ACES 2014 Morning Workshop 3
December 8, 2014 | 8:00am-11:30am

Title: ***Coordinated approaches to Enhance Ecosystem Services in Watersheds Dominated by Agriculture***

Description:
This workshop will focus on ecosystem services in agricultural landscapes. Covering over a third of all global land area, agricultural systems constitute the world's largest engineered landscape and are critical to meet the demands of the growing world population through the provision of food, fuel, and fiber. Agriculture also yields numerous non-marketed ecosystem services (ES), including pollination, biological control, and recreation. However, intensive management to increase marketable output can result in adverse ecosystem impacts. In the Great Lakes region, agricultural nutrient loss via surface runoff and subsurface drainage is threatening aquatic ecosystems. In 2011, a Harmful Algal Bloom (*Microcystis sp.*) of unprecedented size and severity occurred in the Western Basin of Lake Erie. This bloom was primarily fueled by non-point source nutrient runoff from the Maumee Watershed, which has about 80% agricultural land use.

As a result of this and other coastal and freshwater re-eutrophication problems, significant effort is being dedicated to identify strategies that reduce nutrient loss from land in high priority watersheds. During this session, we will present research and programs that take an interdisciplinary, multi-stakeholder approach to identify market and non-market strategies that balance productivity and environmental sustainability in watersheds dominated by agriculture.

Integrated ecological-economic modeling is critical for advancing our understanding of the nutrient loadings to freshwater lakes and the optimal policies that provide farmers with the right incentives to reduce these loadings. We present an integrated modeling approach that develops a model of individual farmer land management decision making and couples this with a spatially explicit model of land management outcomes and nutrient transport in the Maumee watershed of Lake Erie. We apply these models using survey data from 7,000 farmers and spatial data on cropland parcels and other physical watershed attributes to assess the potential nutrient reduction benefits of policies designed to encourage reduced fertilizer application and adoption of best management practices. We show how these results can be linked to non-market valuation estimates of targeted Lake Erie ecosystem services to evaluate the costs and benefits of alternative nutrient management policies.

Ecological models are also used to inform performance-based conservation programs. We will discuss three on-the-ground projects that have been implemented to engage a cross section of the agricultural supply chain (farmers, conservation groups, agricultural suppliers and retailers, and drain commissioners), 1) the 4R Nutrient Stewardship Certification, 2) Drainage Management Incentive Program, and 3) BMP Auction Program. Through these programs, our project team is testing and implementing cost-effective initiatives that sustain agricultural production and improve the condition of rivers, streams and lakes in the Great Lakes Basin.

Workshop Audience:
This session will be of interest to a diverse audience, including resource management and conservation agencies, policymakers, researchers, and agricultural professionals. The presentations will bridge multiple conference themes to offer insights on a common issue in agricultural landscapes nationwide – the need to balance agricultural productivity and ecosystem health. This session will also highlight the value of collaborations between natural and social scientists, conservation agencies, and stakeholders within the agricultural supply chain and offer suggestions for similar initiatives in the future.

Session Organizers:

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Qualification of Organizers:

Leah Harris is currently a graduate research assistant at Michigan State University pursuing a PhD in agricultural, food, and resource economics. Her research focuses on how management of agricultural landscapes can be coordinated to enhance ecosystem services that support more productive agriculture and sound ecological processes. Leah recently received a research fellowship from the Kellogg Biological Station's Long-Term Ecological Research (LTER) program, an NSF-funded interdisciplinary project that examines how ecological knowledge and biological resources can be used to improve management of intensive agricultural systems. Other awards include the 2013 AAEA Sylvia Lane Mentor Fellowship, 2013 Johnson Dissertation Enhancement Fellowship, 2012 Kellogg Biological Station Summer Research Award, 2011 Phi Kappa Phi Love of Learning Scholarship, and four speaking awards for presentations at Michigan State University.

Dr. Joseph DePinto is currently a Senior Scientist at LimnoTech, a water science and engineering consulting firm in Ann Arbor, MI. He has focused much of his 40 year career (27 in Academia and 13 at LimnoTech) on research and management of the Great Lakes, with important contributions to the development and application of mathematical models of both surface waters and watersheds aimed at providing a quantitative understanding and predictive capability for the full range of issues within the basin. In 2011, Dr. DePinto was presented with the ***International Association for Great Lakes Research Lifetime Achievement Award*** for important and continued contributions to Great Lakes research. He is a co-Principal Investigator on the Great Lakes Watershed Ecological Sustainability Strategy (GLWESS) project, which is contributing to the subject matter of this session.