

# A Bird's-Eye View of the USA National Phenology Network: An Off-the-Shelf Monitoring Program

Diana Humple  
dhumple@pointblue.org

The study of the timing (or “phenology”) of reoccurring seasonal life-cycle events is integral to understanding ecological relationships as well as the factors, such as climate change, that might disrupt them.

The USA National Phenology Network (USA-NPN) has developed plant and animal phenology protocols and a data-management system to support a range of stakeholders in collecting, storing, and sharing data. These can be integrated into existing research programs, ensuring comparability over time and across projects, species, and sites.

At Point Blue's Palomarin Field Station, the timing of bird nesting and migration has been studied since 1966. In 2012, we began collecting plant phenology data on 15 tree, shrub, and forb species to complement our bird data at Palomarin and nearby long-term monitoring sites.

To illustrate applications of

the USA-NPN, we (1) used Palomarin as an example of how other bird monitoring programs can incorporate plant phenology protocols to benefit their research and (2) explored phenological synchrony and overlap between flowering plants and Ruby-throated Hummingbirds in Maine.

We found a wide range of phenology strategies. While some plants appear to respond to winter precipitation, by flowering in the spring, others may respond to increasing temperatures, by flowering in the late summer. In Maine, we found strong year-to-year variation in synchrony between hummingbirds and flowering plants and complex patterns of overlap.

Incorporating plant phenology monitoring into long-term bird monitoring efforts like Palomarin will enhance our understanding of the range of variation in plant and avian phenology, trends, and extreme events;

as well as how these phenological patterns respond to climate change.

## Main Points

The USA National Phenology Network has developed protocols and a data-management system for collecting, storing, and sharing phenology data.

Even short-term datasets shed light on different plant phenology strategies and complex interactions between birds and plants.

Recent integration of plant phenology monitoring into the avian monitoring and training program at Point Blue's Palomarin Field Station will allow us to increase our understanding of the consequences of phenological responses to climate change.

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