Informing, Improving, and Expanding Water Quality Financing Through Advanced Data Management

University of Maryland Environmental Finance Center

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About the Environmental Finance Center

The Environmental Finance Center (EFC) at the University of Maryland is part of a network of university-based centers across the country that works to advance finance solutions to local environmental challenges. Our focus is protecting natural resources by strengthening the capacity of local decision-makers to analyze environmental problems, develop effective methods of financing environmental efforts, and build consensus to catalyze action. Our goal is to equip communities with the knowledge and tools they need to create more sustainable environments, more resilient societies, and more robust economies. The Environmental Finance Center is housed within the School of Architecture, Preservation and Planning.

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Executive Summary

Over the past three decades, billions of federal, state, and local dollars have been deployed to support water infrastructure projects and other programs that reduce point and nonpoint sources of pollution to the Chesapeake Bay and its tributaries. Evaluation of these programs often focuses on project effectiveness, in other words, whether or not a particular project resulted in the proposed objectives. However, there is an unrealized opportunity to conduct such an assessment Bay-wide, across multiple grant making entities the fund restoration and protection efforts, and from a financing perspective – examining not only the projects being invested in, but the decision making around how that money moves in the watershed.

In order to improve water quality project grant making, the Chesapeake Bay Program (CBP) asked Environmental Finance Center at the University of Maryland (EFC) to: analyze water quality projects to see if any trends emerged in terms of which project characteristics drive successful outcomes; identify any gaps in how funders collect evaluation data; and, recommend strategies for improving the impact of grant-funded programs and projects.

The EFC reviewed approximately 3,000 projects funded across three organizations and then ultimately analyzed a subset of 699 projects funded by two organizations – the Chesapeake Bay Trust (CBT) and the National Fish and Wildlife Foundation (NFWF) – between 2010 and 2015. The EFC staff categorized project-level data from NFWF and CBT into four main focus areas (capacity building, documentation, education, and implementation) based on the grant's primary objective as described in the project abstract and subsequent metrics collected. We then analyzed the data using basic summary statistics.

Based on the analysis, and using a Theory of Change approach, the EFC observed three general spheres of investment. The first two spheres of investment, scattering seeds and cultivating growth, help to establish the practitioners and practices that make deep water quality improvement possible. These typically have minimal to modest water quality outputs but instead focus on enabling organizations to plan for and take on more challenging projects. The third sphere of investment, supporting maturity, is where significant advancement in the protection and restoration of the Chesapeake Bay can be seen. This sphere emphasizes strategic regional investment that includes larger networks of organizational partners and well-defined operations, maintenance and monitoring practices that enable adaptive management over time. A strong supporting maturation sphere includes investing in trusted organizations who have the capacity to partner with and mentor new project implementers, developing sustainable funding systems, and facilitating transformational adaptive projects capable of deep water quality improvements.

Transitioning from scattering seeds to cultivating growth to supporting long-term, sustainable implementation strategies require investment in broad-scale, regional implementation. While both large and small grants play a critical role in creating the "right" environment, the success of Chesapeake Bay restoration and protection will be heavily dependent on developing an adaptive pipeline for strong regional approaches to investment.

The EFC offered one key overarching recommendation, as well as a series of recommended supporting components.

First, funders should ***emphasize policies, programs, and grant investments to achieve a Bay-wide Theory of Change, with a focus on regional-scale approaches***. Introducing a Theory of Change to Chesapeake Bay investment would improve transparency, establish a common understanding of roles and responsibilities, and facilitate the meaningful regional investments necessary to accelerate Chesapeake Bay restoration.

Second, ***develop an outcomes study process for evaluating investment and project implementation with a set of shared standard success indicators*** for both grant making and project effectiveness. Assessing the success of an institution's investments requires a well-defined understanding of what signifies success and longer-term observational studies.

Third, funders should consider ***streamlining grant reporting to focus on key success indicators***. This would reduce the administrative burden for grant recipients and would assist funders in effectively assessing their grant making success.

Fourth, funders must ***invest more heavily in operations and maintenance, monitoring and longitudinal assessments***. This commitment to invest in operations, maintenance and monitoring will help inform funders of long-term success and help calibrate and adapt management strategies at a regional scale.

Lastly, funders should ***establish an evaluation team to adapt investment and reporting processes over time***. Leveraging the success of the existing Chesapeake Bay Funders Network (CBFN) and extending out to other regional stakeholders and practitioners, funders should consider developing a collaborative team to determine a set of standard indicators and reevaluate the Bay-wide investment strategy and reporting processes over time. This team would evaluate regional grant making and help provide the framework for conducting outcomes studies that are adaptive and flexible.

To advance and build on the analysis conducted to date, EFC proposes the following next steps. CBP should convene a series of roundtable discussions with significant Bay area funders and additional key stakeholders to present and discuss recommendations in this study. These facilitated discussions should focus on potentially developing a regional Theory of Change, defining success for each focus area, and exploring the benefits of developing a sub-set of standardized performance metrics that can be shared across funders.

Finally, the EFC suggests a number of more rigorous analyses that can be performed to better understand the challenges and barriers to project success. Specifically, CBP may be interested in conducting a qualitative profiling of grant recipients including preferred targeted populations and project completion risk factors to help shine light on the types of trends of grant recipients, preferred target populations, and potential risk factors in project completion. Additionally, CBP may want to study the documentation and education project focus areas in more depth to better understand the value and contribution these longer-term investments make to the larger Bay-wide investment strategy. And lastly, CBP may want to lead the development of a more nuanced definition of success and conduct a more rigorous assessment of whether patterns exist between success and existing variables to serve as a more robust baseline for regional investment moving forward.

1. Introduction

Restoring water quality in the Chesapeake Bay is a major endeavor involving significant investments in pollution reduction activities throughout all six states that comprise the Bay's watershed. Over the past three decades, billions of federal, state, and local dollars have been deployed to support water infrastructure projects and other programs that reduce point and nonpoint sources of pollution to the Bay and its tributaries. In addition to these public investments, private philanthropic organizations and corporate entities have funded myriad water restoration initiatives throughout the Bay watershed.

One major conduit for Bay restoration funding is the Chesapeake Bay Program (CBP), a unique partnership between the federal government and Bay states that has coordinated Bay restoration since CBP's founding in 1983. Every year, CBP receives federal funds (averaging $70 million in recent years), most of which is distributed to states, local governments, and nonprofit organizations in the form of grants.

Like other grant making organizations, CBP collects implementation and evaluation information on the projects it funds. Yet to date, there has not been a rigorous assessment of this data to determine which factors are most strongly correlated with successful projects and with positive water quality outcomes. More broadly, there is an unrealized opportunity to conduct such an assessment Bay-wide, across multiple grant making entities that fund Bay restoration. While many funders collect outcomes data and evaluate the projects they fund, there has not been a concerted effort to coordinate this data across organizations and geographies in order to distill larger trends in what makes water quality investments effective.

CBP invited the Environmental Finance Center (EFC) at the University of Maryland to assist with its efforts to improve project evaluation. Specifically, EFC was asked to collate and assess information on grant-funded water quality and resiliency projects in the Chesapeake Bay watershed and to analyze whether any trends emerged in terms of project characteristics that drive successful outcomes. EFC was also asked to identify any gaps in how CBP collects evaluation data and to recommend strategies for improving the impact of regionally funded programs and projects. These recommendations are presented in the final section of this report. They focus on effective means to advance CBP's future project evaluation methods and to meet regional pollution reduction goals in the most cost-effective way.

> **Project goal:**
>
> Assess outcomes of grant-funded water quality and resiliency projects in the Chesapeake Bay watershed in order to inform future grant making decisions and support projects with the highest potential for successful outcomes.

2. Project Approach, Data Sources and Methodology

Project Approach
In conducting this assessment, the EFC considered a process that begins with the dollars available from Chesapeake Bay funders and ultimately ends with a healthier, restored Chesapeake Bay. We then considered the investment activities and resulting outcomes necessary to move from funding inputs to the desired overall impact.
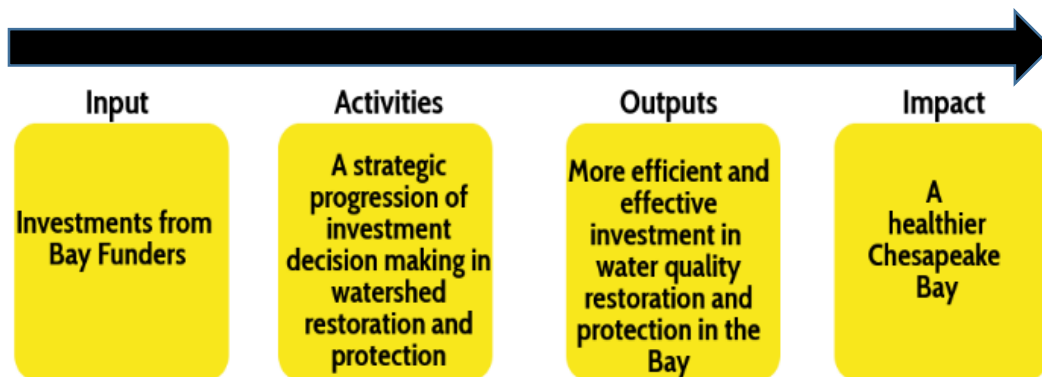

Figure 1.Basic Logic Framework for Bay Investment

To identify factors that contribute to successful water quality outcomes in grant-funded projects, EFC ultimately analyzed data from 699 projects funded by two organizations between 2010 and 2015. Driven primarily by a charge to evaluate *regionally* funded projects, EFC expanded the analysis to include additional grant making organizations for two main reasons: (1) EFC required records with sufficient detail to draw definitive conclusions and (2) a greater number of data points enables more robust trends analysis.

EFC's overall goal was to assess which factors, if any, appear to be correlated with successful outcomes and to shed light on the ways in which funders collect evaluation information on funded projects, revealing opportunities to improve data collection points and methods. This analysis is intended to help inform CBP and other grantmakers as they seek to improve the effectiveness of their future funding decisions.

Data Sources
EFC received project completion information from three sources, all of which fund water quality restoration projects in the Chesapeake Bay region: the Chesapeake Bay Program, the Chesapeake Bay Trust (CBT), and the National Fish and Wildlife Foundation(NFWF) (see Table 1).

EFC's analysis ultimately included information about projects funded between 2010 to 2015 by two organizations – CBT and NFWF – because these records were the most complete. This subset included information for 3,005 grants, all of which EFC catalogued in our database as described below. Key data points included: type of project, acres treated, pounds of pollution reduced, and number of individuals engaged.

Table 1. Data sources for EFC's analysis

Organization	Information provided	Years	Number of grants reported	Included in analysis
National Fish and Wildlife Foundation (NFWF)	Grant specific spreadsheet & project reports	2010-2016	165	Included
Chesapeake Bay Trust (CBT)	Grant specific spreadsheet	2009-2016	2,840	Included
Chesapeake Bay Program (CBP)	State-level funding allocation summary and table including CBIG, CBRAP, and Local Implementation grant funding	2014-2015	n/a	Not included, lacked sufficient specificity

Methodology

EFC's analysis proceeded in three main stages: data gathering, data synthesis, and data analysis.

Data gathering

To understand the amount and character of existing project evaluation information for grant-funded water quality restoration efforts in the Chesapeake Bay watershed, EFC began by convening a scoping group. This group was charged with investigating the quantity, location, type, and format of existing evaluation and outcomes information. The scoping group consisted of representatives from the Environmental Finance Center, the Alliance for the Chesapeake Bay, the Chesapeake Bay Program, the National Fish and Wildlife Foundation, and the National Oceanic and Atmospheric Administration (see Appendix A). Specific questions asked of the group included:

- What entities collect Bay restoration project evaluation information?
- How is information organized and stored (i.e. electronic files, hard copies, open-source)?
- What type of information is available (i.e. financials, questionnaires, follow-up monitoring)?

The scoping group identified the organizations and points of contacts for key water quality funders in the Bay region, as well as regional stakeholders who may have access to grantee records that could inform EFC's analysis. Based on this preliminary assessment, the scoping group discussed limiting EFC's analysis to a targeted subset of project evaluation information (such as a particular geographic region or a particular type of project). Ultimately, based on guidance from CBP, the EFC team elected to keep the assessment broad, utilizing information from multiple grantmakers across multiple geographies and project types.

In addition, it was determined that EFC's analysis would draw only on *existing* documentation, rather than seeking to gather information on project outcomes by interviewing or surveying past grantees. However, EFC did conduct some primary research into three of our own past grant-funded projects, by interviewing clients and partners regarding project outcomes. The EFC used final project reports from

NFWF-funded grants as a baseline, NFWF staff provided a spreadsheet presenting two years of funding information (91 projects) and one year of final project report data (56 projects). EFC used this sample documentation as the template for the request of information from the identified water quality funder organizations.

Data synthesis
Information from grantmakers came in a wide variety of formats, with disparate data points and organizational methods. In order to assess trends across the full data set, it was necessary to synthesize and organize all the records received. This process was iterative and evolved as we reviewed the various grant reports and summary spreadsheets.

Using final project reports from the sub-set of NFWF-funded grants as a baseline, EFC used this sample documentation framework to create the working project catalog. Initial field categories included funder, implementer, geography, project focus area, outputs, outcomes, and communities.

Information from various sources was then input to the catalog. This involved reconciling spreadsheets, reviewing reports to pull out data points, developing normalized metrics across funders, and adapting the catalog to new field categories dependent upon available information. This synthesis presented two significant challenges: (1) information was not standardized across organizations or even within organizations for different project types, funding years, or funding sources, and (2) the vast number of data points – while beneficial to producing valid observations – required an enormous outlay of time to reconcile and input to the catalog.
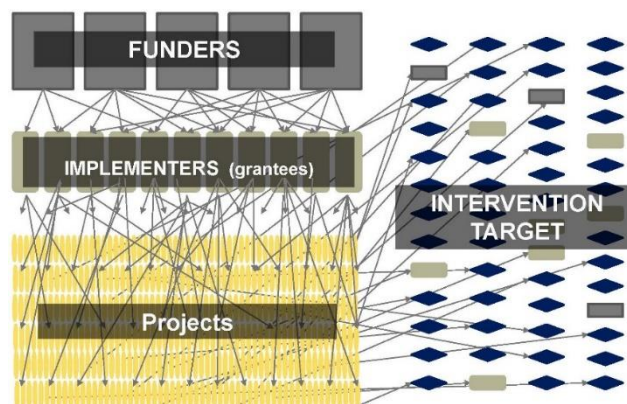

Figure 2. Visual Representation of the one-to-many connections between funders, implementers, and ultimate project benefactors

Standardization involved several steps:
- Assigning each grant to a focus area: capacity building, education, documentation, or implementation.
- Categorizing project-level data by implementer type and target population.
- Identifying 69 distinct metrics reflecting information about grant outputs and activities that are currently being tracked by the two funders.

The EFC staff categorized project-level data from NFWF and CBT into four main focus areas based on the grant's primary objective as described in the project abstract and subsequent metrics collected. Focus areas included capacity building, documentation, education, and implementation, as well as a "multiple or other" category (see Table 2). EFC determined a project's primary objective, or "focus area," based on its predominant desired outcome. For example, if a project was designed to educate 4th graders through a series of outdoor curriculum and culminate in a tree planting, the dominate outcome is assumed to be an educated population. While tree planting is an output of the education process, the primary goal is to educate 4th graders. Thus, this project would fall into the education category rather than implementation.

Table 2. Description of Four Major Project Focus Areas

	Capacity Building	Documentation	Education	Implementation
Action	Strengthens the capacity for organizations to successfully complete other projects with direct impacts on the Bay.	Provides technical insights into a specific issue, assists community leaders in building their technical capacity to make better decisions, or helps set the foundation for taking more effective action.	Develops awareness about a specific topic and motivates individuals to take action or make changes to eventually improve the Bay.	Directly puts into practice a change in technology or practice to reduce pollution.
Results	Improved organizational capacity.	Development of written document or tool.	Individuals engaged in learning and behavior change with regards to water quality issues.	Demonstrable measurable change in pollution.
Impact	Helps support the organizations doing work in the Bay region but does not have a direct impact on the Bay.	Sets the foundation for further action but does not have direct impact on the Bay.	Impacts people directly but does not have direct impact on the Bay.	Directly puts into practice pollution reduction measures that improve Bay water quality.
Major Consideration	Was funding used to develop an organization's internal infrastructure?	Was a report, policy, or tool developed?	Was a group targeted to raise awareness or change their behavior?	Was a practice changed or a physical object installed?
Project Examples	Hiring new staff, expanding essential networks, developing organizational governance structure, professional development activities, or purchasing organizational supplies	Planning documents, assessment and analysis reports, policy and ordinances, as well as the development of tools or resources	Workshops and trainings, events, developing content such as educational brochures or online media content, and or any other marketing and outreach activities	Installing BMPs, restoring, protecting or enhancing land, changing agricultural or urban practices, or other direct physical impact activities

Multiple or Other: Occasionally, projects did not align well with any of the four major focus areas. In this case, we assigned them to an "other" category. Many of the "other" projects included developing cost share programs or establishing financial incentives.

Projects that fell under the "multiple" category were typically comprehensive programs actively pursuing multiple primary goals such as planning, implementation, and outreach. While many projects have multiple goals, most projects offered a dominate objective. Projects that were categorized as "multiple" did not have a clear dominate objective.

EFC also categorized project-level data by implementer type and target population (see Appendix B). Implementer is the grantee or the organization or institution conducting the project. The target population is the group or entity for which the intervention is intended to benefit.

Implementer
•NGO
•Academic**
•Private
•Municipality
•County
•State
•Federal
•HOA/civic association
•Faith-based
**Includes higher education as well as primary and secondary school

Target Population
•Students/Youth
•Residents/General Population
•Local Jurisdictions/ Communities
•Nonprofits
•Hoas/Civic Associations
•Faith-based Organizations
•Technical Professionals
•Property Owners
•Business
•Farms
•Watermen

Figure 3. Example of Implementer and Target Population Categories

After categorizing the projects in these ways, EFC reviewed the data currently being tracked by the two funders and identified 69 distinct metrics that reflected information about grant outputs and activities that are currently being tracked by the two funders, for example, number of volunteers or linear square feet of a restoration project. The intention of this task was to enable data to be normalized and compared across funders and projects. However, it proved to be challenging because metrics are not being consistently tracked across funders, within a single funder, or across projects. Also, the units of measurement varied across funders and projects.

Data analysis
With the project catalog populated, EFC was then able to explore whether any clear relationships emerged in project characteristics and successful outcomes. Guiding research questions included:
- Is it possible to tell if projects are becoming more effective over time? If so, can any factors be attributed to that change?
- Could funders collect different or additional information in order to better evaluate what drives project success?

The data was analyzed using Microsoft Excel software and standard quantitative techniques. Given data limitations, analysis centered on basic summary statistics including count, frequency, mean, and minimums and maximums. As previously mentioned, the dataset included information on 699 grants awarded by CBT or NFWF between 2010 and 2015. These grants are just a subset of the full information set that the EFC collected, which included roughly 3,000 grants.

3. Findings

Funders have made significant investments in water quality restoration and protection in the Chesapeake Bay. The grant information provided by NFWF and CBT that serves as the basis for this analysis alone accounts for over $36 million awarded over six years. While this may only be a fraction of the total Bay water quality investment, the findings are thought to be representative of funding trends throughout the region.

This study indicates that funding streams favored implementation in terms of total dollars awarded and number of total grants, but that documentation projects showed the highest average award amount. This may be because many community-based activities or pilot projects can occur at a small-scale, while planning and research and tool development are typically larger-scale endeavors requiring larger investments.

Awarded Grants by Focus Area

53% Implementation
26% Education
10% Documentation
6% Capacity Building
5% Other

Awarded Dollars by Focus Area

59% Implementation
10% Education
20% Documentation
3% Capacity Building
7% Other
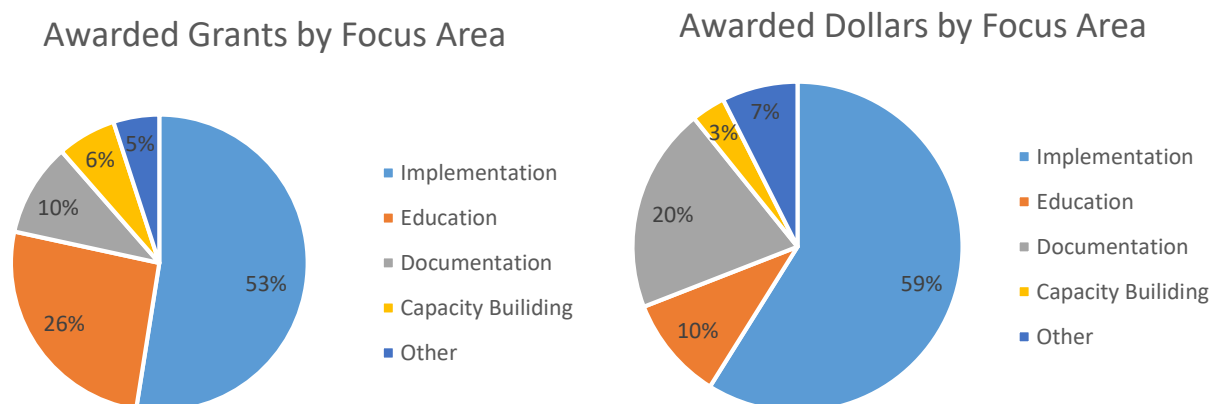
Average Grant Awarded by Focus Area ($)				
Implementation	**Education**	**Documentation**	**Capacity Building**	**All Grants**
$58,100	$20,400	$102,700	$26,900	$51,800

Figure 4. Summary of funding awards by focus area

Although the distribution of grants across the focus areas remained relatively constant, the amount of funds issued varied over time. This fluctuation may be a result of an explicit strategy by Bay funders designed into program requirements, or it may be an implicit preference demonstrating itself over time. Overall the average grant award was $52,000 with a dollar-for-dollar match. According to this study, grants with an education focus showed the highest match at nearly $3 for every grant dollar awarded. Capacity building had the lowest match with roughly $0.40 to ever grant dollar.

Over 2,480 activities or objectives were identified in the 699 grants analyzed. These objectives were indicated in the grant summary or abstract as defined by the grant proposal. Among the four focus areas, implementation captured the broadest range of activities -- roughly 40 different types ranging

from restoration and preservation activities to BMP implementation and pollutant prevention and reduction. Education included nine activities, targeting things such as training, outreach, webinars, reproduction of material, and volunteers. Documentation and capacity building generally had the fewest activities. Documentation focused on generating information, reports and assessments while capacity building projects expanded and connected organizations or accounted in the grant reporting for volunteerism (see Appendix C).

While there were numerous objectives identified, there was limited information on the extent to which these objectives were met. At least 56% of the grants did not report on objectives, meaning either the initial objective was not clearly defined or there was insufficient data describing the final outcomes. This lack of standard and consistent data collection is a barrier to determining whether objectives were met and thus, make it difficult to assess whether a project was ultimately successful.
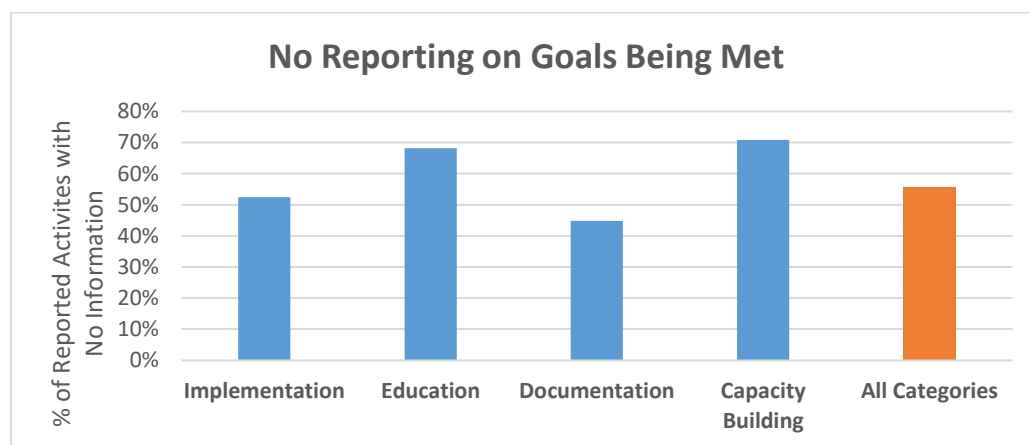

Figure 5. Absence of Reporting Outcomes Across Four Focus Areas.

Of the 44% of activities that did include reporting on objectives, almost three fourths of activities met or exceeded their goals. Barring a more nuanced definition of success, for the purposes of this analysis, unmet was binary based on the defined objective. For example, if a project implementer proposed planting 100 trees but at the end of the grant period they reported planting 99 trees, then the outcome would be considered unmet. Likewise, if they planted 101 trees, they would be defined as having exceeded expectations.

Based on this admittedly limited definition of success, the study found that neither the duration of grant nor the level of funding awarded has a clear impact on meeting outcomes. However, there was variability among meeting expectations and project focus area.

Implementation demonstrated the greatest variability in successfully meeting expectations with 15% of reported activities meeting expectations and 16% exceeding expectations, while 13% of reported activities did not meet expectations. This could be due to the of the nature of implementation proposals where objectives may be based off of projections and estimates that cannot be refined until the project actually gets underway.

Education and capacity building offered the second greatest variability in terms of meeting expectations. This may be a reflection of the metrics by which the grant is being measured. Challenges can exist in meeting expectations with respect to adequately reaching target audiences when measured in terms of

participation levels; however, project implementers have a great deal of control over successfully meeting expectations for producing and delivering services, such as number of workshops offered or frequency of network meetings.

Among the four focus areas, documentation grants demonstrated the greatest ability to meet expectations, which is likely due to the fact that these are strictly output related activities where success relied on the implementers' final deliverable, i.e. was the report delivered or an assessment completed.

With all four focus areas, it is important to consider that the current metrics being collected are an accounting of outputs rather than the tracking of outcomes. In the case of documentation, education and capacity building, outcomes can only be assessed through an ex poste evaluation to determine success over time because it can take several years for a planning document to be fully integrated or a behavior change campaign to impact a community. While implementation projects would also benefit from an ex poste evaluation, access to tools such as the Bay model which can estimate the output of implementation projects based on the specific measures adopted alleviates some of the urgency for this, although conducting an ex poste study of implementation projects would help ensure that the best management practices installed are functioning as intended and management approaches can be adapted as needed.
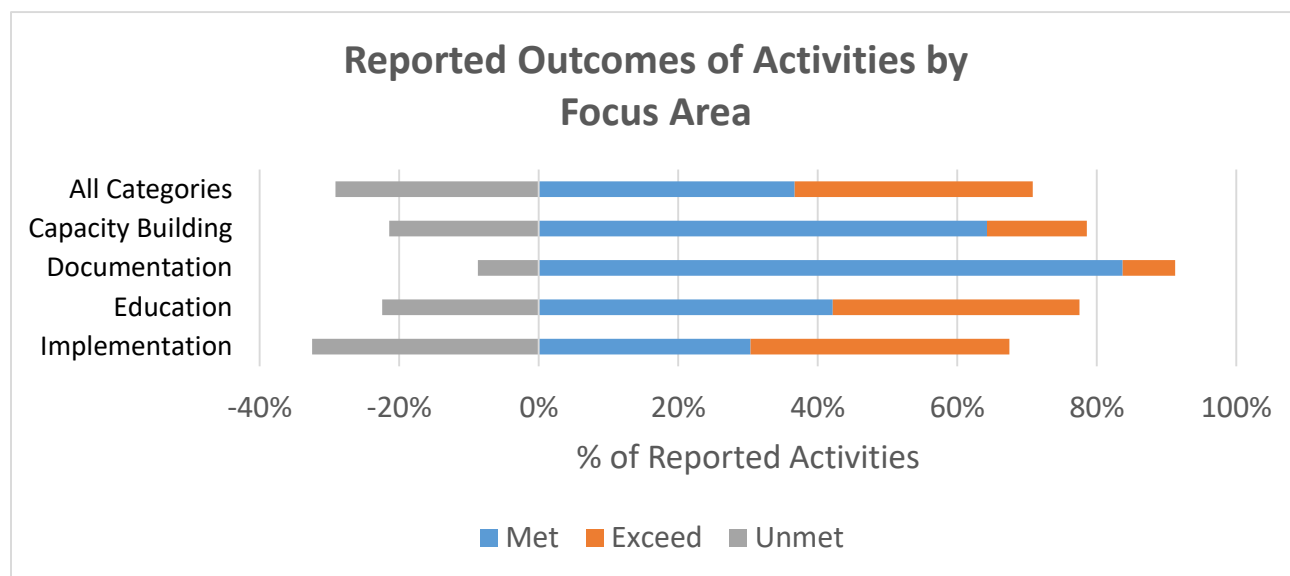
Figure 6.Outcomes of Activities by Focus Area

Also important to note, Bay funders are tracking activities and outputs of *completed* projects, and therefore the data sets that served as the basis for this analysis only contained completed project data, meaning there was no information provided on projects that were not selected for funding or failed to reach completion. Missing from the data are the valuable lessons that could be found in unfunded proposals and abandoned projects. While assessing what has been completed is important for tracking investments and resulting returns, truly understanding what advances restoration efforts and moves communities to action would benefit from knowing what does *not* work and what was *not* invested in as well.

In addition, project tracking is limited in terms of identifying the community or audience who is benefiting from the intervention the grant is supporting. Understanding how investment is flowing into

communities can help funders leverage existing dollars, assess hot spots of community need, implement more strategic regional approaches, and ensure the equitable delivery of services and benefits. This is an opportunity to build on the existing grant reporting process to better capture this information and develop a better understanding of what enables a successful project and the impact of that success over time.

4. Developing an Evaluation Strategy

The Chesapeake Bay Program asked the EFC to collate and assess information on grant-funded projects and to analyze whether any trends emerged in terms of which project characteristics drive successful outcomes. The previous sections described the information collection process and presented an overview of the analysis of this information. The EFC was also asked to identify any gaps in how funders collect evaluation data and suggest areas for improving the impact of grant-funded programs and projects.

This section sets out a framework for evaluating the impact of grant monies and enhancing the funding process. The information summarized in this document represents approximately $36.2 million granted over six years, matched by a further $37.8 million in cash and resources by grant recipients and their collaborators. Although sizable, this flow of resources falls short of the total Chesapeake Bay restoration need. The EFC estimated that Maryland alone needs $4.4 billion to meet 2025 restoration goals.[1]

This gap between need and available resources requires a strategic investment strategy in which grants play an important role. Grants alleviate fund raising pressure on local governments and nonprofits, foster creativity and innovation in the restoration effort, and direct resources into activities that have value for the Bay and its communities, but are not necessarily revenue generating. In other words, well-placed grants can position communities and organizations to deliver services better, faster or more efficiently.

While grant making organizations in the region share a common goal – improving the health of the Chesapeake Bay –the chain from inputs (ie, grant dollars) to impact (a cleaner Bay) varies. The result is a highly fragmented array of diverse organizations often times acting independently of each other. This study suggests that introducing a logical framework to grant making processes in the Bay would facilitate transparency, a common understanding of roles, and strategic collaboration, this framework would also provide an enhanced approach to evaluation, support better collection of outputs and tracking of outcomes, and offer a clearer sense of the impacts of investment.

A Theory of Change – While evaluation mechanisms may vary among the members of the philanthropic community, the most effective foundations rely on this type of logical framework or "theory of change" in order to analyze and improve their impact. Referred to as the "**Theory of Change,**" this methodology looks at the ultimate goal of a project or program and maps backward to identify what must be in place to achieve an outcome. A theory of change is essentially a comprehensive description of how and why a desired change is expected to happen by outlining the linkages between activities or interventions and how these lead to desired goals. A well-defined theory of change with an outcomes framework is a best practice strategy

> **Theory of Change:**
>
> A **theory of change** is essentially a comprehensive description of how and why a desired change is expected to happen by outlining the linkages between activities or interventions and how these lead to desired goals. A well-defined theory of change with an outcomes framework is a best practice strategy ubiquitous in the national philanthropic sphere for program design and evaluation.

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[1] The Chesapeake Bay Commission's 2003 policy report *The Cost of a Clean Bay: Assessing Funding Needs Throughout the Watershed* used $18.7 billion dollars as an estimate to clean up the Bay over eight years.

ubiquitous in the national philanthropic sphere for program design and evaluation.

Using this Theory of Change approach and drawing on observations from the analysis of funded projects in the Chesapeake Bay watershed, the EFC developed a logic framework specific to Bay restoration grant making. This theory of change for Bay-wide investment describes how funding is currently being allocated and how it can be possible to measure progress towards the achievement of longer-term goals that goes beyond the identification of program outputs. The ultimate goal of a healthy Chesapeake Bay requires a regional-scale approach; a diverse landscape of capable practitioners; installed and well-maintained practices; sufficient, sustainable and equitable supporting financing strategies and revenue streams; and monitoring and maintenance protocols that allow for adaptive management of implementation and investment practices over time.

In considering the restoration and protection of the Chesapeake Bay, the EFC observed three general spheres of investment. The first two spheres of investment help to establish the practitioners and practices that make deep water quality improvement possible. The third sphere of investment is where deep Chesapeake Bay water quality improvements can be achieved.
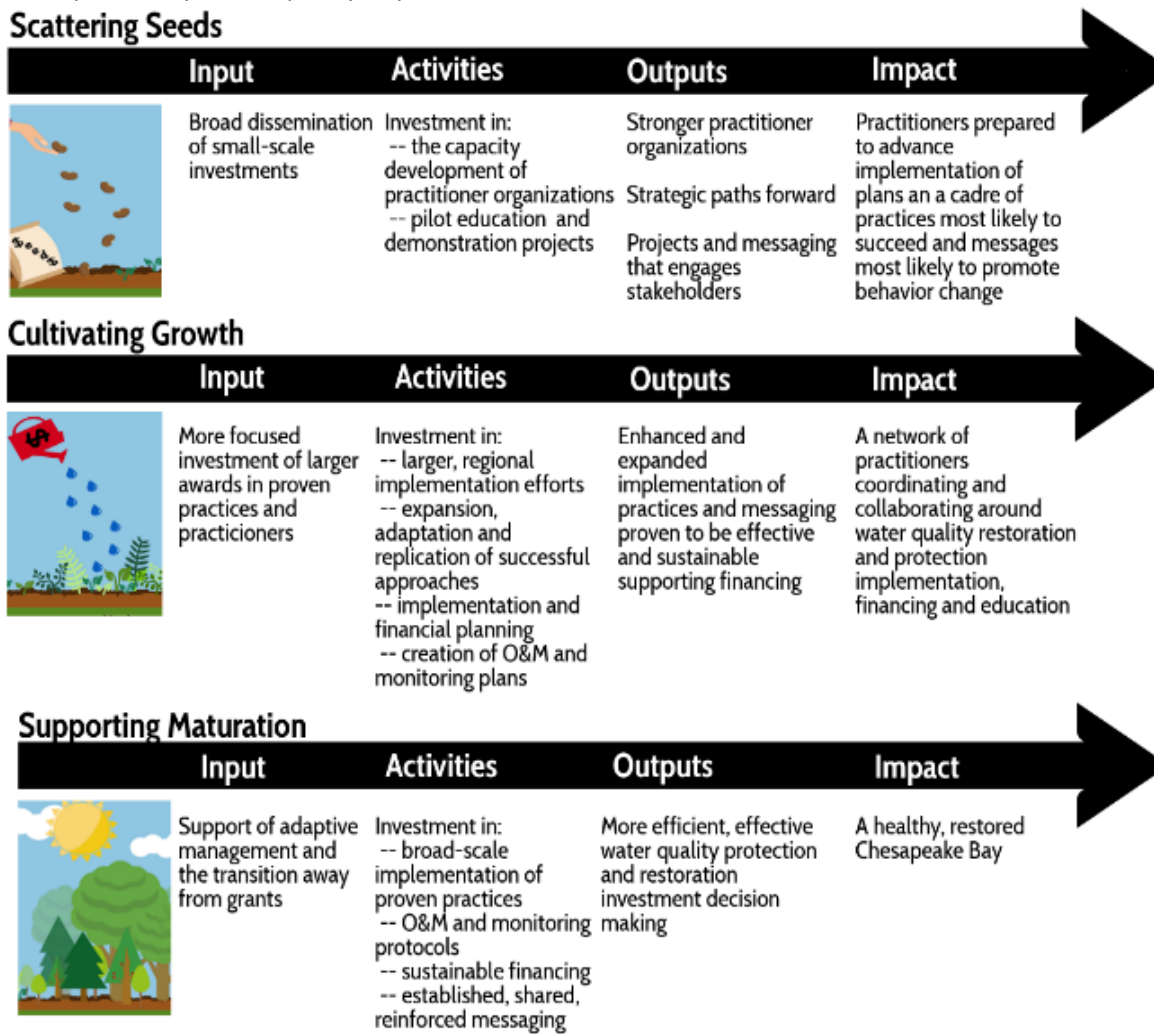

Figure 7. Bay-wide Theory of Change

Scattering Seeds: This sphere of investment sees broad-scale dissemination of funding through small-scale grants – akin to scattering seeds in a garden – to see what emerges. These projects tend to be smaller in terms of the scale of the award, the geography impacted, and the complexity of activities and deliverables. These projects produce minimal water quality outputs but establish a stronger base of organizations qualified to take on more challenging projects and begin to identify practices with the potential for success.

For the scattering seeds sphere of investment, funders should consider if small-scale investments are leading to stronger organizations and project implementers. One indicator for a successful scattering seed investment is that the organization is pursuing "phase 2" of a project or has advanced in terms of their capacity to deliver services.

> **Scattering Seeds Project Spotlight**
> In May 2012 the Savage River Watershed Association received $10,000 from CBT for capacity building support. With this grant, and a matching contribution of $9,639, SRWA automated their communications management system and hired a part time Executive Director to focus on membership development and program coordination.

Examples of existing funding programs operating in the Chesapeake Bay that *could* fall under the scattering seeds sphere based on the general intent of the programs include: (1) CBT's capacity building, sponsorship, and mini grant programs; (2) smaller-scale awards from CBT's environmental education and outreach and restoration programs; and (3) smaller-scale awards from NFWF's technical capacity program.

Cultivating Growth: This sphere of investment sees a more targeted dissemination of funding through fewer, larger awards – akin to targeting resources to the seedlings that have survived and show signs of thriving over time. These projects typically are more focused on protecting, promoting, and scaling existing initiatives and practitioners. The cultivating growth sphere facilitates projects that are modest to moderate in terms of the scale of the award, geography impacted, and the complexity of activities and deliverables involved. These projects produce modest water quality outputs but instead enable organizations to plan for and/or implement successful water quality improvement projects in the near future.

> **Cultivating Growth Project Spotlight**
> In October 2010, the Mountain Institute received a $74,124 grant from NFWF and with a match of $26,474 restored 20,930 linear feet of riparian forest buffers at various sites across the Potomac headwaters region of West Virginia. The project also fostered environmental stewardship and engaged 310 local youth in conservation action through a hands-on, inquiry-based science curriculum.

Maintaining a strategic pipeline of projects and developing a growing portfolio of effective community-based practitioners are signs of success in cultivating growth sphere of investment. Indicators of success include implementation of plans, on the ground projects that have been maintained, and project implementers that are financially stable.

Examples of existing funding programs operating in the Chesapeake Bay that *could* fall under the cultivating growth sphere include: (1) CBT's G3, pioneer, and county-based programs; (2) NFWF's technical capacity and small watershed programs; and (3) larger scale environmental education and outreach and restoration awards from CBT.

Supporting Maturation: This sphere of investment focuses on strategic regional projects that include larger networks of organizational partners and well-defined operations, maintenance and monitoring practices that enable adaptive management over time. At this sphere, funders are supporting proven practitioners who are capable of meaningful water quality improvement through proven and innovative practices and behavior change campaigns. By maturity, there is a pipeline of well-established practitioners who are partnering with community-based organizations to implement large-scale projects, with broad geographic scopes, longer timelines, and that consist of more comprehensive activities.

A strong supporting maturation sphere includes investing in trusted organizations who have the capacity to partner with and mentor new project implementers, developing sustainable funding systems, and facilitating transformational adaptive projects. Example indicators for measuring project success in this sphere of investment includes, a strong portfolio of ongoing programs that have been tracking progress over time; trusted organizations are partnering regularly; and regional strategies are being implemented at scale with the help of community-based partners.

> ### *Supporting Maturation Project Spotlight*
> In September 2010, the Potomac Conservancy received a $500,000 grant from NFWF. With a match of $526,374, it conducted a comprehensive analysis of how local policies can be improved to promote low impact development in the non-tidal portion of Virginia's Chesapeake Bay watershed. The project assessed 37 counties and cities, recommend code revisions in targeted localities, implemented 30 demonstration projects, and sponsored and outreach design competition.

Existing funding programs operating in the Chesapeake Bay include but are not limited to CBT and Maryland Department of Environment's (MDE) non-tidal wetland program and larger-scale, small watershed and innovative nutrient ad sediment reduction awards from NFWF.

Transitioning from scattering seeds to cultivating growth to supporting long-term, sustainable implementation strategies requires investment in broad-scale, regional implementation. While both the large and small grants play a critical role in creating the "right" environment, ***the success of Chesapeake Bay restoration and protection will be heavily dependent on developing an adaptive pipeline for strong regional approaches to investment.***

Scattering Seeds
- < $20K
- Narrow focus
  - Organization building
  - Pilots/Demos
  - Small-scale outreach
- Minimal direct water quality improvement
- Establish stronger organizations

Cultivating Growth
- $20-$100K
- Scaling and promoting existing initiatives
  - Planning and assessments
  - Replicating proven practices at scale
  - Broader outreach
- Moderate direct water quality improvement
- Enable organizations to plan for and/or implement successful projects

Supporting Maturation
- >$500K
- Regional implementation of proven practices and campaigns
  - Ongoing programs with monitoring and maintenance
  - Large-scale pollution reduction tech
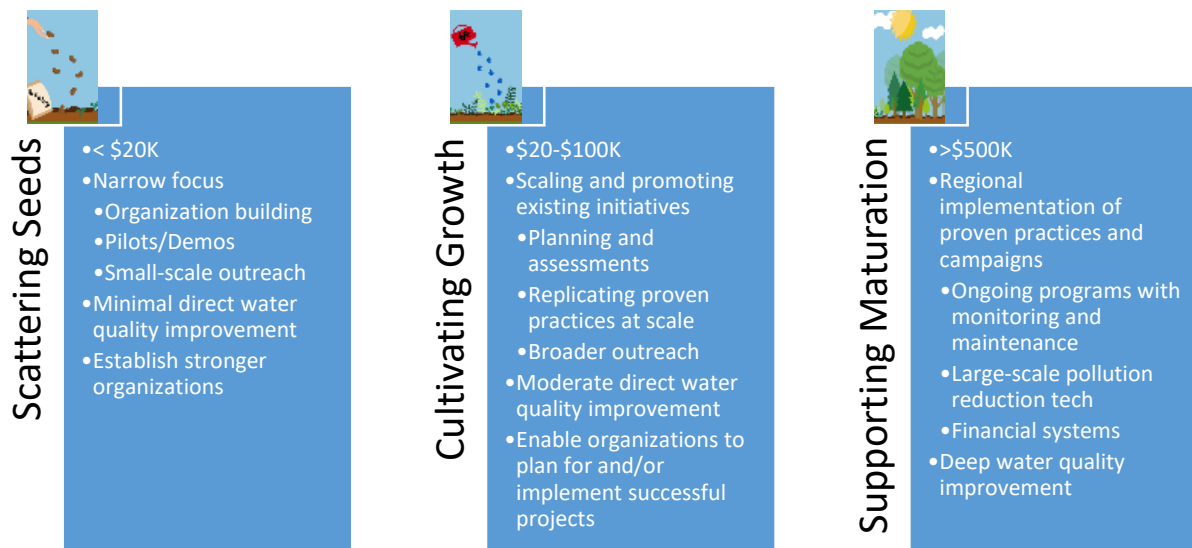 - Financial systems
- Deep water quality improvement

Figure 8. Observed Spheres of Investment for Bay-wide Theory of Change

5. Recommendations

The success of a Bay-wide water quality investment depends on coordination among funders and the engagement of new and existing project implementers in a more nuanced and iterative process of grant making. Currently, individual funders throughout the region have developed strong programs that have demonstrably improved Bay water quality; however, there is an opportunity to create even greater efficiencies and drive more catalytic investments into this effort. Based on the EFC's analysis, we offer one key overarching recommendation, as well as a series of recommended supporting components.

Emphasize policies, programs, and grant investments to achieve a Bay-wide Theory of Change, with a focus on regional-scale approaches. Introducing a Theory of Change to Chesapeake Bay investment would improve transparency, establish a common understanding of roles and responsibilities, and facilitate the meaningful regional investments necessary to accelerate Chesapeake Bay restoration. Our assessment of the grant information available suggests that introducing a Theory of Change would also provide the opportunity to develop a shared evaluation approach, supporting the better collection of outputs and impact information.

Embracing a Theory of Change and assessing each sphere of investment is critical to grant making success. The *Scattering Seeds* and *Cultivating Growth* spheres are critical to developing a pipeline of successful project implementers. Collaboration among funders in fostering new project implementers will develop a strong, community-based, cadre of local practitioners who can effectively implement successful projects in their communities. Understanding which project implementers have received funding from various regional funders, understanding where they are in terms of their maturation across the Theory of Change and strategically building their capacity throughout the *Scattering Seeds* and *Cultivating Growth* spheres can help ensure that resilient new-project implementers are able to contribute to increasing Bay improvement.

In addition to building the capacity of new project implementers, specific emphasis on the regional approach of the *Supporting Maturation* investment sphere is key and must be inclusive of not only investment in projects and programs functioning at the regional scale, but also in the practices and practitioners that support these projects beyond implementation and the evaluation methods that determine success and allow for adaptive management of the investment process over time. Regional coordination among funders and project implementers alike will be required to successfully invest in water quality at scale. This regional approach will involve more coordinated funding efforts, longer-term investment strategies, increased collaborative partnerships between community-based organizations and large regional implementers, as well as an emphasis on strategic data collection and evaluation of projects on a regional scale.

In order to coordinate this effort towards a shared Theory of Change, the EFC recommends the following supporting strategies:

Development of an outcomes study process for evaluating investment and project implementation. Assessing the success of an institution's investments requires longer-term observational studies. While collecting project implementation data is important to determining project outputs, longitudinal studies, annual reviews, and follow-ups after an initial study are likely to be much more revealing of the long-term impacts or project outcomes. This process should assess both project successes and failures. One limitation of evaluating completed projects is that it does not capture the barriers and challenges of

unsuccessful projects. Knowing why a proposal was not selected, or what variables may lead to a default on a grant funded project can provide valuable insight for informing future funding decisions.

As part of this process, Chesapeake Bay funders should consider developing a set of standard success indicators for both grant making and project effectiveness. Grant making indicators should focus on developing a stronger pipeline of projects, fostering the capacity of new organizations, and implementing effective projects. For assessing project effectiveness, funders should develop indicators that are specifically tailored to the project focus area, and thus its primary objective. For example, a project that falls under the implementation category would be successful if it reduces pollution while a project under the education category is successful if it leads to long-term understanding and behavior change as it relates to a particular topic. While it is unlikely that funders will be able to align all reporting requirements, it is important to establish a set of shared indicators that can be measured across regional funders (see Appendix D). Embedding this set of shared indicators in the existing reporting process across funders would facilitate a better understanding of watershed-wide indications of impact.

Streamline final grant reporting to focus on success indicators. Funders should consider streamlining their final grant reports to focus on success indicators. Currently, final grant reports are largely narrative based with a few metrics that are not always well-defined. Reshaping final reports to emphasize success indicators can help streamline the reporting process. Funders could clearly define key indicators before a project has commenced allowing project implementers the opportunity to plan for and quickly answer questions that are designed to be most relevant to measuring success. Streamlining reporting with funders across the region will provide additional efficiencies for project implementers and can help provide better data for assessing bay-wide progress.

Invest in Operations and Maintenance (O&M), monitoring, and longitudinal assessments. In order to determine if investments are having the intended impact, regional funders must make O&M, monitoring and checking up on practitioners and projects over time compulsory. This investment in O&M and monitoring will help inform funders of long-term success. In order to be successful, regional partnerships must be strategic, practices must be evaluated, existing models/assumptions about nutrient removal must be calibrated, and adaptive management must be practiced on a regional scale. This cannot be done without ongoing investment in long-term data gathering.

Regional funders should develop and commit to a strategy to fund long-term assessment. This process can be embedded into grant contracts with funders requiring ongoing reporting even three to five years, or funders can conduct an audit of grant projects every five to seven years with an eye towards on-going success and catalytic nature of the projects. Whatever the process, funders should develop a strategy for conducting long-term reviews of funded projects.

Establish an evaluation team to adapt investment and reporting processes over time. Funders should consider developing a collaborative team to determine a set of standard indicators and reevaluate the Bay-wide investment strategy and reporting processes over time that leverages the already existing Chesapeake Bay Funders Network (CBFN) and extends out to other regional stakeholders and practitioners. This task oriented evaluation team would complement CBFN's efforts to improve the health of the Chesapeake Bay by fostering opportunities to pool resources, exchange information, and coordinate efforts by focusing on the overall grant making process, rather than strategic interest areas. This team of stakeholders would regularly discuss the most relevant research questions and work to develop indicators that will provide insight to those queries in order to conduct outcomes studies that are adaptive and flexible as new information arises.

6. Next Steps

The overarching takeaway from this study is the ***need for a more codified approach to regional scale investment.*** This must be inclusive of not only investment in projects and programs functioning at the regional scale, but also in the practices and practitioners that support these projects beyond implementation and the evaluation methods that determine success and allow for adaptive management of the investment process over time.

Funders in the region have continued to improve their grant making and reporting process over the last six years and have a wealth of data on water quality investment in the Chesapeake Bay. As funders like CBT, NFWF and other members of the CBFN deploy new tools and strategies for improving grant making and project data collection throughout the region, it is a critical that this data be streamlined and analyzed in order to better coordinate and improve financial investments aimed at advancing the regions goal of improving the health of the Chesapeake Bay.

EFC proposes the following next steps to advance and build on the analysis conducted to date:

Convene a series of roundtable discussions with significant Bay area funders (CBP, CBT, NFWF, CBFN) and additional key stakeholders to present and discuss recommendations. Developing a regional theory of change and coordinating reporting efforts would require significant buy in. While the ultimate goal of improving the health of the Chesapeake Bay is shared by all, the individual mandates and missions of various funding organizations may differ widely making it difficult to streamline processes. This challenge makes it that much more important to engage regional stakeholders in facilitated discussions to promote a Theory of Change thought model among the Bay watershed funding community. Stakeholders would both help define success within each project focus area and explore the benefits of developing a sub-set of standardized performance indicators that can be shared across funders in order to facilitate the aggregation of metrics reported by grant recipients and ultimately analyze the success of regional investments.

Conduct a rigorous qualitative profiling of grant recipients including preferred targeted populations and project completion risk factors. The data collected by funders and provided for this study was binary, either a grant recipient completed a project or they did not. This information is limited in scope because it does not provide rich information on the project implementers receiving grant funds or the target populations receiving services from the grants. A rigorous qualitative profiling of grant recipients will help shine light on the types of trends of grant recipients, preferred target populations, and potential risk factors in project completion. Understanding these qualitative challenges and barriers to project success can help funders adapt funding strategies and design interventions to strengthen the pipeline of practitioners successfully completing projects.

Perform a deep analysis of the documentation and/or education focus areas. The documentation and education project focus areas have a time delay between project completion and potential water quality improvement. The time-scale for these types of projects does not lend itself to the typical grant reporting cycle and therefore the only information provided is on outputs, did the project implementer spend grant funds as described. Because projects in these focus areas are designed to support longer-term strategic participation, a deep dive into these focus areas is necessary to better understand the value and contribution of these projects to the larger investment strategy.

Develop a more nuanced definition of success and conduct a more rigorous assessment of whether patterns exist between success and/or scale of activities and level of match, target communities/partners, and other activity metrics. The data set provided by CBT and NFWF is rich with project completion information. With a more nuanced definition of success and additional follow up with project implementers, a more rigorous assessment of whether patterns exist between success and other variables can easily be conducted. This assessment can serve as a more robust baseline for regional investment moving forward.

7. Appendices

Appendix A: Scoping Group

Scoping group participants:

- Alliance for the Chesapeake Bay: Albert Todd
- Chesapeake Bay Program Office: Carin Bisland, Julie Winters
- National Fish and Wildlife Foundation: Elizabeth Nellums, Jake Reilly
- National Oceanic and Atmospheric Administration: Zoe Johnson
- Environmental Finance Center at the University of Maryland: Brandy Espinola, Dan Nees, Jen Cotting, Rob Sprinkle

Appendix B: Project Data Categories

Implementer Type	Target Community Type	Target Population
Unknown	Unknown	Students/Youth/Teachers/Parents/Schools
Ngo	NGO	Residents/Gen Pop/ Adults
Academic	Academic	Non-Residents/Visitors
Private	Park/Center	Targeted Minorities (Low Income, Latino. Disabilities, Etc.)
Municipality	Town/City/Locality	Local Leaders/Govt Officials
County	County	Local Jurisdictions/ Communities
State	State	Nonprofits
Federal	Other	HOAs/ Civic Associations
Public		Faith-Based Organizations
HOA/Civic Association		Technical Professionals (Stormwater Professionals, Inspectors, Contractors, Lawyers, Landscapers, Etc.)
Regional Govts		Property Owners
Faith		Business/Developers/Commercial
Individual		Farms
		Watermen
		Other
		Multi
		Unknown

Appendix C: Focus Area Objectives

Project Type	Project Type Sub Cat	Project Type Metrics	Project Type Metrics Units
Unknown	BMP	Outreach Events	Unknown
Implementation	Capacity	Outreach Events Participants	Count
Education	Fisheries	Volunteers	Hours
Documentation	Habitat	Training Modules Created	Acres
Capacity Building	Impervious Surface	Training Sessions Held	Square Feet
	Land	Training Participants	Linear Feet
	Other	Webcasts Created/Held	Dollars
	Outreach	Outreach Materials	Gallons
	Outreach Materials	Webcasts Views	Pounds
	Planning	Acquisition	Feet/Year
	Policy	Land Preserved	Billions/Year
	Reductions	Land Restored	Percent Reduction
	Research	Land Use Converted	Other
	Shore/Stream	Land Use Enhanced/Improved	
	Tools	Shoreline Restored	
	Participants/Volunteers	Shoreline/Streambank Stabilized	
	Waterbody	Buffer Created	
	Webinars	Riparian Buffer Restored	
	Wetlands	Stream Restored	
	Workshops/Trainings	Wetlands Enhanced/Restored	
		Wetlands Installed	
		Non Tidal Wetland Created	
		Water Body Restored	
		Oyster Reef Balls Made	
		Oyster Reef Created/Restored	
		Oyster Shells Collected	
		Oysters Raised	
		Fish Raised	
		SAV	
		Habitat	
		Created/Enhanced/Improved	
		Adopting BMPs	
		Bio retention Installed	
		Fencing Installed	
		Green Roof Installed	
		Rain Garden Created	
		Rain Barrels Installed	
		Plants Planted	
		Pet Waste Stations Installed	
		Trash Collected	
		Trees Planted	
		Invasive Species Removal	
		Waters Sampled	
		Impervious Surface Removed	
		Impervious Surface Treated	

Bacteria Reduced
Nitrogen Reduced
Phosphorous Reduced
Sediment Reduced
Shoreline Erosion
Stormwater Runoff Reduced
Participants
Hiring
Supplies purchased
Board/Council/Organization
Created
Network Expansion
Workforce development
Impact Assessments
Cost Benefit Analysis
Audits Conducted
Publications Created
Publications Dispersed
Planning Documents
Planning Meetings
Work Groups Formed
Regulation/Policy Change
Incentive/Offset Systems
Developed
Tools/Resources Developed
Communities Represented
Other

Appendix D: Potential Metrics to Collect for Each Project Focus Area

Below is an exhaustive list of potential project metrics which can be used as a starting point for developing a shared list of standard metrics. Funders should determine which pieces of information are the best indicators of success and streamline the data requests. Rather than collecting information on every output, consider which metrics lead to better understanding the desired long-term outcome.

PROJECT

PROJECT
Unique ID
FUNDER
Pass through funds?
Funds origins
IMPLEMENTER
Funds Requested
Funds Approved
Funds Spent
Match Estimated
Match Spent
Match Origins Name
Match Origins Type
Federal
State
County
Municipal
Corporate Giving
Corporate Foundation
Private Foundation
Community Foundation
Family Foundation
Public Foundation
Other
In-kind Estimated
In-Kind Spent
Proposed Start Date
Actual Start Date
Proposed End Date
Actual End Date
Project Type
Education
Implementation
Documentation
Capacity Building
Other
Notes

FUNDER

FUNDER
Unique ID
Contact Info
Funder Type
Federal
State
County
Corporate Giving
Corporate Foundation
Private Foundation
Community Foundation
Family Foundation
Public Foundation
Other

IMPLEMENTER

IMPLEMENTER
Unique ID
Organizational Contact Info
Implementer Type
Academic
Private
NGO
Church
Farm
Municipality
County
State
Federal
Multiple
Other

COMMUNITY

COMMUNITY
Unique ID
Contact Info
Community Type
NGO
Academic
Private
Farm
Church
Water Body
Municipality
County
State
Size
Other
Demographics
Race
Ethnicity
Economic Status
N/A

EDUCATION- type

EDUCATION- type
Target Population
Teachers
Students
Homeowners/Landowners
Farmers
Watermen
Churches
HOAs/Civic Associations
Local Governments
Businesses
Residents
Other

Education Outreach- Project Metrics

EDUCATION	Proposed	Actual	Units	Description- activities proposed	Description- activities accomplished	Name of communities/organizations treated	What is the goal/desired outcome and how will it be measured over time?
Outreach events							
Hosted/facilitated			count				
Individuals engaged			count				
Volunteers assisted in organizing/presenting			count				
Total volunteer			hours				
Workshops/trainings							
Training modules created			count				
Hosted/facilitated/held			count				
Participants attended			count				
Volunteers assisted in organizing/presenting			count				
Total volunteer			hours				
Total session			hours				
Webinars							
Hosted/facilitated			count				
Participants attended			count				
Volunteers assisted in organizing/presenting			count				
Total volunteer			hours				
Outreach material							
Original content developed			count				
Distributed			count				
Views/hits of Outreach Material			count				

Documentation- Project Metrics

DOCUMENTATION	Proposed	Actual	Units	Description- activities proposed	Description- activities accomplished	Name of communities/organizations treated	What are the major findings, recommendations, or proposed next steps? How will this be used and by whom?
Research							
Impact assessments conducted			count				
Cost benefit analysis conducted			count				
Audits conducted			count				
Publications developed			count				
Publications distributed			count				
Planning							
Documents developed			count				
Meetings held			count				
Participants attended			count				
Work group/network formed			count				
Policy/ordinances/regulations							
Policy/ordinances/regulations implemented			count				
Incentive/offset/fee developed			count				
Tools/resources developed							
Mapping tool			count				
Calculator			count				
Guidance document			count				
Decision support tool			count				
Volunteers							
Engaged in documentation project			count				
Total volunteer			hours				

Capacity Building- Project Metrics

CAPACITY BUILDING	Proposed	Actual	Units	Description- activities proposed	Description- activities accomplished	Name of communities/organizations treated	What is the purpose and how is it being institutionalized over time?
Hiring			count, dollars				
Supplies			count, dollars				
Marketing			count, dollars				
Board/council/organization created			count				
Network development/expansion			count				
Professional development			count				
Volunteers							
Engaged in capacity building project			count				
Total volunteer			hours				

Implementation- Project Metrics

IMPLEMENTATION	Proposed	Actual	Units	Description- activities proposed	Description- activities accomplished	Name of communities/organizations treated	How is this being maintained and monitored into the future?
Land							
Acquisition			acres, sqft, linear ft				
Preserved			acres, sqft, linear ft				
Restored			acres, sqft, linear ft				
Use Converted			acres, sqft, linear ft				
Use Enhanced			acres, sqft, linear ft				
Shoreline/Streambank							
Restored			acres, sqft, linear ft				
Stabilized			acres, sqft, linear ft				
Buffer Created			count, sqft, linear ft				
Riparian Buffer Restored			acres, sqft, linear ft				
Stream Restored			acres, sqft, linear ft				
Wetlands							
Wetlands Enhanced/Restored			acres, sqft, linear ft				
Wetlands Installed			acres, sqft, linear ft				

Non Tidal Wetland Created			acres, sqft, linear ft			
Waterbodies restored			acres, count			
Fisheries						
Oyster Reef Balls Made			count			
Oyster Reef Created/Restored			acres, sqft, linear ft			
Oyster Shells Collected			count			
Oysters Raised			count			
Fish Raised			count			
Fish Passage Improvements			acres, sqft, linear ft			
Submerged Aquatic Vegetation			sqft			
Wildlife Habitat						
Created			count, linear ft, sqft			
Enhanced/Improved			count, linear ft, sqft			
BMP Installation						
Bioretention			count, sqft			
Fencing			linear ft, acres			
Green Street			count, sqft			
Green Roof			count, sqft			
Rain Garden			sqft			
Rain Barrels			count			
Plants Planted			count, sqft			
Pet Waste Stations			count			
Trash Collected			count, lbs			
Trees Planted			count, sqft			
Invasive Species Removal			count, sqft, linear ft,			

			percent reduction				
Waters sampled			count, gallon				
Impervious Surface							
Impervious Surface Removed			count, sqft				
Impervious Surface Treated			count, sqft				
Reductions							
Bacteria Reduced			billions/yr, percent reduction				
Nitrogen Reduced			pounds, pounds/yr, percent reduction				
Phosphorous Reduced			pounds, pounds/yr, percent reduction				
Sediment Reduced			pounds, pounds/yr, percent reduction				
Shoreline Erosion			feet/year				
Stormwater Runoff Reduced			gallons, gallons/yr, percent reduction				
Volunteers							
Engaged in implementation project			count				
Total volunteer			hours				