National Phenology Network Office Coming to the UA

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Over the past two years, Julio Betancourt (USGS and Adjunct Professor in Geosciences), David Breshears (UA School of Natural Resources) and other faculty at the UA have been collaborating with Mark Schwartz of the University of Wisconsin-Milwaukee and about 100 other scientists to develop a dense network of repeatable seasonal observations on plants and animals across the US. The National Phenology Network (NPN) is an exciting and emerging initiative that will engage multiple federal agencies, numerous environmental networks and field stations, educational institutions at every level, and mass participation by citizen scientists.

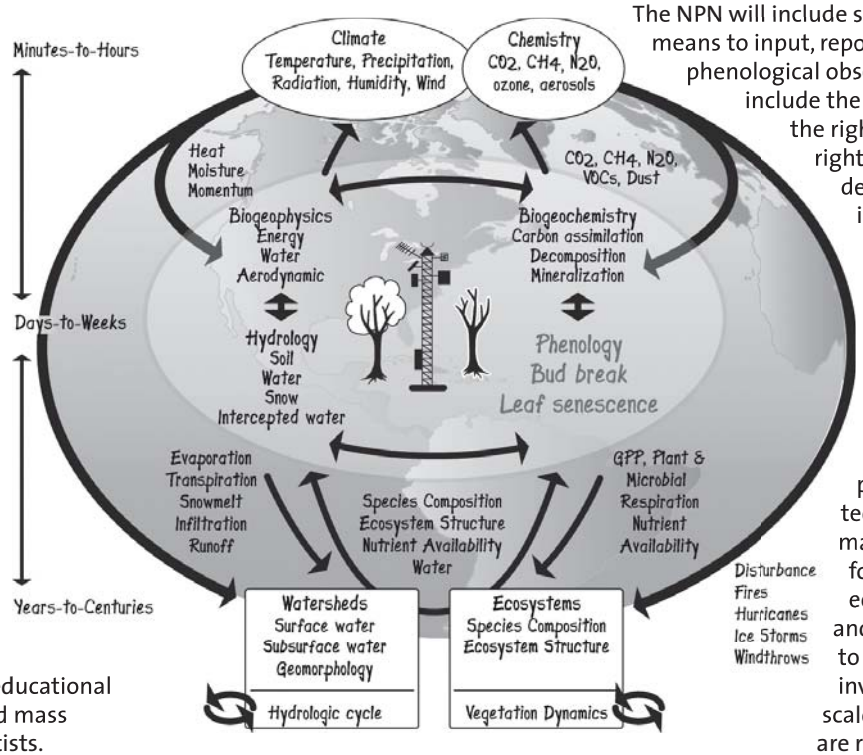

Figure 1. *Phenology is an essential component of environmental science. Phenological phenomena such as leafing and leaf senescence, which define the seasonal 'Green Wave' on Earth, interact with biospheric processes at scales from local to global, from minutes to centuries (Adapted from Bonan, G.B. 2002. Ecological Climatology, Cambridge Univ. Press).*

The National Coordinating Office will be located at the UA (Office of Arid Lands Studies Building on 6th and Campbell). The National Office will be supported through a cost-share agreement between the USGS, which will hire an Executive Director and furnish operational funds, and the College of Agriculture and Life Sciences, the College of Science, the Institute for the Study of Planet Earth, and the Office of Arid Lands Studies at the UA, which will provide space and support for an Associate Director/Staff Scientist. Plans are underway for the first set of observations to be made nation-wide in the growing season of 2007.

Phenology is the study of periodic plant and animal life cycle events that are influenced by environmental changes, especially seasonal variations in temperature and precipitation driven by weather and climate. Important phenological events, or 'phenophases,' include timing of leafing, flowering, and fruiting in plants; agricultural crop stages; insect emergence; and bird migration.

Phenology, representing the seasonal cycle on Earth, is a far-reaching component of environmental science. Variations in phenophase affect the abundance and diversity of organisms, their inter-specific interactions, their ecological functions, and their effects on fluxes in water, energy, and chemical elements at various scales (Figure 1).

With sufficient observations and understanding, phenology can be used as a predictor for other processes and variables of importance at local to global scales and could drive a variety of ecological forecast models with both scientific and practical applications. Phenological data and models are used in agricultural production, integrated pest and invasive species management, drought monitoring, wildfire risk assessment, and treatment of pollen allergies.

The NPN will include simple and effective means to input, report, and utilize phenological observations, and it will include the resources to provide the right information at the right time for a wide range of decisions made routinely by individual citizens and by the Nation as a whole.

A phenology network across the US can now capitalize on integration with other networks and remote sensing products, emerging sensor technologies and data management capabilitities formal and informal educational opportunities, and a new public readiness to participate in nature investigations on a national scale. These opportunities are reflected in a four-tiered monitoring structure with different degrees of integrated measurements and spatial coverage (Figure 2).

An undertaking of this size will require meticulous planning to guide the collection, analysis, and use of the data, and to ensure the success of the network and its objectives over the long term. In the short term, however, the NPN plans to launch its first set of phenological observations nationwide in the growing season of 2007. This pilot phase of the network was planned at an October 2006 workshop in Milwaukee. For more information, see the web page at http://www.uwm.edu/Dept/Geography/npn/.

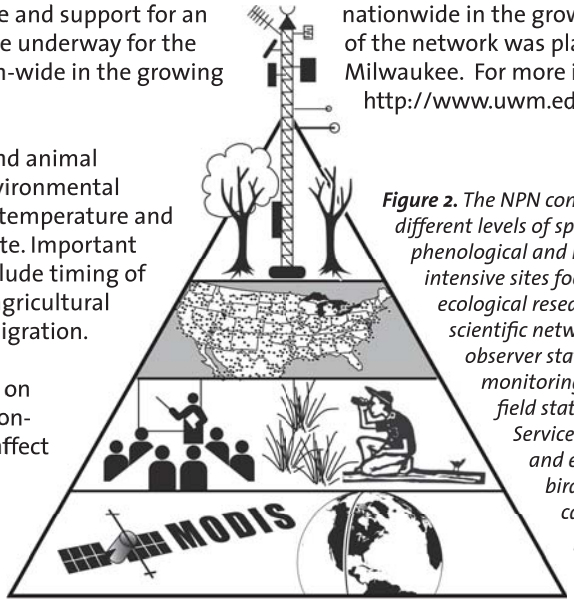

Figure 2. *The NPN consists of four components or tiers, representing different levels of spatial coverage and quality/quantity of phenological and related environmental information: 1) locally intensive sites focused on process studies (e.g., long-term ecological research sites, AmeriFlux); 2) spatially extensive scientific networks (e.g., National Weather Service cooperative observer stations, National Park Service inventory and monitoring sites, organization of american biological field stations, agricultural research stations, USDA Forest Service experimental forests and ranges); 3) volunteer and educational networks (e.g., garden clubs, plant-, bird-, and butterfly-monitoring networks, college campuses, and schools); and 4) remote sensing products that can be ground-truthed and assimilated to extend surface phenological observations to the continental scale.*