THE OHIO STATE UNIVERSITY
SCHOOL OF
Environment and Natural Resources
Impact Statement

Enhancing Ecosystem Services of Wetlands

SUMMARY

Wetlands are a linchpin of the global carbon cycles and effective nexus for nutrient cycling in the planet. Furthermore wetlands can be effectively created, restored, and managed without overdue concern for greenhouse gas emissions.

SITUATION

Wetlands are among the most important yet vulnerable ecosystems on the planet. They are keenly tuned to their climate, their watersheds and landscape geomorphology, and, in some cases, their coastline processes. Wetlands provide many ecosystem services, including biodiversity support, flood and storm mitigation, and water quality improvement, particularly through nutrient reduction, which has led some to suggest that wetlands provide more services to human society than does almost any other ecosystem.

RESPONSE

OARDC/OSU researchers at the Olentangy River Wetland Research Park (ORWRP) have completed biogeochemical and hydrologic studies of wetlands in a variety of climatic zones. From cores representing a sediment record of at least 40 years, they have demonstrated that wetlands are consistently able to accumulate considerably more solid-phase carbon than do uplands. Methane emissions from all wetlands, however, are variable and highly dependent on the system hydrology. Also, studies of pulsing vs. steady-flow conditions have demonstrated that the healthiest wetland systems and the ones with the lowest emissions of greenhouse gases are those that experience regular pulses of water, such as the seasonal flooding associated with rivers, two-per-day coastal tides, etc.

IMPACT

We have demonstrated that the emission of greenhouse gases, especially methane, from functional wetlands can be minimized by promoting natural hydrologic pulsing of water from rivers and streams to the wetlands. We have also demonstrated that planted and unplanted wetlands converge in function over a 15+year period and provide similar ecosystem services of water quality improvement, floodwater retention, and carbon sequestration. These results are important to regulatory agencies responsible for overseeing the design and creation of wetlands. Our results should also lead to a better appreciation of the ecosystem services of wetlands and thus to their conservation and management. Wetlands can clearly be created and restored for their contributions as sinks of carbon in addition to all the other ecosystem services they provide.

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