

Carbon Storage and Sequestration

Land Management Plan Environmental Impact Statement Summary for the South Plateau Landscape Area Treatment Project

Introduction

The South Plateau Landscape Area Treatment Project carbon analysis tiers to the detailed, quantitative analysis in the Land Management Plan (LMP) Environmental Impact Statement (EIS) Section 3.8 Carbon Storage and Sequestration (U.S. Department of Agriculture 2022a). Relevant analysis and conclusions from the Land Management Plan EIS will be summarized but not repeated.

The “Carbon Storage and Sequestration” section (U.S. Department of Agriculture 2022a) of the EIS addresses and compares the existing conditions and expected trends of carbon pools on the Custer Gallatin, specifically the aboveground carbon pool. The spatial scale of this analysis includes the forested lands of the Custer Gallatin NF, which consists of approximately 2.5 million acres of forest land (Dugan, McKinley and Carnwath 2019). The temporal scale for analyzing carbon stocks and emissions focuses on the expected lifespan of the Land Management Plan. The EIS report includes analysis and discussion beyond this expected lifespan to provide context for potential forest carbon dynamics and factors influencing these dynamics in the future. However, specific estimates of future carbon stocks and their trajectory over time remain unclear because of uncertainty from the multiple interacting factors that influence carbon dynamics. The NEPA reviews for a specific action, such as the proposed action in this EA, can incorporate by reference earlier programmatic studies or information such as management plans, inventories, assessments, and research that consider potential changes in carbon stocks, as well as any relevant programmatic NEPA reviews (Council on Environmental Quality 2016).

This climate change/carbon analysis complies with guidance at FSM 2020.3, which states that the Forest Service, in projects and activity goals and objectives, should consider the recovery, maintenance, and enhancement of carbon stocks. On January 9, 2023, the Council on Environmental Quality (CEQ) published interim “National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions and Climate Change” in the Federal Register (88 FR 1196). CEQ grants agencies the discretion to decide whether to apply the guidance to NEPA analyses that were in progress when the guidance was issued. The interim CEQ guidance was published late in the development process for the South Plateau Landscape Area Treatment Project, and therefore this EA analysis will primarily rely on earlier CEQ guidance on considering climate change in NEPA (81 FR 51866). For example, this analysis does not include all new recommendations such as applying social cost of GHG estimates to the incremental metric tons of each individual type of GHG emissions expected from the proposed action and its alternatives. However, this project does analyze the two fundamental considerations required by current and former iterations of CEQ climate change guidance: (1) the potential effects of a proposed action on climate change, including both carbon emissions and reductions from the proposed action, and (2) the effects of climate change on the proposed action and its environmental impacts (see resource specialist reports).

Because actions that are consistent with the Plan are likely to increase carbon storage and reduce emissions over the longer term, and the sum of management activities have historically been a fraction of the effects of natural disturbances, a quantitative analysis of carbon effects at the project level is not meaningful for a reasoned choice among plan alternatives (U.S. Department of Agriculture 2009).

Methods

How did the Land Management Plan EIS analyze the effects of plan direction on carbon storage and sequestration?

The carbon assessment draws largely from two recent U.S. Forest Service reports: the Baseline Report (U.S. Department of Agriculture 2015) and the Disturbance Report (Birdsey et al. 2019). These reports provide assessments of forest ecosystem and harvested wood product carbon stocks and flux, and the factors that have influenced carbon dynamics. The Resource Planning Act assessment (U.S. Department of Agriculture 2016) and a regional vulnerability assessment (Halofsky et al. 2018a, Halofsky et al. 2018b) also provide information on potential future carbon conditions. These reports incorporate advances in data and analytical methods and collectively represent the best and most relevant scientific information available for the Custer Gallatin National Forest.

Potential carbon effects are discussed qualitatively based on modeling of past carbon stocks, impacts of natural and management disturbances on forest carbon, and supporting estimates where possible. This is accomplished by drawing on the quantitative analysis of the most current data and best available science of the impacts of past management activities on forest carbon stocks and fluxes, as well as through future-looking analysis where available (Dugan et al. 2019).

The spatial scale of analysis included the approximately 2.5 million acres of forested lands of the Custer Gallatin National Forest. The effects analysis for GHG emissions is the global atmosphere given the mix of atmospheric gases can have no bounds. The temporal scale for analyzing carbon stocks and emissions focuses on the expected lifespan of the plan. The carbon report includes analysis and discussion beyond the expected Plan lifespan to provide context for potential forest carbon dynamics and factors influencing these dynamics in the future. The effects of future climate conditions are complex and remain uncertain when considered at the project or regional scale. It is difficult to judge how these various factors and their interactions will affect future carbon dynamics on the CGNF. For in depth discussion of carbon assessment methods see *Forest Carbon Assessment for the Custer Gallatin National Forest in Region 1* (Dugan et al. 2019) and Section 3.8 of the Custer Gallatin LMP EIS V1.

Affected Environment

What changes have occurred on the forest since the Land Management Plan EIS was written that are relevant to carbon sequestration or storage?

The mosaic of forest types, successional stages/size classes, patterns and vegetation conditions at the project level are consistent with those analyzed in the final Land Management Plan EIS (Forested

Vegetation Specialist Report). Since the Land Management Plan analysis, there have been no changes in conditions of a magnitude that would change the Land Management Plan final EIS analysis for carbon cycling. As of the date of this report there is no new science that would change the Land Management Plan final EIS carbon cycling analysis or conclusions.

Forested area on the CGNF will be maintained as forest in the foreseeable future, which will allow for a continuation of carbon uptake and storage over the long term. The CGNF will continue to have an important role in maintaining the carbon sink, regionally and nationally, for decades to come. A discussion of prospective climate and environmental effects on forests can be found in *Forest Carbon Assessment for the Custer Gallatin National Forest in Region 1* (Dugan et al. 2019) and Section 3.8 of the Custer Gallatin LMP EIS V1.

Environmental Effects

What did the Land Management Plan EIS conclude?

Considering the maximum area treated with harvesting and prescribed fire, the amount of carbon that might be removed through management is small relative to the approximately 110 million metric tons (Tg) of carbon stored in the forest ecosystem of Custer Gallatin NF. With maximum intensification, potential management actions would affect up to less than 0.25 percent of the forested area and much less than 1 Tg of carbon annually.

Plan components were designed to provide for ecological integrity and resiliency to disturbances. Wildfire and insects have been the dominant disturbance types detected on the Custer Gallatin from 1990 to 2011, while still relatively small on the forest scale (less than 1% of forested land experienced fire on average from 1990 – 2011) (U.S. Department of Agriculture 2022a). Over the longer term, the activities allowed by the Land Management Plan are likely to increase carbon storage and reduce emissions, by reducing disturbance risk and storing carbon in wood products (see section 2.3 in *Forest Carbon Assessment for the Custer Gallatin National Forest in Region 1*). The management mechanisms applied in the Plan are consistent with internationally recognized climate change adaptation and mitigation practices identified by the IPCC (Intergovernmental Panel on Climate Change 2007). Carbon stocks on the CGNF would likely continue to increase or remain stable under the Plan in the foreseeable future. Natural ecosystem processes, including forest growth (succession) and small-scale disturbances (e.g., fire, insects, harvests) would continue to influence carbon stocks and emissions, but they are not expected to substantially change current trends in carbon over the span of the plan. All plan alternatives would preserve existing forest lands and forests by improving forest conditions and retaining forest characteristics by maintaining current land use.

As demonstrated in the LMP EIS V1, the management alternatives analyzed for the Land Management Plan will not significantly, adversely, or permanently affect forest carbon storage, but would rather achieve a more resilient forest condition that will improve the ability of the Custer Gallatin NF to maintain carbon stocks and enhance carbon uptake, mitigating the effects of natural disturbance and management actions on the forest.

How is this relevant? What does this tell us about the direct, indirect, and cumulative effects of the project?

The activities of the proposed action for the South Plateau Landscape Area Treatment Project are included within the program of actions analyzed in the Custer Gallatin Land Management Plan (U.S. Department of Agriculture 2022b). Vegetation treatments of this proposed project are consistent with the strategies and approaches to management analyzed in the Land Management Plan EIS. Vegetation treatments considered in the Land Management Plan EIS and this proposed action would cumulatively contribute to atmospheric CO₂ concentrations but would not alter the current trend described in the Land Management Plan EIS of forest carbon stocks remaining stable or increasing. Short term release of carbon due to project activities is likely to be offset by improvements to forest conditions and resiliency.

In summary, this proposed action impacts a relatively small amount of forest land and carbon on the Custer Gallatin National Forest and, in the near-term, might contribute a small quantity of carbon relative to the forests carbon uptake and stores which would be mitigated by a more resilient forest condition and future carbon uptake. This proposed action will not convert forestland to other non-forest uses, thus any carbon initially emitted from this proposed project's actions will only have a temporary influence on atmospheric CO₂ concentrations as carbon will be removed from the atmosphere over time as the forest regrows. Some proposed vegetation treatments will also produce wood products which will provide long term storage of carbon. Moreover, this proposed action is consistent the Land Management Plan EIS and with internationally recognized climate change adaptation and mitigation practices.

For further information and analysis of management activities effects on carbon uptake and storage see *Forest Carbon Assessment for the Custer Gallatin National Forest in Region 1* (Dugan et al. 2019) and Section 3.8 of the Custer Gallatin LMP EIS V1.

References

- Birdsey, R., A. J. Dugan, S. Healey, K. Dante-Wood, F. Zhang, G. Mo, J. Chen, A. J. Hernandez, C. L. Raymond & J. McCarter. 2019. Assessment of the influence of disturbance, management activities, and environmental factors on carbon stocks of United States National Forests. 116. Fort Collins, CO: U.S. Department of Agriculture Forest Service, Rocky Mountain Research Station.
- Council on Environmental Quality. 2016. Final guidance for federal departments and agencies on consideration of greenhouse gas emissions and the effects of climate change in National Environmental Policy Act reviews. 34. Washington, DC: Executive Office of the President, Council on Environmental Quality.
- Dugan, A., D. McKinley & G. Carnwath. 2019. Forest Carbon Assessment for the Custer Gallatin National Forest in Region 1. 29. Bozeman, MT: U.S. Department of Agriculture, Forest Service, Northern Region, Custer Gallatin National Forest.
- Halofsky, J. E., D. L. Peterson, S. K. Dante-Wood, L. Hoang, J. J. Ho & L. A. Joyce. 2018a. Climate change vulnerability and adaptation in the Northern Rocky Mountains: Part 1. 1-273. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

- . 2018b. Climate change vulnerability and adaptation in the Northern Rocky Mountains: Part 2. 275-475. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.
- Intergovernmental Panel on Climate Change. 2007. *Climate change: 2007 synthesis report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Geneva, Switzerland: Intergovernmental Panel on Climate Change.
- U.S. Department of Agriculture, Forest Service. 2009. Climate change considerations in project level NEPA analysis. 11. Washington D.C.: U.S. Department of Agriculture, Forest Service.
- . 2015. Baseline estimates of carbon stocks in forests and harvested wood products for National Forest System units. (Two baselines: 1990-2013, 2005-2013). Northern Region. 56. Washington, DC: U.S. Department of Agriculture, Forest Service, Office of the Chief, Climate Change Advisor's Office.
- . 2016. Future of America's forests and rangelands: Update to the Forest Service 2010 resources planning act assessment. 250. Washington, DC: U.S. Department of Agriculture, Forest Service, Research and Development.
- . 2022a. Volume 1-Final Environmental Impact Statement for the Land Management Plan, Custer Gallatin National Forest, Chapters 1, 2, and 3 (Part 1). 666. Bozeman, MT: U.S. Department of Agriculture,, Forest Service.
- U.S. Department of Agriculture, F. S. 2022b. Land management plan, Custer Gallatin National Forest. 242. Bozeman, MT: U.S. Department of Agriculture, Forest Service, Custer Gallatin National Forest.