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Abstract

Old-growth forests: An ecosystem approach

Old-growth forests, carbon and climate change: Functions and management for tall open-forests in two hotspots of temperate Australia

C. Dean & G. Wardell-Johnson

Abstract:

The prognosis and utility under climate change are presented for two old-growth, temperate forests in Australia, from ecological and carbon accounting perspectives. The tall open-forests (TOFs) of south-western Australia (SWA) are within Australia's global biodiversity hotspot. The forest management and timber usage from the carbon-dense old-growth TOFs of Tasmania (TAS) have a high carbon efflux, rendering it a carbon hotspot. Under climate change the warmer, dryer climate in both areas will decrease carbon stocks directly; and indirectly through changes towards dryer forest types and through positive feedback. Near 2100, climate change will decrease soil organic carbon (SOC) significantly, e.g. by ~30% for SWA and at least 2% for TAS. The emissions from the next 20 years of logging old-growth TOF in TAS, and conversion to harvesting cycles, will conservatively reach 66(+33) Mt-CO₂-equivalents in the long-term - bolstering greenhouse gas emissions. Similar emissions will arise from rainforest SOC in TAS due to climate change. Careful management of old-growth TOFs in these two hotspots, to help reduce carbon emissions and change in biodiversity, entails adopting approaches to forest, wood product and fire management which conserve old-growth characteristics in forest stands. Plantation forestry on long-

cleared land and well-targeted prescribed burning supplement effective carbon management

biodiversity: higher plants

forest management

climate: climate change

Notes

Biodiversity, carbon, climate change, eucalypt, old-growth, rainforest, wet-sclerophyll

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