

An aerial photograph of a lush, green forested area with a winding river. The trees are dense and vibrant, with some showing early autumn colors. A few buildings and a road are visible in the upper left and right areas. The overall scene is peaceful and natural.

A Sustainable Chesapeake

BETTER MODELS FOR CONSERVATION

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CHAPTER 4

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Incentive Driven Conservation Introduction

Traditional conservation mechanisms have profound merits, but can have significant implementation limitations. Their biggest limitation is our society's unwillingness and inability to buy or appropriately regulate all of the land many scientists and planners believe would optimize our capacity to protect and restore the Bay watershed.

Given this simple reality, some resource managers and policy makers champion the idea of stimulating private conservation efforts that enable landowners and businesses to make a profitable living from the sustainable use of natural resources. Incentive driven conservation strategies use economic and social benefits as pro-active measures to inspire good stewardship and land management that protects and restores natural resources on private land. These approaches are voluntary, non-regulatory and market driven. Financial inducements are a proven motivator for private landowners and have become a primary conservation tool at the federal government level. For example, the Conservation Reserve Enhancement Program (CREP) is a well documented success story. Recently, there has been a growing interest in learning more

about alternative examples of incentive driven conservation in the Bay.

The case studies in this chapter detail emerging ecosystem market opportunities where entrepreneurs and private landowners can make money by restoring and preserving important lands for conservation purposes. Virginia's transferable state tax credit, a voluntary incentive, is a powerful motivator for private landowners to donate conservation easements. A developer on the Eastern Shore has conserved endangered species habitat and created wildlife refuges paid for through the sale of residential lots. Ecosystem Investment Partners demonstrate how to use wetland and endangered species banking to protect critical habitats while making a profit for investors. Forest banking has been used by private landowners to restore forestland, reduce water

pollution and make a profit at the same time.

Some of the principles underlying these incentive driven conservation profiles, which are essential to attaining a sustainable Chesapeake, include:

- **Complement and reinforce environmental regulations and land use controls with incentive driven conservation:** A combination of regulations, land use controls, and incentive driven conservation measures are needed to restore the Bay watershed. The power of a well defined, diverse system of financial and social recognition incentives will continually inspire entrepreneurial and voluntary conservation actions by citizens, NGOs and businesses. Movement toward a "greener" economy, where fully developed markets are established for the purchase of ecosystem services, holds great promise for regenerating the rapidly depleting natural resource base of the watershed.
- **Accelerate site specific and area-wide conservation needs with market-based solutions:** Open markets and government regulated markets have been created around the demand for nutrient reduction, endangered species habitat conservation, carbon reduction, wetland creation, and afforestation and reforestation. Landowners can align their land management needs with these emerging market-based opportunities and simultaneously help the Bay. Government decision-makers can facilitate and steer market-based solutions to accelerate the pace of conservation in targeted geographic areas to help achieve predetermined environmental outcomes.

Virginia's State Tax Credit for Land Conservation

Protecting Virginia's Landscapes With Tax Credit Incentives

Virginia's transferable state tax credit for land conservation represents an effective, voluntary, free-market mechanism that has proven to vastly increase donations of conservation easements, which protects the integrity of the landscape and benefits the Chesapeake Bay watershed.

CASE STUDY SUMMARY

The Commonwealth of Virginia has created a powerful incentive for land conservation, a transferable credit to pay state income tax. Virginia's tax credit program operates state-wide, and in only nine years it has generated over 2,000 individual land conservation donations, protecting over 434,000 acres of land. The appraised value of the protected land is over \$2.2 billion and represents more than \$970 million in tax credits. The total area conserved continues to rise significantly each year.

Virginia loses 120 farms per year and over 20,000 acres of forest land per year to development for housing and commercial interests.¹ If current trends continue, Virginia is predicted to lose a million acres of forest in the next 25 years.² These escalating losses often include thousands of acres of land with high ecological and historical importance. These land use changes have contributed to population declines in the 55 species listed as endangered or threatened (40 animals & 15 plants) in Virginia. Nevertheless, the state ranks near the

bottom nationally in natural resource conservation spending and does not have a dedicated source of funding for land conservation purchases, which makes the tax credit program one of the most important conservation tools in the state.

In 1999, the Virginia General Assembly passed the "Virginia Land Conserva-

tion Incentives Act," to grant a credit against its state income tax to property owners who donated land or easements to protect conservation values in Virginia. The original tax credit granted was 50% of the value of a qualifying conservation donation in the state. Getting the original tax credit law enacted was a collective effort by the Virginia conservation



A stream at a private property protected using Virginia's tax credit program.

community, starting with a model proposed by Philip Tabas of The Nature Conservancy.

In 2001, two Virginia conservationists, architect Philip Hocker and attorney Charles Davenport, proposed that the tax credit should be made transferable in order to make it a more compelling and flexible stimulus for conservation donations. A transferable tax credit is one that can be sold to other taxpayers, in addition to being usable by the conservation donor alone in lieu of cash to pay taxes. Making the credit transferable makes it a much more powerful incentive for conservation gifts. Thanks to support from Delegate William Howell (R-28th District), the Virginia Land Conservation Incentives Act was amended accordingly in 2002.

To address the unexpected popularity of the program and concerns regarding the return to the state in conservation value, legislative amendments were made to the program in 2006 that placed greater financial and oversight controls on the properties claiming the tax deduction. The Virginia Department

of Conservation and Recreation was formally brought into the process to provide state government review of conservation easements claiming over \$1 million in tax credit and to produce an annual reporting of the program accomplishments.

The transferable state income tax credit has proven to be a flexible, politically popular, and dramatically effective tool to leverage significant private investment to accomplish conservation objectives. It provides both the wealthy landowner and the land-rich, cash-poor landowner with conservation options. Virginia's income tax program may provide other states in the Bay watershed and elsewhere with a model for a new and effective way to increase land conservation where consistently appropriated or dedicated funds for natural resource conservation are unavailable or limited.

RESOURCE MANAGEMENT CHALLENGE

Widespread development has overwhelmed farms, forests, and riparian habitat in many areas of the

TAX CREDIT VS. TAX DEDUCTION

The Federal government has offered a tax deduction for easement donations since 1964, but state tax credits for conservation originated in 1983, and were widely enacted in 1999 and afterwards.

Tax credits lower a taxpayer's bill dollar for dollar. Whereas, a tax deduction reduces a taxpayer's taxable income, so the value will depend upon the taxpayer's tax bracket.

For example, a \$10,000 credit lowers the bill by the full \$10,000, regardless of the tax bracket. A \$10,000 deduction will lower a taxpayer's bill in the 25% tax bracket by only \$2500.

Commonwealth. Twenty-five percent of all the development in Virginia has occurred within the last 15 years and the conversion of open space is increasing faster than the population as a whole.³ By some estimates, Virginia is slated to develop more land in the next 40 years than it did in the previous 400 since the founding of the Jamestown colony. Even with the recent economic slowdown, it is clear that development has negatively affected water quality, reduced habitat for threatened and endangered species, and destroyed historic, cultural, scenic and economic resources.

As a part of the Chesapeake 2000 Agreement, Virginia's government agreed with its regional partners to place conservation protections over 20% of its portion of the Chesapeake Bay watershed by 2010. Furthermore, in April 2006, Virginia's Governor, Tim Kaine, announced an aggressive goal



Photo of a Largeleaf grass-of-Parnassus (*Parnassia grandifolia*), an imperiled species in Virginia. This population was protected by an easement established through Virginia's tax credit program.



Aerial photo showing development encroaching upon rural farm and forest lands near Manassas, Virginia.

to protect 400,000 additional acres during his four-year administration, which represented a near doubling of past efforts annually.⁴ While Virginia is on track to meet the Governor's ambitious short-term objective, it will still be several hundred thousand acres short of its 2010 Bay goal.⁵

Although the *Virginia Outdoor Survey* found that 94% of respondents believed protecting Virginia's natural and open space resources was either important or very important,⁶ the Virginia General Assembly has been reluctant to appropriate funds for land or easement purchases. Since the early 1990s, Virginia conservationists have sought a dedicated fund established by state law - to provide a reliable, self-renewing source of funding to pay for land conservation - with no success. Special budget appropriations for conservation have been made, but these have been difficult year-by-year fights, and the amounts appropriated have been small relative to the need. The lack of consistent state funding for land conservation has made accomplishing conservation objectives and commitments tremendously difficult. For a rapidly developing state that covers

25 million acres with a strong conservation need, a new complementary strategy was needed.

CONSERVATION VISION

Offering tax benefits, rather than actual cash payment, to encourage people to do something government desires is an old concept. In the mid-Thirteenth Century, King Louis IX of France granted tax credits to encourage people to move to the new Mediterranean port he built at Aigues-Mortes. In the United States, charitable donations of land for conservation have been encouraged by federal tax deductions since 1917. Donations of conservation easements have been formally recognized as tax-deductible by the Internal Revenue Service since 1964.

To further increase the rate of land protection, some states have elected to offer more than tax *deductions* to encourage land conservation. North Carolina was the first state to offer the added incentive of a tax *credit* for land conservation, starting in 1983. Next, Virginia was the first of four states to legislate a state income tax credit for conservation in the year

1999. In 2000 and since, seven more states have established state tax credit conservation programs. The forms and details of the programs vary widely from state to state.⁷ Virginia's is one of the simplest, and the dollar volume of conservation achieved by the Virginia program is roughly double that of the runner-up, Colorado. Other states' programs have caps on the dollar amount of credit that can be claimed by any single donation, or other financial constraints, that limit their impact.

While the original 1999 state income tax credit was a very powerful first step, many conservation donations earned so much tax credit for the donors that they could not use it all. The top Virginia income tax rate is 5.75%, so state income taxes are often not large compared with the development value of a farm. Although the 1999 law allowed donors to carry unused tax credit forward for up to five tax years after the year of the original donation (paralleling federal treatment of tax deductions for charitable gifts), many land-rich, cash-poor landowners were unable to use the tax credit they had earned even over the six years allowed.

A transferable credit is a much more attractive conservation option because it can be sold by a cash-poor landowner to someone with substantial tax responsibility and provides added flexibility. For example, the tax credit is helpful to the cash-poor farmer who, after donating an easement, can sell the credit and receive cash, perhaps for new equipment or for their spouse's urgent medical treatment. It is also helpful to the problematic family estate with multiple second-generation owners, some of whom want to conserve their heritage, while others want cash benefits. Lastly, it is more appealing to free-market conservatives than special budget appropriations for land

conservation, which provides vital insulation from cutbacks during times of budget pressure. Davenport and Hocker set out to change the Virginia Land Conservation Incentives statute to make the tax credits transferable and to create a reliable market so landowners trust that they can convert the tax credit they earn for the donation into cash.

IMPLEMENTATION RESOURCES

There are two primary costs for the conservation tax credit program: operating costs and a reduction in the income taxes collected by the state.

Operating costs: The Department of Taxation administers the program, with assistance from the Virginia Department of Conservation and Recreation. Operating costs are modest. Under the 2006 amendments, a fee is levied only on the transfer of credit, to be used to cover state administrative costs. This fee is 2% of the value of credit transferred, up to a cap of \$10,000 per donation for any stage of transfers. Credit that is transferred once, and then re-transferred, is subject to a fresh levy each time it is conveyed. This fee has been acceptable to landowners, and does not appear to be a serious disincentive for participating in the program. Someone who uses the tax credit to offset their own tax liability and does not transfer the credit is not assessed a fee.

Reduction in Virginia's income taxes:

If the allowed maximum is used, the total tax cost to the Commonwealth of the credit program each year is capped by state law at \$100 million (adjusted each year for inflation since 2007) in foregone tax revenue. The table "Virginia Land Conservation Tax Credit History" shows how much credit has been issued. However, there is no firm data on how much of this issued credit has actually been

VIRGINIA LAND PRESERVATION TAX CREDIT PROGRAM

Following is a hypothetical example of the tax credit:

\$1,000,000 = Land value pre-easement

\$600,000 = Land value post-easement

\$400,000 = Easement value (EV)

\$160,000 = State income tax credit (40% of EV)

Maximum credit use is \$50,000/taxpayer/year and unless the Assembly changes the code, this will revert to \$100,000 in tax year 2011 and afterwards. A "married filing jointly" couple may use two times the maximum credit per tax year. Unused credit may be carried over for a maximum of 10 taxable years, following the taxable year in which the credit originated, until fully expended.

claimed – that is, returned instead of cash, on taxpayers' returns. Donors now have 10 years from the original donation to claim credits. It is likely that there is a significant decrease in the final cost of the tax credit program to the state, because part of the tax credit that is issued might never actually be submitted in lieu of payment on tax returns. The tax credit program has created a pro-conservation buzz in Virginia that has led to conservation donations being made for which some donors may never claim tax credit at all.

CONSERVATION STRATEGY

In 1999, the Virginia General Assembly enacted the Virginia Land Conservation Incentives Act, which is now codified in the *Code of Virginia* at § 58.1-510 et seq. The land preservation tax credit authorized under the Act provided an income tax credit of 50% of the fair market value for a donation of land or an easement to public or private conservation agencies for conservation and preservation purposes. The Act allowed for a carry-forward period, allowing credits to be applied to future state income tax, for a period of 5 years. The Act

required that eligible taxpayers must ensure that the use of the easement qualifies as a charitable deduction under Internal Revenue Code (I.R.C.) § 170(h) (i.e. exclusively for conservation purposes). It also requires that the donee must be a tax-exempt organization under the provisions of I.R.C. § 501(c)(3) and a private foundation under I.R.C. § 509(a)(2). The monumental effort to pass this legislation was led by The Nature Conservancy and a wide variety of Virginia land conservation advocates.

In 2001, Davenport and Hocker approached Delegate William Howell, currently Speaker of the Virginia House of Delegates, to lead an effort in the General Assembly to make the tax credits transferable. Delegate Howell was personally interested in seeing free-market tools used to advance the public policy goal of land protection and agreed to pursue the amendment. In 2002, the ability to transfer credits under the Act was codified in the *Code of Virginia* at §58.1-513(C), which provides that "[a]ny taxpayer holding a credit under this article may transfer unused but otherwise allowable credit for use by another taxpayer on Virginia income



A view of a private property in Nelson County, Virginia, protected using Virginia's tax credit program.

tax returns.” The phrase “unused but otherwise allowable credit” authorized the transfer of the total amount of the tax credit allowed by law and there was initially no cap placed on the amount of credit a given donation could claim.⁹

The original tax credit legislation effective at the start of 2000 allowed a credit of 50% of the appraised value of a conservation donation. Amendments enacted in 2006 reduced that ratio to 40%, effective at the beginning of 2007, and extended the carry-over period to 10 years. However, the rate of easement donations has stayed high even with the lowered credit ratio. Each year's total credit is dispensed on a first-come, first-served basis. The simplicity of this approach has been a great aid to the program's appeal to landowners. The 2006 amendments also placed a cap on the total amount of credit that may be issued in any year.

A unique aspect of the Virginia Land Preservation Tax Credit Program is the oversight review provided by the Virginia Department of Conservation

and Recreation (DCR). Beginning in 2007, amendments to state law tasked DCR with, among other things, compiling an annual report on all less-than-fee interest (conservation easement) donations for which a tax credit was requested. As a result of this record keeping, Virginia can now track the intended conservation purpose of these donations statewide. For example, in 2007, 22,765 of the 59,423-acres protected were donated with the expressed intent of preserving water quality.

In addition, the legislature assigned the director of DCR the role of verifying the conservation value of all donations where the donor requests more than \$1 million in tax credits. This verification is based on Conservation Value Criteria (Criteria) developed by DCR and adopted by the Virginia Land Conservation Foundation, a state citizen board made up of appointees by the Governor and the legislature. The Criteria include a review of the donation's conservation purpose, public benefit, and protections for water quality and forest stewardship. The DCR director must

verify that each qualifying donation has conservation value before the Department of Taxation can issue the tax credits. The DCR review has helped give confidence to the market that the tax credits will withstand IRS scrutiny.

Transferability has made a big difference in the state's land conservation efforts. After the law allowing transferability was passed, it took some time for a working market to be developed. Land trusts and agencies found the transferable credit to be an appealing marketing tool to interested landowners. Several private companies were formed to assist conservation donors, so there is now a reliable way for credit sales to be completed. Because there is some risk that a tax audit could challenge the validity or amount of the tax credit claimed, sellers usually must offer their credit for sale at a discount from its full face value. Buyers of the transferable tax credit also need to have trust that their expenditure will be valid.

The tax credit market developed slowly, starting in 2003. The first sales were made at a deep discount, because buyers were wary. The first transfer was made at a price of \$0.45 paid per dollar of tax credit value. However, the price paid for credit has risen as buyers' trust has grown. Transfers are now generally made at prices between \$0.75 and \$0.85 per dollar of credit value. Keeping the program stable and predictable has been essential to building buyer trust.

Although significant amendments were made to the statute since its inception, the Virginia tax credit program remains a remarkable success.

RESULTS

The Virginia Department of Taxation maintains a cumulative database of all conservation donations for which tax credit is claimed and the Virginia Department of Conservation and Recreation produces an annual report on the results of the program.¹⁰ As of mid-July 2009, the tax credit program has protected 434,657 acres and issued \$971 million worth of tax credits since 2000. From other sources, one can infer that a number of Virginia conservation donations

are made for which tax credit may never be claimed. Cumulatively, these figures clearly indicate that most of the acreage protected since Governor Kaine announced his 400,000 acre land conservation goal has been made possible by donations of conservation easements that qualified for the tax credit.

In considering the Virginia land conservation tax credit history (see table), several things should be noted: The Virginia *non-transferable* tax credit was enacted in 1999, and took effect for donations made on or after January 1, 2000. This actually led to a reduction in easement donations in 1999, because donors waited until their gift would qualify for the tax credit. The General Assembly's enactment of tax credit transferability in 2002, led to a startling increase in the rate of conservation gifts (mostly in the form of easements).

The volume of conservation donations grew steadily in 2003, '04, and '05. Donations exploded in 2006 when donors rushed to take part in the program before the legislative amendments took effect in 2007. Nevertheless, since the start of 2007, conservation donations have

continued at a rapid pace. Data from the Department of Taxation and the Virginia Outdoors Foundation indicate that 2008 garnered the second highest acreage of conservation donations ever seen, behind the "land-rush" year of 2006 (see Virginia Land Conservation Tax Credit History table).

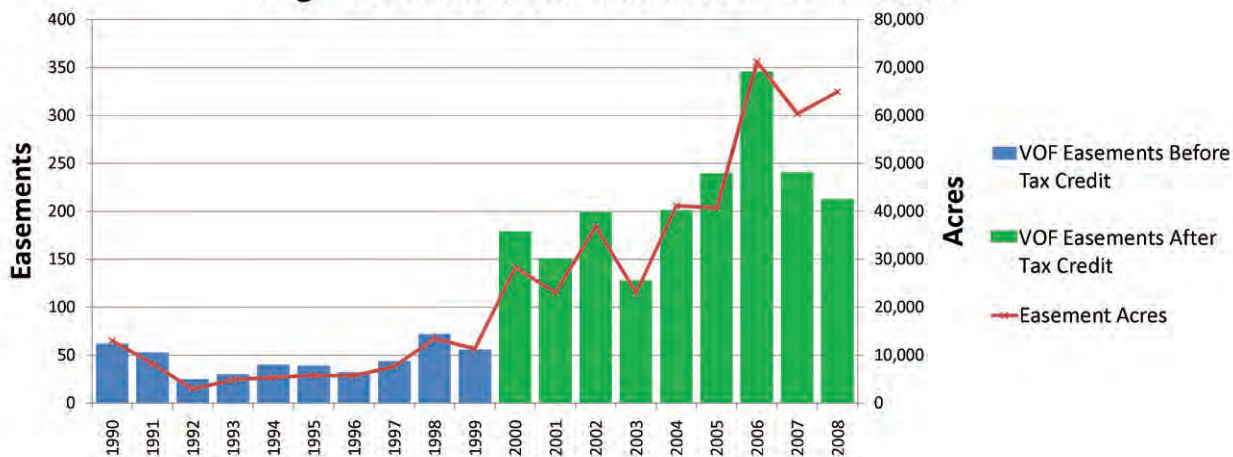
The *rate* of easement donations can be measured through statistics of the Virginia Outdoors Foundation ("VOF"). Approximately 93 percent of conservation easements in Virginia are donated to VOF. Many agencies and independent land trusts in the state work to encourage landowners to donate easements, but prefer that the donations be held by VOF because it is believed that VOF will have a more reliable ability to enforce easements over time.

Through the decade 1990 through 1999, the Virginia Outdoors Foundation received an average of 45 easement donations each year (see Virginia Outdoors Foundation Easement Trends graph). This amounted, to an average of 7,855 acres of land protected each year. In 2000, with the non-transferable tax credit, donations to VOF jumped to 179 individual easements, and a total of

Virginia Land Conservation Tax Credit History				
Tax Year	Number of Donations	Number of Acres	Appraised Value	Tax Credit Issued
2000	126	17,441	\$51,941,891	\$25,970,946
2001	94	13,534	\$53,531,727	\$26,765,864
2002	214	34,791	\$124,520,613	\$62,260,307
2003	139	28,059	\$150,717,414	\$75,358,707
2004	237	49,379	\$283,011,440	\$141,505,720
2005	277	55,914	\$310,875,751	\$155,437,875
2006	455	93,605	\$493,992,166	\$246,996,083
2007	254	59,423	\$249,862,906	\$99,945,164
2008	224	60,199	\$255,717,705	\$102,287,084
mid-2009	92	22,312	\$88,553,720	\$35,421,489
Total to Mid-July 2009	2,112	434,657	\$2,062,725,333	\$971,949,239

*Data from VA Department of Taxation, updated 13 July 2009.

Virginia Outdoors Foundation Easement Trends



28,300 acres. This dropped slightly in 2001. Then when transferability was granted in 2002, the VOF total rose to 199 easements and 36,800 acres. As more landowners and their advisers learned how to use the transferable tax credit and with the visibility and encouragement of the Governor's land protection goal, the rate of conservation easement donations to VOF has risen so that in both 2007 and 2008, VOF protected over 60,000 acres a year.

In 2007, as part of their new oversight role, DCR reviewed 20 potential donations within an average of 22 business days, while providing valuable feed back to the donor and the holder on the conservation terms of the donation. These 20 donations represented \$28 million of the \$100 million in land preservation tax credits requested in 2007. Since many different entities, ranging from The Nature Conservancy to a new local land trust, help to broker and hold conservation easements, DCR's review has proven to be valuable in improving the quality of the conservation easements in Virginia. For example, the Department's preliminary review of easement documents has resulted in improvements such as those listed below to the final donations:

- ▶ Providing consistent protection of forestland by requiring a forest management plan;
- ▶ Ensuring that scenic easements contain visual access;
- ▶ Requiring that water quality be protected by the development and implementation of a farm conservation plan where applicable;
- ▶ Improving the Chesapeake Bay and its tributaries by requiring the establishment of riparian buffer areas along perennial streams and water bodies;
- ▶ Ensuring that historic resources on conserved lands are protected from demolition and alteration if listed on state and national registries; and
- ▶ Requiring the protection of documented rare, threatened, or endangered resources found on the property.

All of these protections were added to donations that otherwise likely would not have protected these significant natural resources. For example, as originally submitted to DCR, one application claiming agricultural use as its sole conserva-



Photo of an Appalachian Jewelwing (Calopteryx angustipennis), an imperiled species in Virginia. This population was protected by an easement established through Virginia's tax credit program.



The Walters placed an easement on their Virginia farm and used the money they received from the transferable tax credit to improve their waste treatment facilities.

tion purpose would have allowed substantial development of the property under the terms of the proposed easement. DCR's review required that the overall development of the property be limited to protect the future agricultural use of the land prior to recordation of the easement and submission of a final application.

Virginia's wealth of unique places is nowhere more apparent than in the lands that were protected using the land conservation tax credit program. Recent examples include the following:

- The program was used to protect a small 40-acre farm in northern Virginia dedicated to organic farming. This farm, which is in the Chesapeake Bay watershed, is within 1,000 feet of several municipal groundwater wells, and protects drinking water for the community.
- The program has been used to protect another property in the coastal region of the Bay watershed that is not only the site of several significant moments in the nation's history, but also contains a rare southern upland hardwood forest and an active agricultural operation.

- An easement on a 1,700-acre family farm along the Mattaponi River not only helped ensure the continuation of high-quality farming and forestry practices, but the tax credits also enabled the elderly owner to be able to afford a nursing home while preserving the farm for her family.
- Tax credits from preservation of a dairy farm on a tributary of the Pamunkey River helped the family pay down debt on new milking facilities, including some state-of-the-art manure and waste treatment facilities, thus, helping this Bay area farm to remain in farming.

Almost every property reviewed in 2007 had some form of agricultural activity at the time of donation, ranging from row crops in Loudoun County to cattle farming in the Tidewater region and equine breeding in Albemarle County. In a number of instances the applicant's stated goal in preserving the property and requesting the tax credit was to provide the financial wherewithal to enable the transition of the next generation of the family into the management of the agricultural operation.

KEYS TO SUCCESS

Fostering a land conservation ethic:

A successful program builds upon and helps cultivate heartfelt concern by local landowners for the beauty and conservation value of their lands.

Creating a simple state tax

credit program: Programs should be designed to be a simple incentive, not a complex directive. The rules for qualifying should generally parallel the federal rules for a tax-deductible conservation donation, however, Virginia's special emphasis on water quality and forest stewardship show that state level priorities can be successfully incorporated. In addition, the state level review if handled properly such as in Virginia can provide greater consistency in the value of lands donated, and offer additional predictability to credit buyers and donors alike. Any concerns over the loss of state income taxes can be overcome by placing an annual program-wide ceiling on the amount of credit to be issued.

Managing a program on a first-come

first-served basis: Fair and equal access is crucial to the integrity of the

program. Applications for credit that are made after the annual ceiling is reached should be placed in a queue, and credit allowed for them in the next year. Virginia does this.

Maintaining a level playing field:

Over the history of Virginia's tax credit program, there have been several proposals to grant higher rates of tax credit to specific kinds or categories of conservation gifts. Targets for favored treatment have included: smaller farms, recreational lands, gifts that allow public access to the protected land (which most conservation easements do not include), or lands in specific watersheds. Thus far, the Commonwealth has resisted such proposals while recognizing their merit. Attempts to grant special treatment to parts of the land conservation could undermine public support for the entire effort if adopted.

Ensuring transactions earning credits deserve public investment:

Beginning in 2007, DCR was given the responsibility for administering a review of conservation value for conservation donations that claim

\$1 million of credit or more. DCR, led by its Director, Joseph Maroon, has worked hard to develop procedures for this review process that are workable and responsive to landowner needs. Of special note is the pre-approval process that DCR created to help landowners determine whether the terms of proposed conservation easements would qualify *before* the landowner had made the irreversible commitment of donating an easement and reducing the property's market value.

Remembering that conservation

progress takes time: Making a conservation easement donation is a complex process. A program on the scale of Virginia's depends on building a level of professional expertise among attorneys, public accountants, appraiser, agencies, and others, in addition to developing trust on the part of landowners. This takes time. The pace of easement donations, as measured by gifts to the Virginia Outdoors Foundation, has grown as the landowner and professional-service community have developed more comfort with the program.

Developing essential partnerships and government agency support:

The tax credit by itself is only an incentive to action; it does not actually protect any land. The fact that hundreds of thousands of acres have been protected through this program is due to a fine cooperative effort by many people, nonprofit organizations and government agencies.

In Virginia, the Department of Taxation has played an especially helpful role. This surprises many folks – after all, the tax credit *reduces* state revenues. An agency dedicated to collecting taxes would not be expected to be an ally. But the staff and leadership of the Department of Taxation have understood that the General Assembly wants the tax credit program to be “user-friendly,” and the Department has worked hard to comply. The Department has been concerned about possible abuse of the program, but in the authors' judgment it has done a good job of balancing the need for solid enforcement of the rules with the need to make the program responsive and accessible to landowners.



Photo of a smooth purple coneflower (Echinacea laevigata), an imperiled species in Virginia. This population was protected by an easement established through the Virginia's tax credit program.

PHOTOS AND FIGURES

Page 135, 136, 139, 141, 143: Photos, Irvine Wilson, Virginia Department of Conservation & Recreation, Natural Heritage Program
 Page 137: Image, Google Earth
 Page 141: Figure, Joel Dunn
 Page 142: Photo, Virginia Department of Conservation and Recreation

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Ecosystem Payments at Work

Conserving Land in Virginia's Great Dismal Swamp

Government land management agencies and entrepreneurs can mutually benefit from emerging ecosystem market opportunities that restore and preserve important conservation lands near existing public lands.

CASE STUDY SUMMARY

Ecosystem Investment Partners' Great Dismal Swamp project showcases how conservation-minded investors can use private capital and Payments for Ecosystem Services (PES) markets to conserve important landscapes. This case study provides an innovative example of capitalizing on multiple resource and value streams of a property to align return on investment with restoring a damaged ecosystem. This incentive-driven conservation solution can be applied to other properties in the Chesapeake Bay watershed.

Ecosystem Investment Partners' (EIP) Great Dismal Swamp property is a 1,037-acre inholding in the Great Dismal Swamp National Wildlife Refuge in southeastern Virginia. This intensively managed agricultural land was once part of an enormous swamp covering close to a million acres across southeastern Virginia and northeastern North Carolina. EIP's inholding is uniquely positioned to tap the converging needs for wetlands restoration and for a ready-made market for mitigation credits in the area. EIP is taking advantage of these factors and hoping to demonstrate both on-the-ground

environmental success and financial success for their investors.

EIP was founded in 2006 by Fred Danforth, Adam Davis and Nick Dilks. They represent three components of the newly emerging ecosystem services industry: business, real estate, and conservation. Adam Davis is president of Solano Partners, Inc., an environmental investment and conservation finance consulting firm. Davis is also co-founder of the website Ecosystem Marketplace, a global information service on market mechanisms and financial incentives for conservation. Nick Dilks is a career conservationist with experience at the Nature Conservancy, the Natural Lands Trust in Pennsylvania, the Maryland Environmental Trust, and The Conservation Fund. Fred Danforth was a co-founder and partner in the private equity firm of Capital Resource Partners, which successfully raised and placed almost \$1 billion during his tenure.

EIP purchased its first property, a portion of the Great Dismal Swamp, in June 2007. While only two years into their expected 10-year ownership of the property, EIP is already showing positive results. EIP is restoring

the property to its natural wetland condition and has established a wetlands mitigation bank under the auspices of the Clean Water Act. The purchase and restoration of the property is being funded by the sale of credits from the restored wetlands to development projects in the surrounding watershed. At the end of the investment period, EIP hopes to sell the conserved and restored property to the U.S. Fish and Wildlife Service so that it may become part of the National Wildlife Refuge. As private sector entrepreneurs, EIP is taking market-based restoration and conservation to a new level, creatively using multiple markets and investment approaches to define the environmental value of an ecosystem and create incentives for its conservation.

RESOURCE MANAGEMENT CHALLENGE

In 1763, George Washington encountered the Great Dismal Swamp and saw a "worthless" swamp wasteland in need of taming. As one of the nation's first real estate developers, Washington founded the Dismal Swamp Land Company (otherwise known as "Adventurers for Draining

the Dismal Swamp”) for the sole purpose of ditching and draining the swamp for agriculture and timber harvest.

Prior to this time, the Great Dismal Swamp supported a distinctive Tupelo-bald cypress and Atlantic white-cedar forest. Long before Washington’s arrival, settlers and slaves ventured into the swamp to harvest these trees for shingles, planking, and other products. More than two hundred species of birds have been identified in the swamp, including two southern species, the Swainson’s warbler (*Limnothlypis swainsoni*) and Wayne’s warbler (*Dendroica virens waynei*), that are more common in the Great Dismal Swamp than in other coastal locations. The swamp supported a variety of mammals including: river otter (*Lontra canadensis*), numerous species of bats, racoon (*Procyon lotor*), American mink (*Neovision vision*), gray fox (*Urocyon cinereoargenteus*), red fox (*Vulpes vulpes*), eastern gray squirrel (*Sciurus carolinensis*), white-tailed deer (*Odocoileus virginianus*), American black bear (*Ursus americanus*), and bobcat (*Lynx rufus*).

Washington’s company dredged the swamp land and built canals across the property to make it suitable for crops. Once the canals were complete, the wild swamp was rapidly converted from a naturally functioning ecosystem to commercial timberland and row crops. For three centuries, agricultural, commercial, and residential development destroyed the natural systems of the swamp until only a fraction of the original swamp remained. Logging nearly wiped out the native Atlantic white cedar and bald cypress stands, while related road and canal construction nearly destroyed the complex hydrology of the swamp. By 1950, no virgin timber remained on the property. A drier swamp and the suppression of wild-

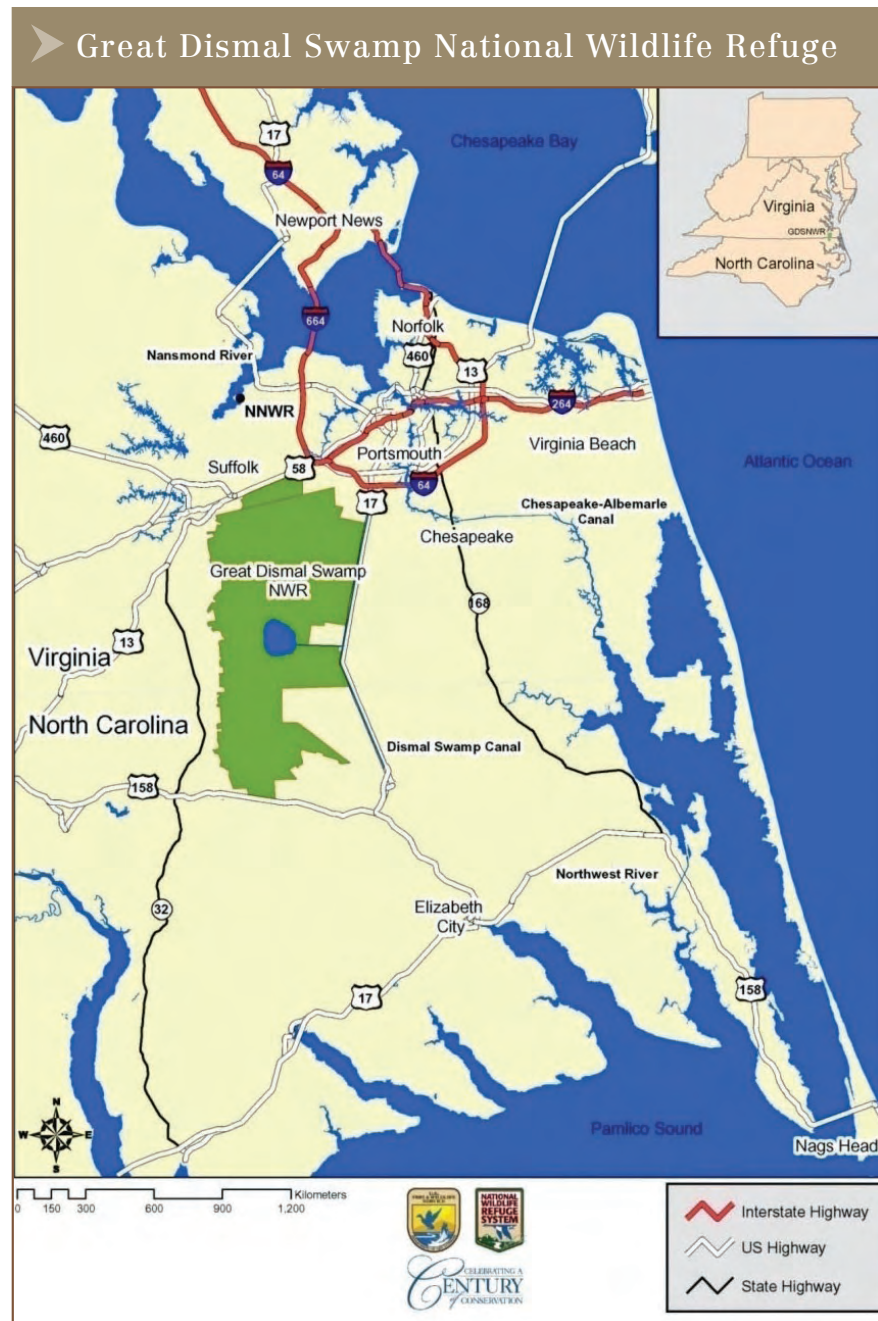
fires created environmental conditions that drastically decreased plant and animal diversity.¹

After ownership by a succession of real estate developers, farmers, and timber companies, the fate of the swamp finally began to change. In 1973, the Union Camp Timber Corporation donated 49,100 acres of the core swamp area to The Nature Conservancy – then the largest land conservation donation by a corporation in U.S. history. The Nature

Conservancy then transferred the land to the U.S. Fish and Wildlife Service, which established the Great Dismal Swamp National Wildlife Refuge.

Over the next several decades, a broad coalition of public and private conservation interests succeeded in adding more than 60,000 acres to the Refuge, bringing its total acreage to 111,000.

Efforts across the Refuge have restored much of its natural hydrology and begun to bring back many native



Lake Drummond, a 3,100-acre natural lake in the heart of Great Dismal Swamp. Aggressive logging nearly wiped out the native Atlantic white cedar and bald cypress stands in the Great Dismal Swamp, while related road and canal construction nearly destroyed the complex hydrology of the swamp. By 1950, no virgin timber remained on the property.



species. However, one 1,037-acre unprotected inholding remained within the acquisition boundaries of the Refuge. Because the Refuge surrounded the inholding on three sides, gaining ownership of this property was of the highest priority for the Fish and Wildlife Service, the State of Virginia, and numerous conservation groups.² Attempts to purchase this final piece of the puzzle were repeatedly thwarted by lack of funding, coupled with the escalating value of real estate in this area.

CONSERVATION VISION

EIP's vision for its Great Dismal Swamp property, along with its other investments, is to capitalize on the critical services provided by ecologically important lands and the new

markets for these services in order to both restore and conserve land. EIP's investment strategy focuses on the double bottom line of achieving conservation goals and financial gains. EIP creates value for its investors by purchasing large properties in need of restoration and then actively managing them to create and monetize environmental value by using market mechanisms such as mitigation and conservation banking. They also manage the timber, agricultural, and real estate attributes of these properties that do not conflict with overall conservation objectives.

EIP's principals agree that environmental protection and restoration activities can be compatible with economic development and returns

to investors. "Unlocking return on investment from conservation and restoration action on private property is a necessity to promote large scale protection of ecosystems and working landscapes," said Nick Dilks. According to EIP's Adam Davis, the marketplace is increasingly interested in such partnerships. Conservation measures are now falling into place not simply for ethical reasons, but because of the measurable ecosystem services such protection provides.³ Since purchasing the Great Dismal Swamp, EIP has invested in three additional projects in Delaware, Louisiana and Montana.

EIP found a significant portion of the capital for this project from the Lyme Timber Company, a private equity



investment firm based in Hanover, New Hampshire, that is a pioneer in economically profitable conservation projects. Lyme has traditionally focused on timberland investment projects, purchasing large timber parcels with high conservation values as a way of bringing conservation and investment dollars to the table. Because of the properties they target, they are often able to sell working forest conservation easements to state agencies that permit sustainable timber harvests as well as public recreation, thus reducing their capital investment in the property. In the first decade of the 21st century, this conservation investment innovator began to see investment opportunities in projects that included markets for ecosystem services. Accordingly, Lyme decided to invest a portion of its fund with EIP.

The previous owner of the Dismal Swamp property knew that this parcel was very important to conservation interests. Therefore, he approached The Conservation Fund about purchasing this land before placing it on the open market. The Conservation Fund contacted the newly formed EIP which, with its partner Lyme Timber, was able to put together the funds needed to purchase the property.

IMPLEMENTATION RESOURCES

The term “ecosystem services” refers to the earth’s natural functions, which include water and air purification, mitigation of droughts and floods, decomposition of wastes, regulation of climate, and maintenance of biodiversity, to name a few. Traditionally, economic systems put little or no value on ecosystem services. The vital life-supporting actions of the planet are taken for granted until disrupted or threatened. Over the last decade, however, the concept of attributing a monetary value for ecosystem services in the marketplace has



Great Dismal Swamp Jericho Ditch.

grown. There are now markets for an array of ecosystem services including the control of greenhouse gases, clean water, habitat protection, forest and watershed functions, and riparian restoration.

What distinguishes sales of ecosystem services from other forms of environmental regulation is that they must involve scientifically verifiable units of performance. In order to market ecosystem services, one must be able to quantify how much of the service is being provided. The United States has created markets for ecosystem services through state and federal environmental regulatory structures that require polluters to mitigate for unavoidable impacts of development projects.

The most active PES market surrounding the Great Dismal Swamp project is the wetland mitigation program of the federal Clean Water Act. Wetlands are complex ecosystems that improve water quality, diminish droughts, provide natural flood control, recharge groundwater aquifers, and stabilize shorelines. They

also provide important habitat for a wide range of plant and animal species and can help support commercial fisheries. Protection of wetlands in the United States is governed by a 1997 amendment to the 1972 Clean Water Act.

Section 404 of the Clean Water Act requires a permit for the discharge of dredge or fill materials into waters of the United States. Since 1997, this applies to wetlands as well. In order to obtain a permit, a developer must demonstrate that they have 1) taken steps to avoid wetland impacts, 2) minimized potential impacts on wetlands, and 3) if necessary, provided compensation for any remaining unavoidable impacts.⁴ If an impact is determined to be unavoidable, the permittee must provide “compensatory mitigation” for their project. This means that other wetlands must be restored, created, enhanced, or, in some cases, preserved in compensation for the destruction of natural wetlands. This mitigation can be done by the permittee or by a third party, such as EIP.

In April of 2008, a new mitigation rule was promulgated by the U.S. Army Corps of Engineers that established one set of standards for all Section 404 mitigation responses. The action superseded previous guidance documents and consolidated it in one rule that ranks the allowable compensation methods in order of preference. Highest preference is given to mitigation through mitigation banks, followed by fee-in-lieu programs and then permittee responsible mitigation actions. The rule further stated that every type of compensation must include a mitigation plan with a clear and uniform set of required components.⁵

A wetland mitigation bank is a legally established entity that owns a wetland, stream, or other aquatic resource that has been restored, established, enhanced, or preserved to compensate for impacts to wetlands elsewhere.⁶ Mitigation banks can be created by private corporations, nonprofit organizations, and/or government agencies through a formal agreement with a regulatory agency. The value of a bank is defined by the mitigation credits it creates. One benefit of third-party mitigation is that the permittee transfers all liability to the bank and the mitigation is usually done by an entity with more restoration experience than the permittee/developer. Between 1992 and 2005, there was a 376% increase in the number of approved mitigation banks owned by for-profit and nonprofit organizations. Since 2001, the number of mitigation banks that have sold all of their credits has tripled.⁷ In 2007, the Environmental Law Institute found that the annual United States wetland mitigation market was worth \$2.9 billion.⁸

CONSERVATION STRATEGY

Prior to purchasing the property, EIP went through a rigorous process of

Formula for Credit Creation at EIP's Dismal Swamp Bank		
	Acres	Credits
Preservation	243.33	24.33
Restoration	689.09	686.09
Upland Buffers	4.36	0.29
Enhancement	29.15	1.45
Easement Bonus	0	35.608

“due diligence” to determine whether their financial estimates for the various PES markets were accurate. They anticipate ongoing demand for credits from small-scale projects as well as additional large-project demand that will be generated by public infrastructure projects like roads, airports, and transmission lines. When EIP purchased the property, there were three large projects planned for the next three to five years that would require up to 370 acres of mitigation. Since there is only one other wetland mitigation bank in the area with available credits, EIP's anticipated market share is very favorable. The approximate value of wetland credits in the area has historically been in the range of \$12,000 to \$15,000 per acre.

EIP will restore and conserve former wetlands that had been converted to agriculture on the Great Dismal Swamp property. Demand for wetlands mitigation in this part of Virginia is driven by commercial and residential development and road construction in and around the Virginia Beach, Chesapeake, and Norfolk metropolitan area. EIP, with the help of the Williamsburg Environmental Group, has established a wetlands mitigation bank, the Dover Farm Mitigation Bank on 966 acres of the property. The site on which the Bank is situated is comprised of 239 acres of existing wetlands, approximately 700 acres of agricultural land, and 27 acres of nonagricultural upland terrain. Approximately 71 acres of the property that was entirely uplands was excluded from the Bank.

The goal of the Bank is to “establish a self-sustaining functional aquatic system to replace the functional values of wetlands and other aquatic resources anticipated to be adversely affected within the authorized service area.” The Bank's credits may be used to offset development impacts within the Albemarle Sound drainage basin, which includes all or part of South Hampton County, Chesapeake City, the City of Suffolk, and the City of Virginia Beach. The Bank will generate a total of 747 wetlands credits and has already sold all 112 of its pre-released credits to the Hampton Roads Executive Airport project. The area included in the mitigation bank is subject to a conservation easement donated to The Nature Conservancy.

The number of credits created per acre depends on the type of land in the bank. More credits are given for restoring land than for preserving existing wetlands. The table entitled Formula for Credit Creation at EIP's Dismal Swamp Bank shows how credits were allocated.

The Bank will be developed over several years. Construction was completed in 2009, with grading and plugging of the ditches that traverse the site and the installation of hydrological control structures. EIP also selectively graded the property to create variations in micro-topography and increase habitat diversity. The entire property has been seeded with a wetland seed mix and planted with over 290,000 native trees and shrubs. The plant diversity will also reflect

The Dover Farm portion of the Great Dismal Swamp Property before restoration: drainage ditches illustrate the way that water had been managed on the site. Working with local experts in hydrology, conservation biology and soil science, EIP develops and implements detailed restoration plans for each project.



those volunteer species already present and species found at the adjacent Refuge. The Williamsburg Environmental Group worked closely with the U.S. Fish and Wildlife Service to ensure the appropriate species mix was planted on the site.

The Refuge contains identified habitat for the state endangered canebrake rattlesnake (*Crotalus horridus*) and the bank has the potential to provide additional habitat. After generating wetland credits, a secondary goal of the bank is the expansion of canebrake rattlesnake habitat on upland portions of the property.¹⁰ EIP has been authorized by the U.S. Army Corps of Engineers and Virginia Department of Game and Inland Fish to sell rattlesnake credits off 239 acres of the wetland bank.¹¹

There are other current and potential revenue sources on the property. Prior to commencement of restoration activities, EIP leased the farm fields for corn and soy bean production. Recreational leasing for quail, waterfowl, deer, and bear hunting also provides some revenue. Virginia is in the process of establishing a cap

and trade system for reducing Total Maximum Daily Loads of nutrients into the Chesapeake Bay watershed. Depending on the rules that are ultimately established, it is possible that EIP could receive credit for water quality improvements made as the farmlands are restored to forested wetlands. These credits could then be sold much like wetland mitigation credits to entities that need to offset their nutrient outputs. There is also a possibility that the nascent carbon sequestration market could develop in such a way that EIP's forest restoration and conservation work could generate marketable carbon credits.

Because EIP's property is within the boundary of the Great Dismal Swamp National Wildlife Refuge, the U.S. Fish and Wildlife Service is very interesting in purchasing it. At the end of the investment period, after the bank is sold out, EIP would like to sell the land to the Refuge. EIP will work with the Fish and Wildlife Service to facilitate funding from various federal and state conservation funding sources, such as the Land and Water Conservation Fund and

the Migratory Bird Program. Under this strategy, the Refuge would be able to acquire the fully restored and permanently conserved property for less than it would have otherwise paid for the parcel, even in an unrestored condition.

RESULTS

EIP's conservation investment model has led to the conservation and restoration of one piece of the Great Dismal Swamp. Because of EIP, the land will be restored to its natural hydrology, conserved forever, and hopefully become part of the Great Dismal Swamp National Wildlife Refuge.

Without an investor like EIP, the only hope of conserving the property would have been the traditional model of seeking government funding and generous philanthropic donors to pay for its conservation. Even if that effort were successful, the property still would not have been restored and endowed. The market for wetland mitigation credits is the financial driver that facilitated the restoration of the property. Without

such a market, it is unlikely that EIP could have made this model work for its investors.

While the Great Dismal Swamp project requires more time to prove its financial success, the company is currently on track to meet its projections. When it is complete, the Dover Farm Mitigation Bank will have restored 700 acres of degraded former wetlands and conserved at least 966 acres in perpetuity.

KEYS TO SUCCESS

EIP's Great Dismal Swamp Project shows how the creation of PES markets can bring a new set of players to the conservation game. These players are not only protecting land from development, but are actually restoring degraded lands—because it makes economic sense. Some keys to the project's success are:

- A property with potential for rehabilitation and conservation
- Investors who embrace the ecosystem services investment model and have relatively patient capital
- The complementary experience of the EIP partners with expertise in the three important fields of conservation, finance and PES markets
- A strong market for the Bank's wetlands mitigation credits in the surrounding communities
- A conservation entity, in this case the U.S. Fish and Wildlife Service, interested in purchasing the restored and conserved property at the end of the investment period
- A strong management partner such as Williamsburg Environmental Group to construct and maintain the Bank

PHOTOS AND FIGURES

Page 145, 147: Photos, R. Winn, U.S. Fish and Wildlife Service
 Page 146: Figure, U.S. Fish and Wildlife Service
 Page 148, 152: Photo, C. Lowie, U.S. Fish and Wildlife Service
 Page 150: Photo, Ecosystem Investment Partners
 Page 151: Figure, Burke Environmental Associates/The Conservation Fund, using Google Earth image

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For more information on ecosystem services markets in the United States, visit www.ecosystemmarketplace.com

Patuxent Greenway Reforestation Bank

Making Up for Lost Forestland in Anne Arundel County, Maryland

As part of Anne Arundel County's forest banking program, the Patuxent Greenway Reforestation Bank LLC reclaimed a former gravel mine and created a profitable forest bank that maintained forest cover, reduced pollution and provided endangered species habitat.

CASE STUDY SUMMARY

The Patuxent Greenway Reforestation Bank is located in southern Anne Arundel County, in Harwood, Maryland, along the Patuxent River. This 70-acre forest was planted in 2000 by the Patuxent Greenway Reforestation Bank LLC on a retired gravel mine that was formerly owned by the Brandywine Sand and Gravel Company. The forest bank has maintained forest cover in the county along the Patuxent River Greenway; provided habitat for endangered species; provided developers with a flexible mechanism to meet the requirements of Maryland's Forest Conservation Act and Chesapeake Bay Critical Areas Act; and gave a private landowner the capital and financial incentives needed to do important environmental restoration and conservation work.

As a result of historic quarrying operations, which occurred from 1950 to 1995, the Brandywine property was virtually barren with very few trees on it when the mine was capped in 1997. In accordance with state regulations to protect the environment and pro-

mote the reclamation of mined areas, the Brandywine Sand and Gravel Company re-graded and fertilized the site, which controlled erosion, promoted germination of seeds, fostered biodiversity, and increased the moisture-retention capacity of the soil. The Patuxent Greenway Reforestation Bank LLC purchased the property in 2000, placed an easement on it, and planted 100 trees per acre to create a forest bank. It then sold forest credits to developers to make the bank a profitable endeavor. This on-the-ground, incentive-driven conservation project could be replicated in other areas of Anne Arundel County or in any county in Maryland.

RESOURCE MANAGEMENT CHALLENGE

Forests are crucial to maintaining the quality of life in Anne Arundel County. Forests are the most beneficial land use for promoting and maintaining clean water.¹ Forests also safeguard wildlife habitat, contribute millions of dollars to the economy, protect public health, provide recreation opportunities, and enhance the quality of life for county residents. However,

like many areas of Maryland, Anne Arundel County is rapidly urbanizing and faces intense development pressure, which results in significant loss of forest cover. From 1986 to 1999, Anne Arundel County lost 42% of its forests.²

Anne Arundel County's resource management challenge along the Patuxent River is to sustain existing forest cover and establish and manage riparian and upland forest buffers. Spurred by public demand, the Anne Arundel County Greenways Master Plan places a high priority on conservation of the Patuxent River Greenway and in particular a 25-mile segment in the southern portion of the county. Back in 1998, area residents determined that they wanted a greenway to mitigate the land use impacts from agriculture, residential development, and mineral extraction activities. They also sought increased public access to the Patuxent River for recreation.³

The former Brandywine gravel mine not only lacked forest cover, but also was a potential source of sediment and nutrient runoff into the





View of Patuxent Greenway Reforestation Bank.

Patuxent River. The formation of the Patuxent Greenway Reforestation Bank presented a means to solve a potential pollution problem at this site and restore forest in the county's designated greenway, all while turning a profit. In addition, the property could offer a private recreational resource for hunting and fishing.

CONSERVATION VISION

A variety of state and county laws and programs exist to protect important riparian area habitat along tributaries to the Chesapeake Bay, but few provide the free market financial incentive of forest banks. Anne Arundel County's Forestry Program, which allows for the use of forest banks, was developed in response to Maryland's Forest Conservation Act. The law was developed and adopted specifically to control the documented loss of forests in Maryland due to development. In short, the act holds developers and landowners responsible for preserving forests and replanting them to make up for any clearing above a certain threshold during construction.

Milt McCarthy, a trained wildlife biologist, has worked with developers and landowners for 30 years. He recognized that few developers were doing their own replanting. Instead, they were participating in the county's fee-in-lieu program, which requires them to pay up to \$1.20 per square foot (\$52,272 per acre) to replace forest in the county's Critical Area within 1,000 feet of tidal waters, and 50 cents per square foot (\$21,780 per acre) to replace forest outside of the Critical Area. McCarthy recognized the forest bank concept as a cost-effective alternative to the fee-in-lieu program that could satisfy the requirements of the county's Forestry Program, so he created the Patuxent Greenway Reforestation Bank LLC and developed several profitable forest banks.

IMPLEMENTATION RESOURCES

The Patuxent forest bank was privately financed by the Patuxent Greenway Reforestation Bank LLC. The organization purchased the property at an undisclosed price and subsequently invested approximately

ANNE ARUNDEL COUNTY'S FORESTRY PROGRAM

Anne Arundel County's Forestry Program allows developers and landowners three options to compensate for forests converted to other uses when on-site replacement is not possible:

- Conducting on-site replanting at another location they own or purchase;
- Paying a per-square-foot-fee of required forest mitigation into a fee-in-lieu program; or
- Buying tree credits in approved forest banks.

The forest bank created by the Patuxent Greenway Reforestation Bank LLC is an excellent example of incentive-driven conservation.

\$4,000/acre (about \$280,000 total) in forest conservation planning, land management, and tree plantings. Rodney Banks, a forester with the county government, provided important assistance during the process. McCarthy and his family did much of the planting on their own. In subsequent years, the Patuxent Riverkeeper and a series of volunteers have helped with trash removal in the property's floodplain.

The county's forest banking program requires that all forest banks be insured with bonds. If for some reason the landowner does not follow through on reforestation plans or the trees die and are not replanted, the bonding agent will replant them. Bonding costs approximately 1% per year, for the first five years of the project. The Patuxent Greenway

Reforestation Bank avoided much of the bonding costs by planting in advance of market demand and with enough time for the trees to become sufficiently well established. This demonstrated the vitality of the trees and reduced the required bonding time from five years to less than three years.

The property tax burden was reduced by entering into a Forest Conservation Management Agreement (FCMA) with the Maryland Department of Natural Resources and filing an application for an Agricultural Use Assessment (AUA) with the Maryland Department of Assessments and Taxation. An FCMA is a legal agreement that includes a forest management plan, conducted by a registered professional forester in consultation with the owner, which outlines

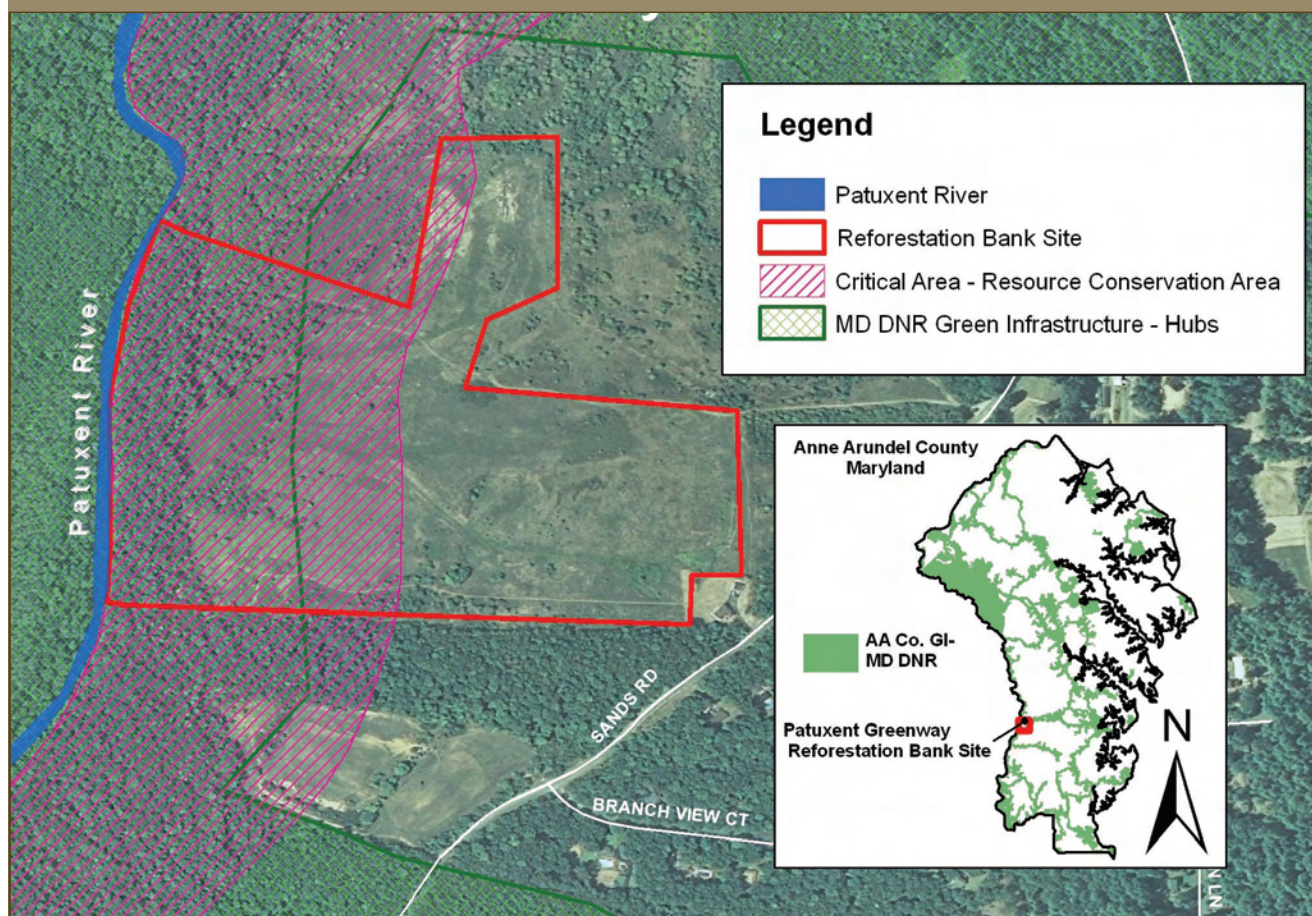
forest management objectives.⁴ An AUA indicates that the landowner is using the property for agricultural purposes. In return for signing a five-year FCMA and receiving an AUA, the property was assessed at \$125 per acre and valuation was frozen at the assessed level for the life of the agreement

CONSERVATION STRATEGY

The Patuxent Greenway Reforestation Bank operated under the following objectives:

- Restoring forest cover to control sediment and nutrient runoff
- Creating wildlife habitat for recreation and hunting in the Patuxent River Greenway
- Ensuring sound management and security for the property

➤ Patuxent Greenway Reforestation Bank



- Earning a profit from the investment in the property and its restoration

As a part of the mine restoration process, Brandywine Sand and Gravel Company worked with Synagrow, a contractor that operates wastewater treatment facilities, to inject treated waste material into the soil. This treatment was needed to provide restoration plantings with sufficient nutrients for sustained growth. Without soil amendments, trees could not grow. The Patuxent Greenway Reforestation Bank site was later planted with coniferous and deciduous trees. Some of the trees in the older mining sections of the property had an 8-inch diameter, and container plants were in 3 to 5 gallon containers. Unfortunately, drought killed the trees planted during 2002 and 2003, so replacement plantings were required. The plant density on the site is 100 trees per acre. Conifers appear to have had the highest survival rate on the site. The restoration effort required occasional mowing for the first three years. All the materials were installed in phases from 2000 to 2006.

The growing forest has created excellent habitat for deer, quail, and fox. Along the Patuxent River where there is mature flood plain forest, one can observe colonial nesting birds, nesting wood duck, beaver, and river otter. To ensure sound management and security of the property, the Patuxent Greenway Reforestation Bank operates under an agreement with the Maryland Natural Resource Police that allows them to hunt during the appropriate season in return for monitoring the property and dealing with occasional poachers and trespassers in all-terrain vehicles. In addition, Patuxent Greenway Reforestation Bank site has benefited from the Patuxent Riverkeeper, a non-profit watershed advocacy organization,

Planted or Naturally Colonized Woody Vegetation at Patuxent Greenway Reforestation Bank	
Common Name	Scientific Name
Sycamore	<i>Platanus occidentalis</i>
Green ash	<i>Fraxinus pennsylvanica</i>
Black willow	<i>Salix nigra</i>
Southern red oak	<i>Quercus falcata</i>
Black locust	<i>Robinia pseudoacacia</i>
Virginia pine	<i>Pinus virginiana</i>
Loblolly pine	<i>Pinus taeda</i>
Black cherry	<i>Prunus serotina</i>
Eastern red cedar	<i>Juniperus virginiana</i>
Crabapple	<i>Malus sylvestris</i>
White pine	<i>Pinus strobus</i>
River birch	<i>Betula nigra</i>
Sweet gum	<i>Liquidambar styraciflua</i>
Red maple	<i>Acer rubrum</i>

through their volunteers efforts in cleaning up the riparian area of the property.

The forest bank is encumbered with a perpetual restrictive easement, which prevents any future development or clearing of the forest. The county holds the easement and has monitoring responsibilities. The easement will convey with the property's future owners indefinitely. McCarthy has willed both the organization and its various properties, including the Patuxent Greenway Reforestation Bank, to his children, who he hopes will manage and enjoy the properties for years to come.

The county has helped refer potential buyers to the Patuxent Greenway Reforestation Bank. The buyer works with the county planner to determine the official requirement in acres. The Patuxent Greenway Reforestation Bank provides the buyer with a contract for the banked acres. Once the transaction is complete, the buyer must prove to the county planner that the required acres have been purchased from an approved forest bank.

Then the buyer has satisfied the forest conservation requirements and may receive their development permits from the county, pending approval of the various other non-forest conservation requirements.

RESULTS

The reforestation and property clean-up has enhanced the Patuxent River Greenway along an important section of the river. A former pollution source to the river has been converted into a sink for nutrients, filter for sediment and habitat for endangered species. Volunteers with the Patuxent Riverkeeper have removed several tons of trash from the property—including old cars, gas cylinders, and washing machines—which improved the aesthetics for boaters on the river.

The Patuxent Greenway Reforestation Bank reforested 30 acres in the Critical Area portion of the property and 32.8 acres outside the Critical Area. To date, it has sold 90% of the forest credits for the property. The property is now used as private conservation land for McCarthy, his family, and



Volunteers with the Patuxent Riverkeeper remove trash from the floodplain of the Patuxent Greenway Reforestation Bank further improving wildlife habitat and aesthetics of the river.

friends. The project was highly profitable and exceeded a 100% return on the investment.

The southern edge of the property appears to contain the largest population of wild lupine (*Lupine perennis*) in the State. This threatened species is thriving in the sunny woodland areas of the forest bank. The Maryland Department of Natural Resources is currently examining the property for potential inclusion in the voluntary Landowner Incentive Program, which provides cost-share assistance funding from United States Fish and Wildlife Service to private landowners to protect, enhance, and restore habitat for rare, threatened, and endangered species.

The Patuxent Greenway Reforestation Bank subsequently purchased another 50-acre gravel mine just down river, where many of the practices discussed above were replicated. This downstream property is also in the Patuxent River Greenway and contributes to the restoration of water quality and wildlife. The forest credits created from this second project have

also been sold to developers at a profit.

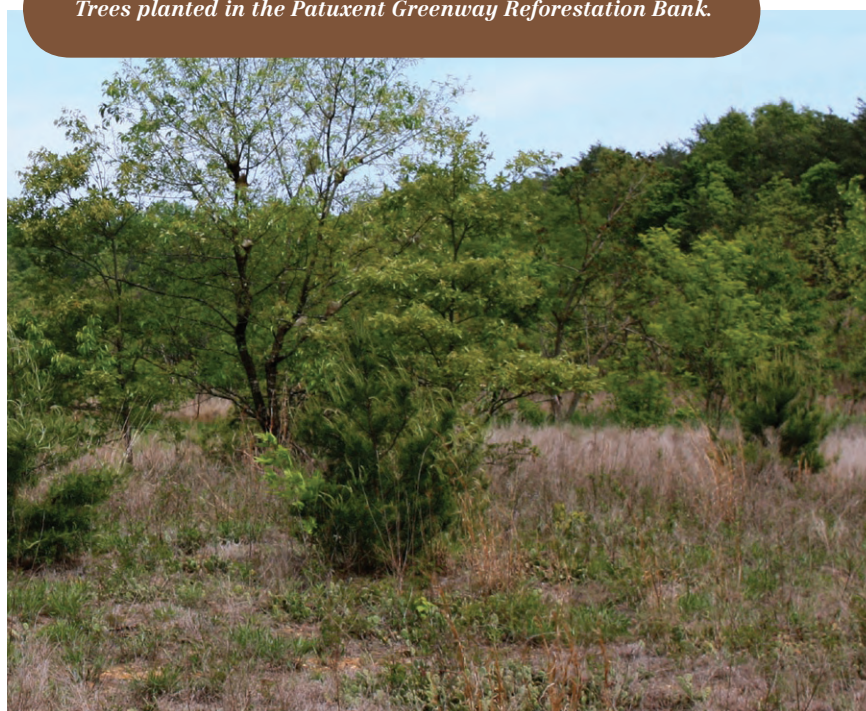
KEYS TO SUCCESS

The Patuxent Greenway Reforestation Bank shows how forest banking can be done to maintain forest cover and restoring degraded lands, while

ensuring a good financial return for landowners. Some keys to the project's success are:

- **Knowledge of the System:** McCarthy's many years as a wildlife biologist and consultant allowed him to become very familiar with the Forest Conservation Act,

Trees planted in the Patuxent Greenway Reforestation Bank.



Critical Areas Act, and other associated restoration laws. He saw an opportunity to restore the environment and make money doing it.

- **Public Support for the Patuxent River Greenway:** The public's early interest in the Patuxent River corridor provided a key impetus for local governments to support the restoration of deforested land in priority areas.
- **Private Capital:** The Patuxent Greenway Reforestation Bank provided its own capital for this venture. It planted the trees in advance of market demand, thereby reducing bonding costs and allowing the plants to mature.

PHOTOS AND FIGURES

Pages 153, 154: Photos, Joel Dunn
Page 155: Figure, Burke Environmental Associates/The Conservation Fund, using Google Earth image
Page 157: Photo (top), Patuxent River-keeper; photo (bottom), Joel Dunn
Page 158: Photo, Sara Tangren

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³Anne Arundel County. 2002. *Anne Arundel County Greenways Master Plan*. Anne Arundel County, Annapolis, Maryland. 79 pp. + appendices. Available online at: <http://www.aacounty.org/PlanZone/MasterPlans/Greenways/>.



Wild lupine (Lupine perennis) in bloom on the eastern shore of Maryland. This threatened species was found at the Patuxent Greenway Reforestation Bank.

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Effective Forest Banking

Forest Conservation in Carroll County, Maryland

Carroll County's forest banking program provides the county with an effective mechanism to stop the loss of forest cover from development and offers landowners the opportunity to protect land and water while making a profit.

CASE STUDY SUMMARY

Carroll County is at the cutting edge of effective forest banking and conservation efforts in Maryland, with an 82% forest retention rate compared with the state's 65% average.

At the beginning of the 20th century, the Carroll County landscape—like most of Maryland—had been purposely cleared of forests for agriculture. Much of the remaining historic forest tracks are now located on land deemed inappropriate for agriculture. The clearing of land for cultivation and pastures slowed dramatically, allowing some forest to return, until the middle of the 20th century when Maryland once again began losing forest, this time as a result of expanding urban development. The county currently has approximately 70,000 acres of forested land, which is about 25% of its total land area.¹

The Maryland Forest Conservation Act was passed in 1991 in an effort to offset development-related forest loss. In 1992, in accordance with the Forest Conservation Act, Carroll County implemented a Forest Conservation Code. The code contains stringent requirements, applicable to all categories of development, which

are designed to control forest loss and ultimately increase forest acreage in the county. These requirements affect business and industrial sites as well as residential development.

Carroll County's Forest Conservation Code includes a pioneering effort that established the use of a forest banking program. Forest banking is a conservation tool that involves the relinquishment of development rights by a landowner on newly planted forest, which generates mitigation credits that can be exchanged for a payment.² The payment typically comes from a developer who must replace forest that has been cleared at another location. Although the code has evolved since its first iteration, the use of forest banking as a mitigation alternative has survived because of its effectiveness.

The forest banking program has restored hundreds of acres of forest in Carroll County and created economic opportunities for landowners. In addition, the program enhances forest stewardship through environmentally sensitive or sustainable forest management. Currently there are varying requirements for the establishment of environmentally sensitive or sustainable forest banks

in Maryland, but Carroll County's program has exceeded all expectations set forth when the program was initially adopted.

RESOURCE MANAGEMENT CHALLENGE

Forests are crucial to maintaining water quality in Carroll County. They also safeguard wildlife habitat, contribute millions of dollars to the economy, protect public health, provide recreation opportunities, and enhance the quality of life for county residents. Nevertheless, Carroll County has far less forest cover than most other Maryland counties, due to its agricultural history. In addition, the availability of open land provides a prime opportunity for suburban development, which threatens current and future forests.

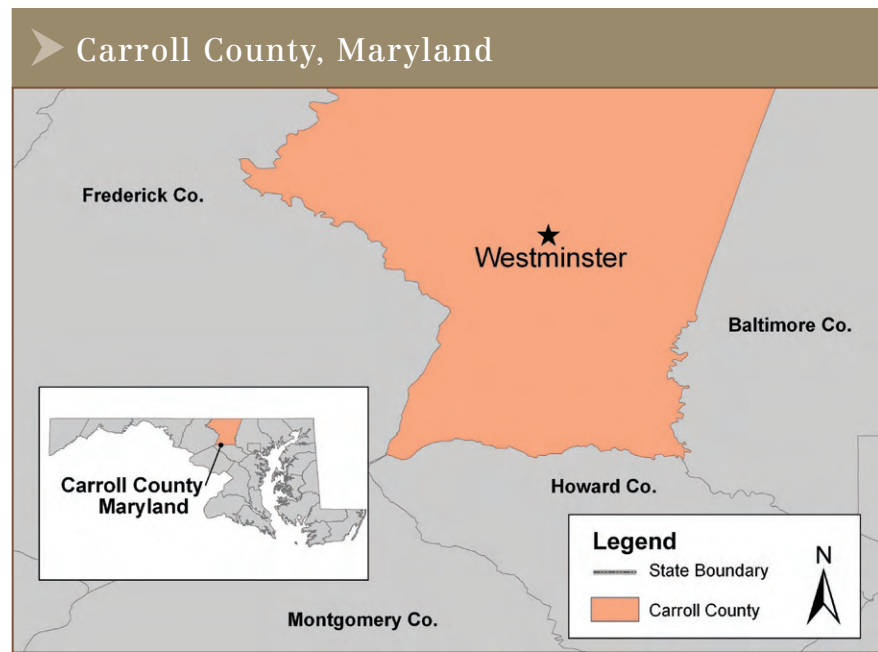
Carroll County has within its boundaries eight incorporated towns, each of which is a nucleus for development. Retention of existing forests within the county is a high priority. Without a concerted effort, the most valuable and vulnerable forests could disappear, making the land less able to absorb and retain pollutants, thus impairing water quality and associated aquatic and riparian living

resources. Carroll County's resource management challenge is to maintain existing forestlands and target afforestation/reforestation efforts to maximize long-term forest sustainability and enhance water quality, particularly along riparian corridors.

CONSERVATION VISION

Maryland's Governor William Schaefer created a task force in 1990 to assess the problems and potential of Maryland's forests. The task force recommended creating a forest conservation, protection, and reforestation law, written by the Department of Natural Resources' Forest Service and others, called the Forest Conservation Act.³ Passed in 1991, the Forest Conservation Act was specifically intended to control the documented loss of forests in Maryland as a result of land development. It stands as the first law in the United States to require forest loss minimization and mitigation when regulated land use changes occur.

The Forest Conservation Act, implemented on the local level, has been responsible for the review of 199,925 acres of forest on land scheduled for development, of which 120,638 acres were retained, 71,885 acres were cleared, and 21,461 acres were planted with new forest.⁴ Carroll



County's forest conservation program was developed in response to the Act; the forest banking provisions are an innovative way to provide developers with an alternative way to meet its requirements.

IMPLEMENTATION RESOURCES

The Carroll County Bureau of Resource Management administers the Forest Conservation Code, including project reviews and forest banking provisions. Land developers pay for the establishment of forest banks. Forest bank landowners typically require the services of a forester to

develop a forest conservation plan and survey the land. These costs are driven by the market.

CONSERVATION STRATEGY

The Maryland Forest Conservation Act and the Carroll County Forest Conservation Code place the highest priority on retention of existing forest land, as opposed to on-site removal and reforestation at another location. In compliance with the state law, Carroll County requires permittees for any construction project that disturbs an area of 40,000 square feet or greater to complete a forest stand delineation and a forest conservation plan. In certain situations, the stand delineation and conservation plan may require reforestation, which is the replacement of forest, or afforestation, which is the establishment of a forest in an area where the preceding land use was not forest.⁵

Carroll County adopted a local ordinance that is tailored to its rural/agricultural character. The ordinance generally requires a one-to-one replacement for forest removal, does not allow fee-in-lieu payments, and establishes the use of forest mitigation banks.⁶ Carroll County has had

BENEFITS OF THE CARROLL COUNTY FOREST CONSERVATION BANKING PROGRAM

- ▶ Helps maintain overall forest cover in the county
- ▶ Complements other elements of the county code to reinforce a no-net-loss of forest approach
- ▶ Offers flexibility for landowners and developers to comply with the Forest Conservation Code
- ▶ Provides protection and preservation of sensitive areas through the use of permanent easements
- ▶ Represents a good tool for forest management



A typical Carroll County landscape, a few miles south of the Pennsylvania border.

particular success at retaining forest and implementing its forest banking procedures for off-site reforestation.

The county's afforestation threshold requires that business and industrial construction sites must have 15% of the property forested and that residential and agricultural construction sites must have 20% of the property forested.⁷ In an effort to focus on retention, the county has also implemented best management practices in the forest conservation plan development process, providing construction contractors with examples of protective measures that stress survival of existing forests on the construction site. All remaining forests on development sites, and any newly planted forest, must be placed in long-term protection, through the assignment of a perpetual protective easement.⁸

Despite the stringent retention measures in the county ordinance,

new plantings may be required either through afforestation or reforestation at an off-site planting location. In an effort to simplify replanting efforts and ultimately yield larger and more contiguous blocks of forest, Carroll County created its innovative and effective forest banking procedure.

Using Forest Banks: Carroll County was the first local jurisdiction to propose and develop the use of forest banks to satisfy Maryland's Forest Conservation Act. Forest banks are established in a variety of ways, but always require landowners to either plant trees or allow for trees to be planted on their property. In order to protect new plantings, the landowner accepts permanent protection and gives up any development rights on the newly planted property. In cases where the bank is being established on land not owned by the bank owner, the planting is exchanged for a payment, based on the assessed value of forest acreage.

KEY FOREST CONSERVATION REQUIREMENTS IN CARROLL COUNTY⁹

- ▶ **A Forest Stand Delineation** is an inventory of existing site conditions and forests and is used during the preliminary review process to determine the most suitable and practical areas for forest conservation during development.
- ▶ **A Forest Conservation Plan** is a planning and construction document that provides specific plans for the amount of the forest which will be retained, reforested, or afforested; the locations where this will occur; proposed protection measures taken during development; construction scheduling; maintenance and monitoring procedures; long-term protection measures; and other measures that may be required.
- ▶ **Tree Quality Best Management Practices** include
 - 1) pre-development evaluation,
 - 2) development design considerations;
 - 3) construction protection measures including post construction damage mitigation and cleanup, and
 - 4) post-development, long-term resource management measures.

The benefits of forest banks are many, but they principally offer the alternative of establishing forest cover prior to development. Banks can be used to create plantings in priority areas, such as stream buffers, that a development site may not offer. Both on and off-site plantings under the county forest conservation program are



EXPLORING FOREST BANK MARKET CONDITIONS

- ▶ Review current and anticipated forest banking regulations and requirements.
- ▶ Determine the current supply of available forest bank acreage. Secure a list of certified forest banks from the County government. Be sure the numbers are current.
- ▶ Evaluate the planning/development climate, including moratoriums and zoning changes. Contact a number of sources, such as County Offices of Planning, Economic Development, and Bureau of Resource Management; local surveyors and engineers; and the Home Builders Association.
- ▶ Determine the current market value of forest banks on a per-acre basis.
- ▶ Determine the costs associated with producing or buying forest from a forest bank.
- ▶ Contact a registered professional Maryland forester or a qualified professional familiar with the forest banking process.

preferred in priority areas, including banks. Also, when working on commercial and industrial development sites with limited or marginal lands, forest banks can consolidate smaller, isolated restoration efforts into larger contiguous tracks with better long-term prospects for a healthy forest. In application, Carroll County has developed and adopted principles, rules, and specifications that have created favorable market conditions and made forest banks particularly effective.

Forest Bank Rules and Conditions:

A person who owns property that is not forested may submit an application to the county for approval of a forest bank. The county must then review the application and determine, based on the physiographic priorities established in the Carroll County Forest Conservation Manual, whether the location, size, and other characteristics of the property are suitable.

Once the application is approved, a bank establishment plan must be developed and submitted to the county. When the plan is approved,

the bank must then be certified prior to the sale of any credits. A perpetual protective easement is required as a part of the certification process. The certification process also requires the completion of a 36-month forest maintenance period and adherence to specified tree survival rates.

When a development project involves a forest bank to satisfy conservation obligations, the developer must cite which bank will be used on the forest conservation plan and provide proof that the bank credits have been purchased. The use of a forest bank site must also be recorded in the land records and is subject to inspection every three years to ensure that the terms of the conservation easement are met.

Contracts, Responsibilities, or

Indemnification: The forest bank owner typically provides a forest bank purchase agreement whereby the bank owner promises and assumes all legal obligations for the off-site forest requirements, including posting of a monetary bond, inspections, survival rate guarantee, maintenance, etc. The buyer or developer provides

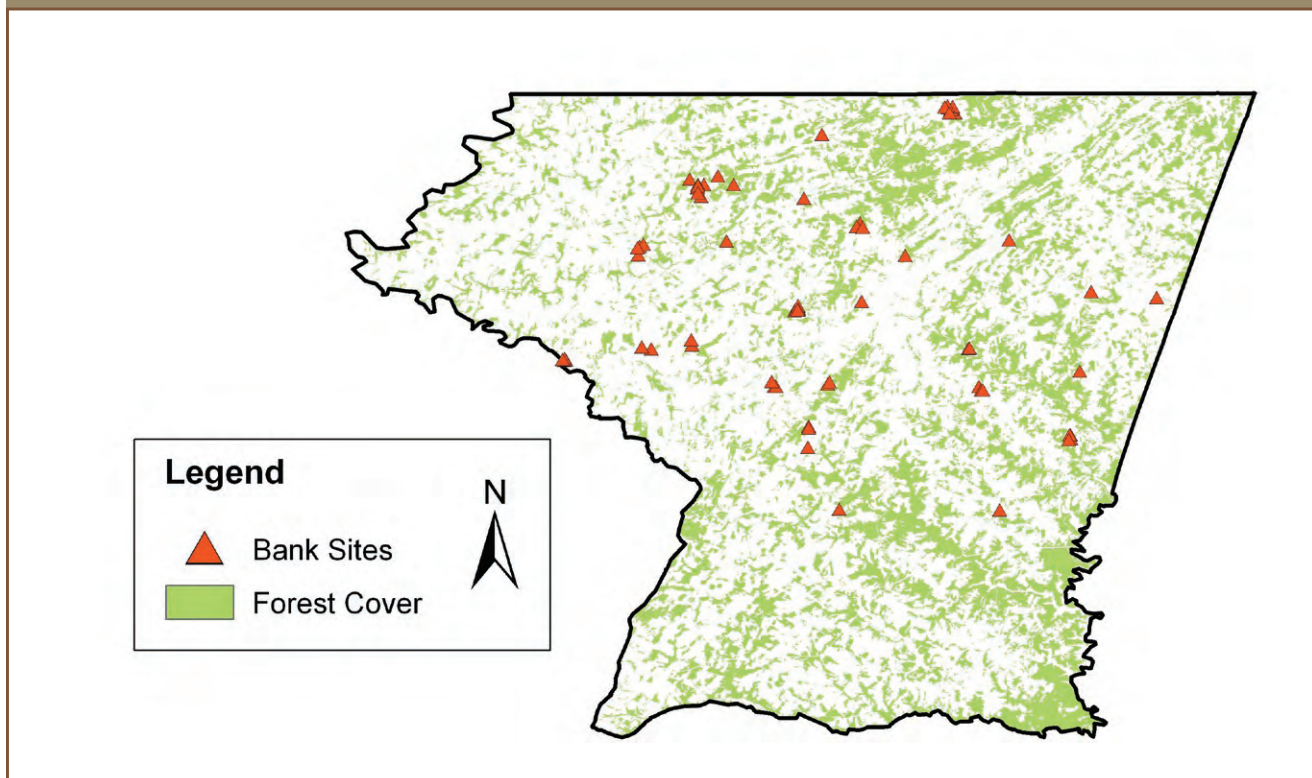
full payment to the forest bank owner and is provided with a written “proof of purchase” of forest bank credits (for a specific project) for presentation to the Carroll County Bureau of Resource Management. This type of arrangement is referred to as a “turn-key” agreement, signed by both parties. These agreements range from five pages to a simple one-page document. The county recommends that forest bank owners seek their own legal consultation in addition to discussing their responsibilities, agreements, and easement restrictions with the county attorney.

Market Conditions: Forest banking has been particularly successful in Carroll County due to the enormous development surge that occurred during the 1990s. This created the free market conditions and demand needed for a thriving banking industry. By establishing a forest bank, marketable credits are produced that can be sold to those who need to satisfy forest replacement requirements. The familiar economic principle of supply and demand holds true in determining forest banking market conditions.

The volume of development plans being processed and progressing to the final approval level is usually the best indicator of demand in the Carroll County marketplace. If the planning process is active and moving forward, then off-site forestation may be necessary and forest banking could be an integral method to meet those needs. Since Carroll County introduced forest banking in the mid-1990s, approximately 653 acres required an off-site planting alternative. Sixty-two percent or 397.6 of those acres were supplied by forest banks.

Sales of forest bank credits follow the trends and cycles of the overall economy. Given the current economic trend, forest bank credits are not

► Forest Bank Sites in Carroll County, Maryland



moving as quickly as in past years. Additionally, changing regulations (including proposed zoning changes) have an unknown affect on forest bank credits sold annually. In the long term however, the on-going need for off-site forest banking credits is expected to continue. Knowing and understanding the local market conditions is crucial before engaging in the venture of forest banking.

Carroll County Forest Conservation Statistics	
Element	Acres
Bank afforested	179.3
Bank reforested	218.3
Total bank acres	397.6
Other acreage	
On-site retention	584.1
On-site afforested	81.3
On-site reforested	139.5
Off-site retention	26
Off-site afforested	103.8
Off-site reforested	142.2

Market Confidence: For landowners or businesses interested in forest banking, determining market confidence is part of the work necessary to minimize risks and reach the comfort level needed to establish a bank. Understanding buyers' numerous considerations may help. When a development project has no other option than to mitigate forestation requirements at an off-site location, their preference has been to acquire forest bank credits by "turn-key" agreement from a certified forest bank for numerous reasons. The various challenges facing developers, particularly time constraints and financial carrying costs, make it desirable and practical to have a third party do the work of establishing the forest bank, so that certifiable credits are immediately available.

Market Access: Once a forest bank is certified, it is listed with all the other forest banks in Carroll County by the Bureau of Resource Manage-

ment. Available bank acreage and contact information is provided for the potential buyer/developer to initiate contact with the bank owner. Some forest bank owners prefer to handle the business calls and contract arrangements directly with the developer and some defer this to a representative familiar with the industry, such as environmental consultants, engineers, or surveyors. Marketing can also include a letter to developers introducing a banking entity and bank acreage availability. Pricing information is usually not included and is provided with specific inquiries.

Market access to prospective buyers of forest bank credits is very important in reducing the time it takes to recoup the forest bank owner's investment. Forest bank credits are rarely sold in one transaction. In most cases, particularly if the forest bank is large, it will take numerous projects over a long time span to completely



Stone Road Forest Bank (in background) adjacent to typical row plantings.

use the bank acreage. Forest bank owners can improve market access by networking with local surveyors, engineers, and environmental consultants who work directly with developers.

Price: Historically, forest bank pricing has fluctuated but the range has remained stable since its inception in the 1990s—generally from \$11,000 to \$15,000 per acre. This variation is due to supply and demand, along with the investment costs required to get a bank to the point of certification. Every potential forest bank site has variables (such as boundary survey costs, site prep, etc.) and should be discussed with a registered forester or a Maryland Department of Natural Resources qualified professional, as well as a surveyor or engineer. Some banks use an average flat rate price; other banks use a price schedule and discount pricing depending on the quantity of acreage purchased.

RESULTS

In Carroll County, 397.6 acres of forest have been created by forest conservation banks since the inception of the

Maryland Forest Conservation Act in 1991. Carroll County landowners are engaged in the establishment of viable and marketable forest conservation banks. The projects highlighted below represent a sample of numerous successful efforts.

Stone Road Forest Bank

Year Completed: 2000 to Present

Acres: 35

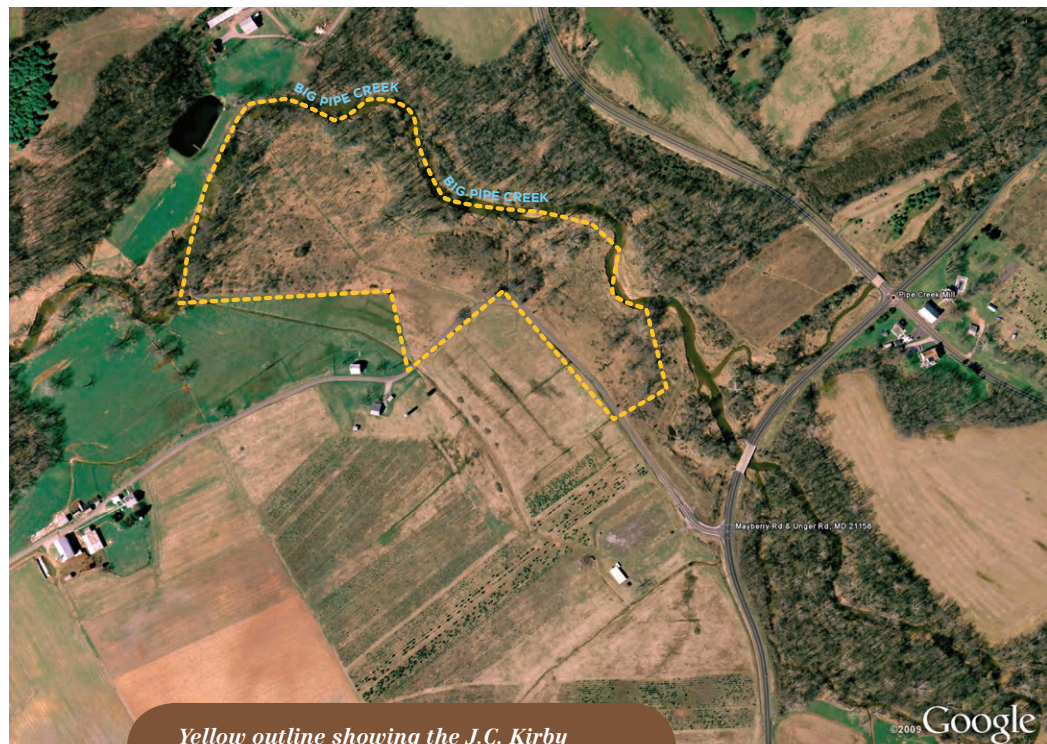
Created in 2000, the Stone Road Forest Bank converted a non-productive, over-mature apple orchard and cultivated agricultural fields to a forest bank. The project includes a new 10-acre section currently in the planning stage. The forest bank will enhance water quality in the area by protecting on-site headwaters of an unnamed tributary to Big Pipe Creek. Core partners include property owner Mark E. Lynn; environmental specialist Glenn Edwards of CLSI, Inc.; and registered professional forester Len Wrabel of Mar-Len Environmental, Inc.

J.C. Kirby Tree Bank

Year Completed: 1997

Acres: 25

The J.C. Kirby Tree Bank created a riparian forest that buffers Big Pipe Creek. In response to market conditions, Mr. Kirby, once a large commercial Christmas tree producer, proactively changed the land use



Yellow outline showing the J.C. Kirby Forest Bank adjacent to Big Pipe Creek.



LEFT: *Bivona forest bank is on a residential lot and adjacent to existing forest.*
RIGHT: *Mayberry Game Protective Association Forest Bank showing an open meadow surrounded by a natural seed source.*

from pasture and potential tree plantation to a native mixed hardwood planting following Carroll County's guidelines for forest bank creation. Core partners include property owner J.C. Kirby; environmental specialist Glenn Edward of CLSI, Inc.; and registered professional forester Len Wrabel of Mar-Len Environmental, Inc.

Bivona Forest Bank

Year Completed: 1995

Acres: 2.5

The Bivona Forest Bank project is an innovative 2.5 acre forest bank on a five-acre residential lot in rural Carroll County. Bivona sold an easement to CLSI, Inc., who then established the bank on the rear portion of the property. The bank reduced lawn maintenance for the property owner. The bank was created adjacent to an existing contiguous forest tract, enhancing one of the larger forests in the area. Small banks, when established and managed in the right setting, can have a positive cumulative effect on the environment. Core partners include property owner Dan Bivona; forest bank owner CLSI, Inc.; registered professional forester Len Wrabel of Mar-Len Environmental, Inc.; and environmental specialist Glenn Edwards of CLSI, Inc.

Mayberry Game Protective Association Forest Bank

Year Completed: 2006

Acres: 4

The Mayberry Game Protective Association Forest Bank applied a natural regeneration method using seed from surrounding forests to establish a new forest on an open meadow owned by a private conservation group. Extensive study, planning, management, and monitoring by a registered professional forester resulted in a successful forest bank. Management practices allowed natural forest regeneration while preventing invasive plants from dominating the site. Core partners include the property owner, Mayberry Game Protective Association; registered professional forester Harry Staley of Forestry Concepts, Inc; registered professional forester Len Wrabel of Mar-Len Environmental; and Environmental Specialist Glenn Edwards of CLSI, Inc.

KEYS TO SUCCESS

- **Understand the potential risks and rewards:** Successful forest bank owners have a good land stewardship mindset with a clear understanding of the potential risk and rewards any agro-forestry business venture may bring. Forest

bank owners must understand the potential risks of crop failure and the reward of crop success. They should also understand the environmental benefits, including enhanced water quality and wildlife habitat.

- **Obtain the assistance of professionals:** Successful forest bank owners hire a registered forester or a Maryland Department of Natural Resources qualified professional, as well as a surveyor or engineer, to ensure plans are done in accordance with state and county regulations.
- **Have a clear plan:** Every landowner and/or prospective forest bank owner should determine their environmental and financial objectives. This will ensure both healthy sustainable forests and economic interests.
- **Have a sound regulatory system:** A forest bank used in combination with rules to minimize forest removal and to retain existing forest helps to achieve the goals of the Forest Conservation Act. In Carroll County, the deliberate decision not to offer developers a fee-in-lieu alternative for required plantings also helped ensure success.





Stone Road Forest Bank which features a mix of planted and natural trees.

PHOTOS AND FIGURES

All photos by Glenn Edwards
Page 160, 163: Figures, Burke Environmental Associates/The Conservation Fund

Page 161: Image, Google Earth

Page 164: Figure, Burke Environmental Associates/The Conservation Fund, using Google Earth image

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A Residential Subdivision Designed for People and Wildlife

Incorporating Wetlands Creation and Forest Protection on Cooke's Hope at Llandaff, Near Easton, Maryland

This land development model remunerates the developer for significant conservation efforts and provides an alternative approach to “golf course” subdivisions for homeowners who want open spaces that feature wildlife refuges with wetlands, ponds, protected forests and waterfowl in abundance.

CASE STUDY SUMMARY

Cooke's Hope at Llandaff (Llandaff) is a 284 acre development located just outside the town of Easton, on Maryland's Eastern Shore. Cooke's Hope, named for Major Miles Cooke who was granted the land by the Lord Baron of Baltimore in 1659, is a 26 lot subdivision of high quality, estate style housing developed by Trippes Creek LLC. Llandaff represents a smaller, rural residential component of the larger master planned community of Cooke's Hope. The parcel was originally a farm set on a bucolic peninsula alongside Peach Blossom Creek, a small tributary to the Chesapeake Bay.

The Llandaff development is truly unique to the Delmarva Peninsula because of its nature-based lot design, retention of forest buffers and creation of wildlife refuges throughout the community. Trippes Creek LLC designed the lots to blend with the natural landscape and lowered the housing density to 1 unit per 11 acres. They also protected or enhanced wildlife on over one-third

of the development —principally the endangered Delmarva fox squirrel (*Sciurus niger cinereus*) and numerous waterfowl species. Llandaff's thoughtful design provides current and future residents with a unique opportunity to live in a wildlife refuge with direct water quality benefits to Peach Blossom Creek.

Trippes Creek LLC has already recouped their capital and development costs, demonstrating the economic viability of this approach even in a difficult housing market. Typically, rural residential subdivisions on the Delmarva Peninsula are created from former agricultural lands and developers are rarely interested in restoring former

wetland and forest environments that were once a major part of the Eastern Shore landscape. Breaking free of this trend, Trippes Creek LLC's work at Llandaff is poised to make a



profit while achieving land and water conservation objectives that are important to conserving and restoring the Bay.

RESOURCE MANAGEMENT CHALLENGE

Four major resource management challenges shaped Llandaff, including development restrictions, endangered wildlife habitat, nutrient runoff and the economics of housing developments.

First, approximately 41% of Llandaff is located within the development restricted zone of Maryland's Chesapeake Bay Critical Area—lying within 1,000 feet of the Bay's tidal waters. More than half of the restricted lands are located in the Resource Conservation Area designation and the remaining lands are in the Limited Development Area. The Resource Conservation Area designation allows for 1 unit per 20 acres while the Limited Development Area allows for the same housing density, character and permitted land uses as those allowed by local zoning regulations. In addition to density imposed restrictions, natural features like forestlands and a mandatory 100 foot buffer setback from tidal waters further constrained the physical layout of the site—necessitating a well thought out strategy to make the development aesthetically appealing and environmentally sound.

The second resource management challenge arose during the conservation assessment for the subdivision when it was discovered that the property contained habitat for the Delmarva fox squirrel, which is a federally listed endangered species. Larger and heavier than the Eastern gray squirrel (*Sciurus carolinensis*), the Delmarva fox squirrel is also slower moving and warier than it's cousin and is found principally on



Habitat for the Delmarva fox squirrel (Sciurus niger cinereus), a federally listed endangered species, was found at Llandaff during the conservation assessment.

the Eastern Shore of Maryland in portions of five counties. This remnant represents less than 10% of its apparent historical range. Delmarva fox squirrels were once found throughout the Delmarva Peninsula, southeastern Pennsylvania and southern New Jersey.¹ The forest habitat on the site was clearly a highly valued asset that would require careful management and protection.

The third resource management challenge was nutrient and sediment runoff from the property. The land had previously been heavily cultivated in a high and low till agricultural operation, which typically produces nutrient and sediment loads that must be carefully managed to minimize water quality impacts. Conversion of the property into a series of wildlife refuges and suburban housing provided a valuable opportunity to manage riparian zones to reduce pollution. Riparian zones are areas adjacent to streams, rivers or shorelines and between the aquatic and upland terrestrial habitats. Riparian areas generally contain a disproportionately high number of wildlife species and perform vital ecological functions,² such as slowing

the flow of stormwater runoff, filtering pollution, protecting stream banks, and moderating water temperature.³ Aggressive riparian area management also provided an opportunity to address some of the growing concerns over additional pollution from new suburban development.⁴

The final and most critical challenge was framed by the economics of this particular land development scenario and the competitive nature of the local housing market. Trippes Creek LLC had to address a host of resource management challenges; set a realistic price point for the lots and homes; carry the upfront design, permitting, land and infrastructure improvement costs; and ensure the overall profitability of the development through future sales revenue. The Llandaff subdivision concept carried some risks in its novel approach and represented a marked change from the rest of the Cooke's Hope community. Llandaff offers only single family homes ranging in size from 2-5 acres to upwards of 48-58 acres for the refuge/open space lots. The Cooke's Hope community hosts a much broader range of home choices from single family estates, carriage

style townhomes, and cottages. Cooke's Hope focuses on the essence of traditional planned communities with historic streetscaping including brick sidewalks, period style street lighting, and tree lined streets. Llandaff is focused on the restoration and protection of the natural environment and the maintenance and enhancement of water quality—not typical concerns of the average home buyer.

CONSERVATION VISION

The principals of Trippes Creek LLC wanted to create an alternative-style subdivision with lower densities, signature wildlife features and a layout that respected the natural constraints and opportunities inherent to the site. They knew their vision would require a significant transformation of the featureless agricultural tract to produce a landscape that wildlife enthusiasts and open space lovers would buy. They were confident in their knowledge of what could be done and factored in strategic partnerships with an experienced contractual team that specialized in wetland habitat creation.

A key element of the vision for this project was the lowering of the allowable dwelling density. The zoning allowed for a development potential of 136 units. This equates to an overall allowable density of 1 unit per 2 acres. To execute the vision called for by the principals, the conservation-oriented site plan would require a density reduction to 1 unit per 11 acres. The plan would effectively decrease the number

of units to less than 1/5 the size of what would be allowed under existing zoning provisions. Based on the experience gained from developing and marketing the first phases of the highly successful Cooke's Hope community, Trippes Creek LLC believed they could also market the new Llandaff home sites and signature refuge lots for a 30% premium over comparable subdivisions in the nearby Oxford area of Talbot County.

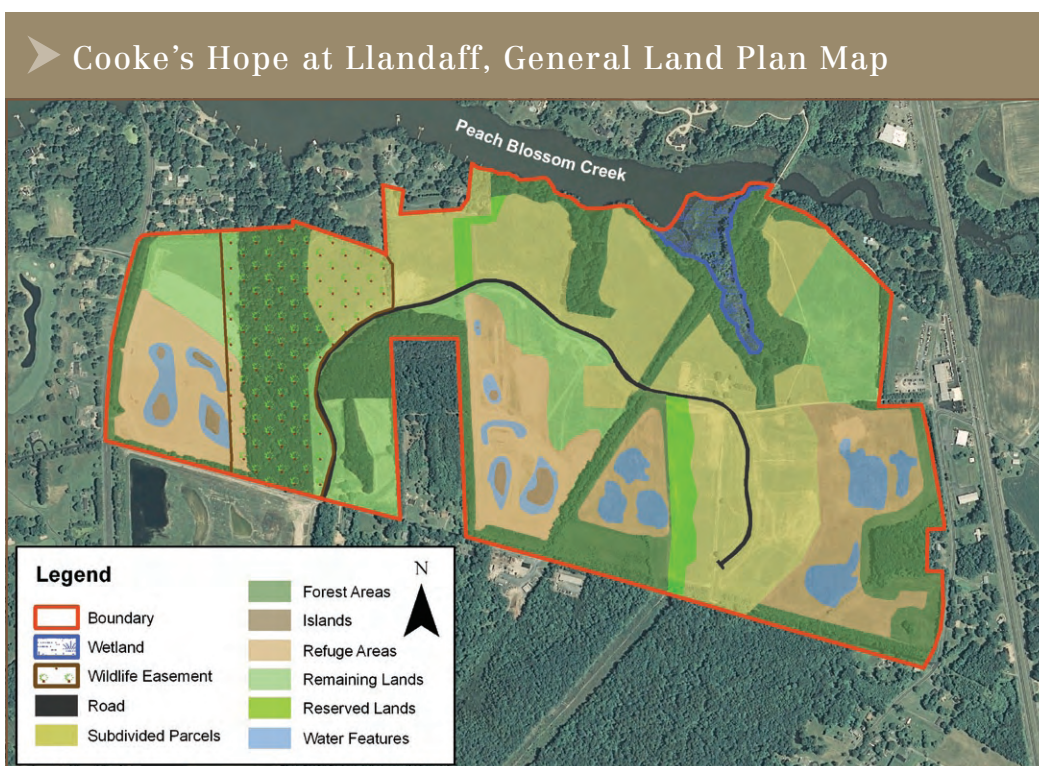
IMPLEMENTATION RESOURCES

Llandaff is a privately financed endeavor that involved the purchase and conversion of an agricultural landscape to one with natural resource character that offered an attractive array of lot sizes, prices and open space amenities. Llandaff is composed of 26 lots, including 3 refuge and open space lots from 48-58 acres and 23 smaller lots from 2-5 acres, for a total of 220 acres. The lots range in price from \$310,000 to just under \$1 million (i.e. refuge lots), with an average price of \$514,000 per lot.

Trippes Creek LLC subcontracted the subdivision layout and engineering work to Lane Engineering LLC, a firm that performs civil engineering, land planning, and land surveying. Their work included the conservation assessment and general land plan. Trippes Creek LLC subcontracted the refuge construction, wetland creation and reforestation work to Conservation Development LLC, a firm that performs natural resource restoration, and Sweetbay Watershed Conservation, a general contractor that provides expertise in watershed restoration including planning and design, installation and post construction support. Finally, Trippes Creek LLC donated a permanent conservation easement on 32 acres to the Eastern Shore Land Conservancy, a nonprofit 501(c)(3) charitable corporation on Maryland's Eastern Shore, which enabled them to take a substantial tax deduction.

CONSERVATION STRATEGY

When Trippes Creek LLC purchased the land, it consisted of 188 acres of



farmland and 32 acres of forest. The farmland was relatively flat with a limited diversity of wildlife species and ordinary landscape aesthetics. The conservation goals were to enhance water quality, protect existing and create additional wildlife habitat by redesigning portions of the landscape to increase the variability and diversity of plant communities and hydrological conditions. Llandaff set up a simple conservation strategy which integrated a conservation assessment and general land plan, wildlife refuge creation and a forest conservation easement.

Conservation Assessment and Land

Plan: The development team did a thorough survey of existing wildlife features on the land and an evaluation of the soils, hydrology and elevation. They identified four locations that were best suited for the creation of wetlands and open water ponds for wildlife. This task involved consideration of several technical issues such as catchment area requirements and soil conditions needed to support wetlands.

Next, forested tracts on the property were delineated along with the most suitable locations for roads and

housing sites. A total of 26 lots were designated for homes, located primarily in the central portion of the property, which offered good access, a compact “footprint”, and a pleasant mix of viewscapes including agricultural lands, wetlands and forestland.

Wildlife Refuge Creation: Llandaff contains four wildlife refuges composed of forest, ponds and wetlands throughout the property. The refuges total approximately 68 acres of new habitat that serves local wildlife needs and offers migratory waterfowl an attractive resting site along the Atlantic Migratory Flyway. The refuges were carved out of the flat landscape using heavy duty equipment to shape deeper areas for permanent ponds; island features that offer a measure of isolation and protection for waterfowl; and shallow water environments that support both temporary and permanent wetland plant communities.

Approximately 75% of the graded areas were allowed to recolonize naturally and 25% were planted with a mix of herbaceous plants and shrubs native to the area and suited to various soil types and moisture regimes. About 4 acres of forest plantings

were also established. Natural buffer zones along Peach Blossom Creek were established that exceeded the 100’ Critical Areas requirement. The wetland and tree plantings had the added benefit of reducing nitrogen and phosphorous loading to Peach Blossom Creek and the Chesapeake Bay. Trails were developed for residents to traverse in and around the refuges for wildlife viewing and photography.

Forest Conservation Easement:

Trippes Creek LLC knew they wanted to permanently conserve part of the landscape at Llandaff, so they contacted the Eastern Shore Land Conservancy early in the development proposal process and expressed an interest in a conservation easement. As assessments were completed on the property, Trippes Creek LLC determined that a 32 acre forested tract at Llandaff contained prime habitat for the endangered Delmarva Fox Squirrel. The US Fish and Wildlife Service required that reasonable and prudent measures be taken to protect the habitat; this included leaving nearly 14 acres in ungraded forestlands to minimize impacts to the squirrel. Trippes Creek LLC went above and beyond the regulations and donated a permanent conservation easement to the Conservancy on the entire 32 acres, preventing any future development of the critical habitat.

RESULTS

Trippes Creek LLC conducted a thorough inventory of the natural resource and land characteristics at Llandaff and produced an environmentally sound general land plan for the property. After establishing 68 acres of wildlife refuges, including a 32 acre forest conservation easement and 13 water features, they established a housing density of less than 1/5 the allowable amount. Finally, they reforested four acres of former



Photo shows a portion of a 32 acre tract of forestland at Llandaff which is permanently protected with a conservation easement.



The Llandaff development on Maryland's Eastern Shore transformed a small farm operation into 4 separate wildlife refuges, which included 68 acres of habitat, and 26 residential home sites. A house built on one of the lots is pictured here (left) along with one of the wildlife refuges (right).

agricultural lands and reduced overall nitrogen loads by 50 percent.

As of the writing of this profile, 10 lots were sold, including one refuge lot. The refuge lot was sold as part of a package deal that included 3 lots for a total of \$1.4 million dollars. Two homes have been built and 5 homes will be built in next 2-3 years. Even with the slowdown in the current housing market Llandaff is bucking the trends and the current lots available will not have to be reduced in price to make this development profitable.

Another quantifiable result of the project is the reduction of nutrients going into the Chesapeake Bay. Converting approximately 187 acres of prior farmland into forest, wetlands and mixed open space reduced the amount of nitrogen going into Peach Blossom Creek by approximately 78 pounds per acre per year. The nutrient numbers are based on the Chesapeake Bay Program's Watershed Model Scenario Output Database, which is specific to the Eastern Shore of Maryland.

KEYS TO SUCCESS

Nature-based Development: Llandaff has been successful because the developer's goals included wildlife conservation and restoration, and the maintenance and enhancement of water quality. In addition, the general land plan adhered to the natural constraints and opportunities of the site, which helped navigate some difficult resource management challenges and shaped the ultimate character of the development.

Nitrogen Delivered at Llandaff Before and After Construction*			
Land Use Type	Nitrogen Lbs/Acre/Year (by Land Use)	Land Use Acres (pre-construction)	Land Use Acres (post-construction)
Forest/Wetlands	0.029	89.48	158.14
High Till Agriculture	0.78	93.67	0
Low Till Agriculture	0.69	93.67	0
Mixed Open Space / Residential	0.34	6.15	122.58
Road (Impervious Urban)	7.92	1.28	3.53
Total Nitrogen Delivered			
Total Nitrogen Delivered	pre-construction = 152.53 Lbs/Acre/Year	post-construction = 74.22 Lbs/Acre/Year	reduction = 78.31 Lbs/Acre/Year

*Land use acreage calculation for pre-construction is based on Google Earth 2009 imagery, and calculation for post-construction is based on NAIP 2007 imagery. Nutrient loadings used were for the delivered amounts.



Construction of Wildlife Refuges:

The inclusion of substantial wildlife refuge acreage, in close proximity to the home sites, provides residents with the highly desirable experience of having a traditional home that is surrounded by nature. It also demonstrates that the public is willing to pay for alternative open space amenities that are environmentally friendly and don't require extensive maintenance and energy requirements, like golf courses. This bold move helps establish a potential new niche in the residential development market that can also work well in areas that are inherently unsuitable for high density development.

Partnerships: Trippes Creek LLC partnered with three excellent firms with proven track records: Lane Engineering LLC, Conservation Development LLC, and Sweetbay Watershed Conservation. They also partnered with the Eastern Shore Land Conservancy to permanently protect vital habitat for an endangered species. This combination of expertise was a critical ingredient in the ultimate success of this conservation subdivision.

Financial Viability: Despite significant investment in land development and wetland construction and an unusual reduction in housing density, the project was financially viable and has already repaid the developers for their initial investment. There are still 16 lots for sale, ensuring the developers of a long term, profitable investment from this nature-based development.

PHOTOS AND FIGURES

Page 167: Photo, David Burke; figure, Burke Environmental Associates/The Conservation Fund

Page 168: Photo, Brian Gratwicke, Wikimedia Commons

Page 169: Figure, Burke Environmental Associates/The Conservation Fund, using Google Earth image

Page 170, 171: Photos, David Burke

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