The Pleasant Bay Alliance, MA Stormwater and Community Resilience Funding and Financing Strategy

Produced on behalf of the Southeast New England Program (SNEP) Network

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Part 1: Introduction. In 2019, the US Environmental Protection Agency awarded a five-year cooperative agreement to the New England Environmental Finance Center (New England EFC) at the University of Southern Maine to establish a technical assistance network to support the work of multiple partner organizations that provide training and assistance to municipalities, organizations, and tribes across the region. The purpose of the network is to advance stormwater management, ecological restoration, and climate resilience within Rhode Island and southeastern Massachusetts. An important overarching component of the network is to create sustainable revenue streams and financing processes in support of local implementation efforts into the future.

The Southeast New England Program (SNEP) Technical Assistance Network is comprised of over 15 different partner organizations from across the region, thereby offering a full complement of technical and financial services to communities in support of leadership development and peer-to-peer learning. The Network's collective goal is to establish a broader understanding of the impacts of stormwater facing communities across the region, and to increase local capacity to implement and finance resilient stormwater management systems and processes.

The SNEP Network was tasked with developing a set of sustainable and scalable stormwater management and financing systems and processes, with a specific focus on expanding local institutional capacity and infrastructure investment. To that end, the SNEP Network worked closely with the Alliance and its partner communities to establish the framework to achieve long-term, sustainable financing success.

Key Findings

Water quality restoration is currently the primary driver of stormwater controls and management practices. Water essentially defines the Cape Cod region, and the connection and interaction with water is the foundation of the region's economy and culture. While water may be the most important asset to the region, it is also the most significant threat to the long-term viability of the region's economic and social structure.

Perhaps the most significant water-based threat to date is the decreased water quality associated with the region's estuaries, including Pleasant Bay. As a result, efforts to reduce nutrient pollution to Pleasant Bay dominate the regulatory and public investment processes and because wastewater is the primary source of nutrient pollution across the region, it too dominates the financing process. As a result, the fiscal resources needed to address stormwater impacts are lacking.

The focus on nutrient pollution and water quality restoration is necessary and understandable. However, stormwater impacts are much broader and significant than the impacts of water quality alone. In fact, because stormwater is a relatively small contribution of nitrogen emission to Pleasant Bay (approximately 9% of the load) it is not the focus of water quality investments. Therefore, successfully funding and financing stormwater management needs will require two simultaneous policy and investment approaches. The first is to ensure that every dollar invested in stormwater management has the maximum impact possible. Second, and perhaps most importantly, there must be a concerted effort to link the benefits of successful stormwater management to other community needs and priorities, and to establish cashflows associated with those benefits.

Climate resilience will become the primary stormwater issue within the Pleasant Bay region. There is no more significant benefit or opportunity associated with effective stormwater management than ensuring the long-term resilience of the region to the impacts of climate change. In fact, it is likely that ensuring climate resilience and mitigating climate impacts such as flooding will become the primary stormwater management driver and issue within the Pleasant Bay region in the near future.

The importance of institutional capacity within natural resource restoration and protection financing systems. The Pleasant Bay Alliance has created an opportunity for the four Alliance communities to expand their own institutional financing capacity by creating regional funding and financing processes.

Summary Recommendations. Our recommendations are focused on identifying opportunities for expanding investments in stormwater management across the PBA region as well as the specific role that PBA can provide in scaling stormwater investments in support of both water quality restoration and climate resilience and adaptation.

Recommendation 1: Create a regional Municipal Separate Storm Sewer System permit compliance program. Water quality restoration as a financing driver is the result of the associated permit requirements. The most basic of these regulatory requirements in regard to stormwater is the Municipal Separate Storm Sewer System (MS4) permit program, which represents the baseline of stormwater management activities. The six MS4 minimum control measures (MCM) are just that—the minimum level of effort that is required to maintain stormwater compliance. However, the MCM's also create an opportunity to generate implementation efficiencies, thereby increasing the restoration impact of stormwater programs within each of the four PBA communities. The primary recommended next steps are to:

- Conduct a detailed fiscal analysis of the existing cost of compliance in each community and the opportunities for reducing costs through collaboration; and,
- Revise the PBA intermunicipal agreement to include and enable formal MS4 collaboration.

Recommendation 2: Draft a stormwater masterplan to identify potential interjurisdictional stormwater management projects. In addition to the MS4 permit requirements, the four PBA communities are subjected to a watershed-wide water quality permit that limits nutrient emissions to Pleasant Bay. While the existing regulatory and financing systems limit the opportunities for collectively addressing stormwater management needs, there may be opportunities to finance and implement stormwater projects collaboratively. This will require the development of a stormwater masterplan. PBA is a uniquely appropriate institution to lead this effort.

Recommendation 3: Expand the scope of the Pleasant Bay Alliance to include coordinating a collective long-term response to climate resilience and adaptation. Our final recommendation focuses on what will certainly be a long-term financing challenge facing the PBA communities: mitigating the impacts of climate change. In the short-term the necessary focus of the four communities should be on stormwater related flooding risks identified in each community's MVP. In the long-term, the focus will require expanding to

other infrastructure needs. In other words, stormwater management, coupled with the existing and potential capacities of PBA, provide a uniquely innovative and effective starting point for directly managing and financing regional climate adaptation.

Part 2: Project Background. The Pleasant Bay Alliance is restoring water quality in Cape Cod's largest estuary by coordinating action among multiple municipalities under an integrated scientific and regulatory framework – the first such inter-municipal, watershed-based water quality permit in Southeast New England. Together, the partners are undertaking a number of actions to reduce or mitigate nitrogen pollution to Pleasant Bay, including stormwater management, shellfish restoration, and public education.

The ***Pleasant Bay Alliance*** is made up of the four towns (Brewster, Chatham, Harwich, and Orleans) that share a border with Pleasant Bay, an embayment in southeastern Cape Cod, MA. The formation of PBA was precipitated by the very pressing need to address water quality impairments in the Bay and the 1987 designation of Pleasant Bay as a Massachusetts Area of Critical Environmental Concern (ACEC).[1] The ACEC designation recognized the unique value and quality of the Pleasant Bay water resources and catalyzed the development a regional resource management plan *(see below)* and the official formation of the PBA to coordinate water quality restoration management activities across the region. The PBA is responsible for "technical research, policy analysis, and public outreach in the areas of coastal processes, watershed planning, navigation, fisheries, wetlands protection, and water quality monitoring."[2]

The Alliance is governed by a Steering Committee that is comprised of representatives from each town. The committee is responsible for policy, implementation, and contracting.[3] A Technical Resource Committee of professionals from each town provides the Steering Committee with technical assistance relevant to the issues facing the Alliance. An Alliance Coordinator is responsible for executive functions, including project implementation and coordination, grant writing, and outreach.

Chatham's Director of Finance is responsible for the Alliance's finances through the management of separate funding accounts. Funding sources are comprised of appropriations from each of the PBA towns, which are earmarked for administrative and research uses, while public and private grants are utilized for specific projects.

Stormwater Management Challenges. The stormwater management challenge facing the four member communities of the Pleasant Bay Alliance will be addressed within the context of three management frameworks: MS4 permits; the watershed permit; and, climate resilience.

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[1] Note an ACEC is a legislated boundary. ACEC's are spelled out in the MassDEP surface water quality standards (314 CMR 4.0). All waters within an ACEC boundary are considered Outstanding Resources Waters, which required special protection. Many other Mass regulations have "piggy backed" (wetlands, surface water permits, stormwater) onto the ORW designations in 314CMR4.0. For more information see: https://www.mass.gov/doc/pleasant-bay-acec-index-map/download, Pleasant Bay was designated in the MassDEP Surface Water Quality Standards (314CMR 4.00) on March 20, 1987. All waters within an ACEC boundary are considered Outstanding Resources Waters, which requires special protection.

[2] https://pleasantbay.org/about-pleasant-bay-alliance/mission

[3] https://pleasantbay.org/wp-content/uploads/RMP-2018-REv-2020-final.pdf

MS4 Permits: each of the PBA communities has been issued a Municipally Separate Storm Sewer System (MS4) Phase 2 permit under U.S. EPA's NPDES Municipal Separate Storm Sewer Systems permit (the MS4 Permit).[4] MS4s are 5-year permits jointly issued by EPA and MassDEP, requiring towns to meet six minimum control measures, which are:

1. Pollution Prevention/Good Housekeeping for Municipal Operations: This measure addresses runoff from municipal operations such as DPW yards, salt storage areas, vehicle maintenance yards, road construction, and includes what practices towns should undertake to operate the stormwater system effectively. Towns must develop an operations and maintenance plan for their stormwater system as well as train employees on how to incorporate pollution prevention and good housekeeping practices into their activities.
2. Illicit Discharge Detection and Elimination (IDDE) Program: Illicit discharges are non-stormwater discharges to the storm drain system. Because illicit discharges typically contain bacteria and other pollutants, the MS4 Permit requires towns to develop and implement an IDDE program that includes: a legally enforceable mechanism prohibiting illicit discharges; a storm sewer map identifying the location of all storm drain outfalls; and, a plan to detect and eliminate illicit discharges.
3. Construction Site Runoff Control: The federal Construction General Permit requires owners/operators to file a Notice of Intent for construction activity disturbing more than one acre of land. Towns may wish to adopt stricter local rules. Minimum requirements include adoption of legally enforceable mechanism to control erosion during construction and procedures for municipal site plan review of construction projects
4. Post Construction Runoff Control: This measure requires ongoing stormwater management after construction is completed. Requirements include: adopting a legally enforceable mechanism to control stormwater after construction and establishing procedures for long-term operation and maintenance of BMPs.
5. Public Education and Outreach: Towns are encouraged to form partnerships to distribute educational materials to diverse local audiences within the community as part of a formal public education program.
6. Public Participation and Involvement: Finally, EPA suggests that communities give the public the opportunity to play an active role in developing and implementing the MS4 program. Towns must comply with applicable public notice requirements and determine the program's implementation goals and strategies.

The six MS4 minimum control measures are just that—the minimum level of effort that is required to maintain stormwater compliance. Each of the 4 communities contain waters that are identified as impaired for pollutants with approved Total Maximum Daily Loads for nitrogen (Chatham) and bacteria (Brewster, Chatham, Harwich, Orleans). Receiving waters with approved TMDLs are required to implement enhanced BMPs that are explained in Appendix F of the permit . Individual community programs to address these requirements create an opportunity to generate implementation efficiencies, thereby

[4] https://www.epa.gov/npdes-permits/regulated-ms4-massachusetts-communities

increasing the restoration impact of stormwater programs within each of the four PBA communities.

Water Quality Restoration and the Watershed Permit: The most significant threat currently facing Pleasant Bay's health is excess nitrogen, 75% of which comes from the more than 5,000 septic systems across the four towns.[5] The remaining 25% is split between fertilizer (16%) and stormwater runoff (9%). The April 2018 Resource Management Plan (RMP), functions to comprehensively coordinate local, regional, and state management efforts of the Bay, its watershed, and its resources. The RMP called for and led to the May 2018 Targeted Watershed Management Plan (TWMP), the foundations of which stem from the Alliance's 2017 Composite Nitrogen Management Analysis, which studied the combined effects of the towns' nitrogen plans and consolidated the varying strategies. Based on the Analysis conclusions, the RMP provided the following recommendations:

- Support comprehensive watershed-based nutrient management planning;
- Promote collaboration to achieve TMDLs and to coordinate activities identified in the Resolution, a subsequent Watershed Permit, and a subsequent Targeted Watershed Management Plan;
- Build public support for nitrogen management strategies and TMDL compliance;
- Update system-wide models and data;
- Monitor, evaluate, and implement non-traditional nutrient management strategies; and,
- Promote BMPs to control nitrogen from fertilizer use.

The current restoration process at best minimizes the role of stormwater restoration as a viable approach to reducing nitrogen. Specifically, the summary of Towns' Nitrogen Removal Plans by Technology contained in the Pleasant Bay Targeted Watershed Management Plan does not include stormwater in any of the four communities, nor does the Watershed Permit include stormwater BMPs in any of the prescribed actions. However, each of the PBA communities has indicated that they have a backlog of stormwater projects, which is an indication that wastewater management is the priority at this time.

Climate Change Resilience: The anticipated impacts of climate change are well documented, and the implications for communities like those on the Cape and within the Pleasant Bay watershed are significant. While coastal communities are uniquely exposed to a number of climate risks, stormwater is perhaps the most acute and immediately pressing. For example, according to the Town of Orleans, MA Community Resilience Building Workshop Summary Findings, "…climate impacts, particularly during the series of March 2018 nor'easters, affected the daily activities of every resident. Low lying coastal roads are experiencing greater impact from major storms, and increases in severe rain events are resulting in routine flooding of certain major roadways where stormwater systems are inadequate to effectively divert rainwater. Additionally, there was a general concern that a long-range plan needed to be developed for how to manage the marine fuel depots, to minimize the risk of spills and pollution during flood and storm events."[6] Of course these

[5] https://pleasantbay.org/wp-content/uploads/2017-03-27-Pleasant-Bay-Composite-Nitrogen-Management-Analysis-print-copy.pdf

[6] Town of Orleans Community Resilience Building Workshop Summary Findings June 2019. Page 5.

impacts are not unique to Orleans; in fact, other Pleasant Bay communities observed similar impacts and expressed concerns about the increasing severity of those impacts into the future.

In the short term, stormwater and flooding events can result in lost commerce to local businesses and financial losses to residents and citizens due to flooding and other storm damage. In the long-term, increased infrastructure requirements will be necessary for coastal communities to adapt and thrive in increasingly difficult conditions. This in turn will require financial investments in resilient infrastructure well beyond those currently in place. The 2018 National Climate Assessment notes that coastal zone counties/communities account for nearly half of the nation's population and economic activity, and that cumulative damage to property in those areas could reach $3.5 trillion by 2060.[7]

The good news is that investing in adaptation and resilience activities, including stormwater management, can be highly cost effective. The National Climate Assessment estimates that such measures could significantly reduce the cumulative damage to coastal property to about $800 billion instead of $3.5 trillion. In short, investment by local government is both a challenge and an opportunity, and it is with this dichotomy in mind that we recommend assessing the potential benefit of a regional approach to resilience financing and investment.

Again, the expected impacts to the Pleasant Bay towns and communities is well documented, and has been addressed by the towns themselves. Specifically, the Municipal Vulnerability Preparedness grant program (MVP) provides support for cities and towns in Massachusetts to begin the process of planning for climate change resiliency and implementing priority projects. Brewster, Orleans and Chatham are designated Municipal Vulnerability Communities in accordance with Massachusetts Municipal Vulnerability Program (MVP) as of 2019 making the towns eligible for MVP Action Grants. Through the MVP process, all three communities identified key community assets and the expected risk to those assets. Each community identified damage from storms, including flooding, to the primary threats to their communities. As a result, mitigating the impacts of stormwater will require communities within the Pleasant Bay watershed, as well as Cape Cod in general, to take a holistically stormwater management approach, thereby focusing on both water quality and water quantity from storm events. In other words, over time, climate resilience will become the primary financial and economic driver for more effective stormwater management.

Stormwater Activities. Within the three stormwater challenge areas, there are a variety of activities—from administration to project implementation—that encompass the stormwater management process. These activities fall within six general programmatic categories, including:

1. ***Administration:*** general administration, program planning and development, customer service, capital outlay, and support services.

[7] https://phys.org/news/2018-12-climate-resilience-trillions-runbut-billions.html. Last accessed on 11/27/19.

2. ***Communications and Capacity Building:*** public awareness and involvement, GIS and database management, special program planning and development, grants management, capacity building, and training.
3. ***Engineering and Planning:*** stormwater management master planning, design, field, and operations engineering, hazard mitigation, zoning support, multi-objective planning support.
4. ***Operations:*** general maintenance management, general routine maintenance, general remedial maintenance, emergency response maintenance, infrastructure management, and public assistance.
5. ***Regulation and Enforcement:*** NPDES stormwater permitting and TMDL implementation, coordinate code development and enforcement, MS4 permit administration, general drainage system inspection, erosion control program, and shared monitoring and field data collection.
6. ***Capital Improvements:*** coordinated design criteria, standards and guidance, joint stormwater capital improvement planning, and scaled revenue and funding.

Again, these six management categories encompass the stormwater management processes within each of the four communities within the Alliance. Clearly, each of the three stormwater management challenges (MS4, water quality, and resilience) will require varying degrees of intensity within each of the categories. For example, MS4 compliance is weighted towards administration, communications, and operations, while water quality and resilience challenges require significant engineering and capital improvement. Each of these activity areas or categories, however, can potentially benefit from a more collaborative implementation approach. The focus of this project is to determine how and to what scale the Pleasant Bay Alliance can improve the efficiency and effectiveness of these activities, specifically through a more collaborative approach to stormwater management. To that end, we address the institutional options and opportunities available to the PBA communities.

Institutional Structures and the Financing Process. The water quality restoration financing systems and processes are complex, interconnected ecosystems comprised of actors, rules, agencies, and revenues all working with the collective purpose of restoring and protecting natural resources like Pleasant Bay. A primary component of a functioning restoration financing system is public institutions. Public institutions are involved in virtually every aspect of the restoration process, including assessing and allocating revenues, developing and enforcing rules and regulations, tracking and monitoring restoration activities, and guiding and coordinating the efforts of a broad set of actors and stakeholders.

There is an opportunity for the Pleasant Bay Alliance to become a regional leader in regard to stormwater and climate finance. The Memorandum of Agreement (MOA) between Brewster, Chatham, Harwich, and Orleans serves as the foundation for strengthening and expanding this collaboration to include stormwater management and climate resilience. By engaging in collaborative financing strategies at some level, either through a formalized structure or less formal process, all four Pleasant Bay municipalities will position

themselves to gain opportunities for additional investment in their currently aging systems and improve compliance on their MS4 permit.

The Network Project Team identified five potential institutional approaches to intermunicipal financing that could be considered:

1. ***Status Quo:*** The Alliance communities can maintain the current level of coordination, or "business as usual." Chatham, Brewster, Harwich, and Orleans would continue to approach funding and financing separately from one another and within their current systems. The focus of the Alliance could continue to be on technical research, policy analysis, training, and public outreach.
2. ***Collaboration***: The Alliance's role can be expanded beyond basic coordination, with the Alliance taking on the role of a collaborative. Communities can share equipment, technology, and perhaps costs in pursuit of projects and practices that benefit multiple jurisdictions and cross political boundaries. The Alliance brings the communities together to develop plans and projects for action by the towns.
3. ***Localized Stormwater Utilities:*** Each municipality within the Alliance can establish its own stormwater utility or enterprise fund. The towns would have their own dedicated sources of revenue to support stormwater activities, allowing general funds to be used for larger capital projects. Autonomy is maintained by the towns. Some efficiencies are created, and there is room for growth and innovation.
4. ***Formalizing the Alliance***: The Pleasant Bay Alliance can become institutionally formalized and structured. The member communities expand, dedicate, and combine revenue streams into the new formalized financing entity. Projects are developed and implemented by the entity and are prioritized based on priority within the watershed.
5. ***Regional Entity:*** The geographic scope of the Alliance can be broadened beyond the Pleasant Bay area, transitioning it into a regional financing entity. The entity is supported by a regional funding scheme by each member community, and projects are financed through the entity. Administration is perhaps carried out at the county or regional level.

Comparing Approaches. The potential intermunicipal financing approaches described above are compared and rated (low, medium, high) below by considering how each aligns with the key desired attributes and potential financing outcomes:

1. ***Generate Revenue and Scale Investments.*** The ability of an approach to sustainably generate its own revenue is central to its success. As stormwater threats continue to grow, the assumption is that sustainable and scalable revenue streams will be needed in the future. This importance compounds when climate resilience is also included in the financing process.
2. ***Programmatic Efficiency.*** Efficiency refers to achieving an outcome with the least amount of wasted resources.
3. ***Local Autonomy***. While regional efficiency is important, there is also desire (oftentimes politically tied) for local independence when making decisions about implementation and revenue flow. In short, there is a balance between autonomy and efficiency.

	Generate New Revenue Streams	*Efficiency*	*Local Autonomy*
Status Quo	**Low:** within the current system stormwater projects will be financed exclusively through general fund revenues. In fact, this accounts for the project backlog within each jurisdiction.	**Low/med:** the potential for increasing administrative, programmatic, and financing efficiencies is limited to the existing system. Generating efficiencies will be limited to existing capacities.	**High:** the current stormwater management system results in the most significant local autonomy. Though the regional watershed permit conceptually could require a regional approach to stormwater management, doing so would require substantive changes to the permit.
Collaboration	**Low/Med:** formal collaboration through the PBA will not in and of itself result in additional revenue streams, especially in the form of taxes and fees. There is the possibility of increased grant funding and reduced cost of capital	**Med:** efficiencies can be gained in certain activities such as administration, outreach, marketing, and (limited) regulatory enforcement.	**High:** collaboration would not reduce local autonomy
Localized SW Utilities	**Med/High:** generating fee revenue is one of the most significant advantages of a stormwater utility. This in turn reduces pressure on the general fund.	**Med/High:** codified enterprise programs eliminate programmatic redundancies; this is especially important in regard to administrative and professional services.	**High:** when stormwater utilities are structured appropriately, they work in concert with pertinent local agencies; as a result, there is no loss of local autonomy.
Formalize/Incorporate PBA	**Med/High:** incorporating the PBA would allow it to serve as a regional enterprise fund. In effect, it would manage stormwater	**Med/High:** programmatic and financing efficiencies can potentially increase significantly. Redundancies would be reduced in both an	**Med:** some reduction in local autonomy would occur, especially in regard to project design and implementation.

	Generate New Revenue Streams	*Efficiency*	*Local Autonomy*
	programs for each community, including collecting and allocating revenues.	intra and inter jurisdictional perspective. Economies of scale would occur.	
Regional Authority	**Med/High:** a regional authority would allow the four communities to address all three stormwater management challenges jointly. This in turn would create significant opportunities to identify and leverage multiple revenue sources.	**Med/High:** as is the case with formalizing the PBA, establishing a regional authority would create both intra and inter jurisdictional efficiencies. However, a regional authority would also link the three stormwater challenges—MS4, water quality, and climate resilience—thereby creating even more significant efficiencies.	**Med:** decisions on project identification, implementation, and financing would be made by an independent authority, which in turn reduces local autonomy. However, this would be offset through innovative contracting processes, as well as predetermined governance structures which enable more local control. This is especially important in regard to leveraging revenue streams.

The intermunicipal financing approaches described above transition from relatively simple collaborative approaches with limited ability to finance stormwater management to more complex approaches that have the potential to create significant options for financing projects. In this continuum greater opportunities for efficiencies are created as we advance toward establishing financing entities including stormwater utilities, incorporating PBA or moving toward a regional authority. Local autonomy is maintained with all approaches to varying degrees. Within each financing approach there are opportunities to customize programs that accommodate each individual community while advancing holistic regional goals.

Part 3: Opportunities and Options for Moving Forward. Finally, we overlaid all of these assessment categories to identify stormwater institutional options as they relate to the PBA communities. In other words, the relationship between the three stormwater financing challenges and the various institutional options provided the framework for our three recommendations to the Alliance specifically and the PBA communities more

generally: develop a collaborative MS4 implementation program, led by the Alliance; support the Alliance in the development of a stormwater masterplan; and, convene a Task Force, again with the assistance and guidance of the Alliance, to develop a comprehensive regional resilience financing strategy and system. We address each recommendation in detail below.

Recommendation 1: Implement a Collaborative Approach Towards Achieving MS4 Permit Compliance. The most immediate opportunity for collectively advancing stormwater management programs is to establish regional efficiencies associated with MS4 permit compliance. ***Specifically we are recommending the Pleasant Bay Alliance serve as a coordinating institution for sharing program resources among the four PBA communities.*** Though the relative scale of potential fiscal savings is relatively small (collectively the four communities spend approximately $620,760[8] per year on stormwater management activities, which includes MS4 programs), any program efficiencies would enable the member communities to target scarce resources towards other restoration priorities. The core benefits to the communities, and to the Alliance, include:

- A formal collaboration would fit with the Alliance's defined role as a coordinator, researcher, and capacity builder for the four communities.
- In the short-term, a formal collaboration would not require the creation of a codified regional stormwater financing institution. However, formal collaboration would not prevent each member community from establishing its own local enterprise fund or fee-based stormwater system.
- Finally, because compliance with the six MCMs does not necessarily require capital projects at scale, a collaborative approach to implementation would provide significant efficiencies, collaboration can be achieved through existing intermunicipal agreements and as such could be managed effectively by the Alliance.

In addition to these three core benefits, a formal collaboration would create efficiencies across many of the six stormwater program management categories:

Communication and Capacity Building: There are opportunities for increasing the Alliance's ability to pursue and manage grants as it relates to stormwater and climate resilience. Although each of the four towns currently have their own MS4 permit to maintain, there are ways in which they can collaborate on enhancing capacity for meeting their minimum control measures specifically in the area of training, GIS and community engagement. A unified effort on public education and outreach at the PBA level would not only reduce overlap, but it would also create a streamlined approach across the Alliance.[9] Additionally, combined contracts for GIS and data analysis could lead to a more cost-effective approach and provide levelized analysis between the communities. In general, program development has been a strength for the Alliance under this category. The

[8] The total low cost estimate for the four communities is $620,760 annually, and the total high cost estimate is $1,312,120 annually. The Cape Cod Commission produced these cost estimates using best available information from town annual MS4 reports, a survey distributed through the Cape Cod Stormwater Managers group, and planimetric data.

[9] Streamlined messaging would also help build more support for expanded collaboration and financing in the future.

Alliance is experienced at taking an innovative concept and expanding it in order to provide more detailed analysis that provides benefits to all four towns. The Alliance's strength is in mapping out a concept to explore and implement. There is an opportunity to expand this to stormwater and resilience as they built up a reputation for including these functions.

Operations: Overall, the Alliance does well on helping all four towns understand where they should make a commitment as it relates to their facilities. The individual town budgets includes needs for operations. The Alliance appears to do a good job of setting up a system for reporting back and checking on progress as it relates to wastewater and there are areas where this can be enhanced to do something similar for stormwater particularly as it relates to sharing equipment and possibly infrastructure management. There is also value in having one place where all best management practices are kept for the entire watershed through the Alliance instead of individually storing them where it can be difficult to access and share information and data.

Maintenance would not be recommended to be covered by the Alliance because this is a town decision but making sure each town has adequate resources for maintenance could be a role for the Alliance. Sharing responsibility for maintenance may be difficult for the Alliance to work out between the town but focus could instead be placed on sharing resources such as expensive items like vacuum truck with terms written out in a memorandum of understanding. Even smaller items such as field test kits that are rather inexpensive yet can be items that are loaned out to communities instead of individual purchases. These shared resources can also be done in collaboration with Barnstable County.

Regulation and Enforcement. The Cape Cod Commission is already doing code development and bylaws which will help the Alliance fill this need so there would not be a need to duplicate this area. The Alliance already has experience working with the TMDL and managing erosion control is a very specific local jurisdiction function. The Alliance has worked with all four towns in the area of wetland protection. Since monitoring and collecting field data includes monitoring of stormwater infrastructure, this can be a good area of collaboration for the Alliance to take on and could be further developed and defined through a Stormwater Management Master Plan.

As it relates to collaboration efforts on enforcement, the Alliance tends not to get involved in local enforcement issues but to the extent that sharing resources, such as a vacuum truck for example, helps the towns meet their MS4 requirements, the Alliance can have a role providing capacity. Also, to the extent progress isn't made on annual reporting for the MS4's, the Alliance could step in and help identify and facilitate adaptive management practices to ensure compliance and host an annual discussion focused on reporting on stormwater to identify those areas where the town's regulatory requirement are not being met. Through a shared facilitation process, towns could be encouraged to adjust, adapt and share accordingly.

Recommendation 2: Create a Stormwater Master Plan Targeting Reduced Nitrogen Emissions. The Pleasant Bay Alliance was created specifically to address water quality issues, and therefore, its primary function is to facilitate implementation of both the *Pleasant Bay Targeted Watershed Management Plan (TWMP)* and the *Pleasant Bay*

Watershed Permit. Therefore, any effort to incorporate stormwater as a more significant component of the region's water quality restoration system should be led and managed by the Alliance. That said, both the TWMP and the Watershed Permit clearly and distinctly omit stormwater management from the core restoration strategy. This makes sense in some respect given the magnitude—both ecological and financial—of the wastewater management challenge. Therefore, substantively incorporating stormwater into the current restoration implementation and financing system would require a much better understanding of the potential efficiencies to be gained, where they would be gained, and the relationship between increased stormwater management efforts and existing wastewater management processes. To that end, the most significant opportunities for collaboration are associated with engineering and planning.

To be clear, the current PBA water quality restoration system is firmly entrenched in the capacity of each member community to administer, operate, regulate, and finance capital projects. In other words, though there is a regional permit, implementation of that permit is prescribed on a community-by community basis. Therefore, there are virtually no efficiencies to be gained through regional cooperation without substantive changes to both the TWMP and the watershed permit.

Stormwater facilities, by their very nature, are unique in design for a specific area, possibly on high ground or in need of custom design, making coordination by the Alliance difficult. An area that may be considered for the Alliance is on standards that all could agree. This is something that can be further explored through a Stormwater Management Master Plan. From an infrastructure planning and design viewpoint, the Alliance is not in position to be owner of facility or a structural best management practice because of the need to access capital or a loan funding. In general, capital improvement is an individual town function with the Alliance having only a facilitation role, as it relates to scaled revenue and funding.

Engineering and Planning: This could potentially be the most important area for enhanced collaboration to improve stormwater management practices and increase overall efficiency of the Alliance. Most notably is the idea of developing a combined Stormwater Management Master Plan and under which, some of the identified areas of collaboration for all six categories will fall under. For example, areas under administration and capacity building would fit under the Master Plan. The Alliance could take on the overarching goal of the Master Plan, under which other categories fall as either an Alliance task, a town task, or a third party task. A Stormwater Master Plan will help to identify what stormwater management would look like for the Pleasant Bay watershed and help describe the specific land area. The Master Plan could fall under the Alliance's domain making the organization stronger, more organized and more effective. Some of the tasks would be clearly identified as implemented individually or collectively with a cohesive plan of action for the watershed. There is also an exciting opportunity to look at stormwater management as an extension of the wastewater work being done.

Recommendation 3: Convene an expert Task Force to develop a regional resilience financing system, including a potential financing institution. Finally, we address what we believe to be the most significant stormwater and natural resource financing challenge facing the PBA communities: mitigating the impacts of climate change, specifically those associated with storm events and stormwater management. Given the anticipated extent of

the risk facing communities across Cape Cod, it is essential that new and innovative financing processes, systems, and institutions be developed to ensure sustainable infrastructure investments into the future. We are recommending that the Alliance lead an effort to convene an expert Task Force charged with designing and potentially implementing a new regional resilience financing system.

Financing systems enable the exchange of fiscal resources between lenders, investors, borrowers, and other participants integral to the financing process. Though financing systems are relatively unique to the industries in which they operate, the goal is basically universal: to allocate and distribute financial resources as to maximize project outcome and return on investment. This in turn requires financing systems to be developed around three elements/conditions: scale, efficiency, and duration.

- Implementation and investment scale. Implementation and investment scale refer to the level of fiscal resources necessary for achieving desired return on investment. In short, scale is the level of revenues that are necessary for achieving economic, social, and environmental resilience goals. Potential interventions available for impacting revenue scale include increasing the available revenue sources or decreasing the relative cost of investments. Therefore, achieving resilience investment scale will likely require PBA communities to identify and leverage an array of revenue sources and schemes over time
- Efficiency. Reducing the relative costs of developing and fortifying civic infrastructure and community assets is foundational to the resilience financing process. Being efficient means achieving a goal or outcome in the least amount of time with the least amount of resources. Efficiency is relative in that it occurs when comparing two or more options. Therefore, striving for maximized efficiency suggests that communities identify and implement the most efficient and/or cost-effective approach for achieving a goal. In short, given the scale that will be necessary to make communities more resilient in the future, will require processes that ensure the greatest resilience outcome per every dollar invested.
- Financing sustainability and duration. Finally, the financing system must have the capacity and resources necessary to ensure long-term success. At its core, financing is the process by which up front capital is allocated and invested in support of restoration activities. Funding is the capital that is used in support of those financing activities. Effectively connecting the two is what ensures implementation success over the long-term.

And, though scale, efficiency, and long-term sustainability are essential to all financing systems and processes, it is the specific application of these conditions to Pleasant Bay watershed region that is relevant here. In addition to ensuring that the design of a proposed financing system is founded on these three enabling conditions, the Task Force should address the key issues and constraints facing the Alliance and the four partner communities, which include:

- Building capacity to finance projects outside the general fund and general obligation bond financing processes. Given the anticipated scale of resilience infrastructure investments into the future, resilience financing systems must be predicated on

revenue and investment processes that complement the existing system without adding pressure on system. This includes minimizing additional general fund debt.

- Limiting the assessment of new taxes and fees. All infrastructure investments require revenue to support those investments, and the responsibility for generating new revenues to support resilience infrastructure will fall primarily—though not exclusively—on the local governments. That said, given current economic conditions at all levels—local, state, national, and global—revenue generation must be as limited as possible, targeted, and extremely efficient. And again, revenues must come from outside the general fund system.
- Balancing internal program control and leadership with apolitical investment decisions. Perhaps it goes without saying, but the resilience financing system must function in complete coordination with local leaders and decision-makers from multiple jurisdictions. This is especially important in regard to programmatic development as well as project planning, design, and implementation. However, balancing this need for internal control is the need to create a firewall between financing decisions and local political processes. In other words, though issues of equity and fairness should be made essential in the financing process, financing decisions should be made outside political pressures.
- Creating efficiencies in staffing and administration. As much as possible, it is important for the local governments to achieve administrative efficiencies, especially in regard to staffing. Therefore, an important need is to establish processes that enable coordinating resources across the communities, agencies, programs, and processes.
- Effectively transitioning short-term funding and investment needs to long-term, comprehensive infrastructure investment processes. PBA communities reflect broader community dynamics in that there are acute funding and investment needs, specifically as they relate to mitigating flooding issues across the region. The challenge to local leaders is to address these acute needs while at the same time establishing a financing system that can adapt to more extensive infrastructure investment needs into the future. The Task Force should be charged with developing a regional system that helps address these localized constraints.

There are certainly other needs and issues that will continue to require attention into the future, but these four effectively describe the Task Force's starting position. And, while addressing these needs will require a comprehensive assessment of the entire financing system, the initial focus should be on institutional needs and opportunities moving forward.

Establishing a Resilience Financing Authority. As the local MVP plans make clear, the anticipated impacts associated with climate change will be significant and varied across the region, which suggests that a new, innovative and scalable financing system may be necessary to address infrastructure needs in the future. A central component of the resilience financing system will be institutional capacity, and as long-term environmental, economic, and social resilience needs on the Cape become increasingly complex, it will be necessary to expand institutional structures and capacity accordingly.

There are a variety of potential corporate structures that may be appropriate for establishing a regional resilience financing authority, and the Task Force should investigate them all. However, the Task Force must also address the general expectations about what that financing institution will do, which primarily include:

- Leadership, governance, and decision-making: external institutions have the authority that enables them to make investment decisions outside the auspices of local government. This includes establishing procurement policies, hiring and firing staff, and prioritizing infrastructure project investments. However, government leaders often have significant governance control through the appointment of board members. Coupled with the fact that most if not all investment decisions must be ultimately approved by institutional boards, local governments are never completely divorced from institutional decisions. That said, external authorities have significant autonomy in regard to program and investment management. This creates an apolitical investment process.
- The ability to incentivize investment in infrastructure. Perhaps by definition, the primary role of the financing institution will be to ensure sufficient investment, from either public or private sources, in support of resilience and civic infrastructure. This will require identifying and leveraging a variety of funding and revenue sources.
- Mobilize public and private capital. In addition to receiving and managing diverse revenue streams, the financing institution will need to apply and utilize a variety of financing mechanisms including bonds, originating loans, and perhaps facilitating grants.
- Anticipate investment scale and accelerate infrastructure development and construction. Finally, a financing authority or institution must be enabled to make existing design, permitting, contracting, and construction processes more efficient and effective. This will require serving as an organizational or focal point of a number of public agencies, departments, and processes. In other words, the financing authority or institution becomes in many ways an important organizing element of the policy development and project investment process.

There will certainly be many other issues for the Task Force to address. Perhaps the most important or fundamental outcome to be achieved by the Task Force will be to create a broader community-wide understanding of the opportunities, risks, benefits, and barriers associated with a collective, regional approach to achieving climate resilience, specifically as it relates to addressing stormwater, flooding, and natural infrastructure restoration and protection.

Regional financing and the six stormwater management functions. Though there are a number of steps that each of the four PBA communities can take to advance the role of stormwater management as a core component of local resilience, it is important to understand how a regional financing approach can improve the efficiency and effectiveness of stormwater programs across the six management functions. In the short-term, the primary focus of a regional authority and associated financing process would be presumably be to expand the impact and importance of stormwater management within broader natural resource restoration and protection processes, including climate

resilience. Though water quality and nutrient reduction goals will remain local and regional priorities (if for no other reason than the fact that regulations will require this to be so), shifting investment priorities towards climate resilience will create a process for ensuring that stormwater investments and projects accomplish multiple ecological and infrastructure needs. While this may result in more complex natural infrastructure design and construction, it will ultimately result in greater efficiency, reduced climate risk, improved water quality, and continued economic growth and development.

In short, the combination of coupling water quality restoration with climate resilience while at the same time aggregating program functions across multiple jurisdictions creates tremendous efficiencies across the entire stormwater management programs. Specifically, these efficiencies include:

- Achieving multiple ecosystem service benefits: first, an effective climate resilience program must include a stormwater financing system that is focused on both improving water quality and mitigating flooding and other impacts from storm events. As a result, the importance of stormwater management and green infrastructure systems will increase thereby attracting more significant local and regional investment.
- Creating financing scale: second, a regional financing system builds on the efficiencies generated by focusing on multiple ecosystem services by creating investment and institutional scale across all of the stormwater management functions: administration; engineering and design; communications and capacity building; operations; regulation and enforcement; and capital infrastructure implementation and financing. As a result, the shift in focus to climate resilience investments will expand the capacity of the four communities within the Alliance to meet existing water quality needs and obligations associated with both the MS4 and watershed permits.

Conclusion. The three recommendations included in this report are founded on the unique capacity and function of the Pleasant Bay Alliance. Each recommendation is based on the Alliance's core function of research, organization, facilitation, and communication. The recommendations are focused on identifying opportunities for expanding investments in stormwater management across the PBA region as well as the specific role that PBA can provide in scaling stormwater investments in support of both water quality restoration and climate resilience and adaptation.