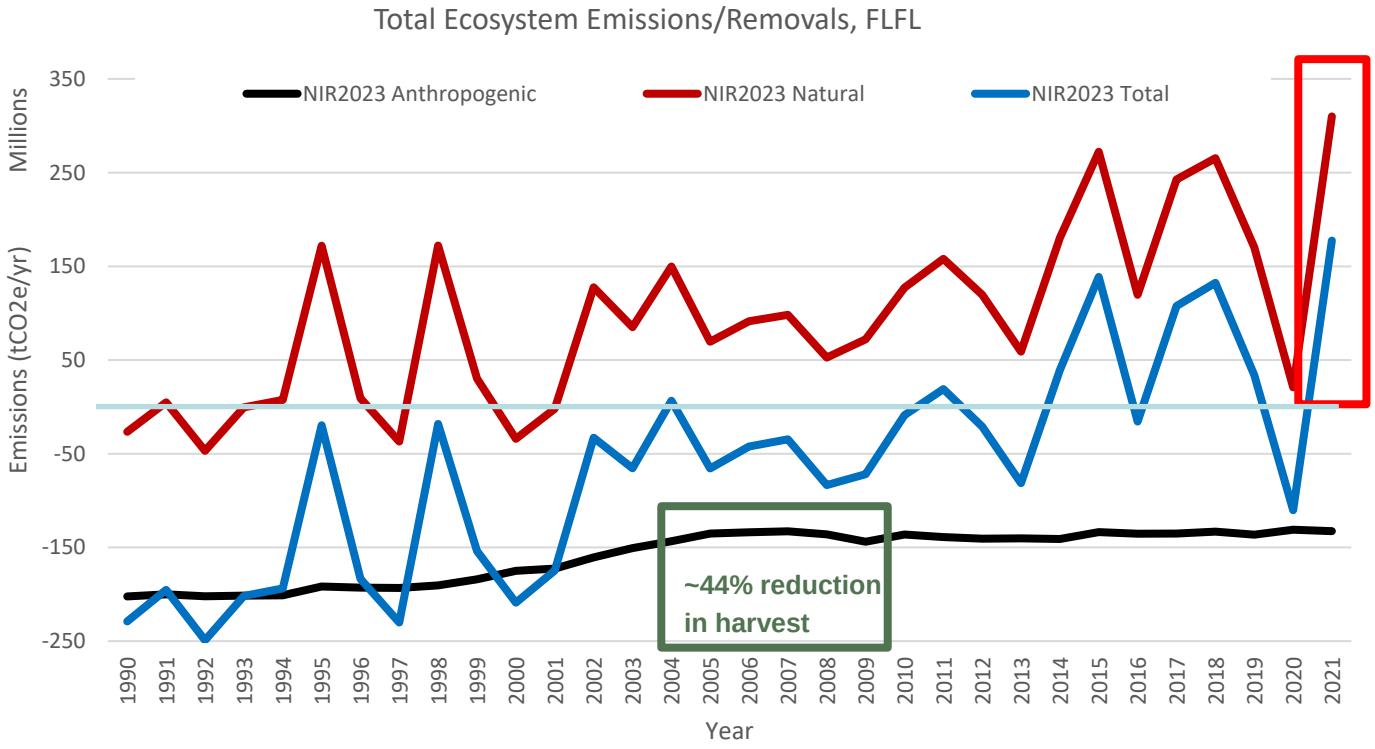
Disaggregated* into E/R component primarily influenced by human activities (Anthropogenic) and component primarily influenced by severe natural disturbances like wildfire (Natural)



* Kurz et al. 2018: https://doi.org/10.1139/cjfr-2018-0176 and IPCC 2019 Refinement

Could mitigation outcomes be overwhelmed by disturbances?

Will depend on the magnitude of changes in emissions/removals due to mitigation and disturbances



~290 Mt CO2e direct fire emissions

Change in disturbances?

Mitigation Outcomes?

* Kurz et al. 2018: https://doi.org/10.1139/cjfr-2018-0176 and IPCC 2019 Refinement

PICS Wildfire and Carbon Project

How can we reduce future wildfire emissions, increase carbon sinks and strengthen BC's forest-based bio-economy?

Wood and biomass removed from forests to reduce fuel loads can be used in engineered wood products, insulation, bioenergy etc.

Combines mitigation and adaptation objectives.

Collaboration between PICS, CFS, USFS, UBC, Parks Canada, and BC Govt.

https://pics.uvic.ca/projects/wildfire-and-carbon

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Estimating GHG costs of alternative strategies

Modelling GHG balance of BC's forest ecosystems at 1 ha spatial resolution.

Implementing alternative fire risk reduction strategies (for selected regions).

Quantifying the GHG emissions associated with alternative strategies, including use of biomass in bioeconomy, for novel and long-lived products and resulting C storage.

Sink changes due to promotion of broadleaf species and landscape design.

Estimating GHG benefits of alternative strategies

Biggest scientific challenge of the project is the estimation of changes in area burned, emissions per hectare and future fire responses to alternative strategies.

Recent extreme fire weather conditions are often referred to as ‘unprecedented’.

Improved data and models are being developed to quantify responses to treatments.


Source: BCWS

A new focus of forest management

- If the land sector is to contribute to net zero pathways, then forest management has to refocus from producing timber and biomass to **removing atmospheric CO_2.**
- The mitigation objective is to **increase the net sinks in forests and the forest product sector** and to reduce emissions in other sectors through wood use.
- This does not always imply increasing forest C stocks: adds more potential energy at risk from rapid release by forest fires.
- **Requires active management** to increase forest health, biodiversity, and resilience to climate change.

Conclusions

- Keeping temperature increase to below 2 ^{o}C requires **net zero emissions** by 2050.
- Requires **drastic reductions of emissions** in all sectors.
- Not achievable without also greatly increasing **forest sinks**.
- But forests are also at **risk from climate change**.
- Requires greatly increased efforts to **reduce wildfire emissions**.
- Canada’s forest sector can make a contribution to net zero targets – but must **address vulnerabilities to climate change** impacts.

Thank you

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Publications at:

https://cfs.nrcan.gc.ca/authors/read/13977

https://scholar.google.ca/citations?user=nhemay8AAAAJ&hl=en

https://cfs.nrcan.gc.ca/publications?id=40710 (List of CBM publications)

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Harvested Wood Product (HWP) Emissions

Canada reports as HWP emissions the annual emissions of biotic carbon from the production, use and disposal of all products manufactured from wood harvested in Canada since 1900, regardless of where in the world these emissions occur.

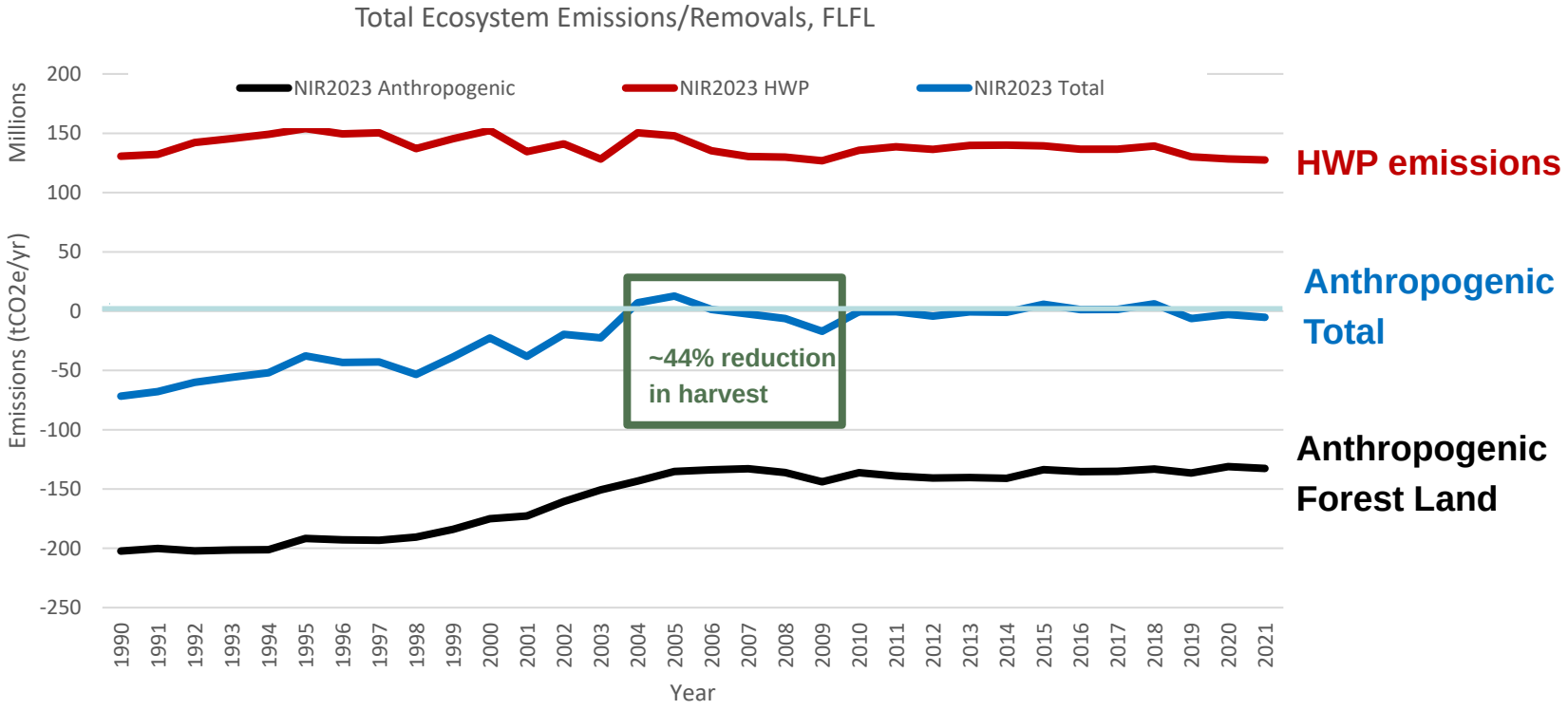
About 45% of the HWP emissions occur outside Canada.

About 65% of the HWP C is stored in products outside Canada.

In Canada's oil and gas sector, emissions from the consumption of fossil fuels are reported in other sectors (in Canada) or by other countries if these emissions occur abroad (consistent with international guidelines).

Anthropogenic component plus HWP emissions

Total reported emissions attributed to human activities include the land sink in the anthropogenic component plus the emissions from HWP.



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