

Project BudBurst: Citizen Scientists Track Seasonal Plant Changes

Case Study Overview

Everyone knows that many flowers come out in spring and most leaves turn color in autumn. Even small children take delight in the seasonal cycles of plants.

But the timing of seasonal cycles is changing. Scientists have observed earlier blooming and later leaf fall in many plant species due to global warming. As global temperatures rise, plant cycles are changing in response.

What scientists don't know is exactly how or where the cycles are changing — or how fast the changes are happening. Hiring researchers to track the changes across the nation would be impossible.



That's where citizen science can help. In 2007, climate change researchers decided to engage volunteers in collecting data on seasonal changes in plants. Sponsored by the National Science Foundation and run by the National Ecological Observatory Network in partnership with the Chicago Botanic Garden, *Project BudBurst* is now a flourishing network of volunteers across the United States who monitor plants for seasonal changes.

Project Description



Volunteers begin by creating an account on the *Project BudBurst* website. Next, they get online training in what to look for as they monitor plants. They choose a particular plant to monitor, such as a tree in their own backyard. Then they use a standard monitoring form to describe the plant's location and to observe seasonal changes — changes that range from leafing, to flowering, to fruiting, to the timing of fall color and leaf fall. Finally, they report their observations on an online database.

Project BudBurst has thousands of volunteers in all 50 states, with participants tracking more than 250 plant species. The volunteers can track any plant they choose, but project organizers encourage them to choose from among 10 plants in particular. The “top ten” are easily identifiable, widely distributed and scientifically interesting. They include species such as California poppy, red maple, forsythia and Virginia bluebell.

Challenges

Project BudBurst resources are entirely Web-based, making them easy to access wherever Internet connections are available. However, the ability to participate using mobile devices is limited to a simplified HTML5 interface rather than a dedicated mobile app for offline usage. Efforts are underway to develop a dedicated mobile app so that volunteers can report data in areas without strong cell phone signals, such as in rural areas or in remote field locations.



People are familiar with changing weather patterns from day to day or week to week, but changing climate patterns happen on much longer time scales — decades. The scientific value of *Project BudBurst* is in long-term data collection, but people often want much more immediate responses. “What have we learned from a few years of data observations?” is a question often asked of program managers at *Project BudBurst*. As with most citizen science programs, recruitment and retention of volunteers is always a challenge.

Benefits and Outcomes



Through *Project BudBurst*, citizen scientists are collecting valuable information about seasonal plant cycles in a consistent way across the country. Scientists use the data to learn more about the responsiveness of individual plant species to changes in climate locally, regionally and nationally. By comparing the results to historical data, researchers can detect some of the long-term impacts of climate change, and data from *Project BudBurst* are already going into scientific studies across the country.

In addition, *Project BudBurst* provides opportunities for volunteers and others to learn how plants are changing in response to changing environmental conditions. The project’s website has lots of information on the seasonal cycles of plants, how they have been studied and how they have changed over time. *Project BudBurst* educational materials are highly regarded by educators in both formal and informal settings. Online professional development courses for using *Project BudBurst* in various educational settings are available through NEON’s [Citizen Science Academy](#).

Tips

The *Project BudBurst* case study illustrates the following steps in the Federal Citizen Science and Crowdsourcing Toolkit:

- **Scope Out Your Problem — Know Where Your Project Fits**
It takes considerable time and resources to successfully launch a new citizen science program. Take the time to understand the citizen science and crowdsourcing projects already available about your topic of interest and figure out how your project fits into that landscape. How can your project build on what is already being done? How can your project add value? *Project BudBurst* works with other plant phenology programs, offering smaller projects a platform to reach their communities by building on *Project BudBurst* resources.
- **Build a Community — Engage Your Community**
Participant motivation varies from community to community. Talk to the communities you wish to reach or who are interested in your project to decide whether you are on the right track. Work with potential partner organization to understand their needs (for science, education and outreach) and their audiences/stakeholders. *Project BudBurst* owes its success in good part to a strong partner program. It partners with a variety of stakeholder groups, including federal agencies (such as the U.S. Fish and Wildlife Service, U.S. Forest Service and National Park Service); local and regional nature centers and botanic gardens (such as the Chicago Botanic Garden and Denver Botanic Garden); and numerous other nature-based organizations.
- **Manage Your Data — Analyze Your Data**
Analyzing and sharing data are an area of growth in citizen science and crowdsourcing. More tools are available for data sharing than ever before, and using the best ones for your project can help motivate your participants. Expect your methods of data sharing to evolve as new tools emerge. In the past, a downloadable spreadsheet was enough for *Project BudBurst*; now, the project uses interactive maps, metadata standards, social media and other tools.

Learn More

- Website: [Project BudBurst](#)
- [NEON Citizen Science Academy](#)

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