

# AQUIDNECK ISLAND RESILIENCE STRATEGY

A SUMMARY

COASTAL RESOURCES CENTER  
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## **AQUIDNECK ISLAND RESILIENCE STRATEGY SUMMARY · 2017**

*Written by Christopher Condit and Pamela Rubinoff and published by the University of Rhode Island Coastal Resources Center and Rhode Island Sea Grant, located at the URI Graduate School of Oceanography, in collaboration with the Aquidneck Island Planning Commission, with support from the Prince Charitable Trusts, the van Beuren Charitable Foundation, and Rhode Island Sea Grant*

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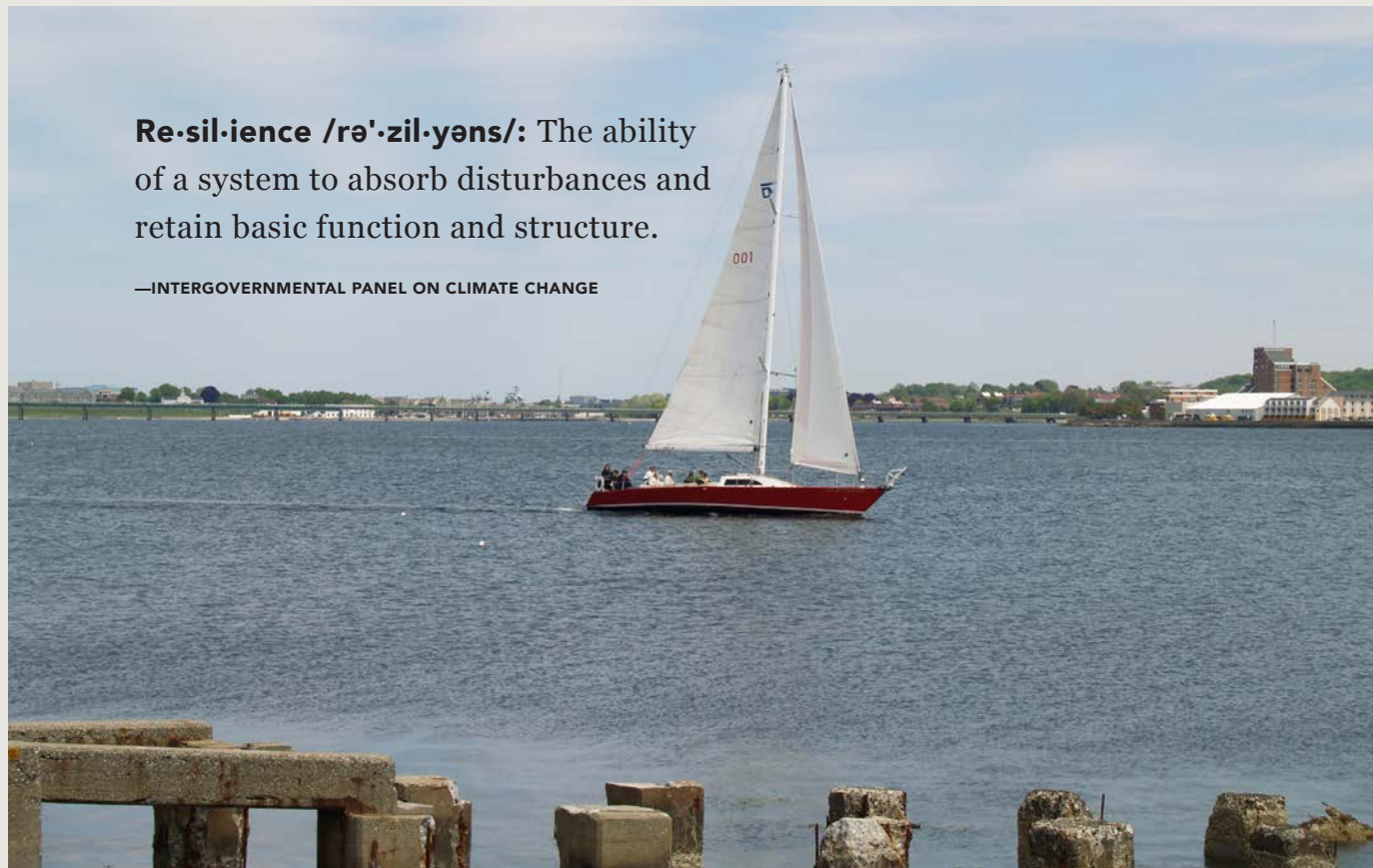
NOTE: This study focused on issues related to regional community resilience identified during interviews and discussions with Aquidneck Island stakeholders. The authors acknowledge that there are many other themes and issues that pertain to the topic of community resilience including public utilities, drinking water resources, natural resources and conservation land, etc. Due to the extremely wide range of topics that the term “resilience” could pertain to, this strategy was written with a focus on areas of concern that were repeatedly identified by stakeholders and that could be addressed by the researchers adequately given their access to data and subject matter expertise. It is recommended that future research efforts consider either going deeper into the subjects covered in this study, or address the subject areas not investigated by the project team.



# INTRODUCTION

**Re·sil·ience /rə'zil·yəns/:** The ability of a system to absorb disturbances and retain basic function and structure.

—INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE



**L**ike other coastal communities in Rhode Island and beyond, Aquidneck Island faces the challenges of coastal hazards. Floods caused by strong storms, periodic extreme tides, and daily high tides are gradually increasing with sea level rise, which will be exacerbated with changing climate. Being an island, Aquidneck faces challenges in remaining self-sufficient should storm events curtail access to the mainland.

Recognizing this, the Aquidneck Island communities of Newport, Middletown, and Portsmouth are taking action to adapt to these changes and to strengthen their individual and collective abilities to prepare the island to anticipate the increasing impacts – to be more resilient.

The Aquidneck Island Resilience Strategy, created in collaboration with municipal and regional leaders, highlights key issues and provides science- and citizen-informed recommendations. The strategy builds on municipal strengths and proposes island-wide actions as a way forward for community-based resiliency planning on the island. It recommends practical steps in four key areas: Emergency Response and Preparedness, Transportation, Island Economy, and Residential Flooding. For this effort, government, private sector, community and academic interests can work in concert, building on a variety of projects to engage the island in adaptation and resiliency planning, and continuing partnerships that have fostered ecosystem-based coastal management on Aquidneck for almost two decades.

This summary highlights key findings, issues and recommended actions in the strategy's four topic areas; it is a tool for resiliency implementation as the island moves ahead with a collaborative effort to start putting regional practices and programs in place. For more on the strategy, visit [www.crc.uri.edu/projects\\_page/aquidneck-island-resilience-strategy/](http://www.crc.uri.edu/projects_page/aquidneck-island-resilience-strategy/).

# EMERGENCY RESPONSE AND PREPAREDNESS



Flooding can cut off access to low-lying neighborhoods on Aquidneck Island, where emergency response could be compromised. Photo courtesy of the Middletown Fire Department

**I**n planning for hazards such as strong storms, Aquidneck Island faces the possibility of being physically isolated from the mainland, should bridge access be compromised. This, coupled with the safety needs of disadvantaged residents, as well as tourists, adds complexity to the island's resiliency story. Yet, the island also enjoys a strong degree of regional collaboration among its first responders—including its fire, police, and public works departments—so opportunities to build on this cooperative work are being explored.





Participants on a walking tour of flood risks in Newport learn about the vulnerability of this fire house, which is in a flood zone. Photo by Monica Allard Cox

#### CONCERNS:

- Aquidneck Island is exceptionally vulnerable during significant wind-driven events when bridges are closed, limiting both evacuation and statewide support.
- The island has a high percentage of vulnerable populations, including economically disadvantaged, often elderly, residents who depend on emergency shelters and other services for basic needs during major storms, including food and heat. Additionally, there is a significant tourist segment combined with off-island commuters who add to population variation and preparedness challenges.
- Flooding and downed trees during storms hamper emergency responders' abilities to keep access routes open. These obstructions cost first responders time, require public funds for removal or mitigation, and severely affect communication lines as well.

#### RECOMMENDATIONS:

- Engage municipal and island partners in dialogue with state and regional entities (such as the Aquidneck Island Planning Commission) to ascertain the potential for dedicated resources targeting hazard mitigation and resiliency activities. This may include coordinating actions within hazard mitigation and comprehensive

plans, promoting Community Rating System related activities, or providing island-wide outreach on adaptation.

- Assess the municipalities' needs for resiliency training of officials, citizens, and businesses. Identify how partners can support this effort with financial or in-kind resources.
- Engage local and state government staff with businesses to determine if, on top of existing collaborations, there are new public-private opportunities to collaborate on preparedness, such as identifying accessible areas (e.g., parking lots) that could serve as food and water distribution sites during emergencies.
- Build existing volunteer emergency response capacity with a funded position to assist Aquidneck Island Emergency Volunteer Alliance (AIEVA) shelter manager with the organization's administration and planning.
- Explore funding opportunities, including pooling resources, to support regional emergency preparedness planning and staffing on the island.
- Weigh the costs and benefits of establishing dedicated separate emergency management positions in Newport and Middletown (similar to Portsmouth) in an effort to increase preparedness planning and leverage, rather than strain, police and fire department resources.

# TRANSPORTATION



DAVID MARSH VIA CREATIVE COMMONS

In the short term, flooding can necessitate road closures; in the long term, increased flooding can strain roads and other transportation infrastructure.

Preparing a community to withstand the impacts of storms and sea level rise involves taking stock of transportation—understanding how key infrastructure, such as roads and bridges, is vulnerable to flooding and erosion—and planning now to ensure people’s safety, whether emergencies require them to reach home or evacuate. Like other coastal communities, Aquidneck Island faces key resiliency challenges when it comes to transportation: congested roads, degraded roads and bridges, increasing costs to maintain this infrastructure, and the existing or projected loss of parts of evacuation routes to encroaching water, from extreme tides, storms and sea level rise. These challenges, along with the possibility of bridge closures cutting Aquidneck Island off from the rest of Rhode Island during a storm event, are drivers encouraging island communities to explore regional opportunities to leverage resources together to bring a resiliency focus to transportation planning.



**CONCERNS:**

- Certain roadways on the island are already demonstrating the impacts of flooding or erosion, and these impacts are likely to increase.
- Strong storms can prompt bridge closures and leave the island cut off from the mainland, necessitating proactive, island-wide planning for self-sufficiency during emergency events.
- Road maintenance often requires cooperation between government layers, as well as with the private sector, complicating efforts to repair or improve infrastructure.
- Island roads are increasingly congested and stressed from traffic volume, especially during tourist season.
- As storms intensity increases, as scientific modeling and research indicates, resulting flood waters will add strain to bridge foundations and roads.
- Economic impacts to businesses, large and small, occur when access is compromised by flooded and/or disrupted roadways.

**RECOMMENDATIONS:**

- Work with island leaders to regularly convene municipal planners, engineers, public works representatives, and state representatives, as appropriate, to discuss island-wide transportation issues, opportunities, and actions to manage storm impacts.
- Engage and collaborate among island municipalities in the Rhode Island State Transportation Improvement Program (STIP) planning process, prioritizing projects that focus on regionally important infrastructure and that can build island-wide resiliency.
- Analyze commuting patterns of major island employers, including Naval Station Newport, to better understand resiliency-based transportation challenges and opportunities.
- Encourage the public and private sectors to continue community dialogue about diversifying transportation modes to help reduce stress on infrastructure.
- Continue to increase public awareness of the opportunities to incorporate resiliency policy and practice into short- and long-term transportation planning on the island.

Closure of the Newport Bridge during a storm cuts the island off from the rest of Rhode Island at a time when supplies or supplemental emergency response may be needed. Photo by Meredith Haas



# ISLAND ECONOMY



Much of Aquidneck Island's tourism economy is vulnerable to storms and sea level rise. Photo by Monica Allard Cox

**A**quidneck Island hosts an internationally important tourism economy, a military presence via Naval Station Newport, a vibrant maritime trades industry, and other critical business sectors. Businesses located on the coast are more likely to be impacted by flooding or erosion associated with strong storms or sea level rise; however, these risks can impact the economy across the island. While the business community is increasingly interested in learning how to take steps to protect workplaces from flood damage, there is also effort between the public and private sectors to identify opportunities to collaborate on resiliency planning and to better stabilize the economy during and after storms and other emergencies.





Naval Station Newport, in Middletown, is part of the island economy that will be impacted by—and can help plan for—the impacts of climate change on the island. Photo courtesy of the U.S. Naval War College

## CONCERNS:

- Flooding from storms and sea level rise increasingly threatens coastal businesses and roadways on the island. More work is needed to engage the private sector in activities to protect themselves as well as be able to remain open to serve the island during and after an emergency.
- A solid foundation for emergency communication exists within the island business community, but more needs to be done to leverage partnerships with the government and community sectors and ultimately protect the economy during emergencies.
- Commuting patterns for residents and workers demonstrate that the island economy is truly regional, and because of that, environmental hazards in one area have cascading impacts on the entire island's economic activity.

## RECOMMENDATIONS:

- Evaluate options for Island Coordinated Business Response. Identify a program where regional entities (such as the Aquidneck Island Planning Commission, Newport County Chamber of Commerce, and/or Discover Newport) can partner to facilitate coordinated preparation and response planning for the island's business community, and then can serve as the communications liaison for the community both during and after events.
- Provide the island business community with learning opportunities focused on building understanding of resiliency science and practice, strengthening ties both among businesses and with the government and community sectors, and fostering commitment to explore opportunities for regional resiliency activities.
- Connect municipal emergency management officials and public works departments with businesses that perform functions critical to disaster recovery and businesses with assets that can assist with immediate response (equipment, large parking lots, storage capacity etc.)
- Build collaboration between government and business to develop a publically accessible map that identifies and reports the real-time status of companies that provide critical supplies and services to residents during emergency events.
- Engage the business community in dialogue about resiliency topics such as the financial impacts and economic risks of storm scenarios and sea level rise, and the process of determining when and how to relocate a threatened business.
- Provide the business community with information about opportunities to engage in continuity or preparedness planning to reduce loss and down time after natural disasters.
- Encourage the business community to envision and discuss change—to consider what is lost or gained by changing location, and how can other assets, such as potential shoreline access sites, become part of the dialogue?

# RESIDENTIAL FLOODING



The Island Park neighborhood in Portsmouth is vulnerable to storm surge and sea level rise. Photo courtesy of Rhode Island Sea Grant

**M**any island residents live outside of areas prone to coastal flooding or sea level rise. Still, some neighborhoods are at risk—the Point neighborhood, the downtown area, and Fifth Ward in Newport, the Atlantic Beach District and Naval Station Newport in Middletown, and the Melville area, Island Park, and Common Fence Point neighborhoods in Portsmouth. While already affected periodically today, these places will be at increased risk from storm surge and sea level rise over the next decades. Residents are learning about the changes and are facing complex questions: How best to weigh the benefits and costs of insurance and home improvement programs? What is the extent to which community dialogue is shaping how today's coastal neighborhoods will appear to, and function for, tomorrow's generations? What are the potential adaptation options appropriate for my home or neighborhood? Aquidneck Island residents and officials alike increasingly acknowledge these challenges, while familiarizing themselves with new tools and forms of assistance to help them make informed choices about their homes and well-being.



## CONCERNS:

- Low-lying areas are already flooding regularly, especially during extreme high tides.
- Historic preservation and coastal adaptation policies do not always mesh well, and this makes it difficult for homeowners to achieve both.
- Residents have concerns surrounding flood insurance—it's increasingly expensive and complex, and the federal context regarding government subsidies is uncertain.
- Tidal flooding is often exacerbated by intense rainfall and/or aging drainage infrastructure.

## RECOMMENDATIONS:

- Engage government, private sector and community groups in collaborative resiliency efforts island-wide, by developing programs (through grants, loans, or partnerships) for mitigation activities, including the creation of

residential rain gardens or elevating utilities above flood levels.

- Enhance efforts throughout the island's watersheds to reduce runoff; leverage initiatives such as Island Waters partnership on green infrastructure installations and open space preservation with the Aquidneck Land Trust.
- Initiate sharing of actions and lessons learned from Newport's and Middletown's experiences with the Community Rating System (CRS) program and assess opportunities for island-wide or regional replication and coordination.
- Assess municipal hazard mitigation plans for priority actions to reduce risk to residential neighborhoods.
- Work with social service providers and the local governments to incorporate data about vulnerable populations in hazard mitigation plans and enhance policy to protect the community during flooding events and other emergencies.
- Target resiliency education efforts to specific audiences—property owners and renters, community and neighborhood associations, and surveyors and builders—to raise awareness about the science behind and adaptation issues surrounding resiliency for residential neighborhoods.



Protecting historic residential areas, such as Newport's Point neighborhood, from flooding can have an added layer of difficulty. Photos by Monica Allard Cox



# MOVING FORWARD



**T**he Aquidneck Island Resilience Strategy’s function is three-fold: First, to share what leaders and key community stakeholders see as their most significant concerns as well as what they are doing already. Second, to inform the people in the island community of the current and future coastal environmental threats, and third, to provide them with recommendations to promote their ability to deal with these disturbances while maintaining their community systems’ many different functions. Beyond the specific recommendations included in the strategy, it is strongly recommended that the practice of seeking out opportunities to work together at the municipal level be continued and expanded.

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Organizations like the Aquidneck Island Planning Commission and the Newport County Chamber of Commerce demonstrate the value in working as an island-wide team. They serve as institutions that build networks, facilitate communication, and support the various groups making up Aquidneck Island’s diverse community.

Ultimately, when dealing with the myriad of coastal hazards that fall under the themes of Emergency Preparedness, Transportation, Island Economy, and Residential Flooding, it is the recommendation of this strategy that planners and responders first consider two questions as they approach a problem: “How will coastal environmental threats impact our plans today and in the future?” and, “How can we leverage resources island-wide to solve this problem?” In doing so, the resilience of the Aquidneck Island region will be maintained and enhanced as the island moves forward. The following pages provide maps and data gathered and developed as part of this project that may aid decision makers in identifying vulnerable areas and prioritizing implementation actions.

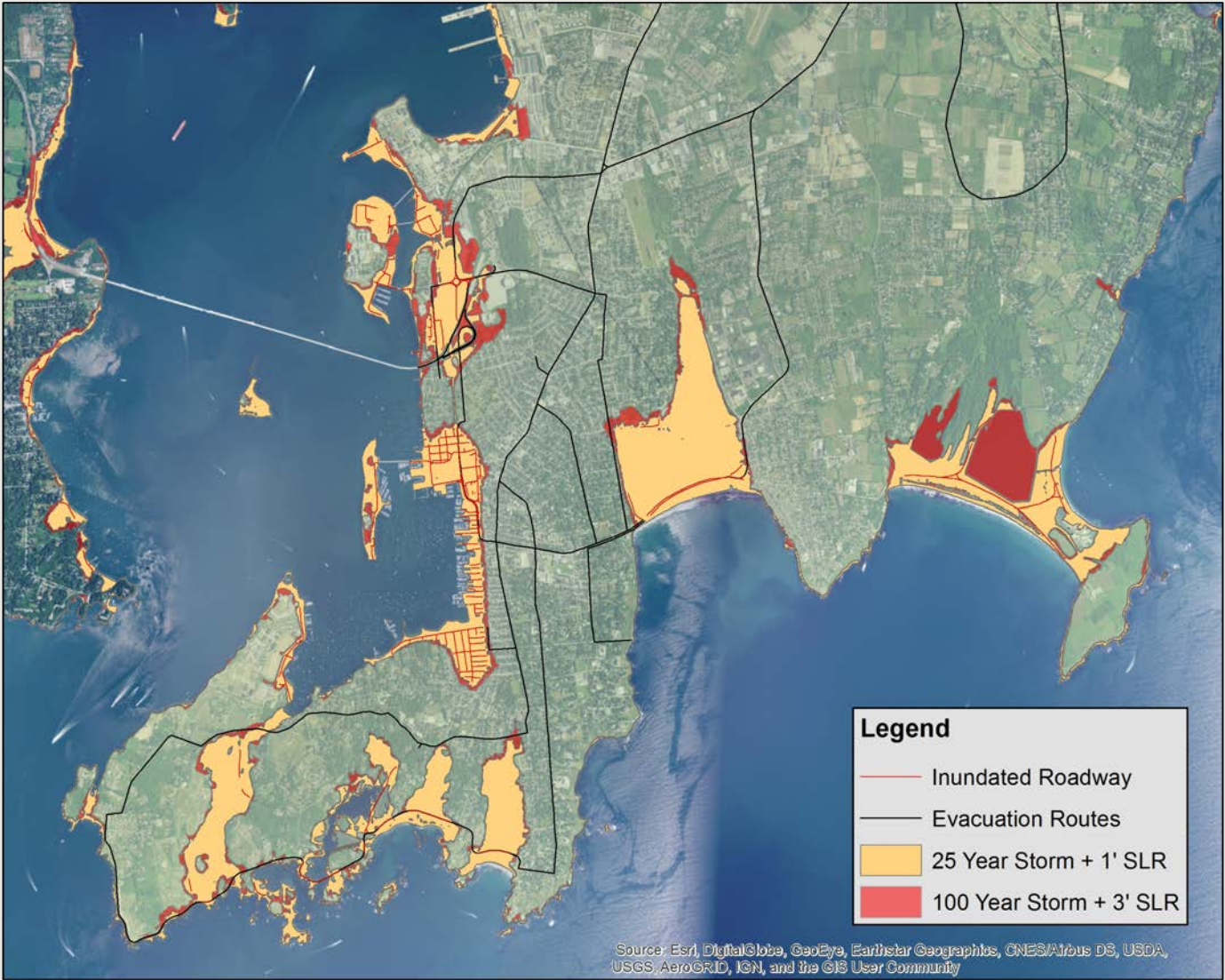


## COASTAL INUNDATION IMPACTS: NORTHERN AQUIDNECK ISLAND





COASTAL INUNDATION IMPACTS: SOUTHERN AQUIDNECK ISLAND



Maps courtesy of the Rhode Island Environmental Data Center

MILES OF COASTAL EVACUATION ROUTES EXPOSED

LOCATION	TOTAL MILES OF EVACUATION ROUTES	25-YEAR STORM +1' SEA LEVEL RISE	100-YEAR STORM +3' SEA LEVEL RISE
Middletown	2.7	0.01	0.01
Newport	2.6	1.3	1.4
Portsmouth	3.8	1.0	1.12
Island-wide	9.1	2.3	2.5

This graph shows the total miles of evacuation routes on Aquidneck Island, and how many miles of those routes would be exposed to flooding in the event of a 25-year storm with 1 foot of sea level rise, and in a 100-year storm with 3 feet of sea level rise.

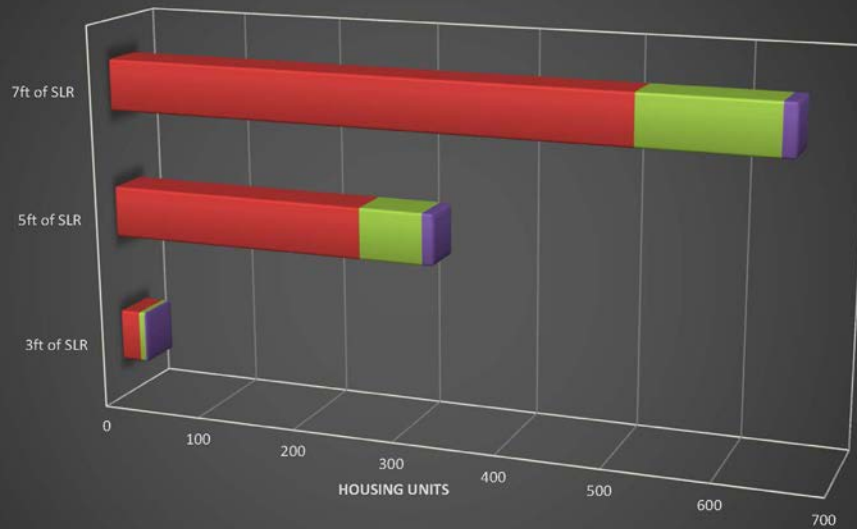
MILES OF ROAD EXPOSED ON AQUIDNECK ISLAND

LOCATION	3' SEA LEVEL RISE	100-YEAR STORM +3' SEA LEVEL RISE
Middletown	0.60	6
Newport	2.17	33
Portsmouth	1.62	30
Island-wide	4.39	69

This graph shows the total miles of road that would be exposed to flooding on Aquidneck Island with 3 feet of sea level rise and during a 100-year storm with 3 feet of sea level rise.

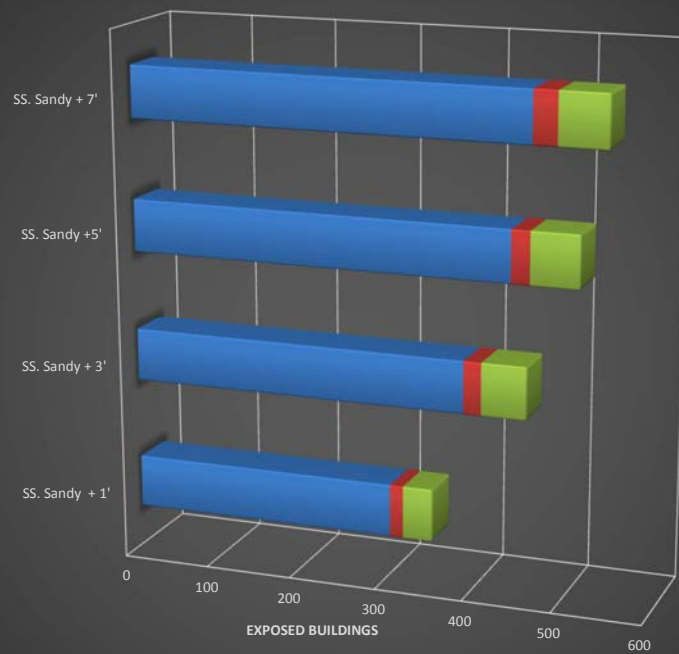


### Sea Level Rise Impact by Housing Type



	3ft of SLR	5ft of SLR	7ft of SLR
Single Family Units	19	255	515
Multi-family Units	6	62	129
Mobile Home Units	2	11	13

### Combined Effects of Sea Level Rise and Storm Surge on Commercial Buildings



	SS. Sandy + 1'	SS. Sandy + 3'	SS. Sandy + 5'	SS. Sandy + 7'
Newport	302	386	438	460
Middletown	15	20	21	27
Portsmouth	34	51	55	56

In Newport, over 50 percent of the city's parcels lie within or touch the floodplain, which represents a total value of \$3.8 billion. Data from Rhode Island Statewide Planning



*The Aquidneck Island Resilience Strategy was facilitated by the University of Rhode Island Coastal Resources Center and Rhode Island Sea Grant, located at the URI Graduate School of Oceanography, in collaboration with the Aquidneck Island Planning Commission. This effort is supported by the Prince Charitable Trusts, the van Beuren Charitable Foundation, and Rhode Island Sea Grant.*