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**Presenter:**
ANDREW J. ELMORE, University of Maryland Center for Environmental Science

**Time of Event:**
Tuesday, October 30, 2018 - 11:00

**Location:**
National Socio-Environmental Synthesis Center (SESYNC)
1 Park Place, Suite 300
Annapolis, MD 21401

*From the mountains to the sea: New insights into mid-Atlantic forest and stream response to global change*

Seminar presented by Andrew J. Elmore, Professor, University of Maryland Center for Environmental Science & SESYNC.

**Abstract**

The rapid pace of urbanization combined with changes in atmospheric composition and climate over the past three decades has influenced patterns and processes at the interface of terrestrial and aquatic ecosystems. In the mid-Atlantic, these changes have consequences for management of the Chesapeake Bay, the largest estuary in the United States. At continental to global scales, rising atmospheric carbon-dioxide concentrations and longer growing seasons are likely to influence biosphere-atmosphere interactions and, therefore, management responses to climate change. However, understanding long-term changes in these processes is complicated by the large area influenced by changing land use and climate, and the inadequacy of long-term monitoring data at this scale. New technologies in the form of medium resolution remote sensing data and spatial analysis have unlocked possibilities for research and new insight. For example, the Baltimore-Washington metropolitan region has seen rapid increases in impervious surface, ultimately burying up to 70% of stream length in the most densely urbanized areas and influencing the timing of forest phenology in spring and autumn. At the same time, rising surface water temperatures in the Chesapeake Bay amount to approximately 1.6 degrees C over the past 30 years, which is faster than the rate of increase in air temperature. As might be expected, warmer springs have led to earlier forest phenology. However, an analysis of nitrogen isotopes in tree rings suggests that earlier springs are causing reduced nitrogen availability, potentially contributing to long-term decreases in nitrogen export from forested headwater systems. Longitudinal studies of global foliar nitrogen content support these findings, and point to the additional impact of rising atmospheric carbon-dioxide on nitrogen availability. These studies contribute to our understanding of the value of forests for providing high quality water to estuaries and how urban land management has contributed to changes in stream and estuarine processes over the past 3 decades.
About the speaker: Dr. Elmore is Professor of landscape ecology at the University of Maryland Center for Environmental Science, Appalachian Laboratory and at the National Socio-environmental Synthesis Center. He works broadly across issues relevant to global environmental change, with a particular interest in ecosystem interactions with land-use and land-cover change. Recent work has focused on the effect of groundwater decline on wind erosion and air quality in deserts; the impact of urban stream burial on stream network structure and functioning; modeling coastal habitat change associate with sea level rise; and, understanding forest responses to changes in spring and autumn timing associated with climate change. He applies an array of tools to these problems, but has made the greatest impact on methods for analyzing satellite and airborne remote sensing data. Dr. Elmore received a BSc in Applied Physics from Purdue University and an MSc and PhD in Geoscience from Brown University. He worked as a postdoctoral scholar at the Carnegie Institution for Science and Dartmouth College before moving to Maryland.

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