Saving the Bay: It's One of the Things ARS Does Best

Some locals measure water quality in the Chesapeake Bay using the "sneaker index." In the 1950s, Maryland resident Bernie Fowler waded into the Patuxent River to his shoulders and could see his white sneakers on the riverbed. But in 1988, when Fowler, who by then was a state senator, ventured back into the Patuxent, he could not see his nice white sneakers once he waded beyond 10 inches of water. It was better in 2009, when he could see his sneakers in 25.5 inches of water—but it's still not good enough.

Agricultural Research Service scientists haven't been watching over the Chesapeake Bay quite as long as Fowler has, but they are committed to restoring water quality in the bay. This is where bald eagles patrol the marshes, American oystercatchers pace the beaches and tidal flats, bottlenose dolphins cruise offshore waters, and crabs with bright blue claws swim sideways through the shallows. And the famed eastern oysters that cluster in massive aquatic reefs double as water-treatment plants—an individual bivalve can filter sediments, algae, and pollutants from as much as 50 gallons of water every day.

But the oysters can't keep up with current challenges. In 2006, about 16.6 million people lived in the bay watershed (see map of watershed on page 5), where the demand for surface- and ground-water supplies continues to grow. At the same time, water sources are contaminated by sewage, sediment, fertilizer runoff from suburban lawns, and expired medications that are poured down drains throughout the six states in the Chesapeake Bay Watershed.

Agriculture is another major factor in the bay's health. Poultry production on the Eastern Shore is an economic mainstay, but nutrient-rich runoff from poultry litter flows into the creeks and drainage ditches that feed the bay. The runoff prompts growth of algae and other plants, and when the vegetation dies, its decomposition robs those waters of oxygen essential to other aquatic life. Sediment and excess fertilizer from crop fields can also eventually migrate into waterways that feed into the bay.

None of this is news. Over the years, a range of state, federal, local, and nonprofit groups have put their best efforts toward stemming water pollution and restoring bay habitats. There's been some progress, but not enough.

So what happens now? And how will ARS be involved?

On May 12, 2009, President Barack Obama signed Executive Order No. 13508 for the Chesapeake Bay Protection and Restoration, which directed federal agencies to increase their cooperation and collaboration in a concerted effort to clean up the bay. ARS scientists will carry out the President's mandate by strengthening their current research and continuing to forge new collaborative efforts with other federal agencies. These partnerships will allow ARS to more fully address the environmental issues presented by the bay's complex landscape—a mix of crop fields, pastures, forests, wetlands, and urban and suburban areas.

For instance, since 2004, ARS scientists in Beltsville, Maryland, have been leading the Conservation Effects Assessment Project's Watershed Assessment Study of Maryland's Choptank River Watershed (see article beginning on page 10). Their long list of county, state, federal, university, and local partners reflects just how vital these studies are to understanding the watershed processes that affect water quality in the bay.

ARS scientist Greg McCarty and USDA Forest Service ecologist Megan Lang are using remote sensing to map forested wetlands in the Chesapeake Bay Watershed (see page 13). They've increased the accuracy of wetland maps by around 30 percent and developed techniques to track temporal variations in wetland flooding and soil moisture. McCarty is also working with U.S. Geological Survey physical scientist Dean Hively to use remote sensing to monitor the effectiveness of winter cover crops in sequestering nitrogen, which will support Maryland's cover crop cost-share programs (see page 16).

ARS scientists Laura McConnell and Cathleen Hapeman are partnering with the U.S. Environmental Protection Agency to examine atmospheric, agricultural, and urban sources of bay pollutants. A few hours up the road, ARS scientists at the Pasture Systems and Watershed Management Research Unit in University Park, Pennsylvania, are making their own contributions to cleaning up the Chesapeake Bay Watershed. Researchers Peter Kleinman, Ray Bryant, John Schmidt, Tony Buda, Curt Dell, and Clinton Church have teamed up with regional partners on a range of water-quality projects that start in New York and end up on a former chicken farm on Maryland's Eastern Shore (see page 4).

At ARS, we'll continue to do what we've been doing all along: partnering with experts throughout the public and private sectors to find new technologies and improve existing tools for cleaning up the bay one crop field, stream, wetland, and drainage ditch at a time.

Mike Shannon, Mark Walbridge, Matt Smith, and **Charles Walthall**
ARS National Program Leaders
Natural Resources and Sustainable Agricultural Systems
Beltsville, Maryland