

One in an occasional series about the regional effects of climate change and how we're coping.

On May 2, 1908, as he strolled along the Perkiomen Creek in Montgomery County, Bayard Long collected a flowering sprig of redbud.

He mounted it, labeled it, and added it to the herbarium at the Academy of Natural Sciences, where he was the curator.

A century later, but just miles away in Chester County, botany graduate student Zoe Panchen also found a redbud in flower. But this time, the short-lived blooms had appeared much earlier. It was April 13, 2010.

Those two data points—and 2,537 others that Panchen analyzed—show a dramatic change in this region's flowering plants.

On average, about 20 species of common spring plants are flowering a day earlier every decade, Panchen concluded.

That scenario is happening across the biological spectrum in ways that could put nature out of sync, worsening pest problems and helping invasive species to flourish.

Migrating birds are arriving earlier, frogs are calling earlier, and insects are emerging earlier than they were decades ago, according to an analysis of the Northeastern United States by a national group focused on phenology—the study of all the things that animals and plants do that are related to the seasons.

Researchers link the numerous shifts they're seeing to climate change—mostly, the warmer springs associated with it.

Individual years are highly variable, of course. Last year was the earliest spring in the North American record, based on "indicators" such as plant leaf-out and flowering. This year in the Philadelphia region, temperatures were slightly cooler than normal. But many creatures shift their cycles to go with the overall trend.

"Climate change is here, it's now, it's in your backyard: that's the way we put it," said ecologist Jake Weltzin, who directs the National Phenology Network, a federal program that is enlisting citizen scientists to gather data on the plants and animals in their own backyards.

Weltzin and others acknowledge that many factors affect living things—habitat loss, pollution, urban heat islands.

But as they try to understand the changes in timing and shifts in abundance, again and again, climate change appears dominant.

"If you have multiple species that aren't even related, and they're all doing something similar, it's likely that there's a shared cause," said Keith Russell, science coordinator with Audubon Pennsylvania. "Climate change is the one thing that makes the most sense."

An international coalition of scientists that produced the seminal analyses of climate change noted in their latest report, in 2007, that phenology "is perhaps that simplest process in which to track . . . responses to climate change."

Even then, they were seeing it. Numerous studies had documented a progressively earlier spring—by two to five days a decade, the group said.

The evidence continues to mount.

A longtime study of lilacs and honeysuckles across North America shows the plants are leafing out several days earlier than in the early 1900s.

Ten bee species have accelerated their emergence date by roughly 10 days over the last 130 years, a Rutgers University entomologist and others reported in a 2011 paper.

Several studies have pointed to earlier bird migrations. One analysis found that 17 forest species were arriving in Pennsylvania earlier over the last 40 or so years—three days for the cerulean warbler to 25 days for the purple finch.

In addition, a National Audubon Society study looking at 305 species found that birds' wintering grounds had shifted northward an average of 35 miles in four decades.

In Pennsylvania and New Jersey, black vultures moving up from the south are becoming more numerous.

"We're seeing this in real time," said Eric Stiles, president of New Jersey Audubon, whose data collectors are part of a national breeding bird survey that is seeing species show up two and three weeks early. "It's all happening in our lifetime."

Some of these changes in patterns may not be bad. They're just changes.

But some changes have been linked to pest outbreaks. A longer growing season for some plants means a lengthening of the allergy season.

Scientists don't know how the changes will reverberate, "If you tug at anything in nature, it's a web," said Gary Stolz, manager of the John Heinz National Wildlife Refuge at Tinicum. "You pull one little string, and it's tied to everything else on Earth."

Researchers have found some cases where early bird arrivals put them out of sync with the sweet spot of insect emergence—their dinner.

Plants that shift their bloom times earlier could be damaged by even a normally timed frost—a potential disaster if the flower happens to be a crop species. Last year in Michigan, frost damage to fruit trees totaled half a billion dollars.

Organizers may need to rethink the timing of a few festivals to boot.

Last year, the parade for cherry blossoms in Washington happened just as the flowers were beginning to fade. The town's cherry tree cultivars now bloom an average of seven days earlier than in the 1970s.

Scientists say much more research is needed.

Some important data are coming from citizen scientists—people who go out in their backyards and simply notice what's going on. Even with inevitable mistakes, the bigger picture emerges.

Observers are reporting leaf-outs and flowering times to Project BudBurst, nighttime trills and croaks to FrogWatch USA, and backyard bird sightings to Cornell University's FeederWatch project.

Diane House, a physician who lives in Newtown Square, tracks beeches and red maples for the Phenology Network's "Nature's Notebook."

The granddaddy of citizen-science efforts, it has nearly 2,000 data gatherers. Its more than 1.8 million records on plants, trees, animals, and birds are already informing research, including a paper showing how ruby-throated hummingbirds are arriving in North America 12 to 18 days earlier than in the 1960s.

In 2010, with a grant from Toyota, Moravian College biologist Diane Husic began a local version, the Eastern Pennsylvania Phenology Project.

She now has 50 regular contributors—master gardeners, nature center staffers, even grade-school teachers who take students on a recess walks past the same trees every day.

Scientists also have a mother lode of data from more than a century ago—before the Industrial Revolution, when temperatures and CO2 levels began to rise.

In the mid-1800s in Concord, Mass., Henry David Thoreau noted enough about the flowering plants of the region that a modern Boston University professor was able to determine that, on average, spring flowers in Concord are blooming 20 days earlier. The work is being featured in a special exhibit at the Concord Museum through Sept. 15.

Philadelphia's Academy of Natural Sciences of Drexel University is known for its wealth of early data.

Its herbarium—with 400,000 specimens from Pennsylvania, New Jersey, Delaware, and Maryland—was crucial to Panchen, who at the time was in the Longwood graduate program at the University of Delaware.

In recent years, volunteers at the North American Bird Phenology Program have begun to transcribe more than 1.2 million bird-migration records—most of them handwritten on old cards—that were collected between 1881 and 1970.

The idea is to digitize the records and make them more researcher-friendly.

None too soon. Within the last month, the level of heat-trapping carbon dioxide in the atmosphere, as measured at a key station in Hawaii, has breached levels that haven't been seen in millions of years.

"All the models say changes are going to accelerate," Husic said. The more data, the better.

AMERICAN FAMILIES CANNOT AFFORD OBAMACARE

(Mr. FLEMING asked and was given permission to address the House for 1 minute.)

Mr. FLEMING. Mr. Speaker, two-thirds of the uninsured say they may not purchase insurance under ObamaCare. A new survey of the uninsured says only 19 percent will opt for coverage by January 1, meaning that only the sickest will buy insurance, driving up the cost of health care for all of us.

In fact, 61 percent expect their health care costs to go up as a result of ObamaCare. You may recall that earlier this year a Federal analysis estimated that the cheapest health insurance plan available for a family in 2016 will cost no less than \$20,000 a year per family.

And it's not just the uninsured who are filled with uncertainty about ObamaCare. More than two-thirds of small business owners surveyed by the U.S. Chamber say ObamaCare will make it harder for them to hire more employees. Many are busily converting employees to part-time as we speak.

American families cannot afford ObamaCare. It must be repealed, just as I and my Federal Republicans, and even some Democrats, have voted to do.

CONGRESSIONAL BLACK CAUCUS

The SPEAKER pro tempore (Mr. WEBER of Texas). Under the Speaker's announced policy of January 3, 2013, the gentleman from Nevada (Mr. HORSFORD) is recognized for 60 minutes as the designee of the minority leader.

Mr. HORSFORD. Mr. Speaker, tonight the Congressional Black Caucus comes before this body and the American people for the next hour to talk about important issues facing our country.

Tonight, we will discuss the problem of poverty in America and what we can do to bring more Americans into the middle class. From SNAP to the earned income tax credit, from Head Start to TRIO and GEAR UP, we have effective programs that reduce poverty and open