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Comments: The request for information lists five specific questions upon which input is sought. My responses follow each of those questions below.

1. 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?

Response: Development of a universal definition that is meaningful without being either underinclusive or overinclusive may be difficult, especially if the executive order includes all areas in which woody plants other than trees are dominant, such as shrub steppes.

Care should be taken not to establish minimum spatial requirements that exclude small patches of trees or other woody vegetation with old-growth characteristics. Even a half-acre of old growth is ecologically significant and can provide an awe-inspiring contrast with its surroundings. Planners may view small, isolated tracts as difficult to manage, but that need not be the case, especially in the digital age. Plus, planners could designate part of the surrounding area to be managed for restoration of stands with old-growth characteristics.

Consideration also might be given to providing different definitions for old-growth forests and mature forests. Old-growth forests are stands that have never been harvested (apart from the cutting of an occasional tree), cleared, or otherwise subjected to significant disturbance by humans in the past few centuries. These stands are of exceptional ecological and aesthetic value and should be protected in almost all circumstances. Mature forests would appear to include any forests in which trees have attained a certain age, tree growth rates have slowed, and forest stand characteristics have stabilized. These forests need not necessarily be protected from all types of harvesting, although clear-cutting should be prohibited to avoid destruction of (or to encourage reestablishment of) mycorrhizae and other soil organisms, together with their attendant understory and wildlife communities.

My visit to a national forest in southwest Oregon several years ago illustrates the difference. Most of the area I visited was second-growth Douglas fir of substantial but not exceptional size. However, there also was a small tract of protected old-growth forest. The difference was striking in that the old-growth forest had fewer but much larger trees. It was darker, punctuated by occasional shafts of sunlight, and had a very different understory. Lots of butterflies were present and the forest floor featured a wide variety of mushrooms in abundance. It was hard to walk without stepping on salamanders. By contrast, I did not see a single salamander while walking in the mature second-growth forest and there were significantly fewer butterflies and fungal fruiting structures.

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

Response: Tree age and, for completely forested sites, the age distributions of trees within the stand come to mind. While not universal, the abundance, diversity, and distribution of lichens can be a major, easily documented supporting characteristic in some areas of high altitude or high latitude.

Tree size should not be a defining characteristic because old-growth trees on sites with harsh soil or climatic conditions may be relatively small.

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

Response: Because of the wide variations in forest type, soils, site conditions, and climate, it might be appropriate to develop a necessarily vague general definition and then authorize or provide more detailed definitions for the relevant communities (or groups of communities) recognized under the National Vegetation Classification Standard published by the Federal Geographic Data Committee in February 2008. Use of other land cover classification systems also might be appropriate.

The meaning of the phrase "changes based on disturbance" is not clear. I oppose any interpretation that would allow or require use of this terminology to remove areas of old-growth that suffer substantial wind, fire, or insect damage from the scope of the definition. Such damage is rarely total, which means that some trees with old-growth characteristics will survive. Those sites should be allowed to recover naturally without harvest, artificial replanting, use of non-native species to establish a quick ground cover, fertilization, or use of mechanized equipment that would disturb soil characteristics. In the rare event in which there is total destruction, there should be a process for removal of these areas from the definition--it should not be unilateral or undocumented.

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

Response: Except as noted in the last paragraph of my response to Q3, changes in climate and forest composition are unlikely to occur at a rate that would necessitate their consideration in this rulemaking.

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

Response: As noted in my response to Q2, tree size should not be a defining characteristic because old-growth trees on sites with harsh soil or climatic conditions may be relatively small.

For the same reason, percent canopy cover should not be used as a reason to exclude arid, semiarid, or other areas in which woody plants have a substantial presence but do not provide much canopy cover.