DELAWARE RIVER WATERSHED INITIATIVE
CASE STUDY

OPEN SPACE INSTITUTE

WILLIAM PENN FOUNDATION

OSI and its partners are evolving a new approach to farmland conservation in the Garden State.

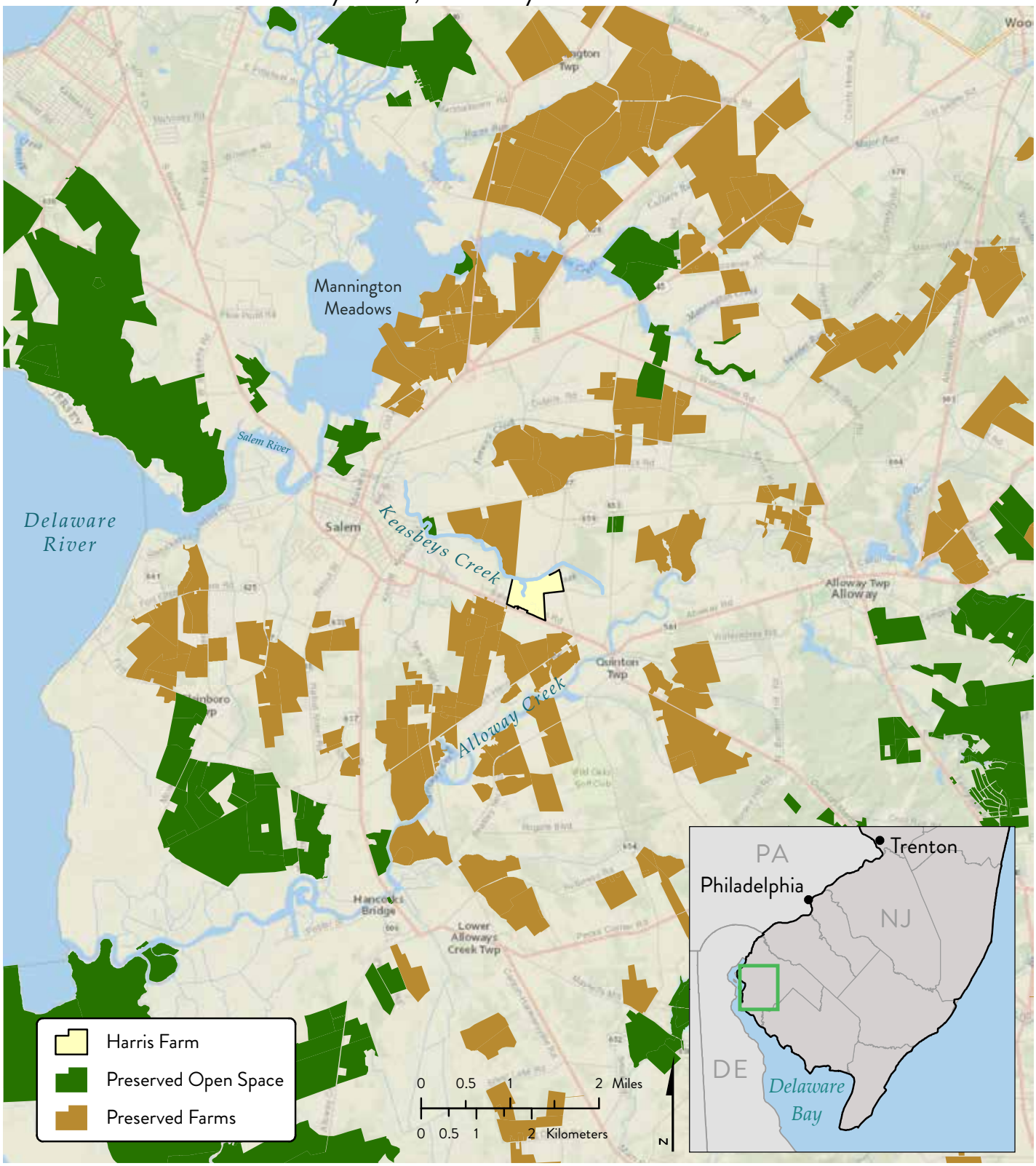
Part of a Watershed Solution: Riparian Buffer Preservation in New Jersey

A recent easement conservation project in New Jersey – spearheaded by the Open Space Institute (OSI) and public-private partners including the New Jersey Conservation Foundation and the New Jersey State Agriculture Development Committee – is the first step toward demonstrating how farms can be part of the solution when it comes to protecting the drinking water of 15 million residents within the Delaware River Watershed.

Building on the successful protection of the Harris farm in Salem County, OSI is working with state agencies in New Jersey and Pennsylvania to expand the use of buffer easements on agricultural lands.

MAP 1: HARRIS FARM, NEW JERSEY

The Harris Farm is located in Salem County in the Delaware Bayshore region of New Jersey, a rural, agricultural corner of the state that also contains rich wetlands that are important habitat for wildlife, migratory shorebirds and waterfowl. The farm lies within a large contiguous band of preserved farms along with other state and county preserved lands and wildlife management areas. The property is located just southeast of Mannington Meadow and the Delaware River and lies in the headwaters of Keasby Creek, a tributary of the Salem River.



A NEW APPROACH TO PROTECTING WATER ON CONSERVED FARMS

Dave Clapp, Natural Resource Conservation Service, near Keasby Creek

Growing up on the rural New Jersey Bayshore, Jeff Harris loved to explore the wooded creek flowing through his great-grandfather's farm. He and his family would roam the centuries-old forest and go canoeing, catching sight of turtles, otters, and beavers.

Harris bought the farm to keep it in the family, and he still likes to traipse through the woods. "Some of the really big old trees, I remember seeing when I was kid," he said. "I go and revisit them all." So in 2013, when he sought to sell an easement on the land to prevent it from ever being developed, the main reason was to protect the stream, woods, and wildlife.

As Harris soon discovered, under New Jersey's Farmland Preservation Program there was no way to protect a natural area such as a forested stream corridor. Preserved land had to be devoted exclusively to agriculture, which meant the woods could be logged by a future owner. But due to his determination – and the efforts of OSI and private funders to work with the state agency to protect water quality on farms – both Harris's farm and woods are now preserved forever under an innovative public-private partnership.

With this transaction – utilizing a pair of side-by-side easements on the working farm and stream corridor – OSI and its partners are evolving a new approach to farmland conservation in the Garden State. It's the first step toward a model that could have far-reaching benefits for water quality in New Jersey and potentially elsewhere in the Delaware River watershed.

"We know that agricultural practices can damage water resources and that farming right down to the stream's edge can be quite harmful, so we need mechanisms in the farmland preservation program to encourage or require farmers to protect water quality," said Dr. Daniel Van Abs, Associate Professor in Water, Society & Environment at Rutgers University and gubernatorial appointee to the New Jersey Clean Water Council.

"We now have new technical tools to target which lands are critical for water protection. By preserving riparian buffers on these lands through easements, along with incentives and agreements to reduce runoff and pollution, we can have better water protection while continuing productive farming."

FARMS AND WATER QUALITY

The small stream on Harris's farm is part of the 13,000-square-mile Delaware River watershed, which supplies drinking water for 15 million people along the East Coast. This vast web of wetlands, streams, rivers, and tidal marshes supports an abundance of fish, waterfowl, migratory birds, and rare plant and animal species. The Harris farm lies within the part of the watershed that drains into Mannington Meadows, 7,500 acres of tidal wetlands critical for fish, migratory waterfowl, shorebirds, wading birds, marshland birds, and raptors.

Water quality in the Delaware has greatly improved after decades of progress in controlling municipal sewage, industrial discharges, and other direct sources of pollution. But today the river system faces increased threats from different, more dispersed sources of contamination, such as suburban sprawl, loss of forests, energy infrastructure, and agriculture

While farms provide food, employ thousands of people, and require few public services, they also cause run-off. When soil, manure, fertilizer, and pesticides wash into headwaters, nutrients and toxic chemicals concentrate downstream. The Delaware River has higher loads of nitrogen and phosphorous than many other major rivers of the Mid-Atlantic and Northeast and is spared the eutrophication and hypoxia that afflict Chesapeake Bay only because nutrients are more quickly and easily flushed out into the Delaware Bay.

But farms can also be part of the solution. Along with adopting practices that prevent runoff, farms can protect and restore water quality by maintaining wide bands of trees, shrubs, and other vegetation along headwater streams. These riparian buffers slow and absorb stormwater and filter out a significant percentage of fine sediment, nutrients, and toxic chemicals. They also enhance the ecological function of streams, stabilize banks, and moderate water flows.

THE ROLE OF STATE FARMLAND PRESERVATION PROGRAMS IN PROTECTING WATER

Although conservationists working to protect the Delaware River have recognized the need to permanently conserve stream buffers in the watershed through easements, it has been a challenge to integrate this protection with the policies of some state farmland preservation programs. Maryland has pioneered the use

1. THE NEW EASEMENT MODEL

Today, two separate easements protect the Harris farm: (1) an agricultural easement to permanently preserve the working farmland, purchased and held by the New Jersey State Agriculture Development Committee (SADC), which administers the Farmland Preservation Program, and (2) a conservation easement to protect in perpetuity an 18-acre forested riparian buffer, funded by OSI and held by New Jersey Conservation Foundation (NJCF).

The buffer easement largely meets the minimum ideal width of 100 feet of undisturbed natural vegetation on each side, except in a few small areas where the SADC was unwilling to incorporate cultivated land. It is subject to a "Resource Management Systems" (RMS) Farm Conservation Plan, drafted by the National Resources Conservation Service, which sets a high standard for maintaining the integrity of the forest and stream. Ideally, an RMS plan would be required to be implemented on the agricultural acreage subject to the working farm easement as well, to prevent erosion and runoff into the buffer from any future farm practices. Because the Harris farm was the first trial in New Jersey of an easement model combining water protection and farmland preservation, this key provision did not make it into the final agricultural easement but would be required in future projects.

Accommodating farm economic concerns, the stream buffer easement bars public access and allows using the stream for irrigation, harvesting dead timber for firewood, removing obstructions that flood fields, and building a stream crossing, as long these activities are done in compliance with the RMS plan.

of such easements, but other states, such as New Jersey, have been slower to adopt them. Guided by research into the design and most cost-effective locations for easements (see sidebars), OSI, through the Delaware River Watershed Initiative, launched a program to work with state agencies in New Jersey and Pennsylvania to develop pilot buffer easements on agricultural lands.

OSI first demonstrated a successful model of riparian buffer protection in Pennsylvania, in 2015. A $250,000 grant from OSI helped the Natural Lands Trust purchase side-by-side easements on the Yoder Farm, Warwick Township, Chester County, Pa.. A conservation easement on an 18.5-acre buffer together with an agricultural easement on the adjoining 114 acres of working farmland made the preservation of the entire farm possible while also protecting the stream along its edge. The project also received funding from the state, the county, and the township.

To guarantee water quality protection on a farm, however, permanent preservation of a riparian buffer is not enough. The adjoining farmland must follow Best Management Practices that prevent runoff and erosion from compromising the buffer's effectiveness. Farms protected under Pennsylvania's farmland preservation program are required to implement conservation plans that protect water and other natural resources.

The next challenge in Pennsylvania is to find a way to permanently protect stream buffers as part of a single agricultural easement, which is not currently possible. OSI is working with the state's Bureau of Farmland Preservation to develop a permanent legal mechanism to test in a pilot project.

BALANCING ECONOMICS AND WATER QUALITY IN FARM PRESERVATION IN NEW JERSEY

As farmland preservation programs in the neighboring states of Pennsylvania and Maryland put in place water resource protections – partly due to state and federal efforts to restore the Chesapeake Bay – New Jersey's program had not yet adopted these important measures.

The agency that governs New Jersey farmland preservation, the State Agriculture Development Committee (SADC), has pursued with great focus and success a mission of preserving the land base and economic viability of the state's

2. RIPARIAN BUFFER DESIGN

Buffer width: The wider the buffer, the more fine soil particles and nutrients it can remove, but the optimal width depends on the soil type, slope, and use of the land above the buffer. Scientific research supports a minimum width of 100 feet to adequately slow down water and filter out sediment and pollutants.

Vegetation: Intact forests make the most effective buffers. Leaves dropped by trees and shrubs nurture soil and stream bacteria that consume nitrogen from fertilizers and manure. Studies have found that forest-buffered streams can process two to eight times more nutrients and organic matter than streams with grass buffers of the same width. In addition, tree canopies shade streams, maintaining cooler temperatures many fish and aquatic invertebrates require, while tree roots prevent banks from eroding and keep channels wide, which moderates water flow and prevents flooding.

Farming practices: When runoff channels directly into a riparian buffer, sediment and pollutants can't be filtered as effectively. Best Management Practices that protect buffers by minimizing runoff and erosion include using no-till farming, growing winter cover crops to anchor soils, contouring slopes, and planting strips of perennial grasses. Livestock must be kept out of the buffer, and farms with cattle need an effective system to contain and manage manure.

agricultural industry. More than 225,000 acres of farmland have been protected with SADC funding since the mid-1980s. However, while the economic viability of farms has been SADC's primary focus, it is beginning to address another original goal that has received less attention, even though it also has important economic benefits: to protect soil and particularly water on farms.

SADC's agricultural easements have no special provisions or requirements to protect water quality or riparian buffers. In fact, the entire area of any preserved farm – including forests, stream corridors, and wetlands – must be available for active agriculture. Although preserved farms are required to have a basic Farm Conservation Plan to protect water quality and prevent soil erosion, implementing the plan is voluntary.

In addition, with rare exceptions, SADC has been unwilling to allow the state's Green Acres program or nonprofit land trusts to preserve part of a farm separately for natural resource purposes because of fears that it would interfere with farming on the adjacent land.

A NEW MODEL IN NEW JERSEY

In recent years, however, water quality has become a more important priority for the SADC. Steeply reduced state funding in New Jersey for farmland preservation, along with growing public awareness of the importance of a farm's natural resources, has led the agency to broaden its direction and seek partners for projects.

Another factor was the SADC's partnership on several easements with the Natural Resources Conservation Service (NRCS), through the Federal Farm and Ranch Lands Protection Program. To meet NRCS stewardship requirements and to address problems that were emerging on preserved farms, the SADC hired a Chief of Agricultural Resources to oversee compliance. It also contracted with an NRCS employee to draft the farm management plans required on these easements.

In 2014, OSI and SADC began working together to create new easement models to protect riparian buffers, which could then be tested through jointly funded preservation projects.

3. EVALUATING SITES FOR RIPARIAN BUFFER EASEMENTS

Land preservation to protect water resources is most cost-effective in sub-watersheds where streams are still clean and there is a high percentage of forest cover. Agricultural restoration is an effective tool if targeted to watersheds that no longer produce clean water. Watersheds on the verge of becoming impaired need a mix of restoration and land protection and are ideal sites for farm buffer easements.

OSI used the **Stream Reach Assessment Tool** – an innovative online tool to assess watershed pollution loads, designed by the Academy of Sciences in collaboration with OSI – to determine that riparian buffer protection would be effective in the Keasbeys Creek watershed where the Harris farm is located.

The tool clarified that the creek's headwaters are largely still intact, with water quality hovering around the tipping point for impairment. Data showed that over 50 percent of the stream buffers in this watershed are still forested. These wooded corridors play a disproportionate role in helping to slow down and filter pollutants and sediment from surface runoff, and their permanent protection will ensure they continue to play this role. The tool clearly shows that if preservation of existing forested buffers is paired with the restoration of forested buffers in other parts of the watershed, water quality in the watershed could reliably meet New Jersey drinking water standards. Protection of existing buffers ensures the water quality doesn't further degrade as improvements are made.

Dave Clapp discussing the buffer configuration with landwoner Jeff Harris

It was a slow and challenging process, set back at times by differing perspectives and occasional miscommunications between the agency and nonprofit partners about the role of easements in protecting water quality. "The North Star that kept the compass needle on track has been the leadership of SADC Executive Director Susan Payne in trying to make this concept work," said Bill Rawlyk, OSI's Mid-Atlantic Field Coordinator.

After research into the original legislation showed that protecting water and soil was indeed part of the agency's charge, two draft easement models finally took shape: the side-by-side easements and a "whole farm" model that modified SADC's standard agricultural easement to take the riparian buffer out of agricultural production and keep it permanently in natural vegetation.

For a pilot project to test the concept, a conservation-minded farmer was needed – someone who would support stronger protections on the stream corridor and was motivated to persevere as a new kind of transaction was hammered out.

As it happened, Jeff Harris had approached the SADC about selling an easement on his farm. But he stalled when he learned that the SADC at the time would not fund an easement on the whole farm unless the buffer was included and dedicated to agriculture. Concerned that under a standard SADC easement a future landowner might cut the trees, he reached out to the New Jersey Conservation Foundation (NJCF) to explore selling a conservation easement on the stream corridor.

In the fall of 2015, all the pieces fell together: SADC would work with OSI and NJCF to protect Harris's farm and stream corridor through side-by side easements.

Still officially committed to funding just working farms, SADC was not yet ready to pilot the whole farm model protecting both farmland and buffer in one easement. The side-by-side model seemed to offer the best solution to meeting Harris's goals, but a land trust was needed to hold and enforce the easement. Despite the insistence of OSI and NJCF, the agricultural easement on the Harris farm was not subject to a high quality conservation plan, leaving the stream at risk from future farm activities.

OSI covered the full cost of the buffer easement, through its Bayshore-Highlands Land Protection Fund, funded by the William Penn Foundation. SADC funded the entirety of the working agricultural easement, providing the required match for OSI's grant. By having OSI fund the

buffer easement, SADC was able to participate in the partnership without committing funding directly to retiring the buffer.

Making a major commitment, NJCF agreed to hold and monitor the buffer easement. A leading advocate for land protection in New Jersey for more than 50 years, NJCF has helped preserve over 125,000 acres of open space, and

Tim Morris, NJ Conservation Foundation's Stewardship Director

has accepted more than 140 easements. More recently, however, the organization has not routinely held conservation easements because of the difficulty and expense of monitoring and defending them. NJCF decided to hold the Harris easement because it had been pushing for greater natural resource protections on farms for decades and this was a significant step toward that goal.

ACCOMPLISHMENTS & TAKEAWAYS

While the pilot project did not require a resource management plan on the working farm, it still served as a major stepping-stone toward improving the environmental protections in New Jersey's agricultural easements. It engaged SADC, if only indirectly, in riparian buffer protection for the first time and developed a stronger working relationship between the agency and nonprofit organizations on the issue.

Most significantly, SADC agreed on formal easement language for stream buffers and set standards to use in a single easement covering an entire farm.

"It's an important first step in a partnership with William Penn and its Delaware River Watershed Initiative," said Susan Payne, SADC Executive Director. "We are very active in farmland preservation in the same areas these organizations are targeting for water quality in the Delaware Basin. Every time we do something new for the first time and hammer out a lot of precedent, it should make the next project easier."

"When we're trying to do innovative things and there are a lot of parties and moving parts, the opportunity for confusion is high," she said. "What I came away with is clear communication is job one – having clear expectations and transparency on everybody's part."

For OSI and NJCF, a major takeaway was that to fully protect streams, future projects must have a rigorous and enforceable farm conservation plan – on both the riparian buffer and working farmland.

"We believe that the natural resource protection should apply to the entire farm as well as to areas of environmental significance," said Byers. That was also the view of Christine Hall, State Resource Conservationist at NRCS, who also serves on OSI's Delaware Watershed Protection Fund's Advisory Committee. "What I would have liked to see is the ability to get conservation practices on the farm acreage that would protect the stream," she said.

Because of the drawbacks of the side-by-side easement, including the difficulty of monitoring and enforcing the buffer easement, for the next project, SADC intends to pilot the whole farm model.

"We're experimenting to find models that work for the different partners and especially landowners," said Payne. "I think we can accomplish most if not all of what the Delaware River Watershed Initiative is seeking to achieve in terms of water quality protection by requiring the implementation of the Best Management

Cindy Roberts, NJ State Agricultural Development Commission describes the dual easements.

Practices of NRCS," said Payne. "That's what we're working on in developing the next pilot." "It's important to recognize the long-term sustainability of monitoring and enforcing easements," said Byers. "We believe that a unified approach would be easier, simpler, and more sustainable to enforce than the model used for the Harris farm. Now that there has been a demonstration of community support for preserving both the natural resources and farmland, we see an opportunity to use this approach on more farms."

"We learned a great deal about the importance of clarifying roles and responsibilities when working with multiple partners, and in remaining both committed to our principles and flexible," said Rawlyk. "For example, while an NRCS Resources Management Plan is essential on both the riparian buffer and working farmland, we are modifying required components in response to input from SADC."

The real test of the concept will come with the piloting of a whole farm easement. This will require enforcement of a revised conservation plan across the entire farm, and SADC's commitment to co-fund an easement that will retire production on the buffer, which would be a first. The agency is currently working with the land trust community to identify a candidate for the pilot.

BRINGING THE MODEL TO SCALE

Beyond drafting a new easement, there are a number of challenges in expanding the model past the pilot stage. It will require building acceptance and interest within the farming community, broadening the funding base for riparian buffer easements, and ensuring effective protections and monitoring.

For farmers to opt to protect streams while preserving their farms – which may require taking land out of production or implementing new management strategies – they need to receive benefits that compensate for potential lost income or additional costs. "A lot of farmers want to conserve the resources if they can," said Payne. "If everybody feels they were treated fairly and got the benefits they needed, that success is going to sell itself to other landowners."

As projects show that protecting riparian buffers can have financial as well as environmental advantages – and that bringing in outside dollars for these transactions will allow a greater number of New Jersey farms to be protected from development – support for riparian buffer easements will grow. "Success breeds success," said Hall. "If Jeff Harris has a positive experience, then others will be open to doing it."

To preserve riparian buffer easements on a wider scale, however, additional funding sources will be needed to augment the resources of nonprofits. Potential matching funds could come from federal programs that have been underutilized in New Jersey, such as the Agricultural Conservation Easement Program (ACEP); the Conservation Reserve Program (CRP), which pays farmers to establish long-term cover on highly erodible land; and the Environmental Quality Incentives Program (EQIP), which gives farms financial and technical assistance for planning and installing best management practices.

The implementation and long-term monitoring of water resource protections on preserved farms presents both opportunities and challenges. When the riparian buffer is under a separate easement, few land trusts want to keep an eye on small strips of land that could be affected by activities on adjacent farmland over which they have no control. Monitoring single easements in a coordinated way could be more efficient.

But it will require building new capacity and funding to hold and monitor easements that would preserve not just the working farm but also the protected buffer. "If we want to scale this up," said Hall, "we'll need more people who are able to write and monitor implementation of plans."

It will take more resources for public agencies to conduct monitoring, and in fiscally challenging times, there may be concerns about their capacity and commitment to ensuring water quality. For land trusts, there will always be the issue of securing sufficient funding to hold and monitor such easements.

But ultimately necessity may drive innovation. "As our population grows and land available for agricultural production decreases, we will need every piece of land to perform all of its functions as efficiently as possible – to produce food, recharge aquifers, protect habitat for wildlife, and filter clean drinking water," said Peter Howell, OSI's Executive Vice President. "We will have to find creative ways to balance what might seem like competing interests in order to satisfy all of those needs."

MAP 2: EASEMENTS

Two separate easements protect the Harris farm: (1) an agricultural easement to permanently preserve the working farmland, (black outline) purchased and held by the New Jersey State Agriculture Development Committee (SADC), which administers the Farmland Preservation Program, and (2 red outline) a conservation easement to protect in perpetuity an 18-acre forested riparian buffer. This easement was funded by OSI and held by New Jersey Conservation Foundation (NJCF), a statewide land trust.

Open Space Institute

The Open Space Institute (OSI) protects scenic, natural and historic landscapes to provide public enjoyment, conserve habitat and working lands and sustain communities. Founded in 1974 to protect significant landscapes in New York State, OSI has been a partner in the protection of over 2.2 million acres in North America.

Delaware River Watershed Protection Fund

With leadership support from the William Penn Foundation, the Delaware River Watershed Initiative is a broad partnership of nongovernmental organizations working with state and local governments to ensure abundant clean water through conservation of targeted watersheds within the 13,000-square-mile drainage of the Delaware River. As part of this initiative, the Open Space Institute (OSI) administers the Delaware River Watershed Land Protection Fund, which provides capital grants for land acquisition and planning grants to promote watershed protection.

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