

Coastal Vulnerability Assessment and Getting to Resilience: Ocean Gate, NJ

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Prepared by the Environmental Analysis and Communications Group, Rutgers University,
for the Borough of Ocean Gate

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I. Introduction

This project was funded by the National Fish and Wildlife Foundation in support of the New Jersey Department of Environmental Protection, Coastal Zone Management Program.

As stated in the 2011 NJDEP document *New Jersey's Coastal Vulnerability Assessment and Mapping Protocol*, vulnerability is defined as the degree of exposure and inability of a human or natural system to cope with the effects of a natural hazard, including changing variability and extremes in weather and climate. By assessing vulnerabilities, communities can plan for future exposures and develop strategies for mitigating long-term risk; making communities more resilient.

This report assesses community vulnerability to sea level rise projected for the year 2050 along with a category 1 coastal storm surge.

The sea level rise projection data used is taken from the publication *A geological perspective on sea-level rise and its impacts along the U.S. mid-Atlantic coast* (Miller et al, 2013). This publication calls for a central projection of 1.5 feet of sea level rise along the shore in 2050.

Category 1 storm surge data was mapped using the Sea, Lake, and Overland Surge from Hurricanes (SLOSH) data developed by the National Weather Service/NOAA to estimate storm surge heights resulting from historical, hypothetical, or predicted hurricanes, taking into account the atmospheric pressure, size, forward speed, and track data of storms. According to the National Hurricane Center, Category 1 storm characteristics include:

- Sustained winds of 74-95 mph
- Well-constructed frame homes could have damage to roof, shingles, vinyl siding and gutters.
- Large branches of trees will snap and shallow rooted trees may be toppled.
- Extensive damage to power lines and poles likely will result in power outages that could last a few to several days.

II. Community Profile

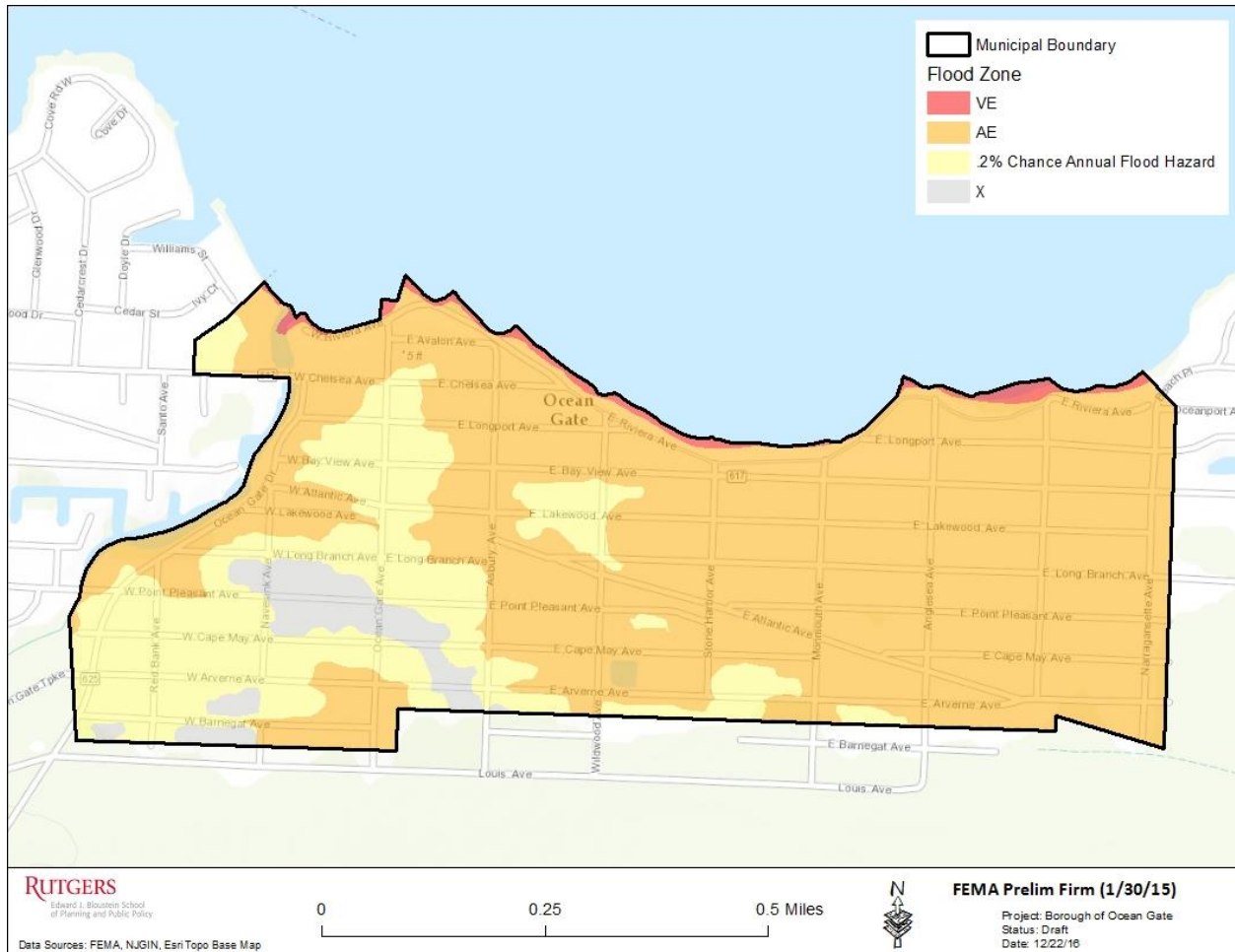
Ocean Gate Borough is an Ocean County community located along the Toms River. In total, the Borough has just over 1 mile of shoreline making up its northern border.

According to the 2015 American Community Survey 5-Year population Estimates, the population of Ocean Gate was 2,105, making it the 22nd most populated of 33 municipalities in Ocean County. The Borough is a total of .45 square miles of land with a median household income of \$41,067 and median age of 37 years. The largest racial group in the Borough is White at 95.18%.

Map 1: Borough of Ocean Gate, Ocean County – NJ

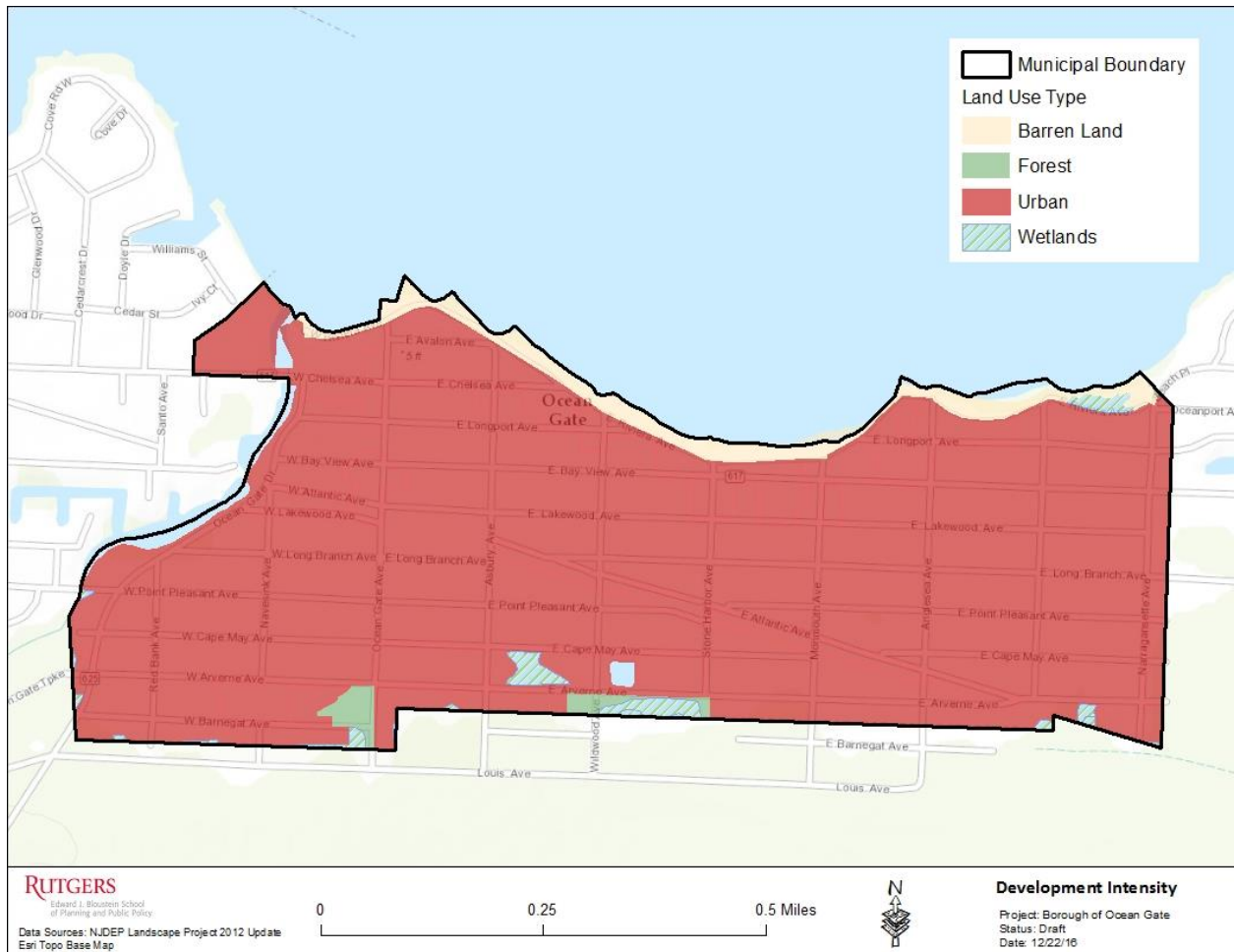


Map 2: FEMA Flood Zones



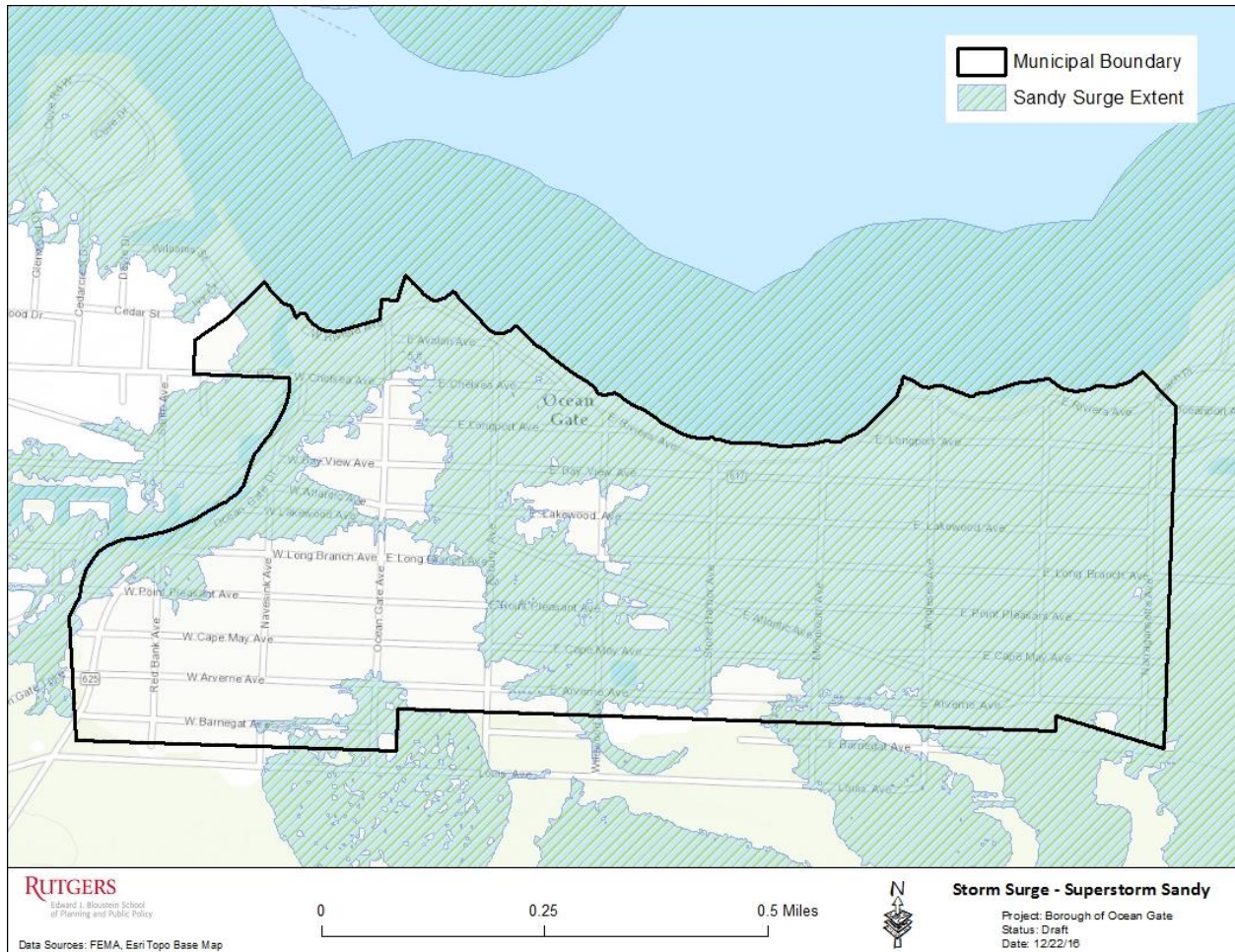
FEMA has designated the majority of land in Ocean Gate as Zone AE. These areas are subject to inundation by the 1% annual-chance flood event, Base Flood Elevations (BFEs) are shown, and mandatory flood insurance purchase requirements and floodplain management standards apply. The Borough's coastline is located in Zone VE, or coastal areas with a 1% or greater chance of flooding and an additional hazard associated with storm waves. These areas have a 26% chance of flooding over the life of a 30 year mortgage. Base flood elevations derived from detailed analyses are shown at selected intervals within these zones.

Map 3: Land Use



The land use type in Ocean Gate consists almost entirely of urban development, including along the waterfront. In Ocean Gate, this is made up of mainly small lot residential.

Map 4: Storm Surge: Superstorm Sandy



FEMA modeling shows storm surge from Superstorm Sandy to have inundated a large portion of the Borough.

III. CVA Methodology

Prior to the first meeting, staff at Rutgers University mapped initial assets to create draft mapping in preparation of the CVA meeting with municipal officials. The CVA meeting was held on January 4th at town hall. Municipal personnel in attendance to assist in identifying critical assets and finalizing mapping included:

- Paul Butow, Construction
- Pam Hilla, Remington Vernick, Municipal Engineer
- Paul Kennedy, Mayor

When a CVA is completed, community assets from four general areas are indexed in a matrix and then used to support the development of the mapping, these areas include:

- Community Resources
- Critical Infrastructure and Facilities
- Natural Resources

- Vulnerable Sites and Populations.

After deliberation, Ocean Gate’s final list of assets consisted of the 12 asset locations.

Map 5: Vulnerable Assets with Sea Level Rise for 2050 and Category 1 Storm Surge



After identifying the assets, depth projections were mapped and listed using combined data provided by the New Jersey Department of Protection for the storm surge from a category 1 storm coupled with sea level rise projected for the year 2050.

Table 1. Vulnerable Assets and Depth Projections

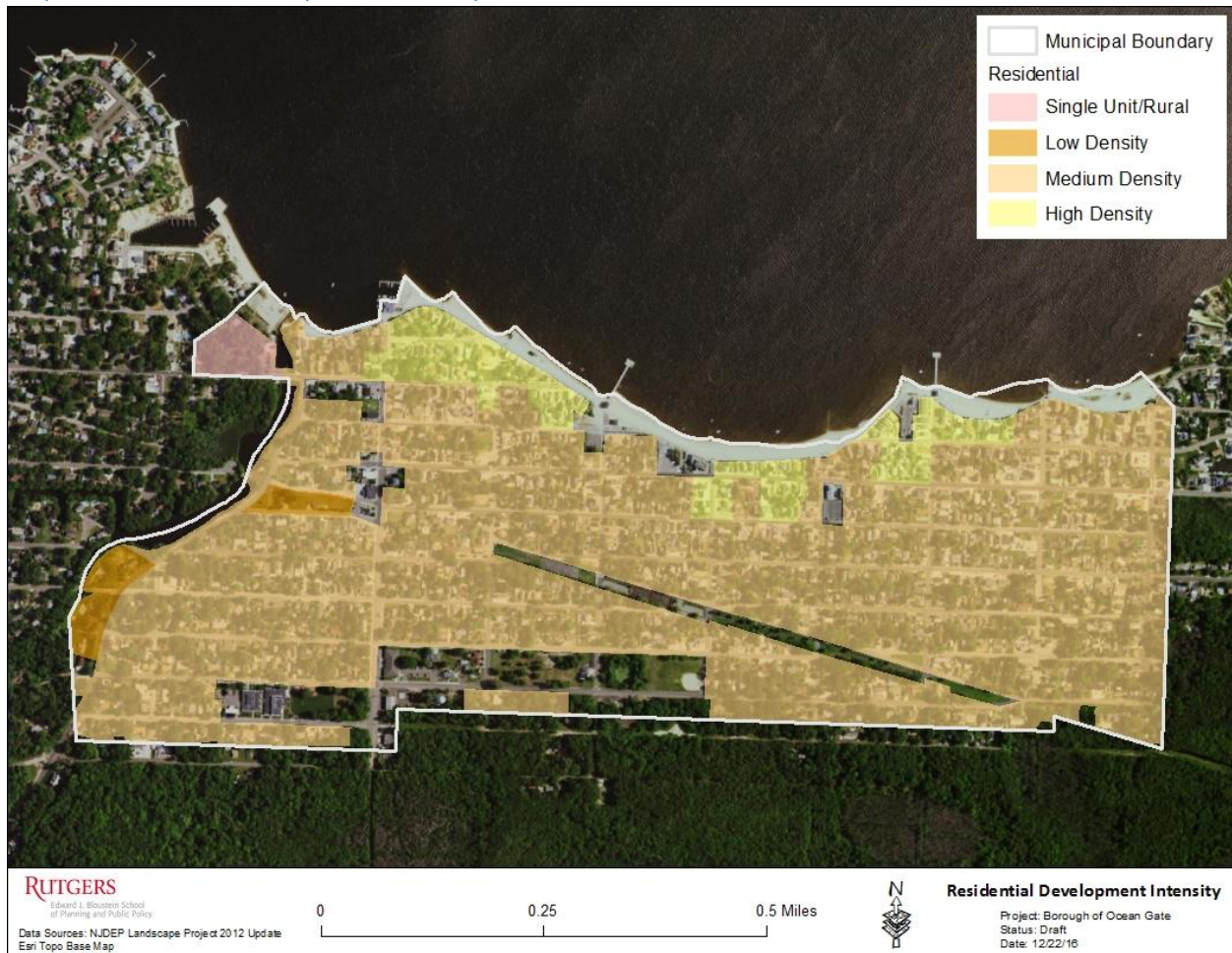
Asset #	Name	Projected Depth (Ft.)
1	Ball Field Beach	>1 around field
2	Bathroom/Office	1 to 2
3	Beach Pavilion East	3 to 5
4	Beach Pavilion West	3 to 5
5	EMS	2
6	EMS Wildwood Ave	>1 around building
7	Jay Marles Park	0 to 1

	Municipal Pump	
8	Station	2 to 3
9	Ocean Gate Beach	3 to 4
10	Splash Pad	1 to 2
11	Yacht Club	2 to 4
12	Boardwalk	1 to 4 throughout

IV. Findings and Recommendations

During the project meeting and throughout discussions with municipal officials, the waterfront stood out as the most critical asset to the City due to its recreational value, but also because the level of protection that it offers to the adjacent homes.

Map 6: Residential Development Intensity



As shown in Map #6, Ocean Gate’s most dense development is seen in small lot, high density residential along the waterfront.

Past mitigation efforts to shore up the coast in the Borough have consisted of beach replenishment and geotubes. Borough officials stated that the post-Sandy replenishment projects

were quickly washed away and that the beachfront area west of the yacht club along West Riviera Ave. has seen significant erosion.

To protect the waterfront homes and maintain the beach, the Borough is interested in a constructed sea wall along the entire length of the waterfront, topped with vegetated dunes built up with what can be locally dredged, instead of importing fill from outside of the area.

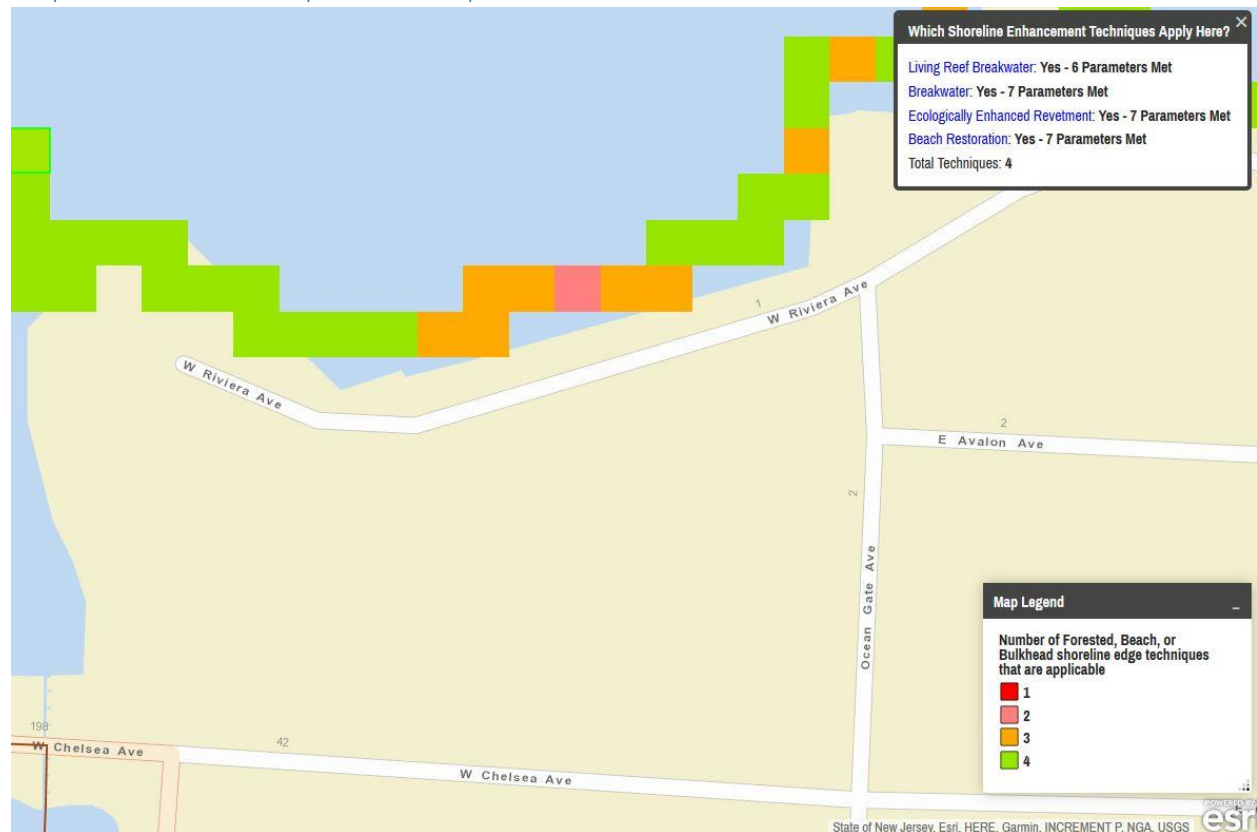
The Army Corp. has stated to the Borough that the beach cannot be filled beyond the mean high water line, yet, the Borough only wishes to replenish the beach back a previous width, not expand the beach.

Dating back about 80 years, the boardwalk that stretches the entire length of the Borough has water, gas, and electric utilities running beneath it. If a sea wall were to be built, there would need to be a plan for including the replacement of these utilities into the new design.

Another mitigation option that can be used along with or as a standalone approach, is to include living shorelines along the Borough's coast.

The graphic below is a screenshot from The Nature Conservancy's Restoration Explorer. It shows the four possible techniques for restoring the shoreline at West Riviera Ave. The four techniques include a living breakwater reef, a breakwater, an ecologically enhanced revetment, and beach restoration. More information on these possible techniques can be found at <http://maps.coastalresilience.org/newjersey/#>

Graphic 1: Restoration Explorer Techniques



Recommendations from the Ocean County Hazard Mitigation Plan that are in line with the CVA:

According to the Ocean County Hazard Mitigation Plan Update, Ocean Gate should consider the following action:

- *Implement erosion and flood control related project (structure and infrastructure projects)*
This recommendation is in line with the town's desired project.

National Flood Insurance Program (NFIP) and the Community Rating System (CRS)

Ocean Gate does not currently participate the CRS. The Borough does, however, participate in NFIP, with 446 policies in force. There are 10 Repetitive Loss Properties and 2 Severe Repetitive Loss Properties located in the Borough.

There are CRS points available for special structural and nonstructural efforts to solve existing flooding problems related to coastal erosion. This can include implementing coastal erosion, dune, and beach regulations as well as marinating erosion coastal erosion data.

Getting to Resilience (GTR)

The Borough completed the GTR online assessment at Borough Hall on February 10th. The complete list of linkages and recommendations is available upon request. The relevant recommendations are listed below.

- *Describe in local planning documents the cost of previous storms, floods, and erosion.*
 - To support their need for shoreline stabilization and erosion control projects, the Borough should detail past projects in local planning documents, such as the Capital Improvement Plan, that will support the need for greater investment in erosion control projects in the future.
- *Involve the public in the identification and documentation of historic storm impacts, such as storm surge elevations, flood-prone streets, beach erosion and overwash, and property loss. Ex. participatory mapping, surveying, focus groups, etc.*
 - Including the public in discussion may make it more likely for residents to support infrastructure projects and natural solutions that may require funding from tax-revenue and may also impact points of access to the beach and beach amenities.
- *Adopt a local ordinance to protect dunes, bluffs, or eroding cliffs from development or disturbance.*
 - Should the Borough eventually add dunes along their shoreline, an ordinance should be adopted to protect the stability of the dunes by limiting activity to maintenance and activities and sustaining access to the beach at specified access areas only.