Accounting Options for Land Use, Land-Use Change and Forestry - Forest Management

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Canada

Canada's Objectives for LULUCF Rules

1. Substantially improved incentives for mitigation benefits through sustainable land management.

2. An accurate accounting of LULUCF sector's contribution to GHG balance.

3. Accounting that focuses on anthropogenic emissions and removals in the LULUCF sector.

Outline

- Overview of issues in forest management (FM) accounting
- Canada's forest carbon balance
- Forward-looking baseline approach to forest management (FM) accounting



Kyoto Rules Do Not Encourage Efforts to Achieve Full Forest Sector Mitigation Potential

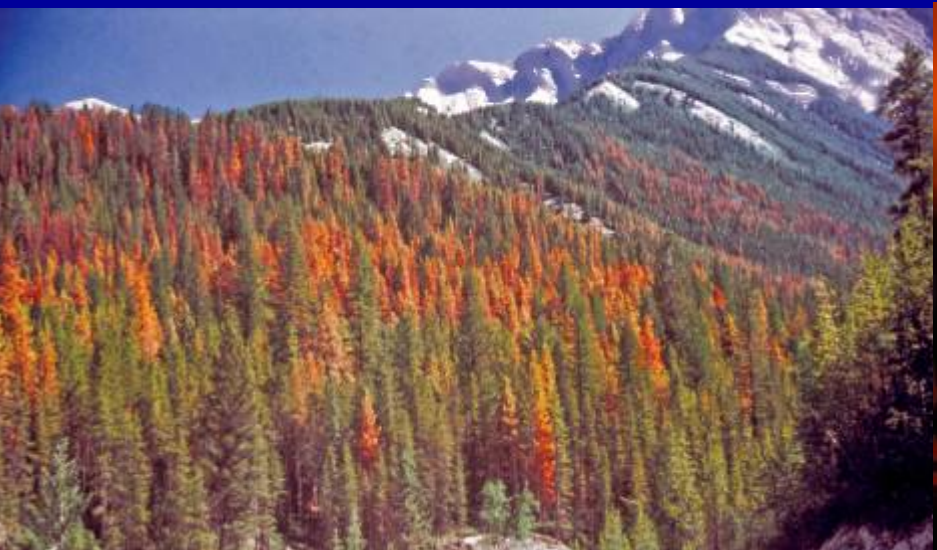
- IPCC AR4, WGIII identified large Forest Sector mitigation potential
- 22 of 36 Annex 1 countries elected FM under Article 3.4 of the Kyoto Protocol – the FM mitigation potential is neither achieved nor incented under the current rules
- Rules create barriers to achieving the FM mitigation potential
  1. Rules fail to account for pre-1990 age-class legacy (see next slides)
  2. Rules do not address natural disturbance and climate change risks (see next slides)
  3. Caps introduced as a crude way to minimize the potential for natural and indirect emissions/removals to enter the accounting, but caps substantially reduce incentives in most Parties

Issue 1:
Effects of Age-Class Legacy

- The future GHG balance of the area subject to forest management is affected by today's age-class structure, which is the result of past disturbances (natural and human).
- Measuring the absolute stock changes over a specified (commitment) period confounds impacts of management (change) with effects of age-class legacy.
- Forest management areas with a "left-shifted" (young) age-class structure are more likely to be sinks, while those with a "right-shifted" age-class structure are more likely to be sources, even with the same management regime.

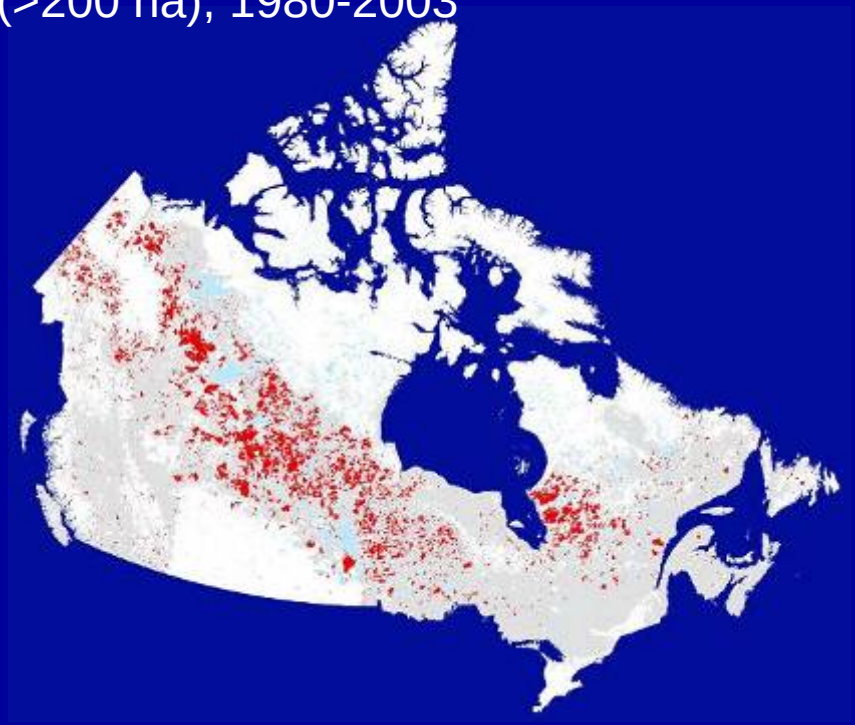
Issue 2:
Effects of Natural Disturbances

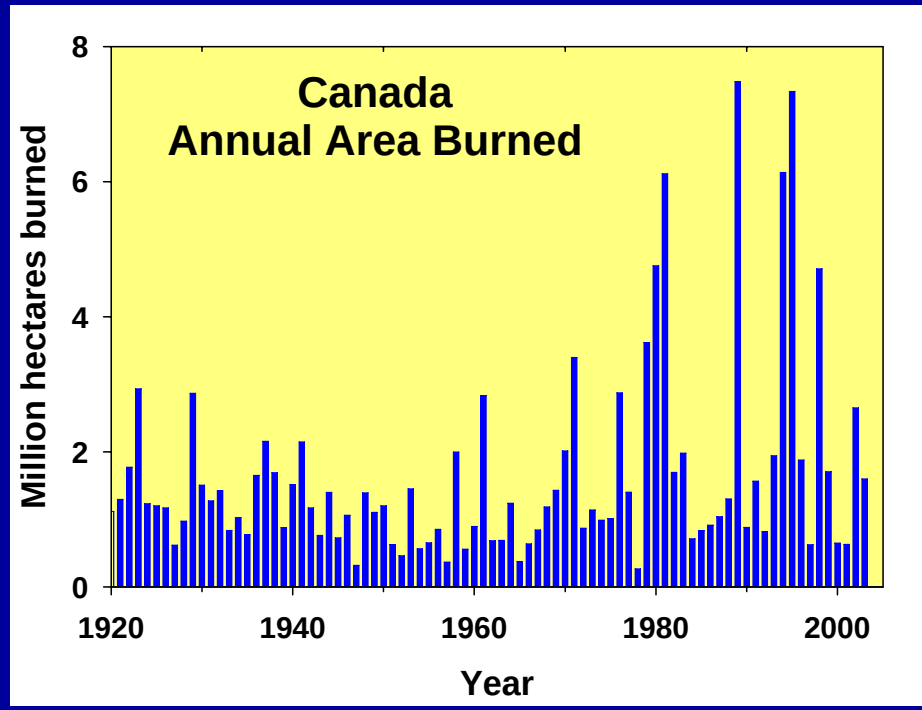
- Throughout Canada's boreal forest, natural disturbances (fire, insects, drought) have a significant impact on the annual GHG balance.
- Climate change is predicted to increase natural disturbances.



Fires in Canada

Area affected by large fires (>200 ha), 1980-2003

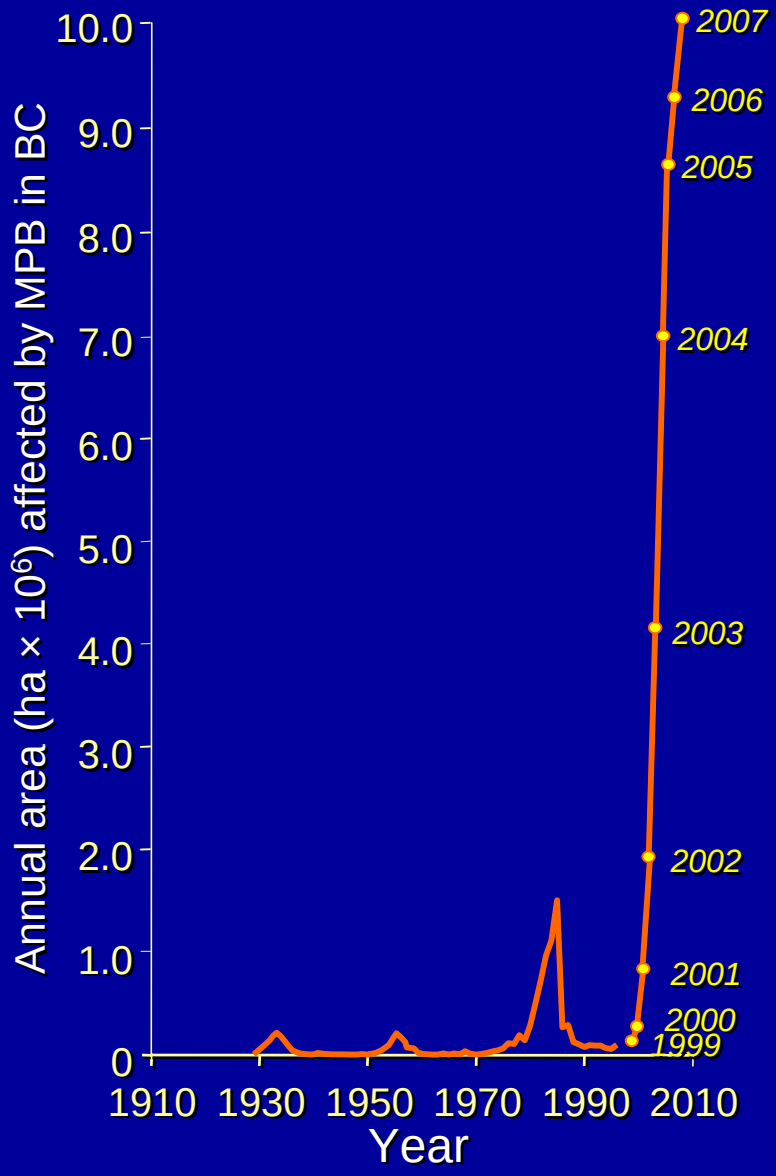




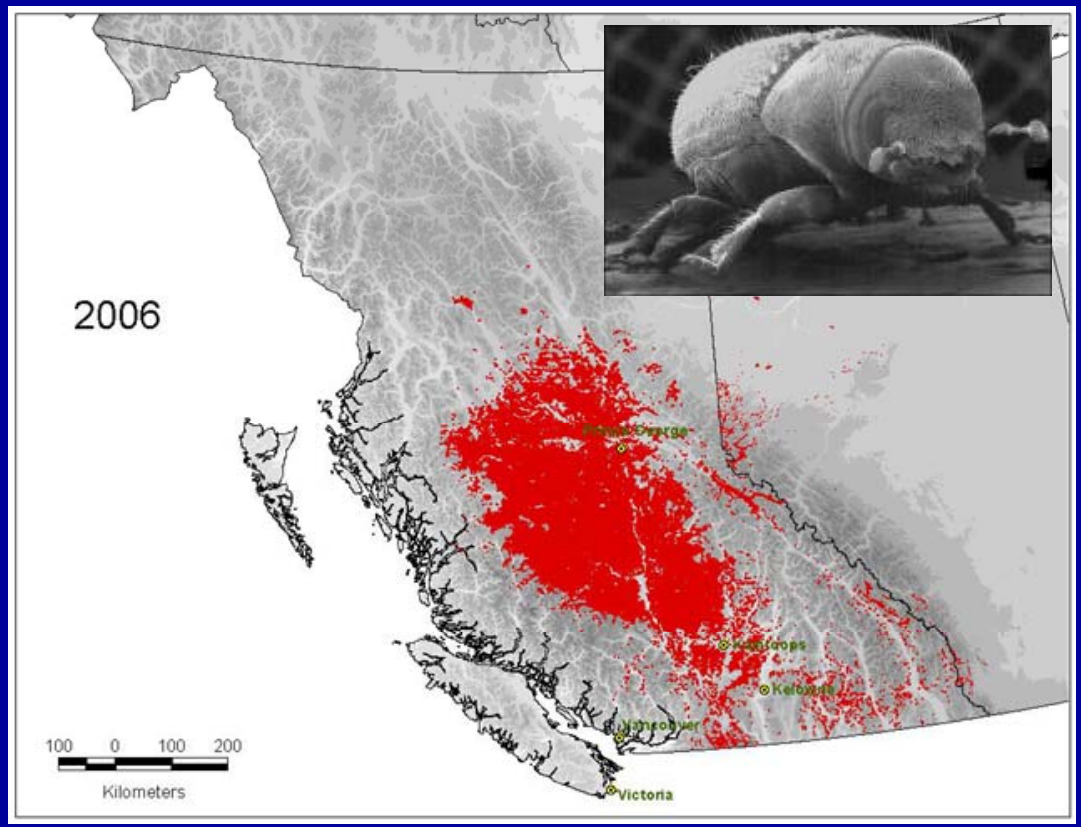
- Very large inter-annual variability in area burned.
- Most of the area annually burned is due to wildfires following lightning.
- Statistics on fire cause (natural or human) are recorded.

Source: Stocks *et al*. 2003

Mountain Pine Beetle Outbreak in Western Canada



Climate change has contributed to higher population growth rates, higher overwinter survival rates, and range expansion northward and to higher elevations.



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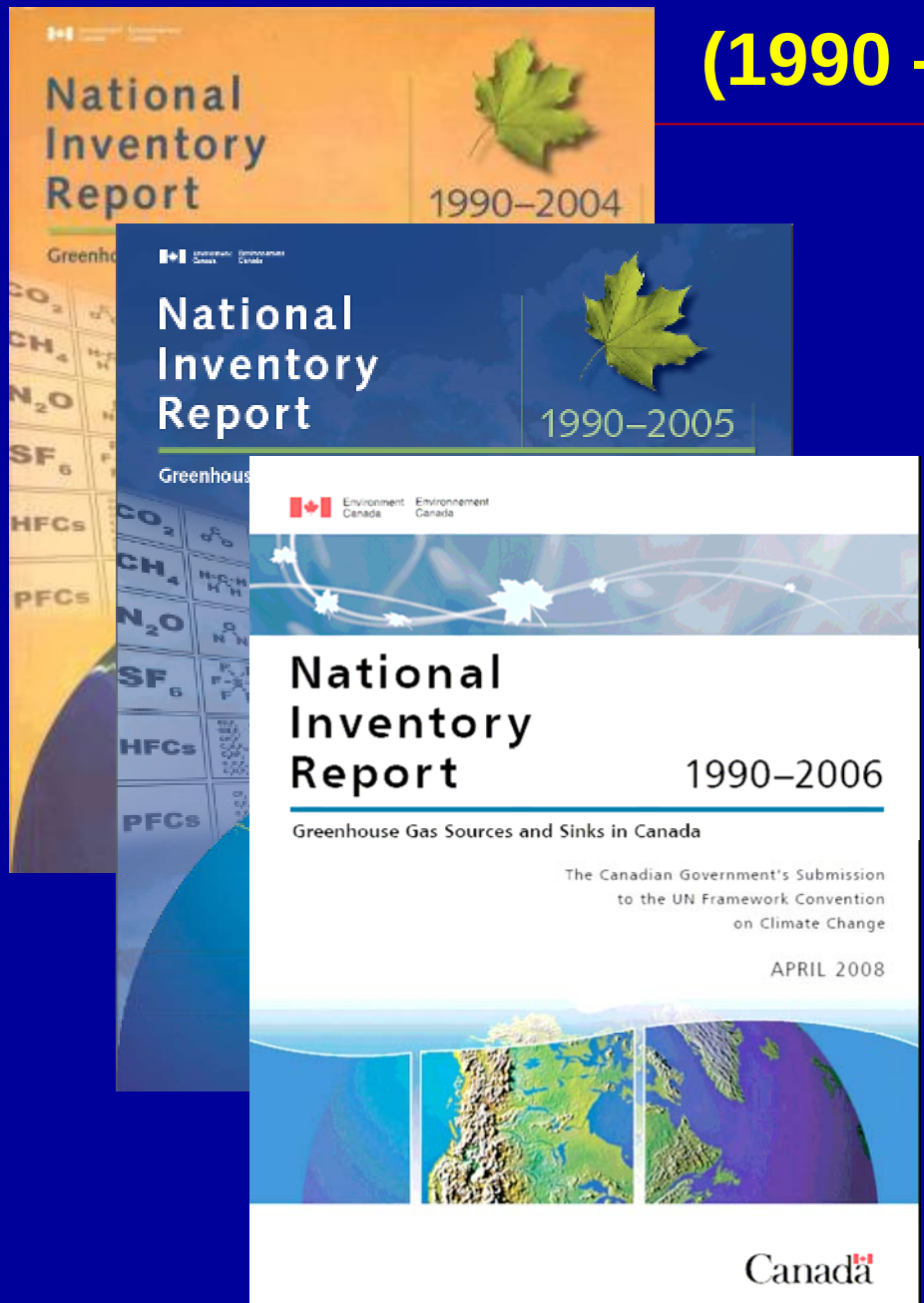
GHG Balance of Canada's Managed Forest (1990 – 2006)



Canada's National Forest Carbon Monitoring, Accounting and Reporting System (NFCMARS)

Carbon Budget Model of Canadian Forest Sector

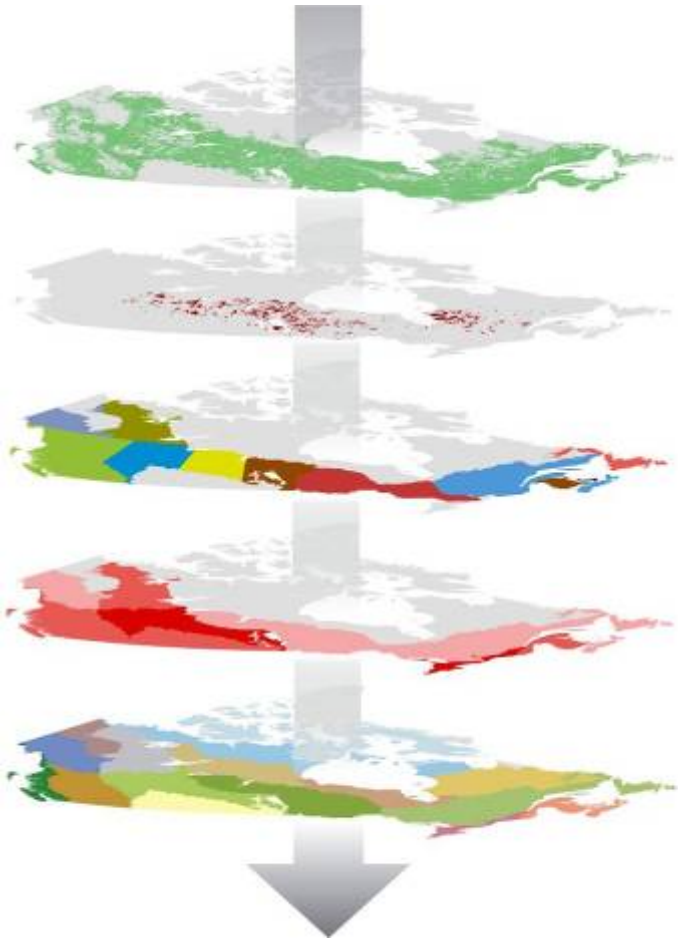
Forest inventory and growth & yield data

Natural disturbance monitoring data

Forest management activity data

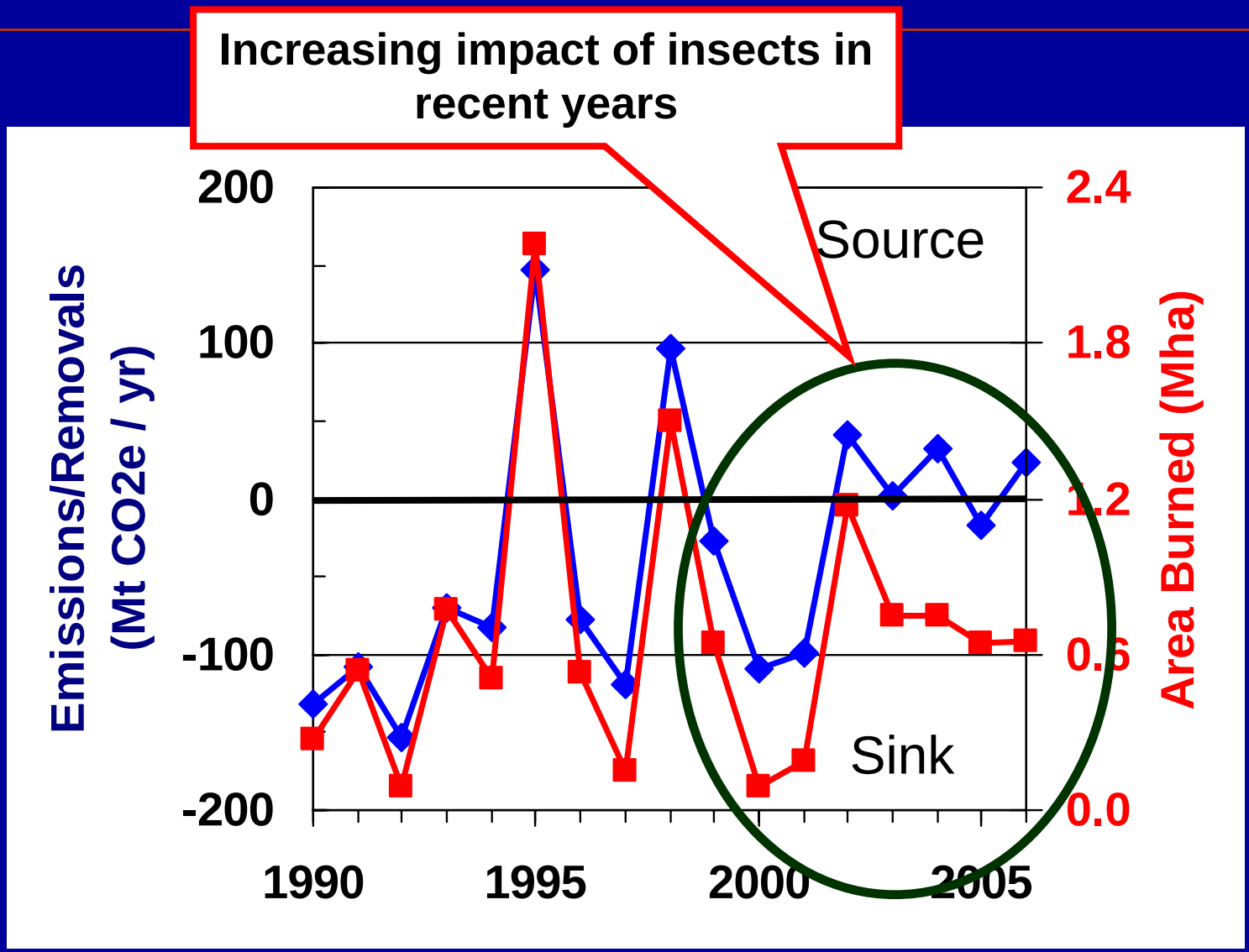
Land-use change data

Ecological modelling parameters

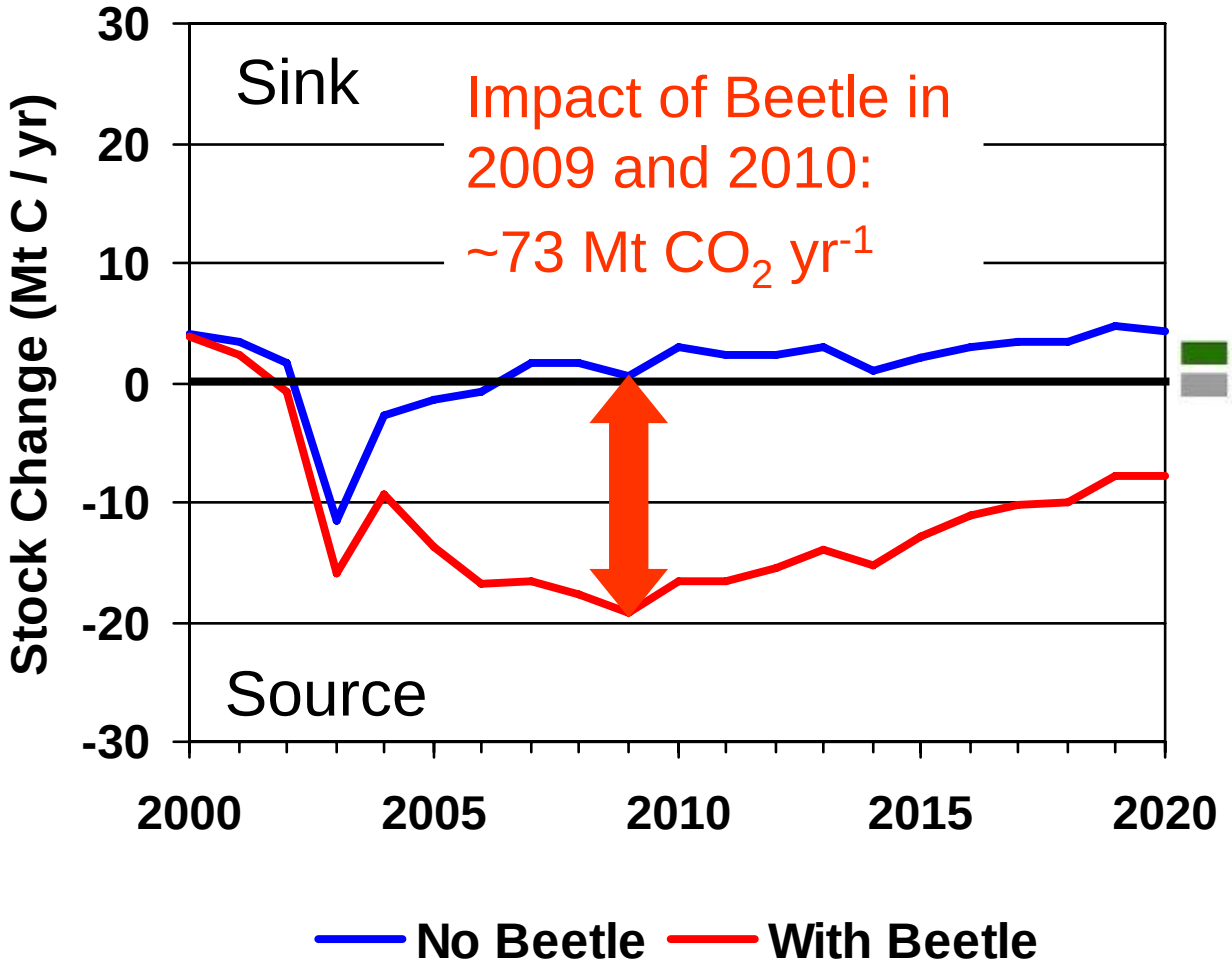


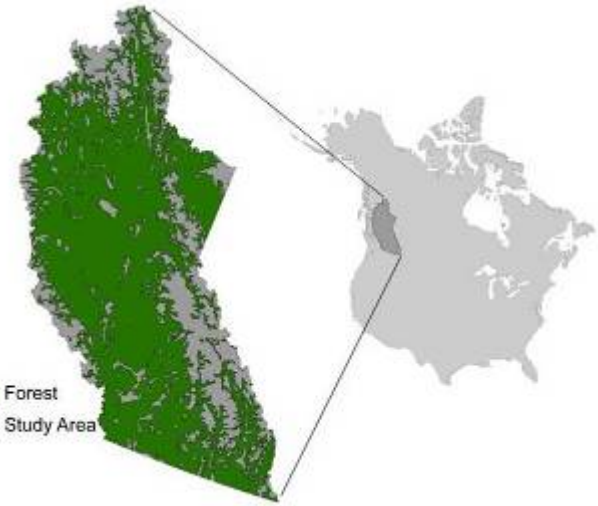
CBM-CFS3

The Area Burned Affects the Annual GHG Balance



Impacts of Mountain Pine Beetle in Western Canada





Source: Kurz et al. 2008, Nature

Summary

- Large interannual variations in the GHG balance occur due to impacts of natural disturbances.
- A net source results in years with large areas burned due to naturally-caused fires.
- The increasing impacts of insects are contributing to a decreasing sink / increasing source.
- Canada's forest is relatively old (right-shifted age-class structure) - age-class legacy affects the GHG balance of the forest management area.

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LULUCF Accounting Using the Forward-Looking Baseline Approch

- Recognised limitations of the current LULUCF accounting approach for FM include:
  - failure to separate direct human impacts from indirect human and natural impacts
  - failure to remove the effects of pre-1990 management and disturbances
  - the use of caps to address these issues, with the result that incentives are limited
  - failure to create incentives for sustainable forest management with climate mitigation objectives
- Accounting using a Forward-Looking Baseline (FLB) resolves all of these issues.

Overview of Forest Management Accounting Using a Forward-Looking Baseline

- A type of net-net approach that compares emissions and removals in the Commitment Period (CP) to a projected baseline.

  Step 1: at the start of each commitment period a Party establishes a business-as-usual (BAU) baseline for the CP (subject to review).

  Step 2: measure and monitor emissions/removals over CP

  Step 3: After the CP, remove the impacts of natural disturbances and account for debits and credits relative to baseline

  Step 4: Reporting, expert review, adjustment (if required) and accounting.

- The approach should also include HWP accounting.

Step 1 of FM Accounting using Forward-Looking Baseline

- Step 1: at the start of each commitment period a Party establishes a business-as-usual (BAU) baseline for the CP (subject to review).
  - The baseline reflects business-as-usual management activities, and post-harvest and post-disturbance regeneration.
  - It includes the effects of the age-class legacy (from pre-1990 disturbances and management)
  - It does not include the projected impacts of natural disturbances.

Step 2 of FM Accounting using Forward-Looking Baseline

- Step 2: measure and monitor emissions/removals in the FM area over the CP
  - Emission and removal estimates are those reported annually to UNFCCC (where FM area is identical to the managed forest)
  - Includes all impacts of management, age-class structure, natural disturbances and any other natural or indirect effects.
  - This is the FM contribution to “what the atmosphere sees”.

Step 3 of FM Accounting using Forward-Looking Baseline

- Step 3: After the CP, remove the impacts of natural disturbances and account for debits and credits relative to the baseline.

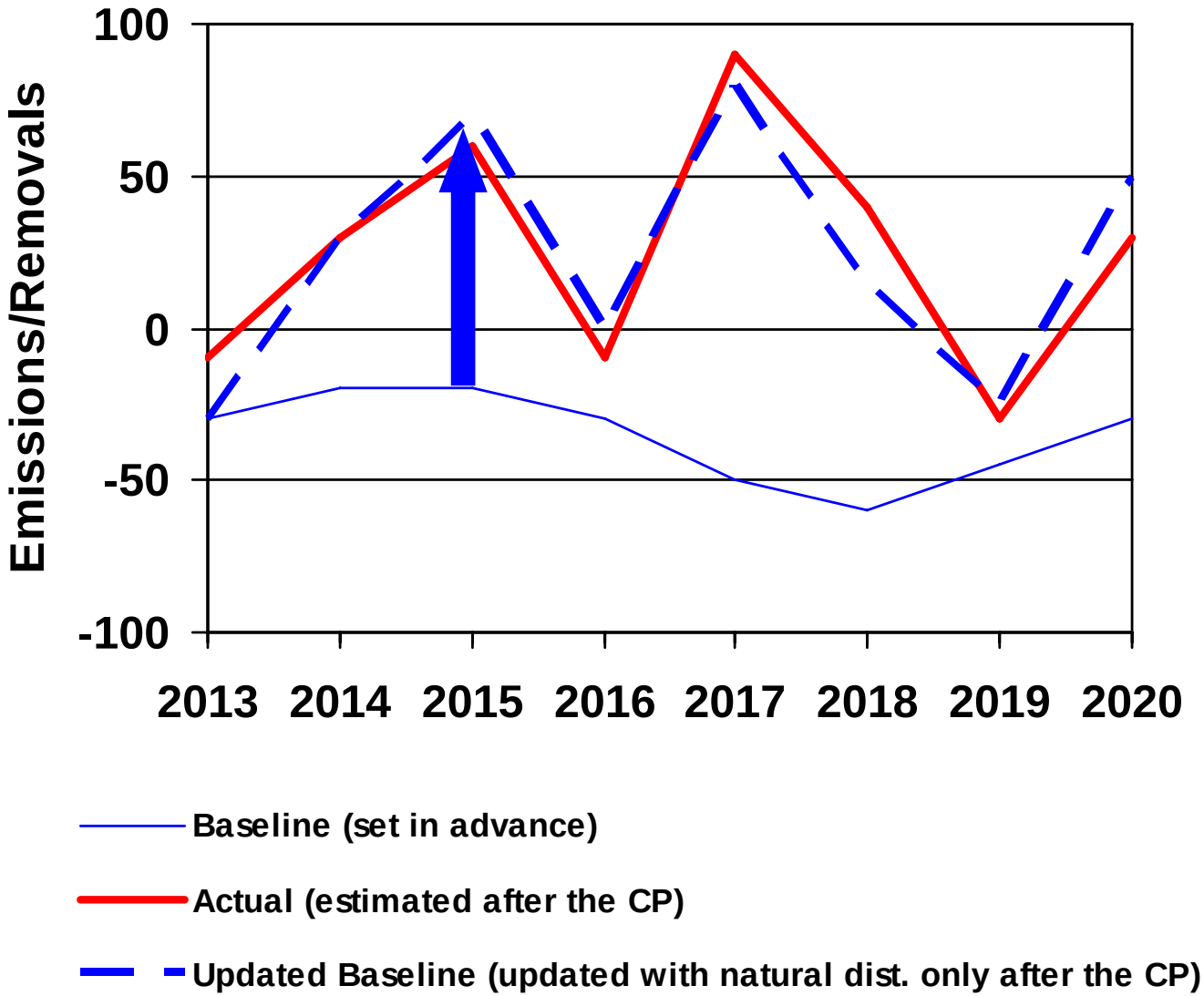
- Two Methods are available and are conceptually identical – Parties would need to agree on which is preferred
  - **Method 1:** update the BAU baseline by adding the impacts of natural disturbances, and compare that to the actual
  - **Method 2:** remove the effects of natural disturbances from the actual values and compare that to the baseline

- With either method, credits and debits will result only from changes in management relative to the baseline management established at the beginning of the commitment period

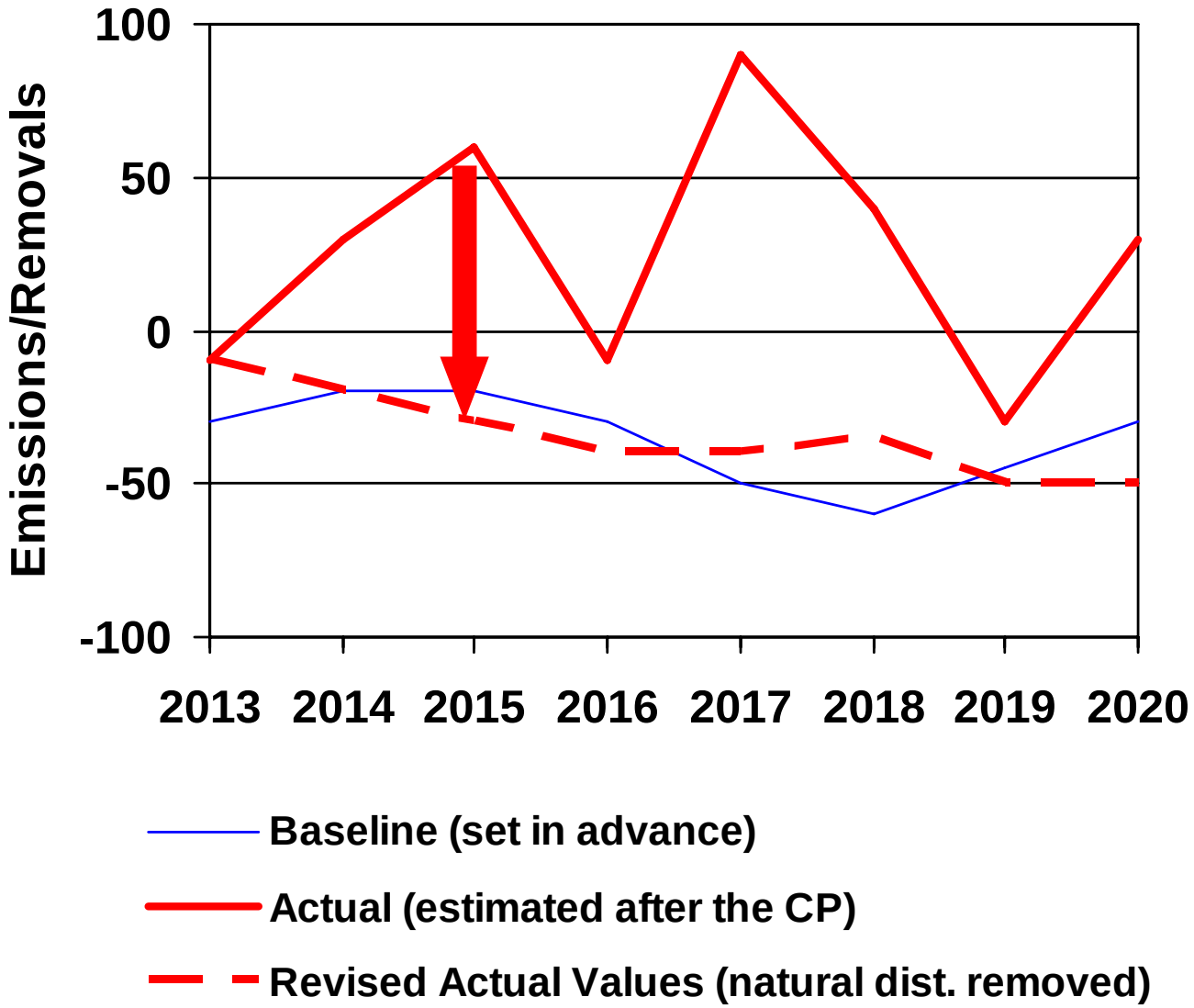
Step 4 of FM Accounting using Forward Looking Baseline

- Step 4: Reporting, expert review, adjustment (if required) and accounting.
  - The BAU baseline would need to be documented and reported: it would be subject to expert review and adjustment
  - The update of the baseline (Method 1) or revision of the actual reported values to remove natural disturbance impacts (Method 2) would need to be documented and reported: it too would be subject to expert review and adjustment

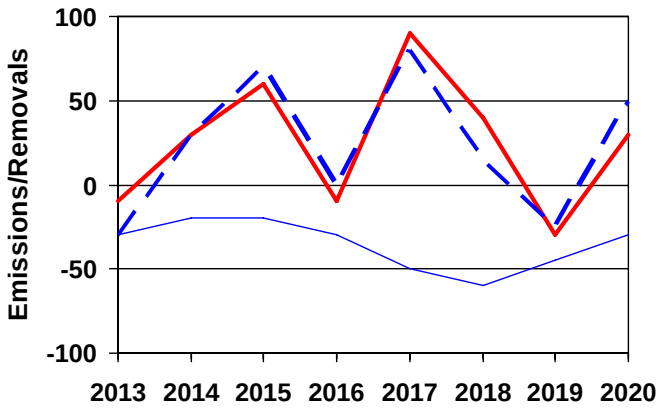
Hypothetical Example of Method 1:
Natural Disturbance Impacts Added to the Baseline

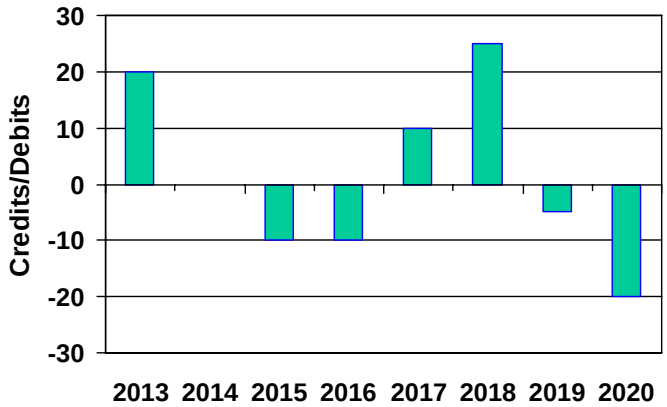


Hypothetical Example of Method 2:
Natural Disturbance Impacts Removed from Actual Values

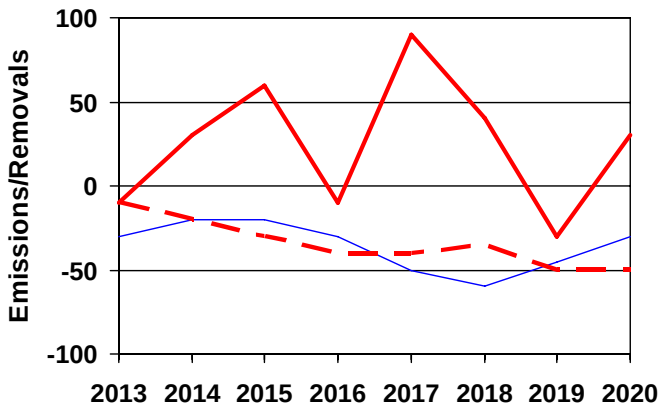


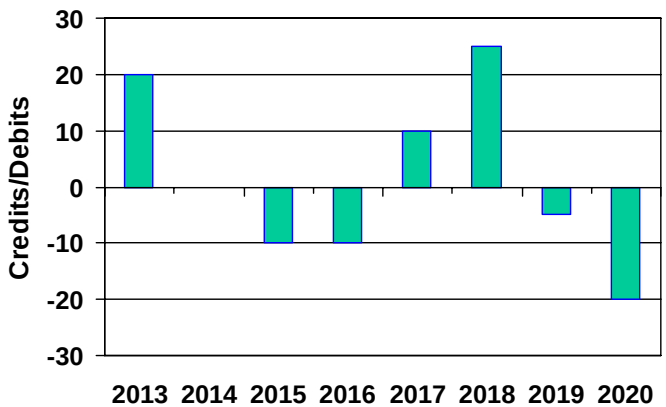
Hypothetical Calculation of Credits and Debits





Method 1
Actual – Revised Baseline





Method 2
Revised Actual - Baseline

Methods 1 and 2 yield equivalent estimates of credits and debits.

Answers to Concerns about the Forward-Looking Baseline Approach

- Complexity of approach:
  - Sustainable forest management planning requires the capacity to project the impacts of planned management activities
  - Development of a baseline projection is common practice
  - Capacity to do this can easily be developed by 2012
- Development of credible baseline:
  - The negotiated agreement should specify requirements for documentation, expert review and modalities for adjustments
- Ex-post adjustments of baseline:
  - Method 2 does not revise the baseline
  - Method 1 only changes the natural disturbance component of the baseline, using the same estimates that are included in the "actual" emissions and removals

Benefits of the Forward-Looking Baseline Approach

- FLB is the most effective option available to remove effects of
  - natural disturbances (both emissions and future removals),
  - age-class legacy, and
  - indirect human-induced impacts (such as climate change).
- FLB is a type of net-net approach similar to methods used for project-level accounting and proposed for REDD.
- FLB provides estimates of the actual emissions and removals (i.e. reporting what the atmosphere sees) and limits accounting to credits and debits that result from changes in forest management (e.g. to address climate mitigation).
- FLB therefore creates strong incentives to fully utilize the climate mitigation potential in the forest sector.

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