More COMMENTS and questions about USFS carbon document: “Forest Carbon Assessment for the White Mountain National Forest” and the Lake Tarleton EA.
https://www.fs.usda.gov/nfs/11558/www/nepa/111828_FSPLT3_5657677.pdf.

Questions round two:

Kris question: “I still don't see how a negative change in carbon stock value could indicate a carbon sink, rather than source.”

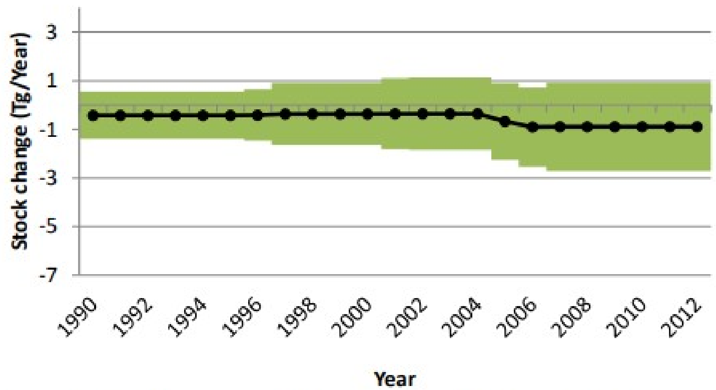



***Figure 3.*** *Carbon stock change from 1990 to 2012 for WMNF, bounded by 95 percent confidence intervals (green). A positive value indicates a carbon source, and a negative value indicates a carbon sink (figure from Appendix A.II, USDA Forest Service 2015).*

USFS Answer: “A negative change in figure 3 means carbon is being removed from the atmosphere and sequestered by the forests (i.e., carbon sink) while a positive change means carbon is added to the atmosphere by forest related emissions (i.e., carbon source). For more information please read through the eastern region carbon assessment, page 28:” https://www.fs.fed.us/climatechange/documents/EasternRegionCarbonAssessmentTwoBaselines.pdf

Response to response: The document you cite above states:

“**Carbon stock change**. The change in carbon stocks over time, calculated by taking the difference between successive inventories and dividing by the number of years between these inventories for each national forest. A positive change means carbon is being removed from the atmosphere and sequestered by the forests (i.e., carbon sink) while a negative change means carbon is added to the atmosphere by forest related emissions (i.e., carbon source).” (p. 23)

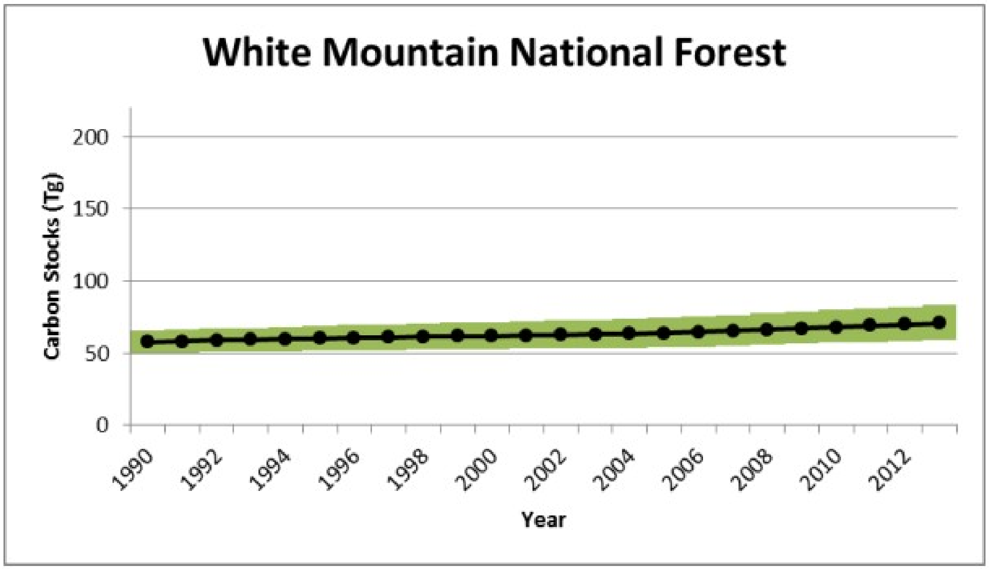
“**Carbon stock change** is the change in carbon stocks over time, calculated by taking the difference between successive inventories and dividing by the number of years between these inventories for each national forest (Woodall et al. 2013). Stock change for a given year is the change between that year and the following year, so that the stock change for 2013 is the change between 2012 and 2013. A negative change in the graphs below means carbon is being removed from the atmosphere and sequestered by the forests (i.e., carbon sink) while a positive change means carbon is added to the atmosphere by forest related emissions (i.e., carbon source).” (p. 28)

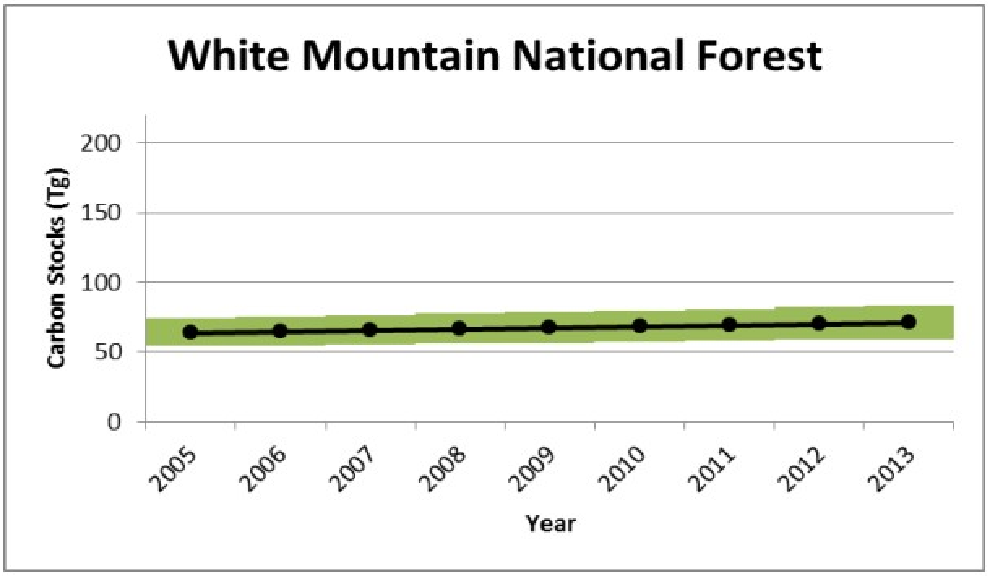
Which of these statements from the same document is correct? The second is not consistent with the y axis labeling on the graph.

Both documents make it clear they they refer to carbon stocks in the forest, not the atmosphere, so why would the graph show the opposite?

If, in the graph below, from the document you referenced above, “a positive change means carbon is added to the atmosphere by forest related emissions”, then the WMNF is a carbon source.

Extending the Y axis to 200 serves to make it harder to see the change in carbon stocks. If this carbon in the the atmosphere, then WMNF is a carbon source. p. 38



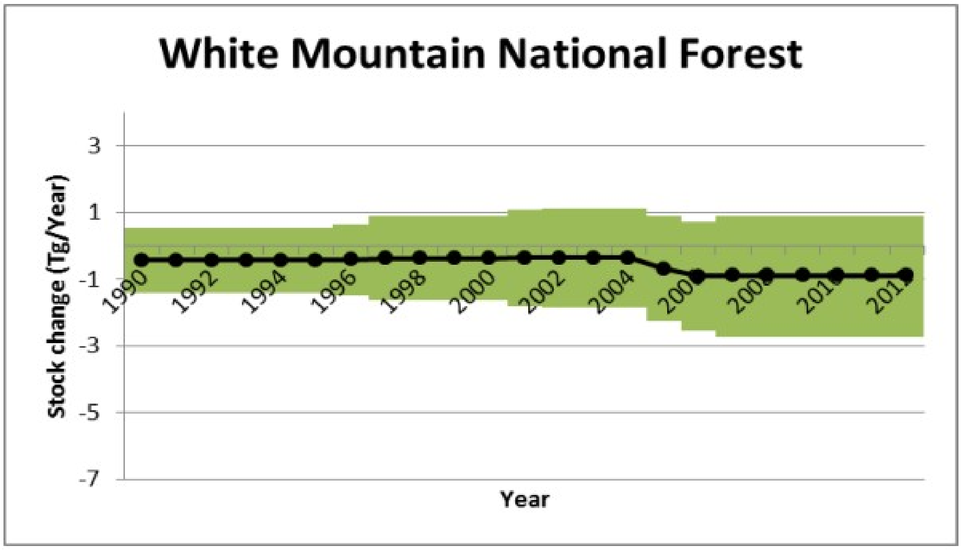



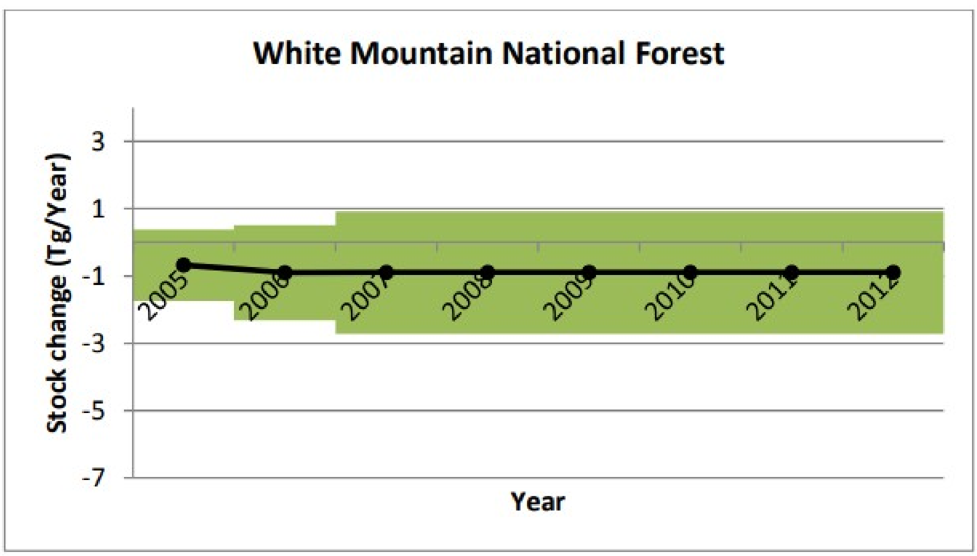

https://www.fs.fed.us/climatechange/documents/EasternRegionCarbonAssessmentTwoBaselines.pdf
In this same report there is a second set of graphs (below) which begins with a small label at the top of one page:

"II. Carbon Stock Change and Uncertainty Estimates (95% confidence level)"

These graphs are on a scale of -7 to 3, rather than -3 to 1.

If a loss in carbon stock means atmospheric carbon stocks, then According to this graph WMNF is a carbon sink. If a loss in stocks means forest carbon stocks, then the WMNF has lost carbon stock, which makes it a carbon source.




I completely agree this reporting style is confusing if you look at the graph without knowing that carbon stock change is typically reported from the perspective of the atmosphere. It is my understanding that reporting carbon in this manner is done internationally. This is also explained on page 5 of the report.

Kris response: Page 5 says nothing about stock change referring to atmospheric carbon stocks.

All the text associated with the graphs in both reports indicates that carbon stock means wood: "When forestland area increases, total ecosystem carbon stocks typically also increase, indicating a carbon sink."

"In this section, we provide an assessment of the amount of carbon stored on the White Mountain National Forest (baseline carbon stocks)…"
https://www.fs.usda.gov/nfs/11558/www/nepa/111828_FSPLT3_5657677.pdf

“Carbon stocks are estimated by linear interpolation between survey years for the seven ecosystem carbon pools – above-ground live tree, below-ground live tree, understory, standing dead trees, down dead wood, forest floor, and soil organic carbon ”

“In the WMNF, carbon density increased from about 70 metric tonnes of carbon per acre in 1990 to 84 metric tonnes per acre in 2013.”
https://www.fs.fed.us/climatechange/documents/EasternRegionCarbonAssessmentTwoBaselines.pdf

USFS 2009 documentation states On average, old-growth hardwood and softwood forests stored 216 and **267 metric tons of carbon/ha**, respectively.” I was unable to find this article from the link:

https://www.fs.usda.gov/research/news/highlights/#:~:text=On%20average%2C%20old%2Dgrowth%20hardwood,18%20metric%20tons%2Fha).

This converts to 88-108 metric tons of carbon per acre.

Kris question: Does this measurement include all of the seven ecosystem pools?

Kris question: If you exclude the wilderness areas, what is the average?

Kris question: Can you provide me with the rationale that justifies for logging as a means of increasing carbon sequestration in light of this data showing loss of carbon stores under the present USFS logging regime?

Kris question: Can you provide me with a section of text or a graph where carbon is expressed as atmospheric?

USFS: More information about the Monte Carlo model and confidence intervals can be found on page 7 of the report or in the reference material linked above.

Kris response to response: “Monte Carlo simulation. The principle of Monte Carlo analysis is to perform the inventory calculation many times by computer, each time with the uncertain factors or parameters and activity data chosen randomly within the distribution on uncertainties specified by the user.”

Kris question: What are the “distribution on uncertainties specified by the user.”?

Kris comment: Is this graph showing how much the carbon stock went down each year, without showing the total loss of carbon stocks?

USFS response: Next response is for both this question and the next one.

Kris question: How can the carbon stock go down every year, while the next graph shows an increase in total carbon stocks?

USFS response: The graph you referred to in your first email shows changes to yearly carbon stock on the WMNF and the graph from your most recent email shows carbon stock totals for all forests in region 9 for the Forest Service. Based on the findings of the assessment both graphs are intentionally displaying that the White Mountain NF is likely sequestering more carbon than it is conveying both on a yearly basis and over time between 1990 and 2012. As explained in the report it is not possible to say definitively that the WMNF is a sink because the confidence interval goes above 0 every year since 1990. (Kris underlining)

Annual carbon stock changes in the WMNF ranged from -0.37 ± 1.28 Tg C per year (gain) to -0.90 ± 1.63 Tg C per year (gain) (Fig. 3). The uncertainty between annual estimates can make it difficult to determine whether the forest is a sink or a source in a specific year (i.e., uncertainty bounds overlap zero) (Fig. 3). However, the trend of increasing carbon stocks from 1990 to 2013 (Fig. 1) over the 23-year period suggests that the WMNF are a modest carbon sink.

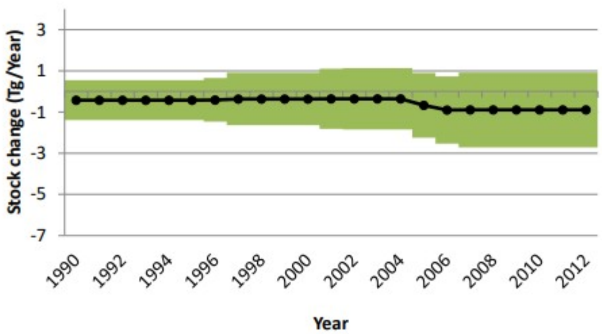



***Figure 3.*** *Carbon stock change from 1990 to 2012 for WMNF, bounded by 95 percent confidence intervals (green). A positive value indicates a carbon source, and a negative value indicates a carbon sink (figure from Appendix A.II, USDA Forest Service 2015).*

Kris response to response: Since your concur that the graph I referred to in my first email, Graph #3, shows changes to yearly carbon stock on the WMNF, then you are saying it doesn't show atmospheric carbon, which contradicts your earlier statements.

Carbon density, which is an estimate of forest carbon stocks per unit area, can help identify the effects of changing forested area. In the WMNF, carbon density increased from about 78.3 tonnes of carbon per acre in 1990 to 81.3 tonnes per acre in 2013 (Fig. 4). This increase in carbon density suggests that total carbon stocks may have indeed increased.

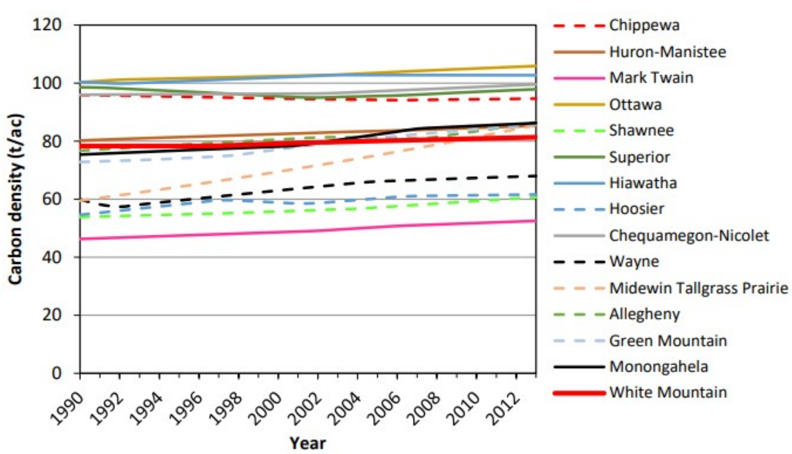



***Figure 4****. Estimated carbon stock density (metric tonnes C per acre) across National Forest units in the Eastern Region from 1990 to 2013.*

Kris question: Can you go into more detail about the different data sets mentioned in the paper, and how they could have skewed the results?

USFA response: Prior to 2005, the FIA would go and record all plots at once for a certain geographic area then return 10 years later and record them all again. After 2005 they started an annual inventory which meant they would do 10% or 20% of ALL FIA plots each year. Techniques stayed the same but sampling regime was modified so they could constantly be feeding data across a broader area. Additional information on uncertainty associated with FIA data can be found on page 8 of the report.

Kris question: What would the carbon stock in WMNF have been in 2012 (and why is there no more recent data?) if there had been no logging since 1990: Since 1950?

Further in the report you will see graphs and models based on the Forest Carbon Management Framework (ForCaMF), pages 11-13. This model does consider a no logging scenario, here is an excerpt from the report on page 11;

"The ForCaMF model then compares the undisturbed scenario with the carbon dynamics associated with the historical disturbances to estimate how much more carbon would be on each national forest if the disturbances and harvests during 1990-2011 had not occurred."

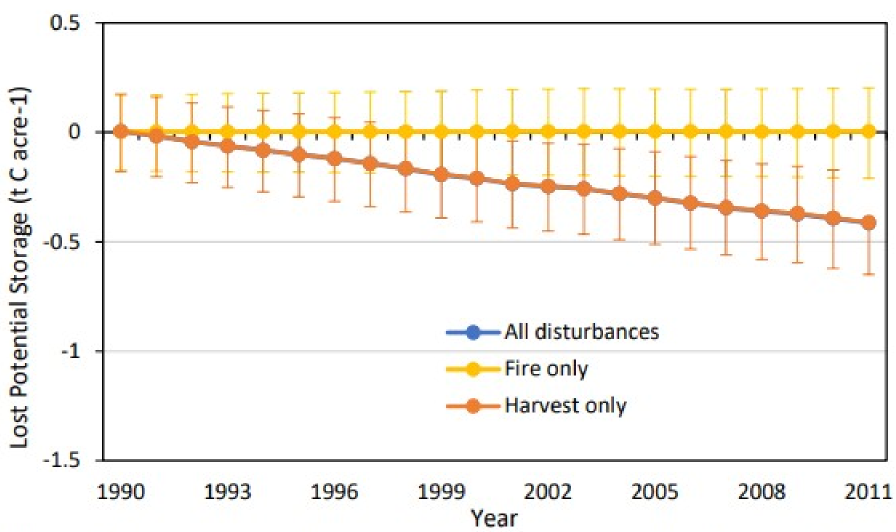



***Figure 7.*** *Lost potential storage of carbon as a result of insect, harvest, and wind (abiotic) in WMNF, 1990–2011 (Figure 2n in Appendix A,* USDA Forest Service, in review*). The zero line represents a hypothetical undisturbed scenario.*

"The ForCaMF model indicates that, by 2011, WMNF contained 0.41 metric tonnes per acre less non-soil carbon (i.e., vegetation and associated pools) due to harvests since 1990, as compared to a

hypothetical undisturbed scenario (Fig. 7). As a result, non-soil carbon stocks in the WMNF would have been approximately 0.8 percent higher in 2011 if harvests had not occurred since 1990 (Fig. 8)."
https://www.fs.usda.gov/nfs/11558/www/nepa/111828_FSPLT3_5657677.pdf

Kris response to response and questions: What does the 1 after j C acre mean? This graph obscures the data. Why is the graph showing "Lost Potential Storage" rather than how much carbon would have been sequestered each year that the Forest was not logged? Does the graph including lost soil carbon?

Kris question: Explain how average carbon loss over the whole forest is relevant to any proposed logged areas' carbon stores per acre.

Kris question: Are you able to provide data supporting forest-wide and project-wide averaging as adequate to represent and assess Logging Project carbon effects?

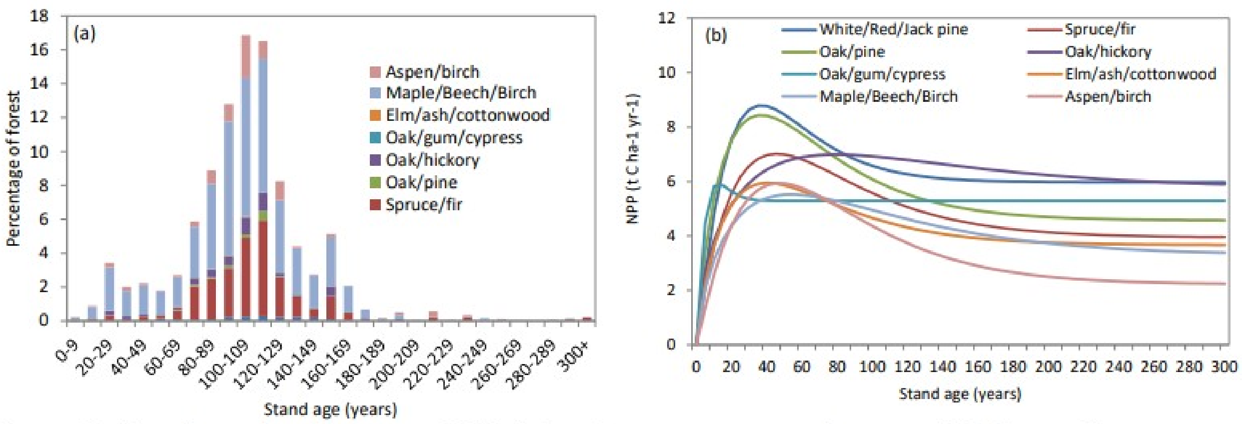



**Figure 9**. *Stand age distribution in 2011 (a) and net primary productivity (NPP)-stand age curves (b) for forest type groups in White Mountain National Forest (from Figures 1-2 in Appendix C.14, USDA Forest Service, in review).*

https://www.fs.usda.gov/nfs/11558/www/nepa/111828_FSPLT3_5657677.pdf

Kris question: This graph (above) shows the almost complete absence of old growth in WMNF. Please explain how this is not a major failure in management for diversity and carbon sequestration.

Kris question: Why isn't net primary productivity defined in this document?

"InTEC model results show that WMNF was accumulating carbon steadily at the start of the analysis in the 1950s through the mid-1970s (Fig. 10) (positive slope) <u>as a result of regrowth following disturbances and heightened productivity of the young to middle-aged forests</u>. As stand establishment declined and more stands reached slower growth stages around the 1980s, the rate of carbon accumulation declined (negative slope). Aging forests, coupled <u>with relatively low rates of new stand establishment</u>, may cause the rate of carbon accumulation in the WMNF to decline in the future, a trend projected for many forests across the United States. 10, 11" p. 15
Kris question: What were the disturbances? "Heightened productivity" compared to what?

Kris question: Please define "relatively low rates of new stand establishment.

Please define what “new stand establishment” is, and if it is more than one thing, provide percentages for each.

Kris question: What supports USFS extrapolation of its data out to 300 years?

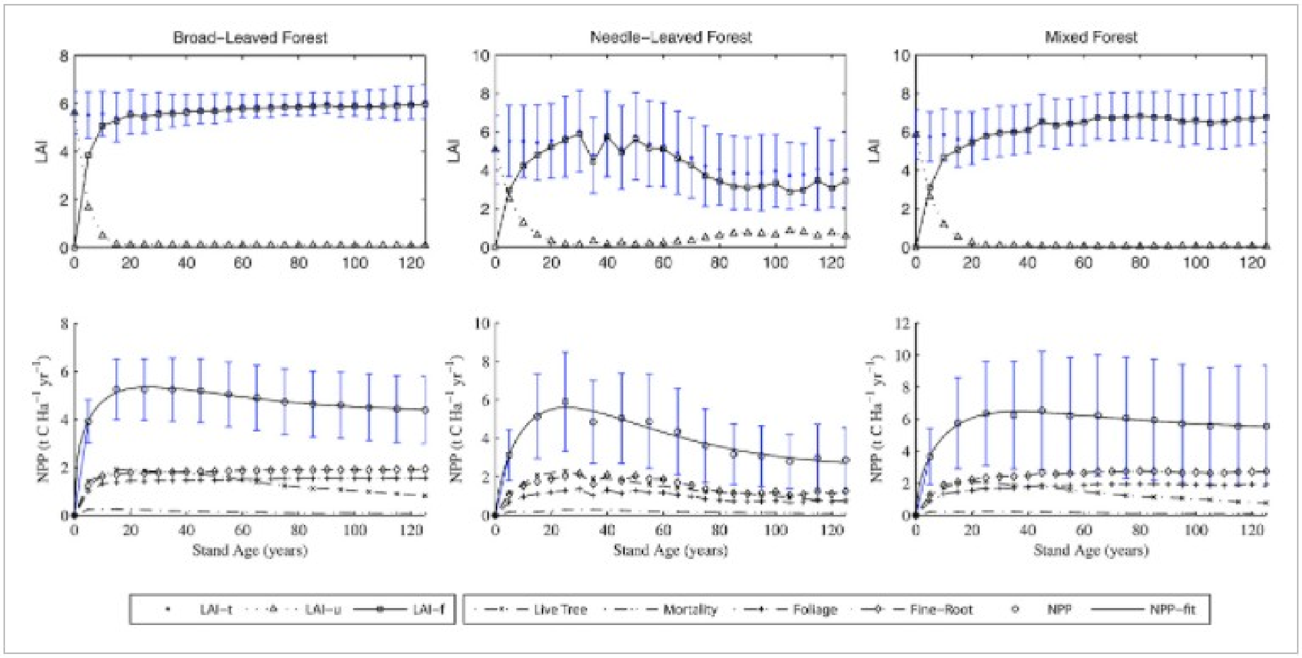
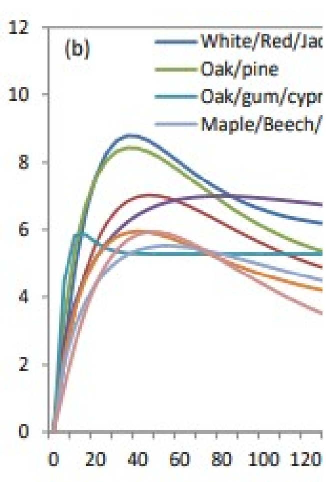



**Figure 2c** Open in figure viewer | PowerPoint

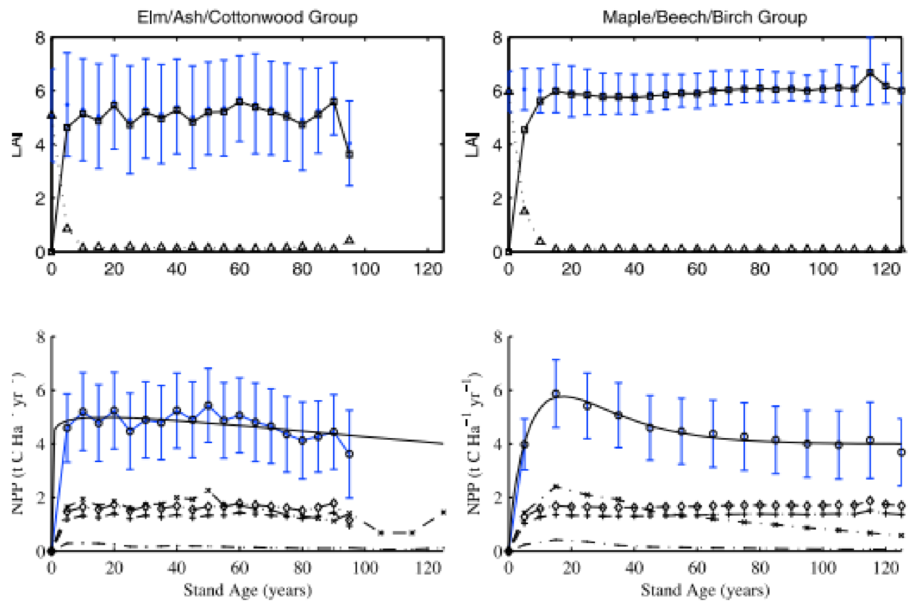
LAI-age and NPP-age relationships for three major forest types in U.S.

[https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2010GB003942](https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2010GB003942) (above and below, right)




[64] In this study the derived NPP-age relationships are limited to a maximum stand age of 125 years because the small numbers of pixels available for the older age groups would produce large uncertainties in the results. Caution should be taken if extrapolating the results beyond 125 years. *Lichstein et al.* [2009] found that for most North American forest types, biomass of older forests was stable or increasing, indicating an equilibrium status of old-growth forests with only slightly positive NPP. We used only one curve shape (equation (7)) for data fitting, so for some forest type groups, the curve shapes in the older ages may not be well represented and could be biased. According to the $R^2$ (coefficient of determination) and RMSE (root mean squared error) shown in Table 6, equation (7) is statistically good enough to fit the NPP-age data.

Expanding the Y axis to 300 years and compressing the X axis makes the supposed decline in NPP look like it is happening faster.




https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2010GB003942

Kris question: Why is “disturbance” is not defined in this document (below left)? One must follow the footnote to find this (below right):

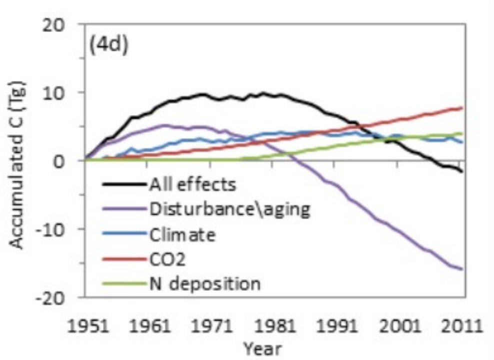
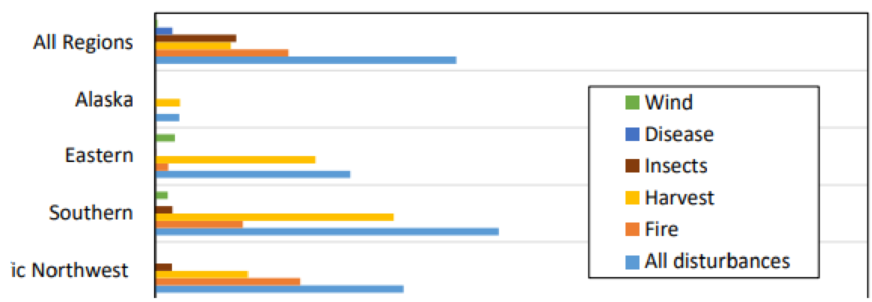



*Figure 10. Accumulated carbon in WMNF due to individual disturbance/aging, non-disturbance factors, and all factors combined for 1950–2011, excluding carbon accumulated pre-1950 (Figure 4d in Appendix C.4, USDA Forest Service, in review).*




Kris question: Is disturbance logging in the graph above?

Kris question: Does accumulated carbon in WMNF (does this include soil carbon?) goes down from 1961 to 2011 because of WMNF logging?

Kris question: Did “more stands reached slower growth states around the 1980s” because of logging?

“The overall trend shows that this C sink has been declining due to disturbance and aging effects but may have stabilized over the past two decades due to the positive effects of non-disturbance factors.” p. 4: https://www.fs.fed.us/rm/pubs_series/rmrs/gtr/rmrs_gtr402.pdf

Kris question: What are the non-disturbance factors referred to above?

Your report states: “For example, if a plot was measured in 2009 but was clear-cut in 2010, that harvest would not be detected in that plot until it was resampled in 2014.” (p. 8)

Kris question: Does this then mean that the carbon loss from lower or absent sequestration for the unsampled years would not be incorporated into your measurements?

Your report states: “Collectively, these reports incorporate advances in data and analytical methods, representing the best available science to provide comprehensive assessments of National Forest System carbon trends.” p. 3

Kris question: Does your report incorporate recent (2020) data indicating that increased growth, due to increased CO2, leads to decreased tree lifespans? https://www.nature.com/articles/s41467-020-17966-z

These reports do not represent the best available science, and ignore more recent findings and those that contradict the data that supports USFS plans for logging.

Please show why the information below is not incorporated into your data set:

“Far from plateauing in terms of carbon sequestration (or added wood) at a relatively young age as was long believed, older forests (e.g., >200 years of age without intervention) contain a variety of habitats, typically continue to sequester additional carbon for many decades or even centuries, and sequester significantly more carbon than younger and managed stands (Luyssaert et al., 2008; Askins, 2014; McGarvey et al., 2015; Keeton, 2018).”

Large trees and intact, older forests are not only effective and cost-effective natural reservoirs of carbon storage, they also provide essential habitat that is often missing from younger, managed forests (Askins, 2014).

For example, intact forests in Eastern U.S. national parks have greater tree diversity, live and dead standing basal area, and coarse woody debris, than forests that are managed for timber (Miller et al., 2016, 2018; Table 1).

The density of cavities in older trees and the spatial and structural heterogeneity of the forest increases with stand age (Ranius et al., 2009; Larson et al., 2014), and large canopy gaps develop as a result of mortality of large trees, which result in dense patches of regeneration (Askins, 2014).

These complex structures and habitat features support a greater diversity of lichens and bryophytes (Lesica et al., 1991), a greater density and diversity of salamanders (Petranka et al., 1993; Herbeck and Larsen, 1999), and a greater diversity and abundance of birds in old, intact forests than in nearby managed forests (Askins, 2014; Zlonis and Niemi, 2014; Table 1).

Forest bird guilds also benefit from small intact forests in urban landscapes relative to unprotected matrix forests (Goodwin and Shriver, 2014). Several bird species in the U.S. that are globally threatened—including the wood thrush, cerulean warbler, marbled murrelet, and spotted owl are, in part, dependent on intact, older forests with large trees (International Union for Conservation of Nature, 2019).

Two species that are extinct today—Bachman's warbler and Ivory-billed woodpecker—likely suffered from a loss of habitat features associated with old forests (Askins, 2014).

Today, forest managers often justify management to maintain heterogeneity of age structures to enhance wildlife habitat and maintain "forest health" (Alverson et al., 1994). However, early successional forest species (e.g., chestnut-sided warbler and New England cottontail) that are common targets for forest management may be less dependent on forest management than is commonly believed (cf. Zlonis and Niemi, 2014; Buffum et al., 2015).

Management also results in undesirable consequences such as soil erosion, introduction of invasive and non-native species (McDonald et al., 2008; Riitters et al., 2018), loss of carbon—including soil carbon (Lacroix et al., 2016), increased densities of forest ungulates such as white-tailed deer (Whitney, 1990)—a species that can limit forest regeneration (Waller, 2014)—and a loss of a sense of wildness (e.g., Thoreau, 1862).

https://www.frontiersin.org/articles/10.3389/ffgc.2019.00027/full#T1

"This is the stage of forest development at which the rate of carbon sequestration is highest, as the amount of leaf area and the rate of photosynthesis peak during this period of high tree-to-tree competition. These higher rates generally occur when the forest is approximately 30–70 years old or the trees are approximately 4"–16" in diameter, though the specific age and size will depend on such factors as site quality and land-use history. Soon after the forest canopy closes, the overall growth of the forest slows down and, with it, the sequestration rate. However, trees continue to sequester significant amounts of carbon in order to grow and maintain themselves. One important thing to recognize is that the forest might actually be a source of carbon immediately following a disturbance, as rates of tree growth, although rapid, are unable to counteract losses of carbon due to the decomposition of organic matter in the soil. This loss of carbon from decomposition is enhanced when large openings are created in the forest, which increases soil temperature and moisture availability and hence microbial activity. **It generally takes 10–15 years before there is enough forest growth to shift a disturbed area from a carbon source to a carbon sink...**

**Old-growth forests can provide us a guide as to how much carbon mature forests store. Estimates of the carbon stored in these forests range from 100 to 120 metric tons of carbon per acre** (Hoover, Leak, and Keel 2012). Due to our past land-use history, our current forests are relatively young, many around 100 years old, and generally store 60–80 metric tons of carbon per acre. Carbon in our current aged forests accumulates at a rate of about 0.41 metric tons per acre each year in a typical maple–beech–yellow birch forest (Smith et al. 2006). Given this rate of carbon accumulation, our current maple–beech–yellow birch forests would need to continue growing at this rate, without a major forest disturbance, for about another 100 years before they would have the levels of carbon storage that we find in old-growth forests. Future gains in forest carbon will primarily come from the diameter growth of trees, additions to the deadwood pool from dying trees, and the accumulation of soil organic carbon from root growth and decomposition." (emphasis added)

https://masswoods.org/sites/masswoods.org/files/Forest-Carbon-web_1.pdf

The Forest Service's analysis of climate change mentions the 2014 IPCC report, but not the 2018 report, which was available at the time the Service conducted their analysis. This analysis has one footnote that refers to the 2000 IPCC report. There is no update report incorporating the very urgent recommendations in the 2022 IPCC report.

In light of the urgency established in the most recent IPCC report, the Service's claim that the release of carbon to the atmosphere through logging would purportedly be offset by long-term forest growth is not credible because our excess of carbon calls for drastic reduction of production and large increases in sequestration. The long-term equilibrium assumed by USFS analysis no longer exists.

The 2022 IPCC FAQ states: "Thus, protecting and restoring ecosystems on land and in the ocean is a key element for success. A range of scientific evidence indicates that the capacity to provide these services relies upon 30 to 50% of Earth's surface (land, freshwater and ocean) to be effectively conserved... Climate Resilient Development will only be possible with fundamental changes in five major areas: 1) in our world's energy systems; 2) in the way we use, manage and safeguard the land and freshwater, the oceans and their respective ecosystems; 3) in the way cities and infrastructure are planned, built, organized and governed; 4) in the way our economies and industries function and 5) in the way our societies function on a local, national and international level."

Kris question: Does USFS Forest Carbon Management Framework (ForCaMF) account for lost soil carbon from logging"

"Forested area on the WMNF will be maintained as forest in the foreseeable future, which will allow for a continuation of carbon uptake and storage over the long term." p. 21

https://www.fs.usda.gov/nfs/11558/www/nepa/111828_FSPLT3_5657677.pdf

Kris questions:

1. How much forested area?

2. How forested?

3. What is the your definition of forested?

4. How much carbon uptake and storage?

5. How much compared to what would be taken up and stored if no logging was done?

"The biggest influence on current carbon dynamics on the WMNF is the legacy of intensive timber harvesting and land clearing for agriculture during the 19th century, followed by a period of forest recovery and more sustainable forest management beginning in the early to mid-20th century." p. 21

Kris question: Please explain why you state that the timber harvesting of the 19th century and logging in the mid 20th century is a larger influence on current carbon dynamics than recent and planned WMNF logging, rather than stating that the past, unalterable logging practices have resulted in the current carbon dynamic, and that now the biggest influence on carbon dynamics in WMNF is your logging.

Influence: "the power or capacity of causing an effect in indirect or intangible ways." The effect of the logging has become part of the given. Or, if you characterize effects as endless, then that view must also extend to the effects of your past and proposed logging.

“More intense precipitation and extreme storm events are expected to continue increasing in this region… Drought-stressed trees may also be more susceptible to insects and pathogens, which can significant reduce carbon uptake” p. 19.

Kris question: Explain how logging, especially clear cutting, and shelterwood cutting, can be considered appropriate when conditions of drought and increased intensity and amount of rainfall are predicted for the northeast.

Kris question: What are the carbon soil measurement after a clear cut/shelterwood cut and in the next ten years?

USFS: As for your question about more recent data there is some exciting news to report on that front, the Forest Service has made the investment and new data up to 2020 will be available in the coming months.  We do intend to update the WMNF carbon assessment once that data is in hand.  Forest carbon dynamics play out over decades and centuries so it doesn’t make sense to report figures on an annual time frame.  Currently the 5-10 year reporting cycle is considered appropriate.

Kris response:  All Logging proposals need to be placed on hold until this 2020 data is available to the public.

some species for a variety of reasons, such as leaching of base cations in the soil, increased vulnerability to secondary stressors, and suppression by more competitive species.[57]**Error! Bookmark not defined.** Some regional studies have documented negative effects on forest productivity

https://www.fs.usda.gov/nfs/11558/www/nepa/111828_FSPLT3_5657677.pdf

Kris request: Please provide the resolution of the error above.

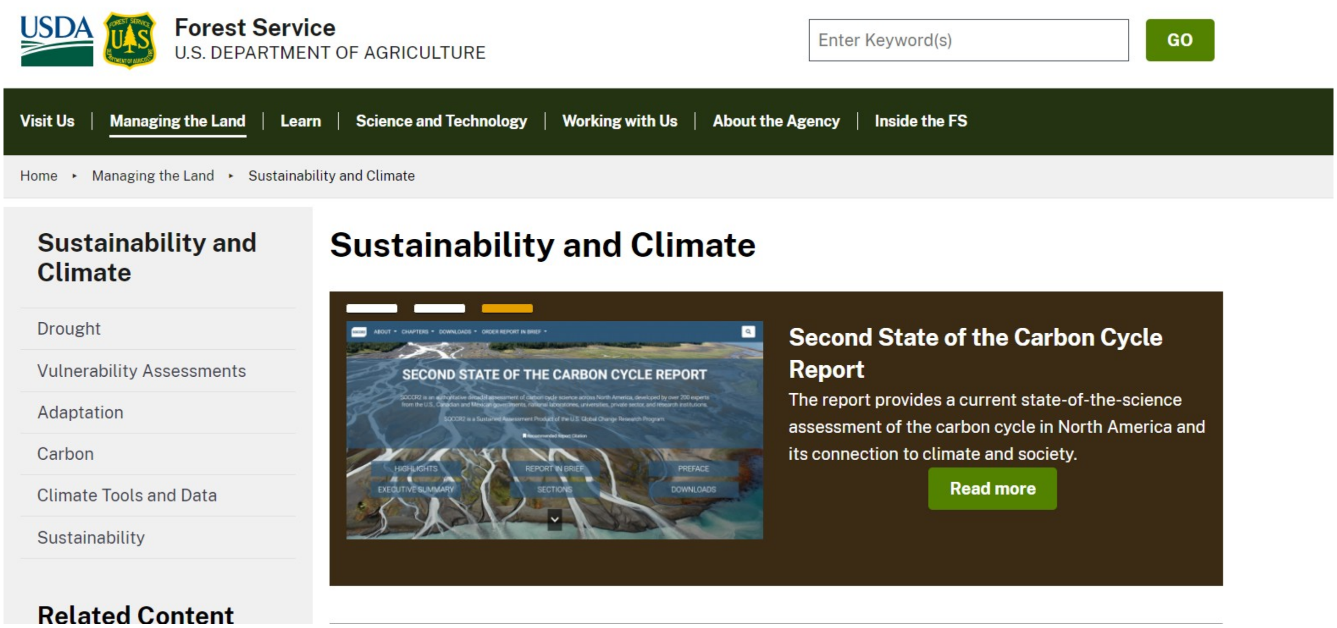
USFS documents cited:

https://www.frontiersin.org/articles/10.3389/ffgc.2019.00027/full#B26

https://www.frontiersin.org/articles/10.3389/ffgc.2019.00027/full#B72

https://www.frontiersin.org/articles/10.3389/ffgc.2019.00027/full#B42

**Comments on Lake Tarleton Logging EA and other documents:**




**The USFS site and all USFS documents should be linked to the 2022 IPCC report, rather than the 2018 report.**

**The Lake Tarleton documents failed to account for the effects of logging on carbon sequestration, diversity and severe dearth of old growth forests in WMNF.**

https://www.frontiersin.org/articles/10.3389/ffgc.2019.00027/full

**The Lake Tarleton logging documents failed to account for the cumulative effects of logging on global warming:**

"Forest Service Categorical Exclusions Challenged in Virginia Federal Court. A lawsuit filed in the federal district court for the Western District of Virginia challenged three categorical exclusions adopted by the U.S. Forest Service to exempt certain projects from NEPA review. The three categorical exclusions are for commercial logging projects up to 2,800 acres and construction of up to three miles of logging roads; construction of up to two miles of permanent road for any purpose; and "special use" authorizations for private uses affecting up to 20 acres of national forest lands. The complaint asserted that the final rule violated NEPA and the Administrative Procedure Act, including because the Forest Service did not consider the exclusions' impacts in light of conditions that are rapidly changing due to climate change. The complaint also alleged that the final rule would allow significant climate impact to occur without analysis "[b]ecause there is no programmatic analysis of the cumulative impact of successive projects on carbon storage." The plaintiffs contended that the Forest Service should have prepared an environmental impact statement or an environmental assessment to address, among other subjects, the rule's impact on efforts to limit greenhouse gas emissions." 1/8/2021
http://climatecasechart.com/climate-change-litigation/case/clinch-coalition-v-us-forest-service/

**The Lake Tarleton Logging Project EA and other documents failed to take the best science into account, most importantly, recent data on climate change which shows that intact forests accomplish USFS habitat diversity and carbon sequestration goals:**

“Intact forests—largely free from human intervention except primarily for trails and hazard removals—are the most carbon-dense and biodiverse terrestrial ecosystems, with additional benefits to society and the economy.

**USFS failed to justify the Tarleton Project as a means of increasing forest diversity, because “Old-growth forests are unique, tremendously biodiverse, and unfortunately, very rare, with less than 1% of our forests now considered old-growth.”** By definition, old-growth forest hasn’t been disturbed by humans in any way, over hundreds of years.” https://extension.unh.edu/blog/2021/04/top-old-growth-forests-visit-new-hampshire

Since WMNF is in a serious state of imbalance, with 99% of the forest unable to reach its natural state, the Tarleton area should be left unlogged to promote age diversity and species diversity. 1950s levels of clearing were not a natural state which is being lost, but he result of 150 years of huge alteration of the natural landscape by an industrial culture. Using this as a baseline for conditions which should be maintained is arbitrary, capricious and damaging to the ecosystem.

**The EA describes old growth in a misleading and inaccurate way. It gives the impression that old growth forest is dark and smothering, without forest openings or young trees.**

***USFS improperly failed to do an EIS for the Lake Tarleton logging project.***

The Revised EA states: “The proposed action affects a relatively small amount of forest land and carbon on the White Mountain National Forest and, in the near-term, might contribute an extremely small quantity of greenhouse gas emissions relative to national and global emissions (Dugan and McKinley 2019).” Engaging in the tragedy of the commons is not an adequate response to climate change.

“The proposed action would not convert forest land to other non-forest uses, thus allowing any carbon initially emitted from the proposed action to have a temporary influence on atmospheric greenhouse gas concentrations, because carbon will be removed from the atmosphere over time as the forest regrows.”

**The Tarleton project documents provide no real comparison between carbon sequestered by a forest left alone for 100 years and one logged.** “Temporary influence” is meaningless now that we have dumped so much CO2 into the atmosphere that at least 3 degrees warming is inevitable even if we stop emitting CO2 right now, which we won't. This statement is grossly irresponsible, misleading and calls into question the accuracy of the whole document. The graphs in the Carbon report submitted with the rest of the Lake Tarleton documents show that WMNF is losing carbon through logging. We have no sequestering capacity we can "give up" at this point, without increasing the rate of ecological collapse. The EA fails to acknowledge and incorporate the 2022 IPCC report.

**The Lake Tarleton EA provided no sources to support the statement that: "The prescribed treatments enhance the diversity of tree species, ages, and structures that are present in forest ecosystems, and this diversity can increase the ability of forests to withstand increasing pressures from climate change and other stressors."**

This assertion is contradicted by this 2019 paper: "Intact forests—largely free from human intervention except primarily for trails and hazard removals—are the most carbon-dense and biodiverse terrestrial ecosystems, with additional benefits to society and the economy. Internationally, focus has been on preventing loss of tropical forests, yet U.S. temperate and boreal forests remove sufficient atmospheric $CO_2$ to reduce national annual *net* emissions by 11%. U.S. forests have the potential for much more rapid atmospheric $CO_2$ removal rates and biological carbon sequestration by intact and/or older forests. The recent *1.5 Degree Warming Report* by the Intergovernmental Panel on Climate Change identifies *reforestation* and *afforestation* as important strategies to increase negative emissions…" https://www.frontiersin.org/articles/10.3389/ffgc.2019.00027/full

"In the absence of forest harvest, the forest where this proposed action would take place would thin naturally from mortality-inducing natural disturbances and other processes resulting in dead trees that would decay over time, emitting carbon to the atmosphere."

**The project documents provides no figures comparing the tree loss from the proposed logging to the tree loss that would happen over the next 200 years if the forest was left alone.** The graphs in the Carbon report show that not-logging increases carbon stored in the forest, so the statement above is basically meaningless except for providing the appearance of analysis, care.

"Furthermore, the proposed project would transfer carbon in the harvested wood to the product sector, where it may be stored for up to several decades and substitute for more emission intensive materials or fuels. This proposed action is consistent with internationally recognized climate change adaptation and mitigation practices."

Any action is consistent with internationally recognized climate change adaption and mitigation practices, especially when most of the practices are devised by entities controlled by industries that are opposed to any recommendations or actions that limit their profits. The question is, is the logging consistent with a rational approach to global warming. It is not. WMNF must take on the role of protecting the forest and stop all logging on our public lands, and let the corporate forest owners log.

"Hydrology The proposed action is consistent with the laws and policies related to the Clean Water Act. Project design, including design features, and best management practices would reduce or avoid impacts to water quality or quantity to de minimis levels. No measurable adverse effects to water quality or quantity are expected due to project implementation."

**The project documents provide no data showing that logging does not adversely affect watersheds. The following sources contradict the EA:**

**1.)** “In addition to terrestrial impacts, timber harvesting may have significant effects on stream discharge and water quality. Loss of mature vegetative cover leads to decreased evapotranspiration and correspondingly increased peak flows. These effects are compounded by road construction, which creates permanently bare surfaces and compacts soil, resulting in decreased infiltration and increased surface runoff. Logging roads also fragment and isolate habitat patches from smaller, less mobile animals such as salamander species, and roads' stream crossings and culverts sometimes become barriers to fish passage. Surface runoff on or near logging roads effectively increases stream density in logged watersheds, resulting in more rapid drainage and higher fluctuations between peak flows and base flow. Increased surface runoff, along with fewer trees for bank stabilization, generally causes increased erosion and siltation, while road construction on steep slopes often results in slope failure and excess sediment delivery to streams. Overall effects can also include elevated and more variable water temperature, increased turbidity, and higher uniformity of substrates, which generally impair habitat for a number of fish and invertebrate species.
Riparian buffers are required in many jurisdictions, but these have not always been successful in mitigating effects on streams. In general, it should be recognized that the effects of logging on stream discharge and temperature are caused by watershed-level processes and, as such, are unlikely to be completely mitigated by riparian buffers alone. *(Harr 1986, Murphy 1995, Jones and Grant 1996)* A major change in federal land management policy in the 1990s has begun integrating watershed analysis into timber management and multi-purpose land management on federal lands across the US.” US EPA

**2.)** “In the humid Northeast, the greatest increase in streamflow occurs during the first growing season after the clearcut. But in following years, as the area begins to revegetate, the increased flow lessens. Five to ten years after the cut, streamflow may return to precut levels. This effect on quantity is most important to managers of water-supply watersheds.

Of greater concern to woodland owners is the effect of timber harvesting on water quality. Because of the possibility of accelerating erosion, logging can contribute to sedimentation—the most damaging and widespread water pollutant from forested watersheds. Sediment harms water resources by destroying fish habitat, reducing the storage capacity of reservoirs, and increasing treatment costs for municipal water supplies. The greatest problems do not occur as a result of the actual cutting of trees, but from moving them out of the forest, which requires the use of heavy equipment on a system of trails and roads. If the transportation system is not carefully designed and maintained, erosion on the watershed can be greatly increased because roads account for the vast majority of sediment associated with timber harvesting.” Penn State Extension

3.) “Nitrogen (N) and phosphorus (P) concentrations and loads increase in receiving waters after clear-cutting because the removal of trees decreases water and nutrient uptake and increases runoff (Vitousek et al. 1979; Stednick 1996; Kreutzweiser et al. 2008). In addition, increased soil temperatures following clear-cutting accelerate mineralization and nitrification in the soil (Paavolainen and Smolander 1998; Smolander et al. 2001) and nutrients are released from decomposing logging residues (Palviainen et al. 2004). Clear-cutting may also increase total or dissolved organic carbon (TOC, DOC) export (Lamontagne et al. 2000; Schelker et al. 2012, 2014), which have implications for catchment carbon budgets (Schelker et al. 2012), the structure of aquatic food webs (Jansson et al. 2000), the acid–base chemistry of surface waters (Buffam et al. 2008), and the mobility, toxicity, and bioavailability of trace metals and organic pollutants (Porvari et al. 2003; Bergknut et al. 2011). The impacts on water quality are long-term and they

are generally at its greatest during the first years after clear-cutting (Rosén et al. 1996; Ahtiainen and Huttunen 1999; Palviainen et al. 2014).
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4552712/

“This is the stage of forest development at which the rate of carbon sequestration is highest, as the amount of leaf area and the rate of photosynthesis peak during this period of high tree-to-tree competition. These higher rates generally occur when the forest is approximately 30–70 years old or the trees are approximately 4"–16" in diameter, though the specific age and size will depend on such factors as site quality and land-use history. Soon after the forest canopy closes, the overall growth of the forest slows down and, with it, the sequestration rate. However, trees continue to sequester significant amounts of carbon in order to grow and maintain themselves. One important thing to recognize is that the forest might actually be a source of carbon immediately following a disturbance, as rates of tree growth, although rapid, are unable to counteract losses of carbon due to the decomposition of organic matter in the soil. This loss of carbon from decomposition is enhanced when large openings are created in the forest, which increases soil temperature and moisture availability and hence microbial activity. It generally takes 10–15 years before there is enough forest growth to shift a disturbed area from a carbon source to a carbon sink...

Old-growth forests can provide us a guide as to how much carbon mature forests store. Estimates of the carbon stored in these forests range from **100 to 120 metric tons of carbon per acre** (Hoover, Leak, and Keel 2012). Due to our past land-use history, our current forests are relatively young, many around 100 years old, and generally store 60–80 metric tons of carbon per acre. Carbon in our current aged forests accumulates at a rate of about 0.41 metric tons per acre each year in a typical maple–beech–yellow birch forest (Smith et al. 2006). Given this rate of carbon accumulation, our current maple–beech–yellow birch forests would need to continue growing at this rate, without a major forest disturbance, for about another 100 years before they would have the levels of carbon storage that we find in old-growth forests. Future gains in forest carbon will primarily come from the diameter growth of trees, additions to the deadwood pool from dying trees, and the accumulation of soil organic carbon from root growth and decomposition.”

https://masswoods.org/sites/masswoods.org/files/Forest-Carbon-web_1.pdf

Carbon density, which is an estimate of forest carbon stocks per unit area, can help separate the effects of changing forested area from the effects of growth and mortality on carbon stock trends. In the WMNF, carbon density increased from about 70 metric tonnes of carbon per acre in 1990 to 84 metric tonnes per acre in 2013 (Fig. 4). This increase in carbon density suggests that total carbon stocks may have indeed increased and are not just an artefact of changes in forested area.

§ Forested area used in the CCT model may differ from more recent FIA estimates, as well as from the forested areas used in the other modeling tools.

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Carbon density, which is an estimate of forest carbon stocks per unit area, can help identify the effects of changing forested area. In the WMNF, carbon density increased from about 78.3 tonnes of carbon per acre in 1990 to 81.3 tonnes per acre in 2013 (Fig. 4). This increase in carbon density suggests that total carbon stocks may have indeed increased.

https://www.fs.usda.gov/nfs/11558/www/nepa/111828_FSPLT3_5657677.pdf

**The Tarleton Lake logging documents provide no cumulative measure of the carbon loss caused by its logging and its effect on climate change.**

"What is the recipe for getting people to accept unsightly practices like clear-cutting?

Give them plausible sounding reasons: tell them that the forest is unhealthy, that red maple is taking over, that alien species are invading, that trees will fall on people, that there is an unacceptably high fire danger, that a hurricane will blow everything down. Sound familiar?

Presumably, clear-cutting is needed to help avert such impending catastrophes. But if people aren't buying, what then? Push the "early successional habitat" argument. Win support from a naive public by insisting that we need more cottontails and game bird species,

of a mid-1800s landscape. Have I missed any of the arguments?"

**Bowen Brook Timber Sale, Unit 23 - Using an "Ecological Approach" 2017**

"...I've been told in private, by foresters, that these are the standard talking points that state and federal forest agencies routinely use to soften up the public prior to an unpopular action."

~Robert Leverett, Forest Ecologist & Executive Director Eastern Native Tree Society http://www.maforests.org/WMNF.pdf

WMNF has logged huge amounts of land over the past thirty years. Below are three years of projects, most of them on land with cultural and scenic resources that were never fully evaluated.

"Albany South Project **(2018)**

An integrated resource management project that proposes vegetation management to improve wildlife habitat and forest health conditions, as well as recreation, watershed and transportation system improvements.

**Bowen Brook Integrated Resource Management**

An integrated resource project designed to move the Wild Ammonoosuc North Habitat Mgt Unit (HMU) toward desired conditions through timber, wildlife habitat, recreation, fisheries and aquatic management, road improvements and decommissioning.

**Cold River Integrated Resource Project**

Vegetation, wildlife habitat, and recreation management activities in the Cold River Habitat Management Unit.

**Crawford Stewardship Project**

An integrated resource project with activities including maintenance and improvement of existing recreation facilities, wildlife habitat improvement, timber harvesting, timber stand improvement, and watershed improvement.

**Deer Ridge Integrated Resource Project**

An integrated resource project designed to move the South Pond South Habitat Mgt Unit (HMU) toward desired conditions through timber, wildlife habitat, recreation, and road improvements.**..**

**Evans Brook Vegetation Management Project**

Proposed timber harvest using even-aged and uneven-aged management methods to improve forest health, improve wildlife habitat diversity, and provide for a sustainable yield of forest products. Connected road work will be proposed as well.

**Four Ponds Management Project**

Proposed timber harvest, wildlife opening expansion, prescribed fire, watershed and stream improvements, and changes to trails, roads, gravel pits, and campsites.

**Intervale Vegetation Enhancement Project**

Silviculturally treat vegetation in Jigger Johnson campground to enhance recreation experience and stand resiliency.

**North Chatham Integrated Resource Management**

An integrated resource management project that proposes vegetation management to improve wildlife habitat and forest health conditions, as well as transportation system improvements

**Northeast Swift Integrated Resource Management Project**

An integrated resource project that considers activities to move the NE Swift HMU toward the desired condition through timber, wildlife habitat, recreation, fisheries and aquatic management, road improvements or decommissioning, and other activities.

**Oliverian Stewardship Project**

Integrated stewardship project. Goals include improvement of quality of timber stands, enhancement of wildlife habitat, mitigation of effects of past logging practices within recent Twin Oaks land acquisition, provide access and day use to Owls Head.

**Pemi Northwest Project**

This project proposes vegetation management and improvements to wildlife habitat, recreation and watershed resources.

**Province Integrated Resource Management Project**

An integrated resource management project that proposes vegetation management to improve wildlife habitat and forest health conditions, as well as recreation and transportation system improvements.

Wild River Roadside Vegetation Management **(2105)** Remove hazard trees and improve forest stand conditions along 6.3 miles of the Wild River Road (Forest Road 12). Harvest timber within a designated roadside risk management zone of 100 feet on either side of Wild River Road."

2021: "Continued maintenance of 750 acres of permanent wildlife openings across the White Mountain National Forest, including an addition of 150 new acres of wildlife openings and a decommission of 150 acres of existing wildlife openings."

**The Tarleton Lake EA and other project documents failed to provide an assessment of the cumulative effects of these projects, or the projects of the past 50 years, on climate change, wildlife, diversity, fragmentation, pollution, loss of cultural resources, scenic impacts.**

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