

Comments on the Draft CWPP Update

This Draft CWPP is based on a single unproven assumption, that vegetation treatments (logging, thinning, prescribed fire) performed on lands miles from homes and other infrastructure will protect those homes and infrastructure.

There are multiple recent examples of those types of treatments accomplishing exactly the opposite (i.e., increasing wildfire risks to infrastructure). Claiming that this reworked CWPP is an improvement does nothing more than give residents of Ravalli County a false sense of security.

It is obvious that the intent of this rewriting is to access federal tax dollars. (Draft CWPP, p. 2)

Additionally, an updated CWPP (< 10 years old) is required for Ravalli County to be eligible for federal funding to implement projects that mitigate wildfire risk.

Put more simply, this current rewriting of the CWPP can be described as “trolling for dollars.”

The Draft CWPP completely ignores the fact that logging and thinning reduces the capacity of forests to sequester carbon. During this time of rapidly accelerating global warming—Montana is already experiencing one of the fastest rises in temperature on the planet—all CO₂ released into the atmosphere is long-lived and cumulative. Even if “treated” forests do transition from carbon emitters to carbon sinks after 2032, as suggested (without evidence) by recent Forest Service research (see below - Near-term investments in forest management ...), the vast amounts of CO₂ released into the atmosphere by the current baseless and ill-advised treatments will continue contributing to global warming for centuries.

Although it should not require repeating, Ravalli County and other collaborators involved in this endeavor to update the CWPP must be reminded that their responsibility is for the wellbeing of all residents of the County and not the hoped-for future revenue streams of the collaborators and associates.

Wildland Urban Interface (WUI)

Redefining and extending the WUI to 1 ½ miles from structures is not only ludicrous but little more than pandering to the desires of the Forest Service—an extended WUI provides that agency access to additional funding and an uncountable number of mature and old-growth trees. The Forest Service’s own fire scientists have clearly shown that the only way to protect structures is to make them as fire resistant as possible and reduce fire hazards in the Home Ignition Zone (HIZ) defined as 100-200 feet around structures.

Pretending, and that is exactly what it is, that vegetative treatments beyond that 100-200 feet influences whether a structure survives a wildfire is dishonest.

Furthermore, asserting that because roads have a “recreation and high resource value” is a valid reason to provide them with a WIU designation requires an astounding stretch of the imagination. This is especially true for the road in Lost Horse Canyon within a riparian area along a stream which is currently proposed for a Wild and Scenic River designation.

Home Ignition Zone (HIZ)

It is admirable that the home hardening is mentioned in the Draft CWPP. However, that is not enough. The HIZ should be the top priority with available funding directed toward home hardening before

anything else. The Forest Service's fire scientists have repeatedly shown (confirmed by the Roaring Lion Fire and many others) that nothing else has as much effect for protecting homes.

Additionally, Ravalli County should implement requirements for new and remodeled homes that require the use of non-flammable materials and fire-resistant landscaping.

Reducing Insect and Disease Outbreaks and Spread

Insect and disease outbreaks are natural disturbances tied directly to climate conditions. Including this as an Objective (Draft CWPP, Appendix A-1) is absurd. No amount of vegetative treatment (i.e., logging, thinning, and prescribed fire) is going to have any positive effect. Believing that it will is a waste of time and effort—irrational magical thinking.

Best Available Science

Claims of using the Best Available Science are meaningless unless ALL new findings are carefully and logically analyzed. There is little indication that such analysis happens. Conversely, there is an abundance of evidence to show that the ever-changing political environment directly influences decision making. Given the history of the "collaborators" who developed this DRAFT CWPP, trusting that science and not politics will guide future decisions is next to impossible.

Recommendations

- Rewrite this Draft CWPP so that it is based on the best recent, independent scientific research and not on politics and baseless assumptions (i.e., logging, thinning, and prescribed fires diminish future wildfires and save trees from insects and disease).
- Focus on and prioritize efforts on home hardening and the HIZ.
- Implement automatic and meaningful restrictions on human ignitions (campfires, pile burning, field burning, etc.) when wildfire risks are high and when stagnant air advisories (inversions) are issued.
- Clamp down on illegal, off-road, motorized use on public (state and federal) lands.
- Do not perform vegetative treatments (i.e., logging, thinning, and prescribed fire) anywhere outside the Home Ignition Zone (HIZ).
- Do not attempt to stop or reduce natural processes such as insects and disease. They are indispensable to ecologically healthy forests.
- Do not waste effort attempting to "restore" landscapes that were degraded by previous ill-advised human management. Nature will find its own equilibrium if left to its own devices.

Respectfully submitted,



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Near-term investments in forest management support long-term carbon sequestration capacity in forests of the United States

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Abstract

The forest carbon sink of the United States offsets emissions in other sectors. Recently passed US laws include important climate legislation for wildfire reduction, forest restoration, and forest planting. In this study, we examine how wildfire reduction strategies and planting might alter the forest carbon sink. Our results suggest that wildfire reduction strategies reduce carbon sequestration potential in the near term but provide a longer term benefit. Planting initiatives increase carbon sequestration but at levels that do not offset lost sequestration from wildfire reduction strategies. We conclude that recent legislation may increase near-term carbon emissions due to fuel treatments and reduced wildfire frequency and intensity, and expand long-term US carbon sink strength.

Keywords: natural climate solutions, climate mitigation, forest carbon projections, climate legislation

Significance Statement

Nature based climate solutions and investments in forest management can help protect communities, improve forest resilience, and improve forest carbon sequestration rates. However, the scope, scale, and timing of the management actions have different carbon consequences in the near-term versus longer-term. Our results suggest that nature based climate solutions can increase forest carbon sequestration, but gains may not be realized for decades.

Introduction

Forests are the largest terrestrial carbon sink [1], and the sink strength is influenced by biological and social dynamics including forest growth, disturbance, management, land use change, and policy [2]. Recent evaluations of forest carbon dynamics in the United States [3] and projections of future forest carbon [4, 5] indicate that the net sink strength is declining and future contributions from forests are uncertain due to biological and social drivers [4, 6]. As US climate legislation is enacted and management strategies are implemented to act on those policies, it is critical to analyze their potential effects on forest carbon and other ecosystem services.

The 2021 Infrastructure Investment and Jobs Act (IIJA; P.L.117-58) and the 2022 Inflation Reduction Act (IRA; P.L.117-169) include important forest-climate components; each allocated billions of dollars for management activities to perform forest restoration, increase planting, combat wildfires, and develop

climate-smart forestry approaches. Forest management activities relevant to IIJA and IRA either remove carbon [7], add carbon [7, 8], or avoid carbon loss [9]. These activities impact carbon futures differently depending on the scale and the time frame examined. In this study, we examined the potential carbon consequences of the US Department of Agriculture Forest Service (USFS) planting and fuel reduction strategies to implement the IIJA policies [10].

USFS strategies [10] align with natural climate solutions [11], including tree planting on an additional 1.6 million ha of USFS forest land with inadequate tree cover or regeneration (nonstocked) and forest fuel treatments on an additional 8.1 million ha of USFS land and 12.1 million ha of non-USFS land in the western United States over the next 10 years. The IIJA policy-driven management actions to protect communities and increase forest resilience aim to affect >7% of the 283 million ha of forest [3] in the United States.

We use data from >130,000 national forest inventory (NFI) plots to clarify the potential effects of planting and increased fuel management on carbon trajectories in the conterminous United States

Competing Interest: The authors declare no competing interest.

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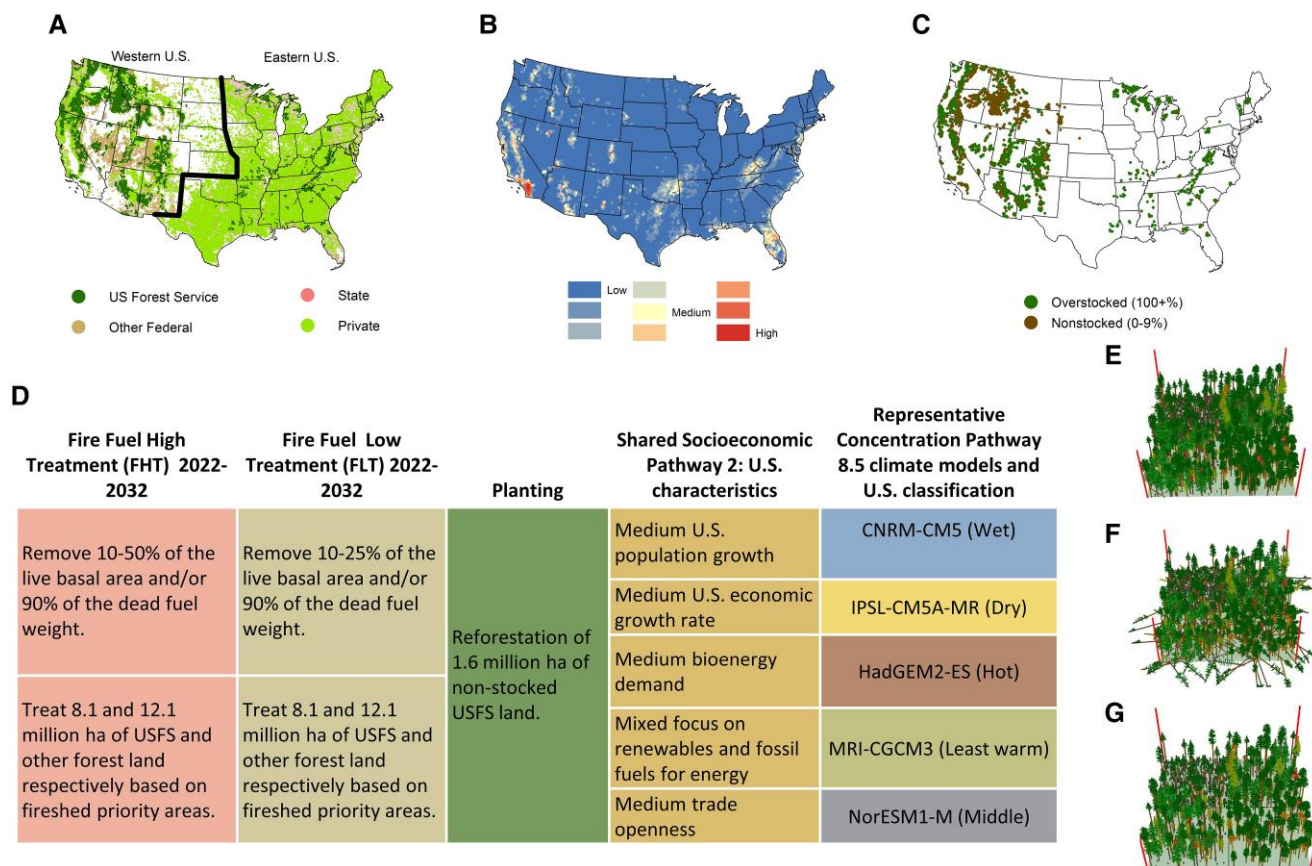


Fig. 1. A) Forested NFI plot locations (approximate) and ownership. B) illustrates fire sheds [12] used to identify western forest fuel treatment locations [7]. C) The fuel treatments within priority fire sheds targeted overstocked and fully stocked USFS land and in other ownerships. Nonstocked USFS land was targeted for planting. D) Projections were based on two different fuel-treatment levels, planting, and five different climates under Shared Socioeconomic Pathway 2. The fuel treatments apply a tree basal area reduction and/or dead fuel weight reduction; E) depicts a western forest stand with $46 \text{ m}^2 \text{ ha}^{-1}$ of basal area, thinned to $23 \text{ m}^2 \text{ ha}^{-1}$, displaying cut and unutilized trees (F) and the resulting forest without cut trees (G).

(Fig. 1). We constructed 30-year projections of the NFI based on Shared Socioeconomic Pathway 2 [13] and five general circulation models under Representative Concentration Pathway 8.5 to assess forest carbon stocks and fluxes associated with two fuel treatment levels and one planting scenario (Fig. 1, SI Appendix). The results highlight the potential effects of recent policies on the capacity of forests to sequester and store carbon and underscore the long-term nature of forest investments.

Results

In 2019, there were 19,362 MMT of aboveground forest carbon (aboveground live vegetation, deadwood, and litter pools; Fig. 2A) increasing at 132 MMT yr^{-1} . Tree planting, even on low-productivity sites, adds carbon to the forests, and under the planting scenario, the results suggest that 5 MMT of carbon will be added to US forests by the year 2032 from seedling establishment and growth (Fig. 2B).

Fuel treatments are designed to temporarily reduce carbon from forests through thinning, prescribed fire, or other mechanical means, and under a fuel high-treatment (FHT) scenario (Fig. 1D), 288 MMT of aboveground carbon will be removed from western forests by 2032 (Fig. 2B). Under a fuel low-treatment (FLT) scenario (Fig. 1D), 194 MMT of carbon will be removed (Fig. 2B). The fuel-treatment scenarios have two additional short-term (2022–2032) effects: (i) lost sequestration potential from live tree removal and (ii) decreased wildfire carbon emissions (Fig. 2B).

Carbon emission mitigation potential is an important measure of policy impact. We define mitigation potential as the difference in net annual carbon flux between the baseline (no planting or additional fuel treatments) and each scenario (FHT, FLT, planting). Our results suggest that planting leads to a positive mitigation potential that increases over time, ranging from $+0.5 \text{ MMT yr}^{-1}$ in 2032 to $+1.6 \text{ MMT yr}^{-1}$ in 2050 (Fig. 2C).

Results for the fuel-treatment scenarios suggest a negative mitigation potential in the near-term largely due to the removal of live trees. In the longer term, projections suggest a positive, but small, mitigation potential largely due to increased growth of thinned stands and reduced fire mortality. Under the FHT scenario, in 2032, projections suggest a -31 MMT yr^{-1} mitigation potential, indicating that forests would have less net annual carbon accumulation with the fuel treatments. Conversely, by 2050, the FHT fuel treatments may lead to a $+6 \text{ MMT yr}^{-1}$ mitigation potential (about 4.5% of current flux). These results highlight that carbon accumulation through net forest growth is unlikely to offset carbon removal and loss of sequestration potential from fuel treatments in the near term. In the longer term, the treatments may lead to small increases in annual accumulation rates due to avoided wildfire emissions and improved growth in thinned forests. However, the projected cumulative 2022–2050 carbon sequestered under the FLT and FHT scenarios is 200 and 310 MMT less, respectively, than the baseline (Fig. 2D), indicating a reduced capacity of US forests to offset emissions from other sectors over the projection period.

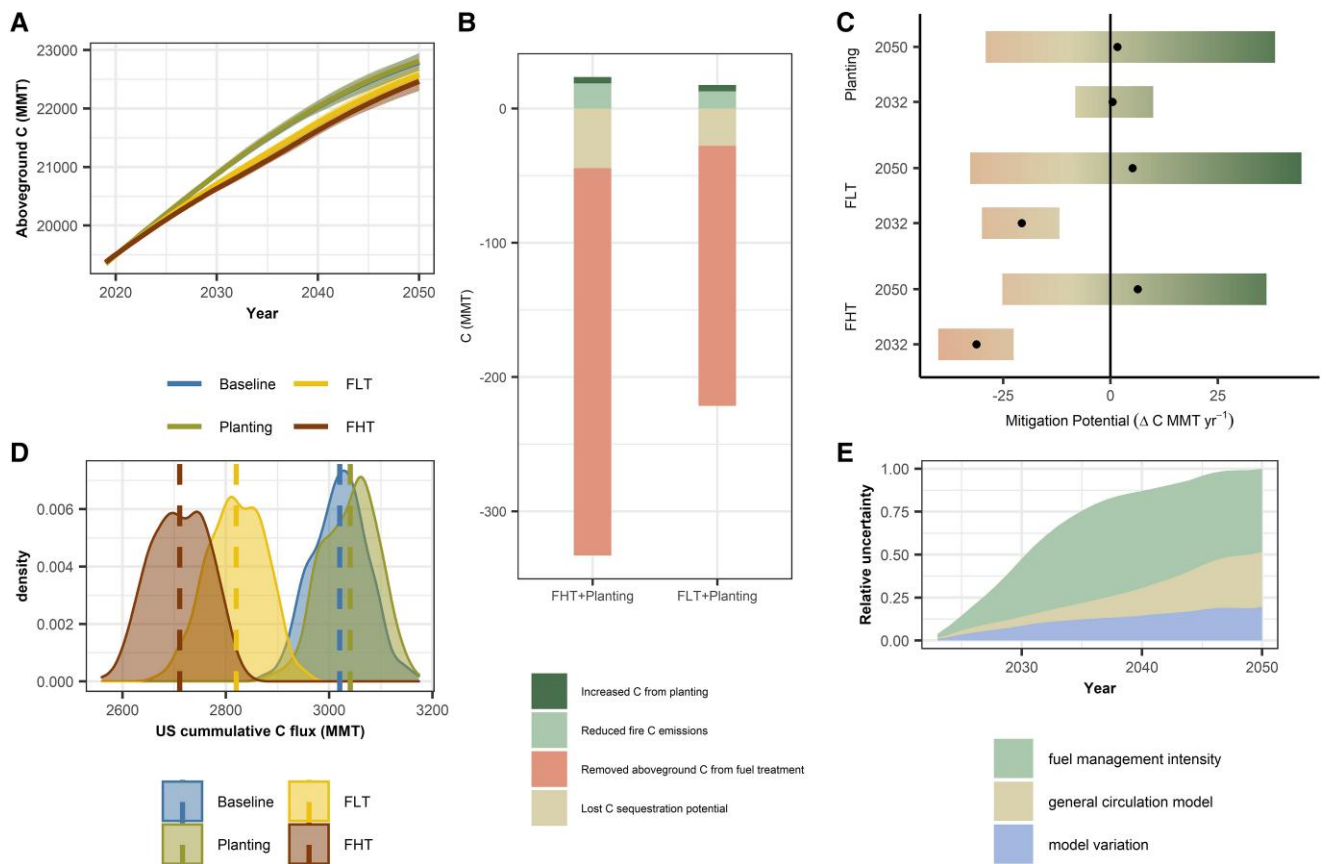


Fig. 2. Historic and projected US aboveground carbon stocks for the baseline, FLT, and FHT scenarios A) from 2019 to 2050, with shaded areas displaying model and climate variability. B) The effects of the fuel treatments and planting from 2022 to 2032. Projected US forest mitigation potential under FLT, FHT, and planting scenarios in 2032 and 2050 (C; length of each bar indicating model and climate variability). The distribution of projected cumulative aboveground carbon sequestration in 2050 for the United States under baseline, planting, FLT, and FHT scenarios D). In E), uncertainty components show variability driven by the forest projection model, alternative general circulation models, and fuel management intensity (FLT vs. FHT).

Discussion

Forest management activities impact carbon futures differently depending on the scale of the activities and the time frame examined. Our results suggest that the IJJA fuel treatment effects outweigh the planting effects, leading to a decrease in expected annual flux through 2032 (negative mitigation potential) and less cumulative carbon sequestered over the projection period. Yet, annual flux is projected to increase after 2032 because of the IJJA fuel treatments, demonstrating the potential longer term benefit of these treatments on forest carbon. Policies put in place through the IRA offer additional funding for fuel reductions, forest restoration, and climate-smart forestry. Management activities associated with forest restoration generally call for a mixture of cutting/thinning and planting [7], and the impact on carbon futures will depend on both the scale and the mixture of the activities, in addition to the utilization of cut material to make long-lived wood products that store carbon in the long term [14].

Biomass removed during fuel treatments was assumed to be an emission. The lack of roundwood receiving facilities in the western region, coupled with the questionable adequacy of the wood removed during fuel treatment, suggests that meaningful shifts in US harvested wood carbon stocks and stock change are unlikely, and hence, any potential forest products arising from the fuel treatment were not accounted for. However, wood product innovation and market investments through climate-smart forestry goals may lead to uses for biomass removed during fuel management and restoration activities (i.e. contribution to carbon stored

in harvested wood products) or mitigation in other sectors (e.g. biomass for energy) [14].

The USFS fuel reduction strategy is principally focused on protecting communities and improving forest resilience [10], which is the requisite for long-term sustainability. Our results suggest that this strategy would be successful on these terms—they would reduce tree mortality from wildfire (i.e. less intense fires) and increase net forest growth after 2032 in the western United States. However, the strategy may also result in decreased cumulative net carbon sequestration, affect annual flux rates differently in the near term vs. long term, and have a range of additional influences on other ecosystem services.

Materials and methods

The US NFI identifies the starting conditions for this research. Projections of the NFI are based on the USFS Forest Dynamics Model [15] (SI Appendix).

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Supplementary Material

Supplementary material is available at PNAS Nexus online.

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Author Contributions

J.W.C. designed the study and the research. J.W.C. and D.M.W. analyzed the data. J.W.C., G.M.D., E.B.B., C.B.O., and D.M.W. wrote the paper.

Data Availability

The USFS Forest Dynamics Model requires US NFI data, climate data, and land use change projections. The US NFI is available at <https://apps.fs.usda.gov/fia/datamart/datamart.html>. The climate data used are available at http://thredds.northwestknowledge.net:8080/thredds/realtime_CMIP5_macav2_catalog2.html. Land use change projections are available at <https://doi.org/10.2737/RDS-2023-0026>. Fire shed data are available at <https://www.fs.usda.gov/rds/archive/catalog/RDS-2020-0054>. Projection results will be made available at <https://www.fs.usda.gov/rds/archive/>.

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