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

**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**

- Climate Adaptation Leadership Award, Association of Fish and Wildlife Agencies, 2018
- Outstanding Achievement, Renewable Natural Resources Foundation, 2017
- Climate Champion, USGS, 2016
- Best webpage: Status of Spring, Shoemaker Award in Communications Excellence, USGS, 2018
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 represent the gold standard for monitoring.”
- Dr. Susan Mazer, University of California, Santa Barbara

"Refuge biologists are seeing a lot of changes. Through our partnership with USA-NPN we’re able to document the changes that we’re seeing."
- Sue Wilder, US Fish & Wildlife Service

"The work that we do could not be accomplished without the National Phenology Network and Nature's Notebook. We rely very heavily on the resources that are developed through USA-NPN."
- Elisabeth Maxwell, UMaine Signs of the Seasons

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