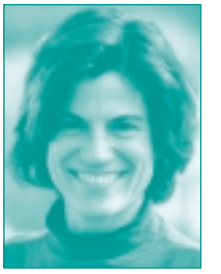
NEON: lighting the way forward

Jerry M Melillo
(ESA Past President)



Nancy B Grimm
(ESA President)

Alan Covich
(ESA President Elect)

The National Ecological Observatory Network (NEON) planning process process has thus far involved over 100 ESA members and has stimulated interest in thousands more. It represents the first opportunity for the ecological community to compete for NSF resources from the Major Research Equipment and Facility Construction program. The promise of NEON is a network of nationally deployed facilities and infrastructure, including sensors and the cyber-infrastructure necessary for data collection and sample analysis, education, training, and outreach. Its goal is to help ecologists document and forecast changes in ecology, at both regional and continental scales, caused by climate and land-use change, alterations of biological and hydrological systems by humans, and movements of genes, invasive species, and disease-causing organisms. Continued funding of NEON will put in motion detailed planning and implementation of 20 regional nodes across the USA.

We have great expectations for NEON; it has the potential to transform ecology by fostering the development of new sensor technologies, miniaturization of analytical instruments, and enhancements of cyber-infrastructure and visualization tools. While scientists working within the NEON network will certainly benefit from these technological advances, these tools and their output must also become available to researchers working outside the network as soon as possible. To ensure broad availability, the NSF can catalyze movement of these technological advances from prototype construction into cost-effective commercial production through its Small Business Innovative Research program and other mechanisms.

We expect NEON to enhance public awareness of environmental trends and their effects on the capacity of ecosystems to provide people with essential services such as clean water and air. Individuals who are knowledgeable about the societal benefits of healthy ecosystems will demand that they be managed in a sustainable way, and they will be more likely to support our science in its mission to serve society.

So how should ecologists help NEON move forward? We should continue to work on refining its design, so as to maintain an open architecture. NEON needs to be nimble enough, as it grows from concept to reality, to take maximum advantage of the rapid pace of innovations in sensor technologies, miniaturization of analytical instruments, and enhancements of cyber-infrastructure. Suggestions on this and other topics can be made via the open feedback process that has been established on the NEON website (www.neoninc.org).

Ecologists will continue to lead NEON, and to define the many crucial roles that modeling will play at all stages of design and implementation. Models will be essential for optimal sensor-array deployment and for integrating and storing the enormous output of data from clusters of sampling nodes. Once the network is in operation, models will play a key role in data assimilation, error analysis, quality assurance, and interpolation to fill the inevitable gaps in data. Modeling will be the basis for forecasting trends, for spatial projections within regions and across the nation as a whole, and for high-level synthesis within and across the major questions that organize NEON research. Finally, models will play a role in facilitating outreach to stakeholders, including decision makers at local, regional, and national scales.

ESA members should be proactive in supporting NSF's efforts to ensure full funding of NEON, including funding for continued design and construction, for the costs of maintenance and operations once the NEON network is in place, and for innovative research by individual scientists and small teams using the data collected across the network. Each ESA member is represented in Congress by two senators and one member of the House of Representatives. Write to them and express your enthusiasm and support for NEON and its potential to advance science in both basic and applied ways.

We encourage the Society's members to remain actively engaged in the NEON process, in order to advance our shared goals in science, education, and public policy. Sustained participation of the ecological community in the NEON process is essential if its full potential for both science and society is to be realized.