Ecology & Conservation Biology

Understanding Forest Dynamics in the Anthropocene

TEXAS A&M AGRILIFE RESEARCH

Exploring the biology of trees to understand the future of forests

Forest Dynamics Research: To predict how forests may change over time, we must first understand their functioning. Forests are biologically complex, often hosting tens to hundreds of tree species per hectare. Dr. Hogan studies how trees survive, grow, compete, and reproduce—and how these processes shape forest ecosystem dynamics. His work focuses on uncovering the mechanisms behind forest demographics and scaling them to the ecosystem level.

Forest Disturbances & Climate Change: Climate change is intensifying disturbances, like cyclones, and leading to an increase in forest pests and pathogens, which are increasingly shaping forest succession and recovery. Dr. Hogan investigates how disturbances and their interactions with other stressors—such as warming and drought—to influence forest structure and resilience.

The Physiological Ecology of Trees: Trees vary widely in form and function. Dr. Hogan uses comparative approaches to link differences in tree morphology and life history to variation in physiological performance, revealing meaningful differences among species and individual trees in carbon and water use. Scaling these traits to the ecosystem level can help predict how tree biology will influence future forests.

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BIO

Aaron Hogan is a broadly trained forest ecologist with experience in both tropical and temperate forest ecosystems. His research spans individual tree physiology, plot-based forest dynamics, and global-scale syntheses. He employs statistical modeling, spatial analyses, and first-principles ecology to investigate how trees and forests respond to global change. In addition to his core work, he conducts research on root form and function and maintains a strong interest in microbial ecology.