Smithsonian Institution

Forest Global Earth Observatory
Smithsonian's National Zoo & Conservation Biology Institute (SCBI)
1500 Remount Rd
Front Royal, VA 22630-5972

April 5th, 2024

Dear Dr. Alistair Hetherington,

Enclosed find our manuscript, "*Nuisance species compromise carbon sequestration potential in an Eastern US temperate deciduous forest*", for submission to the Anthromes and terrestrial carbon Special Collection. Temperate deciduous forests are a crucial component of the global carbon cycle and are increasingly affected by nuisance species (species that are introduced or amplified in an ecosystem as a result of human activity). The effects of nuisance species, which include non-indigenous pests and pathogens as well as overabundant herbivores, are not represented in current global models and accountings of carbon.

Our manuscript evaluates changes in living aboveground biomass (AGB) in a mature, secondary temperate deciduous forest in the mid-Atlantic region of the United States from 2008 to 2023. Using fifteen years of detailed forest census data from a 25.6-ha forest dynamics plot, we demonstrate a substantial reduction in AGB that is attributable to non-indigenous pests and pathogens. The decline in AGB was observed in all areas of the plot, but areas with a large amount of vulnerable canopy species lost > 33% of AGB over the last 10 years. Biomass losses were accompanied by severe depletion of canopy species in the understory in areas with high deer browsing pressure, endangering future canopy regeneration.

If current trends persist, the forest will continue to lose AGB and may critically transition to a low-biomass ecosystem. This site is representative of the forest composition and nuisance-species dynamics within the region, indicating that the carbon sequestration potential of US Eastern deciduous forests is likely overestimated by global carbon models. This manuscript's focus on human-induced changes to forest carbon dynamics and the increasing global relevance of nuisance species to forest ecosystems make it an excellent fit for the Anthromes Special Collection and of broad appeal to the readers of *New Phytologist.*

Thank you for your consideration of our manuscript. If you have any questions, please do not hesitate to contact me.

Sincerely,

Luca L. Morreale

Dr. Luca L. Morreale (on behalf of the authors)