

SUSTAINABLY SOLVING LEGACY NUTRIENTS IN LANDSCAPES WITH WETLANDS AND WETLACULTURE

William J. Mitsch^{1,2} and Sam Miller³

¹Everglades Wetland Research Park, Florida Gulf Coast University, Naples, FL, USA

²School of GeoSciences, University of South Florida, Tampa, FL, USA

³Mendoza College of Business, University of Notre Dame, Notre Dame, IN, USA

Humans have caused both landscape change and climate change, leading to ecological calamities around the world in freshwater and coastal waters. Harmful algal blooms (HABs), more common and wicked because of excessive and non-stop fertilization and runoff from farms and urban areas, are accelerated by increased water temperatures. We have also changed our landscapes by draining wetlands that could help with nutrient retention and carbon sequestration. The world has lost 87% of its wetlands, with half of that loss occurring in the 20th century alone.

Wetlands have been demonstrated to be effective nutrient sinks for long periods and at very large scale of 20,000 ha or more. One hundred thousand acres of treatment wetlands, both in the Florida Everglades and in the former Great Black Swamp adjacent to western Lake Erie have been recommended as sustainable solutions for harmful algal blooms in those regions.

A nutrient recycling approach applicable to landscapes around the world called “wetlaculture” (wetlands + agriculture) could help solve downstream nutrient pollution problems while decreasing the amount of fertilizers added to landscapes. We have established in 2016 to 2018 field physical model replicated wetland mesocosm compounds, two in temperate Ohio and one in subtropical south Florida, for estimating the amount of time needed for wetlands to accumulate nutrients before flipping the land to agriculture. Early results show significant nutrient retention by the wetland mesocosms in Ohio. In addition, our early business model suggests that farmers could make profits comparable to crops by receiving payment for ecosystem services (PES) coupled with public environmental impact bonds sold to investors.

PRESENTER BIO: Bill Mitsch has been a university professor specializing in wetland and aquatic biogeochemistry and ecological engineering for 44 years at 4 universities. He is currently Eminent Scholar and Director, Everglades Wetland Research Park, and Juliet C. Sproul Chair for Southwest Florida Habitat Restoration at FGCU in Naples Florida.