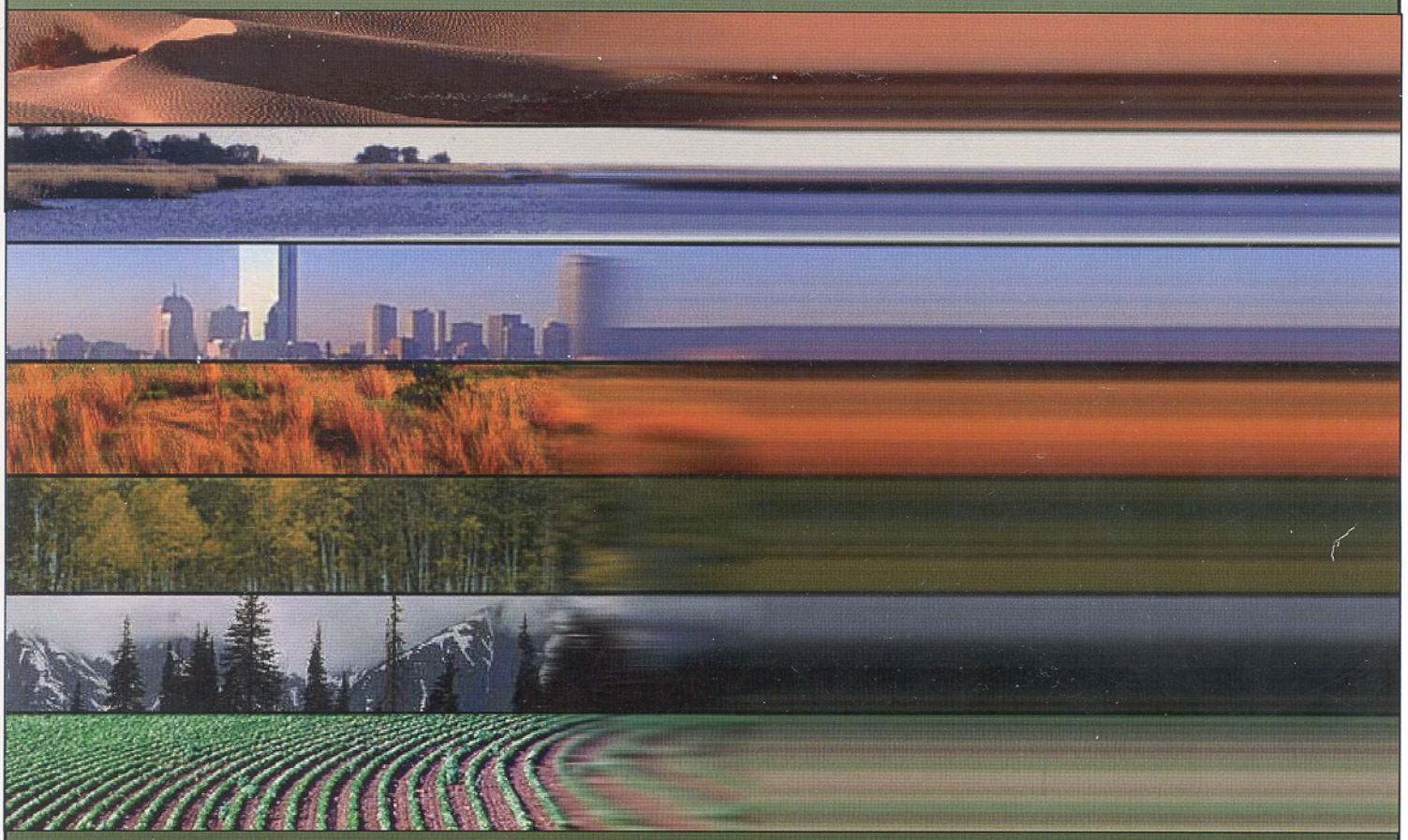
USDA Symposium on Natural Resource Management to Offset Greenhouse Gas Emissions



Raleigh, North Carolina
November 19-21, 2002

USDA UNITED STATES DEPARTMENT OF AGRICULTURE

NRCS ARS ERS ECONOMIC RESEARCH SERVICE USDA CSREES Farm Service Agency

Gleason, Robert (USGS Northern Prairie Wildlife Research Center, 8711 37th Street SE, Jamestown, ND, 58401; Phone: 701-253-5546; Fax: 701-253-5553; Email: robert_gleason@usgs.gov)

Prairie Wetlands of North America Important for Carbon Storage

Ned H. Euliss, Jr.*, R. A. Gleason, A. Olness, R. L. McDougal, H. R. Murkin, R. D. Robarts, R. A. Bourbonniere, B. G. Warner

Wetlands in the prairie region of North America are generally assumed to be inconsequential to the total wetland carbon pool. In an effort to determine what these wetland stocks might be and if they represent a significant pool, we evaluated the potential of prairie pothole wetlands in North America to sequester carbon. Previous research suggests that prairie wetlands traditionally functioned as net sinks for atmospheric carbon, but cultivation, the current principal land use, has shifted their function from net sinks to net sources of atmospheric carbon. Land use changes that lead to protection of existing wetland carbon stocks, restoration of new wetland stocks, and cessation of activities that remove carbon stocks such as conventional agriculture may be expected to have a significant impact on total wetland carbon stocks in this region. Of the wetland area in the prairie pothole region, over 50% in the United States and 46% in Canada has been converted to cropland. Our analysis suggests that greater amounts of atmospheric carbon could be stored in wetlands in the prairie pothole region through restoration programs than on no-tillage cropland even though the acreage of wetlands is much smaller. However, both land use activities should be encouraged given they lead to net gain in carbon sinks.

In addition, emission of trace gases from restored wetlands in the PPR is not expected to exacerbate greenhouse gas emissions. In fact, limited data suggest that restored wetlands emit less methane and nitrous oxide than farmed wetlands. We do not have data on trace gas emissions from wetlands in the prairie pothole region of North America but research from the similarly glaciated prairie region of northeastern Germany demonstrates that methane and nitrous oxide emission significantly increases following artificial enrichment from agricultural fertilizers (e.g., ammonia, inorganic nitrogen). Assuming the same relationship found in Germany holds for the United States, reduction in trace gas emissions will be an additional greenhouse gas benefit. Restored wetlands in the United States PPR are generally situated within large blocks of land (e.g., Conservation Reserve and Wetland Reserve Programs) and hence will receive little or no agricultural enrichment to exacerbate trace gas emissions.