A Watershed Approach for Carbon-Related Ecosystem Services

June 23, 2015

Dr. Caryn Vaughn, Professor at the University of Oklahoma, and Dr. Antonio Castro, Postdoctoral Research Associate at the Oklahoma Biological Survey, used an ecosystem services framework to examine how different water management/environmental flow scenarios in the Kiamichi River watershed affects the delivery of ecosystem services, and thus contributes to the well-being of people both living inside and outside the watershed. The Kiamichi River watershed in southeastern Oklahoma is at the center of intense conflict over water ownership and use. Missing from these disputes are the needs of the watershed's rich animal and plant life, including three federally endangered freshwater mussels. Dr. Vaughn and Dr. Castro's approach involved mapping the spatial delivery of a selection of watershed services, and then exploring the tradeoffs between their biophysical, socio-cultural and economic values.

As part of the broader study, Vaughn and Castro specifically conducted a multidimensional valuation of carbon-related ecosystem services in the watershed. The land is relatively underdeveloped with few urban areas and extensive tracts of forested landscapes that provide carbon storage and sequestration. Most people are unaware that carbon sequestration provides direct benefits such as erosion control and soil fertility and indirect benefits such as air quality and habitat for species. The team assessed the social perception of the general public regarding a variety of ecosystem services provided by the watershed, including direct and indirect benefits related to the carbon cycle, and also used a carbon sequestration model to quantify the spatial distribution of carbon storage and sequestration. These results were then used to analyze the supply-demand framework of ecosystem services for the watershed. Vaughn and Castro hope their results will help stakeholders and managers make more informed land use decisions in the future by allowing them to examine the tradeoffs between different management strategies.

This research is based on work partially funded by the University of Oklahoma through the Oklahoma Biological Survey and the South Central Climate Science Center. Photo courtesy of Dr. Castro.

For more information about the study and its results:

Antonio J. Castro, Caryn C. Vaughn, Jason P. Julian, Marina Garcia Llorente and Kelsey N. Bowman (2015). Social Perception and Supply of Ecosystem Services – A Watershed Appraoch for Carbon Related Ecosystem Services, Biodiversity in Ecosystems-

Linking Structure and Function, Dr. Juan A. Blanco (Ed.), ISBN:978-953-51-2028-5, In-Tech, DOI: 10.5772/59280.

http://www.intechopen.com/books/biodiversity-in-ecosystems-linking-structure-and-function/social-perception-and-supply-of-ecosystem-services-a-watershed-approach-for-carbon-related-ecosystem