

Ecological Society of America - Austin, TX - August 8-12, 2011

Nearly the entire USA-NPN National Coordinating Office staff will be attending the Ecological Society of America meeting in Austin, TX, August 8-12. We will be giving several presentations, hosting a phenology lunch, offering a workshop on how to implement Nature's Notebook, and hosting a booth in the exhibitor's center.

Visit us at Booth 211

Kids of all ages: complete our Pheno-Hunt & win a prize! Test our new Droid App (iPhone coming soon)



Attention Pheno-Fans: Join us our for our Oral, Poster and Workshop Sessions!



- E. Denny / Aug 8, COS 2-ACC BR F 2:10 pm / *USA National Phenology Monitoring System: Enhancements for reporting phenophase intensity and abundance*
- C. Enquist / Aug 9, OOS 9-ACC 17B 8:00 am / *Using phenology as a tool for resource management and climate change adaptation*
- K. Thomas / Aug 9, OOS 9-ACC 17B 10:30 am / *Linking species to science in a phenology monitoring project: The California Phenology Project case study*
- J. Weltzin / Aug 9, OOS 9-ACC 17B 11:10 am / *Nature's Notebook: A USA National Phenology Network ecological monitoring and information management*
- Workshop / Aug 9, WK 31-ACC 18C 11:30am-1:15pm / *Nature's Notebook: Tracking Phenology for Research, Management and Education in the Face of Climate Change -FREE-*
- T. Crimmins / Aug 9, OOS 17-ACC 12A 4:00 pm / *Tracking climate change using Nature's Notebook*
- A. Rosemartin / Aug 9, PS 15-ACC Exhibit Hall 4:30-6:30 pm / *The USA National Phenology Network's model for managing diverse data through space and time to inform phenology research and applications*
- L. Marsh / Aug 10, OOS 22-ACC 17B 10:30 am / *The Needs of the Many: Challenges and Opportunities in Mobile Citizen Science Infrastructure at the USA-NPN*

Bring your brown bag lunch and a friend to the the Phenology Lunch Aug 10, ACC 18B 11:30 to 1:15pm

www.usanpn.org

Late-breaking poster:

G. Kish / Aug 8, PS-2-ACC Exhibit Hall 4:30-6:30 PM / *Engaging the public in observing changes in the environment.*

See below for a compilation of abstracts from all USA-NPN-affiliated talks, posters & workshops given in chronological order with the workshop appearing at the end.

Tracking climate change using Nature's Notebook

T.M. Crimmins, E.G. Denny, C. Enquist, R.L. Marsh, A. Rosemartin, J.F. Weltzin

Background/Questions/Methods

Recurring plant and animal life cycle events are called “phenology”, and information on the timing of these seasonal events is critical to many aspects of human life, including agriculture, gardening, health, cultural events, and recreation, and nearly all ecological relationships and processes, including plant-pollinator and predator-prey relationships, competition, and carbon and water cycling. In addition, phenology is sensitive to environmental variation, particularly variation in climate.

Nature's Notebook is the USA National Phenology Network's plant and animal phenology observation program. Through this program, scientists and non-scientists alike are collecting phenology observations on hundreds of species of plants and animals including birds, frogs, mammals, insects, fish, and herps, following scientifically rigorous protocols. Nature's Notebook is an off-the-shelf program that can readily be folded into secondary and post-secondary curriculum. Additionally, many phenological stages are relatively simple to observe and record, making observing phenology an ideal way to engage students and enhance climate change education efforts.

Nature's Notebook can also directly support research and decision making. The phenology observations collected through Nature's Notebook are maintained in the national phenology database maintained by the USA-NPN and made freely available for query, visualization, and download on the USA-NPN website.

Results/Conclusions

As of February 2011, the national phenology database encompasses over 75,000 observations of 160 species of animals and 258 species of plants from nearly 5,000 locations. Interested users may download data from the national phenology database from www.usanpn.org/results/data. The USA National Phenology Network has also developed training materials including scripted presentations, narrated videos, brochures, tip sheets, and posters that can be used in educational settings; these are available at www.usanpn.org/resources/resources. This presentation will demonstrate the wide range of ways that the Nature's Notebook program and the resultant data can be an asset to educators, researchers, and decision makers.

Abstract #31538

USA National Phenology Monitoring System: Enhancements for reporting phenophase intensity and abundance

Ellen G. Denny¹, Jake F. Weltzin², Carolyn A.F. Enquist³, Alyssa Rosemartin⁴, Theresa M. Crimmins⁵ and R. Lee Marsh⁵, (1)National Coordinating Office, USA National Phenology Network, (2)National Coordinating Office, USA National Phenology Network, Tucson, AZ, (3)The Wildlife Society & USA National Phenology Network, Tucson, AZ, (4)USA National Phenological Network, (5)USA National Phenology Network, Tucson, AZ

Background/Question/Methods

Patterns of phenology for plants and animals control ecosystem processes, determine land surface properties, control biosphere-atmosphere interactions, and affect food production, health, conservation, and recreation. The USA National Phenology Network (USA-NPN; www.usanpn.org), established in 2007, is a national science and monitoring initiative focused on phenology as a tool to understand how plants, animals and landscapes respond to climatic variability and change. One of the core functions of the National Coordinating Office (NCO) of USA-NPN is to develop and implement internationally standardized phenology monitoring protocols for plant and animal species for the collection of data that will serve a variety of end-uses, including ecological research, decision support for land management and public health, and land product validation.

Results/Conclusions

Our integrated plant and animal phenology monitoring protocols now provide internationally standardized methods and monitoring protocols for over 700 animal and plant species, with additional species added upon request. Monitoring methods have already been designed to facilitate collection of presence/absence data for both plant and animal phenology across the nation. A new enhancement now allows for the additional collection of phenophase intensity and/or abundance. Widespread implementation of these enhanced monitoring protocols will provide a much richer data set over time and space.

ESA 2011 Abstract submission

Using phenology as a tool for resource management and climate change adaptation.

Carolyn AF Enquist¹, Jake F. Weltzin², Theresa M. Crimmins², Ellen Denny², Alyssa Rosemartin² and R. Lee Marsh²

(1) The Wildlife Society & USA National Phenology Network, National Coordinating Office, Tucson, AZ (2) National Coordinating Office, USA National Phenology Network, Tucson, AZ, USA

Background/Questions

Changes in the timing of phenological events—such as flowering, migrations, and breeding—have been called a ‘globally coherent fingerprint of climate change impacts’ on plants and animals. Not surprisingly, phenology is now widely accepted as a robust ecological indicator of the impacts of climate change. For example, climate-induced changes in phenology have been linked to shifts in the timing of allergy seasons and cultural festivals, increases in wildfire activity and pest outbreaks, shifts in species distributions, declines in the abundance of native species, the spread of invasive species, and changes in carbon cycling in forests. The breadth of these impacts highlights the potential for phenological data and related information to inform management and policy-decisions across sectors. In this talk, we focus on using phenology as a tool for resource management and climate change adaptation.

Results/Conclusions

We specifically show how phenology monitoring can be used to facilitate the achievement of numerous natural resource management objectives. These range from conventional adaptive management and emerging climate change adaptation strategies to education and public outreach. We first do this by introducing a framework for acquiring and using phenology data at multiple spatial and temporal scales. We address the concept of ‘climate-smart’ monitoring and point out the key metrics for monitoring the ecological response to climate change. We then show how these data can be used in species vulnerability assessment and contribute to our understanding of ecological processes and carbon dynamics. In turn, we discuss how these efforts inform management planning and implementation, particularly in terms of identifying invasive species, fire, and biodiversity conservation and management actions. Finally, we highlight how a new, off-the-shelf phenology monitoring program, *Nature’s Notebook*, is not only operationalizing systematic data collection at protected areas across the U.S., but already is cultivating the public’s natural and climate science literacy by using a participatory citizen science approach.

Engaging the public in observing changes in the environment
George R. Kish , U.S. Geological Survey, Tampa, FL

Background/Question/Methods

The understanding of science for students of all ages depends upon the ability of scientists to describe complex environmental issues in simple terms. Field observations of the natural world's responses to environmental change have traditionally been conducted by university researchers and government scientists. However, due to increasingly limited resources, students and other citizen scientists are being recruited to help with this undertaking. The growing ranks of student and citizen science observers could also be mentored to observe and record detailed environmental, ecological, and phenological[1] events to maximize scientific investigations. A key component of citizen scientist and student training is to provide hands-on experiences to instill an understanding of how ecological and phenological events are influenced by environmental factors such as climate change.

In the southeastern United States, a pilot program is underway to teach climate change concepts by way of biological (ecology and phenology) principles to students and citizen scientists. The pilot program is being presented to students of varied cultural and educational backgrounds, including: 1) middle schools with limited resources for natural resources/environmental education, 2) tribal schools on native American lands to enhance natural resource conservation, 3) non-governmental organizations with enthusiastic citizen scientists, 4) agricultural extension service offices using environmental concepts to educate the public about sustainable practices, and 5) university students to spark interest in the relationship between ecology and the environment.

[1] Phenology refers to recurring plant and animal life cycle stages

Results/Conclusions

Results from this pilot study will be used to: 1) incorporate phenology concepts to enhance ecology milestones for middle and high school curricula nationwide, 2) assist educators in the development of resources to be used in school programs, and 3) develop phenology networks to include nature preserves, school yards, backyards, botanical gardens, and parks for a long-term source of outdoor environmental education opportunities.

The USA National Phenology Network's model for managing diverse data through space and time to inform phenology research and applications

Alyssa Rosemartin, Lee Marsh, Ellen Denny, Bruce Wilson

USA-NPN National Coordinating Office
Oak Ridge National Laboratory

Background/Question/Methods

Patterns of phenology for plants and animals control ecosystem processes and affect food production, health, conservation, and recreation. Although phenological data and models have broad applications, until recently there was no coordinated effort to understand phenology at the national scale in the United States. The USA National Phenology Network (USA-NPN; www.usanpn.org) is a newly established partnership between federal agencies, the academic community, and the general public to establish a national initiative focused on phenology, as well engage the public in science, all with a strong information technology foundation to reach and support broad audiences.

Results/Conclusions

Data management and information sharing are central to the USA-NPN mission. The USA-NPN develops, implements, and maintains a comprehensive Information Management System (IMS), critical to the widespread collection, storage and dissemination of phenology data. Also facilitated by a well-developed information technology infrastructure, are access to phenology-related information, tools for data interpretation, and communication among partners of the USA-NPN. The IMS includes components for data storage, such as the National Phenology Database, Nature's Notebook, a robust user interface for data entry, an exciting new suite of internet-enabled visualization tools, large and inclusive catalogues of phenology-related data and information, and live data exports available for download and analysis. Since its inception in 2009, more than 100,000 phenology observations at 2,000 stations have been collected through Nature's Notebook. The USA-NPN website sees 4,000 unique visitors each month, including 200 visits to available data and 60 visits to the publication clearinghouse. Ongoing development of web services supports data entry interfaces on partner websites, smartphone applications and dynamic visualizations.

Linking species to science in a phenology monitoring project: The California Phenology

Project case study

Kathryn A. Thomas , *Pacific Northwest Aquatic Monitoring Partnership, US Geological Survey*
Angie Evenden , *Californian Cooperative Ecosystem Studies Unit, National Park Service, Berkeley, CA*,
Susan J. Mazer , *Department of Ecology, Evolution and Marine Biology, University of California, Santa Barbara, Santa Barbara, CA*,
Elizabeth R. Matthews , *California Phenology Project, University of California Santa Barbara*,
Jake F. Weltzin , *National Coordinating Office, USA National Phenology Network, Tucson, AZ*

Background/Question/Methods

Species phenology is acknowledged widely as a key indicator of the response of biota to rapidly changing climate. Agencies, organizations, and the public throughout the nation have become aware of the importance of observing phenology and look to the USA National Phenology Network (USA-NPN) for guidance toward selecting appropriate species to develop a phenological monitoring program. The National Coordinating Office (NCO) of the USA-NPN has promoted the use of systematic criterion in selecting species. In 2010, the NCO presented phenophase definitions and species profiles for over 250 plant and 60 animal species through a user-friendly web interface as part of their program Nature's Notebook. These initial species were chosen using biological and ecological criteria, geographical and micro-site considerations, educational goals, and human-use factors. To best connect observations from on-the-ground tracking of plant and animal phenology and the resulting derived metrics with high-level indicators of climate change, a phenology program should be able to describe the relationship of the targeted species to an articulated science need or question relating to climate change.

Results/Conclusions

The California Phenology Project (CPP), funded by the National Park Service, is facilitating the implementation of a phenology monitoring program in 19 NPS units within California (www.usanpn.org/cpp). The CPP planning team, in collaboration with the NCO and U of California Santa Barbara, developed a process to articulate project science questions related to climate change as well as resource management and education and outreach. In addition, the CPP planning team is engaging a broad community of park staff and regional plant experts to select plant species for monitoring across three major bioregions in CA. This species selection process serves as a good example of how the selected plants can represent a variety of selection criteria including linkage to climate-change related questions derived from current and anticipated management needs at the park units. In addition, the process encourages wide participation and engagement of the resource inventory and monitoring, and interpretive staff of the parks, and interested scientists within designated bioregions.

Nature's Notebook: A USA National Phenology Network program for ecological monitoring and information management

Jake F. Weltzin, Theresa Crimmins, Ellen Denny, Carolyn Enquist, Lee Marsh, Alyssa Rosemartin

Background/Question/Methods

Patterns of phenology for plants and animals control ecosystem processes, determine land surface properties, control biosphere-atmosphere interactions, and affect food production, health, conservation, and recreation. The USA National Phenology Network (USA-NPN; www.usanpn.org), established in 2007, is a national science and monitoring initiative focused on phenology as a tool to understand how plants, animals and landscapes respond to climatic variability and change. The network is a partnership between governmental and non-governmental science and resource management agencies and organizations, the academic community, and the public working together to collect and organize phenological information to inform research, education and outreach, agriculture, tourism and recreation, human health, and natural resource conservation and management. Core functions of the National Coordinating Office (NCO) of USA-NPN are to provide a national information management system including databases, develop and implement internationally standardized phenology monitoring protocols, create partnerships for implementation, facilitate research and the development of decision support tools, and promote education and outreach activities related to phenology and climate change. This presentation will describe recently expanded capacity, and preliminary results, for the on-line integrated animal and plant monitoring program called Nature's Notebook.

Results/Conclusions

Nature's Notebook provides internationally standardized methods and protocols for phenological status monitoring for over 700 animal and plant species. The monitoring system facilitates collection of sampling intensity, absence data, considerable metadata (from site to observation). We recently added functionality for recording estimates of animal abundance and plant canopy development. Real-time raw data for plants (from 2009 to present) and animals (from 2010 to present), including FGDC-compliant metadata and documented methodology, are now available for download from the website. A new data exploration tool premiered in spring 2010 allows sophisticated graphical visualization of integrated phenological and meteorological data. Nature's Notebook is supported by an advanced information management system (IMS) that includes a sophisticated data model and a system of databases. The IMS and associated interfaces support access to important historical phenology datasets, bibliographies, catalogs of other phenology monitoring efforts, and a metadata editor for description, registration and search of historical phenology datasets. New web-services facilitate the replication of the on-line interface by collaborating organizations, and provide a data input/output function for mobile applications. The network seeks to develop partnerships with other organizations interested in implementing vetted, standardized protocols for phenological or ecological monitoring.

Proposal for a workshop at the ESA 2011 annual meeting in Austin, TX

Title: Nature's Notebook: Tracking Phenology for Research, Management and Education in the Face of Climate Change

Description: This workshop will introduce participants to the programs and products of the USA National Phenology Network (USA-NPN; www.usanpn.org), with a focus on Nature's Notebook, a national-scale monitoring program designed to increase our understanding of climate change and environmental variation on the phenology of natural ecological systems. We will introduce participants to other tools available to engage scientists, managers, students, and the public in phenological studies and monitoring programs that will contribute to and utilize the new national database for phenology. In addition, we will describe, demonstrate, and discuss opportunities to integrate phenology, ecology, and climate change research into formal and informal education settings and citizen science programs. Speakers will introduce resources, methods, and case studies; the workshop will culminate in breakout group discussions to address specific questions. Participants will leave the workshop with tools and techniques that they can bring to their own science or resource management programs or activities. In addition, this workshop will be of particular interest to coordinators developing or conducting education/outreach programs that focus on earth stewardship, climate literacy or science literacy through active learning, engagement and participatory activities.

Summary: This workshop will introduce participants to programs and products that can enhance our understanding of climate change impacts on natural systems through involvement in phenological research programs. Scientists, educators, managers and volunteer program coordinators are welcome.

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Minimum number of participants: 5

Maximum number of participants: 50

Proposed starting and ending times: Lunch break (11:30-1:15)