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Comments: Old growth can be defined in three ways: first, by the age of the canopy trees, second, by the quality of having minimal direct human impact, particularly of industrial cultures, and third, by forests of continuity (more on the third criteria below).

The first two ways are the most common historically, but both need further clarification. The age of the canopy trees can be alternately set at some arbitrary age, for example, 150 years, or set to equal maximum expected lifespans. In either case, not all trees in the canopy, particularly in all-aged forests, will meet the criterion, hence, a statistical distribution is used: some percent of the canopy must reach the criterion, for example 60% of the canopy trees within 10% of maximum lifespan or 60% of the canopy 150 years or older. Given the past influences of native American populations, given today's permeating effects of climate change, and given invasive species (including pests and diseases) forests are rarely pristine in the sense of having no human impact. So one here must argue that such influences are low rather than absent. This requires further work and the results are specific to specific forests.

But there is also a third criterion and I want to stress that this third way of defining old growth is especially relevant in today's world: the quality of having been continuously a forest going back 3 or more generations of canopy trees. Suppose an old growth forest is blown down by a major storm or experiences a fire--the trees may no longer be old and yet the ecosystem is old. That age has consequences in the embedded legacy of having been continuously occupied by forest and that extends backwards in time to native American days. The embedded legacy includes consequences of having old soils and may also mean that the lesser known groups of biodiversity like soil fungi and microbes may also reflect this long history. The pattern of succession, which involves a turnover of species and an aging of the forest, may also be preserved, rather than just the oldest state. And we can also recognize age of continuity in the face of climate change (and climate change effects on storm, drought, fire, and flood) and invasive species.

Those are the general principles (see below and attached). The specifics will vary by geography and other factors, such as the land-use patterns of native American populations, will have to be defined and documented forest by forest through workshops. And continuous forests can continue to change as climates change.

White, P.S., J.P. Tuttle, and B.S. Collins. 2018. Old-growth forests in the Southern Appalachians: ongoing dynamics and conservation frameworks. Pages 63-82 in A.M. Barton and W. Keeton, eds. Ecology and Recovery of Eastern Old Growth Forests. Island Press, Washington, D.C.