Bioenergy, Forests, Climate: Getting It Right Matters and Is No Easy Task

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April 4, 2012

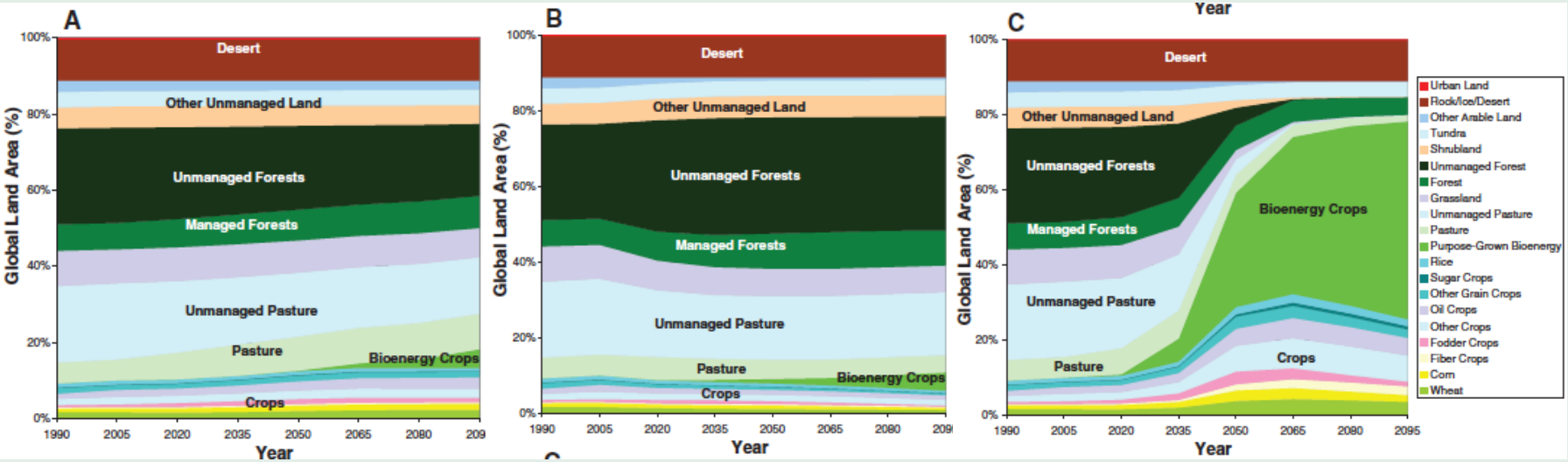
CLEAN AIR TASK FORCE

Project drivers

- Carbon ***must*** be properly valued to understand risks and opportunities for natural ecosystems and climate.
- Bioenergy is not inherently carbon- or climate-neutral, but there are times and situations to generate low- or zero-carbon energy from select biomass types.
- Non-C impacts appear to be significant, and may offer additional opportunities for climate mitigation.
- Figuring out the drivers is complex.

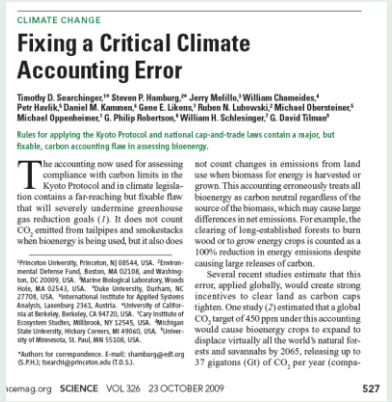
Impact of failure to value standing C

- Wise, *et al*. (2009) found that the likely long-term outcome of a regulatory regime that fails to account for the climate benefits provided by standing forests "is that ... virtually all land that is not required for growing food and forest products is used for growing bioenergy." Unmanaged forests would cease to exist sometime around 2065.
- "…hard to imagine that society would find this result acceptable" – but the modeling exercise illustrates the extent to which misguided bioenergy strategies can sabotage forest conservation efforts like REDD.



Bioenergy is not inherently climate neutral

- **Searchinger, *et al*, *"*Critical Climate Accounting Error*"*** (2009):
  - Policies have wrongly assumed all biomass-based energy is carbon-neutral.
  - "Bioenergy reduces greenhouse emissions only if the growth and harvesting of the biomass for energy captures carbon above and beyond what would be sequestered anyway and thereby offsets emissions from energy use."
- **Manomet** (2010): Even assuming forest regrowth, net CO2 emissions from a biomass-fired EGU will:
  - Exceed the emissions from a like-sized coal plant for 40 years
  - Exceed the emissions from like-sized natural gas plant for 90+ years
- **European Environment Agency Scientific Committee** (2011):
  - "The potential consequences of this bioenergy accounting error are immense."
- **Draft SAB Report on EPA Bioengenic Accounting Framework** (2012)
  - "Only when bioenergy results in additional carbon being sequestered above and beyond the anticipated baseline … can there be a justification for concluding that such energy use results in little or no increase in carbon emissions."


CLIMATE CHANGE

Fixing a Critical Climate Accounting Error

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Rules for applying the Kyoto Protocol and national cap-and-trade laws contain a major, but fixable, carbon accounting flaw in assessing bioenergy.

The accounting now used for assessing compliance with carbon limits in the Kyoto Protocol and in climate legislation contains a far-reaching but fixable flaw that will severely undermine greenhouse gas reduction goals (*1*). It does not count CO_2 emitted from tailpipes and smokestacks when bioenergy is being used, but it also does not count changes in emissions from land use when biomass for energy is harvested or grown. This accounting erroneously treats all bioenergy as carbon neutral regardless of the source of the biomass, which may cause large differences in net emissions. For example, the clearing of long-established forests to burn wood or to grow energy crops is counted as a 100% reduction in energy emissions despite causing large releases of carbon.

Several recent studies estimate that this error, applied globally, would create strong incentives to clear land as carbon caps tighten. One study (*2*) estimated that a global CO_2 target of 450 ppm under this accounting would cause bioenergy crops to expand to displace virtually all the world's natural forests and savannahs by 2065, releasing up to 37 gigatons (Gt) of CO_2 per year (compa-

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NATURAL CAPITAL INITIATIVE AT MANOMET REPORT

MANOMET Center for Conservation Sciences

BIOMASS SUSTAINABILITY AND CARBON POLICY STUDY

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Non-C impacts appear to be significant

- Forests impact climate in a variety of ways that go beyond what are traditionally considered their climate-relevant roles (e.g., carbon sequestration and the selective use of biomass for energy production).
- These expanded climate-relevant role roles include:
  - Producing VOCs / aerosols that affect cloud formation
  - Oxidizing of methane
  - Reducing tropospheric ozone levels in urban/suburban areas
  - Affecting the absorption and reemission of solar radiation
  - Providing wood that can substitute for higher-C construction materials
  - Reducing the demand for air conditioning and heating and hence reducing emissions in developed environments

PHILOSOPHICAL TRANSACTIONS OF THE ROYAL SOCIETY A

Phil. Trans. R. Soc. A (2008) **366**, 4613–4626
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Boreal forests, aerosols and the impacts on clouds and climate

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Previous studies have concluded that boreal forests warm the climate because the cooling from storage of carbon in vegetation and soils is cancelled out by the warming due to the absorption of the Sun's heat by the dark forest canopy. However, these studies ignored the impacts of forests on atmospheric aerosol. We use a global atmospheric model to show that, through emission of organic vapours and the resulting condensational growth of newly formed particles, boreal forests double regional cloud condensation nuclei concentrations (from approx. 100 to approx. 200 cm^{-3}). Using a simple radiative model, we estimate that the resulting change in cloud albedo causes a radiative forcing of between −1.8 and −6.7 W m^{-2} of forest. This forcing may be sufficiently large to result in boreal forests having an overall cooling impact on climate. We propose that the combination of climate forcings related to boreal forests may result in an important global homeostasis. In cold climatic conditions, the snow–vegetation albedo effect dominates and

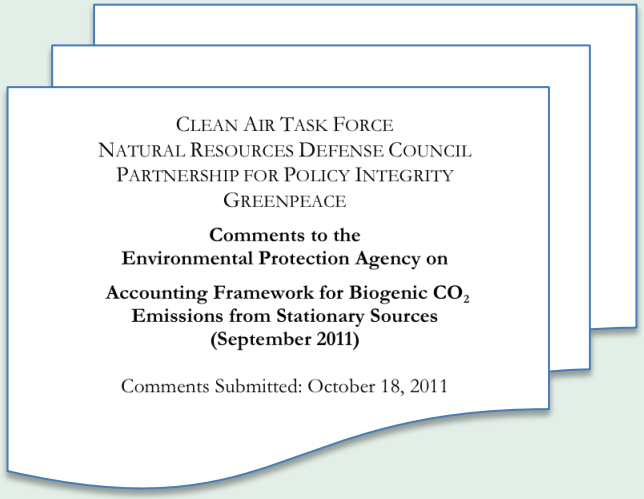
- While current discussions about climate change mitigation generally ignore these roles, emerging research suggests they could contribute significantly to efforts to reduce climate change.
- The positive as well as negative effects of these and others non-carbon roles need to be well understood to chart a productive path forward for the role that forests can play in mitigating climate change.

Approach

- CATF is pursuing a combination of prudent conservation measures and innovative forest management practices that can preserve *and* enhance many of the climate-related benefits that forests provide.
  - Challenge poorly-designed policies
  - Identify and advocate climate-friendly forest management practices
  - Promote sensible biomass power options

Challenge poorly-designed bioenergy policies

- Improve or defeat initiatives that ignore the reality of negative climate effects from biomass-based power production.
  - EPA's July 2011 Deferral Rule
  - EPA Biogenic Accounting Framework
- Preserve the legal opportunity to regulate bioenergy responsibly.
  - EPA New Source Performance Standards for new electric generating units
  - MA renewable portfolio standard eligibility rulemaking

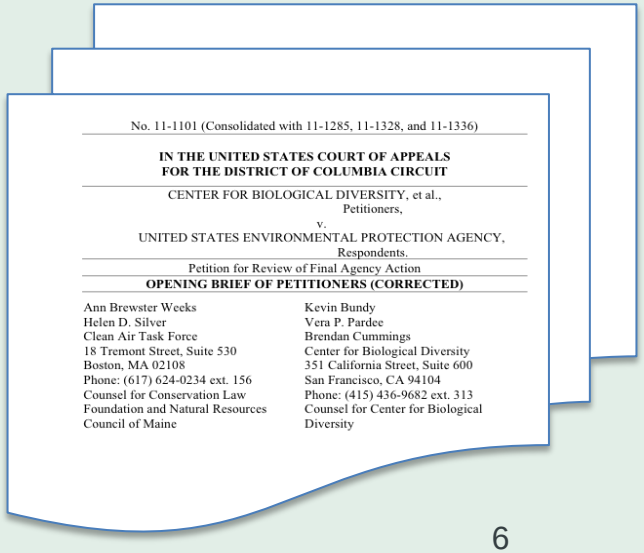


CLEAN AIR TASK FORCE
NATURAL RESOURCES DEFENSE COUNCIL
PARTNERSHIP FOR POLICY INTEGRITY
GREENPEACE

Comments to the Environmental Protection Agency on

Accounting Framework for Biogenic CO_2 Emissions from Stationary Sources (September 2011)

Comments Submitted: October 18, 2011



No. 11-1101 (Consolidated with 11-1285, 11-1328, and 11-1336)

IN THE UNITED STATES COURT OF APPEALS FOR THE DISTRICT OF COLUMBIA CIRCUIT

CENTER FOR BIOLOGICAL DIVERSITY, et al.,
Petitioners,
v.
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY,
Respondents.

Petition for Review of Final Agency Action

OPENING BRIEF OF PETITIONERS (CORRECTED)

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Advocate climate-friendly forest management

- Strengthen connections to key representatives of professional foresters, government agencies, forest landowners, manufacturers, nongovernmental environmental organizations, and others to explore how we can work together in support of an agenda that will capitalize on the various roles forests could play to reduce global warming.
- Work with a network of researchers and foresters to develop a suite of climate-beneficial forestry practices, such as:
  - Favoring species that sequester more carbon or produce natural aerosols that contribute to cloud formation.
  - Favoring management techniques that best support carbon uptake and storage
  - Identifying the policy/regulatory/market framework to best achieve climate beneficial practices.

Promote sensible biomass power options

- CATF is working to construct a science-based consensus around the types of biomass that can be used to generate power in a climate-beneficial way—and those that clearly cannot.
- Working list of presumptively beneficial biomass feedstocks:
  - Slash from logging
  - Manufacturing waste
  - Land clearing debris
  - Dead and dying trees
  - Urban wood waste
  - Materials removed to reduce fire danger in specific types of areas
  - Wood from fast-growing biomass plantations under certain circumstances

Key staff: Alec Giffen

- Forest policy expert and licensed forester.
- Joined CATF in 2011 as Senior Policy and Science Fellow.
- Previously directed the Maine Forest Service and the state's Natural Resource Planning Division.
- Giffen's experience managing the competing interests in forest use and policy includes development of markets for carbon sequestration in forests, managing use of biomass for biofuels and bio-products, and directing Maine's efforts to eliminate liquidation harvesting as a forest management technique.