

Reforestation efforts reshape Hawaii's soil hydrology

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Starting with the arrival of Polynesian settlers in the fourth century, and peaking in the mid-1800s, the destructive forces of wildfires and pests and the grazing of feral pigs, goats, and cattle reduced the native forests of Maui, Hawaii, to just a tenth of their original extent. Maui's native vegetation was replaced largely by imported or invasive species. Over time, the invasive grasses that took root reshaped the hydrological properties of the soil, reducing the viability of native plant species that had evolved to thrive under Hawaii's previous hydrological dynamics. Maui's ecosystem had been changed for so long that scientists were uncertain whether the region could actually again support the native flora.

Starting in 1997, a 10-acre area was fenced off to prevent access by cattle, invasive grasses were killed with herbicide, and fast growing native shrubs were planted in an attempt to restore Maui's native forest ecosystem. Having now been expanded to 50 acres, the Auwahi reforestation project was the site of an investigation by Perkins et al., who sought to find out whether the reintroduction of native species could reverse the changes in the soil's hydrologic properties brought about by erosion, invasive grasses, and other forces.

The authors measured soil water infiltration rates, soil hydrophobicity, and the density and prevalence of preferential soil flow paths at 31 sites in the reforested ecosystem and 24 locations in a neighboring grassland. They find that in the reforested area, the soil's hydrologic properties had changed to enable water to penetrate to deeper depths and to do so more

quickly-conditions amenable to deeper-rooted trees and native species.

The authors' findings suggest that given concerted effort, even long-standing and widespread [ecosystem changes](#) can be overturned by conservation efforts.

More information: Effects of native forest restoration on soil hydraulic properties, Auwahi, Maui, Hawaiian Islands, *Geophysical Research Letters*, [doi:10.1029/2012GL051120](https://doi.org/10.1029/2012GL051120) , 2012

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