

Douglas-fir Mortality and the Potential Loss of Forest Ecosystem Services

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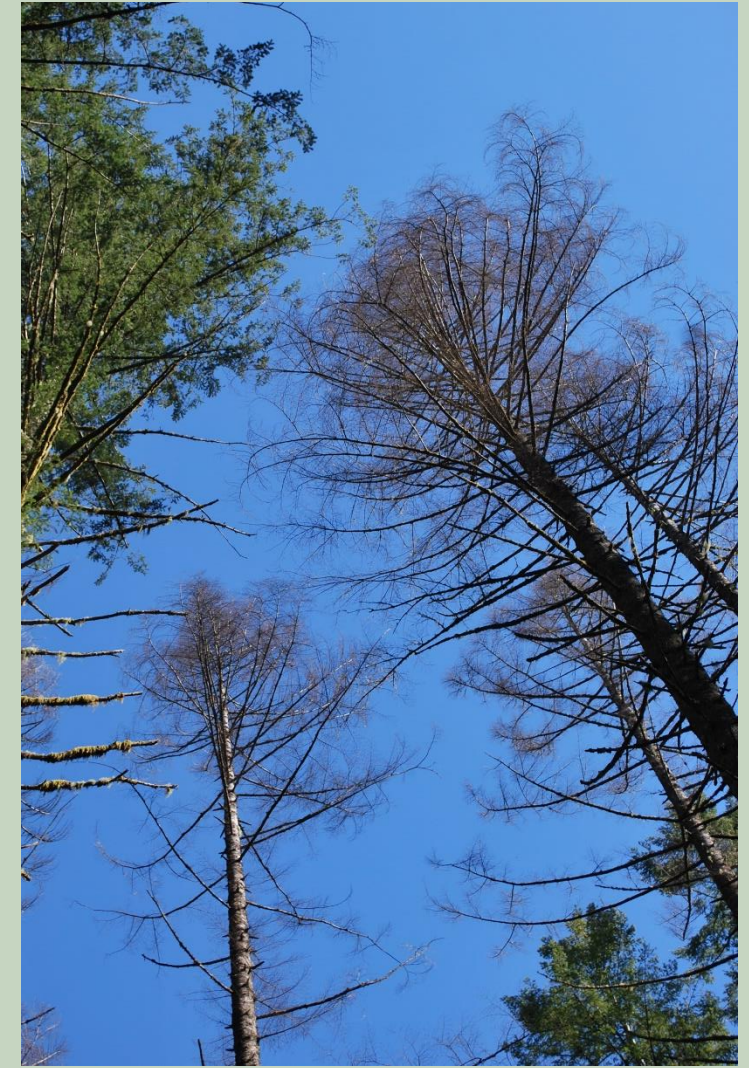
Problem: Douglas-fir mortality is occurring at higher than historical levels at the Cedar River Municipal Watershed, the source of Seattle's drinking water. Douglas-fir forests in the watershed play an important ecosystem role through water filtration and retention, which are fundamental in maintaining high quality drinking water.



A funnel trap used to collect Douglas-fir bark beetles. The timing and abundance of beetles could shed light as to the role they are playing in Douglas-fir mortality.



Douglas-fir bark beetle emerging from its host tree.



Douglas-fir likely killed by a combination of Douglas-fir bark beetles and root diseases.

Potential causes:

- Douglas-fir bark beetle, a native insect that attacks Douglas-fir. Climate warming could be allowing more beetles to emerge per year, which increases their threat to Douglas-fir.
- Tree root diseases may be taking advantage of historically unusual forest types as a result of logging decades ago.
- The interaction of several factors, including bark beetles, tree root diseases, and climate change, could be jointly contributing to increased Douglas-fir mortality.