

HEAD: Science for Everyone

DECK: Wisconsin residents of all ages and backgrounds are tracking wolves, monitoring streams, banding birds and counting invasive plants—all in the name of “citizen science”

By Denise Thornton

At dusk Dave Wilttrout steps out of his house and climbs into a Ford F150 to follow the lonely roads of the Chequamegon National Forest till well after midnight. At an isolated spot, he stops, steps out of the truck, and moves silently down the dark road. Then he fills his lungs and howls.

He’s hoping to learn from answering calls whether the wolf packs he identified while snow tracking the previous winter have added new members. A retired veterinarian who earned his howling chops while treating sled dog teams, Wilttrout sometimes finds that his howls are a bit too effective. “When they answer you back, it’s pretty spectacular. But when a wolf responds to your call from 50 yards away, and it’s pitch black out, and you are the only person for miles—that will make the hair go up on the back of your neck,” he says.

Despite his solitary treks, Wilttrout is no lone wolf. He is a citizen scientist, one of many volunteers who work with biologists, wildlife technicians and tribal conservation departments to monitor the wolf population of Wisconsin. And the contribution of citizen scientists doesn’t end there. They are playing an increasingly crucial role in many areas of research at CALS and other institutions. Projects that incorporate citizen scientists benefit from an enthusiastic (and usually unpaid) workforce that allows researchers to conduct projects that otherwise would not be possible. And in return, citizen scientists increase their knowledge and contribute to issues that matter to them.

Data collected by citizen scientists directly benefits Adrian Treves, a professor with the UW-Madison Nelson Institute for Environmental Studies, where he explores coexistence and conflicts between people and wildlife. “The accuracy of the wolf count in Wisconsin is important to both research and state policy,” he says. “Citizen scientists working with DNR biologists make it possible to locate every wolf pack and attempt to enumerate every single wolf in the state.”

“The volunteers more than double the miles we can cover,” says Adrian Wydeven, a mammalian ecologist and conservation biologist with the Wisconsin Department of Natural Resources (DNR). “We try to cover as much of the landscape as possible to detect every wolf out there. Volunteers provide many more eyes and ears looking for wolves and searching for signs, and that gives us a better picture of the distribution of wolves in the state.”

The volunteer tracker program has been in place since 1995 and coordinates up to 150 trackers each year. Wydeven puts out a news release each fall requesting volunteers. “We get Internet inquiries, and I send them to our Wisconsin’s Volunteer Carnivore Tracking Program website.” (This URL and others provided below.)

To become a tracker, volunteers spend a weekend studying wolf ecology, survey methods, conservation and the social and political aspects of wolf management. Then they get outside to look for wolf signs and do howl surveys. A second class is a day-long animal tracking class in early winter to identify wolf tracks, conduct a survey within a certain area and fill out the survey forms.

The wolf count culminates every April when scientists and trackers convene at the Wausau Days Inn and pull out a big map of the state. That map gets covered in Post-its marked by numbers up to 11, which is the biggest wolf pack in the state. Volunteer data is included on that map. Wydeven says experienced volunteers are as good at reading tracks as agency biologists. Volunteers also jump into the discussion to interpret the data, giving them an opportunity to participate and gain a better understanding of how scientific information is formulated.

“When they see how carefully their data is assessed and how it is being used, that seems to encourage people to stay involved,” says Wydeven. “As an agency we get a lot of scrutiny of populations we report on, but I don’t recall ever having criticism from anybody involved in the track survey. By being involved in these surveys, volunteers understand our survey methods, and this puts people out there in the community who are aware of how we get our numbers.”

Treves feels the role citizen scientists play in carrying what they learn back into their communities is as important as gathering data in the first place, and Wilttrout, who attends and contributes at the annual meeting, agrees. He sees his role as reporting the facts as accurately as he can both to the DNR and to his neighbors.

“I live in a small community, and we get to know each other pretty well,” says Wilttrout. “The people in the neighborhood rely on me for information about wolf ecology. I wind up being kind of a resource person for that.”

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In a world where public support and funding for science is becoming more uncertain, the connection between citizens and science can be key. “We are dealing with an environment where public buy-in and public participation in science may be critical,” says Dietram Scheufele, a professor of life sciences communication at CALS.

The National Science Foundation is changing its narrative and criteria, notes Scheufele, and there are efforts underway to make broader public impact a more important element of grant proposals.

“Being able to point to a citizen science component makes a grant more competitive,” he says. “One of the beauties of CALS is that we have taken advantage of many opportunities to incorporate citizen science, and that brings more research money into Wisconsin.”

Volunteers build more excitement around science and ultimately make us more competitive for federal funding.”

A citizen science project, Scheufele says, can increase not only people’s scientific knowledge but also their understanding of how that knowledge might inform public policy. That’s increasingly important in a world where so many science-based issues—climate change, stem cell research, genetically modified foods, to name but a few—have become so politically charged.

An important trigger to a deeper understanding of complex policy decisions is the act of talking things over with other people, Scheufele notes.

“Imagine you are sitting in a 400-student lecture course, twice a week, and the professor tells you facts about soil science or genetically modified foods—but you need to get together with your fellow students in a study group and talk it through to make sense of it,” Scheufele says. “Citizen science plays the role of a study group for participants. People who go out and interact with others about science have a more integrated understanding.”

In essence, citizen science provides a forum not only for learning but also for informed discussion. “The more infrastructure we have for understanding science, the more likely we are to interact with others on this topic,” Scheufele says. “There is positive feedback. If you know something, you are more likely to engage—and the younger we are when we begin this process, the better.”

Indeed, engagement is the key. Kris Stepenuck, of UW Cooperative Extension, coordinates 300 adults and 1,500 students who wade into streams all around the state collecting data for UW-Extension and the DNR as part of the Water Action Volunteers (WAV), a group that makes water monitoring possible at a level that simply could not happen without them.

Last year WAVs were asked to help expand an urban road salt monitoring project that, because of the cost of continuous monitoring equipment, had stalled at 22 sites.

“Each continuous monitoring site costs \$15,000 to run,” says Stepenuck. “But with volunteers grabbing samples every other week, plus whenever it snowed, they were able to monitor 34 sites for under \$10,000. So it’s much more economical, and we can get a broader picture with the help of this network of local volunteers.”

To keep her volunteer army growing, Stepenuck pays close attention to what motivates them. “They want to see lakes and streams protected for the future,” Stepenuck says. “And the more they learn, the more they care.”

As evidence Stepenuck points to newsletter she uses to keep her volunteers connected with each other and with the research to which they contribute. A recent edition shows the results of a survey tallying volunteers’ community connections and activities related to natural resources. Every person surveyed said he or she has written a letter to the editor of their local paper about water or other resource issues, attended a public meeting, talked

with neighbors, engaged in personal reading or research, or sought experts for additional information on water issues. Before becoming a stream monitor, almost half stated they had rarely or never participated in water issue activities in their local communities.

Ted Ludwig is an example of someone who waded into water monitoring gradually and soon found his engagement deepening. First he joined the Tainter Lake Association, and then he attended a water monitoring course through Water Action Volunteers. Soon he was monitoring multiple sites. "I've taken on supervising 20 people who are monitoring 15 different streams," says Ludwig. "Now that I understand the value of water monitoring I keep looking for ways to do more."

After retiring from 21 years in the Marine Corps and 20 years with the U.S. Postal Service, Ludwig now spends more than 50 hours a week as a Water Action Volunteer and running his own nonprofit dedicated to monitoring area streams. When he is not in the water, Ludwig is writing letters to newspapers and going to hearings on environmental issues. He also serves on a citizen committee to help develop lakeshore rules at the county level.

In addition to enjoying being outdoors, says Ludwig, "The thing I like the best is working with young kids. It's always fun to see the kids when they try to identify the creatures they have found in the water. The people you work with are really nice, and it makes for an enjoyable retirement."

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When the solution depends on observation over large areas, citizen scientists can play a pivotal role. The Great Lakes Early Detection Network, launched this spring and spearheaded by CALS agronomy professor Mark Renz, will depend heavily on citizen monitoring to identify invasive plant species.

"We started this project to better understand where invasive plants are located and how they are moving within the Great Lakes Area," says Renz. "Wisconsin has more than 70 species of invasive plants. When you add in Minnesota, Illinois, Indiana, Michigan, Ohio, Pennsylvania, and New York, it's a huge task to find out where these plants are. We quickly realized that as scientists and researchers, we could not tackle this by ourselves. We are asking people to do a service for their community by reporting invasive plants."

Renz has designed a website where information can flow back and forth between volunteers and researchers to keep the volunteers engaged. He hopes to attract and build a relationship with volunteers who become knowledgeable about plant identification and stay involved in the program. "We are a network," says Renz. "The citizen scientists are equal members. We know that if they are not happy, the project will falter."

For the partnership to work, both volunteers and the scientists working with them need to be happy. Some researchers have been hesitant to take advantage of citizen scientists because they are concerned about the quality and accuracy of volunteer-collected data.

Advancements in the smartphone are beginning to ease those concerns. Scientists are developing apps that can answer volunteers' questions in the field and document their observations. A good example is WeBIRD, a smartphone app that identifies birds by their call, thus letting citizen scientists know which bird they are listening to. Its creator, CALS animal science professor Mark Berres, is applying for funding to use the new tool to monitor birds at the UW Arboretum.

"WeBIRD takes the guesswork out of species identification," Berres says. "The user records the call from the bird they want to identify, which verifies the siting, and then WeBIRD identifies the bird. It gives the volunteer immediate feedback. It's like having an expert in the woods with you."

Similar techniques are being used to photograph and identify many kinds of plants and animals, and more are being developed. There is even a smartphone app that can be used in stream monitoring, but Stepenuck, who has had her cell phone dropped in the water by a volunteer, is not sure stream monitoring is the best use for this technology.

A continuing attraction of citizen science is the learning process. For many volunteers, apps will not replace in-person training by professionals or even seasoned volunteers like Mara McDonald, an assistant administrator in the CALS department of genetics. McDonald helps run a bird-banding program on Biocore Prairie near Picnic Point, where she coordinates the efforts of other citizen scientists.

Through weekly bird netting and banding over the past dozen years, McDonald and her fellow citizen scientists have demonstrated that bird diversity increases in an established prairie, even if that land is less than two acres in size. "We were able to show within four years that there was a positive effect in the prairie. It's been an exciting little piece of work," McDonald says.

McDonald also has seen exciting growth in her banding project, which she started in 2000 as a teaching assistant in the UW-Madison Biocore program. A school assignment soon became an opportunity for anyone from the campus and the community to come out and do bird census work. It has evolved into the Biocore Prairie Bird Observatory, and McDonald hosts regular open houses to recruit citizen scientists to the project.

Looking for a family activity, John Bauch, along with his wife Michelle and two sons, Alex and Evan, attended one of McDonald's open houses about seven years ago. They've been banding Saturdays from spring to fall ever since.

"While we're there, we see other biology groups doing all kinds of experiments on insects and prairie plants," says Bauch. "We see people who are studying dragonflies. They are really good at catching them, and we look at dragonflies while we are banding birds. It's been a tremendous influence on the whole family, especially the kids. The people we work with are so genuine and interested in what they are doing and willing to share information."

The experience made his kids keener observers of nature, Bauch notes. "From our work in the prairie, I'm convinced my sons learned to see things differently than many young people," Bauch says. "They notice things that other kids run right by."

Alex Bauch is now a biology major at St. Olaf College. "I remember the first time I went to the prairie," he says. "It was one of those open house days, I must have been 11. At that point, I wasn't really interested in birds. That was the first time I got to hold a bird, and that sparked something in me. It was a great way to spend my time. I definitely felt like I was contributing to the scientific effort."

After reflecting for a moment, Alex offers this advice to other potential citizen scientists. "If there is anything you are even a little interested in, try it out. It may become something that's really important to you."

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HEAD: Get Involved

DECK: Here's how to get in touch with programs mentioned in this story

Biocore Prairie Bird Observatory:
<http://waa.uwalumni.com/lakeshorepreserve/birdbanding.html>

Great Lakes Early Detection Network:
www.gledn.org

Water Action Volunteers (WAV):
<http://watermonitoring.uwex.edu/wav/>

Wisconsin Volunteer Carnivore Tracking:
<http://dnr.wi.gov/org/land/er/mammals/volunteer/>

And for an array of other opportunities:
Who's Who in Citizen-Based Monitoring, <http://watri.net/cbm/WhosWho/>