Peer Review Plan

(Reference Information Quality Act)

FS-1400-0003 (V.1.2) 5/16

(●) Influential Scientific Information Pe ( ) Highly Influential Scientific Assessment Peer

Agency

USDA Forest Service

Agency Contact (name/ email/ phone)

Sean Healey, sean.healey@usda.gov, 801-391-7536

Title of Review

Direct Effects of Albedo Offset Half of US Forest Carbon Storage Benefits

Purpose of Review

Agency technical review under influential scientific information policy

Type of Review

( ) Panel Review (●) Individual Review

( ) Alternative Process (Briefly Explain):

Internal review selected by authors and leadership;
Formal, anonymous peer review from the journal, once submitted

Timing of Review

09/16/2022

Start 09/16/2022

End 09/23/2022

Number of Reviewers

(●) 3 or fewer

( ) 4 to 10

( ) More than 10

Primary Discipline/Types of Expertise Needed for Review

Climate Modeling
Forest Carbon Dynamics
Forest Inventory

Reviewer Names and Affiliations

David Hollinger, Research Plant Physiologist, Northern Research Station, USDA FS
Richard Birdsey, Woodwell Climate Research Center, Woods Hole,MA
Both scientists are renowned in this field, and Dr. Hollinger's review was arranged through the FS IMAR Program

Expected Publication Outlet (Science or Similar Peer Reviewed Journal)

Nature, where the manuscript will receive additional anonymous peer review from scientific experts selected by the journal editorial board

Reviewers Selected by: (●) Agency ( ) Designated Outside Organization

Organization's Name: _____

Opportunities for Public Comment? ( ) Yes (●) No

If yes, briefly state how and when these opportunities will be provided:

How: _____

When: _____

Peer Reviewers Provided with Public Commentary ◯ Yes ◯ No

Summary of Peer Reviewers' Comments

The reviewers were provided with 4 guiding questions. Dr. Birdsey's answers are provided below:
1. Does the manuscript rely upon the best available monitoring data and research? Are there conflicting authoritative data sources that are not considered? Yes, the paper relies on the best and newest available monitoring data. I am not aware of any conflicting authoritative data sources, even though there have been quite a few studies of albedo effects over the last two decades.
2. Does the manuscript appropriately acknowledge limitations and uncertainties of the source data? Yes – the authors assess sampling errors and conduct a sensitivity analysis to represent uncertainties in the data and applications.
3. Are the cited monitoring data - Landsat albedo and Forest Service inventory plots - appropriately interpreted? Yes – the authors are experts in using and interpreting remote sensing and inventory data.
4. Is the conclusion (half of the carbon benefit of American forests is offset by the effects of albedo) consistent with the information presented?
This comment from Dr. Hollinger's review summarizes the primary objection shared by both reviewers:
"I think this manuscript needs to be much more cautious about embracing the equivalency of radiative forcing from albedo difference with that from CO2 removal. Forested plots compared to unforested plots influence the climate system in many ways beyond albedo and CO2 uptake. Specifically ignored in this work are differences in latent heat (evapotranspiration), sensible heat, and roughness which can propagate into differences in boundary layer properties such as height and different profiles of temperature and specific humidity."

The point is well taken; we had too strongly simplified the climatic role of albedo, and had not adequately presented factors which may moderate (or accentuate) the direct radiative effects we quantify from albedo. We have added relevant context and qualifiers throughout the paper, including the first sentence of the Abstract and the title, which now specifies "direct effects" instead of just effects. We also now cite an analysis of albedo in the world's dry forests, which generally agrees with our results for the Interior West and which (like our work) only accounts for direct effects of albedo. A markup version of the paper following this revision is available.

Public Nominations Requested for Review Panel ◯ Yes ◉ No

Other Comments

The author list includes Dr. Grant Domke, who leads Forest Service carbon accounting and who assured appropriate carbon estimation in this paper. Dr. Ryan Bright of Norway's NIBIO has also been included; Dr. Bright is perhaps the world's leading expert in assigning climate impacts to forest albedo; he methodically checked all of our albedo calculations.

Summary of implications from the associated briefing paper:
The paper demonstrates the feasibility of considering albedo effects in many of the same settings - climate offset markets, fuel reduction initiatives, tree planting projects - that have heretofore only recognized the climatic effects of carbon storage. More comprehensive consideration of forest-climate interaction may challenge conventional wisdom in these contexts.