

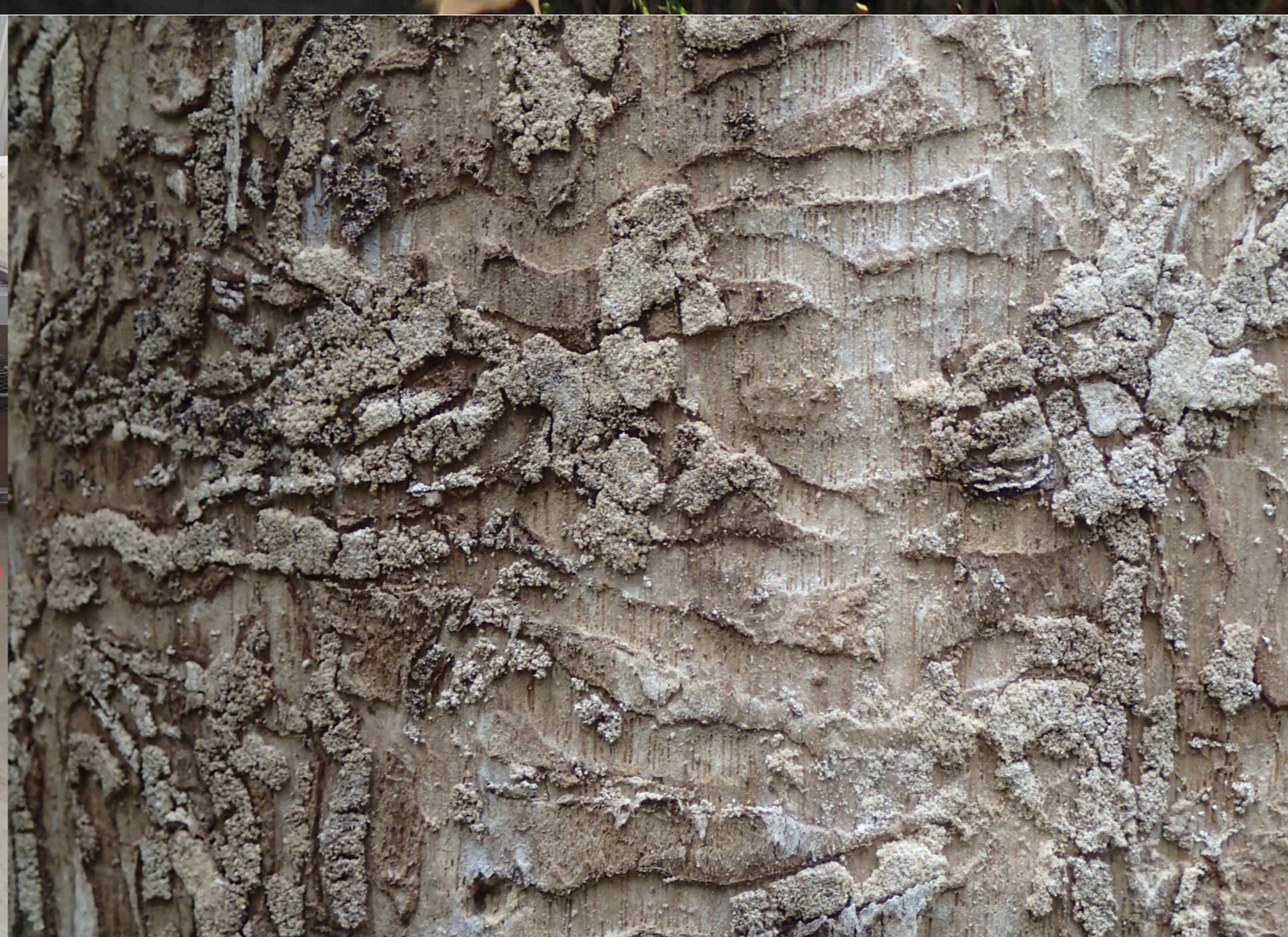


Undergraduate Program

Ecological Technology Design
Ecosystem Health
Soil and Watershed Science
Natural Resources Management

Graduate Program

Soil and Watershed Sciences
Ecological Technology Design
Wetland Science
Ecosystem Health & Natural Resource Management



Wetlands: Ecology, global change, and restoration

Professor Andy Baldwin has been working in wetlands for over three decades, first as an environmental consultant and then as a researcher and teacher. He teaches classes on wetland ecology and wetland restoration, and has a passion for understanding the role of wetlands in global change processes and how to improve wetland restoration outcomes.

Why are wetlands important?

Wetlands are ecosystems where soil is saturated or flooded, resulting in interspersed anaerobic-aerobic conditions that support biogeochemical processes, plants, and animals distinct from those of terrestrial and open water systems. These waterlogged lands provide crucial ecosystem services, including habitat for plants and wildlife, shoreline protection, flood storage, and water quality improvement. They also play a critical role in Earth's global carbon and nitrogen cycles. Although many wetlands have been damaged or destroyed by human activities, restoration of wetlands shows promise of renewing lost ecosystem services.

Global change, eutrophication, and invasive species

Wetland ecosystems are impacted by global changes including rising sea-level, saltwater intrusion, and warming temperatures, but can also sequester carbon. Excess nutrients and invasive plants and animals impact wetland vegetation and biogeochemical cycling, altering ecosystem service provision. Dr. Baldwin and collaborators have examined effects of temperature, hydrology, and nutrient availability on plant and microbial communities, carbon sequestration, and methane emissions from tidal freshwater wetlands. He is also studying ecosystem responses of ash-dominated tidal freshwater forested wetlands to catastrophic damage by emerald ash borer, a non-native beetle.

Ecological restoration

Wetlands are complex ecosystems that have proven difficult to restore or create. Although hydrology can often be restored and native plants used in revegetation, plant communities may not resemble those of natural wetlands for many years, as Dr. Baldwin's research group has shown for restored Delmarva Bays and tidal freshwater marshes of the Chesapeake Bay. Accumulation of organic matter in soils may take longer, on the order of decades or even centuries, indicating that microbially mediated biogeochemical functions remain impaired. Dr. Baldwin and his collaborators are studying plant-microbe interactions in restored and natural wetlands with the goal of understanding how restoration of soil organic matter and associated plant communities can be improved.

Research benefits:

- Improved forecasting of global change effects on coastal and inland wetlands
- Increased success in restoring wetland ecosystems and their vital ecological services
- Advances in fundamental knowledge of how plants and microbes interact in wetlands