Gary Hugh Irwin
Black Mountain, NC 28711

December 16, 2019

The Honorable Sonny Perdue Secretary
U.S. Department of Agriculture
1400 Independence Ave S.E.
Washington, D.C. 20250

Dear Secretary Perdue:

The proposal to change the Roadless Rule or exempt its application in Alaska is wrong headed in many ways. The Roadless Rule protection of important conservation lands, protection of wildlife and fish habitat, protecting the sources of clean water, and the safeguarding of traditional uses should be indisputable arguments for keeping the Roadless Rule in place. However, the important role of the Tongass National Forest as a globally significant carbon reserve clearly puts this proposal into the realm of being foolhardy.

Research is increasingly demonstrating that old growth, and particularly old growth in carbon dense forests like the Tongass, play outsize roles in carbon sequestration. Law et al, 2018, in PNAS "Land use strategies to mitigate climate change in carbon dense temperate forests":
https://www.pnas.org/content/115/14/3663

looks at forest practices that could mitigate carbon emissions in Oregon, and the study is offered as a potential template for other regional studies. Under significance, the paper states: *"... we demonstrate this approach in a high biomass region, and found that reforestation, afforestation, lengthened harvest cycles on private lands, and restricting harvest on public lands increased net ecosystem carbon balance by 56% by 2100, with the latter two actions contributing the most."*

The Forest Service has too long relied on outdated studies that give credit to the outdated idea that trees grow fast when young and slow down as they get old. This has resulted in the generalization that younger forest sequesters carbon faster than older forests. This generalization is countered with the fact that old forests actually sequester large amounts of carbon for long periods, tying up (and keeping out of the atmosphere) greater amounts of carbon in old growth forest. But most studies still carry the assumption that carbon sequestration reaches a plateau in old growth (at least from the standpoint of tree stem carbon). The benefit of old growth in these studies just relies on the fact that large amounts of carbon are sequestered for long periods of time.

However, the assumption that tree carbon reaches a plateau with tree size/age has been just that – an assumption. Stepherson et al, 2014 in Nature:

https://www.nature.com/articles/nature12914 essentially refute this assumption.

From this study:

"To fill this gap, we conducted a global analysis in which we directly estimated mass growth rates from repeated measurements of 673,046 trees belonging to 403 tropical, subtropical and temperate tree species, spanning every forested continent."

…

"For all continents, aboveground tree mass growth rates (and, hence, rates of carbon gain) for most species increased continuously with tree mass (size) (Fig. 2). The rate of mass gain increased with tree mass in each model bin for 87% of species, and increased in the bin that included the largest trees for 97% of species…"

Models and assessments of carbon sequestration really depend on the accuracy of this dynamic of tree growth, and the assumption of most studies – even those that show the carbon benefit of old growth – has been that trees reach a plateau of carbon sequestration. The whole purpose of the Stepherson study was to fill in the missing pieces in how trees sequester carbon over their life cycle. Just accounting for standing sequestered carbon in old growth (with the assumption of a steady state) seems to argue for the important role of old growth and older forest in carbon sequestration. However, this does not account for the potential for trees to continue to sequester significant amounts of carbon throughout their life cycle. The Stepherson study provides an important tool to conduct this accounting. The paper includes this tantalizing bit of analysis:

"The rapid growth of large trees indicates that, relative to their numbers, they could play a disproportionately important role in these feedbacks. For example, in our western USA old-growth forest plots, trees >100 cm in diameter comprised 6% of trees, yet contributed 33% of the annual forest mass growth. Mechanistic models of the forest carbon cycle will depend on accurate representation of productivity across several scales of biological organization, including calibration and validation against continuously increasing carbon accumulation rates at the scale of individual trees."

Note that even Stepherson's study only accounts for above ground carbon and doesn't address below ground carbon and coarse woody debris which is also a significant carbon sink in balance within old growth forest.

Luyssaert et al, in Nature, 2008, "Old-growth forests as global carbon sinks":

https://www.researchgate.net/publication/42089659_Old-growth_forests_as_global_carbon_sinks_Nature goes into some of the history behind “The commonly accepted and long-standing view that old-growth forests are carbon neutral (that is, that photosynthesis is balanced by respiration)”. It also gives a great overview of the carbon budget differences between old growth, plantations, and recovering second growth. The authors conclude that: “The present paper shows that old-growth forests are usually carbon sinks. Because old-growth forests steadily accumulate carbon for centuries, they contain vast quantities of it. They will lose much of this carbon to the atmosphere if they are disturbed, so carbon-accounting rules for forests should give credit for leaving old-growth forest intact.”

The role of the Tongass National Forest as a carbon sink and the protection of roadless areas to assure that old growth forest continues to sequester carbon must be taken into account. Alternative 1, the no action alternative, should be chosen and the Roadless Rule kept in place in Alaska and throughout the National Forest system.

Sincerely,

Hugh Irwin