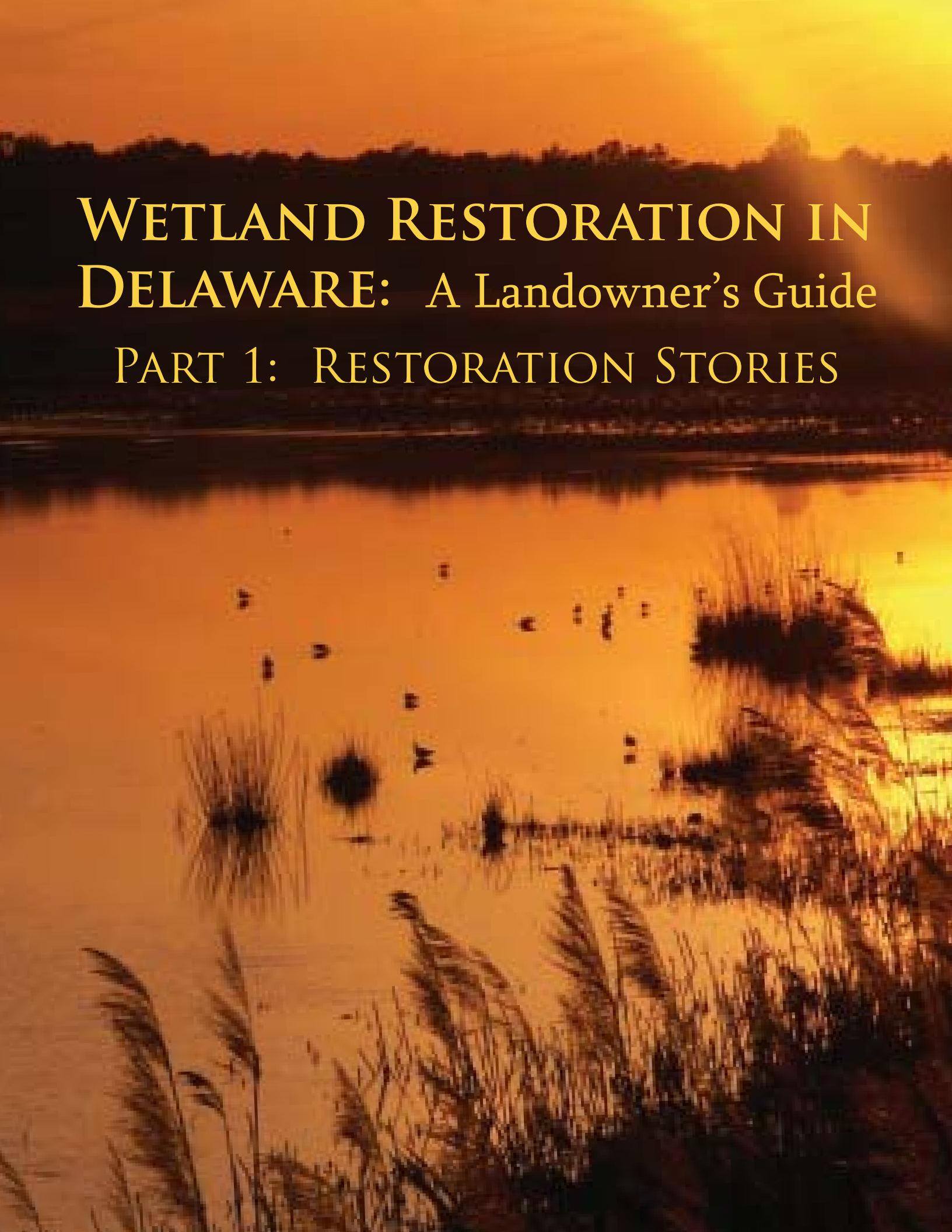

Wetland Restoration in Delaware: A Landowner's Guide

Part 1: Restoration Stories

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Restoration Stories

Restoration - a word that means different things to different people. For some, it speaks of reconstructing or restoring buildings, archaeological sites, artwork and other valued materials to some semblance of their historic state. When a person becomes ill or injured, we send wishes for restoration of their health, and encourage a pathway of rehabilitation and recovery that will speed the healing along. In any context, restoration implies some sort of effort or giving back - not just letting things recover or renew on their own - but taking some kind of action that helps move the process along.

In the realm of wetlands, streams and other habitats, restoration implies a similar goal - the act of assisting or intervening in the recovery of an ecosystem that has been degraded, damaged or destroyed to restore it to some measure of its natural condition. In a state like Delaware, where centuries of abuse and misuse have left much of our remaining wetlands impaired, the opportunities for restoration are numerous. The pages to follow showcase real-life examples of everyday Delawareans - farmers, business people and homeowners - who took it upon themselves, in varying circumstances and for different reasons, to restore wetlands on their properties. These are a sampling of their stories. We hope you will find in them the inspiration to consider doing likewise.

"The edges where land and water meet charm us all - they please and feed the soul."

~ Tom Horton

The Webber Farm


Matt and Joyce Webber at the family farm

The Webber farm spans over 213 acres in western Kent County and is home to about 120,000 chickens. Managing water and runoff for such an operation is no simple task. So when Bill Webber heard he could improve water management on his farm and reduce any nutrients washing downstream, it sounded like a natural fit.

The Webber family takes great pride in how they manage their farm. Their nutrient management plan already kept effluents well within the mandated limits, but they strive for a higher standard. As Bill's son Matt pointed out: "Like most farmers, we're always concerned with what we're doing as stewards of the land. When we put the wetlands in, nutrient reduction wasn't in the forefront of most people's thinking. But, we wanted the water that leaves our farm to be just as clean and clear as possible. I'd say that we're a success story of nutrient management if you look at our nutrient levels over the years to now."

Their success has come easier than most people might expect. Matt explained "The wetland was put in ten years ago and has been very low maintenance. We maintain the ditches only every other year so that plants grow up to help filter the water. There's a private ditch back behind the chicken houses that feeds into the tax ditch which then flows through the wetlands for a final cleaning before the water leaves here and heads for the Bay."

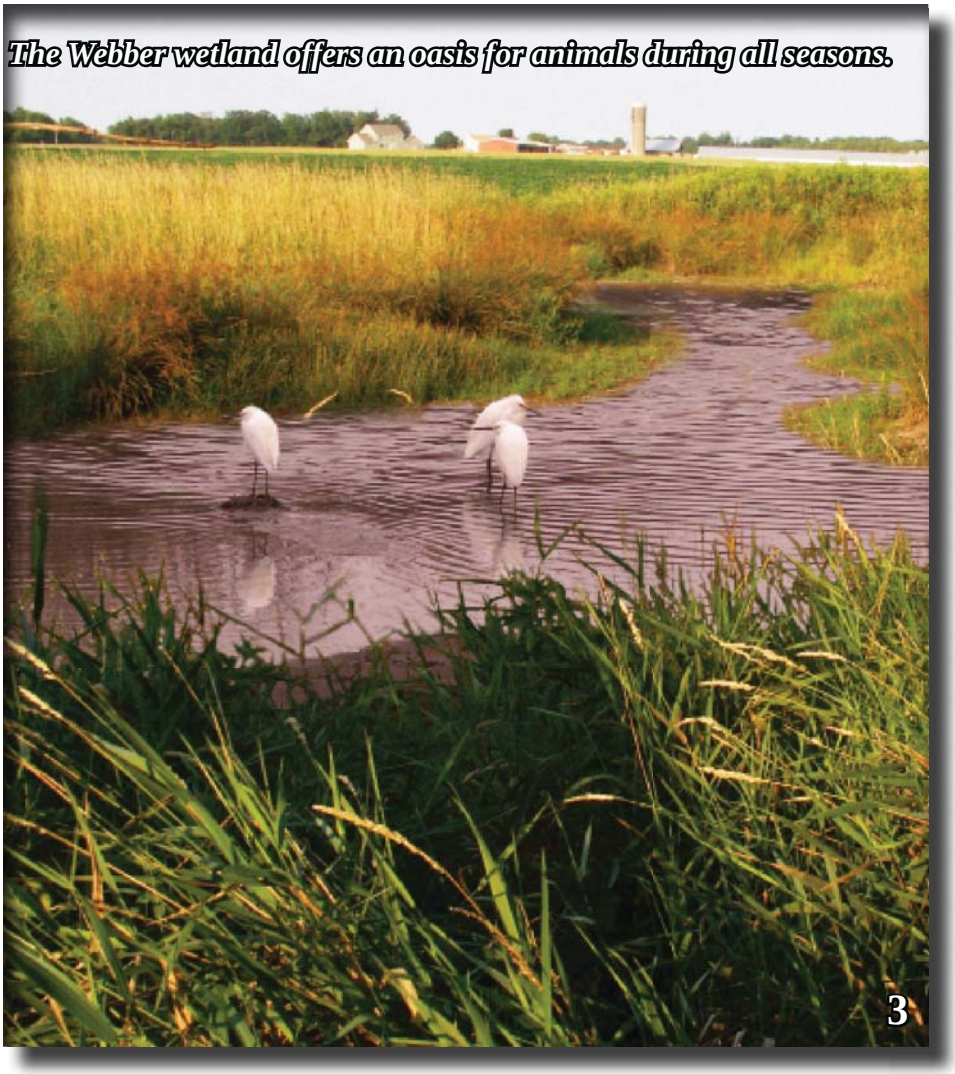
The Webber farm wetlands helps reduce the amount of nutrients running off their lands.

Wildlife and agriculture co-exist nicely at the Webber farm.

The Webbers are one of several Delaware landowners who have had wetlands constructed and drainage updated with little out-of-pocket costs. Government agencies and non-profit organizations have programs available for financial and technical assistance. Robert Palmer of DNREC's Non-Point Source Section would like to see more farms managed like the Webbers: "We pool our funds with funds from a lot of partners to get the best bang for the buck in any given year. Our highest priorities are where we can make the greatest nutrient load reductions. In an agricultural state like Delaware, things like BMP (Best Management Practices) implementation and preventing poultry runoff are important to us. Programs like CREP (Conservation Reserve Enhancement Program) can provide cost-share to restore wetlands affecting ditches that connect to impaired streams." Matthew added that assistance is available from other sources as well: "The chicken companies have been helping people with putting in trees and bushes as windbreaks or to improve ditches."

But the rewards for the Webbers go way beyond all this. Matt's mother, Joyce, is especially passionate about the aesthetic benefits of the project: "The wetlands are a really special place for our family to relax. We've got five grandkids now. We pack a picnic lunch and bring them back here to see what we can find and listen to. There are all kinds of turtles and frogs and birds. Especially with this season having been so dry, we're seeing a lot of animals coming here to drink at the wetland."

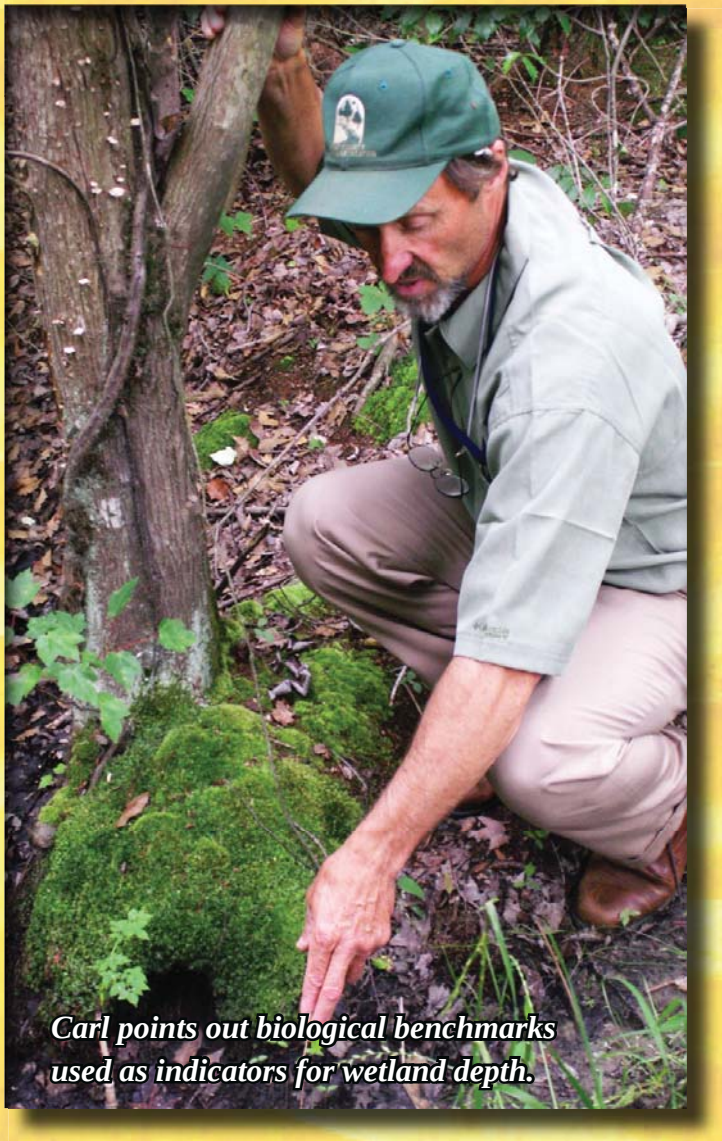
Matt adds, "I think there are many farms that could benefit from restoring wetlands. If they have marginal cropland that could be used to build a wetland, I'd definitely suggest it. It's really been a good way to go for our farm and family."



The Webber wetland offers an oasis for animals during all seasons.

The Solberg Preserve

In the past, drainage systems were developed and constructed with little regard for environmental issues such as wetland function and wildlife habitat. Over the years, thousands of acres of Delaware's freshwater wetlands were lost to drainage projects, and with them, many of the wildlife habitat values and other natural benefits they provided.



Carl points out biological benchmarks used as indicators for wetland depth.

Carl Solberg sees his property as an example of that history. "The ditches on my property were dug many years ago to drain lands that are now no longer in need of such systems. This includes a long ditch that was dug just to drain some little wet spot on a small ag field upstream." Carl wanted his property restored to the rich forested floodplain it had once been, but done in a way that it would not affect drainage on neighboring properties.

To help him plan and implement the restoration, Carl called on Tom Barthelmeh of DNREC's Drainage Section. Once a planner of projects to ditch lands for drainage, Tom now devotes much of his energy to altering those old ditches and restoring natural wetland functions and associated habitat benefits. For landowners like Carl, such projects provide a viable option for restoring a more natural, attractive and wildlife-habitat-friendly look to his land while retaining the needed drainage benefits.

A once straight ditch now resembles a natural creek.

Due to the steep grade on Carl's ditch, Tom installed three water control structures. This maintains water in the ditch at a higher level than previously, allowing water to flood the newly created wetlands. Tom cautioned, "When designing a water control structure, you've got to have a handle on the hydrology - how much of an area will be flooded, how much of a watershed you've got, what the peak flows are, and so on. But the really hard part is changing people's minds that what you're planning to do won't adversely affect what the ditch was designed to do."

In Carl's case, that wasn't a problem. Working with Tom, they came up with a plan that would give the previously straight, narrow ditch the look of a wider, pooled stretch of a slow-moving stream. To further add to the natural look and feel, one of the water control structures was constructed to resemble a natural beaver dam. Reused cedar tree stakes were placed in the ditch and intermingled with soil and cedar trees to assure the stability of the dam.

Since the construction, several large storms have tested the new water control system and it has performed as intended. Carl will continue to monitor the system and consult with Tom should any adjustments be needed. Carl considers the project a huge success: "Over a quarter mile of ditch was restored to habitat with no effect on the ag field or the neighboring properties. After construction, we noticed an immediate increase in animal usage of the area. We've got a pair of black ducks, a beaver and a whole family of otters. Walking around this area now, you might think things had always been like this if you didn't notice the water control structures."

Maintaining water level in a ditch, beaver-style.

The land healing after restoration.

This forested wetland pool was restored by plugging the ditch that once drained it.

Carl knows he is just one landowner but hopes people will see his project and want something similar for themselves: "I think there are many places where this type of project could be done. A lot of ditches and right-of-ways could be restored to wetlands and floodplains without negative effects on the fields. You can trust the drainage section to do a conscientious restoration project. They know what to be cautious about and what to be ambitious about. After all, you've got to know drainage before you know about rehydrating these areas and they do. That's why I have such faith in them."

Pike's Marsh

Growing up along the Mispillion River, Bill Pike knew well how the marshes protected and provided for his community. But, over the years, as modern life encroached, he saw the resource suffer as people lost sight of those values. He watched his fishing nets come up empty and the wild lands he hunted tamed with bulldozers. So when a crucial section of wildlife corridor came up for sale, he scraped together every cent he could to save it.

Bill initially wanted to let nature heal the damage, but soon realized he'd have to help nature along. As he explored options, he came to rely on the expertise of state consultants to help him plant bushes for wildlife forage, control phragmites, and manage wildlife habitat. He earned the reputation of a dedicated steward, committed to restoration and preservation of the land. So, when funding became available for a large scale restoration project, Bill Pike's marsh became an ideal candidate.

In 1929, to improve navigability for large ships along the Mispillion, the U.S. Army Corps of Engineers cut off a bend in the river that went through what is now Pike's Marsh. In the decades after, increasing erosion left the river banks denuded and in sore need of stabilizing. Bill ruled out bulkheads and riprap, knowing they would ruin the habitat value of the marsh and reflect destructive wake energy to the opposite river bank. Then, Al Rizzo of the U.S. Fish and Wildlife Service suggested a better option: "As you go up and down the river, you'll notice that some of the best fish habitat is by trees the wind knocked over. Those trees also absorb a lot of the erosive forces along the river and act like natural groins to accumulate sediments. Our plan was to do the restoration in such a way that those benefits were replicated - thus preserving the natural beauty and function of the marsh while ensuring the completed project looks like what nature had intended."

Providing stabilization and habitat

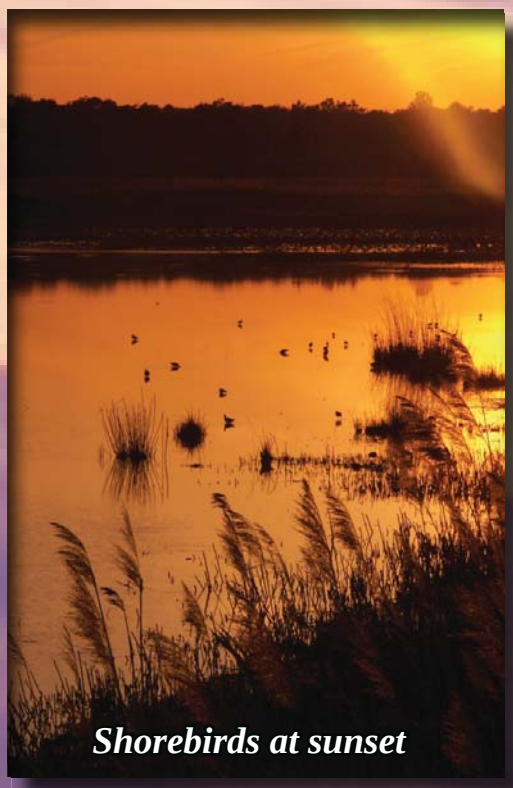
The plan's first line of defense called for anchoring long stumps into the banks with their root-wads facing the river like fallen trees. Behind that, three rows of coir (coconut fiber) rolls were inserted, along with sprigs of pickerel weed, to hold the sediments in place. Not long after the logs were placed, fishermen began to cast around the roots to catch fish as curious about the new habitat as they were. The long lines of wake from passing boats were broken into ripples as sediments accumulated and plants began to take hold.

First line of defense

But stabilizing the river bank was only part of the solution. As flow through the old riverbed dwindled over the years, the ponds that were once part of Pike's Marsh became clogged with sediments. Delaware's Mosquito Control Section agreed to lend a hand in dredging tidal streams to restore flow to the ponds and allow hungry mosquito-eating fish access to parts of the marsh where mosquito larvae lurked. With the next high tide, mummichogs and other small fish could be seen exploring the pond as shorebirds swooped in looking for an easy meal and place to rest.

Bill expected it would take years before he could see results. However, within the same season, he noticed more foxtail, water hemp, and other water-dispersed plants. By fall, migrating ducks were frequent visitors to the new ponds. White perch, herring and shad began schooling in the tidal waters. Each week Bill seemed to discover some new animal that had discovered his marsh.

Before committing to a project, agencies may ask for an easement or maintenance agreement to ensure that the site will be cared for after the work is done. Bill found that the terms offered in his easement fit perfectly with what he had in mind for his land: "Even though this isn't a huge tract of land, I wanted to make sure to leave something here for posterity. I've put this whole strip of wetlands and woodlands in a conservation easement with DNREC, which is going to run in perpetuity and to me that means as long as there are people, it's going to be kept this way. I retain ownership. I hunt and trap and fish on it. Pretty much what I can do with it is what I planned to do anyways."



Shorebirds at sunset

Peace of mind on protected land

What started as one man's simple step to conserve may become a foothold for something grander. Bill is hoping other landowners will come visit his marsh: "The more people that can see it, they might think 'hey, I could do that'. Sometimes all it takes is for somebody to see that the little guy with a small piece of property can do all this and then the light may come on. I intend this site not only as a place to bring people and demonstrate how things were done and how well they worked, but also to inspire others."

Three Little Bakers Golf Course


Before: Desolate


After: Full of life

Like many streams in our area, Pike Creek had become badly degraded over the years by increased stormwater run-off and quick-fix attempts to control problems. Its watershed has been developed to where over 29% of the area draining into the creek is covered by impervious surfaces such as roofs, parking lots and roads. With each rain, water rushed down the shifting stream channel and gouged into the banks.

Previous attempts to control erosion included 'armoring' with riprap. Though it looks heavy and stable, riprap can wash away like pebbles in a strong storm, and it offers little habitat value for aquatic life. Straightening of the stream channel to hurry water through was no solution either, as this led to increasing velocity and erosion of the channel and more damage downstream. To put it bluntly, Pike Creek along Three Little Bakers had become an inhospitable wide ditch of washed out rocks and sediments, edged by crumbling banks.

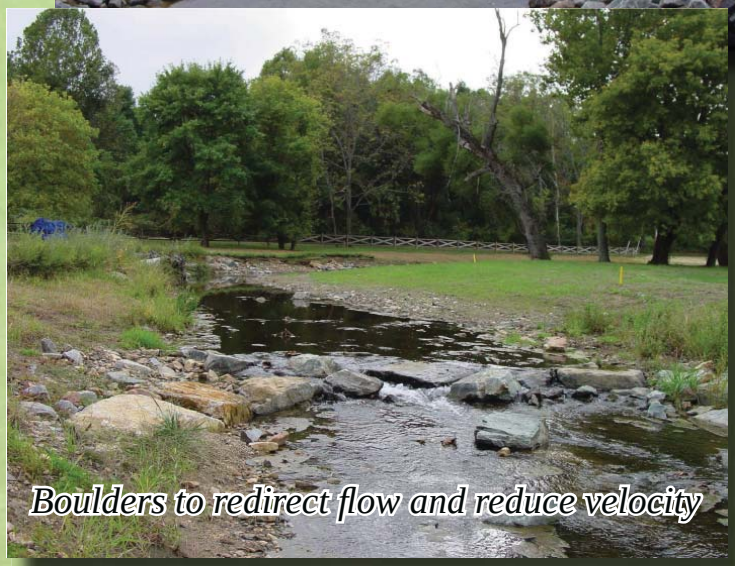
Steve Segui, former Course Manager at Three Little Bakers, remembers what the creek used to be like: "We were watching our fairway around holes 7, 15, and 16 literally disappear before our eyes, as the stream banks eroded away with each major storm". A less obvious problem, as noted by Stephen Williams, Stream Restoration Coordinator for DNREC's Division of Soil and Water Conservation, "was excessive amounts of sediment in the streambed and water column – which destroys the habitat of fish and the prey they depend on." Golf Pro Dick Matthias added, "The sediment was a problem for the golf course as well. Before the restoration, the water would flood over the greens and when the waters receded, there'd be sediments covering the grass, killing it."

The first part of construction was to return the stream to a more natural configuration with gently sloping banks, a damp flood plain just above base flow level, and a stable stream channel meandering along with sweeping curves. In sections where bank scouring was likely, rock and log 'toes' were inserted along the banks.


Restored stream channel with log toe


Ugly riprap flushing everything down

The force of water was also redirected away from the banks by flowing over logs or lines of boulders back into the channel. Along the deeper pools of the broad outer bends, large stumps were anchored with exposed roots angled upstream to disrupt the current and provide shelter for fish. Runs and riffles between the pools helped to quickly transport sediments, while offering quality habitat for aquatic insects. Boulders placed randomly in the runs and riffles further reduced velocity and enhanced the habitat.


Boulders to redirect flow and reduce velocity

The restoration project also featured creation of floodplain wetlands along the formerly grassy streamside lands. In addition to reducing sediment loads, filtering runoff, and providing temporary storage of flood waters, these wetlands also enhanced wildlife habitat. Constructed to be just above the base flow of the restored stream sections, the wetlands were modeled after naturally occurring streamside wetlands in the region. Water from Pike Creek enters the wetlands during high flow times, thus reducing the velocity of floodwaters heading downstream. During flooding, hard structures direct excess flow into the wetland pools. The water level of the pools is maintained by a rock outfall that flows back into the creek. The wetland receives water from a drainpipe that collects run-off from upland areas. A volunteer group has been monitoring water entering and leaving the wetland and has noted a marked improvement in water quality downstream.

The final phase of the project involved planting more than 3,500 native trees and shrubs, along with a mixture of wetland plant seeds, along both sides of the stream. Besides being attractive, these plants serve a practical purpose - stabilizing stream banks to prevent erosion, filtering sediments and nutrients, and reducing flood damage. Converting previously mowed grassy meadows into wetlands has not only created habitat, but has reduced the areas now being mowed by the golf course staff, while putting more streamside riparian buffer in place for improved water quality. Thanks to all this, Three Little Bakers Golf course now has a richer character and more natural feel to it. Rather than trying to tame Pike Creek, the managers of the Three Little Bakers lands learned to work with nature, and that has proven to be a better way.


Creation of a floodplain wetland.

Restoring Wetlands for Ducks and Shorebirds

Blue herons and egrets in the mist

Landowner and hunter Mike Luzier knew he wasn't making the best use of his marginal field. Some years he'd get nothing but frustration after investing in seed, fertilizer, and herbicides only to get stunted plants and a stuck tractor. So, when he saw an ad in the back of the hunting guide for the Delaware Landowner Incentive Program (DELIP), he decided to call and see what they had to offer.

The Delaware Landowner Incentive Program is designed to help private landowners interested in providing habitat for species-at-risk, such as shorebirds. Ducks Unlimited, a long-time advocate of waterfowl habitat restoration, has partnered with DELIP on a number of projects including this one. Shelley Tovell-DiBona, Private Lands Biologist for DELIP, explains the multiple use focus: "Although the shorebirds and the ducks are making use of the same habitat, they're migrating at different times. This wetland will be fully flooded in February and March for the migrating ducks and then will be gradually drawn down at the end of March until June for the shorebirds. After the wetland dries out for a couple of months, a thin layer of water will be allowed to accumulate for the fall shorebird migration that actually starts in August. By the time waterfowl season opens the shorebirds will be long gone." Kirk Mantay, Regional Biologist for Ducks Unlimited, added, "We see the value of the wetland as a habitat year-round for a lot of different animals and we're seeing more landowners interested in that as well. People may like to harvest a few ducks and that's fine, but there are other uses that they want from that habitat throughout the year as well, such as providing forage and resting places for other wildlife, watching birds, and just having a place to relax."

Mike agreed to Shelley's design and management plan which called for a low berm that followed the curves of the land, creating an extended wetland with two irregularly-shaped, shallow pools, well-suited for the habitat needs of shorebirds and puddle ducks. Since shorebirds prefer shorter grasses along the water's edge, as part of the maintenance agreement, Mike agreed to disc plow the dried wetlands if plant growth became too dense. He also would follow the flooding and drawdown schedule tailor-made to attract various birds to the site in their respective seasons.

Layout of the Luzier wetlands shortly after construction.

In contrast to the typical, artificial looking, deepwater pond, the Luzier wetland blends beautifully with the natural landscape, bridging two large wooded tracts for optimal wildlife habitat connectivity. And, Mike likes what he sees: "My family enjoys birdwatching and we used to go down to Bombay Hook to see the birds. Now, we can just come out to the back of our property and see all kinds." Shovelers, pintails, snow geese, curlews, ibises and killdeer are among the visitors seen already. In the mud at the pool's edge, one can find tracks of deer, raccoon, opossum, and other animals.

The importance of these projects cannot be overstated. Each year there are fewer wetlands available for shorebirds and waterfowl. Increasingly, agencies and landowners are coming to realize the importance of working together to preserve and protect what remains. Kirk Mantay of DU explains why working with farmers like Mike is so important: "In Delaware, development is the biggest cause of habitat loss. Farmlands remain because farmers have a deep sense of heritage and they want their kids to have someplace natural to grow and to be able to take them hunting and fishing. In Delaware, agriculture may prove to be the salvation of natural resource conservation."

There was a time when success would have been measured in number of ducks, but now DU considers the project's broader habitat value for all wildlife, as well as the ecological services that wetlands provide. Kirk notes, "When somebody calls us with just a basic duck impoundment in mind, it is so gratifying when we can help them have a whole lot more." As Shelley points out, "Over 80 percent of the available or restorable wildlife habitat in Delaware occurs on private lands. The future of our wildlife hinges on the willingness of landowners to maintain wildlife habitat on their properties."

Pintails looking for a swimming hole.

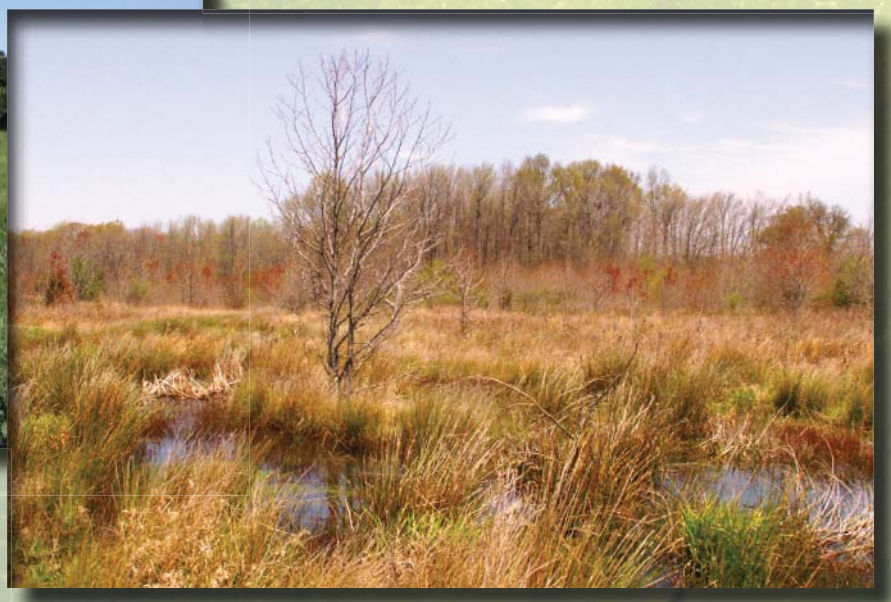
The Battista Backyard Wetland

Like many landowners, Bill and Roseanne Battista weren't sure what to do with the unused acreage on their property. The area had once been flat pasture with a ditch running through it. It seemed as though every alternative involved a lot of costs and too much work. "We had considered a number of other options for the land such as Christmas trees or hay fields, but then you have to sink money into supplies and equipment and you've got to put in a lot of hours of work. We wanted to be able to enjoy our land, to come back here and be able to just relax."

Bill and Roseanne Battista in their 'backyard' wetland.

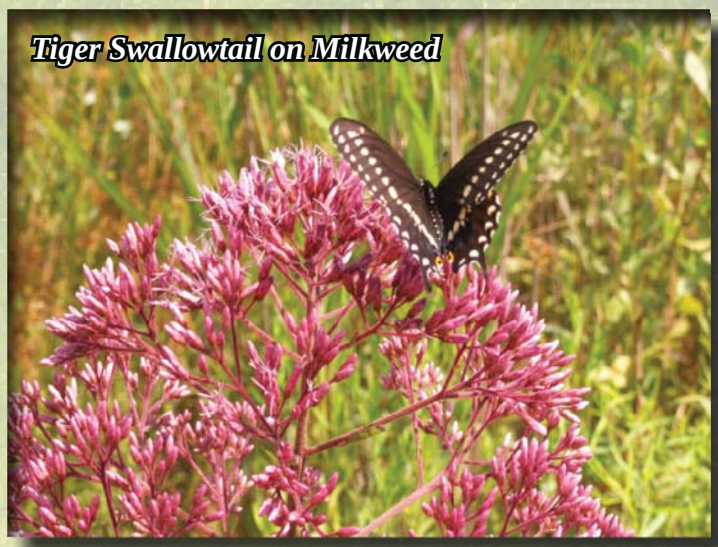
A few years earlier, Bill and Roseanne had completed a small backyard habitat project near their house and they thought perhaps they could create even more habitat on a grander scale. But they weren't sure what kind of habitat would be most attractive for themselves and for the wildlife they hoped would visit. There was also the problem of how to take on such a large project and how to pay for it. Then someone told them that DNREC's Soil and Water Division had provided assistance to neighboring landowners in restoring wetlands on their property. The Battistas knew a wetland in their area would be an excellent natural resource, but their land had been a hay field or pasture for as long as anybody could remember. Fortunately, because their field still retained its soggy soils and hydrology, they found it was possible to restore the area into a functioning wetland.

The Battista's backyard used to be an old field (photo left). With restoration (photo below), that old field was transformed into a beautiful, vital wetland habitat..



"They asked us what we wanted and I said that I don't care as long as we have a path to walk through it. The plans were developed to make sure the wetlands would function as intended. John Lucks from the Kent Conservation District is a craftsman with his bulldozer and he made paths and all of these little pools. After they were done moving the soil around, they planted the area with a wild seed mix to get things started. Later, students from Polytech High planted a lot of trees and shrubs. We put in a bunch of flowering and berry shrubs that the birds would enjoy and a couple of benches. It's been interesting to see how it's transpired each year and how it changes with the seasons. Each time you come back here, it's like visiting someplace new."

Mallard hen leads her ducklings through the Battista wetland



Tiger Swallowtail on Milkweed

Roseanne has particularly enjoyed working with all of the different plants: "Closer to the house, the wetlands transition into our backyard habitat. But further from the house, it's like being out in the wild. Out back, the Polytech kids planted rushes, sedges, ashes and oaks, as well as chokecherry, winterberry and viburnum for the birds. Nearer the house, we put in sunflowers for the birds, and a variety of plants to attract butterflies and hummingbirds. We put in fennel for the butterflies and the milkweed came in on its own. I just like that we've gotten so much use out of the area!"

Bill was surprised at how much wildlife has visited their wetland: "We had mallards nest here last year and they had eleven babies. It was great to see how the ducklings would lay on the log all lined up and then go into the water right in a line. I've since put in wood duck, kestrel and bluebird boxes. Other animals have been using the area as well. We've seen rabbits, deer, raccoons, and even a fox. We were fortunate to have our "eyesore" transformed into a wetland. It has added another dimension to our lives! We frequently walk along the path and feel the stress of life melt away."

Mallard eggs

Rare Things at Risk

In Delaware, there are 457 species of plants and wildlife that are at-risk because their habitats are threatened by changing land uses. But some landowners are bucking that trend. The restored south section of the Walters' farm, which historically featured coastal plain ponds surrounded by woodlands (and had since become a low, wet-spot in the field) now has a renewed connectivity of habitat types supporting diverse communities of rare plants and animals. Tiger salamanders and barking treefrogs make their way down from the nearby forest to lay their eggs in the restored wetland. A Northern Harrier stands watch over a field of warm-season grasses, as a yellow-crested night heron hunts along the edges of the lush wetlands. Restoration emphasizing such habitat diversity for species at-risk is at the heart of the Delaware Landowner Incentive Program (DELIP), and the Walters' farm provides a prime example of the benefits it offers.

Once a poorly producing field . . .

. . . is now more productive than ever before!

Before restoration, much of the Walters' 55 acre south field was tilled each year. Due to wet soils in several places, the field yielded scant crops, but the family relied on the income. Under DELIP, managed by DNREC's Private Lands Assistance Program, the wettest part of the Walters' land was restored to wetlands. To ease tilling around the wetlands and provide an expanse of habitat favorable to grassland birds, forty to fifty acres of fields were returned to grasslands. Along with providing cover for salamanders and breeding habitat for grasshopper sparrows and harriers, these areas help buffer impacts to the wetlands from sediments and pesticides. To offset acreages taken out of production, the family receives rental payments from DELIP.

The restoration ground work was completed by the Kent County Conservation District. The first step was to disrupt the tiles and plug the ditches that had previously drained native wetlands. With the restored hydrology, some directed digging, and seasonal rains, a coastal plain pond was restored on the landscape. The wetland sits close to the woodlands where several species of amphibians spend their adult lives. It is deep enough to hold water from the time that tiger salamanders lay their eggs in February until the young of the summer-breeding frogs emerge in July. But it is sufficiently shallow to occasionally dry out, deterring tadpole-eating fish from establishing there.

The pool is also free of trees, allowing growth of dense patches of emergent plants for amphibian egg-laying. A series of smaller restored wetlands in nearby fields offer additional habitat and help treat run-off before it reaches the pond.

To jump start the naturalization, Mrs. Margaret Walter's son planted the upland portions of the field with a native grassland seed mix. Loads of seeds were also introduced on the wind or by birds. Within a few years, the warm season grasses were firmly established and the plant community had achieved a natural balance. To protect that balance, the landowner will need to periodically control patches of invasive plants, such as Phragmites. Mrs. Walters has been surprised by how much enjoyment the restored field has brought her: "All the wildflowers that came up that weren't there before were so beautiful. There were pretty yellow flowers and daisies that were really nice."

The diversity of birds that have been drawn to the new habitat has been amazing. Restoration coordinator Shelley Tovell-DiBona noted, "We have been monitoring the grassland habitat for use by birds. The landowner has been ecstatic about seeing the birds day in and day out. She's even seen bald eagles making use of the area for the first time." At least 48 species of birds have been observed making use of the restored site including spotted sandpipers, red-shouldered hawks, great crested flycatchers, and Northern flickers.

Shelly elaborates: "The animals that are here are state-rare but not federally listed, so there isn't any regulation on those. In addition to the birds, within one year of restoration, tiger salamanders and spotted salamanders were using the site for breeding. These two species are in need of conservation action to restore their populations, and it is hoped that as the site matures, their populations will expand."

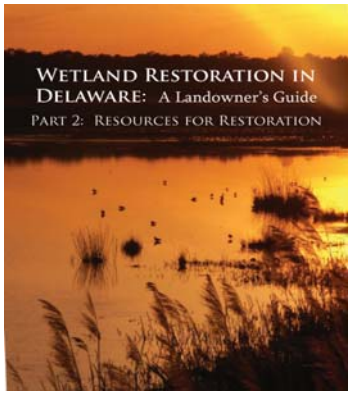
By working together, Delaware's landowners and state agencies present the best chance for keeping our rare species from disappearing. Landowner Margaret Walters is enjoying her new guests and is enthusiastic about her family's role in the process: "I think we should preserve the salamanders and other animals because there is just so much development that is getting rid of our native species. After this ten-year enrollment is up, I hope to enroll again to keep protecting them. "

Tiger salamander tadpoles developing within their eggs.

Square-stemmed rose pink.

Field sparrows are one of many species nesting in the restored site.

Next Steps: Taking on a Restoration Project



If any of these stories have hit their target and left you thinking about moving forward with a restoration project on your land, help is available on several fronts. To get you started, a wealth of information on wetland restoration approaches, resources and funding support has been compiled into Part 2 of this guidebook. A free copy of Part 2 can be ordered in by returning the attached postcard insert or by downloading at: www.dnrec.delaware.gov/Admin/DelawareWetlands. A list of contacts for those restoration project supporting agencies and programs referenced in the preceding stories follows.

DNREC, Division of Soil and Water Conservation, Wetland and Stream Restoration

Wetlands & channel restoration: Tom Barthelmeh, (302) 739-9921, thomas.barthelmeh@state.de.us
www.swc.dnrec.delaware.gov/Drainage/Pages/TaxDitchRestoration.aspx

Stream projects: Steve Williams, (302) 739-9921, stephen.williams@state.de.us
www.swc.dnrec.delaware.gov/district/Pages/Restoration.aspx

DNREC, Division of Fish and Wildlife, Private Lands Assistance Program

Shelley Tovell-DiBona, (302) 735-3600, shelley.tovell@state.de.us
www.dnrec.state.de.us/dplap/

U.S. Fish and Wildlife Service, Partners for Fish and Wildlife and Coastal Programs

Al Rizzo, Chesapeake Bay Field Office, Annapolis, (410) 573-4500, al_rizzo@fws.gov
Rick McCorkle, Delaware Bay Estuary Project, (302) 653-9152, richard_mccorkle@fws.gov
www.fws.gov/chesapeakebay/partners.html

Ducks Unlimited (DU) Habitat Stewardship Program & Conservation Reserve Program

Kurt Anderson, Ducks Unlimited Annapolis Office, (410) 224-6620
www.ducks.org/media/Conservation

Natural Resources Conservation Service (NRCS) Wetlands Reserve Program (WRP)

Jayme Arthurs, NRCS Dover office, (302) 678-4191, jayme.arthurs@de.usda.gov
www.de.nrcs.usda.gov/programs/wetreserve/

County Conservation Districts

Sussex County: Georgetown, (302) 856-3990, ext 3, http://sussexconservation.org/
Kent County: Dover, (302) 741-2600, ext 3, http://kentcd.org/
New Castle County: Newark, (302) 832-3100, ext 3, http://newcastleconservationdistrict.org/

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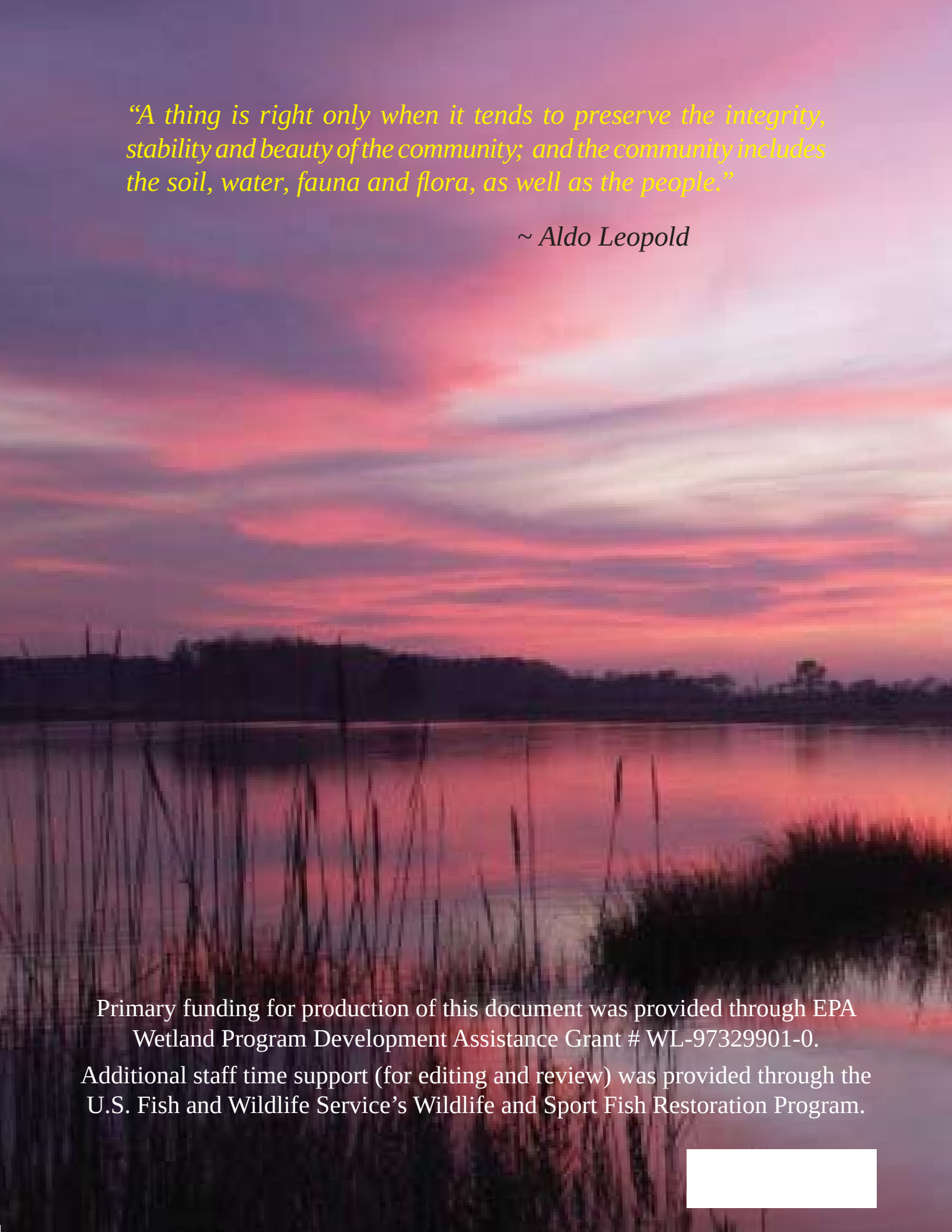
Wayne Lehman – DNREC, Wildlife Section
Kirk Mantay – Ducks Unlimited, Annapolis Office
Robert Meadows - DNREC, Division of Fish and Wildlife, Mosquito Control Section
Michael Mensinger & Jennifer Holmes - DE National Estuarine Research Reserve
Robert Palmer – DNREC, Non-Point Source Section
Evan Rehm - formerly of DNREC, Watershed Assessment Section
Al Rizzo – U.S. Fish and Wildlife Service, Chesapeake Bay Field Office
Carl Solberg – Kent County Parks & Recreation
Michael Valenti - DE Department of Agriculture, Forestry Section
John Van Stan - University of Delaware Cooperative Extension 4-H Group
Sara Wozniak & Kate O'Brien - Appoqunimink Watershed Association



"A thing is right only when it tends to preserve the integrity, stability and beauty of the community; and the community includes the soil, water, fauna and flora, as well as the people."

~ Aldo Leopold

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