

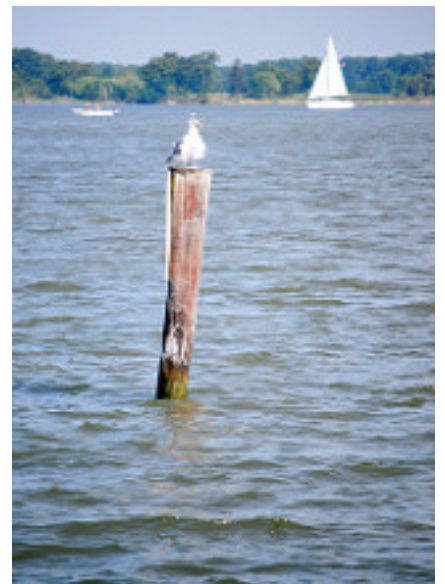


# CHESAPEAKE BAY ENVIRONMENTAL FINANCE SYMPOSIUM

## Recommendations and Final Report



Prepared by the Environmental Finance Center at the University of Maryland  
August 2016



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<sup>1</sup> A complete list of the members of each committee is included in the [Appendix](#) of this report.

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Cover photos courtesy of the Chesapeake Bay Program Office.

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## Executive Summary

On April 25-26, 2016, the Environmental Finance Center (EFC) at the University of Maryland, in collaboration with the EPA Chesapeake Bay Program (CBP), convened the **Chesapeake Bay Environmental Finance Symposium**. This event was catalyzed by Chesapeake Executive Council Resolution 2015-2, which charged CBP with bringing together a symposium to identify innovative approaches to leverage or incentivize private investment in Bay restoration and protection efforts.

The event gathered more than 130 creative, successful leaders from diverse fields including finance, business, policy, and resource protection to discuss options for advancing a more market-like approach to achieving Bay restoration goals. Symposium participants engaged in robust discussion both during and following the event, and while these conversations did not result in concrete, consensus-based conclusions, they advanced knowledge on why the private sector has not been more involved in financing restoration to date, as well as how this sector could be more effectively engaged.

In its work plan with CBP, EFC was tasked with distilling key findings from the Symposium and developing a set of financing recommendations to present to the Chesapeake Executive Council at its fall 2016 meeting. To develop these recommendations, EFC listened carefully to Symposium conversations – especially to the opinions of private sector participants – and also drew from the Center’s own deep understanding of the restoration financing landscape. EFC recognizes that continued debate is necessary and hopes that this report will serve as a launching point for ongoing discussion that catalyzes action.

**Key findings.** The Symposium addressed an array of financing, policy, and implementation barriers and opportunities. Though the event generated a diverse array of ideas, a handful of themes permeated much of the discussion and have therefore directly and indirectly influenced the recommendations presented in this report. These common themes include:

- *Market diversity.* Symposium participants represented many different industries, firms, and market segments, each playing their own unique role in the Bay restoration effort. The private sector is diverse, serving a range of functions and providing an array of potential benefits in the context of water quality improvement. As a result, there is no single solution or set of solutions that can effectively leverage private sector activity. The conversations at the Symposium, therefore, largely focused on the universal conditions that are necessary to engage multiple market segments and actors.
- *It is not all about water quality trading.* The benefits and barriers of establishing water quality markets was a dominant theme at the event, and for good reason. Water quality trading and markets have the potential to dramatically reduce the cost of water quality compliance, especially at the local level. However, the scale of the restoration effort means that trading is not a panacea, but rather one of many important components of the financing solution.
- *There is a foundation for successful financing across the region.* The Chesapeake Bay restoration financing challenge is significant and will require the mobilization of fiscal resources across the entire region. In spite of the challenge – or perhaps as a result of it – there are examples of local and state governments effectively establishing the conditions necessary to catalyze market

behavior, and of successful market-based financing programs that are accelerating implementation and reducing costs.

- *The private sector is ready to engage.* Symposium participants represented industry sectors that are ready to engage, invest, and advance restoration activities, once the right conditions are in place to enable these sectors to act.

**Summary of core recommendations.** To leverage the private sector’s tremendous potential for advancing the Bay restoration effort, it will be necessary to lay the groundwork for effective engagement. All participants in Bay restoration – public and private – have a role to play in creating a set of key “enabling conditions” that set the stage for successful interaction with the market and private sector: 1) allowing flexibility in how projects are designed, financed, and implemented; 2) fostering consistency and predictability in market demand, permitting, procurement, and regulatory enforcement; 3) developing shared or integrated standards for the water quality marketplace; and, 4) boosting broad-scale demand for restoration.

To advance these enabling conditions and catalyze private sector engagement in Bay restoration, the EFC makes the following core recommendations:

- *Advance a Chesapeake Bay restoration economic development effort.* Much of the Bay restoration finance dialogue is focused on the cost of complying with pollution reduction mandates. Though reducing costs and achieving greater returns on investment must be a primary goal, the overall restoration effort will be more effective if it can be folded into a larger economic development initiative. Water quality investments can stimulate significant and sustainable economic activity across the region. Better coordinating restoration goals with economic development priorities could create jobs in key industry sectors, spur entrepreneurship around innovative ventures that produce revenue while also helping clean up the Bay, and establish the mid-Atlantic as a hub for water quality restoration-based technology, industry, and business.
- *Create a credit-based financing system and market infrastructure, basin-wide.* The foundation for achieving efficient and effective Bay restoration financing is a credit-based system that enables nutrient and sediment reductions to be generated and sold across the watershed, once local water quality mandates are met. Such trading systems already exist within Bay states and the District. If these disparate programs can be integrated in a way that enables trades to occur easily and cost-effectively across jurisdictions, there is great opportunity to reduce the overall cost of compliance and accelerate implementation of Bay restoration goals.
- *Establish implementation and performance standards, basin-wide.* One of the most important prerequisites for effective market activity is the establishment of standards that set the code of conduct. While the restoration financing effort may have myriad goals – including stimulating economic activity in the region – the primary, overarching goal of the effort must be to restore water quality in the Chesapeake Bay and its tributaries. Implementing performance standards helps ensure that restoration markets ultimately advance this goal – and it gives private firms the clear expectations they need in order to get involved.
- *Reduce unnecessary transaction costs.* A consistent message in Symposium discussions was the fact that inefficient government processes have an adverse impact on private sector activity.

Targeted reforms to permitting and procurement processes to remove unnecessary inefficiencies could go a long way in stimulating private sector engagement.

- *Facilitate the flow of restoration investment through innovative institutional structures.* Private sector and market experts at the Symposium described a variety of opportunities for gaining investment efficiencies, each one requiring flexibility that is too often lacking in existing public financing systems. Yet there are models of institutional structures that invest public funds in a way that incentivizes effective programs and practices, and these models should be replicated.

These primary recommendations are universal, in that they could apply in all jurisdictions throughout the Chesapeake Bay watershed. In addition, there are opportunities for establishing innovative financing processes and programs with local-level specificity, including linking private capital and implementation power with public sector investment through pay-for-success programs; adapting the mitigation banking model to meet local stormwater management needs; utilizing public-private partnerships to reduce implementation costs; and creating tax incentives to motivate adoption of water quality practices on private land. While these options may not apply in every jurisdiction, their potential to reduce the cost of complying with local water quality regulations makes them worth consideration and further study.

## Section 1: Background

In July 2015, the Chesapeake Executive Council issued Resolution 2015-2, which directed the EPA Chesapeake Bay Program (CBP), under the leadership of the Principals' Staff Committee (PSC), to convene an Environmental Finance Symposium that would identify innovative approaches for leveraging or incentivizing private investment in Bay restoration and protection efforts. The CBP engaged the Environmental Finance Center (EFC) to plan and implement this Symposium, which was held at University of Maryland in College Park on April 25 and 26, 2016. Drawing from the rich discussions that occurred during the Symposium, the EFC prepared a set of key financing recommendations contained in this report.

**Committee guidance.** To guide the development and implementation of the Symposium, the CBP and the EFC convened two committees, each comprised of public and private sector leaders from the Bay states and the District of Columbia. Committees included representation from experts in a range of relevant fields, including finance, resource management, planning, and policy. Committee descriptions and a list of Committee members can be found in the [Appendix](#).

**Event structure.** The Symposium convened more than 130 individuals from a range of fields including academia, resource management, finance, business, and policy. The two-day event agenda included plenary sessions that set the stage for conversations on effectively engaging the private sector in Bay restoration. These framing presentations were made by speakers from Bay states and around the country, representing both the public sector and the private sector. The core of the event, however, was a series of working sessions in which participants dove deeply into the issues at hand, brainstorming and vetting innovative approaches to catalyzing private investment in Bay restoration, as well as singling out obstacles to these approaches. Each participant was assigned to participate in two of six working groups organized around key themes (see below), with discussion led by a trained facilitator. Work groups discussed barriers and opportunities associated with creating more effective linkages between the public sector, the private sector, and the marketplace. A full summary report of work group discussions, along with the complete event agenda and list of participants, can be found in the [Appendix](#).

**Key themes.** The Chesapeake Executive Council's directive clearly defined the focus of the Symposium to be the interaction with and engagement of the private sector, including the role of environmental markets in the Chesapeake Bay restoration financing effort. Given the complexity and scale of the challenge facing the Bay community, this charge made sense. While public investments are essential to catalyze restoration, the public sector alone does not have the capacity to achieve restoration goals; success will depend on involvement by citizens, businesses, and investors. To that end, the Symposium was designed to hone in on how the public sector – primarily state and local governments – can effectively engage and partner with the private sector in the restoration effort.

To organize discussions within this broad topic, the project team identified six themes for participants to explore in depth during the Symposium:

- Reducing implementation costs;
- Incentivizing innovation;
- Creating and expanding consumer demand for conservation and restoration;



- Integrating public and private capital;
- Mitigating investment risk; and,
- Establishing water quality markets and trading programs.

Each of these themes represents an opportunity for the private sector to bring value to the restoration financing effort and/or the mechanisms that can create linkages to the marketplace.

**Goals of this report.** In its work plan with the CBP, the EFC was charged with distilling key findings from the Symposium and preparing a set of financing recommendations to be delivered to the Chesapeake Executive Council at its 2016 annual meeting. Specifically, this report was to focus on:

- The enabling conditions necessary for incentivizing private investment and,
- The key opportunities for bringing water quality investments to scale

This report first lays out, in [Section 2](#), the prerequisite factors or enabling conditions for local and state governments to effectively partner with the private sector. In addition, some of the main obstacles to establishing these conditions are identified, drawing from input received at the Symposium. Following that, [Section 3](#) lays out recommendations for moving forward with a more market-based approach to Bay restoration, informed both by Symposium conversations and the EFC's own understanding of this landscape. The [Appendix](#) contains a set of materials intended to provide additional context for the Symposium and this report.

**A few preliminary notes.** The charge from the Chesapeake Executive Council was to focus on *water quality*, so this report does not discuss the financing challenges related to the myriad additional issues that are critical to Bay restoration and addressed in the Chesapeake Bay Agreements, such as goals related to fisheries and public education. The EFC's intent is to develop a path forward based on engaging private investment and market-based programs for water quality restoration that will pave the way for similar efforts related to other watershed restoration goals.

Second, where this report touches on *public* rather than private sources of revenue for restoration, it is intended to highlight how to maximize the impact of those investments, rather than explore potential new public sources. Public investment is essential to the Bay restoration financing system, and in many cases is the primary catalyst for restoration activity. However, the range of public revenue sources and the mechanisms for deploying them are, for the most part, well-established, and there are plentiful existing resources addressing the financing challenges that Bay area jurisdictions face. Additionally, because public revenue generation is a political rather than technical challenge, the conversation is contained to understanding how to maximize the effectiveness of investments, whether they come from public or private sources.

Third, the EFC's focus is on state and local financing opportunities and processes; federal financing and funding resources are not directly addressed. Certainly, federal resources are critical to the restoration process, especially in certain sectors such as agriculture, and federal involvement can impact market dynamics in a variety of areas such as insurance tools and mechanisms, land protection, and application of technology. However, the complexity of federal financing programs and the cumbersome process for shifting spending patterns and priorities would have made it difficult to identify recommendations that could affect change in time to achieve mandated pollution reduction

targets. That said, the recommendations presented in this report provide a good foundation for leveraging federal resources within their existing structures.

Finally, it should be noted that the Symposium did not attempt to estimate the aggregate cost of restoration activities. Costs matter, but rather than try to estimate what costs may be in the long term (a necessary exercise when developing budgets and financing plans), the focus was narrowed to the issues, processes, and opportunities associated with reducing those costs, whatever those might be.

## Section 2: Conditions that Enable Private Sector Engagement

The private sector is no newcomer to the world of public infrastructure financing. In fact, private firms and the market have been integral players in financing public services for generations – and the Chesapeake Bay restoration effort is no exception. Private institutions and businesses are involved in a range of restoration activities, including designing and constructing best management practices (BMPs) and water quality infrastructure; providing institutional management and capacity building services; supplying financing and capital management; and, facilitating market activity through aggregation and technical assistance.

The advantages of such private sector involvement are well documented and include:

- **Efficiency:** Market-based financing processes are often able to achieve outcomes more quickly and cost effectively. In regard to water quality restoration, this translates to an opportunity to maximize the level of pollution reduction per dollar invested.
- **Effectiveness:** The private sector is often able to achieve higher-quality outcomes as a result of greater overall capacity and access to resources.
- **Expediency:** When unnecessary public barriers are removed, the marketplace is able to mobilize capital and resources nimbly—a boon to the Bay community, with restoration deadlines approaching quickly.
- **Innovation:** The market forces that create cost efficiencies also incentivize the development of innovative new practices, policies, and financing mechanisms that can advance the restoration effort.
- **Risk mitigation:** When private firms provide restoration services, they assume the risk associated with them, shifting it away from the public sector.

The private sector is already serving a number of market functions related to Bay restoration, as mentioned above, and there is almost limitless opportunity for enhanced engagement in order to capitalize on the power of the market to achieve more efficient, effective, and innovative outcomes. The success of such engagement, however, depends on how it is structured and whether the right conditions are in place. What those conditions are, and how they can be achieved, was a main theme of the Symposium dialogue. Participants worked to identify the prerequisites for successfully stimulating private sector engagement, as well as the challenges and opportunities associated with putting these conditions in place. These discussions led to the identification of four “enabling conditions” that provide the foundation for leveraging the benefits of the market.

***Flexibility in how projects are designed, financed, and implemented.*** A common theme in Symposium discussions was the risk-averse nature of the public sector associated with restoration investments. The need to comply with regulations, permitting procedures, and procurement policies has resulted in a financing system that has a tendency to be rigid and unnecessarily prescriptive, which in turn reduces incentive for innovation and efficiency. A more flexible system that emphasizes results rather than approach would motivate market actors to find the lowest-cost way to achieve desired outcomes. The result would be increased innovation, cost savings, and accelerated implementation. What often inhibits policy makers from enabling flexibility is a concern that it could result in substandard outcomes. To avoid this, programs can include clear, appropriate program parameters that drive performance, as will be discussed later in this report.

**Market consistency.** Another critical prerequisite identified repeatedly in Symposium discussions is the need for consistency or predictability, especially in three areas: steady demand for restoration services, clear and predictable public procurement and permitting processes, and consistently-enforced water quality regulations.

The first of these – steady demand for goods or services – facilitates market activity by bringing vendors to the table, which fosters healthy competition and drives down costs. Predictable levels of investment in pounds of nutrient and sediment pollution reduction, for example, would let private firms know what is expected (pounds reduced) and also offer reliable revenue flow as they work to achieve those results. Steady demand is difficult to achieve, however, for several reasons, including the fact that public spending priorities necessarily shift year to year to reflect pressing needs, the tendency for appropriation processes to base investment decisions on various goals other than or in addition to pollution reduction, and the “use it or lose it” provision common to many public spending programs.

Another area where predictability tends to be lacking is in the public processes of permitting and procurement. Procurement is the primary point of connection between private firms and local governments. When procurement requirements are unwieldy to navigate, or when they vary significantly from community to community, transaction costs increase. Costs also increase as a result of unnecessarily slow or cumbersome processes for permitting water infrastructure projects, which causes frustration and project delays. Reducing the burden of inefficient permitting systems at all levels of government was identified at the Symposium as a major opportunity for improving the likelihood of private sector participation in restoration activity.

Finally, inconsistent regulations – specifically related to stormwater management in urban communities – and inconsistent regulatory enforcement across jurisdictions pose barriers to project implementation, especially as it relates to market-based programs. Contrary to popular belief, it is the consistent application of well-defined regulations – not the reduction of regulatory obligations – that provides the optimum framework for effectively engaging the private sector. By developing and applying clear parameters, jurisdictions free the market to do what it does best: pursue the lowest-cost methods for achieving regulatory goals.

**Integrated standards and policies for the marketplace.** A third prerequisite for successful private sector engagement is the establishment of shared standards for the water quality marketplace. This is especially challenging – but also especially necessary – given the size and diversity Chesapeake Bay watershed. Bay jurisdictions currently use a range of regulatory, financing, and technical strategies to achieve water quality goals; for example, metrics for MS4 permit implementation range from acres of impervious surface treated, to gallons of water retained on site, to pounds of nutrients reduced. While local governments unquestionably *should* tailor their approach to local needs, the Bay-wide restoration effort would benefit from a more integrated system. Shared standards for the design, installation, and monitoring of stormwater BMPs, for example, would make it easier and less costly for private firms to provide these services region-wide. At a minimum, states should strive to make their own internal standards straightforward and consistent.

**Broad-scale demand.** Finally, a necessary condition for engaging markets at scale is broad demand for the practices, behaviors, and programs that result in a restored Chesapeake Bay, which in turn will

drive the supply of those practices, behaviors, and programs. Building demand for restoration will require interventions at multiple points, including maintaining and increasing existing levels of public investment in restoration; ensuring that local, state, and federal laws are consistently enforced; and redoubling efforts to boost public demand for Bay clean-up. The latter will involve outreach and education so that citizens, businesses, and institutions throughout the watershed understand that a clean Chesapeake Bay is integral to the community's quality of life and economic health.

These four conditions – flexibility in project implementation; consistency in market demand, procurement, permitting and regulatory enforcement; shared standards for the marketplace; and, broad-scale demand for restoration – represent the foundation for establishing a robust Bay restoration market. The EFC does not presume that these are simple goals to achieve – but any strides forward will help set the stage for effectively engaging the market and the private sector, with the payoff of enhanced efficiency, effectiveness, and innovation – and ultimately, a healthier Bay and regional economy. The next section presents recommendations for incremental actions that work toward achieving this vision.

### Section 3: Recommendations for Scaling and Accelerating Public - Private Engagement

The EFC's key recommendations represent strategies with strong potential to bring about a Bay restoration financing system that proactively leverages private sector capacity. If implemented, these approaches would take significant strides toward overcoming the barriers outlined in the previous section and fostering the conditions necessary for productive engagement between the public and private sector. Some recommendations target particular levels of government; nearly all will require coordination between state, local, and federal agencies and among both private and public market participants. The recommendations are organized into two categories:

- **Core recommendations** represent broad-scale market interventions and for the most part are intended to be implemented by states rather than local governments; they could be undertaken by all Bay jurisdictions; and,
- **Theme-specific recommendations** address specific ideas that have demonstrated capacity to accelerate the implementation of enabling conditions at the state and local levels.

Before presenting these recommendations, however, the EFC offers one over-arching recommendation for an immediate next step that will aid implementation of all of the proposed next steps. The challenge of Bay restoration financing, and all potential solutions, warrant significant additional debate. To ensure that the conversation begun at the Symposium *continues* – and that this conversation catalyzes action – the EFC recommends that the Chesapeake Bay Program create a **Finance Advisory Board**. This board would be comprised of finance, economic, and policy experts and charged with advancing Bay restoration financing solutions.

This Board would work in partnership with and receive staff support from CBP's newly-formed Budget and Finance Work Group, which has been tasked with engaging on issues that pertain to financing the requirements of the Chesapeake Bay agreement. Working together, the two groups would have the capacity to provide public and private sector leaders with actionable ideas for advancing restoration finance – those contained in this report and any others that emerge moving forward. Below, EFC suggests specific tasks that would be appropriate for this new Board to undertake.

The EFC recognizes the significant staff limitations affecting all involved in Bay restoration and the challenge of populating a new board. There may certainly be other ways to continue the restoration financing conversation in a codified way and move toward implementation; the key point is that the conversation must not stop here.

## Core Recommendations

### **Recommendation 1: Advance a Chesapeake Bay restoration economic development**

**effort.** This recommendation represents what the EFC believes is the greatest hope for restoring and protecting the Chesapeake Bay: strengthening the linkage between the Bay restoration effort and the region’s economy and economic development framework. While the Symposium process and this report have attempted to identify ways to reduce Bay restoration costs, the public sector must begin to shift from a focus on controlling costs toward a vision of water quality investment as a powerful tool for achieving sustained economic development in the region.

Bay states are compelled by federal mandates to pay for water quality improvements, yet these expenditures are not simply costs to Bay area jurisdictions; they are in fact investments in local and regional economies, creating jobs, building key industry sectors, and shoring up the long-term potential for the Bay area to remain a desirable place to live and work. It goes without saying that a clean and healthy Bay is foundational to the Bay area’s economy and way of life, sustaining iconic industries such as fishing, tourism, and recreation. Yet more can be done to strengthen the linkage – both perceived and actual – between Bay restoration and economic development.

There are three key opportunities here. First is the opportunity to develop industries and products that are naturally linked with a clean and healthy Bay. A cluster of sectors with high growth potential – including sustainable agriculture and fisheries, urban green infrastructure, eco-tourism, and nature-based recreation – is predicated on clean water. Economic activity associated with these sectors is already substantial and is poised for growth. Bay states have an opportunity to establish the region as a hub for such “clean water” industries. Growth in these sectors will attract new businesses and skilled workers, improve quality of life for citizens, and enhance the infrastructure foundation for long-term economic growth and development.

Second, there is the opportunity to target investment in BMPs that also support the local and regional economy. A study conducted by the EFC in 2013 showed that investments in stormwater management practices, for example, have an impact on local economies similar to the impact of other industries such as construction.<sup>2</sup> There is compelling evidence that effective water quality investments will pay real dividends to state and local governments, and projects should be selected with an eye toward accelerating that economic impact. This approach to using water quality investments to spur local economic development activity is a key element of Prince George’s County’s new stormwater public-private partnership, which is on its way to becoming a national model in achieving multiple community economic and financing goals.

Third, local and state governments can create incentives to grow innovative initiatives that both generate revenue and function as restoration practices in and of themselves. Some examples include oyster farming, cultivating fruit and nut trees within forest buffers, and installing waste-to-energy systems; all of these have capacity not only to create jobs but also to improve water quality. The region would benefit from fostering such innovative enterprises through startup incubators, business development assistance, entrepreneurial training, accelerator programs, and similar efforts.

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<sup>2</sup> University of Maryland Environmental Finance Center. 2013. *Stormwater Financing Economic Impact Assessment: Anne Arundel County, MD; Baltimore, MD; Lynchburg, VA.*

This mindset shift – water quality as economic development – may have the added benefit of helping to overcome resistance to restoration activities among certain stakeholders, especially upstream communities and industries that tend to resist regulation. It is not a new idea to use Bay restoration to generate economic activity, and it will be important to learn from those communities that have successfully advanced Bay-related economic development initiatives, so that successes can be replicated in communities across the region. But more than that, what is called for is a widespread, coordinated economic development effort that leverages the “Bay brand” for growth in promising industry clusters and seeks strategic connections between restoration activity and broader economic development initiatives.

**Next steps:**

The critical first step is to better integrate economic development experts and leaders in the Bay restoration apparatus, thereby creating the opportunity to advance these ideas. The EFC recommends that representatives of state Departments of Commerce and Economic Development be included in Chesapeake Bay management and decision making systems, specifically in the Principals’ Staff Committee (PSC) at the Chesapeake Bay Program and the proposed Finance Advisory Board.

While some coordination does already occur between economic and natural resource departments, if the goal is to tightly weave Bay restoration with economic development, it will be important to involve the economic development community first-hand. Once engaged in this way, these professionals will be in prime position to identify opportunities to integrate restoration into state and local economic development activities and priorities, including those surrounding finance, marketing, neighborhood development, workforce development, small business development, business retention and expansion, technology transfer, and real estate development. In addition, economic development professionals are uniquely qualified to investigate the economic impact of Bay restoration and could spearhead an effort to quantify the jobs created and revenue generated by restoration activities in Bay jurisdictions, which could help localities make the case that restoration *is* economic development.

**Recommendation 2: Create a credit-based financing system and market infrastructure, basin-wide.** The second core recommendation is to establish a common restoration financing and market system that is directly tied to reducing pollution loads to the Chesapeake Bay in the most efficient way possible. This will involve establishing nutrient and sediment credits as the basis for restoration financing, requiring that investments result in actual pollution reduction, and setting up the necessary infrastructure to enable this marketplace to function smoothly. Such a system will be most effective at reducing the cost of Bay restoration if implemented basin-wide, but should a regional system prove elusive, state- or local-level trading programs can still achieve impact, as evidenced by the successful trading programs in place in Virginia and the District of Columbia. With state-level trading systems up and running, the next step would be to coordinate systems across jurisdictional boundaries.

**Sub-recommendation 2a:** The first part of this recommendation is to **establish a credit-based financing system** in order to explicitly tie water quality restoration investments with the desired



outcome of reduced nutrient and sediment loading to the Bay.<sup>3</sup> By structuring restoration transactions in terms of credits, the marketplace will have a consistent protocol for evaluating each proposed restoration project (i.e. in terms of how many credits it generates), and the Bay community will have a clear metric by which restoration progress can be measured. This supports enhanced transparency in how state and local governments finance restoration activity, and it will require project implementers in the private sector to be more transparent in accounting for performance, which ultimately improves the efficiency ratio and results in greater conservation per dollar spent. When this system is designed correctly, it will incorporate all the costs associated with a water quality BMP, including not only its design and construction but also its lifetime operations and maintenance, which over time can exceed the costs of construction.

Demand for credits may come from a variety of buyers, such as local governments seeking to comply with MS4 permits; wastewater treatment plants needing to achieve regulated pollution reduction requirements; or state or federal governments investing subsidy monies in restoration activities. Similarly, credits could be generated by a range of sources: agricultural operators planting cover crops, private firms aggregating water restoration BMPs on private land, municipalities or states constructing green infrastructure on vacant properties. Before being eligible to sell credits in a statewide or regional market, MS4 regulated communities would first need to meet their own local permit requirements.

Coordinated across multiple jurisdictions, a credit-based accounting system would provide broad-scale consistency in how restoration investments are made and reduce transaction costs to project implementers. Furthermore, such a system would lend itself to be folded into a larger, watershed-wide water quality trading market, which could leverage the success of current functioning environmental market programs in the watershed.

**Sub-recommendation 2b:** Hand-in-hand with adopting a credit-based financing system is a **shift toward a performance-financing approach**, which focuses on the desired outcome rather than the means to get there. If BMPs can be evaluated based on how many pounds of nutrients or sediments they reduce, investors would be able to target funds to practices that achieve reductions at the lowest cost. Paying for results rather than projects provides the incentive that private firms need to find the most cost-effective and highest-performing technologies and practices.

Paying for performance represents a new way of doing business for many public revenue programs. Yet performance need not supplant other funding criteria but rather can supplement them, enabling multiple project needs to be addressed without sacrificing financing efficiency. One of the more common concerns about focusing on the cost effectiveness of restoration investments is that getting projects to the point of investment and implementation can require a variety of interventions that are not directly associated with water quality restoration. For example, overcoming cultural barriers through education and outreach, or providing technical assistance are often “off balance sheet” in that they do not show up in project proposals or cost assessments – and therefore would not be accounted for in the credit generation process. However, this need not be the case. The power of performance-

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<sup>3</sup> We use the term “credit-based financing system” as a way of capturing the multiple components, actors, and activities within that system. It should be noted that in many cases the credit-based financing system is referring to an accounting system, which is a specific component of the broader system.

based based financing is that the funding organization, usually state or local government, can require the seller of credits, i.e. the project implementer, to be responsible for all project costs, including outreach, evaluation and monitoring, and long-term technical assistance. Including these activities in the marketplace provides incentive to ensure that they are accomplished in the most efficient manner possible.

**Case Study: Chesapeake and Atlantic Coastal Bays Trust Fund.** A good example of a public revenue program that uses performance to guide investments is the Chesapeake and Atlantic Coastal Bays Trust Fund. Formed by the Maryland General Assembly in 2007, the Trust Fund is capitalized with revenue from Maryland motor fuel and car rental taxes.<sup>4</sup> Between 2009 and 2015, the Fund invested more than \$250M in efforts to improve the health of the Chesapeake Bay, including projects that advance implementation of local and state Watershed Implementation Plans (WIPs).<sup>5</sup>

The Fund's explicit goal is to ensure the greatest environmental return on investment.<sup>6</sup> To that end, the Fund is advised by a Scientific Advisory Panel, which annually recommends where funds should be targeted and which BMPs and monitoring protocols are likely to be most effective. Based on Panel recommendations as well as geographic mapping via the US Geological Survey SPARROW model, the Fund annually targets investments to "specific watersheds, watershed areas, projects and practices that provide the most cost-effective water quality benefits to the Chesapeake and Coastal Bays via reductions in non-point source nutrient and sediment loadings."<sup>7</sup>

To track whether projects are achieving anticipated goals, the Trust Fund works with the Maryland Biological Stream Survey (MBSS) to document baseline conditions and monitor and compare the effectiveness of various BMPs. Results are shared publicly via the Fund's Trust Fund Monitoring website as well as the Maryland StreamHealth website managed by the MBSS.<sup>8</sup>

**Sub-recommendation 2c:** To enable water quality trading and other Bay-wide restoration investments, it will be necessary for local and state leaders to **create water quality market infrastructure**. Setting up market infrastructure includes defining the currency or unit of transaction, which may be a water quality credit defined as one pound of nitrogen, phosphorus, or sediment reduced per year, as well as establishing a protocol for calculating the value of a credit. There will also need to be mechanisms for evaluating the pollution reductions of various water quality BMPs, as well as administrative system(s) for tracking, monitoring, and registering market activity.

Each jurisdiction may choose to establish its own market infrastructure rather than participate in one over-arching system, but to minimize transaction costs for buyers and sellers and efficiently allocate

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<sup>4</sup> Maryland Department of Natural Resources. 2016. *Maryland's Chesapeake and Atlantic Coastal Bays Trust Fund Fiscal Year 2016 Budget At a Glance*. Available: <http://dnr2.maryland.gov/ccs/Documents/TrustFundFY16.pdf>

<sup>5</sup> Ibid.

<sup>6</sup> Maryland Department of Natural Resources. Chesapeake and Atlantic Coastal Bays Trust Fund website. Accessed 7/21/14: <http://dnr2.maryland.gov/ccs/Pages/funding/trust-fund.aspx>

<sup>7</sup> Ibid.

<sup>8</sup> Trust Fund Monitoring site: <http://dnr2.maryland.gov/streams/Pages/trustfund.aspx>; MBSS Maryland Stream Health site: <http://www.streamhealth.maryland.gov/>

scarce resources, various state programs should be integrated in a way that allows easy transactions across state lines. For example, the District has an effective stormwater retention credit trading program<sup>9</sup> that is based on acres treated for stormwater emissions, whereas Maryland's credit trading program is based on pounds of nitrogen and phosphorous reduced. An integrated system would include a mechanism for translating these differing metrics into a common currency, and it would also include some kind of unified platform where buyers and sellers can make transactions.

With such an integrated market infrastructure in place, any community in any state could meet its Chesapeake Bay pollution reduction obligations – i.e. those transcending local permit requirements – by financing the most efficient restoration practice anywhere across the basin, thereby achieving overall Bay pollution reduction targets more quickly and cost effectively. Setting it apart from some existing state programs, this system would be able to mitigate not only the impacts of new growth but also *existing* sources of nonpoint pollution.

Transitioning to a credit-based financing and accounting system that is integrated across all Bay jurisdictions offers huge potential to harness the power of the market – and yet it will not be without considerable logistical, legal, and political challenges. The most significant will be integrating new accounting systems with those already in place throughout the watershed. At the state level where the majority of water quality investments are in the form of subsidies, the shift will require transforming grant-based funding programs to investment-based ones, which will likely take concerted effort and strong leadership.

**Case study: Maryland Nutrient Credit Trading Program's Marketplace and Trading Registry.**

While Maryland's Nutrient Credit Trading Program has not yet seen much trading activity, its web-based Marketplace and Trading Registry is a good model of well-conceived market infrastructure. The portal includes a tool for estimating credits generated by BMPs, and it serves as a central place for buyers and sellers to make transactions. After setting up an account on the Marketplace, participants can post and/or purchase registered credits. The Registry also records all registered credits, tracks transactions, and enables the public to monitor progress of the trading program.<sup>10</sup>

**Next steps:**

Sub-recommendation 2a is foundational and could be implemented independently of the other two sub-recommendations, but the greatest impact will be had if they are all pursued in tandem. While many actions will be needed in order to bring about such a comprehensive change, big-picture next steps include the following:

- Transition state and local funding programs and resources to credit-based financing. Local governments will still meet local water quality needs first, but for additional pollution reduction investments that advance Chesapeake Bay restoration goals, intra- and/or inter-state credit systems should be enabled (where they do not currently exist). Credit-based financing systems

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<sup>9</sup> For more information, visit: <http://doee.dc.gov/src>

<sup>10</sup> Maryland Nutrient Trading Program website. Accessed 7/21/14: <http://www.mdnutrienttrading.com/farmers/q3.php>

have the capacity to improve *local* financing systems as well; stormwater banking is a good example and it is discussed in the next section of this report.<sup>11</sup>

- Convene a summit of state and local leaders to identify ways to coordinate existing trading programs, especially marketplace platforms and registries.

### **Recommendation 3: Establish Implementation and Performance Standards, Basin-**

**Wide.** Efficiency and effectiveness are the two hallmark features of a functioning market. If we think of pollution reduction investments as a basic equation – dollars per pound reduced – *efficiency* is concerned with the numerator (dollars spent) and *effectiveness* with the denominator (pollution reduced). The previous recommendation focused on efficiency, making each dollar invested go as far as possible. But to be effective, a water quality market must also result in actual improvement in water quality. Implementation and performance standards help achieve that goal.

Performance standards have long been integral to mitigation and conservation banking programs, which successfully preserve habitat and wetlands at scale, in no small part because they clearly articulate to the private sector what outcomes are expected. Performance standards for a stormwater or water quality market can be modeled on those in the mitigation banking system, which address three main areas:<sup>12</sup>

- Legal standards address many of the activities that can create the most significant transaction costs for both the public and private sectors such as deed restrictions, conservation easements, property rights, and the securing of trust and bank documents. Legal standards are essential for bringing practices on private property to scale and therefore have perhaps the greatest impact on the long-term viability of projects.
- Financial standards or assurances cover activities such as construction bonding, interim management security, contingency security, and the establishment of land management endowment accounts. These standards remove much of the risk from project implementation, thereby providing assurance to the public sector that the right steps have been taken to mitigate unintended project setbacks and delays.
- Biological or physical standards ensure that projects are designed, constructed, and maintained as stipulated in the agreement between the investor and the implementer. It is these standards that ensure environmental performance and they often require monitoring efforts.

Collectively, these standards provide the framework or rules of engagement for the market and ensure that investments in water quality infrastructure and projects actually do improve water quality (though of course, water restoration should not be pursued at the detriment of other community values; and jurisdictions certainly can and should invest in stormwater BMPs that achieve multiple co-benefits).

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<sup>11</sup> An excellent example of a local credit system is Lake Tahoe, CA's Lake Clarity Credit Program. For more information, visit: <http://enviroincentives.com/portfolio-item/lake-clarity-crediting-program-lake-tahoe-2/>

<sup>12</sup> *Mitigation Banking: Performance Standards and Credit Releases*. The Environmental Law Institute Web Site: <https://www.eli.org/sites/default/files/docs/denisoff.pdf>. Last visited July 23, 2016.

Because performance standards require monitoring and evaluation in order to gauge effectiveness, they have potential to advance the science related to water quality restoration practices and to create greater investment certainty over time. Such enhanced knowledge would support an “adaptive management” approach to Bay restoration, in which leaders make management decisions with limited understanding of what the results will be, knowing that these decisions are likely to be adjusted as information is gained, or as social, political or economic conditions change.<sup>13</sup> This kind of flexible decision-making approach – which continually seeks better science but does not delay action until complete results are available – will be necessary if pollution reduction deadlines are to be met.

**Next steps:**

The proposed Finance Advisory Board should work in concert with the National Water Quality Trading Alliance and the National Water Quality Network to develop model performance standards for the water quality restoration market. These model standards may be adapted and/or adopted by Bay jurisdictions as deemed appropriate. While each state will determine the desirability and feasibility of implementing performance standards, the more that these standards are integrated across the watershed, the more they will foster predictability in the Bay restoration market, a key condition for engaging the private sector.

**Recommendation 4: Reduce Unnecessary Transaction Costs.** Performance standards, recommended above, have the potential to reduce transaction costs to the public sector. The public sector can also *create* transaction costs through inefficient application of services necessary for project implementation. The EFC recommends two main process changes that could significantly improve private sector engagement: streamlining permitting processes, and transforming local and state procurement systems.

***Reform local and state permitting processes as needed.*** No single barrier was discussed more at the Symposium than challenges associated with local and state project permitting, which can cause implementation and construction delays and drive up costs. While water quality projects must go through the permitting process in order to achieve best outcomes, unnecessary delays in the process can have surprisingly profound cost impacts on private firms and by extension, on the public. This problem is not unique to water quality industries; a study by The American Institute of Architects showed that removing permitting delays in the construction process could increase spending by up to 5.7% and lead to a more than 16% increase in tax revenue to state and local governments.<sup>14</sup> In addition to increasing tax revenue, streamlined permitting processes can make local governments more competitive in attracting business investment.

While permitting delays are often assumed to be solely due to slow government operations, permittees themselves can also play a role. Fast-tracking initiatives often include checklists of ways the applicant can speed up the process, such as meeting with city staff to discuss the project prior to

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<sup>13</sup> National Research Council. 2011. *Achieving Nutrient and Sediment Reduction Goals in the Chesapeake Bay: An Evaluation of Program Strategies and Implementation*.

<sup>14</sup> The American Institute of Architects. March 2011. *Issue Brief: Expedited Permitting*

application, submitting a complete application the first time around, working with staff to be sure state and local requirements are met, and responding to permit review comments in a timely manner.<sup>15</sup>

Fast-tracked permit options available to Bay jurisdictions include Clean Water Act general permits or state programmatic general permits, which can provide regulatory efficiency while also ensuring that projects comply with regulations. Such permits “shrink review timelines by reducing or eliminating public engagement so, therefore, are designed to authorize only limited resource concerns and clearly-defined project scopes.”<sup>16</sup>

**Case study: PA DEP Permit Decision Guarantee Policy.** In 2012, Pennsylvania’s Department of Environmental Protection (DEP) rolled out a new permitting process designed to “reward applicants who spend time and resources submitting what DEP considers to be high quality applications for projects with verifiable, positive economic impact”<sup>17</sup> by providing them with a guaranteed fast-tracked review timeline. Conversely, initial permit applications that fail to meet established standards are subject to an extended review process. To enjoy expedited review, applicants must submit complete and technically adequate applications that address all relevant regulatory and statutory requirements in the first submission. The Department also strongly encourages potential applicants to participate in pre-application meeting with DEP staff, “going so far as to state that the Permit Decision Guarantee may be ‘void’ if an applicant chooses to forego a pre-application conference when one has been advised by DEP.”<sup>18</sup> In addition to incentivizing the submission of complete, high-quality applications, the goals of the Permit Decision Guarantee Policy are to (1) provide predictable review timeframes for applicants, (2) make application requirements clear and concise, and (3) establish expectations for DEP staff in order to make the permit review process more clear, efficient, and consistent.<sup>19</sup>

**Improve efficiency of local and state procurement systems.** Performance-financing systems benefit from a procurement process that is flexible and able to shift from project-based payments to performance-based investments in pollution reduction. Flexible, efficient, and adaptive are not terms that are usually associated with local procurement systems, and in fact procurement is by necessity a conservative and cautious process that is designed to discourage poor behavior rather than encourage what is best. However, performance financing is actually in keeping with the spirit of local procurement policy: to get the most efficient and effective outcome per dollar invested.

Communities can shift to performance-based payments using their existing procurement systems, meaning administrative costs would be minimal. A good example of this type of performance system is the North Carolina Ecosystem Enhancement Program (NCEEP). NCEEP is able to disseminate Request for Proposals (RFPs) for water mitigation credits through their state procurement system. Through this

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<sup>15</sup> For an example, see the City of Tallahassee’s Development Review Fast Tracking and Customer Service Initiative:

<http://www.talgov.com/growth/growth-10ways.aspx>

<sup>16</sup> Ann Swanson, Chesapeake Bay Commission. Personal communication with EFC, 7/27/16.

<sup>17</sup> Manko, Gold, Katcher, and Fox. November 5, 2012. MGKF Special Alert: “DEP Finalizes Permit Decision Guarantee Policy.”

<sup>18</sup> Ibid.

<sup>19</sup> Pennsylvania Department of Environmental Protection, Office of Program Integration. November 2, 2012. “Policy for Implementing the Department of Environmental Protection (Department) Permit Review Process and Permit Decision Guarantee.” Available: [http://files.dep.state.pa.us/ProgramIntegration/PermitDecisionGuaranteePortalFiles/021-2100-001\\_PRP\\_and\\_PDG\\_Policy.pdf](http://files.dep.state.pa.us/ProgramIntegration/PermitDecisionGuaranteePortalFiles/021-2100-001_PRP_and_PDG_Policy.pdf)

method, the state is able to connect with bidders through a market approach using a platform already in place.

**Next steps:**

State and local government are best equipped to identify permitting and procurement barriers in their own jurisdictions; thus, the EFC recommends that each Bay jurisdiction engage its stakeholders to identify and resolve inefficiencies. There is no one-size-fits-all public procurement or permitting program model, but states should advance industry standards such as clear expectations for applications and a straightforward and predictable timeline. Many states have already worked to make improvement in these areas, but Symposium conversations indicate there is still significant room for progress. To assist in this process, it may be beneficial to engage a group such as the Chesapeake Legal Alliance to identify any needed legislative actions to improve the efficiency of local permitting and procurement processes.

**Recommendation 5: Facilitate the Flow of Capital Through Innovative Institutional Structures.**

Though the private sector is essential to the restoration financing process, it is state and local government that will ultimately be held responsible for restoring the Bay, and thus they will continue to lead the effort and serve as primary investors in restoration activity for the foreseeable future. To make sure these investments foster a functioning restoration market, public investments should be structured so they are consistent with what the private sector needs in order to participate fruitfully. A critical way for public investment to do this is to *only invest in projects when those projects are ready for investment*. This may sound like common sense, and indeed in the private sector this generally happens naturally. In the public sector, however, budgeting and procurement restrictions – especially the “use it or lose it” provision common in public spending programs – can inadvertently compel project managers to invest in inefficient projects rather than lose those funds. This sends the wrong signal to the marketplace.

Bay jurisdictions are addressing this challenge by establishing institutional structures that have the capacity to hold funds through multiple fiscal years and make investments in nonpoint pollution reduction projects, only when viable projects are ready.<sup>20</sup> These initiatives take various forms, such as standalone institutions like PENNVEST in Pennsylvania (described below) and programs within existing agencies, such as the Maryland Department of the Environment’s Water Quality Financing Administration. What is innovative about these programs – and should be modeled in each jurisdiction – is that they have the capacity to:

- Hold or bank revenue without concern that funding will be sequestered or reallocated;
- Leverage revenue; and,
- Purchase, hold, and distribute water quality credits as needed<sup>21</sup>

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<sup>20</sup> We focus on nonpoint source pollution because each of the Bay States has created financing programs to address point source reductions from sources such as wastewater treatment plants.

<sup>21</sup> These structures do not require a credit trading system in order to function, however.

When states have capacity to invest in this way, they will be able to send the correct market signals in order to achieve implementation standards. Restricting investments to quality projects creates a powerful incentive for the private sector to provide quality projects.

**Case study: Pennsylvania Infrastructure Investment Authority (PENNVEST).** Established in 1988, PENNVEST is a state authority charged with improving water quality by providing low-interest loans and grants for the design and construction of wastewater, drinking water, and stormwater infrastructure projects.<sup>22</sup> PENNVEST also manages the state’s nutrient trading program, serving as a clearinghouse for nitrogen and phosphorous credits. The agency invests more than \$3 million annually, with revenue coming from the Clean Water State Revolving Fund, the Drinking Water State Revolving Fund, state general obligation bonds, PENNVEST revenue bonds, and loan repayments and interest earnings.<sup>23</sup> The institution has all the capacities outlined above: the ability to pool, hold, and leverage revenue; to facilitate nutrient credit trading; and to target investments toward nonpoint source pollution reduction projects likely to achieve strong results, not just ones that are ready for funding in a given funding cycle.

**Next steps:**

Bay jurisdictions have a variety of existing agencies that can invest in nonpoint pollution reduction projects, including State Revolving Fund and Clean Water Revolving Fund programs. Yet not all of these have the capacity to allocate and invest capital as described above and modeled by PENNVEST. Jurisdictions should conduct an assessment of their capacity to invest in this way, and based on that analysis, either create new institutions or reform existing agencies/programs.

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<sup>22</sup> Pennsylvania Association of Conservation Districts. April 2014. “PennVEST Nonpoint Source Program: Frequently Asked Questions.” Available: <http://pacd.org/webfresh/wp-content/uploads/2012/03/FAQsApril2014Rev1.pdf>

<sup>23</sup> Brion Johnson, PennVEST. 2012. “Financing Clean Water Projects for Pennsylvania” presentation. Available: <http://www.dvrpc.org/EnergyClimate/WSTP/pdf/Presentations/Pennvest.pdf>



## **Theme-Specific Recommendations**

This section presents recommendations associated with specific programs or policy interventions that are available to state and local governments and address the needs of Bay communities. How these ideas are applied will be as varied as the communities that are considering them. This section offers discussion of each idea's merits and any potential drawbacks, as well as thoughts on next steps for implementation.

**Recommendation 1: Pilot Pay for Success Investment Models.** A social impact bond, also known as a pay for success contract, is an agreement between a public agency and a private firm, in which a commitment is made to pay for improved social outcomes that result in public sector savings.<sup>24</sup> These mechanisms are relatively simple in design and are essentially an extension of the performance-based financing systems described above. Through these models, investors pay the costs of a new program in its early years, and the government later repays the investors, often with a bonus, as long as the program meets its goals. If it fails, taxpayers pay nothing. This is a relatively new model; as of spring 2016, fewer than a dozen pay for success projects have been launched nationwide (i.e. contracts finalized, financing secured, and delivery initiated),<sup>25</sup> but they are widely recognized in impact investing circles as a promising mechanism for linking funding to outcomes.

When applied to Bay restoration, pay for success mechanisms would involve a governmental agency agreeing to pay a private investor a certain sum of money for pounds of nutrient and/or sediment pollution reduced. The private investor would then identify a third party (landowner, aggregator, watershed organization, etc.) that is able to achieve the reductions at a cost below what the government has agreed to pay. The difference between the guaranteed payout and the actual implementation costs is profit to the investor.

Pay for success and social impact financing arrangements provide multiple benefits to the public sector. By offering the potential for return on investment – something very few other conservation financing systems accomplish – these models offer incentives to improve performance, achieve innovation, and lower costs. In addition, these models encourage companies to monitor and evaluate which pollution reduction practices and monitoring systems work best, and what types of communication, outreach, and social engagement processes are helpful in spurring action. Finally, this type of financing system effectively transfers risk from the public to the private sector, which is better equipped to efficiently mitigate that risk.

Despite its potential benefits, the pay for success model also has limitations. For example, it does not represent a new source of capital, and the complexity of these arrangements can require a significant amount of upfront work and due diligence on the part of agency staff, which in turn increases project costs. Importantly, these models also tend to narrow the competition, which is counter to the efficiency arguments made throughout this report.

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<sup>24</sup> New South Wales Government. Social Impact Investment website. Last accessed 7/21/16: [http://www.treasury.nsw.gov.au/site\\_plan/social\\_impact\\_investment](http://www.treasury.nsw.gov.au/site_plan/social_impact_investment)

<sup>25</sup> Nonprofit Finance Fund. April 2016. *Pay for Success; The First Generation. A Comparative Analysis of the First 10 Pay for Success Projects in the United States.*

### Next steps:

- Where appropriate, state and local governments should pilot pay for success financing programs. The [Pay for Success Learning Hub](#), maintained by the Nonprofit Finance Fund, is a repository for information on this model and includes an assessment tool for governments to evaluate readiness to implement such a program.
- An agency such as the proposed Finance Advisory Board should commission a compilation of successful pilot project case studies in the region as they are implemented and disseminate lessons learned.

**Recommendation 2: Establish Proactive Stormwater Banking Programs.** As communities seek lower-cost options for complying with state and federal stormwater regulations, stormwater banking is emerging as a promising option to save money for permit holders, as well as for private property owners subject to stormwater utility fees. In a stormwater banking system, property owners construct BMPs capable of treating more stormwater than is required by their own permit, thereby generating credits that can be sold to others who need to meet their own stormwater management requirements, such as developers seeking a lower-cost alternative to managing stormwater onsite. This system is modeled on traditional mitigation banking, and like mitigation banking, the goal is to provide water quality benefits before they are needed in order to offset the impacts of development.<sup>26</sup> However, the stormwater banking has the potential to be equally effective in reducing the costs of addressing pollution from *existing* sources of pollution across the region, especially in urban communities.

There is likely to be strong demand for local stormwater banking in municipalities throughout the Chesapeake Bay watershed from three main sources:

- Developers seeking lower-cost options for meeting stormwater management requirements: Many jurisdictions in the watershed require new development or redevelopment to manage a significant amount of stormwater onsite. This can be expensive and logistically challenging, especially in urban areas, because of poorly draining or contaminated soils, limited land availability, and existing utilities. Stormwater banks offer developers an easier and often cheaper alternative to onsite management.
- Municipalities complying with MS4 and TMDL permits: It has been estimated that Maryland's ten biggest MS4 jurisdictions will need to spend up to \$89.8 million per jurisdiction per year to comply with mandated Chesapeake Bay TMDL nutrient and sediment reductions.<sup>27</sup> Cities would have a strong incentive to utilize stormwater banks if it would enable them to meet permit requirements at a lower cost.
- Private property owners wanting relief from stormwater utility fees: Many communities in the Chesapeake Bay watershed implement a stormwater fee to pay for stormwater management.

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<sup>26</sup> Capiella, K., B. Stack, J. Battiata, D. Nees, and L. Fraley-McNeal. November 2014. *Potential Application of Stormwater Banking in the Chesapeake Bay Watershed Using Two Case Studies*. Ellicott City, MD: Center for Watershed Protection.

<sup>27</sup> Maryland Department of Legislative Services. 2013. *Stormwater remediation fees in Maryland: Local implementation of House Bill 987 of 2012*.

While the fee tends to be relatively low for residential property owners, it can be significant for owners of large properties with extensive impervious cover, which are often commercial. A stormwater banking program would enable these property owners to reduce their fee by building oversized stormwater BMPs on their site and selling credits, or by purchasing credits generated elsewhere.

There are multiple ways that a stormwater banking program can be set up, depending on a municipality's particular conditions including regulatory drivers, degree of urbanization, stormwater utility details, and land availability. Cities with abundant vacant properties, for example, could make land available through sale or lease to a third party who would then construct green infrastructure or stormwater BMPs on the parcel, thereby generating credits for sale.

Another scenario is an **off-site stormwater fee-credit program**. Many cities with stormwater fee systems offer credits to property owners who install stormwater management BMPs on their property. But for commercial property owners in particular, the payback period for BMP installation is often too long to justify the investment, or they are hesitant to limit land uses on their property or take a portion of their land out of production. Off-site stormwater fee-credit programs can address these barriers by allowing commercial ratepayers to reduce their stormwater fee by supporting offsite mitigation projects, whether previously constructed or as-yet constructed. Such a system has the further benefit of allowing BMPs to be grouped together and targeted where they can have the greatest impact on water quality, such as streambank restoration. In this way, off-site programs give cities “the ability to direct capital to those projects with the greatest economy of scale—the highest pollution reduction at the lowest cost, which is something that traditional fee-credit programs are unable to do effectively.”<sup>28</sup> This system creates a revolving source of capital that municipalities can use to install BMPs where they are most needed.

It is important to note the difference between local stormwater banking programs and the nutrient trading system suggested in Core Recommendation 2, above – as well existing state-level nutrient trading programs. Both are credit-based systems, but the key difference is *scale*: stormwater banking keeps BMPs and funds within a single jurisdiction; credit supply, demand, and transactions all take place within the community. This is important, because local stormwater banking programs will not be able to compete, price-wise, with state or regional nutrient trading programs, where credits are typically derived from agricultural operations in rural areas and thus will be significantly cheaper to produce than credits generated by urban BMPs. While a Bay-wide credit system will help meet Bay-wide restoration goals, stormwater banking offers jurisdictions the option to meet local water quality goals and to keep restoration dollars local.

**Case study: Philadelphia's Greened Acre Retrofit Program.**<sup>29</sup> Philadelphia Water Department (PWD) administers a stormwater utility fee based on impervious cover at the property level. To incentivize investments in stormwater infrastructure on privately-held properties, PWD offers a fee credit of up to 80% for property owners that install green infrastructure practices that treat

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<sup>28</sup> Cappiella, K., B. Stack, J. Battiata, D. Nees, and L. Fraley-McNeal. November 2014. *Potential Application of Stormwater Banking in the Chesapeake Bay Watershed Using Two Case Studies*. Ellicott City, MD: Center for Watershed Protection.

<sup>29</sup> EPA Region 3. April 2015. *Community Based Public-Private Partnerships and Alternative Market-Based Tools for Integrated Green Stormwater Infrastructure: A Guide for Local Governments*.

at least the first inch of stormwater. However, a 2013 study by Natural Resource Defense Council and the Nature Conservancy found that “the costs associated with stormwater retrofits in the Philadelphia area are generally higher than the return on investing in stormwater infrastructure construction for a majority of non-residential property owners,”<sup>30</sup> with the payback period of most green infrastructure retrofits longer than 10 years. Based on these findings, PWD began exploring other options beyond fee credits to encourage green infrastructure installation on private property.

The result was the Greened Acre Retrofit Program (GARP), which provides grants to contractors that install green infrastructure on large areas, often over multiple properties, within the city’s combined sewer area. Property owners benefit by receiving a fee credit. What sets GARP apart is its emphasis on project aggregation, “an approach that groups projects together under a single retrofit effort to reduce transaction costs, by spreading this cost over many projects, and by gaining economics of scale, thereby transforming projects with unreasonable costs and return-on-investment horizons to be financially attractive efforts when viewed as a whole.”<sup>31</sup>

### Next steps:

Jurisdictions in the Bay watershed should pilot stormwater banking programs to test various banking scenarios and assess how well they reduce costs of stormwater management. An entity such as University of Maryland or Center for Watershed Protection could study these pilot projects and share results. Municipalities considering this approach should:

- Assess the demand for stormwater banking through interviews and surveys with ratepayers and developers (this will also help determine the appropriate price points for fee credits), as well as the supply of potential locations for stormwater banks. The Center for Watershed Protection’s 2014 article “[Potential Application of Stormwater Banking in the Chesapeake Bay Watershed Using Two Case Studies](#)” offers a framework for assessing potential locations for stormwater banking.
- Ensure that stormwater banking is enabled within local regulations and that fee offsets are allowed within stormwater program policies.
- Determine program elements such as fee structure, crediting approach, administrative needs, and operating policies to launch a pilot program.

**Recommendation 3: Advance Public-Private Partnerships Where Appropriate.** The potential use of public-private partnerships (P3s) for stormwater management has attracted a great deal of attention throughout the region. As local governments increasingly struggle to meet stormwater permit requirements, many are considering P3 structures to augment local capacity and reduce risk.

A P3 is a “contractual arrangement between a public agency (federal, state or local) and a private sector entity. Through this agreement, the skills and assets of each sector (public and private) are

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<sup>30</sup> Ibid.

<sup>31</sup> Ibid.

shared in delivering a service or facility for the use of the general public.”<sup>32</sup> The two parties share resources in delivering the good or service, and they also share the potential risks and rewards. P3s can be used for various aspects of a project, including financing, design, construction, operations and maintenance, and/or monitoring and evaluation.

While the application of P3s for stormwater is a relatively new practice, these structures have been used extensively in other utility and infrastructure contexts, including water, wastewater, transportation, and military housing. The benefits to the public sector vary from project to project, but some of the more universal benefits that are also transferrable to the stormwater sector include:

- Lower costs: One of the biggest benefits of P3s is their potential to reduce the overall cost of a project by finding efficiencies that may not be available to the public sector.
- Expedited projects: In many cases, P3s allow projects to get off the ground faster and to be completed sooner, because of efficient project management and the ability to bypass some of the administrative slowdowns than can happen when a public agency is managing the project.<sup>33</sup>
- Improved asset management: Asset management is a systematic method for evaluating the life-cycle costs of infrastructure assets. When the private company is tasked with not only construction but also ongoing maintenance, it will be motivated to undertake strategic, long-term planning to maximize the life span of installed infrastructure.
- Development of innovative strategies and technologies: Because P3s include built-in incentives for achieving outcomes more cheaply or quickly, these arrangements can catalyze the development and implementation of newer and/or more effective mechanisms for achieving desired impact.
- Economic development: When a P3 makes it possible for a city to renew its aging infrastructure, the city may be able to attract new or expanded business development.<sup>34</sup> In the case of updated stormwater infrastructure, benefits such as flood mitigation and improve aesthetics in public spaces are a boon for economic vitality. Further, P3s can be structured to achieve ancillary economic development goals, such as Prince George’s County stormwater P3, which requires that 30-40% of project activities be conducted by small, local, and minority-owned businesses.

In short, P3s offer the opportunity to harness many of the advantages offered by the private sector. However, it is important to caution that P3s are not a pot of gold. Communities will still need to identify a dedicated, reliable stream of revenue for funding stormwater and water quality infrastructure investments. Just as with publicly-managed projects, stormwater projects managed by a private firm will need to be funded by one or more revenue sources such as taxes, stormwater fees, grants, state revolving loan funds, etc.

Communities considering a P3 structure to achieve water quality goals should first clearly understand their water quality goals and financing requirements over the next 5-10 years, as well as their capacity

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<sup>32</sup> The National Council for Public-Private Partnerships. “7 Keys to Success.” Accessed 7/20/14: <http://www.ncppp.org/ppp-basics/7-keys/>

<sup>33</sup> Investopedia. “Public-Private Partnerships.” Accessed 7/20/14: <http://www.investopedia.com/terms/p/public-private-partnerships.asp>

<sup>34</sup> Black & Veatch. “12 Ways the Public Benefits in a Public-Private Partnership.” Accessed 7/20/14: <http://bv.com/Home/news/solutions/water/12-ways-the-public-benefits-in-a-public-private-partnership>

to meet these needs. This will inform whether a P3 is really needed and, if so, how it should be structured. When a community knows what fundamental gap(s) it needs to fill – whether administration, permitting, construction, or any other stormwater management function – then it will be better positioned to design a P3 program that meets that need.

US EPA Region 3 has been leading the way in evaluating and promoting P3s in the Bay region. Communities considering this approach should reference Region 3's 2015 *Community Based Public-Private Partnerships (CBP3s) and Alternative Market-Based Tools for Integrated Green Stormwater Infrastructure: A Guide for Local Governments*. This comprehensive guide is designed to help communities decide if a P3 is appropriate for their unique stormwater management needs. It includes a review of the regulatory and legislative context in the Bay states as it affects the establishment of P3s; a list of key questions that a community should consider when determining if a P3 is right for them; a series of checklists to help define and establish a P3; a discussion of options for structuring the contractual relationship between the public entity and the private partner; various financing scenarios that communities may pursue; case studies from the mid-Atlantic; and other relevant information.

**Case Study: Clean Water Partnership, Prince George's County, MD.**<sup>35</sup> A hallmark example of a stormwater P3 in the Chesapeake Bay region is the Clean Water Partnership, a 30-year agreement between Prince George's County, Maryland and Corvias Solutions, a private stormwater management firm. Finalized in spring 2015, this agreement aims to install green infrastructure and low-impact development practices on up to 4,000 acres of impervious surface throughout the County, in order to ensure compliance with federal MS4 permit requirements.

Corvias will manage the design, construction, and long-term maintenance of stormwater infrastructure; the County expects that this integrated approach will “maximize the efficiencies and savings for the entire life cycle of the green infrastructure assets,”<sup>36</sup> as well as transfer risks associated with construction and maintenance from the public sector to the private sector. Prince George's County has committed to invest \$100 million between 2016 and 2019 to plan, design, and construct projects on the first 2,000 acres. Projects will be completed across the County and may be contiguous; priority will also be given to green infrastructure installations that support the goals of various County strategic plans.

The Clean Water Partnership is unique in its scale – it is attempting to manage urban stormwater and meet federally mandated requirements *county-wide*. As mentioned above, the program is also unique in its workforce and economic development goals; at least 30% of project activities are to be completed by local, minority-owned small businesses, with a workforce training element folded into the program. This partnership is still in its infancy, and the Bay community should watch closely to evaluate its progress and determine whether it is a model for the rest of the region.

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<sup>35</sup> Prince George's County Clean Water Partnership website. “Frequently Asked Questions.” Accessed 7/20/14: <http://thecleanwaterpartnership.com/faqs/>

<sup>36</sup> Ibid.

### Next steps:

- P3s can be used in a wide range of contexts, at varying scales, and for myriad purposes. Any jurisdiction – whether municipality, county, or state – that is considering this approach would benefit from first walking through the thought process outlined above, in order to realistically assess local capacity and gaps. Resources from EPA Region 3 will help communities carefully assess whether a P3 can bridge identified gaps. Designing and implementing a P3 program requires a significant investment of public resources, so it is important that communities not start down that road until they have a solid understanding of their goals and a reasonable expectation that they will realize anticipated benefits.
- The dissemination of Prince George’s County’s lessons learned from its pioneering county-wide stormwater P3 will help municipalities and counties in the watershed emulate successes and avoid any pitfalls.

### **Recommendation 4: Incentivize Commercial Landowners to Mitigate Nutrient and Sediment Emissions.**

Bay restoration requires the participation of multiple public and private stakeholders, and none are more important than private landowners. Whether in urban or rural environments, private property owners control not only actions that can impair water quality, but also those that can mitigate that impairment. How best to engage landowners in restoration activities will be determined by the unique financial and economic systems associated with those lands.

One of the primary barriers to broad-scale adoption of water quality practices among commercial landowners is their *cost*, either direct costs of BMP installation or indirect costs associated with reduced land productivity. The performance and credit-based financing systems recommended in this report would address this barrier by improving the efficiency of public investments and payments to landowners. Yet, long-term success will require integrating restoration activity into the core competencies of businesses, and one powerful way to do this is to impact commercial landowners’ tax obligations. Below are two possible tax incentive scenarios that will enable private landowners to overcome the often prohibitive costs associated with installing restoration practices on their land.

***Tax credits for depreciation and/or one-time capital improvements.*** Tax credits for depreciation or voluntary land improvements is a common approach to incentivize desired action by commercial and residential property owners. The tax credits generally apply to either asset depreciation or direct expenditures; however, businesses often advocate for tax credits based on depreciation. Depreciation is an income tax deduction that allows a taxpayer to recover the cost or other basis of certain property. It is an annual allowance for the wear and tear, deterioration, or obsolescence of the property.<sup>37</sup> A more accelerated depreciation schedule provides greater upfront benefit to land or property owners, which in turn provides more financing benefit. There are examples of tax depreciation being used to incentivize landowner activity, such as energy efficiency and green building

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<sup>37</sup> United States Internal Revenue Service. “A Brief Overview of Depreciation.” Last accessed 7/29/16: <https://www.irs.gov/businesses/small-businesses-self-employed/a-brief-overview-of-depreciation>.

tax incentives, which have been widely used nationwide. In the real estate market, tax incentives have been shown to have a positive effect on the rental and market values of commercial buildings.

Depreciation as a tax credit can come in the form of a one-time deduction or through an accelerated depreciation schedule. Section 179d of the Federal Tax Code<sup>38</sup> (known as the “green building tax deduction”) is an example of using depreciation as the basis for a one-time tax credit. To qualify for the deduction, owners must invest in upgrades that meet clearly stated, nationally accredited performance standards. Accelerated depreciation helps offset high upfront costs and often cited as an approach to deploy break-through technologies.<sup>39</sup>

***Real estate – leaseback model.*** A unique feature of water quality restoration in urban and rural settings is the need to construct management practices on private lands. This requires establishing contractual relationships between government entities and private landowners to ensure proper operations and maintenance of water quality restoration structures. To that end, private and/or commercial landowners often have easements on their property that allow the public sector (government) or utilities the right to undertake work in a specified area. The easements restrict activities on the land, which in turn results in a loss of value to property owner. Existing tax systems vary in regard to the extent to which property owners are compensated for this loss of use.

One potential approach for compensating for lost value is to create a lease arrangement between the government/utility and the landowner. A lease would permit the government to have limited access to the property to appropriately operate and maintain practices. In addition, the lease approach would potentially allow for the property owner to create lease expense tax deductions. A lease-based tax deduction would essentially be a modification of conservation easements, which provide an ongoing income tax deduction.

These recommendations will require significant local, state, and federal coordination and advocacy, which creates a level of complexity that may distinguish it from other direct incentive programs. In addition, providing tax incentives will have an impact on budgets at all levels. However, once the appropriate enabling conditions have been put in place, these types of incentives have the potential to move commercial landowners to action more effectively than perhaps any other incentive program. Finally, utilizing tax incentives will connect Bay restoration activities with the types of incentives and programs that define economic development efforts at the state and local levels. It therefore represents an important step towards integrating restoration activity into the economic fabric of the region.

#### **Next steps:**

This recommendation differs from the others in that enabling depreciation for water quality practices will require federal authorization and legislation. States can create conservation tax credit programs independent of the federal government;<sup>40</sup> however, the most effective program would include federal income tax relief. Though prescribing a specific approach for affecting change at the federal level on

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<sup>38</sup> <https://www.poplarnetwork.com/news/5-green-building-tax-incentives-2015>

<sup>39</sup> <http://solutions-network.org/site-energyshift/accelerated-depreciation/>

<sup>40</sup> The Pennsylvania Resource Enhancement and Protection (REAP) program tax credit provides an excellent example.



this issue is beyond the capacity and scope of this report, it should be noted that national and global attention is being given to the concept of accelerated depreciation for green infrastructure, which many analysts feel could have a significant impact on a variety of environmental issues, including climate change mitigation. Therefore, a coordinated effort by Chesapeake Bay stakeholders and jurisdictions would potentially benefit from a broader effort to achieve similar goals.

## Conclusion

The Chesapeake Bay Environmental Finance Symposium process generated ideas and energy to move the needle on Bay restoration financing and economic development, and the recommendations presented in this report have the potential to accelerate that financing process. Implementing these approaches will require no small amount of effort, coordination, and new ways of doing business. Yet, as illustrated throughout this report, communities throughout the watershed are already pioneering many of these promising approaches and are demonstrating that innovation is possible:

- The District of Columbia's Stormwater Retention Credit Trading Program is a strong model of a **credit-based financing system**. The program is becoming one of the most well-known market-based financing systems in the nation.
- The Commonwealth of Virginia has an established nutrient trading program which includes a **phosphorus offset system** to mitigate the impact of new development in perpetuity. Though the program does not currently address existing pollution, it is an exemplar of a comprehensive market-based offset program.
- The Maryland Department of Natural Resources (DNR) is piloting a **performance-based financing approach** via the state's Chesapeake and Atlantic Coastal Bays Trust Fund. Through innovative program design, DNR staff is demonstrating how public financing can strive for the greatest pollution reduction per dollar spent.
- The District of Columbia Water and Sewer Authority is piloting a **pay for success financing program** that will potentially reduce the risk and long-term cost of installing stormwater retention projects by linking public and private capital with on-the-ground practitioners.
- Pennsylvania Department of Environmental Protection has implemented a **permit decision guarantee program** designed to accelerate the permitting process for well-conceived projects, thereby reducing transaction costs to the private sector.
- Prince George's County, Maryland is pioneering an innovative **public-private partnership** for stormwater management that has the potential to achieve multiple benefits, including reduced costs, better water quality outcomes, and economic development in the county.
- Lancaster City, Pennsylvania has become a regional model in the use of green infrastructure to address water quality and stormwater retention needs. In addition to testing innovative implementation and market processes, City leaders have identified green infrastructure as an important component in the City's **economic development plans**.
- Pennsylvania has advanced **tax policy** by establishing the Resource Enhancement and Protection (REAP) program tax credits. This program provides tax credits to farmers who install water quality BMPs.

While examples such as these collectively represent just a fraction of what will be needed to restore the Chesapeake Bay, they provide an excellent foundation for moving forward. The challenge is significant, but as the Symposium process indicated, there is a wealth of talent and resources throughout the region with regards to watershed science, creative financing, and effective policy change. If that talent can be harnessed, there is great potential to continue momentum and take concrete steps to finance Bay restoration activities more innovatively and effectively.

# Appendix

## Appendix 1: Event Agenda

### Chesapeake Bay Environmental Finance Symposium

Samuel L. Riggs IV Alumni Center | University of Maryland  
College Park, Maryland | April 25-26, 2016

Purpose & Background. One of the most significant environmental challenges facing our region is the restoration and protection of the Chesapeake Bay and its watershed. Though almost everyone can agree that cleaning up the Bay is important, coming to agreement on a sustainable and sufficient financing plan has been problematic to say the least. To that end, the Chesapeake Executive Council made the decision to convene the Chesapeake Bay Environmental Finance Symposium, the goal of which is to identify options, opportunities, and resources that can reduce costs and accelerate implementation. Through this event we will bring together creative, innovative, and successful financing, business, and policy leaders to identify options for advancing a more market-like approach to environmental protection and restoration. The conversations, discussions, and debate coming from the Symposium will be translated into a suite of financing recommendations that will be forwarded to the governors later this summer.

Day 1 – April 25, 2016. The purpose of Day 1 is to set the stage for the conversations and deliberations during the working sessions of the Symposium. The Day 1 agenda will include remarks from Bay States’ cabinet members and local government representatives.

**1:00 pm**      **Welcome**

- Dan Nees, *Environmental Finance Center*

**1:10 pm**      **Introduction**

- President Wallace Loh, *University of Maryland*

**1:20 pm**      **Financing Chesapeake Bay Watershed Restoration: The Path Forward**

- Secretary Ben Grumbles, *Maryland Department of the Environment*
- Secretary John Quigley, *Pennsylvania Department of Environmental Protection*
- Deputy Secretary Angela Navarro, *Virginia Department of Natural Resources*
- The Honorable Penelope A. “Penny” Gross, *Local Government Advisory Committee to the Chesapeake Executive Council, Virginia Delegation*
- Delegate David Bulova, *CBC and Virginia Delegate*

**2:30 pm**      **Leveraging the Innovation, Creativity, and Efficiency of the Private Sector**

This event will focus on how the public sector—primary state and local governments—can effectively engage and partner with the private sector. More specifically, the Symposium will identify opportunities for scaling investment, creating financing efficiencies and cost reductions, reducing restoration financing risk, expanding

economic development opportunities, and incentivizing innovation and new approaches to water quality restoration. This part of the event will serve as a launching point for the facilitated deliberations in Day 2 by providing a brief lay of the land within the six symposium themes.

- **Creating Financing Efficiencies and Cost Reductions**  
Eric Letsinger, *Quantified Ventures*
- **Incentivizing Innovation**  
Paul Carroll, *City of Newport, Rhode Island*
- **Influencing the Consumer Marketplace**  
Perry Raso, *Matunuck Oyster Bar, South Kingston, Rhode Island*
- **Integrating Public and Private Capital**  
Jag Khuman, *Maryland Department of the Environment*
- **Mitigating Restoration Investment Risk**  
Nick Dilks, *Ecosystem Investment Partners, Baltimore, Maryland*
- **Environmental Markets**  
Jeremy Sokulsky, *Environmental Incentives, South Lake Tahoe, California*

**4:15 pm**      **Closing**  
▪ Dan Nees, *Environmental Finance Center*

**4:30 pm**      **Networking Reception** (ending at 6:30 pm)

Day 2 – April 26, 2016. This is a day of small working groups designed to dive deeply into themes critical to financing Bay restoration efforts. Attendees will spend much of this full day rolling up their sleeves to engage in robust dialogue.

**9:00 am**      **Opening Remarks**  
▪ Dean Robert Orr, *UMD School of Public Policy*

**9:30 am**      **Working Group Session 1**

**12:30 pm**      **Lunch**

**1:30 pm**      **Working Group Session 2**

**4:30 pm**      **Closing**  
▪ Dan Nees, *Environmental Finance Center*

## Appendix 2: Committee Membership

To guide the development and implementation of the Symposium, CBP and EFC convened two committees, each comprised of public and private sector leaders from the Bay states and the District of Columbia. The committees included representation from experts in a range of related fields, including finance, resource management, planning, and policy.

The **Executive Steering Committee** was charged with ensuring that the Symposium and related reports were developed and implemented within the spirit of Resolution 2015-2 and the restoration financing goals of the signatories to the Chesapeake Bay Watershed Agreement. The committee provided strategic guidance to the planning team in regard to the selection of speakers and issue experts, the structure of the Symposium, and the production of a summary report that was delivered to the Executive Council. Committee members included:

- Dana Aunkst, Pennsylvania Department of Environmental Protection
- Russ Baxter, Virginia Natural Resources for the Chesapeake Bay
- Carin Bisland, US EPA Region 3 – Chesapeake Bay Program
- Sonia Brubaker, US EPA HQ
- David Craig, Maryland Department of Planning
- Nick Dispaquale, US EPA Region 3 – Chesapeake Bay Program
- Matt Fleming, Maryland Department of Natural Resources
- Mary Gattis, Alliance for the Chesapeake Bay
- Penny Gross, Fairfax County (VA)
- Ben Grumbles, Maryland Department of the Environment
- Ann Jennings, Chesapeake Bay Commission
- Hamid Karimi, DC Department of Energy and Environment
- Joseph Maroon, Virginia Environmental Endowment
- Frank Piorko, Delaware Department of Natural Resources
- John Stefanko, Pennsylvania Department of Environmental Protection
- John Quigley, Pennsylvania Department of Environmental Protection
- Lisa Wainger, University of Maryland Center for Environmental Science
- Julie Winters, US EPA Region 3 – Chesapeake Bay Program

The **Planning Committee** worked in parallel with the Executive Steering Committee and was charged with providing guidance and resources associated with event organization and implementation. This included identifying key participants and speakers and providing input on agenda development and implementation processes. Committee members included:

- Mark Breyer, The Nature Conservancy
- Preston Bryant, McGuireWoods Consulting
- Jeff Corbin
- Felicia Dell, York County Planning Commission
- Chris Hartley, USDA Office of Environmental Markets
- Charlotte Katzenmoyer, City of Lancaster, PA
- George Kelly, Resource Environmental Solutions

- Doug Lashley, GreenVest
- Joe Lerch, Virginia Municipal League
- Eric Letsinger, Quantified Ventures
- Paul Marchetti, PennVest
- Beth McGee, Chesapeake Bay Foundation
- Neal Menkes, Virginia Municipal League
- Brad Rodgers, Moreland Advisors, Inc.
- Brooks Smith, Troutman Sanders
- Joanne Throwe, Maryland Department of Natural Resources

With leadership and support from CBP and EFC, each committee held regular conference calls in late 2015 and early 2016, in order to complete their respective tasks.

### Appendix 3: Symposium Participants

While the findings and recommendations in this report were informed by conversations among Symposium participants, the views expressed herein do not necessarily reflect the views of all participants.

Stephan Abel, Oyster Recovery Partnership	Lynn Buhl, Maryland Department of the Environment
Kristyn Abhold, US EPA	David Bulova, VA House of Delegates/Chesapeake Bay Commission
Danielle Algazi, US EPA Region 3	Fiona Burns, State of Maryland, Dept. of Budget and Management
Ashley Allen, i2 Capital	Jim Caldwell, Howard County
Gregory Barranco, EPA, Chesapeake Bay Program	Paul Carroll, City of Newport, RI
Randy Bartlett, Fairfax County	Patricka Coady, Seale & Associates
Rich Batiuk, US EPA Chesapeake Bay Program	Kim Coble, Chesapeake Bay Foundation
Jenny Beard, Environmental Finance Center, UMD	Gabe Cohee, Maryland DNR
Alex Beehler, Earth & Water Law, LLC	Kari Cohen, USDA Natural Resources Conservation Service
Mark Belton, Department of Natural Resources	Kevin Conroy, Maryland Department of Agriculture
Kathy Benini, Markit	Lesley Cook, MD Department of Legislative Services
Clare Billett, William Penn Foundation	Jeff Corbin, Restoration Systems
Carin Bisland, US EPA	Jen Cotting, Environmental Finance Center
Jessica Blackburn, Alliance for the Chesapeake Bay	David Craig, State of Maryland
Ruby Brabo, VA Vice Chair LGAC, King George County Supervisor	Michael Curley, Environmental Law Institute
Shannon Brawley, RI Nursery and Landscape Association	Jana Davis, Chesapeake Bay Trust
Maria Broadbent, City of Annapolis, MD	Frank Dawson, Montgomery County Department of Environmental Protection
John Brooks, Timmons Group	Liz Deardorff, American Rivers
Seth Brown, Storm and Stream Solutions, LLC	Terry Deputy, Delaware DNREC
Sonia Brubaker, US EPA	Mike Dieterich, Renew and Sustain
Preston Bryant, pbryant Consulting LLC	Nick DiPasquale, US Environmental Protection Agency
Mark Bryer, The Nature Conservancy	
Darlene Bucciero, Frederick County Government	

Sarah Dougherty, Natural Resources Defense Council  
Jim Edward, EPA Chesapeake Bay Program Office  
Jennifer Egan, Skelly and Loy Inc.  
Paul Emmart, Maryland Dept. of the Environment  
Hilary Falk, National Wildlife Federation  
Lisa Feldt, Montgomery County Department of Environmental Protection  
Brent Fewell, Earth & Water Law LLC  
Matthew Fleming, Dept. of Natural Resources  
Suzy Friedman, Environmental Defense Fund  
Mary Gattis, Alliance for the Chesapeake Bay  
Jose Gaztambide, Quantified Ventures  
James Gebhardt, US EPA  
Bill Gill, Smithfield  
Kimberlee Glinka, Center for Social Value Creation, UMD  
Kate Gonick, Lancaster County Conservancy  
David Goshorn, MD Department of Natural Resources  
John Griffin, Buchart Horn  
Penelope Gross, Fairfax County  
David Groves, White House  
Ben Grumbles, Maryland Department of the Environment  
Rebecca Hammer, Natural Resources Defense Council  
Christopher Hartley, USDA Office of Environmental Markets  
Charles Hegberg, Skelly and Loy, Inc.  
Ruth Hocker, City of Lancaster, PA

Peter Hughes, Red Barn  
Matt Jacobs, Coldwell Banker Residential Brokerage  
Ann Jennings, Chesapeake Bay Commission  
Hamid Karimi, District of Columbia Department of Energy and Environment  
Charlotte Katzenmoyer, City of Lancaster  
Marita Kelley, DCED, Center for Local Government Services  
George Kelly, Resource Environmental Solutions  
Jason Keppler, Maryland Department of Agriculture  
Jag Khuman, Maryland Water Quality Financing Administration  
Sandra Knight, UMD Center for Disaster Resilience  
Joshua Kurtz, The Nature Conservancy  
Doug Lashley, GreenVest LLC  
Eric Letsinger, Quantified Ventures  
Thomas Liu, Bank of America Merrill Lynch  
Paul Marchetti, PENNVEST  
Joseph Maroon, Virginia Environmental Endowment  
Brenton McCloskey, Environmental Finance Center  
Beth McGee, Chesapeake Bay Foundation  
Steve McHenry, MD Ag & Resource-Based Ind. Dev. Corp.(MARBIDCO)  
David McKay, US EPA  
Erik Michelsen, Anne Arundel County  
Kristen Mui, Environmental Finance Center  
Fay Nance, Chesapeake Bay Foundation  
Angela Navarro, Office of Governor McAuliffe



Ryane Necessary, Maryland Department of  
Legislative Services

Dan Nees, Environmental Finance Center

David Newburn, University of Maryland

Sara Nicholas, PA Dept. of Conservation and  
Natural Resources

Patrick F. Noonan, The Conservation Fund

Teresa Opheim, Iroquois Valley Farms

James Parker, Falling Springs

Michael Patella, US Environmental Protection  
Agency

Susan Payne, Maryland Department of  
Agriculture

Ross Pickfordm, Earth-Concepts, LLC

Frank Piorko, Maryland Coastal Bays Program

Christopher Pomeroy, AquaLaw PLC

Robert Proutt, VenGott, LC

John Quigley, PA Department of Environmental  
Protection

Carissa Ralbovsky, Department of Budget and  
Management

Jake Reilly, NFWF

Marc Ribauda, Economic Research Service -  
USDA

Lisa Riggs, Economic Development Company of  
Lancaster County

Brad Rodgers, Moreland Advisors, Inc.

Angie Rosser, West Virginia Rivers Coalition

Clifford Rossi, Robert H. Smith School of  
Business, UMD

Kit Schaefer, i2 Capital

Theodore Scott, Stormwater Maintenance &  
Consulting

David Small, DE Dept. of Natural Resources and  
Environmental Control

Ginny Snead, Louis Berger

Jeremy Soluisky, Environmental Incentives, LLC

Tanya Spano, Metropolitan Washington Council  
of Governments

Charlie Stek, Advisory Committee

Kurt Stephenson, Virginia Tech

Ann Swanson, Chesapeake Bay Commission

Sandra Taylor, Sustainable Business  
International LLC

John Thomas, Hampden Township Board of  
Commissioners

Joanne Throwe, Maryland Department of  
Natural Resources

Rachel Toker, Urban Ecosystem Restorations,  
Inc.

Dennis Treacy, Smithfield Foundation

Michelle Vigen, Montgomery County

Rob Wallace, i2 Capital

Cory Weiss, Urban Ecosystem Restorations, Inc.

Douglas Wheeler, Hogan Lovells US LLP

Leigh Whelpton, The Conservation Finance  
Network

Bruce Williams, Local Government Advisory  
Committee

Julie Winters, US EPA

Brandon Wright, State of Maryland

## Appendix 4: Summary Notes from Work Group Discussions

### *Theme 1: Reducing Implementation Costs.*

Context: Perhaps the most fundamental reason for engaging the market and private sector is to achieve restoration goals more efficiently and effectively. Market-based economies and financing processes are predicated on achieving goals in the most cost-effective manner possible. As a result, there is an opportunity throughout the region to maximizing the level of pollution reduction achieved per dollar invested. The forum identified the types of conditions that are necessary for market forces to function efficiently. As a starting point for the discussions, participants discussed potential financing innovations such as pay-for-success or Social Impact Bonds, as well as pay-for-performance financing systems.

#### Key discussion issues, topics, and goals

- Need for identifying the market and finance strategies that have the highest potential for reducing costs.
- Focus on innovative new policy and financing approaches such as social impact bonds and pay-for-success programs.
- Incentivize projects with demonstrated environmental or social outcomes.

#### Barriers

- There is a lack of clarity associated with market and pay-for-performance financing systems that could be addressed with a common vocabulary.
- There is a need for a consistent approach to establishing ecosystem service value.
- Government procurement procedures are often counter to efficiency efforts.
- The public sector's financing and implementation approach is often prescriptive rather than performance based.
- There is inconsistency in regulations and policies.

#### Solutions

- Clarity of markets and common vocabulary:
  - Bring stakeholders together and get started: process will develop language and trust.
  - Recognize that perceived failures can be opportunities for growth.
  - Track and disseminate examples and case studies.
- Ecosystem service evaluation and value:
  - Engage more professional accounting firms.
  - Engage a more diverse collection of players and stakeholders.
- Government procurement procedure:
  - Assess examples from national and international spheres and create a system of best practices.
  - Establish adaptive processes and check points for managing and tracking implementation results.
- Public sector allocation process:
  - Set and focus on standards rather than implementation goals.

- Enable and incentivize governments to set a market-like playing field. This will require creating a better understanding of government’s role in the financing process.
- Allow and incentivize industry to determine the most efficient implementation processes.
- Move towards paying for performance as opposed to specific projects.

***Theme 2: Incentivizing Innovation.***

Context: The market forces that help reduce costs and create efficiencies also incentivize innovation. In fact, the push towards innovation in technology, financing, and production is one of the most beneficial aspects of market activity. However, driving innovation in an ecosystem restoration process is complicated by regulatory and policy dynamics. Therefore, the conversation in this forum focused on overcoming regulatory and policy barriers, thereby creating unique and effective options for financing and implementing restoration practices and programs. Specific discussion topics and potential financing innovations included using technology to accelerate restoration, as well as the use of formal public-private partnerships.

Key discussion issues, topics, and goals

- The need for consistent regulatory and policy frameworks to promote more restoration innovation.
- The need for governments at all levels to incentivize innovative technologies that can assist in the collection of data while at the same time directly engaging citizens in the restoration effort.

Barriers

- Regulations prioritize outputs over outcomes.
- There is a language barrier among different disciplines and sectors.
- Vendors experience significant contracting delays at all levels of government.
- Bureaucrats are often unnecessarily risk-averse.

Solutions

- Regulating actual outcomes:
  - Develop metering and monitoring systems to track outcomes for all sectors.
  - Include the cost of monitoring in project cost estimates.
  - Provide financial incentives that encourage sustainability and cost-effectiveness.
  - Allow for flexibility; relax precision.
- Overcoming language barriers:
  - Push for financial literacy among environmental professionals and vice-versa.
  - Create mechanisms for cross-cultural, multi-discipline dialogue.
  - Establish a financial advisory group at Bay Program.
- Bureaucratic delays:
  - Accelerate priority permitting – pipeline innovative, sustainable projects.
  - Minimize rigidity to provide requirements that allow for innovation.
  - Tie science into statutory/regulatory and out year funding decisions.
- Minimize risk adversity in public service programs:
  - Allocate unspent funds for innovation.

- Remove adverse consequences for risk-taking.
- Review models and case studies for agency leadership on risk/innovation.

### ***Theme 3: Creating and Building Consumer Demand.***

Context: Though a market-like restoration system will be primarily predicated on effective regulations and policy, there are opportunities to achieve restoration goals by creating, building, and leveraging consumer demand. There are a number of opportunities for better positioning a healthy Chesapeake Bay watershed in the consumer marketplace through industries such as organic and sustainable agriculture, sustainable fisheries, recreation, and sustainable stormwater management.

#### Key discussion issues, topics, and goals

- Identify new and innovative ways to build consumer demand outside of the regulatory process.
- Create processes to engage key industry sectors.
- Incentivize public recreation areas such as marinas, boat launches, and the like as opportunities to foster a public interest and investments into restoring the Bay.
- Focus restoration efforts that support the Bay’s restoration and improvement.

#### Barriers

- While sustainable fisheries, recreation, stormwater management, and agriculture all have their unique challenges, several themes emerged from the group discussions.
  - The individual culture of each of these sectors has inhibited the flexibility to act aggressively on a collaborative basis.
  - Public education limitations prevent the public from effectively engaging.
  - Uncertainty around costs, benefits and impact deter greater investment.
  - Deficiencies and confusion in labeling impedes market activity.

#### Solutions

- Create a well-defined pipeline of locally-sourced products with proceeds returning to Bay restoration.
- Strengthen partnerships and communication around economic development and conservation.
- Prioritize asset management at the community level.
- Improve public awareness.

### ***Theme 4: Integrating Public and Private Capital.***

Context: Though it is clear that private investment and engagement will be necessary to achieve restoration goals, it is public investment that will drive the financing process. Linking and integrating public investment to the private sector and the marketplace will be essential for creating financing scale and efficiency. This forum focused on potentially innovative approaches for maximizing the efficiency and effectiveness of existing financing mechanisms such as the State Revolving Loan Fund program. In addition, the conversation focused on how to improve the performance and effectiveness of state-based funding programs, which have the potential to invest billions of dollars in water quality practices and programs.

### Key discussion issues, topics, and goals

- Linking and integrating public investment to the private sector to create financing scale and efficiencies.
- Using the State Revolving Fund as a foundation for financing other water quality infrastructure needs.
- Linking public funding to performance-based outcomes in order to create efficiencies and reduce costs.

### Barriers

- There is a lack of scale necessary for efficient financing.
- Changing political environments and a lack of civic involvement and community outreach make it difficult to effectively link public and private capital.
- There is a need to educate legislators on private sector perspective.

### Solutions:

- Create a non-state entity to convene and bundle projects.
- Establish a special-purpose vehicle to specifically target water quality infrastructure investments.
- Identify high-level educators and conveners that could serve as a coordinating entity.
- Have the public sector act as an aggregator to create financing pools.

### ***Theme 5: Mitigating Investment and Implementation Risk.***

Context: Given the scale of the Chesapeake Bay Restoration effort, addressing financing and implementation risk will be important at all levels of government. The Symposium's goal was to identify options and opportunities for the public sector to leverage the capacity and innovation of the private sector to ensure the financial and physical performance of water quality investments. The Symposium's forums specifically addressed established risk-based institutional and financial mechanisms such as public—private partnerships and mitigation banking programs, and how those financing tools and processes can serve as the foundation for other innovative approaches for reducing the risk and improving the performance of water quality investments. As with the other issues addressed, the goal was to identify the enabling conditions that are necessary for establishing effective market-based risk mitigation programs and tools.

### Key discussion issues, topics, and goals

- Employing public-private partnerships to improve the quality and effectiveness of BMP operations and maintenance.
- Apply lessons learned from wetland and habitat mitigation banking programs.

### Barriers

- Local and state regulations do not enable innovative programs that can shift risk to the marketplace.
- Effective risk management is often blocked by traditional procurement processes.

### Solutions:

- Create regulatory and policy templates that will enable market-based financing processes.
- Incentivize the application of public/private partnerships and other innovative risk reducing systems.
- Expand the use of mitigation banking type financing processes.

### ***Theme 6: Water Quality Trading and Environmental Markets.***

Context: Regulatory-based trading programs are perhaps the most discussed, debated, and potentially impactful financing system available to state and local governments. In spite of the significant attention these market systems receive, the level of market activity has been relatively low in many Chesapeake Bay jurisdictions, and nonexistent in others. This forum focused specifically on the potential benefit of trading and the necessary enabling conditions for bring these programs to scale.

### Key questions and issues:

- Establishing the necessary framework to generate marketplace demand.
- Identifying the options and possibilities for applying mitigation banking programs in a stormwater or urban environment.
- Establishing standards for BMP construction and maintenance.

### Barriers

- The certainty of demand is in question.
- The local government procurement model is challenging.
- The fear of litigation from environmental community.

### Solutions

- Enable and incorporate trading and market programs into regulations and permits.
- Create clear and transparent rules that decisions can be made against.
- Establish publically-backed insurance policies and credit assurance programs.