

Defining Mature and Old Growth:

Why it's so important to rely on place-based science and local expertise when attempting to define stages of forest structure.

Mature and old-growth forests provide an invaluable suite of benefits to society, ranging from spiritual and recreational value, to critical habitat and carbon storage. With Executive Order 14072, President Biden initiated an exercise to define, identify, and inventory mature and old-growth forests on our public lands. This move by the administration presents a terrific opportunity to conserve our forests through science-driven policy.

There is no scientific basis for a universal definition of mature or old-growth forest. Tree age, size, and carbon storage capacity differ dramatically across mature and old-growth forest types depending on species composition, site conditions, regional factors, and more.

Old-growth forests look dramatically different from coast to coast, state to state, and forest to forest. For instance, old-growth sequoia groves on the West Coast can be thousands of years old with trunk diameters of more than 30 feet and heights in excess of 250 feet, while an old-growth forest of pitch pine in the Northeast may include 300-year-old trees that never reach heights over 16 feet.

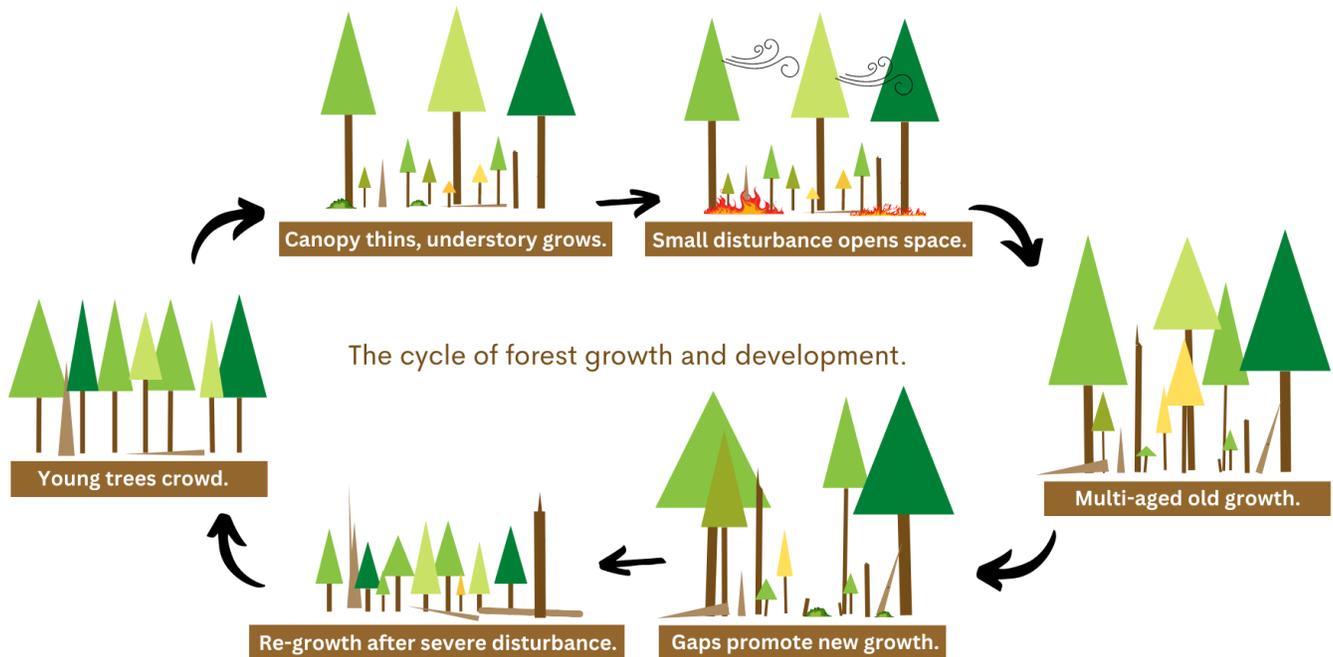


This is because "old growth" – as it's generally understood by forest researchers and professionals – refers to a stage in a forest's succession, not just the average age or size of the trees within it.

Old-growth forests will often include trees of diverse ages and sizes, dead and fallen trees, and canopy gaps and layers. You may also hear the term "old growth" used to describe a complex forest habitat based on these characteristics. The term "mature forest" refers to the stage before old growth and, therefore, is also defined on a local basis.

The solution to defining mature and old-growth forests accurately is recognizing the significant and varied structural differences that exist across all of America's forests. Science-based, meaningful, and accurate definitions will require site-specific evaluation and considerable local expertise. They cannot be based solely on tree age or tree size.

What are the greatest threats to old-growth forests? Old-growth forests are most threatened by climate-amplified disturbances like wildfire, drought, insects, and disease. According to the National Park Service, we lost 13-19% of all large giant sequoias between 2020 and 2021 due to a combination of climate-induced drought (and subsequent insect infestation) and severe wildfire.



What makes a healthy forest? Forests develop in stages over time. Severe disturbances may reset the cycle, but smaller disturbances allow forests to age and develop mature and old-growth features. As trees grow, they need resources like water and light. Small disturbances (whether it's a natural one, like a wind storm, or a human one, like a timber harvest) remove trees from a forest, making room for other trees to flourish.

Not all mature forests are healthy or destined to become old growth. For instance, a mature forest in the western US may be overly dense and particularly susceptible to catastrophic wildfire. Science-based management helps forests stay healthy, adapt to climate-change pressures, and develop and maintain old growth traits.

What are common misconceptions about mature and old growth?

- ~~X~~ All forests, if left to grow, will become old growth.
- ~~X~~ There is a universal age that can determine mature status.
- ~~X~~ Old-growth forests are static and won't change if left alone.
- ~~X~~ A forest managed by humans cannot have old growth features.
- ~~X~~ Unmanaged mature and old-growth forests store carbon in perpetuity.

