

“TOWARDS A SOUTHWEST REGIONAL PHENOLOGY NETWORK”:
Summary Proceedings of the First Annual NPN-ASPRS Symposium,
5 October 2007, Tucson, AZ
(Compiled by Mark Losleben, 2 October 2008)

INTRODUCTION

This document summarizes the proceedings of the First Annual NPN-ASPRS Symposium. It presents background material, a summary of the key points of the afternoon discussion, current conditions, and concludes with future outlooks from the perspective of one year later.

Remote sensing and photogrammetry are powerful tools to bridge the gap between surface phenology observations and Landscape Phenology (LSP). This link is key to attaining a comprehensive coast-to-coast phenology national database. Such a spatially extensive phenology database, integrated with near- and long-term climate models, enables well informed predictions of species to ecosystem to biome changes which in turn enables creation of intelligent adaptative strategies for ongoing and future climate change.

The Southwest Chapter of the ASPRS and the National Phenology Network (USA-NPN) co-sponsored this, the first of an annual series of symposia highlighting the intersection of remote sensing and phenology research, and exploring potential advances in the development of monitoring and analytical techniques. Excellent oral and posters were presented, followed by a discussion exploring the symposium theme, “Towards a Southwest Phenology Network”. The 2007 agenda and presentation abstracts can be viewed at <http://www.asprs.org/SouthwestUS/html/oct07-phenology.html>

BACKGROUND

Integration of spatially-extensive phenological data and models with both short and long-term climatic forecasts offer a powerful agent for human adaptation to ongoing and future climate change. Regional networks are key to fully realize the value of phenological data at local to regional scales, and may portend conditions at, or be contextually linked to, the national scale. Therefore, Regional Phenology Networks (RPN's) are vitally important to the mission and goal of the National Phenology Network (USA-NPN), and will advance the mission and goals of the ASPRS.

A goal of the USA-NPN is to compile basic information on phenological responses to climate change; to study its nature, pace and the effects on ecosystem function; and to understand connectivity and synchrony among species. The USA-NPN will collect phenology data from across the nation, but a national network that is able to detect issues at a smaller scale relies on the collection and reporting of phenological information from local sites, and remote sensing is a key component in phenology observations as it is the “cement” linking the spatially discrete surface phenology observations to provide wall-to-wall coverage.

Regional phenology is applicable to a variety of important topics in a changing climatic environment such as:

- Monitoring ecosystem function and services, and assessing their vulnerabilities to environmental variation (e.g., carbon budget, wildfires, water budget, health hazards);
- Improvements to agriculture, forestry, and nature management;
- Weather, climate, and ecosystem forecasting and monitoring;
- Providing measurements critical to identifying local and regional impacts of climate variability and change;
- New information for vector and invasives control;
- Relationship between temporal patterns of germination and invasiveness, providing a framework for tracking and managing the spread and productivity of invasives;
- Establish a baseline of biological activities for future reference, providing a framework for assessing our national biological resources;
- Evaluate impacts of lengthening of growing season on plant moisture stress, seasonal timing, geographic range, frequency and severity of fire insect and pathogen outbreaks, fire and other ecological disturbances;
- Evaluate impacts of growing season lengthening on hydrology, ecological disturbances (fire and insect/pathogen/pest outbreaks), agriculture, ecological disturbances, and spread of invasive species and infectious diseases;
- Evaluate phenological effects in the hydrologic cycle, particularly on evapotranspiration, recharge, ground-water levels, and streamflow;
- Human health consequences of allergens related to changing phenology;
- Add critical value to the heavy public investment in satellite remote sensing platforms and products; and
- Opportunity for a large segment of society to be involved in the network and environmental monitoring

To gauge interest and investigate the possibility, form, function, and future of a Southwest Regional Phenology Network (SWRPN) in the southwest US, an open discussion was held in the afternoon.

2007 SYMPOSIUM DISCUSSION SUMMARY

This symposium was concluded with thoughtful and insightful discussion of the thematic topic, Towards a Southwest Phenology Network.

Key points, questions, and issues raised are summarized below. Many of these have been addressed as the USA-NPN has rapidly developed programs and tools for dissemination and sharing with Regional Phenology Networks (RPN's), as well as all other networks, organizations, researchers, and the public interested in phenology. These developments are presented in the following section on Future Directions.

The discussion centered on the nature, identity, character, and relevant topics to guide the attention and activities of a SWRPN. The following is a condensed reporting of the points, questions, and opinions raised:

- It is paramount to establish goals & objectives.

- Should there be a pilot program (model) for regional networks – USA-NPN?
- Will other networks ‘play’ with each other & USA-NPN?
- Will it address issues related to drylands/other unique features?
- Will it organize special sessions at national conferences, or a USA-NPN talk to start to organize the regions?
- What would be the infrastructure we would need – how do we bring people together without detracting from individual goals?
- What is the application of our data?
- What models do we have to follow?
- How can we create value-added projects to engage the various players/citizens?
- Topics unique and/or relevant to the southwest include fires, allergies, drought, hydrologic processes, etc... (see “Background” above).
- Goal: increase public awareness of phenology.
- As a regional group we could find ways to identify and leverage projects that otherwise wouldn’t be seen as phenologically important at the national scale.
- Most difficult thing to do is establish a mission and a vision (10 yrs) – then set goals and objectives.
- Should the goal of a SW network be to support the goals of the National Network? We should not reinvent the wheel- but we can identify the unique SW applications.
- Objective: data standards.
- Important to affiliate with politically-empowered entities.
- E.O.: Invasive species council, because invasive species are particularly important to the region. And the task force is politically empowered.
- Federal land management is being required to incorporate more science-based management into planning/management. Federal agencies will look to SWRPN.
- Identify end-users? Tourism (bird watching, hunting, fall foliage, flowers etc), Hantavirus, drought-monitoring (agriculture); end users often want the monitoring/visualization end products; pest outbreaks – getting better or worse (ecological forecasting).
- Employ logic model-structure for organizing thoughts, short, mid and long term goals.
- Define regulatory standards for data collection.
- Identify information seeking and information dissemination (to who, what and how) venues.
- The SWRPN should have a library function, goals, objectives, mission statements, etc. (workshop).
- Mount cameras on flux towers, and all appropriate platforms.
- USA NPN – remote sensing working group will require a geographical team.
- All major educational institutions be included in this effort –UA, NAU, ASU.
- Public education will be critical.
- Extend beyond AZ to ‘the Southwest’ including Mexico?
- Products to get attention:
 - Wildflowers
 - Riparian greenup
 - Monsoon greenup
 - Fire/fuel forecasting
 - Rangeview- already has a consistent drought tool
- Ask for people’s projects.

- A person is needed to take a lead.

PRESENT

The SWRPN is currently in the conceptual phase; however, developments at the USA-NPN have significantly advanced its move into reality since this symposium. These developments—web-based tools, handbooks, a resource clearinghouse, and a host of persons with experience in program development—include:

- Nationally vetted species lists and observational protocols;
- Access to educational and outreach materials and handbooks;
- Access to extensive phenology bibliography;
- Clearinghouse for resource sharing;
- Phenology garden templates and cloned species;
- Communications facilitation between individuals, Regional Phenology Networks, and national scientific networks;
- National Coordination Office (NCO) assistance and working in conjunction with RPN to develop regionally specific species protocols;
- NCO assistance in proposal writing for coordination and training meetings;
- Currently in development are:
 - A regional PN developmental template including web page;
 - Purchase of all RPN domain names; and
 - Data entry, visualization, and download tools.

SUMMARY and FUTURE DIRECTIONS

Significant advances towards facilitating the development of a Southwest Regional Phenology Network occurred in the past twelve months. These include plans for the development of a Regional Phenology Network (RPN) development plan or template, the acquisition of domain names for each of the RPN's in the United States, a sample web page template ready for individual RPN's to use and adapt reflecting their regional focus, and access to the full range of resources of the USA-NPN. Currently available are the NPN plant calibration and regional focus species lists and nationally vetted observational protocols with data entry through the NPN web page (www.usanpn.org); data visualization, download, and display tools are being developed. Resources available to all RPN's are educational handbooks and outreach materials containing resources to start and nurture local and community phenology programs, phenology observers training materials, grant proposal resources, and clearing house functions to share experiences with other RPN organizers and participants. Thus, given the streamlined implementation of a RPN, the identification of a regional coordinator moves the SWRPN much closer to becoming an imminent reality!