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Comments: My comments are based on more than 50 years studying, living and working in the forests. I have two degrees, one in forestry and one in communications. I am also a certified Land Steward through OSU. Since I returned from Vietnam I have continually studied, learned, observed and watched forestry operations around this country while caring for my family's 372-acre tree farm.

What criteria are needed for a universal definition framework that motivates mature and old-growth forest conservation and can be used for planning and adaptive management?

In order to determine the significance of any old growth tree, whether site specific or across the landscape, the criteria must include all of the factors that make the tree unique and what it contributes to the ecosystem. Often dominant or co-dominant in any given timber stand, old-growth trees can be found in set aside groves, but also as one tree in a hundred acres or ten trees in twenty acres. These dominant trees help to determine the health of the water, soil and balance of life within its landscape.

As Princeton professor Rob Nixon puts it, "We co-exist with other life-forms in a porous world." Thus we see the interdependence of humans with all other life forms on this planet, just as forest landscapes are icons of the interdependence that shapes our world. In this view we see the mature and old growth trees as the progenitors of existence, shaping the world around them through a million cells or more. The entire ecosystem below the soil's surface is connected through the big trees to increasingly large areas and numbers of "brothers and sisters."

All that said, any good forester or silviculturist should be able to recognize trees with old-growth characteristics on sight. It is difficult to come up with a standard definition, since each tree species will exhibit old-growth characteristics in different ways. For the purpose of this writing I will work with evergreen trees, focusing on Douglas Fir, most prevalent in my area. To that end, many environmentalists consider trees older than 100 years and/or greater than 20 inches in diameter as old-growth. Certainly 100 years qualifies as old-growth, but the 20-inch limit seems arbitrary. Some 20-inch Douglas Fir will display old-growth characteristics (e.g., dominant, very healthy, clear to continue growing for a long time), but many will not. The key will be to educate crews marking timber sales in what to look for.

That said, foresters must also consider the considerable impact of "incidental taking" on mature and old-growth trees in Northwest timber sales. Mature and old-growth trees need the space around them to remain a vital part of the landscape. Cutting right up to old-growth can make it susceptible to disease or worse. Most incidental taking, however, comes from the logger on the ground who sees a money tree and decides on his/her own that it

should come down for timber volume. Likewise, agencies developing large-scale timber sales often include plots that have a few old-growth here and there, which are sacrificed for convenience.

What are the overarching old-growth and mature forest characteristics that belong in a definition framework?

While old-growth characteristics can be found across the landscape, sites containing old-growth trees are usually natural sites (i.e., undisturbed or natural second growth) in an uneven-aged stand that may also be high in biodiversity. The presence of old-growth trees, or trees with old-growth characteristics, should most often lead the silviculturist to prescribe a thinning of the surrounding landscape in a way that will preserve the density (> 30 percent canopy cover) and soil characteristics important to the old-growth tree as the provider of genetically adapted offspring. These forests can be managed to provide true sustainability in finitum through appropriate application of silvicultural principles suited to the area.

It is thus very difficult for any single definition of old-growth to apply nationwide. A framework that offers adaptability to local areas would be most helpful, so the forester in Vermont isn't trying to deal with a definition made for the Pacific Northwest.

How can a definition reflect changes based on disturbance and variation in forest type/composition, climate, site productivity and geographic region?

Any framework should first set the guidelines for considering old-growth. It then becomes a local issue to consider the impacts mentioned in this question. Questions to address these issues might include average daily temperatures, climate cycles, soils conditions, and the overall environment, both social and physical.

How can a definition be durable but also accommodate and reflect changes in climate and forest composition?

Again, provide a framework and make rules for local application in view of future plans.

What, if any, forest characteristics should a definition exclude?

Plantations will never produce true old-growth trees unless left abandoned for 500 years. Old-growth

preservation is contra-indicated in areas of high traffic, heavy air pollution, or on slide-prone hillsides. Properly protected in parks and other heavily trafficked areas, old-growth trees provide a balm to the public spirit. In the wild they convey history, awe and an enduring quality of life.