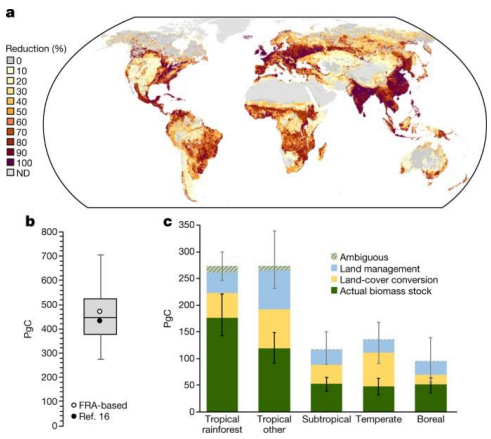
From: William Moomaw <william.moomaw@tufts.edu>
Sent: Friday, 26 May, 2023 4:01
To: Supervisory-Body <Supervisory-Body@unfccc.int>
Subject: Comments concerning Removal activities under the Article 6.4 mechanism Version 04.0

Comments by Prof. William R Moomaw william.moomaw@tufts.edu 617-335-3994

36. *Taxonomy of removal activities. The following are the broad types of removal methods (R-32:j): (a) Biological methods: The separation of CO2 from the atmosphere is achieved through the photosynthesis process. These methods can be further divided into: (i)* ***Land-based biological methods consisting of tree planting or regeneration of natural vegetation such as forests.*** *Almost all current removals come from this category (R-50:b);*

This definition only includes CO2 removal by afforestation and reforestation. In fact, growing forests now remove an amount of nearly 30% of annual emissions. This value can be substantially increased and perhaps doubled by managing more existing forests to achieve their potential for carbon accumulation and biodiversity by avoiding harvest. https://www.nature.com/articles/nature25138



Unexpectedly large impact of forest management and grazing on global vegetation biomass - Nature

Analyses of potential and actual biomass stocks indicate that trade-offs exist between conserving carbon stocks on managed land and raising the contribution of biomass to raw material and energy supply for the mitigation of climate change.

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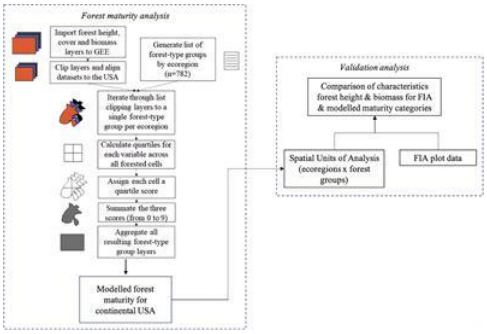
This management option has been called "proforestation." In 2022, IPCC AR6 WG2 page 303 stated, "It is also the case that **protection of existing natural forest ecosystems is the highest priority** for reducing GHG emissions (Moomaw et al., 2019) and restoration may not always be practical." The paper cited is available here https://www.frontiersin.org/articles/10.3389/ffgc.2019.00027/full

An actual demonstration that halting harvest (proforestation) results in major increases in carbon dioxide removal and accumulation of carbon in forests has been found in Tasmania when half the forest harvests were abruptly halted, within less than a decade, emissions from LULUCF went from +10 to -12 MMt CO2. https://iopscience.iop.org/article/10.1088/1748-9326/ac661b

40. Table 4. does not include proforestation that produces large trees that store disproportionate amounts of carbon. Lutz et al. (2018) found in a survey of 48 mature and old growth forests globally, the largest 1% of trees stored half the carbon. The four more heavily harvested forests in the United States in the study had just 30% of the carbon in the largest 1% of trees. https://onlinelibrary.wiley.com/doi/abs/10.1111/geb.12747
Two recent studies confirm that a smaller number of large trees hold the most carbon in US National Forests. https://www.frontiersin.org/articles/10.3389/ffgc.2022.979528/full



Mature and old-growth forests contribute to large-scale conservation targets in the conterminous United States

Mature and old-growth forests (MOG) of the conterminous United States collectively support exceptional levels of biodiversity but have declined substantially from logging and development. National-scale proposals to protect 30 and 50% of all lands and waters are useful in assessing MOG conservation targets given the precarious status of these forests. We present the first coast to coast spatially explicit MOG assessment based on three structural development measures—canopy height, canopy cover, and above-ground living biomass to assess relative maturity. MOG were displayed by major forest types (n = 22), landownerships (federal, state, private, and tribal), and Gap Analysis Project (GAP) management status overlaid on the NatureServe's Red-listed Ecosystems and species, above-ground living biomass, and drinking water source areas. MOG total ~67.2 M ha (35.9%) of all forest structural classes and were scattered across 8 regions with most in western regions. All federal lands combined represented the great
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https://www.frontiersin.org/articles/10.3389/ffgc.2022.1074508/full

Assessing carbon stocks and accumulation potential of mature forests and larger trees in U.S. federal lands

Mature and old-growth forests (collectively "mature") and larger trees are important carbon sinks that are declining worldwide. Information on the carbon value of mature forests and larger trees in the United States has policy relevance for complying with President Joe Biden's Executive Order 14072 directing federal agencies to define and conduct an inventory of them for conservation purposes. Specific metrics related to maturity can help land managers define and maintain present and future carbon stocks at the tree and forest stand level, while making an important contribution to the nation's goal of net-zero greenhouse gas emissions by 2050. We present a systematic method to define and assess the status of mature forests and larger trees on federal lands in the United States that if protected from logging could maintain substantial carbon stocks and accumulation potential, along with myriad climate and ecological co-benefits. We based the onset of forest maturity on the age at which a forest stand a

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Another study of six national forests in Oregon found that just 3% of trees were more than 21" in diameter, but they held 42% of the above ground carbon.
https://conbio.onlinelibrary.wiley.com/doi/10.1111/csp2.12944

Because the Carbon Capture and Storage part of BECCS takes a great deal of energy, some 30% or more additional forest must be harvested to operate the plant. Clearly continuous harvesting of trees for BECCS is diminishing the capacity of forests to produce large trees that store lots of carbon and provide habitat for the most threatened species. There are few of these forests remaining in many parts of the world including U.S. and E.U.