



BUILDING ECOLOGICAL SOLUTIONS TO COASTAL COMMUNITY HAZARDS (BESCCH)

Coastal Vulnerability Assessment Island Beach State Park Ocean County NJ

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PARTNERS



NFWF



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I. Project Introduction

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.”

This report aims to assess vulnerabilities to enable communities in the planning for future exposures and develop strategies for mitigating long-term risk, making communities more resilient. To do so, this report assesses community vulnerability to sea level rise projected for the year 2050 along with a category 1 hurricane storm surge.

Figure 1: Range of Sea Level Rise Estimates (Miller et.al)

	Sea-level rise (feet)		
	Global	Bedrock	Shore
2030 central	0.5	0.7	0.8
2030 low	0.3	0.5	0.6
2030 high	0.7	1.0	1.1
2030 higher	0.9	1.2	1.4
2050 central	0.8	1.3	1.5
2050 low	0.5	0.9	1.1
2050 high	1.3	1.8	1.9
2050 higher	1.6	2.1	2.3
2100 central	2.5	3.1	3.5
2100 low	1.4	2.2	2.5
2100 high	4.0	4.6	4.9
2100 higher	4.6	5.5	5.9
2100 collapse	8.7	9.7	10.1

Figure 1 illustrates the sea level rise range of estimates for 2030, 2050, and 2100. This publication calls for a central projection of 1.5 feet of sea level rise along the shore in 2050 and is the projection used in this report.

Figure 2: Tide Gage Data (Miller et.al)

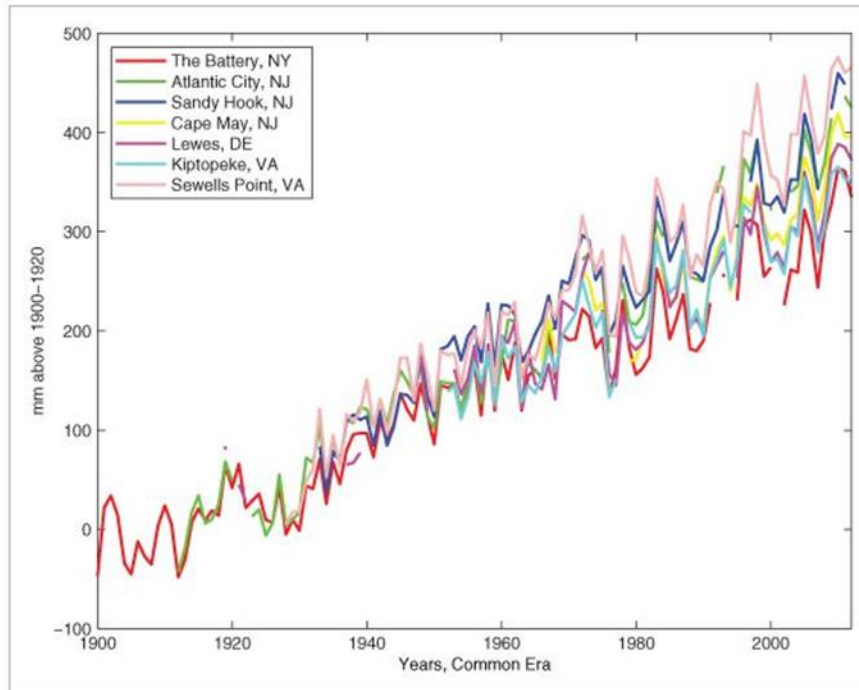


Figure 2 illustrates tide gage data taken along the Eastern seaboard from 1900 to past the year 2000. Miller et.al. attribute a higher rate of rise in the coastal plains to coastal subsidence and groundwater withdrawal and compaction.

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. Park Profile

Island Beach State Park (IBSP) is a barrier island of over 3,000 acres and 10 miles of coastal dunes located along the eastern shore of Ocean County, with the Barnegat Bay to the west and the Atlantic Ocean to the east (Refer to Map #1). The island was purchased by the State of New Jersey in 1953 for \$2.7 million.

Image 1: IBSP Swimming Area (visitnj.org)



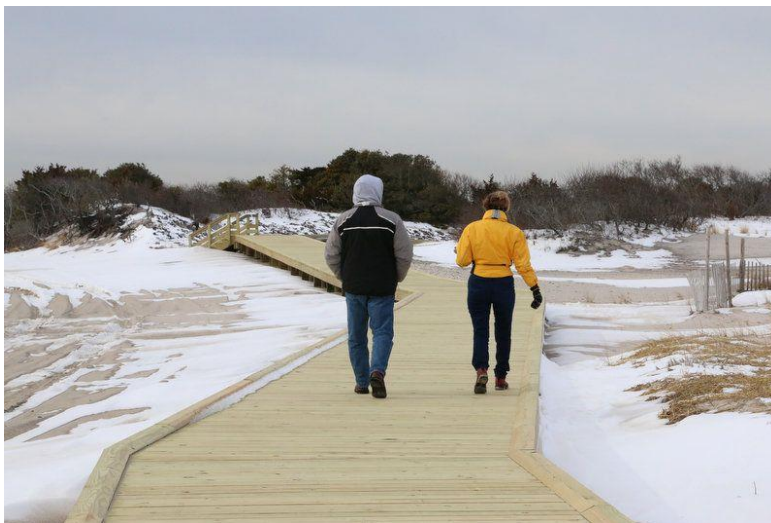
The park attracts nearly one million visitors a year enjoying various activities including swimming, fishing, hiking, biking, birdwatching, and kayaking.

According to the NJDEP, the preserved land is home to various animal species including foxes, ospreys and over 400 species of plants. Many of these species are listed by State and Federal Environmental Protection Agencies as either of special concern, threatened, or endangered (Refer to Map #2). The

Piping Plover made a resurgence on the island in 2016 and a recent explosion in the fox population has since slowed down.

IBSP experienced some damage from Superstorm Sandy in 2012 and was closed to the public until March 2013. Impacts included dune breaches (with a century-old shipwreck exposed at one of the breaches), damage to Fisherman's walkway, and 7 feet of sand in the roadway.

Image 2: The rebuilt Fisherman's Walkway (nj.com)



III. Municipal Coastal Vulnerability Assessment Methodology

The CVA meeting was held on May 30th at the park office. Jenifer Clayton, IBSP Park Supervisor, was in attendance to assist in identifying assets and finalizing mapping.

The process for completing the CVA was done in three steps:

1. Identify Assets
2. Establish Vulnerabilities and Consequences
3. Recommendations

CVA Step 1: Identifying Assets

When a CVA is completed, community assets from four general areas are indexed in a matrix and then used to support the development of asset mapping, identification of depth inundations, community-led findings, and eventual recommendations. These four asset areas include:

- **Community Resources:** Schools, shelters, storm-related retail, major employers, churches, food banks, etc.
- **Critical Infrastructure and Facilities:** Government operations, utilities, evacuation routes, emergency response
- **Natural and Ecosystem Resources:** Beaches, bayfronts, wetlands/critical habitat, parks
- **Vulnerable Sites and Populations:** Identifiable clusters of senior citizens, low income populations, limited English proficient populations, mobile home parks, contaminated/otherwise hazardous materials/sites

The final list of assets consists of the 5 individual asset locations located in the following table.

Table 1. Assets

Asset #	Name	Asset Category	Function
1	Kayak Launch Site (A15)	Natural Resource	1 of 2 very heavily used kayak launch sites
2	Maintenance Area	Critical Facility/Infrastructure	Holds all vehicles and machinery
3	Marina	Natural Resource	Active marina located at end of 24 th St. No office/bathrooms.
4	Rescue Road	Critical Infrastructure	Sand road / only access to Barnegat Inlet
5	Swimming Areas 1 & 2 (Bayside access)	Natural Resource	Pathways located across from the swimming sites / at grade / serve as bird observation trail

IV. Findings and Recommendations

CVA Step 2: Establish vulnerability and consequences matrix

After identifying the assets, depth projections were mapped and listed using the chosen project scenario: 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. (Refer to Map #5) *Note: projected depths are based on sea level.

Vulnerability was rated at a range from *N/A* to *High* based on the projected inundation depth. Consequences were rated from *N/A* to *High* based on how flood damage from the projected depth or loss of the asset might impact the community socially, environmentally, economically, etc.

Table 2 displays the potential vulnerability and consequences rating based on conversation with municipal offices.

Table 2: Coastal Vulnerability Assessment Matrix

Asset #	Name	Asset Category	Projected Depth (Ft)	Vulnerability Rating	Consequences Rating
1	Kayak Launch Site (A15)	Natural Resource	19	High	High
2	Maintenance Area	Critical Facility/Infrastructure	1-3 at driveways, 0 building/lot	Low	Low
3	Marina	Natural Resource	2-4 at water's edge	Low	Low
4	Rescue Road	Critical Infrastructure	1-3 at end of paved road, 0 on sand road	Moderate	Moderate
5	Swimming Areas 1 & 2 (Bayside access)	Natural Resource	3-4	Moderate	High

Asset #1: Kayak launch site A-15 is one of two heavily utilized launch sites at the park, the other being site A21 located further south before the Barnegat Inlet. The park supervisor noted that there is erosion occurring at the site and there is barely any wetland fringe remaining. Park personnel attempted to address the issue by filling the eroded area with clam bags but it did not work. Due to the popularity of kayaking at the park, stabilizing the shoreline at this site is a top priority for the park.

Asset #2: The park maintenance area holds the park service vehicles and machinery and there are 7 separate buildings located on the site. The area is currently protected on the ocean-side by a secondary and primary dune. Future projected inundation shows flood impacts coming from the bay-side, most immediately impacting access to and from the lot. A buffer will need to be created to keep flood water from inundating the lot from the bay-side. Other than the machinery located here, there is currently no sewer infrastructure located on the island beyond the entrance gate. The park is, however, scheduled to be fully sewered in the future.

Asset #3: The marina is located on 24th Street just before the park entrance. It is owned and operated by IBSP. It currently holds 40 slips but does not have infrastructure such as an office or bathrooms. The land immediately adjacent to the marina is only about 25 feet wide from the water to the roadside. This area could benefit from a living shoreline to stabilize this area and therefore protect the parking and access to the site from storm surge and wave action.

Asset #4: Rescue Road is a sand road located at the terminus of Shore Road at the southern end of the park. It offers access to a mobile sport fishing site and is the only access to the Barnegat Inlet. Maintaining access to the inlet via this sand road is important in case an emergency should occur with sport fishermen utilizing the site. The inundation is coming from the bay-side and therefore a buffer should be considered to maintain this access route.

Shore road, the main north/south road on the island, does have drainage issues due to sand and grass debris most likely clogging outfalls.

Asset #5: There are 24 auxillary beach access sites in total on the island. Access to the only 2 official swimming areas in the recreation section are projected to be inundated by flood water



coming from the bay-side, as the parking lots and paths to the ocean are dune protected. Funds permitting, the park service would consider constructing raised pathways over the dunes. Shoreline restoration at the bay-side site would protect access to the two swimming areas as well as preserve the use of the bird observation trail located on the bay-side.

Image 3: Restoration Explorer Screenshot

➤ *Utilize living shoreline restoration projects along the Bay Shore.*

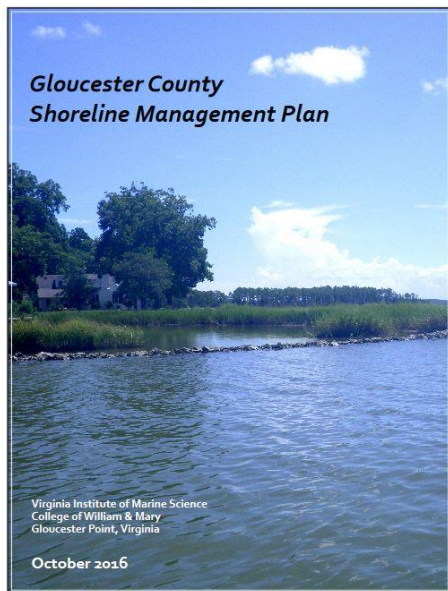
Living shorelines are protected and stabilized shoreline that is made of natural materials such as plants, sand, or rock. The bay shore

of IBSP has many areas that could benefit from living shorelines. The park can use The Nature Conservancy's Restoration Explorer to help identify specific areas for erosion control and focus on which restoration techniques to use.

- Resource: [The Restoration Explorer](#)

➤ *Draft a park-wide Shoreline/Special Area Management Plan*

Currently, there is no park-wide management plan to documents shoreline erosion and the Park Service's mitigation efforts. There is, however, an unofficial, fluid dune management plan for the ocean-side of the park. A park-wide Plan could be used to log past erosion control measures, their performance, and support recommendations for future restoration projects. It could also set the tone for future land use decisions taking into account future sea level rise projections, this could include if and how well the tidal marsh is keeping up with the rate of sea level rise.

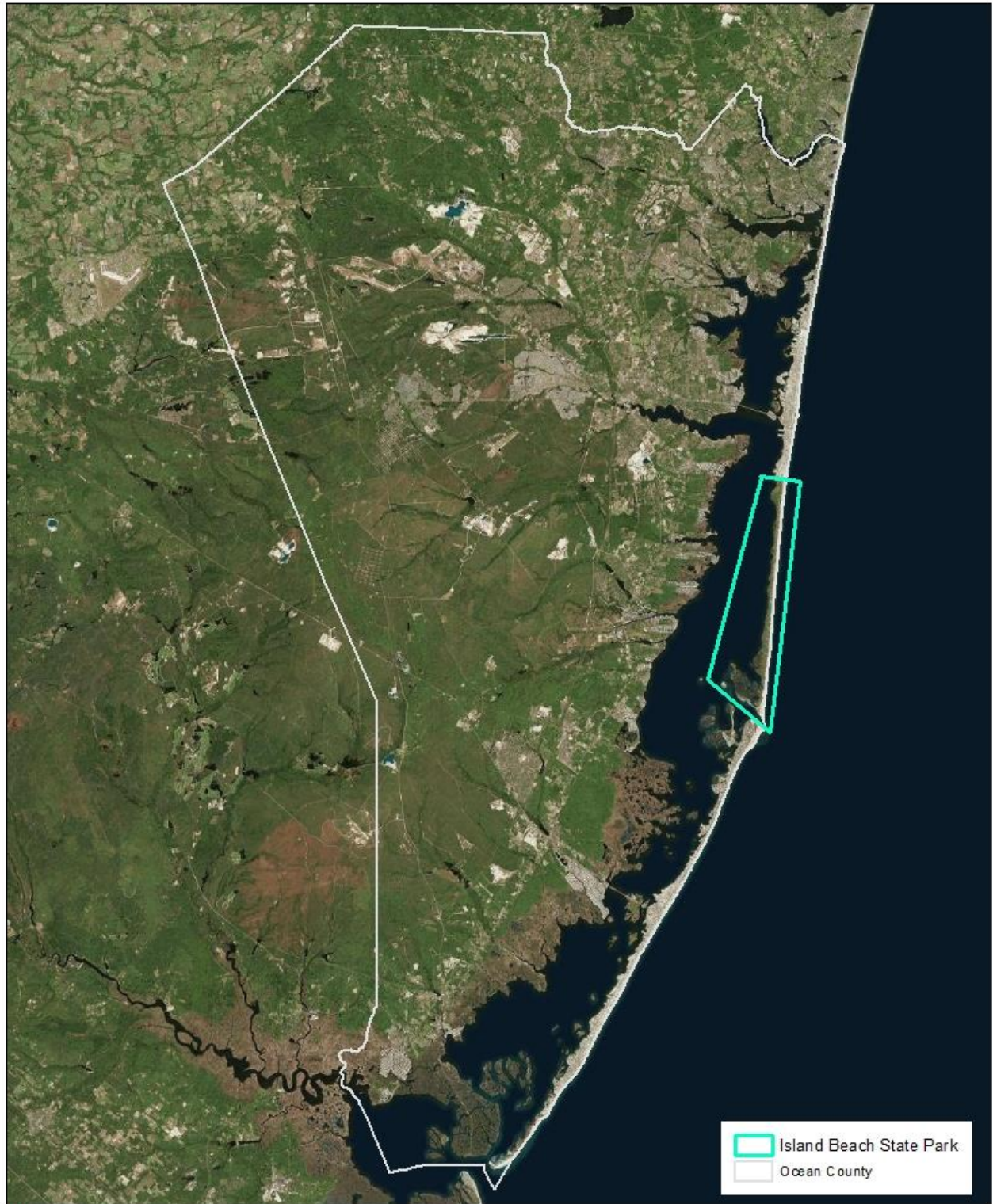


- Resource: [Gloucester County Shoreline Management Plan \(Virginia Institute of Tech.\)](#)

Image 4: Ex., Shoreline Management Plan

Appendices

Map 1: IBSP, Ocean County – NJ



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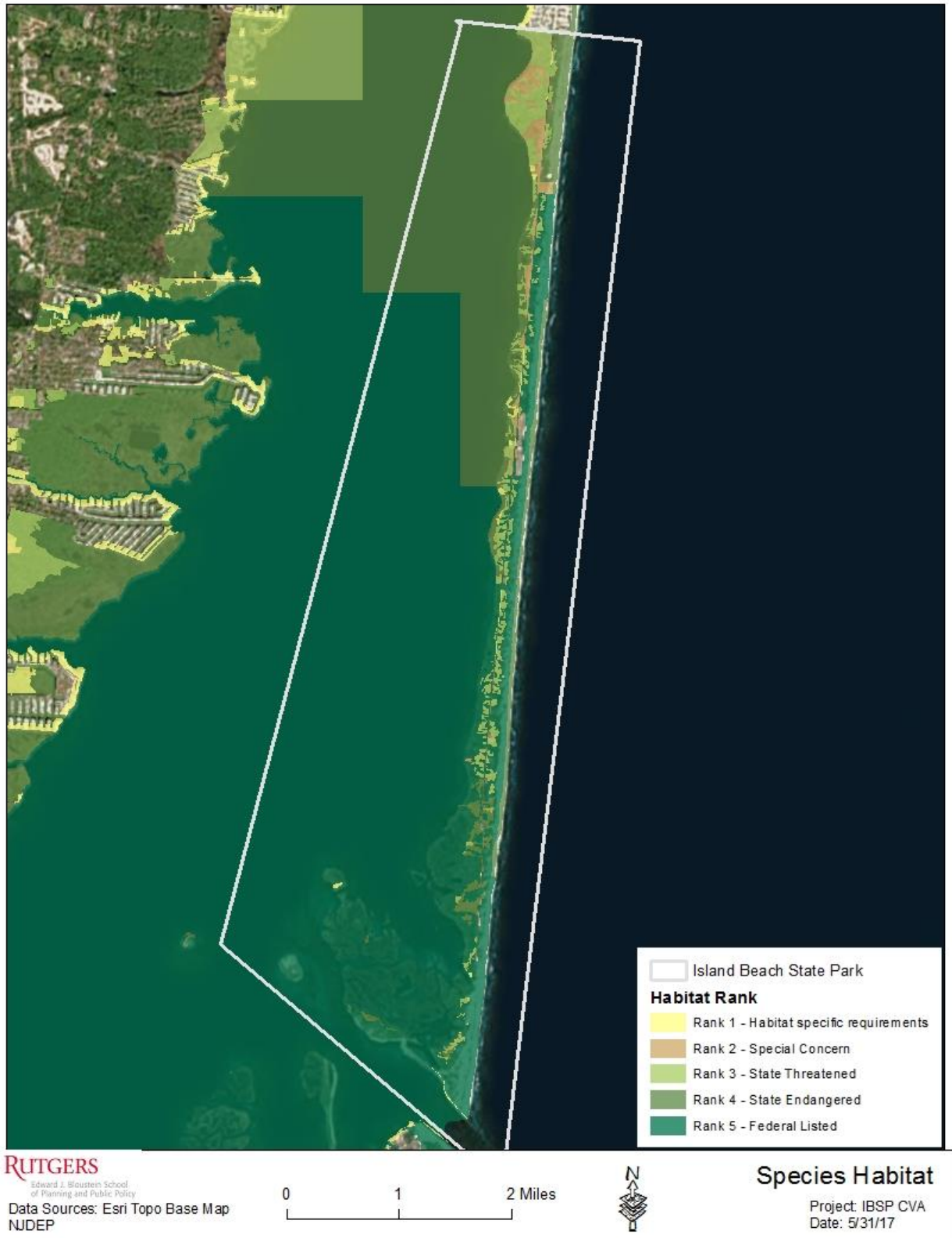
Data Sources: Esri Topo Base Map

0 5 10 Miles



Project: IBSP CVA
Date: 5/31/17

Map 2: Species Habitat



Map 3: Asset #1 - Kayak Launch Site



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Data Sources: Esri Topo Base Map
NJDEP/NOAA

0 0.05 Miles



Project: IBSP CVA
Date: 5/31/17

Map 4: Asset #2 – Maintenance Area



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Data Sources: Esri Topo Base Map
NJDEP/NOAA

0 0.05 Miles



Project: IBSP CVA
Date: 5/31/17

Map 5: Asset #3 - Marina



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Data Sources: Esri Topo Base Map
NJDEP/NOAA

0 0.05 Miles



Project: IBSP CVA
Date: 5/31/17

Map 6: Asset #4 – Rescue Road



Map 7: Asset #5 – Swimming Areas



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Data Sources: Esri Topo Base Map
NJDEP/NOAA

0 0.1 Miles



Project: IBSP CVA
Date: 5/31/17