

Sea Level Rise Adaptation Exchange: Leading Practices for Moving from Assessment to Action

Virtual Forum Summary

June 23–24, 2021



Forum Background

The *Sea Level Rise Adaptation Exchange: Leading Practices for Moving from Assessment to Action* was a virtual forum coordinated by the Water Utility Climate Alliance (WUCA) Sea Level Rise (SLR) Committee and EcoAdapt. In 2019, the WUCA SLR Committee was formed by the seven coastal member agencies working to address SLR—Seattle Public Utilities, San Francisco Public Utilities Commission, San Diego County Water Authority, Tampa Bay Water, Philadelphia Water Department, and the New York City Department of Environmental Protection. The goal of this committee is to foster discussion and information sharing in order to learn from each other and stay on top of adaptation best practices and the rapidly advancing field of SLR science.

The forum was a part of a larger project called *A Field Guide to Sea Level Rise Adaptation for the Water Sector: Moving Beyond Risk Assessment to Implementation*, intended to document the leading practices in SLR adaptation for the water sector. Building on the [WUCA Leading Practices project](#), this effort focuses on a specific climate stressor—sea level rise—and a specific part of the adaptation process—implementation (Figure 1). The final product will serve as a guide to help utilities and their municipalities advance SLR adaptation efforts and address barriers to implementation.



Figure 1. Wheel of Adaptation Practices from the WUCA Leading Practices Project.

Forum Goal: To create a forum for key stakeholders in coastal cities to discuss SLR adaptation opportunities and barriers, including the unique challenges faced by water utilities and other infrastructure managers

Forum Objectives:

1. Provide participants with baseline understanding of barriers to SLR adaptation.
2. Highlight case studies and success stories from around the U.S. that demonstrate best practices and tangible solutions.
3. Facilitate peer-to-peer knowledge exchange between and among cities.

Forum Structure

The two-day forum was structured around presentations and interactive portions, including breakout discussion groups. Presentations included:

- WUCA member highlights of efforts to date on SLR adaptation and overviews of barriers to and opportunities for advancing adaptation. Speakers included:

- *Seattle*: **Ann Grodnik-Nagle** (Strategic Advisor, Climate Adaptation and Built Environment, Seattle Public Utilities) and **Miles Mayhew** (Strategic Advisor, Seattle Public Utilities)
- *Philadelphia*: **Julia Rockwell** (Climate Change Adaptation Program Manager, Philadelphia Water Department) and **Abby Sullivan** (Environmental Scientist Specialist, Philadelphia Water Department)
- *New York City*: **Alan Cohn** (Managing Director, Integrated Water Management, New York City Department of Environmental Protection) and **Erika Jozwiak** (Infrastructure Program Manager, New York City Mayor’s Office of Resiliency)
- *Tampa Bay*: **Kay Parajuli** (Water Resources Systems Engineer, Tampa Bay Water) and **Tirusew Asefa** (Planning and Systems Decision Support Manager, Tampa Bay Water)
- Case studies from other cities that have implemented SLR adaptation measures to share lessons learned, including highlighting how specific factors have hindered or facilitated action. Case study materials are available at <https://bit.ly/SLRForum>. Speakers included:
 - *Miami-Dade, FL*: **Katherine Hagemann** (Adaptation Program Manager, Miami-Dade County), **Annalise Mannix** (Planning and Development Division Chief, Miami-Dade Water and Sewer Department), and **Enrique Vadiveloo** (Senior Associate, Hazen and Sawyer, consultant to Miami-Dade Water and Sewer Department)
 - *Virginia Beach, VA*: **CJ Bodnar** (Stormwater Technical Services Program Manager, City of Virginia Beach)
 - *Boston, MA*: **Charlie Jewell** (Director of Planning, Boston Water and Sewer Commission) and **John Sullivan** (Chief Engineer, Boston Water and Sewer Commission)
 - *San Francisco, CA*: **David Behar** (Climate Program Director, San Francisco Public Utilities Commission), **Adam Varat** (Acting Director, San Francisco Planning Department), **Anna Roche** (Project Manager, San Francisco Public Utilities Commission), **Luiz Barata** (Senior Architect and Urban Designer, San Francisco Planning Department), and **Brad Benson** (Port of San Francisco)

Breakout groups were designed to facilitate direct peer-to-peer knowledge exchange on barriers to and opportunities for advancing SLR adaptation implementation. A suite of potential discussion questions were devised for each group.

Key Themes and Takeaways

There are several reasons given for why individuals, agencies, and communities cannot or do not implement SLR adaptation measures. The forum organizing team used the following categories to classify the most commonly mentioned types of barriers:

- Technical barriers are limits to the availability of adaptation options for implementation, including the capacity or ability to implement options and how effective the options are at reducing the effects of SLR.
- Financial barriers include upfront and maintenance costs of adaptation measures, as well as the availability and flexibility of funding sources.
- Governance limitations include the presence and flexibility of regulatory and policy measures, as well as clarity on who is responsible for on-the-ground implementation.
- Social or cultural limits to adaptation may arise from conflicting interests of stakeholders and/or sectors (e.g., state vs. local agencies, public vs. private landowners, disproportionate impacts on vulnerable groups).

The primary takeaways for each barrier, as discussed in the breakout groups, are outlined below.

Technical

- **Pay attention to the cumulative effects of climate-related stressors (e.g., SLR, precipitation and storm intensity, drought) and interactions with non-climate stressors (e.g., social vulnerability, development pressures).** Climate stressors are not mutually exclusive and may all happen simultaneously; for example, SLR may exacerbate inundation during storms. Non-climate stressors may also amplify vulnerability to SLR; for example, shoreline hardening in one location can hinder sediment accretion and increase erosion rates and infrastructure damage in another. Planning across stressors is important but also complicates decision-making as multiple partners, agencies, and cities need to be involved in order to effectively respond.
- **Avoid further development on land that is highly vulnerable to SLR.** In practice, this can be difficult because the priorities of developers often do not align with the adaptation actions needed in areas highly vulnerable to SLR. However, continuing to develop in areas that are highly susceptible to SLR is unsustainable.
- **Improve upon and leverage existing tools where possible to support decision making.** FEMA's Flood Insurance Rate Maps (FIRMs) can be informative but are based on existing rather than expected future conditions. Consider adding a safety factor to account for SLR on existing FEMA maps. It is also important for local agencies to use agreed-upon maps that reflect up-to-date science (e.g., updated every five years with newest projections) in order to streamline decision-making and increase the likelihood of creating more resilient structures and communities. In some cases, these tools may be best mandated by law. For example, NYC is using the [Envision framework](#), which provides industry-wide sustainability metrics for infrastructure, similar to the LEED certification framework for buildings. It helps decision-makers prioritize cost-effective, long-term infrastructure and disinvest in projects that do not meet criteria (e.g., meeting service level goals over its expected useful life in a changing climate).

- **Invest in a regional approach rather than individual projects.** Creating a holistic suite of projects in which to invest helps to spread risk across a wider geography and set of resources (e.g., funding, time, materials). This will also help to ensure that investment decisions reflect on how a singular project promotes or detracts from regional SLR resilience efforts.
- **Strategically use visuals to engage leadership, other decision-makers, and the public.** Strong visualization tools can make the connections for people between SLR projections, consequences, and the viability of potential adaptation responses. For example, the Boston Water and Sewer Commission developed 3D renderings to depict what flooding would look like in certain parts of the city.
- **Mainstream the iterative nature of adaptation into all decision-making processes.** All future-oriented planning needs to remain flexible enough for course corrections. Comprehensive plans cannot be a “one-and-done” activity and must include updates to the plans.
- **Create/strengthen interdepartmental partnerships.** Collaboration is particularly important with other departments or groups that compete for budgetary allocations.
- **Internal staff capacity needs to be a core investment strategy for SLR adaptation.** Internal capacity of agency staff to advance SLR adaptation needs to be strengthened and supported by leadership. For example, while progress has been made in San Francisco to advance climate resilience, there is still a lack of staff capacity to do all of the work.
- **Invest the time in implementation planning.** Do not just spend your SLR adaptation planning time on modeling and outlining potential strategies. Participants discussed what they wished they had done during the planning process, including allocating as much time to developing actual implementation plans for their adaptation options as was spent on modeling and scenarios. Investment in implementation planning can help prepare cities for unexpected extreme weather events and flooding. Participants highlighted the power crisis that occurred in Texas in February 2021 due to the state’s lack of preparedness for extreme weather events. The crisis not only impacted the availability of electricity, but also essential resources such as water, food, and heat.
- **Look for innovative engineered ways to “make room for water.”** The combination of nature-based solutions and gray infrastructure can be used to create space for flooding or inundation. For example, in Boston, they are looking into building a barrier around the Fort Point Channel. This would be a deployable barrier across the mouth of the channel that would let the tide retreat during a flooding event and then close and let stormwater outfall fill the area.
- **Utilize FEMA’s programs and resources to fund risk assessments and keep flood maps up to date.** The Cooperating Technical Partners (CTP) Program allows communities participating in the National Flood Insurance Program to partner with the Agency to be more active participants in the FEMA flood hazard mapping program. Unlike other FEMA grant programs that prioritize shovel-ready brick and mortar projects, the CTP grants

can be used for risk analyses and technical mapping. The FEMA Risk Map Coordinator for your region can provide more information.

- **Develop mandated climate-resilient design standards.** The cost to add resilience into an existing capital project or design from the get-go is much lower than trying to retrofit an asset or project after-the-fact. Having a top-down directive or policy that mandates the use of climate information and updated design standards empowers employees to mainstream climate information into their daily work.

Financial

- **Develop a menu of funding options and a funding strategy.** Funds for large projects are unlikely to come from one place. There needs to be multiple streams of revenue or options for funding (e.g., federal programs, state bond programs, parcel taxes, grants) and staff time needs to be dedicated to applying for and managing grants. Being cognizant of the timeframe of receiving grants and when and how the funds are available once received is essential. The turnaround time of grants is also an important factor to integrate into a menu of options, and can be helpful when creating an implementation plan and expected timeline for a project. San Francisco's Planning Department developed a funding strategy for its [Islais Creek project](#), which addresses the impacts of SLR on San Francisco's northern waterfront. Funding and financing strategies are organized into near-term and long-term categories, are accompanied by implementation details, and can be re-organized by project type, geography, and project cost.
- **Develop a finance working group for large-scale adaptation projects.** Creating a finance working group is a way to ensure that funding options are explored, and a funding strategy is developed. In San Francisco a Seawall Finance Working Group was developed with an interdisciplinary team from various departments. They helped [created a report](#) that evaluated over 50 different possible funding sources with standard metrics (e.g. funding strategy score cards) to help identify the funding options that were the most feasible and effective. This report also helped bolster their case when they requested funding from the state.
- **Consider the cost of inaction and municipal liability.** How much would it cost if strategies were not implemented? What would this mean for local economic activity and how can this impact be quantified?
- **Look for mechanisms to combine funds from multiple agencies and departments, such as a joint benefits authority (JBA), to blend public dollars.** The creation of a [joint benefits authority](#) (JBA), which is being piloted in San Francisco, allows multiple government entities to raise money and issue bonds for projects that address cross-sector issues and provide multiple benefits.
- **Group projects by cumulative benefit as a way to appeal to funders.** Look at the potential benefits of combined projects—or single projects that address multiple issues-across agencies and use this as leverage to seek multiple sources of funding or to

strengthen applications so they appeal to grant funders. Nature-based solutions tend to have opportunities to layer funding and generate multiple benefits. **Look for alternative funding sources or create a dedicated funding stream for resilience projects by redirecting a portion of tax revenue.** Develop or support a tax funding stream that is dedicated to resilience efforts. California has created a fund specifically for resilience and climate change adaptation efforts in the water sector, including a focus on projects that address the needs of small and disadvantaged or underserved communities. Other alternative funding sources discussed in this forum include:

- Issuing bonds: e.g. statewide resilience bonds, general obligation bonds, social impact bonds
 - Federal and state funds earmarked for resilience/adaptation projects
 - Community financing districts
 - Selling greenhouse gas (GHG) credits
 - Mitigation banks
 - Shoreline fees
 - [Land value capture](#) tools, e.g. tax increment financing and land readjustments
- **Conduct cost-benefit analyses that include equity on specific projects.** Cost-benefit analyses (CBA) are often abstract; narrowing the scope to a neighborhood-level project can help to better align priorities and understand what is feasible. These real numbers provide support for climate scoring/checklists for capital projects. Traditional scoring measures for cost-benefit analyses usually do not weigh equity concerns and focus primarily on financial metrics, leading to a bias for areas with high property values and excluding historically under-resourced or underfunded communities. Including equity and environmental justice in CBA formulas can ensure that benefits are not just defined by dollar amounts. Better aligned priorities and revised scoring measures on real and specific projects can help address the limitation of traditional analyses in prioritizing equitable solutions.
 - **Document the cost of adaptation.** There is value in understanding the cost of adaptation on a project level. To apply the Envision framework, NYC is updating policies and standard operating procedures and documenting all additional costs incurred related to certification and upgrades. Documenting the cost to make a project resilient to climate impacts will be essential to understanding the long-term cost/benefits and costs avoided over the useful lifespan of the asset. Miami-Dade Water and Sewer Authority noted that the added costs to make a project that was already in the capital improvement program resilient is only an estimated ~5% of the total project cost. This information can be essential for getting buy-in for updated design standards that increase infrastructure resilience. Furthermore, stakeholders, including the public and bond rating agencies, want to know the specific ways that infrastructure managers are ensuring resiliency in their investments.
 - **Establish a standardized approach to prioritizing risks and establish level of service goals as a way to manage and prioritize projects in a capital planning program.** A

standard approach to organizing which risks, levels of service, and communities or areas are priorities can help in managing funds and determining where funds are most needed. This can help in developing a capital plan to determine which assets should be addressed first.

- **Factor maintenance costs of engineered solutions into strategic decision making.** It is critical to consider both upfront costs and long-term maintenance costs of infrastructure/engineered solutions.
- **Work with federal agencies to better understand the appropriate pacing of projects so they align with the release of federal funds.** Sometimes federal agencies are limited in the amount of funds released per fiscal year. Therefore, a project that was awarded a significant amount may not receive all the funds for several years or even decades. Knowing this as projects are planned and scoped can be critical information.
- **Navigating long term maintenance roles and costs are common challenges in large-scale resilience projects.** Successful large-scale resilience projects often require cross-department collaboration and external funding sources. While there may be funds to help plan, design and construct a project, there is rarely funding available for maintenance. Working across departments also makes ownership and maintenance roles challenging—this should be addressed early-on in the project planning phase.

Governance

- **Unified SLR projections for a region, municipality, or city ensures consistency in adaptation planning.** Southeast Florida’s counties use a regionally-unified SLR projection, updated every five years, to inform design and construction standards, which allows county agencies to be consistent across planning and communications. NYC has also officially adopted SLR projections to support planning and implementation.
- **Top-down directives set expectations for SLR integration but “vertical complexity” still presents challenges.** Mandates from leadership and/or official policies/regulations support the integration of SLR science into decision-making and empower staff to incorporate climate change into their efforts (e.g., Miami-Dade). In other cities, leadership on SLR adaptation is either lacking or dispersed across different agencies with no clear coordinating body. In some instances, these different agencies intentionally collaborate as much as possible to advance SLR adaptation (e.g., City of San Francisco’s SLR committee comprises deputies from different agencies that meet monthly to discuss progress and plans). However, there is inherent “vertical complexity” in cities and counties, wherein administrative hierarchy can inhibit progress if something needs to be changed. Even within individual departments there is need for top-down directives. Oftentimes, responsibilities are added to the workload of existing staff in a department when a new position exclusively dedicated to an issue (e.g., flood management) is needed instead.
- **Collaboration across departments, organizations and stakeholder groups is key to addressing complexity of large coastal protection projects.** The larger the project, the

more agencies and sectors need to be engaged. In NYC, most strategies to prevent or limit storm surge impacts require closing some sort of gates, which will result in the flooding of roadways and tunnels, each of which are under different agency authority and/or jurisdiction, making regional coordination critical in advance of storm events. San Francisco's Planning Department's [Ocean Beach Project](#) is an example of a city, state, and federal agency collaboration to develop and implement adaptation strategies to address SLR, coastal erosion, and flooding. The project team coordinates a series of projects in the region and communicates with local communities to understand and respond to the complexities that arise with such a large-scale project dealing with transportation and wastewater infrastructure, networks of parks, natural landscapes and recreation areas, as well as the impacts these changes will have on local residents.

- **Consider regional solutions with projects coordinated across multiple jurisdictions.** Not only does this work have to happen across departments and sectors, sea level rise adaptation solutions should be regional in nature as water does not stop at jurisdictional borders. The City of Norfolk worked on a project with the United States Army Corps of Engineers (USACE) to explore storm surge gates installed for flood mitigation. Because their project application with USACE was limited to Norfolk, they were unable to explore alternatives with the storm surge gates placed in different locations outside of Norfolk which would have protected three cities, including Virginia Beach, rather than one.
- **Federal grants can be difficult to apply for, receive, and manage.** Federal grant programs often release challenging proposals to complete, requiring matching funds (e.g., ~25%) and technical cost-benefit analyses. Federal grants are also viewed as difficult to manage. Plans that are required for cities to develop, including hazard mitigation and comprehensive plans, may be a "way in" to receiving federal funding for SLR adaptation planning.
- **Misalignment of project timelines between federal and city agencies can delay adaptation action.** Some collaborative projects can take years to complete and may inhibit or discourage the development and implementation of new SLR-specific projects by cities or municipalities. Major infrastructure projects often require significant amounts of time for planning, permitting, approval, and construction. The lag time between federal studies (e.g., environmental review, mapping, approval) and on-the-ground implementation hamper effective decision-making at the local level.
- **Promote the use of ballot questions to permanently establish Resiliency/Sustainability offices or to get approval for bonds to fund resilience.**

Social/Cultural

- **Consider social dynamics, social pressures, costs and potential inequities of adaptation strategies.** Consider how specific choices may affect residents, particularly those who are most vulnerable to the effects of SLR and/or have higher social vulnerability (e.g., lower income, higher cost of living). For example, using property values as a criterion to prioritize what to protect or address in regard to SLR results in disinvestment in highly vulnerable areas. Directly ask residents and stakeholders in vulnerable communities

how you can help to alleviate the disproportionate burdens they face. In low-lying areas along the Duwamish River communities are highly vulnerable to the impacts of SLR, but historically have not been prioritized in adaptation policy and planning. The city is addressing this issue by working closely with community-based organizations in the area to better understand their needs and provide funding to support staff that will collaborate with the city in its adaptation work.

- **Consider unintended consequences of decisions.** Certain actions may incite public backlash and disengagement, exacerbate existing inequities, cause displacement of residents, or transplant a problem to a different location (e.g., building a seawall in one location could inundate other area).
- **Consider the unique needs of different communities/neighborhoods through public engagement.** Trust building and collaboration with communities are important, but engagement and progress in climate adaptation cannot happen in a vacuum. Each community has its own unique characteristics, needs, wants, and resources (e.g., social, cultural, economic, location, etc.). These characteristics must be accounted for in planning adaptation strategies alongside partnerships with those communities. Be aware that communities may also be overwhelmed at times by what is being asked of them from city/regional agencies.
- **Use foresight and find synergies between agencies, projects, and the community.** For example, land use is an issue associated with planning and community development. Creating an avenue for communication between agencies and community organizations/members can lead to multi-benefit solutions. For example, in Philadelphia, interdepartmental coordination and orchestration allows the city's Flood Risk Management Task Force to engage with 15 partners, including state and federal partners and eight city departments, to pursue action around issues related to SLR and flooding. The Task Force led to the creation of the City's [Flood Management Program](#). In San Francisco, the Sea Level Rise Coordination Committee, led by the Mayor's Office of Resiliency, was established to coordinate and address sea level rise across departments.
- **Incrementally introduce new regulations.** At the local level, introduce changes to certain regulations (e.g., stormwater) that can address climate change impacts (e.g., incorporate climate change into planning/development). Incremental changes may facilitate a culture change in communities and decrease push-back. In Philadelphia, more progressive and stricter stormwater regulations were released for development projects, and the development community responded quickly to these new requirements.
- **Build community trust and buy-in for adaptation action.** Educational tools, workshops, and collaborations with community-based organizations encourage involvement in programs and can create a sense of community ownership over implemented actions in their neighborhoods. The transparency and accountability of top-level leadership (e.g., mayors) is critical in building long-term trust with communities. In Virginia Beach, the city's public works department meets with local communities to discuss plans for adaptation, focusing on issues the community can relate to by using tide gauge data,

photographs taken by citizens, and local observations to validate SLR model projections instead of focusing on the general issue of climate change. In San Francisco, the “I am Islais” campaign started with students from local schools and used the arts as a tool to allow residents to identify their values and concerns and to express their support for the coastal adaptation project.

- **Develop communication tools to encourage engagement from community members and those in leadership or decision-making roles.** Communications tools, such as inundation maps, can provide visuals of future and current impacts from climate-related events that resonate with the public and can encourage investment from those with decision-making power. The Boston Water and Sewer Commission has developed inundation maps and a 3D panorama using model data that represents what will happen if action is not taken to address storm surge and SLR in Boston. These maps are being used as outreach and education tools to gain public support—and willingness to pay—for adaptation planning and action.
- **Create messaging and outreach strategies for a variety of audiences.** Different people respond to different messages and means of delivering those messages. Outreach on SLR science and adaptation measures should be tailored to best speak to people’s interests and areas of expertise (e.g., politicians, builders, real estate developers, residents).
- **Sea level rise adaptation strategies can also be anti-displacement strategies that consider solutions that go beyond infrastructure-based projects.** The city of Seattle is coordinating across departments and with community groups to find adaptation solutions that protect communities from both sea level rise and displacement. They received a grant from the Robert Wood Johnson Foundation to create a Resiliency District that focuses on sea level rise but also *community* resilience that builds wealth and empowers residents. Seattle is also considering equity when it comes to funding resilience projects. They are exploring the use of Land Value Capture mechanisms to finance projects that address climate, health and equity.

Jamboard Results

Participants were asked to reflect on two questions using Google Jamboard:

[What does success and failure look like in the context of your efforts to address sea level rise?](#)

[What is one action you commit to doing to advance SLR adaptation moving forward?](#)

Successful SLR adaptation looks like:

- Fully considering and integrating climate change risk, resiliency, sustainability, and environmental justice into all capital projects
- Strong public support
- Prioritizing those most affected by racial inequities, health disparities, and climate change
- Leveraging our investments to attract more capital that fosters community resilience

- Avoid[ing] unnecessary costs (liability, infrastructure, site acquisition, capital, etc.) borne by future ratepayers and tax payers
- Moving the needle on institutional culture regarding importance of managing climate risk, lengthening planning horizons and taking a more proactive approach
- Ensur[ing] incumbent communities can thrive in place
- Accommodating the needs of aquatic and terrestrial animals and habitat along with the needs of people
- Co-creati[ng] solutions with those most impacted solutions proposed
- Community leadership in adaptation planning and implementation
- Right-sizing adaptation planning with a focus on the most likely levels of rising seas through time while also thinking about the unlikely but possible worse case scenarios with a plan to move from one to the other as needed
- Develop[ing] organization-specific tool that successfully allows for continued performance improvement in terms of refined processes and metrics

Unsuccessful SLR adaptation looks like:

- Waiting until a major storm does catastrophic damage to take action
- Fail[ing]to understand [the] urgency to plan...[and that] success requires external partnerships and consideration of unintended consequences
- Single-purpose seawalls
- Allowing the “haves” to simply raise their assets/homes/facilities on fill but burdening the “have nots” with the costs of dealing with where the water will want to go
- Siloed-agency approach to projects
- Continuing to plan, design, and construct capital projects without any change [and] ignoring the SCIENCE because funding concerns are not addressed/resolved.
- Focusing too much on low-likelihood, high-consequence SLR projections in planning, causing hopelessness, risking maladaptation, and disincentivizing reasonable, iterative decision-making as observations, science, and GHG mitigation efforts advance
- Not centering racial equity in our decision-making and investments
- Creating a disproportionate windfall for private stakeholders with public investments to adapt to sea level rise

Participants committed to:

- Continue to advocate (instigate) for disclosure of SLR risks and for integration of SLR into development plans, permit reviews, and funding analyses
- Center racial equity and environmental justice in our sea level rise adaptation efforts

- Expand this practitioner collaboration and sharing of leading practices to an international scale over the next year. The U.S. can learn from others – others can learn from us (US!). We need all hands on deck.
- Continue to advocate for the incorporation of climate resiliency into other parts of my agency that do not currently prioritize these issues
- Continue to support inter-agency collaboration to develop and implement projects
- Frame the topic of flood risk as a cross-cutting issue that affects residents at a fundamental, long-term level – as a way to keep this issue at the forefront for policy makers and to encourage a top-down directive for SLR adaptation
- I commit to reaching out to Marc and others in Philly to see if they would also like to find a JBA pilot. We could have an east coast and west coast pilot! One of our grant requirements is to create a white paper on the JBA that could be relevant nationally.
- Continue to push for top-down directives and setting policies that will promote the culture shifts needed for successful adaptation

Sea Level Rise Adaptation Exchange

Leading Practices for Moving from Assessment to Action

Wednesday & Thursday, June 23–24

9:00-12:30 Pacific | 12:00-3:30 Eastern

AGENDA

Day 1 – Wednesday, June 23rd

TIME PACIFIC	AGENDA ITEM	PRESENTER(S)
9:00	Welcome and Opening Remarks	Abby Sullivan, Philadelphia Water Department Rachel M. Gregg, EcoAdapt
9:10	SLR Adaptation Overview & Implementation Barriers	Rachel M. Gregg, EcoAdapt
9:20	Water Utility Climate Alliance Member Highlight Seattle Public Utilities Philadelphia Water Department	Ann Grodnik-Nagle, Seattle Public Utilities Miles Mayhew, Seattle Public Utilities Julia Rockwell, Philadelphia Water Department Abby Sullivan, Philadelphia Water Department
9:45	Case Study 1: Miami-Dade Miami-Dade County Miami-Dade Water & Sewer Dept	Katherine Hagemann, Miami-Dade County Annalise Mannix, Miami-Dade Water & Sewer Dept. Enrique Vadiveloo, PE, ENVSP, Hazen and Sawyer (consultant to Miami-Dade Water & Sewer Dept.)
10:45	BREAK (15 minutes)	
11:00	Case Study 2: Virginia Beach	CJ Bodnar, City of Virginia Beach
11:30	Breakout Group <i>Break as needed</i>	<i>Breakout group assignments given the day-of</i>
12:20	Closeout	Abby Sullivan, Philadelphia Water Department
12:30	ADJOURN	

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AGENDA

Day 2 – Thursday, June 24th

TIME PACIFIC	AGENDA ITEM	PRESENTER(S)
9:00	Introduction to Day 2 & Overview of Day 1	Abby Sullivan, Philadelphia Water Department Rachel M. Gregg, EcoAdapt
9:15	Water Utility Climate Alliance Member Highlight NYC Dept. of Environmental Protection Tampa Bay Water	Alan Cohn, NYC Dept. of Environmental Protection Erika Jozwiak, NYC Mayor's Office of Climate Resiliency Kay Parajuli, Tampa Bay Water Tirasew Asefa, Tampa Bay Water
9:45	Case Study 3: Boston Water and Sewer Commission	Charlie Jewell, Boston Water and Sewer Commission John Sullivan, Boston Water and Sewer Commission
10:15	BREAK (15 minutes)	
10:30	Case Study 4: San Francisco	David Behar, San Francisco Public Utilities Commission Adam Varat, San Francisco Planning Department Anna Roche, San Francisco Public Utilities Commission Luiz Barata, San Francisco Planning Department Brad Benson, Port of San Francisco
11:30	Breakout Group <i>Break as needed</i>	<i>Breakout group assignments given the day-of</i>
12:20	Reflection and Closeout	Abby Sullivan, Philadelphia Water Department Rachel M. Gregg, EcoAdapt
12:30	ADJOURN	

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Forum Goal:

Create a forum for key stakeholders in coastal cities to discuss sea level rise adaptation opportunities and barriers, including the unique challenges faced by water utilities and other infrastructure managers

Forum Objectives:

1. Provide participants with baseline understanding of barriers to sea level rise adaptation.
2. Highlight case studies and success stories from around the U.S. that demonstrate best practices and tangible solutions.
3. Facilitate peer-to-peer knowledge exchange between and among cities.

Field Guide Project

This forum is a part of a larger project called *A Field Guide to Sea Level Rise Adaptation for the Water Sector: Moving Beyond Risk Assessment to Implementation*. The project goal is to document the leading practices in sea level rise adaptation for the water sector. It is intended to serve as a guide or road map to help utilities and their municipalities advance sea level rise adaptation efforts and address the challenges and barriers to implementation. **Your participation in this forum will directly inform and strengthen this project!** The Field Guide will be a published as a report and as a digital resource online—we look forward to sharing it with you upon its completion.

FORUM HOSTS



The **Water Utility Climate Alliance** is comprised of twelve of the nation's largest water providers who supply drinking water to more than 50 million people throughout the U.S. WUCA's mission is to collaboratively advance water sector climate change adaptation.

The **WUCA Sea Level Rise Committee** consists of WUCA members impacted by sea level rise, including Seattle Public Utilities, San Francisco Public Utilities Commission, San Diego County Water Authority, Tampa Bay Water, Philadelphia Water Department and NYC Department of Environmental Protection.

www.wucaonline.org



EcoAdapt's mission is to create a robust future in the face of climate change. We bring together diverse players to reshape planning and management in response to rapid climate change, and help government agencies, organizations, and individuals figure out how to do what they do effectively, even in the face of climate change.

www.ecoadapt.org

Sea Level Rise Adaptation Exchange

Leading Practices for Moving from Assessment to Action

Case Study Speaker Bios

Case Study #1 Miami-Dade

Miami-Dade County

Katherine Hagemann

Adaptation Program Manager, Miami-Dade County Office of Resilience

Katherine Hagemann is the Resilience Program Manager for Adaptation within the Office of Resilience at Miami-Dade County. Her work focuses primarily on climate change, adaptation and implementing the County's Sea Level Rise Strategy. Before moving to Miami, she also worked on coastal climate adaptation during the post-Sandy Rebuild by Design and National Disaster Resilience competitions.

Miami-Dade Water and Sewer Department

Annalise Mannix, P.E.

Planning and Development Division Chief, Miami-Dade Water and Sewer Dept.

Annalise Mannix has over 30 years of engineering experience in civil and structural engineering with a focus on resiliency for municipal public works. She is currently the Planning and Development Division Chief for the Miami-Dade Water and Sewer Department, leading the master planning, modeling, water certification, hydrogeology and utility coordination efforts to develop sewer and water infrastructure improvements and provide the County with high quality potable water and sewer services. Formerly, Annalise was the Interim Assistant City Engineer for the City of Fort Lauderdale and lead of the City of Key West Engineering, Environmental and Stormwater Utility programs.

Annalise is a Florida Licensed Professional Engineer, PMI Project Management Professional and an Envision SP. She is a graduate of New York Maritime College and holds a Master's degree in Executive Management. Appointed as a Consumer Representative to the National Association of Insurance Commissioners' Consumer Liaison Committee, Annalise focused on wind and flood insurance modeling concerns and providing testimony concerning flood, wind and earthquake mitigation. She was the past chair of the Monroe County Climate Advisory Board, and Board Member of Fair Insurance Rates of Monroe working to improve wind insurance modeling.

Case Study Speaker Bios

Case Study #1 Miami-Dade (*continued*)

Miami-Dade Water and Sewer Department

Enrique Vadiveloo, P.E., ENVSP
Senior Associate, Hazen and Sawyer

Enrique Vadiveloo P.E. ENVP is a Senior Associate at Hazen and Sawyer and has participated in a variety of sustainability, wastewater and water reuse projects in over 15 years with the firm. He is currently Miami-Dade's WASD Wastewater Senior Technical Consultant on the \$2.3B Ocean Outfall Program.

Case Study #2 City of Virginia Beach

C.J. Bodner, P.E.
Stormwater Technical Services Program Manager, City of Virginia Beach

Charles J. (C.J.) Bodnar, P.E. is a registered Virginia Professional Engineer and is the Stormwater Technical Services Program Manager for the City of Virginia Beach, Department of Public Works Stormwater Engineering Center. He graduated in 1990 from the Virginia Military Institute with a Bachelor of Science in Civil Engineering. C.J. worked as a land development consultant for over 20 years prior to joining the City of Virginia Beach in 2015.

Case Study #3 Boston Water and Sewer Commission

John Sullivan, P.E.
Chief Engineer of the Boston Water and Sewer Commission

John Sullivan is the Chief Engineer of the Boston Water and Sewer Commission. Mr. Sullivan has over 49 years of experience in water and wastewater engineering. He has a degree in Civil Engineering from the University of Massachusetts in Amherst, and an MBA from Northeastern University, as well as a Master's degree in Emergency Management from Massachusetts Maritime Academy. Mr. Sullivan is a Registered Professional Engineer in the Commonwealth of Massachusetts, and a Certified Operator of Drinking Water Supplies in the Commonwealth.

Mr. Sullivan has served on the Massachusetts Water Resources Authority Advisory Board since 2005, and currently serves as Commissioner on the New England Interstate Water Pollution Control Commission. He serves as chair to the Water Information Sharing and Analysis Center. Mr. Sullivan also serves on the Board of Directors for both the National Association of Clean Water Agencies and Association of Metropolitan Water Agencies.

Case Study Speaker Bios

Case Study #3 Boston Water and Sewer Commission (*continued*)

Charlie Jewell

Director of Planning, Boston Water and Sewer Commission

Mr. Jewell currently holds the position of Director of Planning and Sustainability at the Boston Water and Sewer Commission. He has over 31 years of experience directing and supporting public projects. Charlie earned a Bachelor of Science Degree from Texas State University in Urban and Regional Planning, a Master of Urban and Regional Planning from Texas A&M University and a Master of Business Administration from UMass Boston.

The Planning Department coordinates projects related to the Commission's CSO and Stormwater NPDES Permits, Discharge Permit with the MWRA and helps coordinate work for the Commission's Consent Decree with the EPA. The Planning Department also completed an Inundation Model to show the effects of significant storms in the City of Boston, completed a Stormwater Detention Project and is currently working on a Coastal Stormwater Discharge Analysis that will analyze the Commission ability to discharge stormwater during rain events that occur with the impact higher sea levels and storm surge events. The Commission is also working with other city agencies to address climate change issues.

Case Study #4 San Francisco

David Behar

Climate Program Director, San Francisco Public Utilities Commission

David Behar is Climate Program Director at the San Francisco Public Utilities Commission with a focus on adaptation practice, science translation, and collaboration building. The SFPUC, a department of the City and County of San Francisco, delivers drinking water to 2.7 million Bay Area residents, generates hydroelectric power, and manages wastewater and stormwater facilities in San Francisco. David co-founded the Water Utility Climate Alliance (WUCA) and served as first chair from 2007-11. In 2013-14 he chaired San Francisco's first Sea Level Rise Committee, which created "Guidance for Incorporating Sea Level Rise into Capital Planning," adopted as City policy in 2014 and updated in 2015 and 2020.

David currently co-chairs the Sea Level Rise Grand Challenge Committee of the World Climate Research Programme and chairs the Bay Area Climate Adaptation Network (BayCAN). Interior Secretary Sally Jewell appointed him co-chair of the Advisory Committee on Climate Change and Natural Resource Science, which recommended that USGS prioritize the development of actionable science in aiding land and ecosystem managers respond to climate change.

Appendix 3. Attendees

Name	Affiliation	Email
Abby Sullivan	Philadelphia Water Department	Abby.sullivan@phila.gov
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