



Changes in **phenology** are the “fingerprint” of climate change.

[usanpn.org](http://usanpn.org)

The USA National Phenology Network is a national-scale monitoring and research initiative focused on collecting, organizing, and delivering phenological data, information, and forecasts to support management and decision-making, to advance the science of phenology, and to promote understanding and appreciation for phenology by a wide range of audiences.

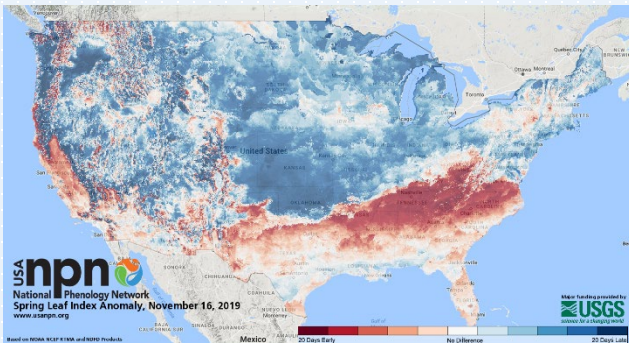
## OUR VISION

We are a team of research scientists, programmers, educators, and program designers dedicated to **providing data and information on the timing of seasonal events in plants and animals to ensure the well-being of humans, ecosystems, and natural resources.** We offer creative solutions, set the standards within the field, and are committed to equity in our work.

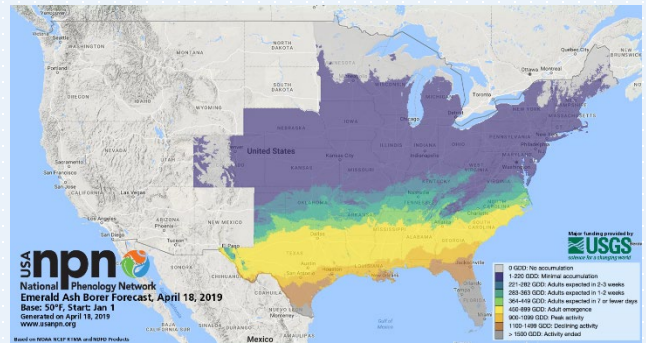


## PHENOLOGY MAPS AND TOOLS

The USA-NPN offers a growing suite of maps, forecasts, and products to support management, decision-making, and to document environmental change. For example:



**Predicting the start of spring.** Status of Spring maps indicate when early-season plants leaf out and bloom across the country. These maps have appeared in hundreds of news outlets including *The New York Times*, *The Washington Post*, and the Today Show.



**Forecasting optimal timing for pest management.** Pheno Forecasts, currently offered for 13 species, indicate the optimal time to control for insect pest and invasive species.

## AWARDS

- Enduring Achievement Award, Advancing Research in Society, 2021
- Climate Adaptation Leadership Award, Association of Fish and Wildlife Agencies, 2018
- Outstanding Achievement, Renewable Natural Resources Foundation, 2017
- Climate Champion, USGS, 2016
- Best website: *Nature's Notebook*, Shoemaker Award in Communications Excellence, USGS, 2014
- Best webpage: Status of Spring, Shoemaker Award in Communications Excellence, USGS, 2018



30 M Phenology observation records

160+ Peer-reviewed publications

575+ Partners contributing data

12 Research-driven data collection campaigns

200+ Phenology leaders certified

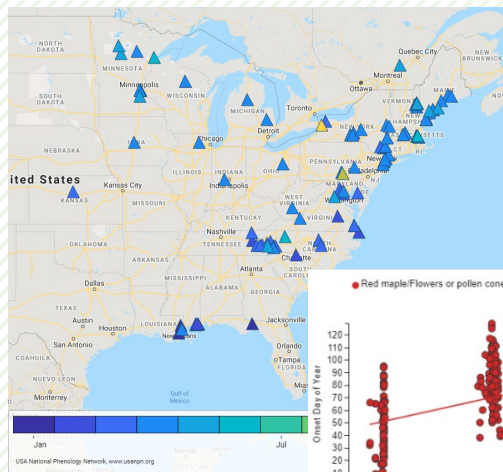
Nature's Notebook is the USA-NPN's plant and animal phenology observing program, ideal for professional and citizen scientists alike.

Nature's Notebook has been the premier plant and animal phenology program in the US for over 10 years, featured on television programs including *American Spring LIVE*, *The Crowd & the Cloud*, and *SciGirls*.

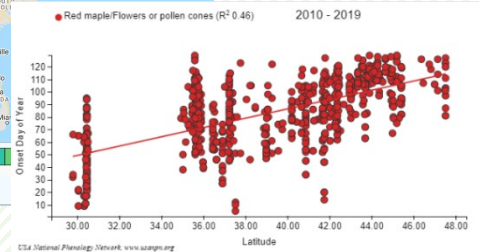
Data, maps, forecasts, and other information are readily accessible through an online interface, application programming interfaces, and an R package.

Using USA-NPN data, scientists have determined:

- Flower phenology is a strong indicator of wildfire risk in California
- Warmer winters lead to delayed leaf-out when chill requirements are not met
- Daytime temperatures play a larger role than nighttime temperatures in triggering leaf-out



Onset of flowering in red maple follows a latitudinal gradient.



### USA-NPN data and data products have appeared in articles in:

- *Nature Ecology and Evolution*
- *Ecology*
- *Frontiers in Ecology and the Environment*
- *Environmental Research Letters*
- *Ecological Applications*
- *Biological Conservation*
- *Agriculture and Forest Meteorology*

### Data submitted to the National Phenology Database have been collected at:

- 53 National Parks
- 24 National Wildlife Refuges
- 78 NEON sites
- 98 Universities
- 5 University of California Natural Reserves
- 2 Long-Term Ecological Research sites

### Pheno Forecasts have been used by:

- University of Georgia Extension
- Rainbow Treecare Scientific Advancements
- Saguaro National Park
- Pima County
- Arizona Department of Transportation
- Davey Tree Expert Company

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