



RHODE ISLAND BAYS, RIVERS, & WATERSHEDS COORDINATION TEAM

OUR FUTURE SHORELINE

SUMMARY OF BRWCT SPECIAL MEETING ON THE RI BEACH SPECIAL AREA MANAGEMENT PLAN

January 2014
Rhode Island State House

Introduction

Ames Colt, BRWCT Chair

Arguably the most serious impact of long-term climate change upon Rhode Island will be the rise of sea level by as much as three feet in the next 30-40 years. This will be an extraordinary, unprecedented increase in the rate of sea level rise compared to the previous 50 years. The sea will inundate our shorelines and coastal infrastructure, increase salinity levels in coastal groundwater (and some surface water) drinking supplies, alter how fresh and saltwater mix and flow through our salt ponds and embayments, flood our salt marshes, and significantly intensify storm damages wrought by nor'easters and hurricanes. While scientists cannot yet predict precisely how fast sea level will rise in the next 5-10 years, long-term projections for sea-level rise are highly credible and alarming. They demand our fullest attention.

We convened this special meeting of the Rhode Island Bays, Rivers, and Watersheds Coordination Team (BRWCT) to promote greater understanding and coordination of monitoring and management efforts being brought to bear on the future of our shorelines via the Rhode Island Shoreline Change Special Area Management Plan, aka the Beach SAMP. We reviewed and discussed the purpose and need for the RI Beach SAMP, and how other state agencies, local governments, and private interests are working in conjunction with the Beach SAMP to address current and anticipated changes to the Rhode Island shoreline. The presentations and discussion of this meeting are summarized below.

In April 2013, the RI Coastal Resources Management Council (CRMC), in partnership with the URI Coastal Resources Center, Rhode Island Sea Grant, the University of Rhode Island (URI), and others launched the Beach SAMP to advance scientific and technical understanding of shoreline erosion, storm surge inundation, and long-term sea level rise along Rhode Island's shorelines and waterfronts; and to utilize these new insights to plan for future impacts to public and private coastal properties, infrastructure, and public access. These planning goals reflect the mission of the BRWCT to conserve, restore, manage, and utilize Rhode Island fresh and marine waters through interagency coordination, strategic planning, monitoring, and evaluation. The BRWCT has provided \$150,000 to the RI Beach SAMP and has pledged to support over the long-run the development and implementation of the RI Beach SAMP by the CRMC.

Working together via the Beach SAMP, we will build a long-term policy and planning framework that will enable all of Rhode Island to prepare for the future of our shorelines.

Overview of the RI Beach SAMP Grover Fugate, RI Coastal Resources Management Council

Mr. Fugate opened his presentation by emphasizing that while the CRMC is ultimately responsible for the development and implementation of the RI Beach SAMP, the Beach SAMP is truly a partnership of government agencies, local communities, universities, and private interests. He noted that CRMC closely follows other shoreline erosion management and planning initiatives in the US and around the world, in order to incorporate relevant best management practices into the RI Beach SAMP. There will be plenty of lessons learned elsewhere: sea-level rise threatens the entire US coast, presenting significant economic risks to many coastal communities and regions. Each state and municipality will need to address the particular impacts of sea level rise upon their unique shorelines and coastal processes.

In terms of coastal hazard policies and regulations, Rhode Island is a national leader, but even we are insufficiently prepared to address future coastal hazards.

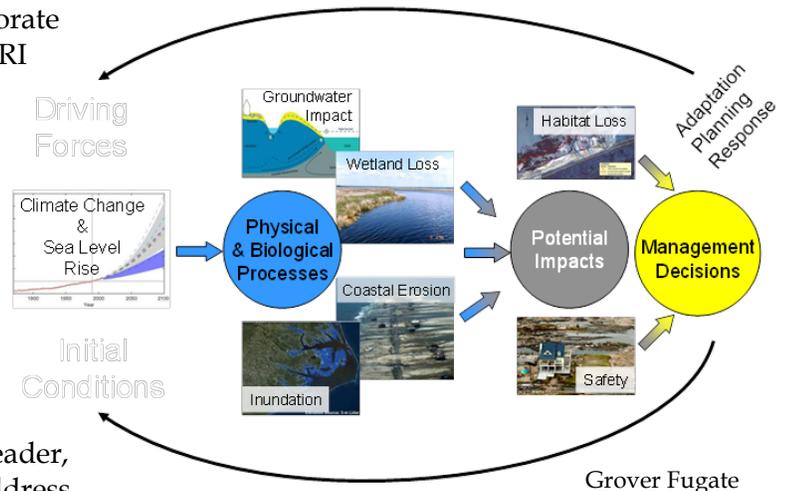
The RI Beach SAMP is assessing three major threats: sea level rise, storm surge, erosion, and combinations of all three. The RI Beach SAMP will help Rhode Island, local governments, and federal agencies determine the type and scope of these threats to public and private coastal infrastructure in Rhode Island, and then develop a suite of adaptation strategies to address these threats. Fugate emphasized that in developing the Beach SAMP, we must expand public awareness and appreciation for the emerging risks posed by sea-level rise, shoreline erosion and inundation, and storm surges.

Coastal climate change adaptation needs to reach beyond the “front row” of shoreline development. In other words, adaptation strategies have to be developed for entire coastal communities not just the properties and public infrastructures situated directly along the shoreline and waterfronts.

The legal ramifications of intensified shoreline erosion and inundation remain incompletely understood within local and state permitting processes. When development in high hazard areas is allowed to go forward, municipalities and state and federal governments incur long-term obligations to maintain public infrastructure and protect public health and safety. Thus, liabilities for damages due to storms and sea level rise may also be attached to the permitting authorities. Local property tax systems remain diametrically opposed to directing development away from vulnerable shorelines that still retain significant real estate value because people want to live and recreate on the shore regardless of the risks of doing so. And, as always, there are significant tensions between public and private rights with regard to developing and managing shorelines.

The consequences of not adequately preparing and planning for coastal change will be significant: massive changes and losses coastal real estate markets due to physical impacts and

Sea-level rise impacts: A multivariate problem with uncertainties everywhere



ballooning property insurance costs, erosion of local tax bases, damage and losses to coastal economies (responsible for up to 60% of US gross domestic product).

Mr. Fugate expressed concern that we still lack a “nuts and bolts” approach to climate change adaptation: that we have yet to galvanize around the goals of coastal climate change adaptation at a level necessary to drive major legal and land-use planning reforms, and rapid, large-scale engineering and technology development. What is urgently needed is greater appreciation of future economic costs of shoreline erosion and inundation. We have about 20-50 years to institute major changes to how we live and work along the shore. If we do not begin concerted preparations now, our adaptation choices will steadily diminish in number, feasibility, and affordability. The tools we need to adapt successfully do not exist today in a useful form. We urgently need innovation and big ideas that can be applied relatively rapidly at local, regional, and national scales. Therefore, the University of Rhode Island (URI) is working with CRMC to establish a URI Coastal Adaptation Innovation Center to develop and disseminate solutions across science, planning, engineering, policy, law, economics, and business development.

Mr. Fugate concluded by emphasizing how the Beach SAMP is conducting significant local education, outreach, and communication initiatives in order to help the general public understand and support the imperative of proactive coastal climate change adaptation. The Beach SAMP will also develop model planning tools and policies for municipalities and the state development. The completed Beach SAMP will produce a document that will guide CRMC’s decisions into the future, but also to help other state and federal agencies, municipalities, and the public and private sectors develop plans and solutions to the tremendous challenges we face on the shore in the coming decades.

A Municipal Perspective

Jon Reiner, Town of North Kingstown

Mr. Reiner introduced his presentation on his work as Town Planner for North Kingstown on coastal climate change adaptation by emphasizing that if Rhode Island municipalities don’t start now to proactively address shoreline erosion, sea-level rise, and increased storm surges, decisions are going to be made for them by property insurers, state and federal authorities, investors, and local residents. Mr. Reiner stated that a guiding principle for climate change adaptation is that future local development will need to be directed upland and away from coastal areas most vulnerable to storms and flooding. He acknowledged however metropolitan urban cores situated along exposed, low-lying shorelines such as the village of Wickford, downtown Newport, downtown Providence, and Westerly cannot simply be

Cascading Risks posed by SLR and Shoreline Erosion

- Massive losses in many coastal communities of key economic assets causing dislocations in local economies.
- Significant losses in job related tax dollars due to loss of key economic assets.
- Declining property values and municipal tax base as real estate markets react to increased property insurance costs and the realization of wide spread property losses.
- Municipalities in turn will be forced to seek to make up revenue in unaffected, currently less affluent areas.
- Financial losses in municipalities will transcend to state governments causing significant economic dislocations at the state and federal level.

abandoned. We need therefore to develop and implement in the coming years robust climate resiliency strategies for “staying in place” for these areas.

Mr. Reiner noted that in October 2012, Sandy generated a storm surge of about 4 feet, considerably less than flooding levels produced historically by major hurricanes. Yet the flooding and coastal disruptions generated in Wickford by Sandy were significant, providing us a glimpse of what future storms and hurricanes could do when coupled with increased sea-level.

Mr. Reiner reviewed how North Kingstown has worked since 2011 with CRMC, RI Sea Grant, the URI Coastal Resources Center, and the Department of Environmental Management on a pilot sea-level rise inundation and salt marsh migration modeling project. Phase I of the project produced detailed maps of the inundation levels and storm flooding in North Kingstown resulting from one, three, four, and five feet of sea level rise, with comparison of these inundation levels to storm surge levels generated by the hurricane of 1938. Phase II sought to engage North Kingstown residents, business owners, and government officials in formulating draft policies and practices that would protect vulnerable assets identified in Phase I, with Phase III entailing an update North Kingstown’s community comprehensive plan and further dialogues with local stakeholders to review local land use and transportation practices and infrastructure.

This project has entailed very challenging public engagement. For example, when the inundation maps were presented to the North Kingstown Planning Commission during Phase II, they inspired significant concerns regarding the consequences for tax revenues and property owners of updated floodplain maps and proposed climate adaptation zoning and policies. These concerns in turn generated greater scrutiny by the Planning Commission of the projections for intensified shoreline flooding and erosion in North Kingstown due to climate change and sea level rise.

The North Kingstown Planning Commission’s reactions reflect those of the general public, which still expresses a significant uncertainty about how climate change and sea level rise will impact their communities, shorelines, and waterfronts.

Mr. Reiner concluded his presentation by characterizing the tremendous challenge confronting local officials and boards regarding the institution of coastal climate change adaptation. They lack the expertise or time to absorb fully scientific findings regarding climate change, sea level rise, and the risks they pose, but are being briefed by numerous authoritative sources that the projected consequences are truly dire to the future well-being of their coastal communities. They and the general public require what may still be significant time and effort in order to come to understand and accept what climate change and sea level rise means for

Local Climate Change Adaptation Strategies

- **Regulatory** – zoning ordinance (height increases for floodplain management, etc.) and comprehensive plan amendments
- **Hazard Mitigation Plan** – incorporate and implement actions
- **Educate Locally** – distribute information to elected officials and homeowners
- **Incorporate into town GIS and IMS** – more accessible information
- **Community Rating System (CRS) impacts** – achieve lower rating
- **Transportation** – ID roads and infrastructure inundated
- **State of RI Transportation Improvement Program (TIP)** – incorporate into future TIP project applications
- **Capital Improvement Plan (municipal)** – infrastructure improvements (i.e. sewers, dams, roadways, water)
- **Building Code** – work with RIBA and CRMC to modify code in coastal zone
- **Open space acquisition** – ID/prioritize lands for protection, salt marsh creation

their communities and shorelines, and the difficult choices that they and state officials increasingly face.

A Business Community Perspective **Monica Staaf, RI Association of Realtors**

Ms. Staaf affirmed the comments by both Mr. Fugate and Mr. Reiner that public perception continues to be one of the most important challenges to seriously addressing climate change along our coasts. She emphasized a pragmatic approach: clear delineation of the problems that need to be addressed, and renewed efforts to convince the public and property owners that coastal climate change adaptation are just as important as the immediate, tangible issues they deal with daily.

Ms. Staaf represents the 4,000 members of the RI Association of Realtors, who include real estate brokers, sales people, and appraisers that list, sell, lease, and manage both commercial and residential real estate. As legal counsel to the Association, one of the services Ms. Staaf offers is a legal hotline that provides guidance and advice on real estate transactions. Ms. Staaf noted that in the thirteen years she has worked for the Realtors' Association, she has never received a call about sea-level rise or climate change. However, she has fielded many questions about flood insurance and flood insurance rates.

Ms. Staaf expressed concern that current communications efforts are not yet succeeding in convincing the public that sea level rise, shoreline erosion, and increased flooding need to be seriously addressed now. Climate change is often viewed as a diverse suite of intangible impacts or risks that may or may not happen in twenty years. How do you convince the public that climate change is as important address now as replacing a heating system or a roof? The future impacts of climate change are inevitably perceived and addressed as one of many risks or needs that commercial and residential property owners must grapple with simultaneously.

Ms. Staaf noted that businesses and the public seek certainty and predictability, but precise determinations of when and how quickly sea-level is going to rise are hard to come by. What is perceived widely is that new state and local regulations for coastal development intended to address coastal property vulnerabilities to climate change will increase property ownership costs. Therefore, Ms. Staaf encouraged greater scrutiny of how commercial and residential property owners perceive the risks of sea level rise, shoreline erosion and inundation risks, and how they perceive accordingly the value of proactive efforts to address and reduce them, particularly in relation to the everyday challenges of owning, managing, and protecting coastal properties and infrastructure.

How State Agencies Contribute to the Beach SAMP

RI Emergency Management Agency **Michelle Burnett**

Ms. Burnett reviewed how the RI Emergency Management Agency (RIEMA) is participating in development of the Beach SAMP. The mission of RIEMA is to "protect life and property in the event of a disaster or crises situation, through a program of mitigation, preparedness, response and recovery." RIEMA thus works to enhance emergency preparedness in Rhode Island. RIEMA acts as the primary conduit between the state and the Federal Emergency Management Agency (FEMA). RIEMA receives federal funds to be dedicated to pre- and post-disaster assistance, and hazard mitigation which are distributed to impacted coastal

regions and communities throughout Rhode Island. Rhode Island has been subject to four federal disaster declarations in the past four years, an unprecedented number for the state.

RIEMA maintains and updates the RI Hazard Mitigation Plan that is up for renewal in 2014. They have worked diligently with municipalities and stakeholders on the plan update. A draft update plan will be submitted to FEMA for initial review in early 2014. (*A copy of the draft plan update is available at the [RIEMA website, www.riema.ri.gov](http://www.riema.ri.gov) -Ed.*) FEMA approval for this plan is critical because if a disaster occurred in Rhode Island and it lacked an up-to-date FEMA-approved plan, the state would be ineligible for federal disaster assistance.

Ms. Burnett discussed how RIEMA assists in the development of municipal hazard mitigation plans by providing planning support and helping to characterize local risks and vulnerabilities. When local hazard mitigation plans are approved by FEMA, municipalities become eligible for federal hazard mitigation funds. Funded projects may include stormwater drainage upgrades, elevating or relocating a structure, and acquiring properties. Cities and towns are eligible to apply for funds to carry out projects that have been identified in their plans.

Finally, Ms. Burnett pointed out how RIEMA has partnered with the RI Association of Realtors to train nearly 1,000 realtors in 2013 on changes to the National Flood Insurance Program. RIEMA has also recently rolled out a flood plain mapping tool.

RI Statewide Planning

Amanda Martin

Ms. Martin reviewed several climate change adaptation projects currently underway at Statewide Planning, all of which benefit from and will contribute to the Beach SAMP. First, the Beach SAMP will improve sea level rise impact projections for Rhode Island's transportation infrastructure. Statewide Planning funded the modeling and policy development project in North Kingstown and will help North Kingstown incorporate sea level rise considerations into its comprehensive plan.

Every coastal community has transportation infrastructure that is vulnerable to sea-level rise. Beginning with the work for North Kingstown described previously, Ms. Martin described how Statewide Planning will rely upon projections for sea level rise, coastal erosion and storm surge produced by the Beach SAMP, to specify where and how coastal areas will be affected, and inventory the transportation infrastructure assets located in these vulnerable coastal areas. This information will in turn support better decisions regarding local public works and infrastructure reinvestment and management.

Ms. Martin noted that as Statewide Planning reviews and approves community comprehensive plans, it requires cities and towns to address natural hazards in their comprehensive plans. Statewide Planning is currently developing guidance to help municipalities do so. As Statewide Planning reviews comprehensive plans against state goals and policies, including CRMC policies and standards, the Beach SAMP will serve as a resource for cities and towns in updating local comprehensive plans to address shoreline change. Ms. Martin described how in the past year, she has worked with individual towns whose draft comprehensive plans don't adequately reflect CRMC policies and goals. It will be important to inform cities and towns proactively regarding new CRMC policies and standards that the Beach SAMP will engender.

Ms. Martin described a new Statewide Planning project to study the economic impacts of climate change, funded by EPA through their Smart Growth Implementation Assistance

Program. The project will examine how to manage impacts to jobs, businesses, and public and private investments in Rhode Island as sea-level rise continues. The first part of this project will assess potential economic impacts and the second part will develop strategies targeted at small business owners, cities and towns, and state agencies to help them build socio-economic resilience to coastal climate change.

Finally, Mr. Martin reviewed the ongoing project RhodeMap RI, a \$2 million (federally funded) effort to develop a statewide plan for sustainable development, generate an updated housing plan element of the State Guide Plan (SGP), a new SGP element for economic development, and make new recommendations to advance implementation of the SGP land use element, Land Use 2025. Specifically, RhodeMap RI is assembling and organizing a geospatial database that inventories Rhode Island's natural resources, historic and current land uses, water supplies, etc. This database will foster informed discussions regarding future development designs and locations.

RI Department of Environmental Management Bill Patenaude

Mr. Patenaude observed that the overall emphasis of the Beach SAMP is coastal climate change adaptation. He noted that his office, the Department of Environmental Management's Office of Water (DEM OWR), is aligning with the Beach SAMP by addressing climate change adaptation in two ways:

- **Proactive** climate change adaptation: advancing the use of new "green" construction and methods for stormwater and wastewater treatment, often termed "green infrastructure", which also generate positive economic impacts; this is an area that Director Coit has stressed.
- **"Mainstreaming"** climate change adaptation strategies into DEM OWR program activities. Mainstreaming infuses adaptive philosophies and technologies into current water resources, planning, management, and permitting, often in response to emergency events", such as the March 2010 floods. These floods resulted in the unprecedented inundation of important wastewater infrastructure such as the Warwick sewage treatment plant. Subsequent rebuilding of wastewater infrastructure around Rhode Island has incorporated climate change adaptive strategies and technologies when appropriate and possible.

Mr. Patenaude noted that as part of its response to the 2010 floods, DEM OWR is undertaking a comprehensive climate change risk assessment for wastewater infrastructure statewide (funded in part by the BRWCT) that will dovetail with the Rhode Island Department of Health's recently completed study of the risks posed to the state's water supply infrastructure. While the procurement processes for the wastewater infrastructure risk assessment has taken longer than expected (due in part to new sources of funding being added to those originally committed by the BRWCT) the extra time taken has resulted in better coordination with parallel climate change risk assessment and adaptation efforts underway at Statewide Planning, Department of Health, the Beach SAMP, and academia.

Mr. Patenaude noted that DEM OWR will coordinate its climate change adaptation efforts with local community leaders and individual wastewater treatment facility superintendents and staff in order to guide them in making informed decisions about how to

invest wisely in climate change adaptation for their wastewater treatment facilities. As part of this ongoing coordination with local sewer authorities, DEM OWR will work with the Beach SAMP, which has many of the same goals as DEM's planned wastewater climate change vulnerability assessments.

RI Department of Transportation
Melissa Long

Ms. Long stated that the RI Department of Transportation (RIDOT) recognizes that shoreline changes and sea-level rise will significantly impact transportation infrastructure, and supports the development of the Beach SAMP to proactively address these impacts. The consequences of not responding proactively in a timely manner to sea-level rise, shoreline erosion, and increased storm surges could drastically affect the way people travel in Rhode Island. The current projections of 3-5 foot rise in sea-level by 2100 will result in many state roadways being inundated, including portions of high volume roadways such as Interstate 95. Among the many challenges such a rise in sea-level will produce is hampering or preventing emergency response to coastal areas that need relief and evacuation during storm events.

RIDOT believes the Beach SAMP presents a great opportunity to revise state standards for transportation engineering and design in order to incorporate climate change adaptation policies and standards. RIDOT Director Lewis has emphasized the need to invest more money in transportation infrastructure, but also the importance of investing transportation funds in a manner that enhances climate change resilience. The Beach SAMP is one means to ensure wiser investments in transportation infrastructure as it will help us make wiser choices about how, where, and when to rebuild Rhode Island's transportation infrastructure.

Open Discussion

How we can improve public communications regarding sea level rise and shoreline erosion in light of scientific uncertainties regarding the long-term rate of sea level rise.

Mr. Fugate responded that reducing such uncertainties is going to be difficult because shorelines are extremely dynamic systems and efforts to develop accurate models of global sea level rise are hindered by the high rates of change being observed in the global ocean and the cryosphere. Hence, existing sea level rise models likely underestimate what is actually occurring. What we are forced to work with is a wide range of estimates for future sea level rise that will nevertheless become more precise in the next 5-10 years. Currently, the latest sea level rise projections from NOAA for the US Atlantic coast by 2050 are as high as 3 to 5 feet, but details on how those projections are being arrived at are not generally available. The best current estimate for the Rhode Island shoreline is a couple of feet of sea-level rise by 2050.

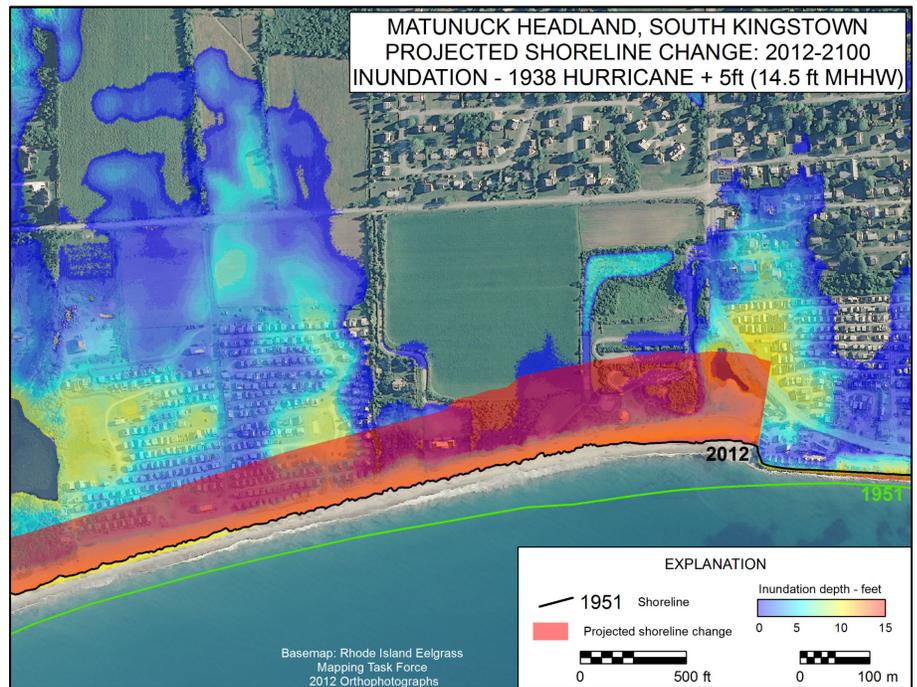
Could Director Fugate provide additional details on the proposed URI Climate Change Adaptation Center?

Mr. Fugate stated that the mission and function of the Center is currently being discussed with URI officials and additional details on the Center proposal will be forthcoming. It is logical to have URI establish such a Center that will provide government and the public critical information and outreach services related to climate change adaptation. Universities are

well-suited to gathering such information and to provide training and guidance via outreach. CRMC is primarily a regulatory entity and thus often viewed as a less credible source of for such information and support than a University-based program.

With regard to public infrastructure, water, transportation, or energy, situated on the coast, to what extent are state and local agencies considering abandonment of existing public infrastructure and foregoing the construction of new public infrastructure in order to avoid creating obligations to pay for new infrastructure and/or rebuilding existing infrastructure that is no longer viable due to sea level rise?

Mr. Fugate replied that the need to make such decisions in the future is reflected in President Obama's recent Executive Order addressing how the US needs to prepare for climate issues. This is significant because the federal government has a lot to say about how state and local governments manage their coasts. These kinds of decision have to be considered on a long time-scale. Whether to maintain or abandon public infrastructure are decisions that will play out over many decades.



Ms. Burnett noted that local hazard mitigation plans must specify hazard mitigation actions and foregoing the construction or repair of public infrastructures certainly should be considered as a possible hazard mitigation action, especially on a long-term basis. Such mitigation actions will need to consider carefully alternative infrastructures and local hazard profiles.

What short-term, pragmatic coastal climate change adaptation strategies should we undertake now?

Mr. Fugate answered that immediate, short term adaptations strategies are being discussed now at the local and state level. The North Kingstown sea level rise and inundation mapping project addressed policy options and allowing property owners to increase property elevations 2-3 feet. If you build above three feet your flood insurance rates drop dramatically and such elevated structures have more resistance in the storm events occurring now. Increasing property elevations is one strategy we actively consider now, but in the coming years there will have to a continual stream of new ideas and strategies that will have to be proposed and implemented.