Citizen scientists monitor stream quality with iPhone app

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Kevin Cronk has 1,800 lakes and 3,000 miles of waterway to watch as monitoring coordinator for Michigan's Tip of the Mitt Watershed Council. And only two eyes. But Creekwatch, an iPhone app designed by IBM to help average citizens monitor waterways, could help Cronk and other Great Lakes researchers short on staff and resources. It's a simple tool to use. You don't need to buy water-testing kits or sit through a training program.

Users take a picture of a stream or creek. Then they assess its water level, flow rate and the degree of trash it contains. The data, picture and location are recorded by IBM and given to scientists and other water monitors.

Recruiting citizen help is valuable, Cronk said. "We need eyes and ears to monitor our waterways." The U.S. Geological Survey already uses meter sticks to monitor stream flow. "People who live near one of them could take a picture of it on a day-to-day basis," Cronk said.

That information could determine if a creek's water level is steady or rises and falls, he said. It would provide a consistent picture of what waterways look like. What's more, people could document vegetation removal and stream bank erosion, he said. Water researchers in the western U.S. have already found the app useful.

The California Water Resources Control Board tracks the flow of creeks with data supplied by citizen-scientists using Creekwatch. "We don't have enough data on whether or not creeks run year-around," said Erick Burris, California's statewide citizen water monitoring coordinator. "They aren't visited by our staff." Creekwatch helps plug that gaping data hole. "There are more people than scientists in the state," said Burris, who helped develop Creekwatch by explaining to IBM.

A Creekwatch map of the Great Lakes region - the pinpoints indicate user contributions. Photo: Sara Matthews. The needs of water monitoring boards. The app empowers people to become science-based stewards of the environment. That's important not only in thirsty areas but also in places where water is plentiful. Two universities in the Great Lakes region are using Creekwatch in a challenge called Waterpressures.

Northwestern and the University of Wisconsin – Milwaukee are asking science professors to pair their students with municipal officials to work on a water issue. Creekwatch is one tool students will use to monitor the waterway they work on. Each school and community will identify a problem, fix it and document the action with video and blogs, said Ann

Feldman, a visiting professor at Northwestern who is involved with the project. Videos of student and citizen-led solutions will be hosted at Waterpressures.org. The Creekwatch data viewer will display the data that users contribute.

Access to this information can inspire other people to act in a similar manner, Feldman said. A key is to remove the idea that water issues are either too big to fix or only experts can solve them. IBM created the Creekwatch app in 2010 to improve water around the world, said Wendy Murphy, a product manager at IBM's Global University program. It is designed to be given away, she said. Anyone with a smart phone can download Creekwatch at Apple's iTunes store, collect data and work with a water authority to improve knowledge about a region's watershed.

People in Brazil used the app to monitor flooding during heavy rains, said Christine Robson, a Creekwatch developer. They sent in pictures of bridges washed away and water flooding the streets. It was designed with arid regions in mind, but users demonstrated that it has even broader potential, she said. IBM is now working on localized versions of the app so that it's helpful to both areas of water scarcity and water abundance.

One complaint is that the app doesn't provide the name of the waterway nor allow the user to name it. "When they find it to monitor it, they don't know the name of the stream, but they want to know it," Robson said. IBM is working with the U.S. Geological Survey to better translate the data into names.

But it's a challenge. Many waterways have multiple names. A lot of money and time has been invested into naming and mapping U.S. roadways, Robson said. Not nearly enough has gone into officially naming natural features like water courses.