



The Relationship Between Waterfowl Herbivory and Wetland Methane Emission

Waterfowl are among the longest-recognized values provided by wetlands, with enthusiasts catalyzing the first widespread wetland conservation efforts in America during 1920s. But ducks and their ilk may play an underappreciated role in the regulation of greenhouse gas emission from wetlands and in the Earth's climate system, says Duke University Wetland Center graduate student Scott Winton.

Winton is studying waterfowl and greenhouse gas emissions at Lake Mattamuskeet, North Carolina's largest natural fresh water body and home to hundreds of thousands of wintering ducks, geese, and swans.

All those birds migrate south from their northern breeding grounds to escape the harsh winters and are attracted to Lake Mattamuskeet's open water and abundant aquatic vegetation. Many emergent wetland plants have hollow stems, which studies have shown greatly enhance the emission rates of methane, an important greenhouse gas produced in oxygen-depleted wetland sediments. When water birds arrive at Lake Mattamuskeet for winter to gobble up plant matter, reducing stem densities, they may be attenuating the release of methane and helping to mitigate climate change.

To look for evidence of this phenomenon Winton has set up plots bordered by deer fencing to keep

waterfowl out. He will compare methane efflux rates in these areas protected from herbivores to those of control plots, into which birds can freely enter.

Winton's project is sponsored by a generous research grant from the Carolina Bird Club that has allowed him to purchase weatherproof cameras to monitor bird activity at his study sites and procure materials to construct the plots as well as large custom-built transparent chambers that Winton designed for collecting gas samples.

Few studies outside Europe have attempted to link herbivore-plant interactions and methane emission rates. Given that milder winters are allowing waterfowl to shorten their southerly migrations along the east coast, Southeastern wetlands may be left with an herbivore shortage and enhanced methane emission. This scenario, if true, would represent a novel positive climate feedback, with milder weather allowing waterfowl to shift their wintering grounds northward, lowering their populations in southern lakes and impoundments, and resulting in less herbivory and more methane escape through the stems of denser stands of wetland plants.

*Scott Winton
Ph.D. Student, DUWC*



Left. Sunset finds thousands of birds over and on Lake Mattamuskeet, a major wintering ground for northern waterfowl, including Tundra Swans, Snow Geese, and many duck species. DUWC graduate student Scott Winton has selected several sites on the lake to study possible relationships between bird herbivory and GHGs. Right top. An automatic camera captures a group of foraging birds, including White Ibis and Tundra Swans, in one of the research plots. Right bottom: The red dot indicates the location of the Lake Mattamuskeet National Wildlife Refuge in eastern North Carolina.

Photos by Scott Winton

