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High-Tech Woods in Queens Help U.S. Monitor Urban Ecology

http://www.nytimes.com/2014/12/03/nyregion/high-tech-woods-in-queens-help-us-monitor-urban-ecology.html?_r=0



Lauren Smalls-Mantey, a Ph.D. student at Drexel University, in the equipment chamber that holds the electronics for the sensors in Alley Pond Park. The instruments are mounted on a tree and in the ground. Credit Richard Perry/The New York Times

By LISA W. FODERARODEC. 2, 2014

Deep in the woods at Alley Pond Park in Queens is a laboratory that looks like something out of a weather fanatic's wild imagination.

Attached to a lofty oak are a webcam and a wind vane, humidity and temperature sensors, rain gauges and instruments to measure solar radiation. The high-tech tools, which transmit information in real time, are part of the United States Forest Service's new "smart forest" initiative, in which data is collected from selected woodlands to help scientists manage landscapes in a changing climate.

At 635 acres, Alley Pond Park, at the head of Little Neck Bay, is the first urban forest to be included in the current crop of a half-dozen wired forests across the Northeast. And despite its location in one of the most populous and developed corners of the country, its natural features remain intact, including freshwater and saltwater wetlands, tidal flats, meadows and forests.

The data collection began in 2011, when researchers at Drexel University teamed up with the city's parks department to study the sylvan nook inside the park, along with two other engineered green spaces in the city designed to capture storm-water runoff. But the Forest Service has now added Alley Pond Park to its Smart Forest Network.

Lindsey E. Rustad, a research ecologist with the Forest Service and co-director of the United States Department of Agriculture's Northeast Climate Hub, said that scientists had extensive data on pristine wilderness areas, but needed a better grasp of urban forests.

"We know relatively little about what's going on in these forest ecosystems," Dr. Rustad said on a tour of the outdoor laboratory at Alley Pond Park on an unseasonably warm November afternoon. "Eighty percent of the population lives in urban areas, so understanding urban forest ecology is critical."

Dr. Rustad added that in some ways the information gleaned from urban sites like Alley Pond Park would help steer policy-making decisions on climate change and resiliency elsewhere in the country.

"We can think of them as the canary in the coal mine because of their heat island effects, air pollution and development pressures," she said.

Hourly photographs taken by the webcam in the park, for instance, reveal precisely when buds burst each spring, when leaves open and when they die off. Over time, that information will give scientists a clearer picture of how quickly climate change is altering ecosystems.

For New York City, measuring things like soil moisture and soil temperature and determining when the trees leaf out each spring will also inform decisions, if not immediately, then down the road.

As the city nears completion of its million-tree planting campaign, the data collected from Alley Pond Park could, for example, guide future decisions about stewardship and species selection.

Since 2007, the city has planted 45,000 trees and shrubs in Alley Pond Park alone. "You can see why we would want this information to ensure that the new trees and shrubs live and thrive," said Bram Gunther, the parks department's chief of forestry, horticulture and natural resources.

Mr. Gunther said he envisioned a time when armchair naturalists, park advocates and students could tap into the trove of information being pulled from the soil and sky at the site.

"Everyone is wired up, and now we're wiring up our forests and wetlands," Mr. Gunther said. "Anyone who has a phone can be linked more closely to places like this in a new way."

The sensors, located off a trail near the park's adventure course, are not immediately visible. Some are about 12 feet off the ground, and some are buried next to the tree. The site has been vandalized once since its installation.

On this afternoon, Lauren A. Smalls-Mantey, a doctoral candidate with Drexel's Sustainable Water Resource Engineering Laboratory, was standing waist-deep inside a circular pit containing modems, radios and other devices that collect and transmit the data.

"This is the equipment bunker," she said. "This is where we log everything."

Franco A. Montalto, an associate professor in Drexel's department of civil, architectural and environmental engineering, said that the availability of affordable digital sensors made it possible for him to gain access to that day's recordings from Alley Pond Park on his iPad and instantly compare them with data from the two experimental storm-water runoff sites in the city.

But despite the high-tech tools, Dr. Montalto insists on having eyes and ears verify the data. To that end, more than a dozen high school, college and graduate students have periodically trekked to the site at Alley Pond to sift soil through their fingers and take photos.

"To believe the sensors, you need validation," he said. "Bad data is worse than no data."

Eventually, scientists working at Alley Pond Park would like local schools to make the research part of their lessons.

"We're all excited about seeing the data online, but we'd like to put it in the classroom and curriculum," said Richard Hallett, a Forest Service ecologist based at the New York City Urban Field Station, a joint city-federal research center in nearby Fort Totten. "It's teaching kids how to think and ask questions about the natural environment."

Designing a Citizen Science and Crowdsourcing Toolkit for the Federal Government

<http://www.whitehouse.gov/blog/2014/12/02/designing-citizen-science-and-crowdsourcing-toolkit-federal-government>



Workshop participants document the process of planning and launching a citizen science project using a human-centered design tool known as journey mapping.

by Jenn Gustetic, Lea Shanley, Jay Benforado and Arianne Miller Whitehouse.gov, December 02, 2014 at 01:59 PM EST

In the 2013 Second Open Government National Action Plan, President Obama called on Federal agencies to harness the ingenuity of the public by accelerating and scaling the use of open innovation methods, such as citizen science and crowdsourcing, to help address a wide range of scientific and societal problems.

Citizen science is a form of open collaboration in which members of the public participate in the scientific process, including identifying research questions, collecting and analyzing data, interpreting results, and solving problems. Crowdsourcing is a process in which individuals or organizations submit an open call for voluntary contributions from a large group of unknown individuals (“the crowd”) or, in some cases, a bounded group of trusted individuals or experts.

Citizen science and crowdsourcing are powerful tools that can help Federal agencies:
Advance and accelerate scientific research through group discovery and co-creation of knowledge. For instance, engaging the public in data collection can provide information at resolutions that would be difficult for Federal agencies to obtain due to time, geographic, or resource constraints.

Increase science literacy and provide students with skills needed to excel in science, technology, engineering, and math (STEM). Volunteers in citizen science or crowdsourcing projects gain hands-on experience doing real science, and take that learning outside of the classroom setting.
Improve delivery of government services with significantly lower resource investments.
Connect citizens to the missions of Federal agencies by promoting a spirit of open government and volunteerism.

To enable effective and appropriate use of these new approaches, the Open Government National Action Plan specifically commits the Federal government to “convene an interagency group to develop an Open Innovation Toolkit for Federal agencies that will include best practices, training, policies, and guidance on authorities related to open innovation, including approaches such as incentive prizes, crowdsourcing, and citizen science.”

On November 21, 2014, the Office of Science and Technology Policy (OSTP) kicked off development of the Toolkit with a human-centered design workshop. Human-centered design is a multi-stage process that requires product designers to engage with different stakeholders in creating, iteratively testing, and refining their product designs. The workshop was planned and executed in partnership with the Office of Personnel Management’s human-centered design practice known as “The Lab” and the Federal Community of Practice on Crowdsourcing and Citizen Science (FCPCCS), a growing network of more than 100 employees from more than 20 Federal agencies.

A group of Federal innovators, citizen science project managers, and scientists discuss the resources needed to implement the Lantern Live project, a crowdsourcing activity recently announced by the Department of Energy.

Using a suite of human-centered design tools like “journey maps,” “storyboards,” and “wireframes,” workshop participants provided input to each other, FCPCCS, and OSTP on the types of tools, resources, and networks needed to plan and implement citizen science and crowdsourcing projects. Participants also gained human-centered design skills to take back to their agencies. Workshop participants document the process of planning and launching a citizen science project using a human-centered design tool known as journey mapping.

The Toolkit will help further the culture of innovation, learning, sharing, and doing in the Federal citizen science and crowdsourcing community: indeed, the development of the Toolkit is a collaborative and community-building activity in and of itself.

The following successful Federal projects illustrate the variety of possible citizen science and crowdsourcing applications:

The Citizen Archivist Dashboard (NARA) coordinates crowdsourced archival record tagging and document transcription. Recently, more than 170,000 volunteers indexed 132 million names of the 1940 Census in only five months, which NARA could not have done alone.

Through Measuring Broadband America (FCC), 2 million volunteers collected and provided the FCC with data on their Internet speeds, data that FCC used to create a National Broadband Map revealing digital divides.

In 2014, Nature’s Notebook (USGS, NSF) volunteers recorded more than 1 million observations on plants and animals that scientists use to analyze environmental change.

Did You Feel It? (USGS) has enabled more than 3 million people worldwide to share their experiences during and immediately after earthquakes. This information facilitates rapid damage assessments and scientific research, particularly in areas without dense sensor networks.

The mPING (NOAA) mobile app has collected more than 600,000 ground-based observations that help verify weather models.

USAID anonymized and opened its loan guarantee data to volunteer mappers. Volunteers mapped 10,000 data points in only 16 hours, compared to the 60 hours officials expected.

The Air Sensor Toolbox (EPA), together with training workshops, scientific partners, technology evaluations, and a scientific instrumentation loan program, empowers communities to monitor and report local air pollution.

In early 2015, OSTP, in partnership with the Challenges and Prizes Community of Practice, will convene Federal practitioners to develop the other half of the Open Innovation Toolkit for prizes and challenges. Stay tuned!

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Arianne Miller is Deputy Director of The Lab at the Office of Personnel Management (OPM).

Learn More:

[Using Citizen Science to Solve National Problems \(OSTP, 2014\)](#)

[Second Open Government National Action Plan \(2013\)](#)

[Federal Community of Practice on Crowdsourcing and Citizen Science](#)

MINNESOTA

Mountain beetle threatens Minnesota's pine forests

<http://www.mprnews.org/story/2014/12/02/mountain-beetle-poses-threat-to-minnesotas-pine-forests>



Dan Kraker MN Public Radio, Dec 3, 2014

Duluth, Minn. - A tiny beetle that has wiped out tens of millions of acres of forest in the western United States and Canada could be close to invading Minnesota's majestic pines.

Although mountain pine beetles are about the size of a grain of sand, they have devoured 45 million acres of pine trees in western North America over the past couple decades — the world's largest forest insect outbreak in recorded history.

The state Department of Agriculture is proposing a quarantine in hopes of keeping the beetles at bay and protecting the state's nearly 200 million pine trees large enough for them to attack — at least for the time being.

That likely will be difficult. Mountain pine beetles have marched east to the Black Hills of South Dakota. On at least two occasions, they have been transported all the way to Minnesota — once in a load of firewood, and once in timber for log cabins and furniture.

But Minnesota was lucky because the bugs already were dead, said Mark Abrahamson, an entomologist for the Minnesota Department of Agriculture.

"In both cases it seemed like we were fortunate in that the material just happened to be aged long enough that nothing was alive in it," Abrahamson said. "But it's demonstrated to us that there is a real pathway across the plains and we need to take that seriously."

The proposed quarantine would ban freshly cut logs from states infested with the mountain pine beetle that have the bark still on them. Abrahamson said that should be effective.

"The main thing in any regulatory effort is that people understand what the issue is and how to address it," he said. "This is a big problem in the West. People realize that. No one wants to see this same thing happen here in Minnesota."

Abrahamson adds that the quarantine likely will do little harm to Minnesota's economy. A mountain pine beetle attacks a tree. Courtesy Derek Rosenberger / University of Minn.

The Minnesota Forest Resources Council, which advises Gov. Mark Dayton on forest policy, voted unanimously to support the quarantine.

"In terms of the forest products industry, as far as we can determine, none of the forest products companies here in the state move western wood into Minnesota with the bark on," said Dave Zumeta, the council's executive director.

"So the industry representatives on our council voted in support of this exterior quarantine to help protect the interests of the industry," he said. "They do not want to see this insect in Minnesota." But even if the quarantine proves effective, the mountain pine beetle could still make it to Minnesota, without human help.

In 2003, the beetle jumped from lodgepole pines west of the Rocky Mountains, over the continental divide, and into the jack pine forest in Alberta, Canada, said Brian Aukema, an entomologist at the University of Minnesota.

"Now the big concern is that it will come through the Canadian boreal forest, through jack pine, and reach the lake states region where we have a number of different pines that may be suitable for mountain pine beetle," he said.

Aukema said temperatures of 40 below zero knock back the mountain pine beetle. But he notes winters are warming and Minnesota is not reaching that temperature as often as 50 years ago.

"It looks like we do have a slowly ameliorating climate, and the climate appears to be suitable for the mountain pine beetle," he said.

Aukema said it's still possible the beetle may have trouble reproducing in the particular strains of pine found in Minnesota. But, so far, tests he's conducting show there's no reason to believe the insects would not do quite well here.

In the first year of a \$250,000 state funded study, Aukema took red, white and jack pine from Minnesota to the Black Hills to offer "a smorgasbord of pines" to the insects. So far they've concluded the beetles will bore into Minnesota pines, attract mates to them, and lay eggs. Next summer they'll see how well the newly hatched beetles do when they emerge from the trees.

As part of that same study, for the past two years the Department of Agriculture has placed traps throughout northern Minnesota, but so far has not captured any live mountain pine beetles.

"The results so far are encouraging," said Abrahamson, the department entomologist. "We seem to be ahead of the problem at this point."

But that advantage could quickly disappear if the beetle makes it to Minnesota, Aukema said.

"We know from outbreaks out west, [that] once insects move into live, green standing trees, and you have thousands and thousands of insects coming out of trees — mass attacking new trees every year — basically the insects will keep attacking those trees until they either run out of hosts, or you get a really cold winter that knocks populations down," he said.

"It's a very, very big concern."

IOWA

Council prepares for Emerald Ash Borer & public hearing

http://www.kmaland.com/news/council-prepares-for-emerald-ash-borer-public-hearing/article_eaa2127a-7a17-11e4-90f1-ff8447611af7.html

by Chuck Morris KMA (IA), Dec 2, 2014

(Red Oak) -- A short agenda for the Red Oak city council resulted in a fairly quick meeting last night at the Red Oak Fire Station.

City Administrator Brad Wright says the council heard from Bill Drey who was on hand representing the Red Oak Park and Tree Board.

"He presented the Red Oak Emerald Ash Borer Community plan to the city council. It's plan the Red Oak Park and Tree Board has been working on and recommended approval from the council. The plan puts some proactive steps in place to prepare for Emerald Ash Borer if it should ever appear in Red Oak. We have not identified any such disease in Red Oak, but want to take some steps to have some policies in place if that time ever happens."

In other business last night, Wright says the council set a December 15th public hearing on a proposal to enter into a loan agreement not to exceed \$2,625,000. He says the proposal has several purposes.

"Approximately half of that is re-funding of some older bonds at better interest rates and the other half is new money for projects that we've been talking about with the city council for some time."

Those projects include buying a new sewer jet machine Truck, a new fire truck tanker, reimbursement of money spent on downtown building demolition and funding for the 2015 street improvement project in town.

Urban forestry

<http://kimt.com/2014/12/02/urban-forestry/>

By Emily Boster KIMT (IA), December 2, 2014, 8:20 pm

MASON CITY, Iowa – Planting a tree not only helps the environment, but can help better a community.

That's what a group of city employees and tree industry workers are learning at a presentation in Mason City. The Iowa DNR is discussing proper tree maintenance and the economic benefits of being arbor-wise. The message: it's a deep-rooted issue.

"Biggest thing we're going to stress are the benefits that urban trees have. We're going to cover that from every aspect in the community so from the waste water treatment plant to the streets department all the way up to city council," said Laura Wagner, grant coordinator with the Iowa Department of Natural Resources Forestry Bureau.

Mason City was selected to receive a sustainable forestry grant from the Iowa DNR and Tuesday's presentation is part of that. They're reviewing the city's forestry program and helping to take steps to address the emerald ash borer as well.

MISSOURI

Millions of Ash Trees Are Dying, Creating Huge Headaches for Cities

Ash trees are a dominant species on American city streets, but an invasive beetle is killing them off.

<http://news.nationalgeographic.com/news/2014/12/141202-emerald-ash-borer-forestry-trees-environment/>



In July, workers remove a tree from a front yard in Plainfield, Illinois, that was infested with the emerald ash borer beetle. Communities are now struggling to dispose of millions of infected trees. PHOTOGRAPH BY ROB WINNER, THE HERALD-NEWS/AP

Tina Casagrand for National Geographic, DECEMBER 2, 2014

KANSAS CITY, Missouri—Forester Kevin Lapointe remembers clearly the day he and his colleagues at the Kansas City Parks and Recreation Department did their first autopsy on a dead ash tree. Under its peeling bark, they found S-shaped burrows running across every inch of the outer layer of wood. Looking closer, they discovered the killer: a slender green beetle smaller than a penny.

The emerald ash borer, or EAB, a native of East Asia, has already devastated entire ash populations in northern cities such as Detroit, where it first appeared in 2002. Since then, the insect has swept into 22 states across the country. In the summer of 2012 it reached the Kansas City metropolitan area. There are seven billion ash trees in North America, and within the next few decades, the beetle could kill most of them—a die-off ten times bigger than the one caused by Dutch elm disease.

In big cities, where ash species account for up to a quarter of trees in public spaces, planners must consider the environmental consequences of the massive die-off—liability hazards, an increase in stormwater runoff, and the simple problem of disposing of millions of dead trees. And officials don't have time to waste.

Eight years after the initial discovery of the beetles in an area, about 50 percent of the ash population will die—all at once. The rest die within another two to three years. In the Kansas City metropolitan

area, where Lapointe works, 6.4 million ashes are on track to die as early as 2015—unless they receive insecticide treatment.

Chad Tinkel, who inherited an EAB problem when he became the city arborist of Fort Wayne, Indiana, didn't have the luxury of early identification or a big city budget for prevention. Of the 18,000 ash trees that once shaded Fort Wayne's sidewalks and parking lots, only about 1,300 remain alive. Tinkel now speaks about EAB to municipalities across the country.

"If you know that it's coming, be proactive," he says. "Get your plan in place. Get your budget set. Too few decision-makers realize that trees are infrastructure—just like a city bench, just like a streetlight—and they pay back more than they cost to put in."

A good first step is a tree inventory. Kansas City did that a decade ago, identifying the location and size of all its trees.

That helps foresters track trees that are about to die, though it doesn't solve the problem of what to do with all the wood. Burning the wood causes air pollution; dumping it in landfills take up space and releases methane, a potent greenhouse gas.

In Fort Wayne, Tinkel partnered with a local lumberyard to process the influx of dead trees. The city uses the profits to replace the ash trees. In the Northeast, companies such as New York Heartwoods that specialize in milling distressed trees are gaining traction in the market. A project in Ohio is making desks and cubbies out of urban hardwood.

After researching solutions like these, two private Kansas City businesses, Missouri Organic and Urban Lumber Company, entered a partnership with the city. They established drop-off sites for homeowners and arborists. Urban Lumber gets first dibs on wood that's usable for milling, and Missouri Organic turns the rest into mulch.

It sounds like good economic sense, but Deborah McCollough of Michigan State University is ambivalent about such measures. She says she's sat at conference tables made of beetle-killed ash: "I hate to even see that, because it means people have given up."

According to McCullough, insecticide research has improved since the early days of the EAB infestation, and in many cases today, treating trees with insecticide is cheaper than cutting them down. Kansas City plans to treat the roots of about 12,000 trees on city property, spending about \$80 a tree for protection that lasts up to three years. Once taken up by the roots, the insecticide travels up the trunk under the bark—which is exactly where the beetle larvae do their damage, feeding on the wood and boring tunnels that interrupt the flow of water and nutrients through the tree.

Since the insecticide has to be reapplied every few years, it may not be economical as a permanent solution. But by preventing all the ash trees from dying at once, it would at least buy the city some time to replace its canopy and give its local partners time to create markets for beetle-killed ash products. At a total cost of nearly \$100 million for the city, even a one-time application of insecticide is a costly investment. "You have to look at the environmental, economic, and political benefits of a live tree," Lapointe says. Tree-value calculators show that trees save millions of gallons of water from entering cities' storm-water systems.

What's the future of ash trees in America? As EAB spreads across the country, says Mark Nelson, urban forestry supervisor for the Missouri Department of Conservation's Kansas City region, "the best we can hope is to slow it down."

Still, some scientists say, it's possible that ash trees won't have to go the way of the Dutch elm or American chestnut. "We will probably see in very vulnerable species of ash, their functional role in forest ecosystems will disappear," McCollough says. "That doesn't mean they will necessarily go extinct. Even where we've seen nearly 99 percent of overstory trees have been killed by EAB, seedlings are still growing and getting larger."

Other species, such as blue ash, are less vulnerable: 60 to 70 percent of them have survived in EAB-ridden areas. In addition, more predators are learning to eat the beetles, and Asian wasps that prey on EAB have been introduced to control the population. "Whether they can keep EAB back [until] ash trees can rebuild populations," says McCullough, "that's what we're not sure of yet." In the void left by the vanished ashes, cities nationwide are planting more diverse species than ever before. Fort Wayne, for instance, has instituted a "Shading Our City" management plan that doesn't allow more than 10 percent of any tree species to be planted in one area. Tinkel wants his city's forest to be able to cope with future pests, blights, and climate change.

"You can't manage a biotic thing with a static plan," he says. "I don't want to be the person that sets people up for another infestation in the next generation."