29th Annual Mapping Contest Maps

Analytical Presentation

Mapping Shoreline Change to Inform Coastal Restoration Projects

Evan Sherer[1] and David DuMont[2]

Purpose: Identify eroding shorelines in order to target coastal restoration efforts.

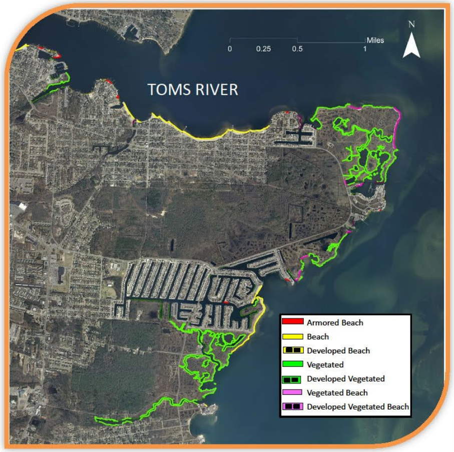
Introduction:

In the wake of Hurricane Sandy the importance of estuarine systems as storm surge buffers was made evident. Efforts to restore degraded wetlands and improve their resiliency capabilities by replanting lost vegetation and using natural materials like rocks and oyster reefs to dampen wave energy are underway, not just in New Jersey, but all over the USA. These tactics, collectively known as "Living Shorelines", also provide wildlife habitat, improved water quality and a host of other ecosystem services.

This study, piloted in Good Luck Point, Berkeley Township, NJ, identified those shorelines that were quickly eroding and may require restoration efforts. This study also broke the study areas into distinct shoreline types to determine if a particular shoreline type experienced different rates of change compared to the others. This study marks the first attempt by NJDEP to measure estuarine shoreline loss in detail.

Step 1: Shoreline Inventory

To map the shoreline types along the study area NOAA's Environmental Sensitivity Index (ESI) layer was used. ESI provides shoreline type descriptions for the entire coast of the USA. ESI is used for prioritizing oil spill clean up response. The New Jersey ESI layer was added to GIS and edited, resulting in nine distinct shoreline types.

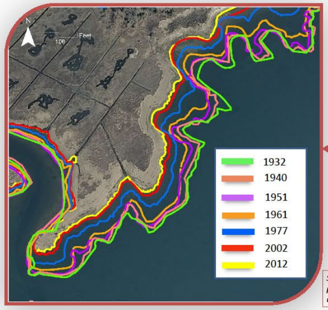


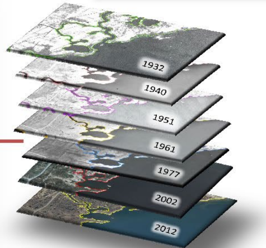
Shoreline inventory of the Good Luck Point, using NOAA's ESI data. "Developed" shoreline types are natural shorelines that are adjacent to hardened shorelines. Developed shorelines may receive higher erosional forces from wave energy being redirected off of adjacent hardened shorelines. Hardened shorelines were mapped as well, but were not included in the shoreline change rate analysis. Vegetated shorelines accounted for over two-thirds of the study area.

Step 2: Historic Shorelines

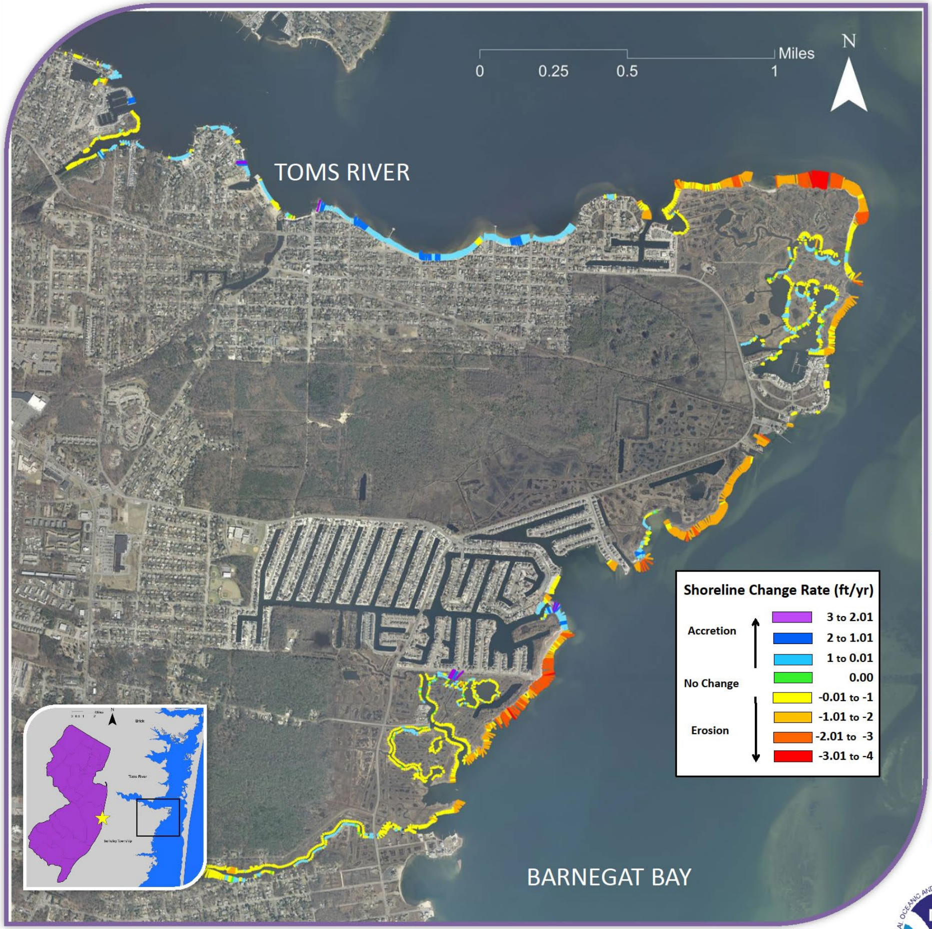
Seven historic shoreline vectors were created from georeferenced aerial photos (1932 – 1961) and existing NJDEP data layers (1977-2012). Shorelines were digitized to the "wet/dry line", characterized by a change in tone along the shore from dark to light. The Shorelines were then compiled together onto a single map (shown to the right).

Baselines were created in preparation for Step 3. All of the shorelines for a particular shoreline type were buffered and dissolved together. The buffer was then turned to a polyline and cut so that only the most landward or seaward line remained.





Seven historic shorelines were digitized from aerial photography and existing GIS imagery. This map gives a close up view of the shorelines used in the study area



The colored lines along the shoreline are the transects cast by DSAS to calculate shoreline change (The Linear Regression Rate, LRR). The warmer colors indicate erosion and the cooler colors indicate accretion. The length of the transects were clipped to show the difference between the furthest and closest shorelines. Longer transects indicate more shoreline change than shorter transects.

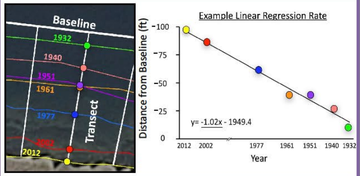
Step 3: Digital Shoreline Analysis System

The historic shoreline vectors were analyzed using the Digital Shoreline Analysis System (DSAS) program developed by USGS. DSAS casts transects at user defined intervals from the baselines created in Step 2. DSAS allows a number of statistics to be calculated. This map shows the Linear Regression Rate (LRR), calculated by taking the distance between the baseline and the point where the historic shorelines cross a transect. The residuals are plotted and a best fit line is placed that minimizes the sum of squares of the residuals. The LRR at that transect is equivalent to the slope of the best fit line. Armored shorelines and areas that eroded to allow inland ponds to open up to become shoreline were not included in this study as they would have given inaccurate shoreline change rates.

[1] NOAA Coastal Management Fellow - New Jersey Department of Environmental Protection
(evan.sherer@dep.nj.gov, evansherer23@gmail.com)

[2] New Jersey Department of Environmental Protection
(H.David.DuMont@dep.nj.gov)

Step 3, cont

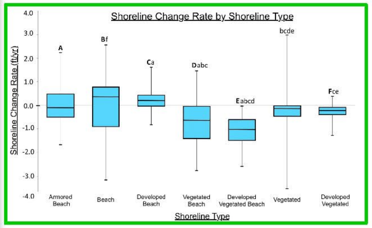


The rate of shoreline change is equal to the slope of the best fit line, -1.02. The shoreline is eroding 1.02 ft/yr. Hardened shoreline and areas where inland ponds opened up as a result of erosion were not included in the results as they would have given inaccurate rates.

Step 4: Results

All statistics were performed using R statistical software (version 3.2.3). The shoreline change rate (LRR) for each shoreline type were compared using a Kruskal-Wallis test, followed by a Dunn's test for multiple comparisons (using the Holm method to adjust p-values).

The results suggest that Developed Vegetated Beaches experience the most consistent erosion at Good Luck Point with all transects having negative rates. Vegetated Beaches also show high erosion with 75% of the transects having negative rates. Vegetated shorelines account for the highest rates of shoreline change, both eroding and accreting (this is most likely because vegetated shorelines account for over two-thirds of the study area). Costal restoration efforts should be focused on these shores.



This plot depicts the shoreline change rates by shoreline type. The area within each blue box represents the interquartile range (middle 50 % of the data). The line in the middle of each box is the median and the ends of the whiskers represent the maximum and minimum shoreline change rates for each shoreline type. Shoreline types with a lowercase letter have a shoreline change rate that is significantly different than shoreline types with a corresponding uppercase letter.

Citations:

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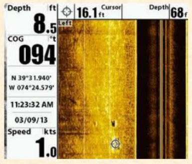
An Analysis of Bycatch and Encrusting Organisms of Derelict Crab Pots in Oyster Creek and the Shore of Waretown, NJ

By: Kayla Johnston



Figures 1 and 2. A tautog found in a crab pot (left), and the side-scan sonar device used to locate pots (right). The dark black box-shape in the sonar depicts a crab pot.

Objective: To analyze bycatch and encrusting organisms in derelict crab traps and determine if trends exist between two locations in Barnegat Bay

Abstract

Derelict fishing gear (DFG) is fishing equipment that has been lost or abandoned either due to storms, neglect, or other reasons and is left unattended in bodies of water. DFG contributes to marine debris, and is often responsible for "ghost fishing," which is the unintended capturing and/or killing of organisms in abandoned fishing gear. This study will involve retrieving derelict crab pots from Barnegat Bay, New Jersey, and recording data regarding their condition and the species within them. This study also aims to look at differences between bycatch of pots found in Oyster Creek vs. pots found off of Waretown. This species data, will be analyzed utilizing statistical tests such as t-test, Simpson's diversity indices, and a Sorenson's similarity index. ArcMap Geographic Information Systems Software will also be used to map pot locations and allow for spatial analysis. Although no significant differences between species between the sites were found, there were unique species in each area indicative of the difference between the two habitats within the bay. There was also a higher overall percentage of encrusting organisms off of Waretown, suggesting a preference of structural habitat among encrusting organisms. The low diversity also showed that certain species have a tendency to be caught as bycatch, allowing for a more precise identification of what species are being affected most by derelict fishing gear. Analyzing crab pot bycatch and encrusting organisms is important for determining exactly what species are at risk and if threats differ among locations.

Introduction

Derelict fishing gear (DFG) is fishing equipment that has been lost or abandoned either due to storms, neglect, or other reasons and is left unattended in bodies of water. Derelict fishing gear includes but is not limited to nets, lines, crab pots, and other recreational or commercial harvest equipment ("Derelict Fishing Gear Removal," n.d.). When fishing gear becomes abandoned, it can cause long term damage to an environment: not only is DFG a concern for boaters and swimmers, but it contributes to marine debris, and is often responsible for "ghost fishing," which is the unintended capturing and/or killing of organisms in abandoned fishing gear. DFG also often travels beyond where it was abandoned due to oceanic currents and storms, causing problems in other locations as well as their own ("Marine Debris: Derelict," n.d.). This particular study will focus on crab pots. It is important to determine what species are being unintentionally harvested in these pots, for they could potentially trap species of concern or endangered species, impeding conservation progress. Allowing organisms to die in these pots will only attract more, for the decomposing organisms are an attractive food source to those not trapped in pots ("Impact of "Ghost," 2015). While derelict crab pots do cause the death of many species, there are some species small enough to move freely in and out of these pots that prefer structure. The extra structure provided by these pots may be attractive habitats to certain species ("Derelict Fishing Gear," 2016). This study aims to determine if there are trends in bycatch and encrusting organisms in different areas of Barnegat Bay.

Figures 3 and 4. A seahorse found at Oyster Creek and a group of American eels and a crab found off of Waretown.

Methodology

- Crab pots were be collected in conjunction with several partner groups from around Barnegat Bay, New Jersey, particularly Oyster Creek and off the shore of Waretown (Ocean Township)
- Pots were located via side-scan sonar and retrieved utilizing grappling hooks
- Collected pots will be assessed for condition, bycatch, and encrusting organisms using special data sheets. Percentage of encrusting organisms was determined by visual analysis of the approximate percentage of the pot surface covered by encrusters. GPS coordinates were taken for every pot as well
- Locations of the pots as well as percent encrusting organisms will be mapped utilizing Esri ArcMap 10.2 software
- Species found as bycatch will be compared between the two sites utilizing statistics such as a t-test to, Simpson's diversity indices, and a Sorenson coefficient to compare sites

Results

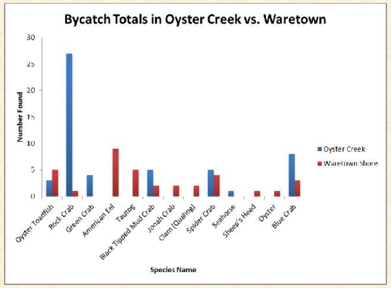


Figure 5. The total bycatch species counts for Oyster Creek and Waretown. Although the t-test returned an insignificant p-value of 0.5821 (0.05 alpha), there were several unusual species of interest such as a seahorse and a large amount of crabs found at Oyster Creek. Wintertime retrieval could have contributed to this low value.

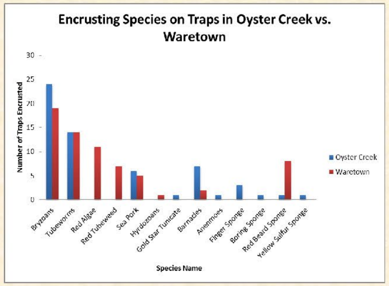
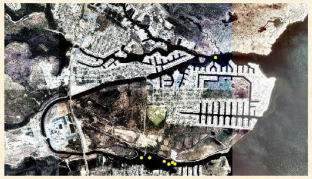
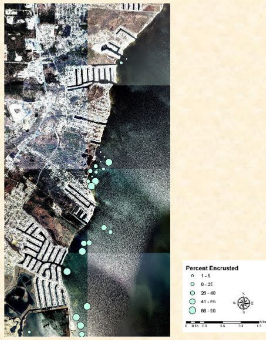


Figure 6. The total counts for encrusting species for Oyster Creek and Waretown. Although the t-test an insignificant p-value of 0.8170 (0.05 alpha), there were unique species for each location such as algae, red tubeweed, and hydrozoans for Waretown and tunicate, anemones, and various sponge species for Oyster Creek. Wintertime retrieval could have contributed to this low value.

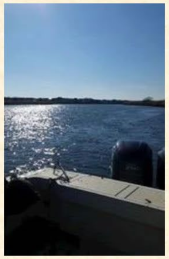


Figures 7 and 8. The locations of crab pots containing fish off the shore of Waretown (top), and Oyster Creek (bottom). Both sites contained a similar amount of pots containing fish, though the individual species per site varied.

Figures 9 and 10. The locations of crab pots containing invertebrate bycatch (crabs, mollusks, etc.) off the shore of Waretown (top), and Oyster Creek (bottom). Oyster Creek had a slightly higher instance of pots containing invertebrates, as well as a slightly greater abundance of invertebrates, crustaceans in particular.



Figures 11 and 12. The percentage of encrusting organisms on each pot off the shore of Waretown (top), and Oyster Creek (bottom) shown via dot density maps. The Waretown shore had a higher mean percentage of encrusting organisms of 44.46%, while Oyster Creek had a mean of 29.78%. The warmer waters of Oyster Creek may not provide as ideal of a habitat as the shores of Waretown for these organisms.



Figures 13 and 14. A view of Oyster Creek from the R.V. Sirenia (left), the vessel used for crab pot retrievals, and a pile of retrieved crab pots at Spencer's Marina in Waretown (right).

Discussion

This study aimed to analyze the differences in bycatch species and encrusting organisms among two different locations within Barnegat Bay, Oyster Creek and Waretown, utilizing statistical analysis and Geographic Information Systems software. **Figure 5, as well as Figures 7, 8, 9, and 10,** work together to show the distribution of different species between the two locations. Although a t-test ran on the species found between the two locations returned and insignificant p-value of 0.5281, there were unique species to each location. A larger amount of crustaceans such as blue, spider, and rock crabs, as well as uncommon species such as a seahorse were found in Oyster Creek, while more fish species were found off of Waretown. This is likely due to the warmer waters of Oyster Creek providing a better breeding ground for crustaceans that prefer warmer waters, while the cooler, more open waters of Waretown provide better habitat for fish and filter-feeders such as oysters (Wnek, 2016). A Sorenson similarity coefficient was calculated to compare the two sites and returned a value of 55.56% similarity, which shows that even though these two sites are both located in the bay, they are still 44.44% different, likely due to the more sheltered, warmer effluent waters of the Oyster Creek nuclear plant. A Simpson's diversity index was also calculated for each site, returning a low diversity index of 0.296 for Oyster Creek and 0.12 for Waretown. This low diversity is likely caused by the fact that sampling was performed in the winter when species are less prevalent, but is also a good indicator that there are only a few select species being caught as bycatch instead of many. Similar tests were performed on encrusting organisms as shown in **Figure 6**. Like the bycatch, the encrusting tests returned an insignificant p-value of 0.8170 for the t-test of species found, a Sorenson similarity coefficient of 55.56%, and a low Simpson's diversity index of 0.24 for Oyster Creek and 0.18 for Waretown. The insignificant p-value and low diversity indices are likely due to the fact that very specific organisms prefer to attach to crab pots. However, the overall mean encrusting percentage for Oyster Creek was much lower at 29.78%, while Waretown had a mean of 44.64% (this is shown visually in **Figures 11 and 12**). The higher percentage found at Waretown is likely due to the fact that most of these encrusting organisms prefer the cooler, more open waters of Waretown, and that the warmers waters of Oyster Creek are more desirable for the rarer species found there such as anemones, finger sponges, boring sponges, and yellow sulfur sponges. These results suggest that the impact of derelict fishing gear on species can differ across different areas of the same ecosystem. It also introduces the potential to utilize crab pot bycatch to indicate species diversity and health. With populations of blue crabs in lower abundance, it is important to identify ways to conserve this species; studies in Maryland have found that the removal of derelict fishing gear has led to more blue crab harvests annually (Wnek, 2016). By utilizing GIS and statistics to analyze crab pot contents, it becomes easier to identify which species are threatened most by derelict gear, which locations are at the greatest risk, and the preferences of encrusting organisms which also are a nuisance to boats and human structures.

Figures 15 and 16. A crab pot covered in algae (left), and a bucket of rock and spider crabs retrieved from a pot in Oyster Creek (right).

References

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Analysis of DC Fast Charging Infrastructure for Electric Vehicles (EVs) in NJ

Ryan Gergely
NJDEP
Bureau of Energy and Sustainability

Introduction

In NJ, the transportation sector accounts for roughly 46% of all greenhouse gas emissions in the State. Electric vehicles (EVs), which have no tailpipe emissions, are often seen as an essential component transitioning towards a more sustainable transportation sector. Since they use energy stored in batteries for propulsion, these vehicles must be plugged in and "charged". Failure to do so will result in the depletion of the battery over time, eventually rendering the vehicle unable to move. As a result, charging infrastructure must be deployed across the state, similarly to how gas stations are present for fueling conventional gasoline-powered vehicles.

With this said, the lack of available public charging infrastructure in the State has been seen as a major barrier hindering the widespread adoption of EVs. Without this, EV owners are frequently limited to home or workplace charging, which can severely limit their drivable range and cause "range anxiety". In New Jersey, there are currently 32 publicly accessible Non-Tesla DC Fast Chargers in the state at 21 locations (Tesla Superchargers are only compatible with Tesla Models). Compared to Level 1 or Level 2 chargers, which take hours to charge an EV's battery, DC Fast Chargers are able to provide an EV with 50-70 miles of drivable range in as little as 20 minutes. This technology, especially when placed along major transportation corridors, can be extremely beneficial to EV drivers, allowing them to charge up faster and travel further distances with no tailpipe emissions or "range anxiety".

Legend

- Public Non-Tesla DC Fast Chargers (32 at 21 locations)
- Priority Rest Stops
- Rest Stops
- Major Highways
- Counties
- DC Station Buffer (20mi)
- Rest Stops Buffer (20mi)

AC Level 1: 2 to 5 miles of range per hour of charging
AC Level 2: 10-20 miles of range per hour of charging
DC Fast Charging: 50-70 miles of range per 20 minutes of charging

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy
Alternative Fuels Data Center

Photos: Blink Network, ChargePoint, and AeroVironment DC Fast Chargers

Data and Methodology

The electric vehicle charging station data for this analysis was downloaded from the US Department of Energy's Alternative Fuels Data Center on 1.4.16. Non-Tesla DC Fast Chargers were plotted using their geographic coordinates (Tesla Supercharger locations were excluded since they are only compatible with Tesla models). Using the buffer tool , a 20 mile radius was mapped around each of these stations to show the land area of the state that is located within 20 miles of one of locations. This initial analysis revealed a spatial irregularity in the current distribution of DC Fast Chargers. It is clearly apparent that the Jersey Shore, a region of high economic productivity, was not covered by this range.

In order to spread the land area located within 20 miles of a DC Fast Charger, more charging stations will need to be installed. Using the geographic coordinates provided from the NJ Turnpike Authority, all of the rest stops/service areas (24 total) along 4 major highways in the state were plotted (NJ Turnpike, Garden State Parkway, Atlantic City Expressway, and Interstate-78). Using a similar technique, the buffer tool was used to map the area within a 20 mile radius of each of these rest stops. When this data was overlayed with the current DC Fast Charging data and buffer, it became clear that by strategically installing DC Fast Chargers at the 6 "priority rest stop" locations (chosen based on their location outside the current 20 mile radius), nearly 95% of the State would be located within a 20 miles radius of one of these valuable charging resources.

Discussion and Conclusion

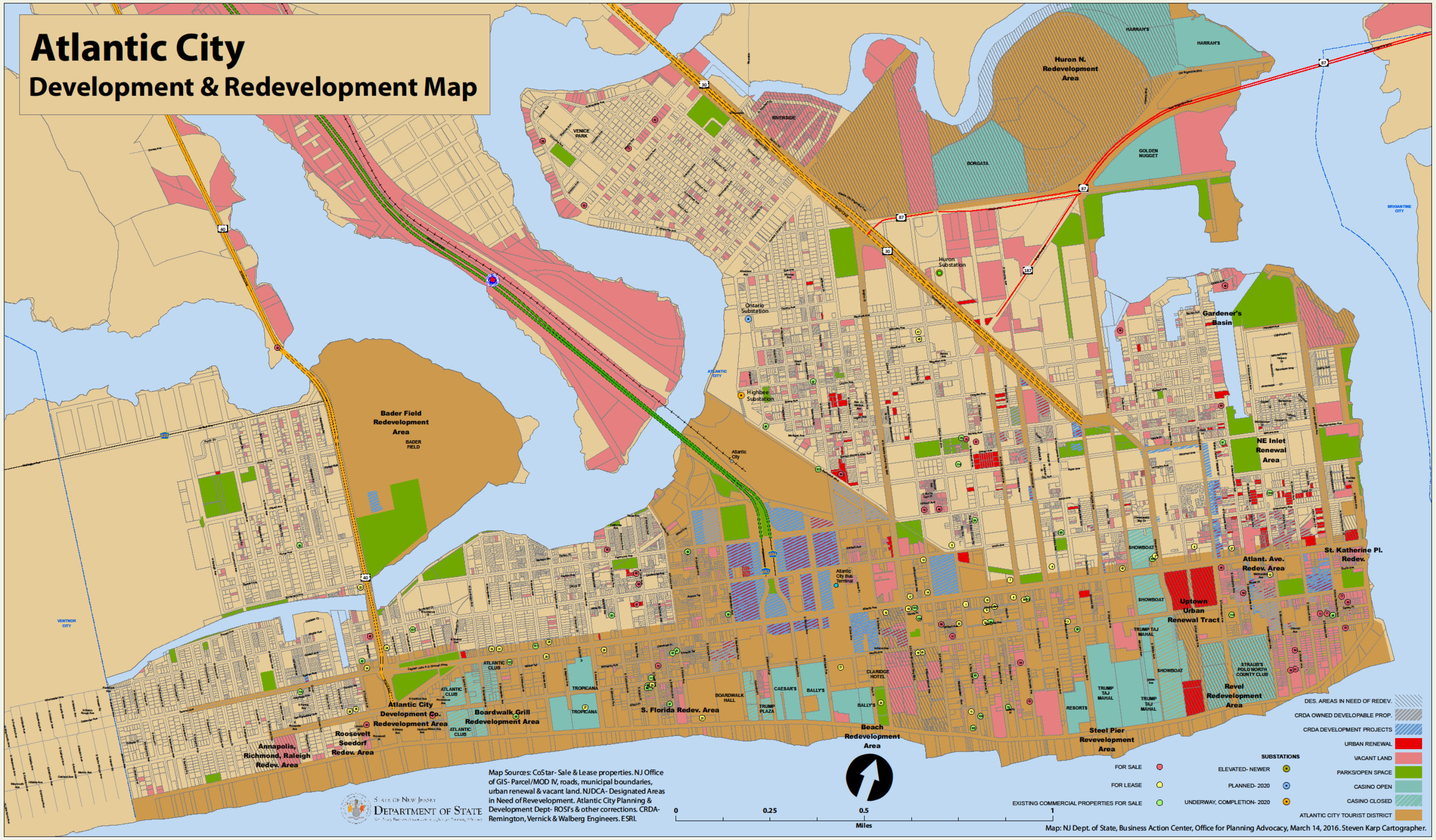
The initial analysis of the DC Fast Charging stations revealed that only about 63% of the state is currently located within 20 miles of a DC Fast Charger. It also uncovered spatial irregularities that indicate that the majority of area that is not covered happens to be along the coast. EV owners should not be discouraged from visiting the Jersey Shore, which is one of the most economically productive aspects of the State, due to the inability to charge their vehicles as a result of the lack of infrastructure. In order to improve access to the coastal amenities for EV drivers, the DC Fast Charging network in the state must be expanded.

By conducting a spatial analysis of the current DC Fast Charger network in the state, it is apparent that the majority of chargers are located along the I95 corridor—arguably the most heavily trafficked region in the state. With this in mind, a spatial analysis of rest stops/service areas along other major transportation corridors and highways was conducted, along with the area located within 20 miles of each. The results of this rest stop analysis showed a much more even distribution across the state, with more land area covered.

Since DC Fast Chargers tend to be expensive, in order to have the biggest impact per dollar spent, it is recommended that DC Fast Chargers are installed at the 6 "priority rest stops" which would effectively increase the percentage of the State that is located within 20 miles of a DC Fast Charger from 63% to 95%. Doing so would all but erase "range anxiety" while also facilitating the growth of the EV market.

Data Integration

Atlantic City
Development & Redevelopment Map



Map Sources: CoStar- Sale & Lease properties. NJ Office of GIS- Parcel/MOD IV, roads, municipal boundaries, urban renewal & vacant land. NJDCA- Designated Areas in Need of Revevelopment. Atlantic City Planning & Development Dept- ROSI's & other corrections. CRDA- Remington, Vernick & Walberg Engineers. ESRI.

State of New Jersey Department of State

Map: NJ Dept. of State, Business Action Center, Office for Planning Advocacy, March 14, 2016. Steven Karp Cartographer.

PROPERTIES FOR LEASE

Site_Num	Street	City	State	ZIP	Type	Status	SF Avail	For Sale Price	F Price SF	Sale Status	Land_Acres	Tenancy	County
1	1 S New York Ave	Atlantic City	NJ	8401	Office	Existing	40,000.00	2500000	62.5	Active	0.17	Multi	Atlantic
2	10 N DELAWARE AVE	Atlantic City	NJ	8401	Retail	Existing	3,000.00	Yes	-	Active	0.07	Single	Atlantic
3	1109 PACIFIC AVE	Atlantic City	NJ	8401	Hospitality	Existing	1,000.00	No	-	-	-	Multi	Atlantic
4	1125 Atlantic Ave	Atlantic City	NJ	8401	Office	Existing	16,946.00	No	-	-	1.13	Multi	Atlantic
5	114-116 S New York Ave	Atlantic City	NJ	8401	Industrial	Existing	1,000.00	No	-	-	0.22		Atlantic
6	1300 Atlantic Ave	Atlantic City	NJ	8401	Office	Existing	20,000.00	No	-	-	-	Multi	Atlantic
7	1301 Atlantic Ave	Atlantic City	NJ	8401	Office	Existing	13,500.00	No	-	-	0.43	Multi	Atlantic
8	13 N New Jersey Ave	Atlantic City	NJ	8401	Industrial	Existing	11,500.00	No	-	-	0.73		Atlantic
9	14 S Tennessee Ave	Atlantic City	NJ	8401	Office	Existing	9,500.00	550000	57.89	Active	0.1		Atlantic
10	1400 Atlantic Ave	Atlantic City	NJ	8401	Retail	Existing	13,937.00	No	-	-	4	Multi	Atlantic
11	1515 BOARDWALK AVE	Atlantic City	NJ	8401	Retail	Existing	2,500.00	Yes	-	Active	0.95	Single	Atlantic
12	16 S Rhode Island Ave	Atlantic City	NJ	8401	Office	Existing	2,250.00	No	-	-	-		Atlantic
13	1600 Arctic Ave	Atlantic City	NJ	8401	Retail	Existing	8,500.00	350000	41.18	Active	0.11	Multi	Atlantic
14	1601 Atlantic Ave	Atlantic City	NJ	8401	Office	Existing	18,987.00	5500000	124.15	Active	0.15	Multi	Atlantic
15	1616 Pacific Ave	Atlantic City	NJ	8401	Office	Existing	9,884.00	No	-	-	0.17	Multi	Atlantic
16	1618-1622 Pacific Ave	Atlantic City	NJ	8401	Retail	Existing	5,108.00	No	-	-	0.19	Multi	Atlantic
17	1637 Atlantic Ave	Atlantic City	NJ	8401	Retail	Existing	1,958.00	No	-	-	0.05	Multi	Atlantic
18	1638 Atlantic Ave	Atlantic City	NJ	8401	Retail	Existing	3,000.00	No	-	-	0.07	Multi	Atlantic
19	1728 Atlantic Ave	Atlantic City	NJ	8401	Retail	Existing	2,812.00	No	-	-	0.09	Multi	Atlantic
20	1801 BOARDWALK	Atlantic City	NJ	8401	Retail	Existing	1,500.00	No	-	-	1.73		Atlantic
21	1900 Pacific Ave	Atlantic City	NJ	8401	Hospitality	Existing	17,650.00	No	-	-	9.82	Single	Atlantic
22	210 N Albany Ave	Atlantic City	NJ	8401	Office	Existing	1,600.00	No	-	-	-		Atlantic
23	2401 BOARDWALK	Atlantic City	NJ	8401	Retail	Under Construction	16,000.00	No	-	-	-	Multi	Atlantic
24	25 N Albany Ave	Atlantic City	NJ	8401	Office	Existing	1,700.00	449000	132.06	Active	0.04	Multi	Atlantic
25	2600 Pacific Ave	Atlantic City	NJ	8401	Retail	Existing	3,000.00	Yes	-	Active	0.07		Atlantic
26	2718 Atlantic Ave	Atlantic City	NJ	8401	Office	Existing	17,000.00	No	-	-	0.16	Multi	Atlantic
27	2821 BOARDWALK	Atlantic City	NJ	8401	Retail	Existing	12,000.00	No	-	-	4.33		Atlantic
28	2919 ATLANTIC AVE	Atlantic City	NJ	8401	Retail	Existing	6,000.00	399000	51.15	Active	0.1		Atlantic
29	2922 Atlantic Ave	Atlantic City	NJ	8401	Office	Existing	4,286.00	3400000	113.33	Active	0.23	Multi	Atlantic
30	30 S New York Ave	Atlantic City	NJ	8401	Office	Existing	3,116.00	No	-	-	0.12	Multi	Atlantic
31	3123 Atlantic Ave	Atlantic City	NJ	8401	Office	Existing	1,000.00	No	-	-	0.13		Atlantic
32	32 S Tennessee Ave	Atlantic City	NJ	8401	Office	Existing	1,500.00	199000	66.33	Active	0.06		Atlantic
33	3201 ATLANTIC AVE	Atlantic City	NJ	8401	Retail	Existing	2,500.00	No	-	-	0.11	Multi	Atlantic
34	3717 Ventnor Ave	Atlantic City	NJ	8401	Retail	Existing	500.00	No	-	-	0.33	Multi	Atlantic
35	3813-3815 Atlantic Ave	Atlantic City	NJ	8401	Retail	Existing	3,000.00	799000	133.17	Active	0.07	Multi	Atlantic
36	3829-3831 Atlantic Ave	Atlantic City	NJ	8401	Retail	Existing	1,942.00	No	-	-	0.12	Multi	Atlantic
37	515 Atlantic Ave	Atlantic City	NJ	8401	Industrial	Existing	30,000.00	No	-	-	0.34	Multi	Atlantic
38	7 S South Carolina Ave	Atlantic City	NJ	8401	Office	Existing	20,900.00	Yes	-	Active	0.12	Multi	Atlantic
39	7 S Tennessee Ave	Atlantic City	NJ	8401	Retail	Existing	2,000.00	1500000	144.84	Active	0.36	Multi	Atlantic
40	800 N New York Ave	Atlantic City	NJ	8401	Industrial	Existing	12,500.00	750000	60	Active	0.32	Single	Atlantic
41	820 N New York Ave	Atlantic City	NJ	8401	Flex	Existing	5,000.00	599000	99.83	Active	0.53	Multi	Atlantic
42	907 Atlantic Ave	Atlantic City	NJ	8401	Retail	Existing	2,800.00	No	-	-	0.05	Single	Atlantic

PROPERTIES FOR SALE

Site_Num	Street	City	State	ZIP	Sale_Status	Sale_Category	Sale_Price	Price_SF	Land_Acres	Sale_Type	Property_Type	County
43	900 N ALBANY AVE	Atlantic City	NJ	8401	Active	land sale	$ 5,200,000	26.26	4.55	Investment	Land	Atlantic
44	109-111 S Lincoln Pl	Atlantic City	NJ	8401	Active	land sale	$ 2,750,000	126.72	0.50	Investment	Land	Atlantic
45	538 Atlantic Ave	Atlantic City	NJ	8401	Active	land sale	$ 2,500,000	104.16	0.55	Investment	Land	Atlantic
46	44 N Albany Ave	Atlantic City	NJ	8401	Active	land sale	$ 2,200,000	138.64	0.36	Investment	Land	Atlantic
47	3510-3512 Pacific Ave	Atlantic City	NJ	8401	Active	land sale	$ 2,100,000	300.18	0.16	Investment	Land	Atlantic
48	1501-1517 Baltic Ave	Atlantic City	NJ	8401	Active	land sale	$ 1,100,000	37.69	0.67	Investment	Land	Atlantic
49	400-422 CARSON AVE	Atlantic City	NJ	8401	Active	land sale	$ 1,000,000	6.69	3.43	Investment	Land	Atlantic
50	222-232 N California Ave	Atlantic City	NJ	8401	Active	land sale	$ 975,000	22.38	1.00	Investment	Land	Atlantic
51	1509-1517 Pacific Ave	Atlantic City	NJ	8401	Active	land sale	$ 950,000	87.17	0.25	Investment	Land	Atlantic
52	120 Oriental Ave	Atlantic City	NJ	8401	Active	land sale	$ 899,000	107.04	0.19	Investment	Land	Atlantic
53	SOUTH CAROLINA AVE	Atlantic City	NJ	8401	Active	land sale	$ 799,000	23.58	0.78	Investment	Land	Atlantic
54	120-122 S South Carolina Ave	Atlantic City	NJ	8401	Active	land sale	$ 675,000	59.60	0.26	Investment	Land	Atlantic
55	600 N DELAWARE AVE	Atlantic City	NJ	8401	Active	land sale	$ 495,000	18.94	0.60	Investment	Land	Atlantic
56	121 Dewey Pl	Atlantic City	NJ	8401	Active	land sale	$ 445,000	53.77	0.19	Investment	Land	Atlantic
57	341 N Tennessee Ave	Atlantic City	NJ	8401	Under Contract	land sale	$ 399,900	11.41	0.80	Investment	Land	Atlantic
58	2015 Riverside Dr	Atlantic City	NJ	8401	Active	land sale	$ 399,000	30.46	0.30	Investment	Land	Atlantic
59	34 S Massachusetts Ave	Atlantic City	NJ	8401	Active	land sale	$ 350,000	114.78	0.07	Investment	Land	Atlantic
60	336-340 N MASSACHUSETTS AVE	Atlantic City	NJ	8401	Active	land sale	$ 399,000	83.27	0.11	Investment	Land	Atlantic
61	329 HYGEIA PL	Atlantic City	NJ	8401	Active	land sale	$ 299,000	528.01	0.01	Investment	Land	Atlantic
62	1924-1940 Murray Ave	Atlantic City	NJ	8401	Active	land sale	$ 299,000	18.99	0.36	Investment	Land	Atlantic
63	2322 Murray Ave	Atlantic City	NJ	8401	Active	land sale	$ 249,000	16.94	0.34	Investment	Land	Atlantic
64	216 S Victoria Ave	Atlantic City	NJ	8401	Active	land sale	$ 240,000	99.99	0.06	Investment	Land	Atlantic
65	122-124R N Texas Ave	Atlantic City	NJ	8401	Active	land sale	$ 229,000	20.63	0.25	Investment	Land	Atlantic
66	1811 Bacharach Blvd	Atlantic City	NJ	8401	Active	land sale	$ 199,000	10.35	0.44	Investment	Land	Atlantic
67	38 N Texas Ave	Atlantic City	NJ	8401	Active	land sale	$ 199,000	10.34	0.44	Investment	Land	Atlantic
68	106-112 N Texas Ave	Atlantic City	NJ	8401	Active	land sale	$ 185,000	22.57	0.19	Investment	Land	Atlantic
69	27 S Kentucky Ave	Atlantic City	NJ	8401	Active	land sale	$ 180,000	42.34	0.10	Investment	Land	Atlantic
70	19-21 S Texas Ave	Atlantic City	NJ	8401	Active	land sale	$ 159,900	33.31	0.11	Investment	Land	Atlantic
71	127 S Seaside Ave	Atlantic City	NJ	8401	Active	land sale	$ 120,000	20.01	0.14	Investment	Land	Atlantic
72	116 Seaside Ave	Atlantic City	NJ	8401	Active	land sale	$ 70,000	76.16	0.02	Investment	Land	Atlantic
73	2106 Murray Ave	Atlantic City	NJ	8401	Active	land sale	$ 55,000	10.43	0.12	Investment	Land	Atlantic
74	205 N Kentucky Ave	Atlantic City	NJ	8401	Active	land sale	$ 35,000	5.65	0.14	Investment	Land	Atlantic
75	332 N Tennessee Ave	Atlantic City	NJ	8401	Active	land sale	$ 23,900	9.56	0.06	Investment	Land	Atlantic
76	337-339 HYGEIA AVE	Atlantic City	NJ	8401	Active	land sale	$ -	0.00	0.03	Investment	Land	Atlantic
77	114 Pacific Ave	Atlantic City	NJ	8401	Active	land sale	$ -	0.00	0.09	Investment	Land	Atlantic

EXISTING COMMERCIAL PROPERTIES FOR SALE

Site_Num	ARC_Street	City	State	ZIP	Address	SaleStatus	Sale_Category	Sale Price	Sq Ft	Acres	Sale Type	PropertyType	Yr Blt	Ren	Stories	County
78	2610 Pacific Ave	Atlantic City	NJ	8401	2610 Pacific Ave	Active	property sale	350000	2,000	0.02	Investment	Retail	1920		2	Atlantic
79	229 S Tennessee Ave	Atlantic City	NJ	8401	229 S Tennessee Ave	Active	property sale	349999	1,315	0.06	Investment	Retail	1925		1	Atlantic
80	161-169 S New York Ave	Atlantic City	NJ	8401	161-169 S New York Ave	Active	property sale	349900	7,920	0.04	Investment	Office	0		3	Atlantic
81	10 S Florida Ave	Atlantic City	NJ	8401	10 S Florida Ave	Active	property sale	325000	10,302	0.12	Investment	Multi-Family	0		3	Atlantic
82	19-25 N Trenton Ave	Atlantic City	NJ	8401	19-25 N Trenton Ave	Active	property sale	325000	9,500	0.27	Investment	Retail	0		0	Atlantic
83	334 N Tennessee Ave	Atlantic City	NJ	8401	334 N Tennessee Ave	Active	property sale	319000	3,000	0.07	Investment	Multi-Family	1910		3	Atlantic
84	128 N Tennessee Ave	Atlantic City	NJ	8401	128 N Tennessee Ave	Active	property sale	299000	5,000	0.05	Investment	Multi-Family	1910		3	Atlantic
85	401 N Elberon Ave	Atlantic City	NJ	8401	401 N Elberon Ave	Active	property sale	279000	3,500	0.09	Investment	Industrial	1930		1	Atlantic
86	1100 Pacific Ave	Atlantic City	NJ	8401	1100 Pacific Ave	Active	property sale	279000	814	0.02	Investment	Retail	0		1	Atlantic
87	720 N Ohio Ave	Atlantic City	NJ	8401	720 N Ohio Ave	Active	property sale	275000	1,800	0.08	Investment	Retail	1940		1	Atlantic
88	3101 BOARDWALK	Atlantic City	NJ	8401	3101 Boardwalk	Active	condo sale	259900	1,495	0.00	Owner/User	Retail	1985		30	Atlantic
89	2402-2406 Fairmount Ave	Atlantic City	NJ	8401	2402-2406 Fairmount Ave	Active	property sale	229000	4,090	0.06	Owner/User	Industrial	0		1	Atlantic
90	4 N Mississippi Ave	Atlantic City	NJ	8401	4 N Mississippi Ave	Active	property sale	229000	1,716	0.03	Owner/User	Office	0		2	Atlantic
91	240 N Massachusetts Ave	Atlantic City	NJ	8401	240 N Massachusetts Ave	Active	property sale	215000	11,000	0.16	Investment	Industrial	0		0	Atlantic
92	12 S Florida Ave	Atlantic City	NJ	8401	12 S Florida Ave	Under Cont.	property sale	209500	4,186	0.05	Investment	Multi-Family	1920		0	Atlantic
93	24 N California Ave	Atlantic City	NJ	8401	24 N California Ave	Active	property sale	200000	10,000	0.14	Investment	Industrial	0		0	Atlantic
94	32 S Tennessee Ave	Atlantic City	NJ	8401	32 S Tennessee Ave	Active	property sale	199000	3,000	0.06	Investment	Office	0		2	Atlantic
95	511 N Arkansas Ave	Atlantic City	NJ	8401	511 N Arkansas Ave	Active	property sale	175000	2,500	0.14	Investment	Retail	0		1	Atlantic
96	138 S New Hampshire Ave	Atlantic City	NJ	8401	138 S New Hampshire Ave	Active	property sale	175000	2,724	0.06	Investment	Multi-Family	0		3	Atlantic
97	140 S Bellevue Ave	Atlantic City	NJ	8401	140 S Bellevue Ave	Active	property sale	150000	1,680	0.00	Investment	Multi-Family	0		3	Atlantic
98	1107 Arctic Ave	Atlantic City	NJ	8401	1107 Arctic Ave	Active	property sale	120000	2,280	0.02	Investment	Retail	1910		2	Atlantic
99	2612 Pacific Ave	Atlantic City	NJ	8401	2612 Pacific Ave	Active	property sale	75000	1,530	0.02	Owner/User	Retail	1956		2	Atlantic
100	1624 Atlantic Ave	Atlantic City	NJ	8401	1624 Atlantic Ave	Active	property sale	For Sale	4,305	0.06	Investment	Retail	0		1	Atlantic
101	3001 ATLANTIC AVE	Atlantic City	NJ	8401	3001 Atlantic Ave	Active	property sale	For Sale	4,310	0.13	Owner/User	Retail	1966		1	Atlantic
102	3112 Atlantic Ave	Atlantic City	NJ	8401	3112 Atlantic Ave	Active	property sale	For Sale	12,000	0.10	Owner/User	Retail	0		3	Atlantic
103	1923-1931 Bacharach Blvd	Atlantic City	NJ	8401	1923-1931 Bacharach Blvd	Active	property sale	For Sale	11,000	1.49	Investment	Industrial	0		1	Atlantic
104	322 BEACH AVE	Atlantic City	NJ	8401	322 Beach Ave	Active	property sale	For Sale	18,000	0.00	Investment	Multi-Family	0		0	Atlantic
105	1515 BOARDWALK AVE	Atlantic City	NJ	8401	1515 Boardwalk Ave	Active	property sale	For Sale	2,501	0.95	Owner/User	Retail	1986		2	Atlantic
106	10 N DELAWARE AVE	Atlantic City	NJ	8401	10 N Delaware Ave	Active	property sale	For Sale	3,000	0.07	Owner/User	Retail	1967		1	Atlantic
107	15 N Hartford Ave	Atlantic City	NJ	8401	15 N Hartford Ave	Active	property sale	For Sale	20,000	0.11	Investment	Multi-Family	1940		4	Atlantic
108	12 S Mount Vernon Ave	Atlantic City	NJ	8401	12 S Mount Vernon Ave	Active	property sale	For Sale	30,000	1.00	Investment	Hospitality	0		4	Atlantic
109	247 S New York Ave	Atlantic City	NJ	8401	247 S New York Ave	Active	property sale	For Sale	8,000	0.10	Owner/User	Retail	0		2	Atlantic
110	526 Pacific Ave	Atlantic City	NJ	8401	526 Pacific Ave	Active	condo sale	For Sale	40,000	0.00	Investment	Multi-Family	2006		28	Atlantic
111	2600 Pacific Ave	Atlantic City	NJ	8401	2600 Pacific Ave	Active	property sale	For Sale	6,000	0.07	Owner/User	Retail	1920		2	Atlantic
112	2601 Pacific Ave	Atlantic City	NJ	8401	2601 Pacific Ave	Active	property sale	For Sale	5,490	0.07	Investment	Retail	1978		2	Atlantic
113	7 S South Carolina Ave	Atlantic City	NJ	8401	7 S South Carolina Ave	Active	property sale	For Sale	21,000	0.12	Owner/User	Office	1965		4	Atlantic
114	300 N Tennessee Ave	Atlantic City	NJ	8401	300 N Tennessee Ave	Active	property sale	For Sale	65,000	1.71	Investment	Industrial	0		1	Atlantic
115	4014 Ventnor Ave	Atlantic City	NJ	8401	4014 Ventnor Ave	Active	property sale	For Sale	3,718	0.04	Investment	Retail	1927		3	Atlantic

The Impacts of Human Disturbance on Avian Presence in Barnegat Bay, New Jersey

Christopher J. Sayers II

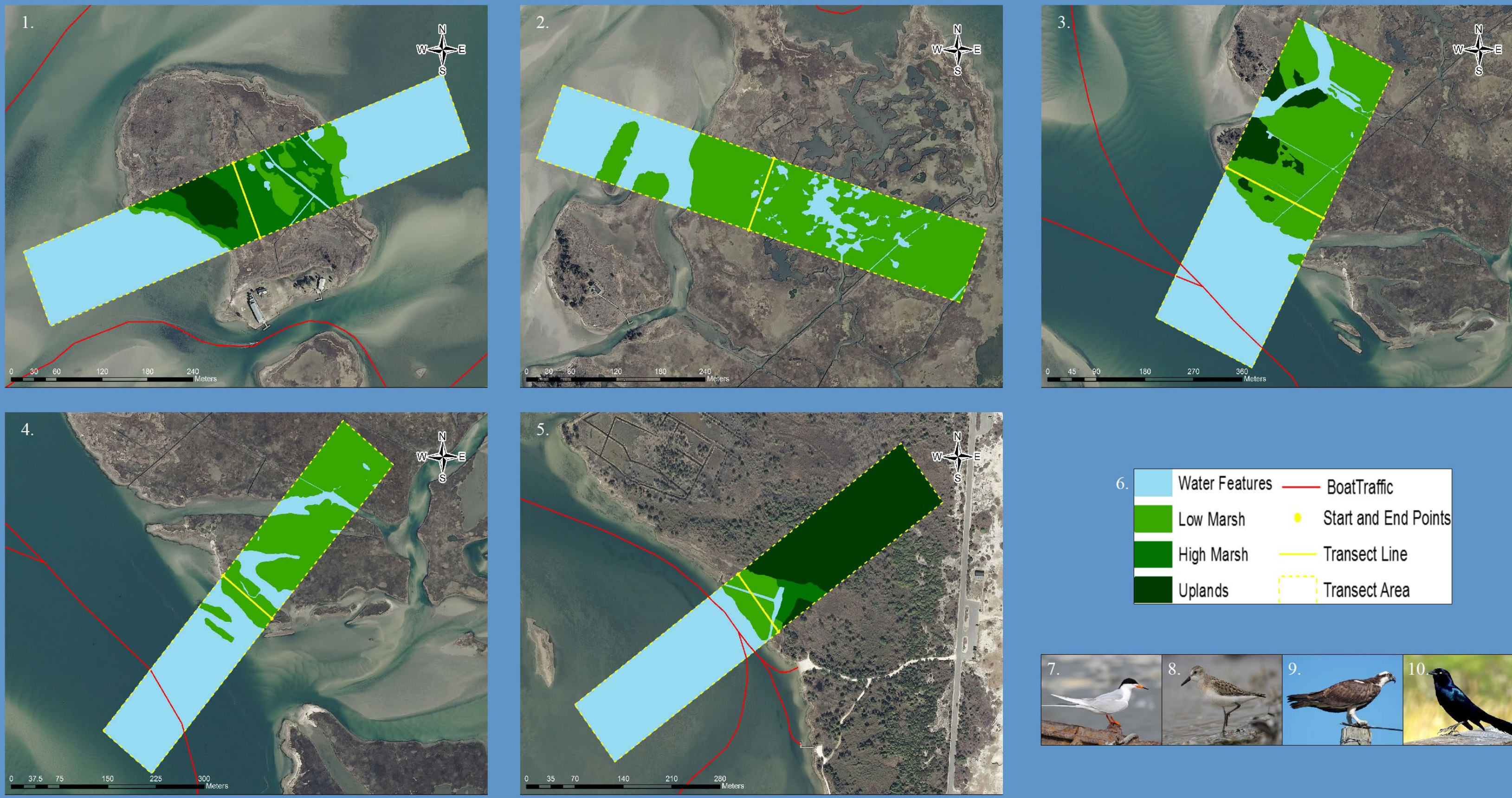


Figure 1-10. Digitized GIS maps displaying habitat zonation of each transect area in the Sedge Island Marine Conservation Zone, legend, and the most prevalent bird species during the study: Forster's Tern (*Sterna forsteri*), Semipalmated Sandpiper (*Calidris pusilla*), Boat-tailed Grackle (*Quiscalus major*), and Osprey (*Pandion haliaetus*)

Abstract

Nearly all types of birds are subjected to human disturbance. Forms of disturbance include recreation, development, commercial fishing, as well as boat-based and aviation tourism. Such activities can have negative effects on the foraging, hunting, nesting, and mating habits of birds, depending on the species. While migrating, birds use the barrier islands and coastal salt marshes of Barnegat Bay, New Jersey for food and resources to regain energy before resuming their travels. In order to determine the impact human disturbance has on avian presence in the Sedge Island Marine Conservation Zone, five transects (in both sheltered and unsheltered areas of the bay) were surveyed for seven weeks during the summer of 2015. Any birds, boats, humans, or aircrafts observed within the transect area and in the 15 minute sampling period were tallied and weather data was also recorded. Using statistical tests including Simpson's Biodiversity Index, Jaccard's Index, Tukey $HSD^{a,b,c}$ Post-Hoc, and regression, it was found that all the transects had high avian biodiversity values and had the same degree of similarity. The results of this study support the claim that the affects of human disturbance on avian presence in Barnegat Bay, New Jersey are minimal. Based on the data and statistical analysis, the Sedge Island Marine Conservation Zone ecosystem is in a healthy state and protects the bird species that thrive there.

Introduction

Birds play an irreplaceable role in almost every ecosystem on Earth. The three main niches birds fill within a food web are agents of dispersal, biological controllers, and biological indicators. Birds benefit the environment by acting as agents of dispersal through the relocation of seeds, pollen, and fish eggs when foraging for food, defecating, or flying to different areas. Birds such as swallows and warblers act as biological controllers and keep insect populations in check, many of which can potentially be harmful to humans. Birds are also major bio-indicators that can tell humans about the health of the environment, levels of pollution, and the potential health risks posed to humans by diseases ("The Importance of Birds," 2001). Needless to say, birds are extremely important to both mankind and the environment.

Nearly all types of birds are subjected to human disturbance. Forms of disturbance include recreation, development, commercial fishing, as well as boat-based and aviation tourism. Such activities can have negative effects on the foraging, hunting, nesting, and mating habits of birds, depending on the species. Increased human disturbance can force birds to relocate to less favorable foraging or hunting areas, thus causing possible malnourishment in the future. For colonial nesting birds, such as sandpipers, plovers, terns, and martins, human disturbance "can have direct effects on the nesting success and survival of individual breeders, as well as long-term consequences for the persistence of colonies as a whole" ("Human Disturbance," 2012).

While migrating, shorebirds use the Atlantic Flyway for food and resources on beaches, grassland wetlands, and agricultural wetlands to regain energy before resuming their travels. The barrier islands and coastal salt marshes of Barnegat Bay, New Jersey serve mainly to protect primary coasts from wave action and storm surges; however, these unique ecosystems also provide primary habitat for shorebirds and their invertebrate food sources. This study will be conducted in order to see the severity human disturbance poses on the avian life in Barnegat Bay, NJ.

Methodology

- Data collection took place two days a week (Wednesday and Saturday) for 7 weeks of the summer. The data collection schedule encompassed both weekdays and weekends, in which there was varying amounts of human disturbance.
- The collection times took place in the morning, usually from the hours of 7AM-10AM (unless otherwise delayed by outside forces i.e. weather, transportation interruptions, etc.).
- Several strip transects (100m or 200m x 600m) were performed at various locations around the Sedge Islands in Barnegat Bay, NJ.
- Any birds, boats, humans, or aircrafts observed within the transect area and in the 15 minute sampling period were tallied and weather data was also recorded.
- Simpson's Diversity Index and Jaccard's Index were used to calculate species biodiversity. A Tukey $HSD^{a,b,c}$ Post-Hoc test was used to compare significance among the transects' parameters. Additionally, regression tests were used to show correlation strengths and significant differences between the data.

Objective/Hypothesis

This research project was conducted to unveil more information about the impacts of human disturbance on birds and to evaluate the effectiveness of the Sedge Island Marine Conservation Zone. Because of the relative skittishness of birds, I believe that the increased human presence in Barnegat Bay, New Jersey during the weekends will have a negative effect on avian presence.

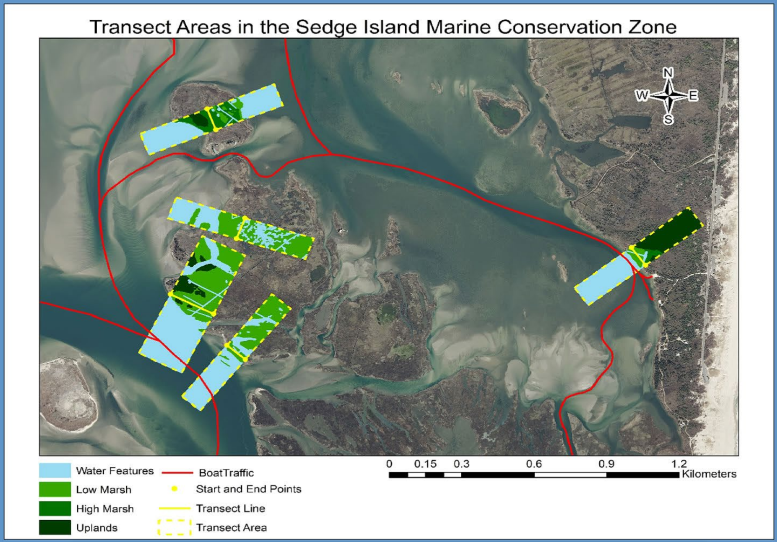
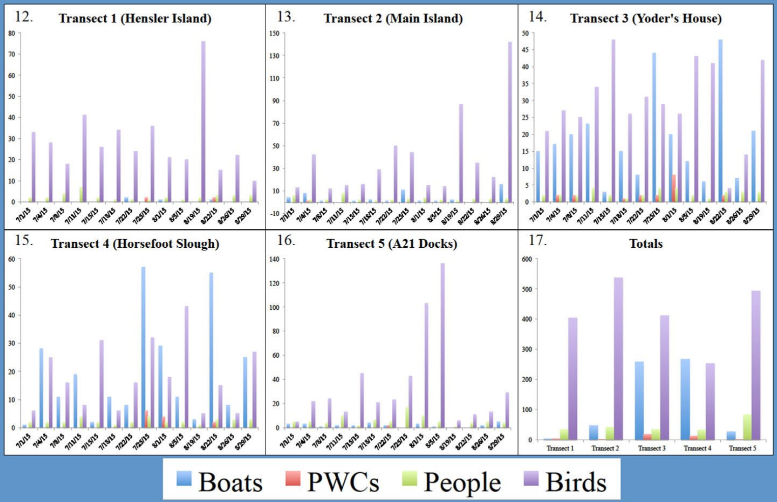


Figure 11. Transect areas and popular boating routes in the Sedge Island Marine Conservation Zone



Figures 12-17. Bird, boat, PWC, and people tallies in each transect of the study

Results

A Simpson's Biodiversity Index showed that all transects had extremely high biodiversity values (Transect 1 = 0.902, Transect 2 = 0.804, Transect 3 = 0.836, Transect 4 = 0.942, Transect 5 = 0.772). Averaging the biodiversity values of the transects reveals that both the sheltered and unsheltered areas have a biodiversity of 0.85. Jaccard's Index similarity percentages ranged from 65-218%; however, after averaging the values, the Jaccard's Index revealed that there is a 104% similarity among all of the transects. A Tukey $HSD^{a,b,c}$ Post-Hoc test showed that the parameters measured in all five transects had the same degree of similarity. When comparing the weather conditions to the amount of birds observed each day using a regression test, no significant correlations among any of the comparisons emerged ($R^2 < 0.12$, $P > 0.65$). When each habitat type area was compared against the amount of birds and the biodiversity values for each transect for using a regression test, no significant correlations emerged ($R^2 < 0.44$, $P > 0.35$).

Discussion

The results of this study refute my hypothesis and support the claim that the Sedge Island Marine Conservation Zone is in a healthy state that shelters avian species. Bird presence is influenced by a plethora of variables. Excluding human disturbance, avian presence and biodiversity can be influenced by changes in weather conditions, predation, food and water resources, and habitat (Vaughn and Strauss, 2013). Due to the poor correlations and significant differences among the data when comparing avian population observations to weather and habitat zonation areas, it was ruled that human disturbance does not play an important role in affecting the presence of avian species in the Sedge Island Marine Conservation Zone.

After analyzing the results from the Simpson's Biodiversity Index, Jaccard's Index, and Tukey $HSD^{a,b,c}$ Post-Hoc test, it was found that many of the transects had similar traits. Since the averaged biodiversity values for the sheltered and unsheltered transects were the same, the transects had a cumulative similarity of 104% , and all of the transects had the same degree of similarity according to the Tukey $HSD^{a,b,c}$ Post-Hoc test, the results suggest that there are no supportable differences between the sheltered and unsheltered transect areas in terms of avian diversity. The tests signify that the avian biodiversity in the Sedge Island Marine Conservation Zone is uniform and that there is no significant correlation between the amount of human disturbance and avian presence.

After compiling the data, several notable bird absences were discovered. Species including American Black Duck (*Anas rubripes*), Belted Kingfisher (*Megaceryle alcyon*), Black-bellied Plover (*Pluvialis squatarola*), Marsh Wren (*Cistothorus palustris*), and Northern Harrier (*Circus cyaneus*) were expected birds that should be found in a saltmarsh habitat, but were never spotted. In addition, there were no invasive species observed: Brown-headed Cowbird (*Molothrus ater*), Canada Goose (*Branta canadensis*), European Starling (*Sturnus vulgaris*), House Sparrow (*Passer domesticus*), Rock Pigeon (*Columba livia*). The sensitivity of birds to proper ecosystem functioning makes them valuable indicators of habitat quality (Hill, 2016). Although there were several key species that were not observed during data collection, the absence of all avian invasive species found in New Jersey (bioindicators for impaired ecosystems) reveals that the Sedge Island Marine Conservation Zone is in a healthy state.

Conclusion

The results of this study support the claim that the affects of human disturbance on avian presence in Barnegat Bay, New Jersey are minimal. Based on the data and statistical analysis, the Sedge Island Marine Conservation Zone ecosystem is in a healthy state and protects the bird species that thrive there. In future research, I hope to continue evaluating ecosystems while looking at avian biodiversity.

Acknowledgements

I would like to thank Brendan Tumpey for his momentous role and continued assistance while collecting data, Charles Homoki and Ryan Gittler for their occasional contributions to the data collection, Charles Homoki and Kyle Oliveira for their help with creating GIS maps, and the Sedge Island Natural Resource and Education Center and Island Beach State Park for their permission to use their land and facilities. A special thanks is given to Dr. John Wnek and Mr. Jason Kelsey for overseeing this project and for providing me with their superb guidance throughout my research career.

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Streaming the Rivers and Creeks in Ocean County, New Jersey

Nicolette Corrao, PJ LoBello, and Victoria Pobok

Objective: To spread awareness of the natural beauty of The Barnegat Bay Watershed to enhance conservation efforts

Abstract

The Barnegat Bay is an estuary with tributaries such as Metedeconk, Toms River, and Cedar Creek. The purpose of this project is to expose the natural beauty of the Barnegat Bay Watershed to support conservation efforts and acquaint citizens with the local ecosystem through pictures and historical information.

Introduction

Barnegat Bay estuary is a local attraction for fishing, swimming, clamming, and other recreational activities. It is tidally influenced by the Atlantic via Point Pleasant Canal, Barnegat Inlet, and Little Egg Harbor Inlet, which provide an influx of ocean water in high tide conditions. Barnegat Bay estuary has a greater net influx of fresh water and is mostly influenced inland tributaries including the Metedeconk, Toms River, Cedar Creek, and Forked River. Each tributary contains a headwaters and mouth, or a beginning source and end point, respectively. All tributaries contain headwaters in or near Ocean County and drain into the Barnegat Bay, forming the 600 mi^2 Barnegat Bay Watershed ("The Watershed"). The Watershed encompasses most of Ocean County and Southern Monmouth County, with 560,000 people residing within ("The Watershed"). As Ocean County continues to grow, it suffers from the negative influence of humans and their habits. Runoff, habitat loss, and fishery declines are all adversely affecting Barnegat Bay Watershed ("The Watershed"). The purpose of this project is to expose the natural beauty of the Barnegat Bay Watershed to support conservation efforts and acquaint citizens with the local ecosystem.

Figure 1: Location of Ocean County in New Jersey

Methods & Data

- The headwaters and mouth of each Barnegat Bay tributary in Ocean County were visited, as well as several points of interest along the water body accessible to the public totalling 169 points
- All photographs were taken by professional nature photographer Bob Birdsall (**Figure 3**). GPS coordinates were gathered using a Garmin GPS device, as well as the iPhone Compass app
- All coordinates and photos were compiled into a Microsoft PowerPoint presentation and into a Microsoft Excel spreadsheet
- All coordinates were plotted in a map document using Esri ArcMap 10.2.2. Multiple maps were created with the gathered coordinates and were plotted in reference to different attributes such as county wetlands and waterbodies, roads, and national and state parks (**Figure 2**)
- The State and County open spaces were clipped to the Ocean County layer from the NJDEP Open Spaces shapefile
- The state and county highways, Route 9, and the Garden State Parkway were selected from the NJDEP Tiger Roads 2000 in Ocean County, New Jersey shapefile
- All points of interests were displayed onto Esri Story Maps with a corresponding picture
- All data collected during this project was qualitative and collected in the form of photographs.
- All basemap data was retrieved from the New Jersey Department of Environmental Protection's (NJDEP) Bureau of Geographic Informational Systems.

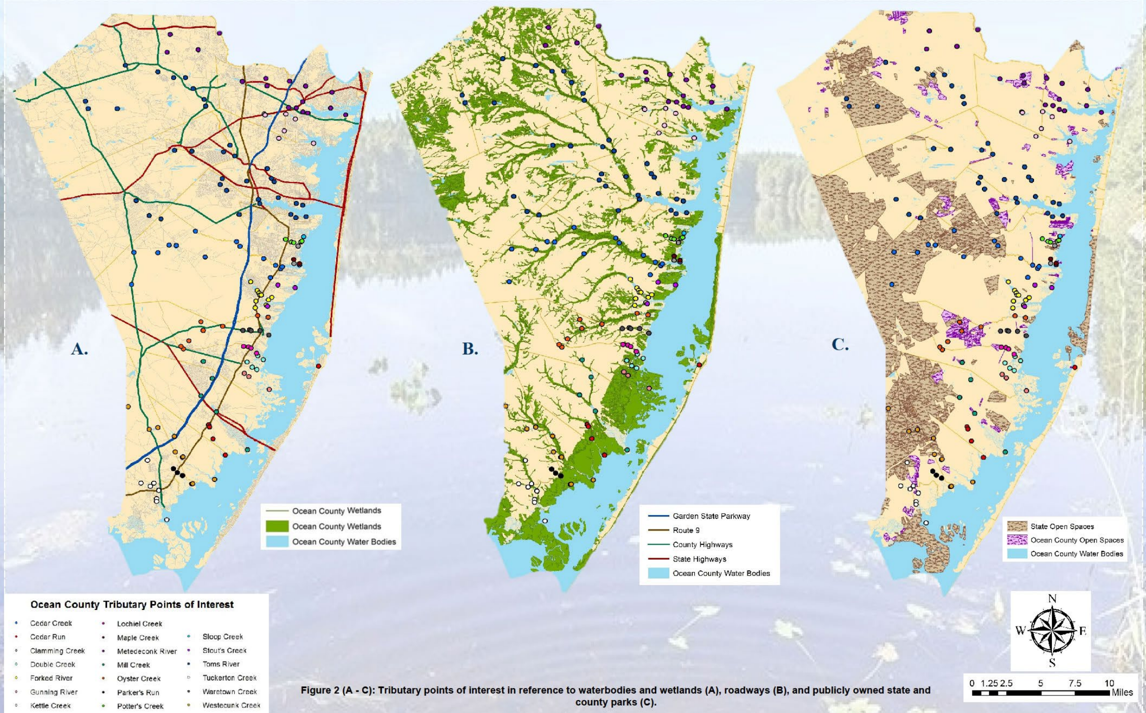


Figure 2 (A - C): Tributary points of interest in reference to waterbodies and wetlands (A), roadways (B), and publicly owned state and county parks (C).

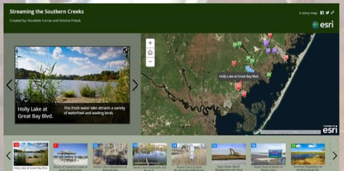
Figure 3: Sample photos of points of interest. From left to right: Sloop Creek at Bayview Avenue, Mouth of Tuckerton Creek at South Green St., Holly Lake at Great Bay Blvd., Native American Monument at Forge Pond along the Metedeconk, Cold Brook near old "Home Place" along Oyster Creek, and Headley Cranberry Farm at Pine Bridge Branch.

Table 1: Selected sites of historical significance

Historical Site	Location
NJ's Tallest Pitch Pine	Manahawkin
Thoroughfare Island Indian Hummocks	Stafford
Stout's Creek	Lacey
Rova Farms Russian Settlement	Jackson
Salt Works	Berkeley
Good Luck Point	Ocean Gate
Native American Monument	Brick
Huddy Park	Toms River
Old Central Railroad	Barnegat

Get Exploring!

Scan the QR codes or follow the links below to explore StoryMaps, like the one pictured below featuring all points of interest along Ocean County tributaries



Streaming the Northern Creeks
http://arcg.is/23ANS9z

Streaming the Southern Creeks
http://arcgi.s/1PkhPEF

Table 2: Species spotted at points of interest

Animal Species	Plant Species
Great Egret	Curly Grass Fern
Northern Pine Snake	Floating Heart
Red Shouldered Hawk	Pine Barrens Gentian
Pine Barrens Tree Frog	Purple Pitcher Plant
Red Squirrel	Swamp Pink
Barred Owl	Sundews
Wood Duck	Bog Asphodel
Garter Snake	Arethusa
Mute Swan	White Fringed Orchid

Discussion and Conclusion

In completing this study, there were several interesting discoveries made within Ocean County. Some species spotted were the garter snake, red squirrel, mute swan, sundews, pitcher plants, wood ducks, and Swamp Pink, a threatened species (**Figure 4 & Table 2**). Additionally, specific landmarks were accounted for, such as numerous historical cranberry bogs, and Native American hummocks (**Table 1**). It was found that with exploring the nature of the county, there was also corresponding historical stories that took place at each of these locations. Additional facts and information about individual points of interest can be seen in the StoryMaps featured in the QR codes or links below.

Although all data gathered was pictorial and historical, there are several uses for this data. With the funding graciously provided with by the Barnegat Bay Partnership, printed maps of each tributary and their points of interest are being constructed through the Ocean County Planning Office. Also, digital data will be compiled in an app available for download in app marketplaces. With these efforts, those involved in this project hope to make a usable interface for Ocean County citizens to become involved and concerned with their home ecosystem.

Figure 4: Photos of species spotted during site exploration.
Left Column (Top to Bottom): ***Swamp Pink, Pitcher Plants, Domestic Geese***
Right Column (Top to Bottom): ***Red Squirrel, Garter Snake, Wood Ducks, Mute Swan***

Acknowledgements

At this time, we would like to thank the Barnegat Bay Partnership for providing funding to make this project possible. We would like to thank Terry O'Leary and Bob Birdsall for their guidance in collecting data and crafting a final project. Also, we would like to thank Nicolette Corrao and all others who assisted for their cooperation.

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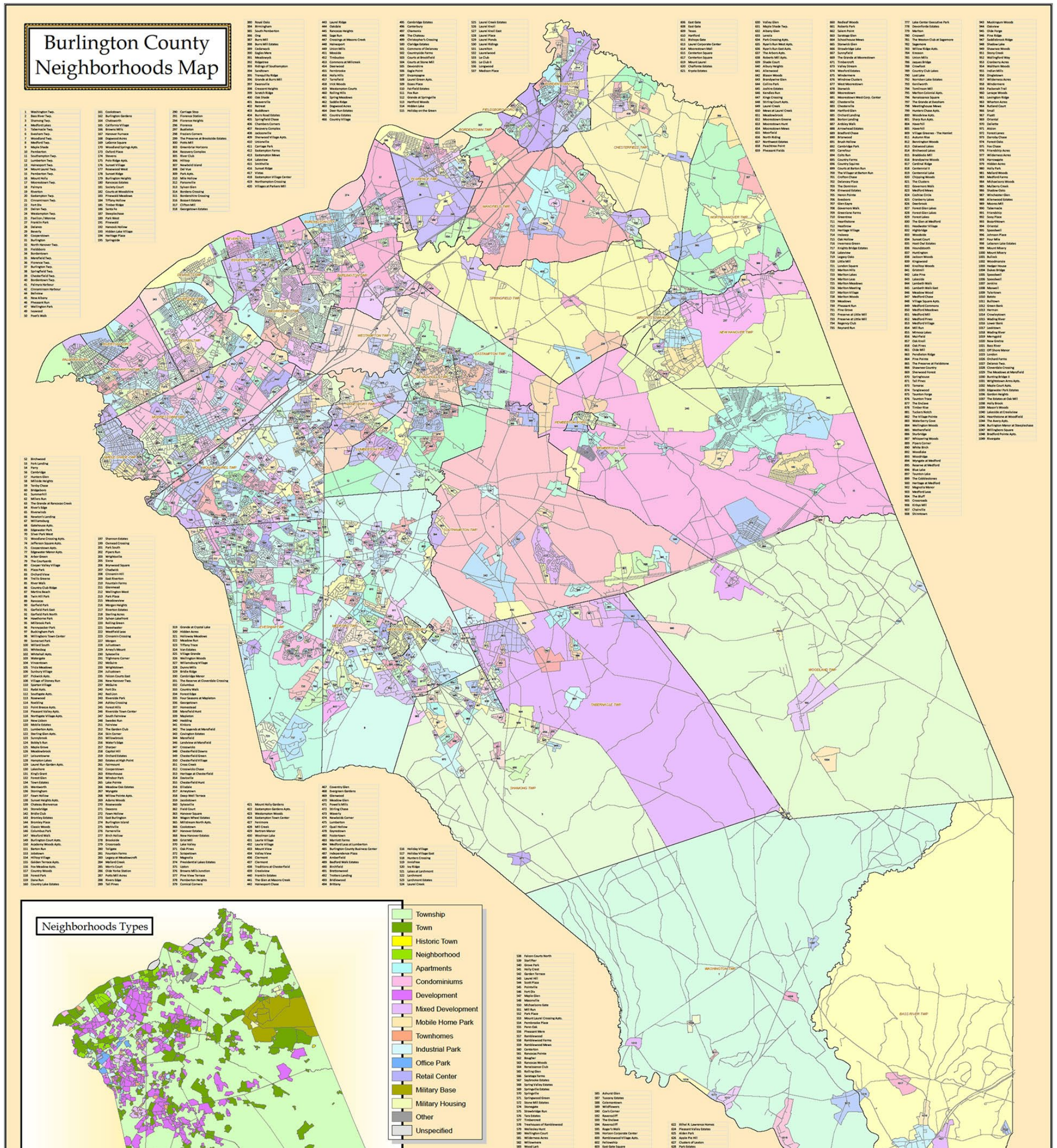
Burlington County Neighborhoods Map



Code	Name	Description
AP	Apartments	Leased multi-unit dwellings on common land
CM	Condominiums	Owned multi-unit dwellings on common land
DV	Development	Builder-driven planned community. Primarily single-family residential.
HT	Historic Town	Center maintained primarily for historic education and recreation
IP	Industrial Park	Commercial warehousing and distribution
MB	Military Base	Federally owned military use area
MD	Mixed Development	Multi-type / multi-use planned community
MH	Mobile Homes	Titled modular dwellings on leased land
MR	Military Housing	Federally owned residential community
NH	Neighborhood	Diverse building stock and use with evolution over time.
OP	Office Park	Commercial office center with multiple structures
OT	Other	Other
RC	Retail Center	Commercial retail center with multiple structures
TH	Townhomes	Development of adjacent-unit structures on owned and common land
TN	Town	Older center of development
TS	Township	Multi-use municipal unit outside of town or neighborhood centers
UN	Unspecified	No specific use or construction

New Jersey Conservation Focal Areas

Overview

The identification of **Conservation Focal Areas** is one of two main components of New Jersey's revision of the **State Wildlife Action Plan** (http://www.nj.gov/dep/fgw/ensp/waphome.htm) that aims to identify and address the highest priorities of NJ's fish and wildlife resources. The existing plan's focus will be narrowed by establishing and prioritizing focal species, identifying the areas that provide good conservation opportunities and then target the greatest threats to those species and habitats. Implementable conservation actions will then be linked to those threats, creating a blueprint for conservation of NJ's wildlife. Conservation Focal Areas represent the second of a two-part approach to identifying threats to New Jersey's Species of Greatest Conservation Need (SCGN), as well as to develop actions which will address these threats. In addition to identifying "Focal Species" (priority subset of SCGN) specific geographic areas of NJ's landscape are recognized as presenting greater opportunities for effective conservation action. Conservation Focal Areas are where the conservation community can undertake actions to improve the conditions not only of the focal species but of other species relying on the same habitats.

Objectives

- Provide a data-driven approach for geographically focusing conservation action with New Jersey's Landscape Regions that incorporates metrics of **landscape condition/ecological integrity**, existing **conservation infrastructure**, existing **wildlife habitats**, **biodiversity**, and **negative human influences**.
- Incorporate a **regional perspective/context** that addresses ecosystems of importance to the Northeast region that are found in New Jersey.
- Emphasize **riparian corridors** that serve to **connect** larger tracts of habitat in an otherwise fragmented landscape.

Next Steps

Identify the threats in each Conservation Focal Area and develop conservation actions that will guide the conservation community and land-use decision makers that are able to undertake actions to improve the conditions of New Jersey's highest priority fish and wildlife resources.

Process – Phase I

- Compiled ~41 inputs spanning terrestrial, freshwater aquatic and marine environments from state and regional sources.
- Performed conversion, re-scaling and reclassification so that each input was standardized into 30' cells
- Categorized data into four geodatabases: Condition/Integrity, Conservation Infrastructure, Wildlife Habitats, Biodiversity and Negative Influences.
- Assigned relative importance (weights) to each input.

Process – Phase II

- Performed weighted co-occurrence analysis that combines inputs to identify areas where several different qualities are present ("resource-rich" areas).
- Stratified by Landscape Regions (calculated percentile ranks relative to each region) in order to have even distribution of areas between regions.

Process – Phase III

- Extracted percentile ≥70 in each Landscape Region.
- Applied minimum size criteria to identify core areas
- Applied connectivity rules to select key connections between high value areas
- Ran basic generalization/simplification processes to smooth boundaries of areas.

BIODIVERSITY

- Natural Heritage Priority Sites	This layer identifies critically important areas to conserve New Jersey's biological diversity.
- Species Richness Indices (4)	The number of unique species, with a status of E, T, or SC, was calculated for each habitat patch mapped in the Landscape Project.
- Submerged Aquatic Vegetation (Rutgers)	This layer represents submerged aquatic vegetation (SAV) of the Barnegat Bay - Little Egg Harbor estuary, from 2003 to 2009.
- Artificial Reef Sites	Artificial reefs represent man-made, longterm bottom structure that are able to provide a surface for corals and habitat for various structure-dependant fish species.
- Seal Haul-out Areas	This layer identifies Seal Haul-out areas.
- Marine Waterbody Access Areas	Direct ocean access "Primary" sites were designated by an area with a radius twice that of the minimum width of the passage.
- Ocean Trawl Species Rich Areas	A total number of fish species caught between 2010 and 2015 was calculated from the New Jersey Ocean Stock Assessment Survey.
- Seabird Annual Average Abundance (NOAA/AWOIS)	The data represent predicted number of individuals of each listed seabird species per standardized survey segment.
- Shellfish Areas	Unpublished Shellfisheries data.
- Sportfishing Areas	The data is updated to identify the areas they consider recreationally significant fishing areas or prime fishing areas.
- Shipwreck Dense Areas (NOAA/AWOIS)	Recorded shipwrecks were examined by the density in which they coexisted.
- Trout Production Waters	It represents all the trout production (TP) waters.
- Freshwater Mussel Habitat	This layer represents the stretches of stream that serve as habitat for endangered, threatened and special concern freshwater mussel species.
- Streams Weighted by species	Using species data as a guide, the layer was hand-edited to estimate appropriate areas of habitat.
- Odonate Habitat	This layer represents the stretches of stream that serve as habitat for endangered, threatened and special concern odonate species.
- Diadromous Fish Habitat (TNC)	The data includes documented current freshwater habitat.

CONSERVATION INFRASTRUCTURE

- Preserved Lands	This layer is a composite of protected open space and recreation areas owned in fee simple interest by the NJDEP
- Natural Areas	This layer includes areas of land or water, owned in fee simple or held as a conservation easement by the Department.
- Marine Protected Areas (NOAA)	This layer represents the marine protected areas.

WILDLIFE HABITATS

- All habitats	This layer is derived from the 2012 Land Use/Land Cover, which includes core forest habitat, grassland habitat, wetlands, scrub/shrub, beach/dune and water.
- Vernal	This layer identifies not only vernal and potential vernal pools themselves, but also surrounding habitat that allows for successful breeding, dispersal, foraging, overwintering, and migration of species that use vernal pools.
- Habitats of High Regional Responsibility for NJ (TNC)	It represents the habitats which New Jersey contains at least 25% of the total habitat in the Northeast region.

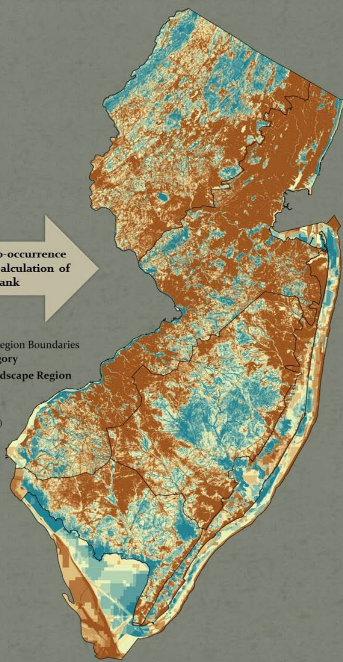
CONDITION/INTEGRITY

- Category 1 Streams	This layer was derived from New Jersey's Surface Water Quality Standards.
- Pinelands Streams	It represents all the streams in the Pinelands Region (PL).
- Permeability - Regional Flow (TNC)	
- Local Connectedness (TNC)	It estimates the degree of permeability, or conversely the degree of resistance, surrounding each cell in the region.
- Landscape Complexity (TNC)	It refers to the variety of landforms created by an area's topography, the range of its elevation gradients, and the density of its wetlands.
- Landscape Context Index (TNC)	It quantifies the degree of human conversion of natural landcover in the immediate neighborhood of that cell on the landscape.
- NE Index of Ecological Integrity (UMass)	Ecological integrity is defined as the ability of an area to sustain important ecological functions over the long term.
- Impervious Surface	Impervious surfaces are hard substrates like paved roads, parking lots, and roof tiles.
- Riparian Landcover	The riparian zone is the land area directly adjacent to a stream or river and subject to its influence.
- Ambient Biomonitoring Network	This layer represents point sites sampled by NJDEP as part of its Ambient Biomonitoring Network (AMNET).

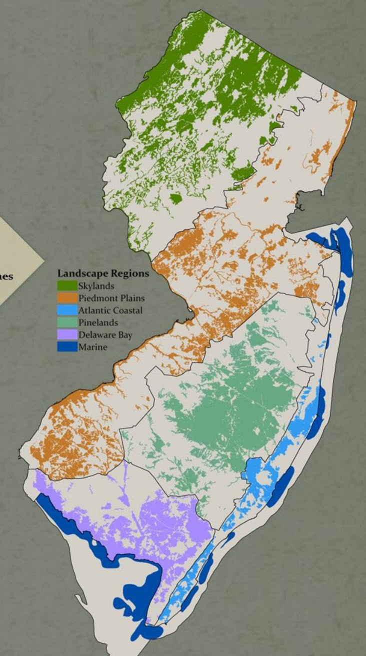
NEGATIVE INFLUENCES

- Developed Lands	Developed lands and associated buffers. This layer is derived from the 2012 Land Use/Land Cover.
- Roads	his layer represents all the segmented Road Centerlines of New Jersey.
- Shipping Density (NOAA/USCG)	The data are based on 2013 vessel track line data for the Atlantic.
- Aquaculture Lease Lots	Unpublished Aquaculture data.

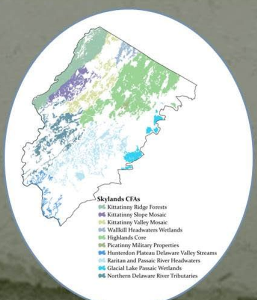
Weighted Co-occurrence Analysis & Calculation of Percentile Rank

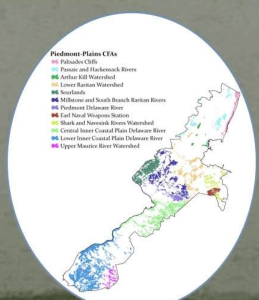


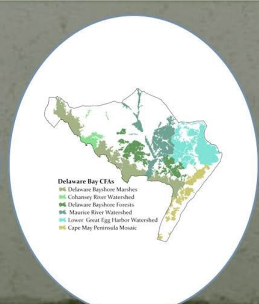
Extraction of ≥ 70th percentile & Generalization Routines

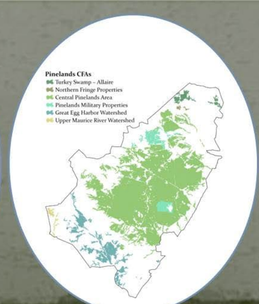


Regional Conservation Focal Area Insets







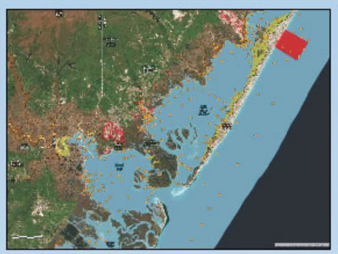


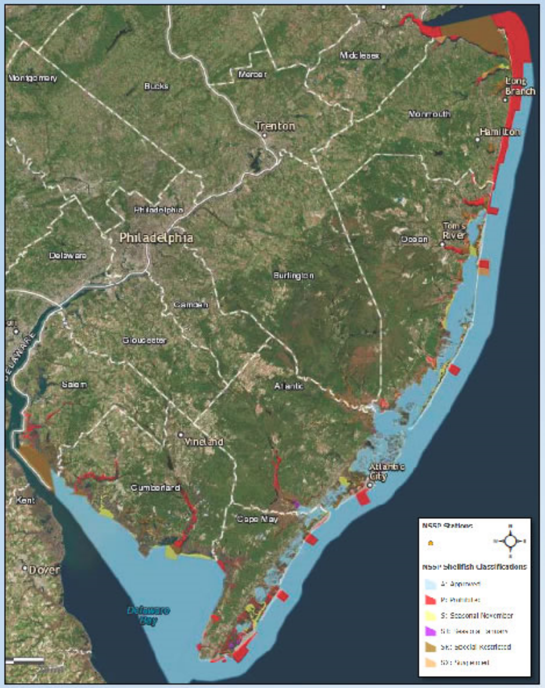
The datasets used in the analysis were provided by NJDEP and our partner organizations in landscape conservation:

NSSP Monitoring Network

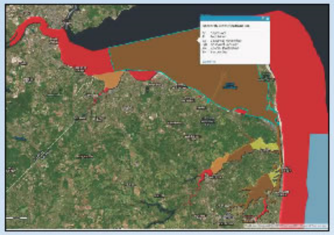
NJDEP Bureau of Marine Water Monitoring

In compliance with the National Shellfish Sanitation Program (NSSP), the Bureau of Marine Water Monitoring collects and analyzes approximately 12,000 to 15,000 samples each year to ensure a safe shellfish harvest. The NSSP ArcGIS Online map allows users to interact with the published data to review shellfish classification areas based off of statistical analysis of results collected at 1,781 NSSP stations along New Jersey's coast. Through the analysis of this data, waters are classified to inform shellfish harvesters of areas to avoid to protect Public health.
More information: http://www.nj.gov/dep/bmw/.

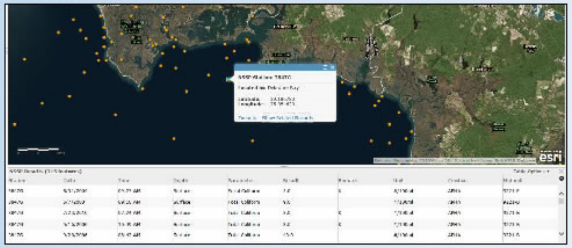




By using both NSSP Station data and NSSP shellfish classification data, the coast of NJ can be effectively monitored and classified to ensure the safe harvest of shellfish (See above).



Each NSSP shellfish classification is represented by different symbology. Users are able to identify each polygon to find out the shellfish classification of a particular area (See above).



A user can find more information about each NSSP station by identifying each point. A Relationship Class was created between the NSSP Station feature class and the NSSP Results table. This relationship class utilizes the NSSP Results table that auto populates through multiple tables in the relate. Any data added to the DEP supported Enterprise COMPASS database automatically updates the results. To view this table, click on the "Show Related Record" hyperlink (See left).

Data Sources: ArcGIS Online And NJDEP.

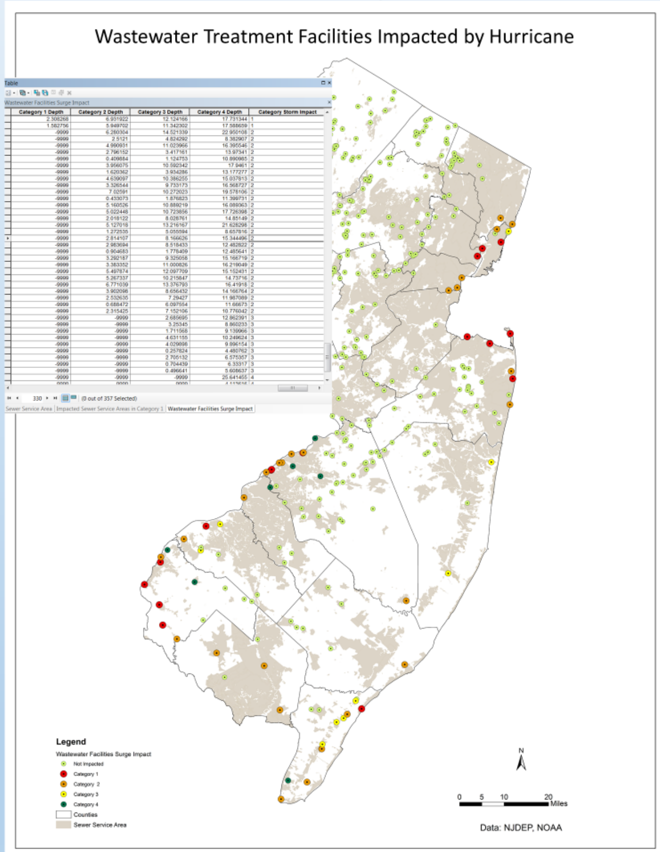
Created by Mike Kusmiesz, Dnyanada Bhide, William Smith NJDEP. April 21, 2016

Instructional Presentation

GIS - Planning and Decision Making Tool for Hurricanes

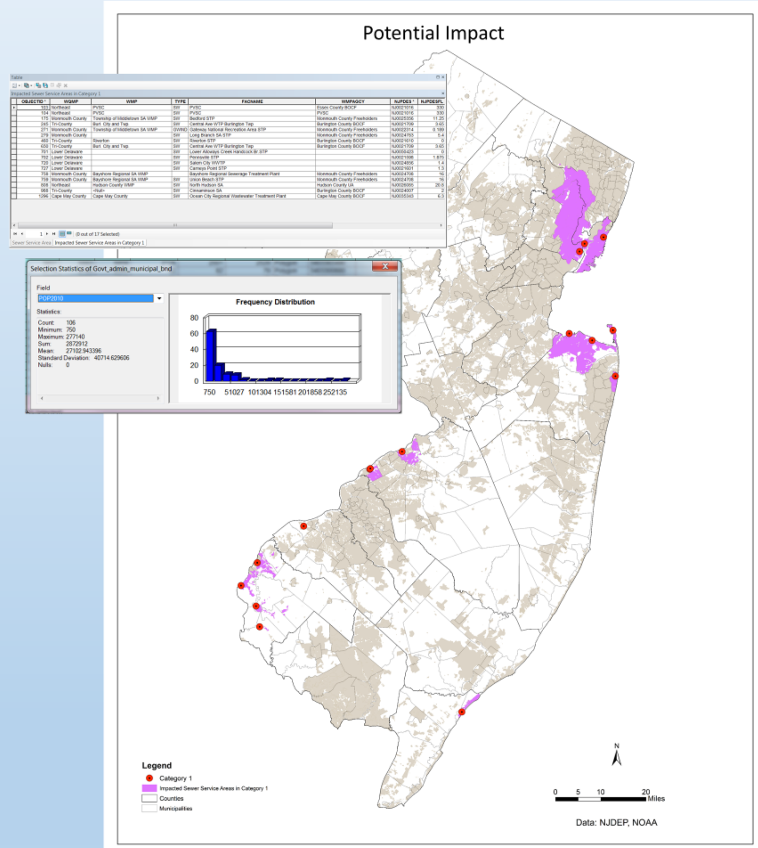
Pre-Storm Planning

Intersection of the Wastewater Treatment Plants with Sea, Lakes, Overland Surge from Hurricane (SLOSH) Model output



During Storm and Post Storm

Potentially impacted Sewer Service Areas and Municipalities as a result of impacted Wastewater Treatment Plants by Category 1 Hurricane



Hurricane Categories	Impacted Facilities
1	16
2	44
3	53
4	60

Potential Impact of Category 1 Hurricane

* 16 Wastewater Treatment Plants
* 17 Sewer Service Areas
* 106 Municipalities
* 2,872,912 Population Impacted

This analysis can be used to determine possible impacts on drinking water intakes, Shellfish beds etc. and indicate necessary actions.

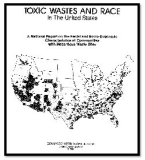
Dnyanada Bhide, Ed Apalinski April 21, 2016

Layers of Concern: Using GIS to Communicate Environmental Injustice in Newark, New Jersey

Lisa Jordan[1], Johnny Quispe[2], Bryana De Veaux[1]
[1]Drew University, Environmental Studies and Sustainability Program, [2]Rutgers University, Evolution & Ecology Program

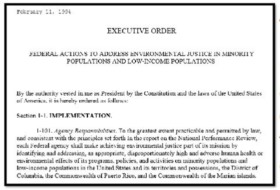
History & Background

A movement, backed by early GIS research, alerted activists government officials, and researchers to the significant disparities in exposure to environmental hazards, faced by minority and low income populations.



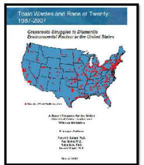
Environmental Justice is defined as the equal treatment and involvement of all people regardless of their race or income when it comes to the implementing the proper environmental laws and policies. Everyone has a right to be protected under the same laws that protect them from environmental and health risks. In order for everyone to reach this status everyone must have a say in regards to the decision making process that affects their well being and pursuit of happiness. Unfortunately, many minority and low income areas are threatened by environmental injustices everyday, because of the lack of say they have in the decision making process when it comes to the dumping of hazardous waste sites and the lack of air and water quality in many areas.

EJ is short for Environmental Justice.



EO 12898 – Clinton Administration

An Executive Order, upheld by federal agencies, required environmental and public health organizations to begin to consider their impact on on minority and low income communities.

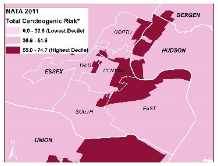


EJ as a social movement, body of research, and area of governance continues today. The lead found in Flint and Newark drinking water introduced a new community of concerned citizens to the phrase and its meaning. EJ has also been used to examine social impacts of climate change and a wide range of public health and urban planning work (e.g. food access and variety, access to transportation and to greenspace).

Layers & Sources

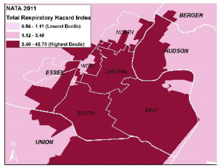
Environment:

Air Pollution, Cancer Risk



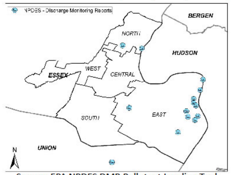
Source: EPA National Air Toxics Assessment (2011)

Air Pollution, Respiratory Risk



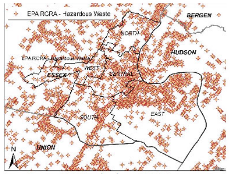
Source: EPA National Air Toxics Assessment (2011)

Water Pollution, Majors (NPDES)



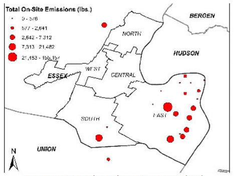
Source: EPA NPDES DMR Pollutant Loading Tool

Hazardous Waste, RCRA



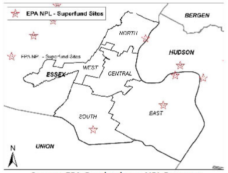
Source: EPA Geodatabase, RCRA Program

Industrial Pollution, Emissions



Source: EPA Toxics Release Inventory (TRI)

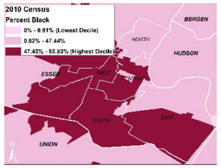
Legacy Pollution Sources



Source: EPA Geodatabase, NPL Program

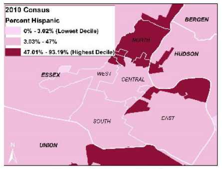
Demography:

Minorities: Percent Black



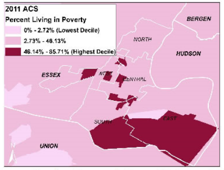
Source: US Census (2010)

Minorities: Percent Hispanic



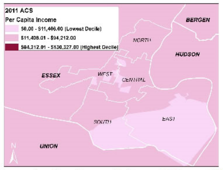
Source: US Census (2010)

Economic Factors: % Poverty



Source: American Community Survey, US Census, 2011

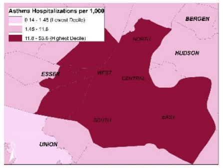
Economic Factors: Income



Source: American Community Survey, US Census, 2011

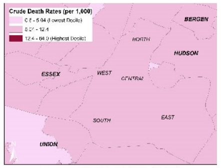
Health:

Asthma Hospitalizations



Source: NJ DOH, NJSHAD (2009-2011)

Crude Death Rates



Source: NJ DOH, NJSHAD (2010)

Analysis:

Summary Statistics:

As in the original *Toxics Wastes and Race* report, the use of GIS is very valuable for assessing environmental, demographic, and health risks, as they relate to minority and low income populations. The measures below summarize our findings shown in the Newark maps.

Environmental Health Measure	Number of Tracts in Top Decile
Air Pollution, Total Cancer Risk	19 of 87 (22 percent)
Air Pollution, Total Respiratory Hazard Index	67 of 87 (77 percent)

Environmental Risk Measure	Total Count
Water Pollution, Major Dischargers	13
Hazardous Waste Sites, RCRA	1,348 (of 32,843 in the state)
Industrial Pollution (TRI)	19 (of 131 in the county)
Legacy Pollution Sources (NPL)	4 (of 150 in the state)

Demography Measure	Number of Tracts in Top Decile
Percent Black	54 of 87 (62 percent)
Percent Hispanic	24 of 87 (28 percent)
Percent in Poverty	9 of 87 (10 percent)

Economic Measure	Number of Tracts in Bottom Decile
Per Capita Income	10 of 87 (11 percent)

Health Measure	Municipality Rate
Asthma Hospitalizations	14.2 per 1,000
Crude Death Rates	670.9 per 100,000

Advanced Demographic Summaries:

In New Jersey, a disproportionate number of minorities live in areas with the highest risks for cancer and respiratory disease, due to air pollution. Even among Newark residents, Hispanic populations are more likely to live in areas with higher respiratory risks.

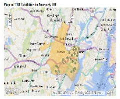
Demographic Characteristics in New Jersey Census Tracts with the Highest Respiratory Risks from Air Pollution (NATA 2011)

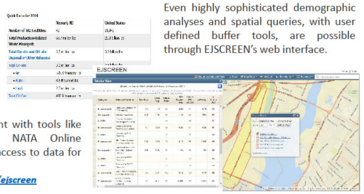
Top Decile	Number of Census Tracts	Total Population	%	Black Population	%	Hispanic Population	%
No	1809	7,882,562	92%	961,273	80%	1,297,638	83.44%
Yes	201	703,163	8%	243,553	20%	257,506	16.56%
	2010	8,585,725		1,204,826		1,555,144	

Demographic Characteristics in Newark's Census Tracts with the Highest Respiratory Risks from Air Pollution (NATA 2011)

Top Decile	Number of Census Tracts	Newark's Total Population	%	Black Population	%	Hispanic Population	%
No	89	293,729	79%	174392	91%	84559	72.30%
Yes	21	76,195	21%	17628	9%	32389	27.70%
	110	369,924		192,020		116,948	

Online Tools:





Even highly sophisticated demographic analyses and spatial queries, with user defined buffer tools, are possible through EJSCREEN's web interface.

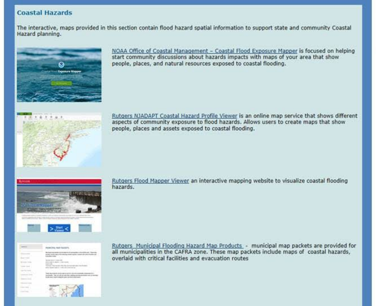
Automation of EJ Assessment with tools like EJSCREEN and the EPA NATA Online Application, enables easier access to data for research.

Website: https://www.epa.gov/ejscreen

NJDEP Coastal Management NJ Coastal Atlas Website

http://www.nj.gov/dep/cmp/czm_mapindex.html

Coastal Hazards


Coastal Hazards

The interactive, maps provided in this section contain flood hazard spatial information to support state and community Coastal Hazard planning.

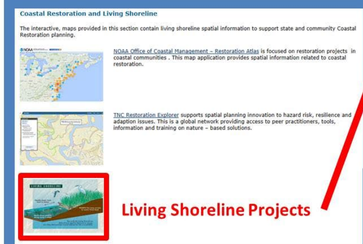
NOAA Office of Coastal Management – Coastal Flood Exposure Mapper is focused on helping start community discussions about hazards impacts with maps of your area that show people, places, and natural resources exposed to coastal flooding.

Rutgers NJADAPT Coastal Hazard Profile Viewer is an online map service that shows different aspects of community exposure to flood hazards. Allows users to create maps that show people, places and assets exposed to coastal flooding.

Rutgers Flood Mapper Viewer an interactive mapping website to visualize coastal flooding hazards.

Rutgers Municipal Flooding Hazard Map Products - municipal map packets are provided for all municipalities in the CAFRA zone. These map packets include maps of coastal hazards, overlaid with critical facilities and evacuation routes

Coastal Restoration and Living Shorelines


Coastal Restoration and Living Shoreline

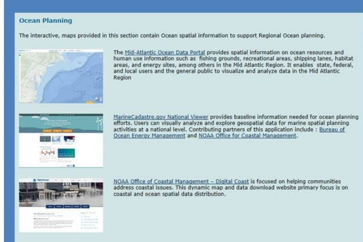
The interactive, maps provided in this section contain living shoreline spatial information to support state and community Coastal Restoration planning.

NOAA Office of Coastal Management – Restoration Atlas is focused on restoration projects in coastal communities . This map application provides spatial information related to coastal restoration.

TNC Restoration Explorer supports spatial planning innovation to hazard risk, resilience and adaption issues. This is a global network providing access to peer practitioners, tools, information and training on nature – based solutions.

Living Shoreline Projects

Ocean Planning


Ocean Planning

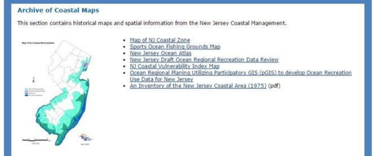
The interactive, maps provided in this section contain Ocean spatial information to support Regional Ocean planning.

The Mid-Atlantic Ocean Data Portal provides spatial information on ocean resources and human use information such as fishing grounds, recreational areas, shipping lanes, habitat areas, and energy sites, among others in the Mid Atlantic Region. It enables state, federal, and local users and the general public to visualize and analyze data in the Mid Atlantic Region

MarineCadastre.gov National Viewer provides baseline information needed for ocean planning efforts. Users can visually analyze and explore geospatial data for marine spatial planning activities at a national level. Contributing partners of this application include : Bureau of Ocean Energy Management and NOAA Office for Coastal Management.

NOAA Office of Coastal Management – Digital Coast is focused on helping communities address coastal issues. This dynamic map and data download website primary focus is on coastal and ocean spatial data distribution.

NJ Coastal Map Archives

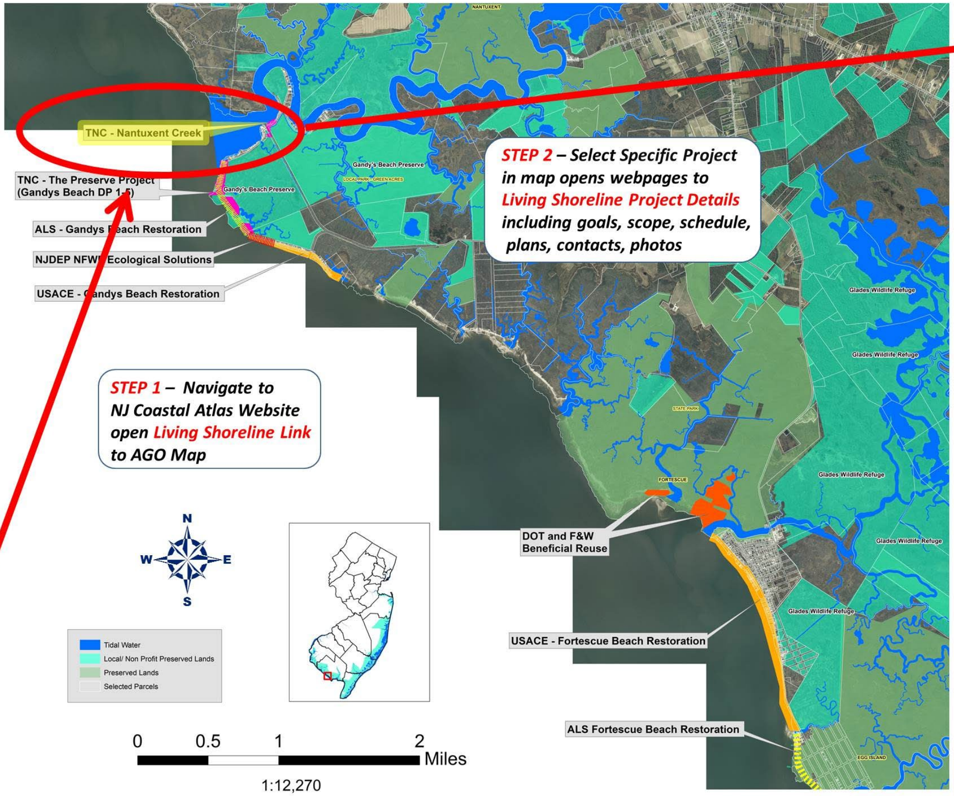

Archive of Coastal Maps

This section contains historical maps and spatial information from the New Jersey Coastal Management.

- Map of NJ Coastal Zone
- Sports Ocean Fishing Grounds Map
- New Jersey Ocean Atlas
- New Jersey Draft Ocean Regional Recreation Data Review
- NJ Coastal Vulnerability Index Map
- Ocean Regional Planing Utilizing Participatory GIS (pGIS) to develop Ocean Recreation Use Data for New Jersey
- An Inventory of the New Jersey Coastal Area (1975) (pdf)

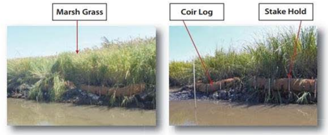
April 2016

Developing an AGO Story Map for Identifying Living Shoreline Projects in New Jersey



Historic Shoreline Treatments (2)

Living Shoreline Coir Log and Marsh Grass Project Components (3)



The coir logs and marsh grasses also combine to prevent prevent erosion of the shoreline. The natural fiber coir log is woven tightly together and is able to withstand wave action that normally would erode the bank. The root system from the marsh grasses growing in the coir log and soil also acts to more solidly holding the soil in place.

Examples of Living Shorelines (1)

Figure 1: Example Living Shorelines Projects (A - Marsh Sill, B - Joint Planted Revetment, C - Oyster Reef, D - Reef Balls)

TNC Nantuxent Creek Project

Location: Along the southern bank of Nantuxent Creek, upriver of the Money Island Marina.

Goals: increase the resiliency of tidal marsh, beach, and oyster reef habitats to the impacts of sea level rise and more frequent and intense storms to ensure these habitats are providing the full suite of ecosystem services to the wildlife and human communities within the project areas.

Scope: Approximately 2,800 linear feet of oyster breakwaters split between the Preserve and Nantuxent Creek project areas. Approximately 300 feet of coir log living shorelines in the Preserve's detail plan 1 and Nantuxent Creek site.

Schedule: 1st Phase - August 2015- October 2015. 2nd Phase April 1-15, 2016 and June 15 – November 8, 2016

- TNC The Preserve - Gandy's Beach
- ALS Gandy's Beach Restoration
- NJDEP NFWF Ecological Solutions
- USACE Gandy's Beach Restoration
- NJDOT / F&W Beneficial Reuse
- USACE Fortescue Beach Restoration
- ALS Fortescue Beach Restoration

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION - OFFICE OF COASTAL AND LAND USE PLANNING

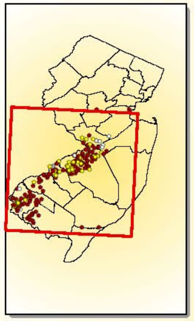
Map Development: Dave DuMont

References: (1) Stevens Institute of Technology, Living Shorelines Engineering Guidelines; (2) Southeast Aquatic Resources Partnership

Photo credit: (3) Steve Jacobus

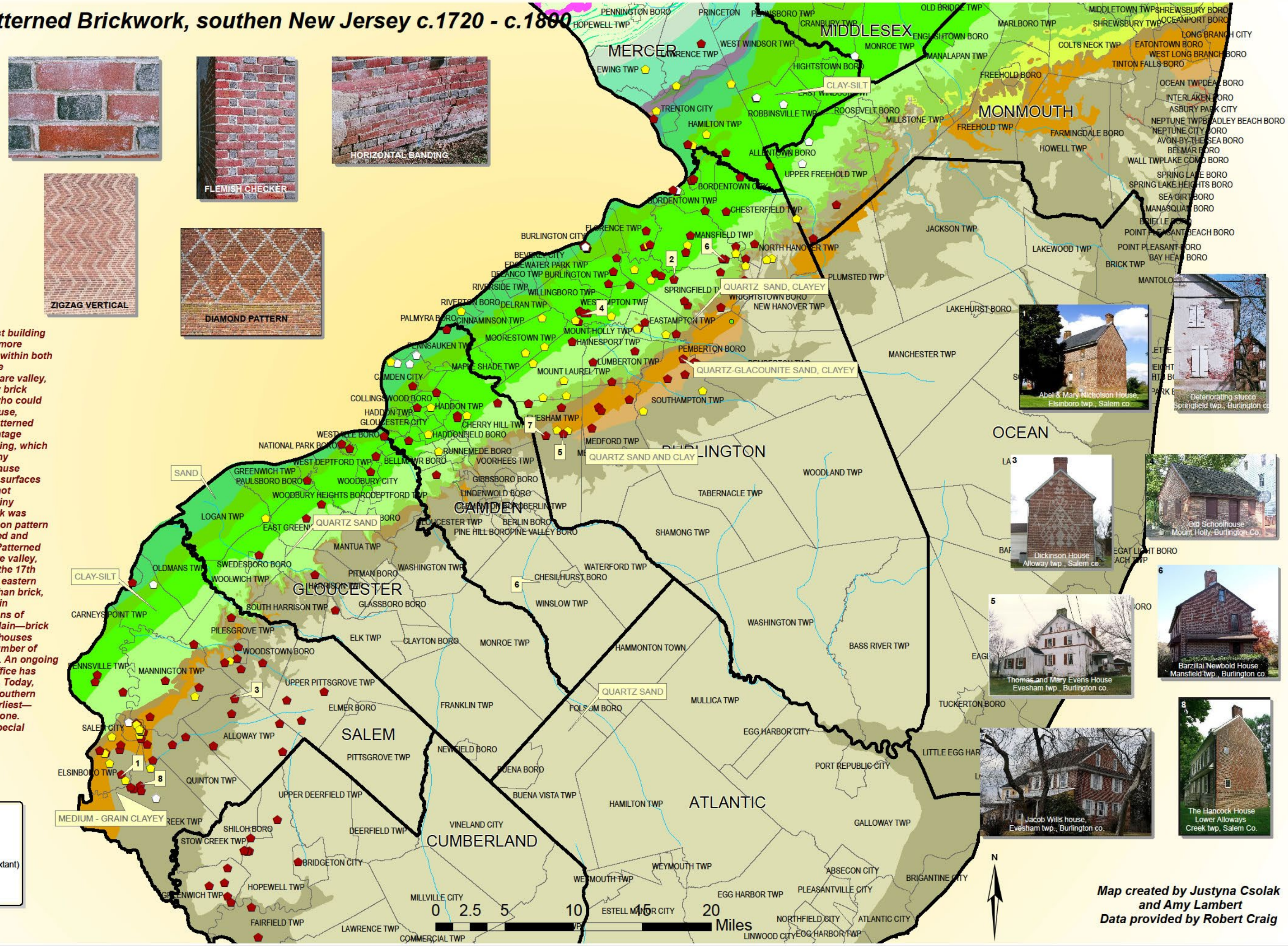
Vernacular Architecture: Patterned Brickwork

Patterned Brickwork, southen New Jersey c.1720 - c.1800



In colonial New Jersey, brick was the finest building material that was widely available. It was more expensive than wood or stone, but it was within both the means and the aspirations of the more prosperous property owners in the Delaware valley, where clay was plentiful and where many brick makers and bricklayers lived. For those who could either purchase or commission a brick house, there was a further popular refinement: patterned brickwork.Patterned brickwork took advantage of the pre-industrial methods of brickmaking, which resulted in a percentage of the bricks in any firing becoming "glazed" on one end, because of vitrifying substances in the clay. These surfaces present a dark appearance when light is not reflected at the viewer, but a bright and shiny appearance when it is. Patterned brickwork was the art of the bricklayer. The most common pattern is called 'Flemish checker', in which glazed and unglazed brick alternate in each course. Patterned brickwork became popular in the Delaware valley, including Philadelphia, before the end of the 17th century, but the better houses in much of eastern Pennsylvania were built of stone rather than brick, and relatively few such houses were built in Delaware. However, in the clay-rich portions of southern New Jersey—the inner coastal plain—brick was widely used, and even though many houses were built with plain brickwork, still the number of patterned brickwork houses is impressive. An ongoing inventory by the Historic Preservation Office has thus far yielded more than 300 examples. Today, along the Delaware bay shore, the most southern examples—including some of the very earliest—will be lost to sea-level rise if nothing is done. This is a vernacular architecture that is special to New Jersey—and it is at risk!

NJ Historic Preservation Office
Natural and Historic Resources



Legend

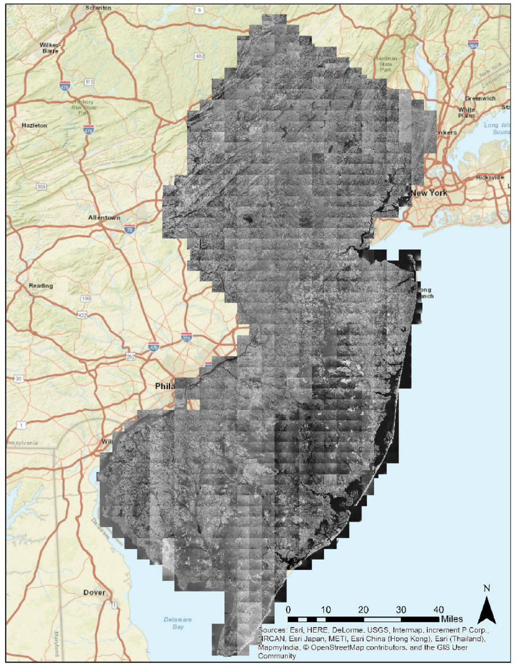
Patterned Brickwork Points

- Patterned Brickwork (Extant)
- Known or Suspected Patterned Brickwork (Extant)
- Patterned Brickwork (Demolished)
- Hydrography (state/major - generalized)

Basemap: Bedrock Geology

Map created by Justyna Csolak and Amy Lambert
Data provided by Robert Craig

Panchromatic 1987 Imagery of New Jersey

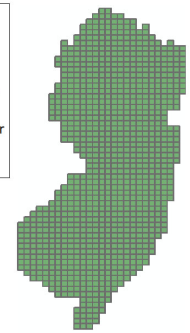


The 1987 Imagery of New Jersey is a statewide panchromatic (grayscale) mosaic dataset of aerial images. It is composed of 933 individually georeferenced images. These images were flown and collected by Keystone Aerial Services, and purchased by the NJDEP for their historical imagery archive.

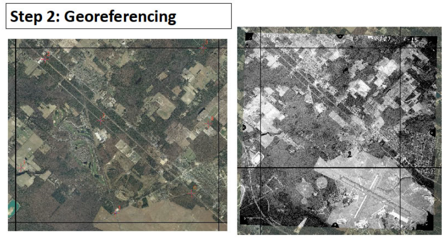
In order to create the final mosaic dataset, many different geoprocessing steps had to be done to ensure an accurate dataset. These geoprocessing steps include creating a fishnet grid, georefencing each individual image, image clipping, and QA/QC. Other software like Microsoft Excel 2016 can provide a means to organize and tracking data as it is finish.

Based on this procedure, the statewide imagery layer of 1987 was created before being distributed to internal NJDEP applications.

Step 1:Create Grid
Using the Fishnet tool, a grid was generated based upon the approximate centroid of each image frame. A starting coordinate is used to orient and align the rest of the grid. This grid allows the user to quickly spatially locate each image in the image set (See right).

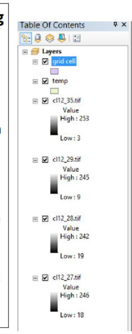


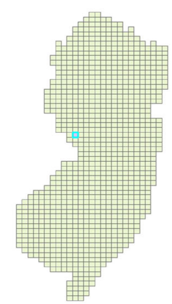
Step 2: Georeferencing



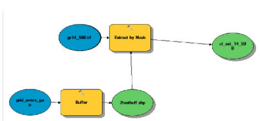
Georeferencing was done using 7 to 15 points control points around the images based on identifiable and unchanged features on the source image. The 2nd Order Polynomial transformation was used to increase the accuracy of each control point. The images are then rectified and saved to a specified directory.

Step 3: Image Clipping
A clipping tool was created using python to match and clip images to their corresponding grid cell. Each image and grid cell are standardized with a row and column. The clipping tool selects the appropriate grid cell, extracts it, creates a 2 foot buffer to account for the raster pixel cell size, and then goes on to the next image located in the specified directory (See right).



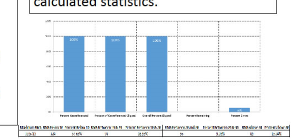


Step 4: Individual Image QA/QC
The accuracy of each image were reviewed in comparison to its adjacent images. Data Models were created to fill in gaps, cover corner tags, and replace additional information with the appropriate geography.



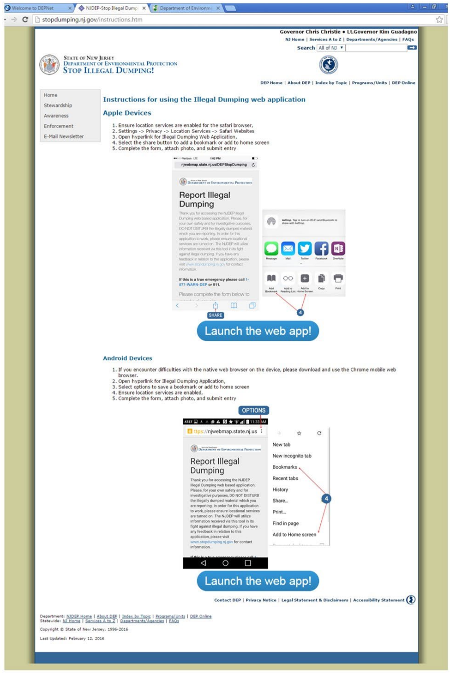
Step 5: Mosaic
Building the mosaic requires creating an empty mosaic dataset within a geodatabase and importing the appropriate images based on dataset or workspace. The user can generate overviews and building pyramids to enable the imagery to draw faster. Footprints and the imagery boundary should then be created to be able to identify individual images within the mosaic dataset (See full map above).

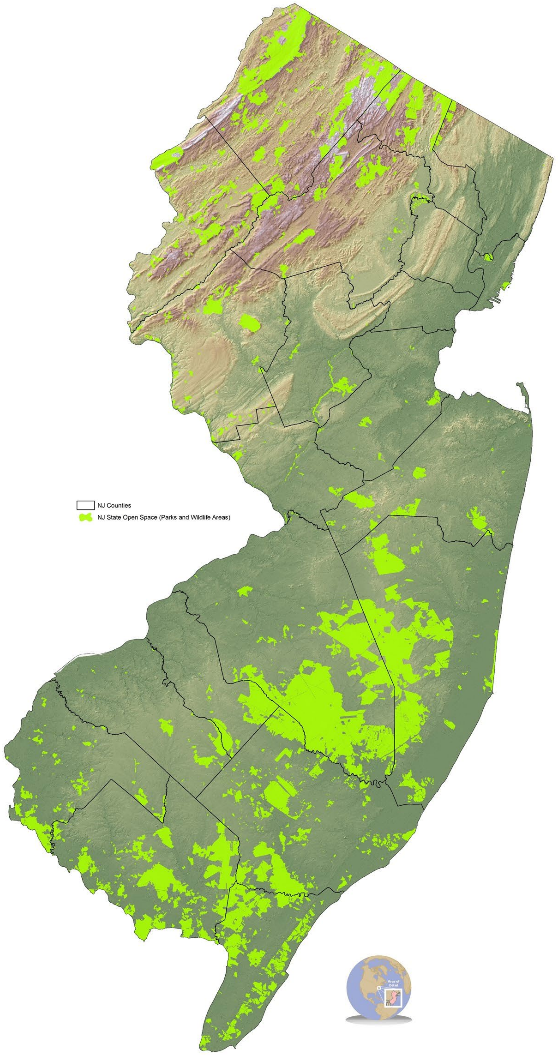
Bookkeeper
By using Microsoft Office 2016, data locations, progress statistics, were tracked to ensure no data was omitted during the project. The project timeline was updated automatically based upon the calculated statistics.



Data Source: NJDEP, Keystone Aerial Services Project Members: William Smith, Dan Oliva, John Tyrawski, NJDEP. April 21, 2016.

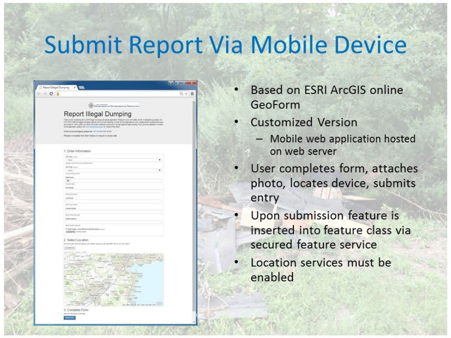
NJDEP Illegal Dumping Crowd Sourcing Application

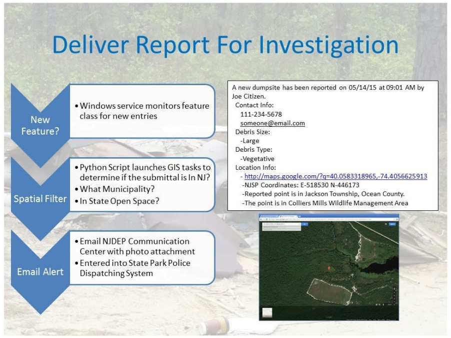


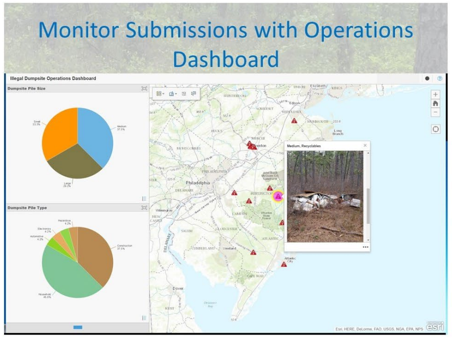


Public lands all over New Jersey are being used as dumping grounds. Litter, garbage bags, tires, televisions, electronic waste, appliances, yard waste, and construction debris are being dumped and threatening our local environment, animals and public. This dumping detracts from the natural beauty of our public lands; it decreases property value, and costs the citizens of New Jersey tax dollars to clean up. New Jersey's 39 state parks, 11 forests, 4 recreation areas, 42 natural areas and 57 historic sites, representing New Jersey's natural and cultural legacy, are situated on over 360,000 protected acres.

new jersey department of environmental protection





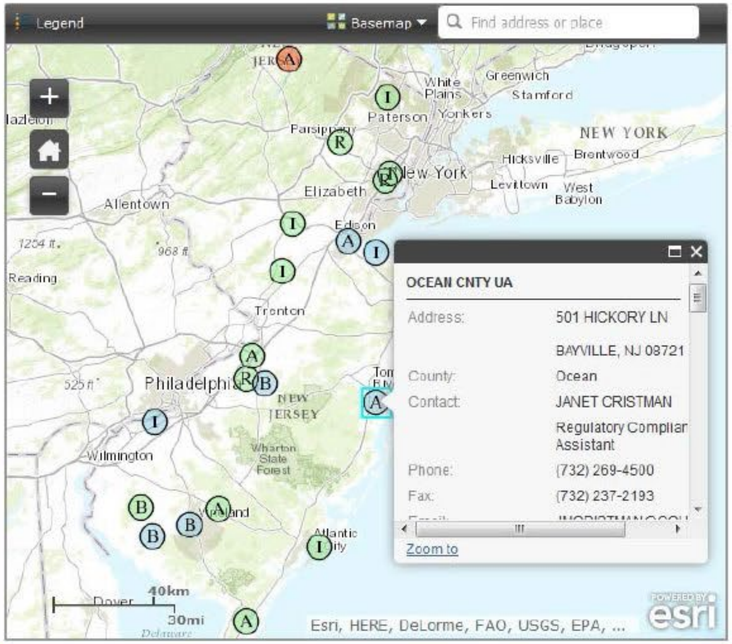


Map Production: Ed Apalinski NJDEP/BGIS, 4/2016
For more information visit : http://stopdumping.nj.gov/

DWQ - Interactive Sewage Sludge Management Tool

The project was a result of the closure of sludge processing facilities due to Hurricane Sandy and the need for sludge generators to locate alternative facilities.

Basic view showing the five categories of sludge receiving facilites and their operational status.



Popup Window Displays:

1) General Info
2) Acceptance Criteria
3) Capacity Data

Popup window allows the user to see the pertinent information for alternative disposal facilities.

NJDEP/WRM/DWQ/BPR
Contact: Tom Cosmas or Steve Boyer

Most Unique

Thru-Hiking the Pacific Crest Trail

In 2015, Mr. Straus thru-hiked the Pacific Crest Trail in 156 days as an ultra-light backpacker. The following map will give you the "feeling" of thru-hiking the Pacific Crest Trail. You will be guided through the Mojave Desert, Lake Tahoe & Lassen Volcanic National Park of Northern California, the beautiful lakes of Oregon including Crater Lake, and Cascade National Park in Washington.

Most consider Mr. Straus an expert in the backcountry. He has guided and led many trips throughout the Boundary Waters Canoe Area (BWCA) and Quetico Provincial Park, an area covering 2.2 million acres in Minnesota and Ontario, Canada. He has backpacked, mostly solo in various national parks around the world. He has backpacked in the rain forests of Costa Rica, Denali National Park, Alaska, Banff and Jasper National


Hi Tidelands & Dean,
I finally finished the PCT on Saturday, September 24 – Hooray! Several thru-hikers packed in champagne bottles from Stehekin to celebrate. The last two sections were very tough. It rained/poured almost everyday with temps from 30's to low 50's. I could not feel my fingers & toes most mornings. Glad to be finished but already miss the trail, friends, & challenges. I look forward to see everyone soon. Take care,
Tom

SEATTLE WA 980
02 OCT 2015 PM 7 L
RECEIVED
2015 OCT -5 P 12:58
LAND USE REGULATION

State Of New Jersey
Department Of Environmental Protection
P O Box 420 Code 501-02B
Trenton, NJ 08625-0439

08625042020

The Pacific Crest Trail (PCT) is 2,650.4 miles long and ranges in elevation from just above sea level at the Oregon–Washington border to 13,153 feet at Forester Pass in the Sierra Nevada. The route passes through 25 national forests and 7 national parks. Total elevation gain/lost by a northbound hiker is 977,829 feet (489,418 feet of climbing and 488,411 feet descending) with an overall change of 1,007 feet as they hike from Campo, CA to Manning Park, British Columbia Canada. Total elevation change is equivalent to climbing up Mount Everest and back down over 16 times.

A thru-hiker has a window of four to six months to finish the trail due to weather conditions making sections of the trail impassable. On average, 20-30 miles a day must be hiked in order to finish the trail within the required time frame.

Legend

- Mail Locations for Food and Gear (23) [1]
- Camping Spots Along the PCT (77) [2]
- Pacific Crest Trail (PCT)
- GPS Coordinates Missing [3]
- US State Boundary

NOTES:

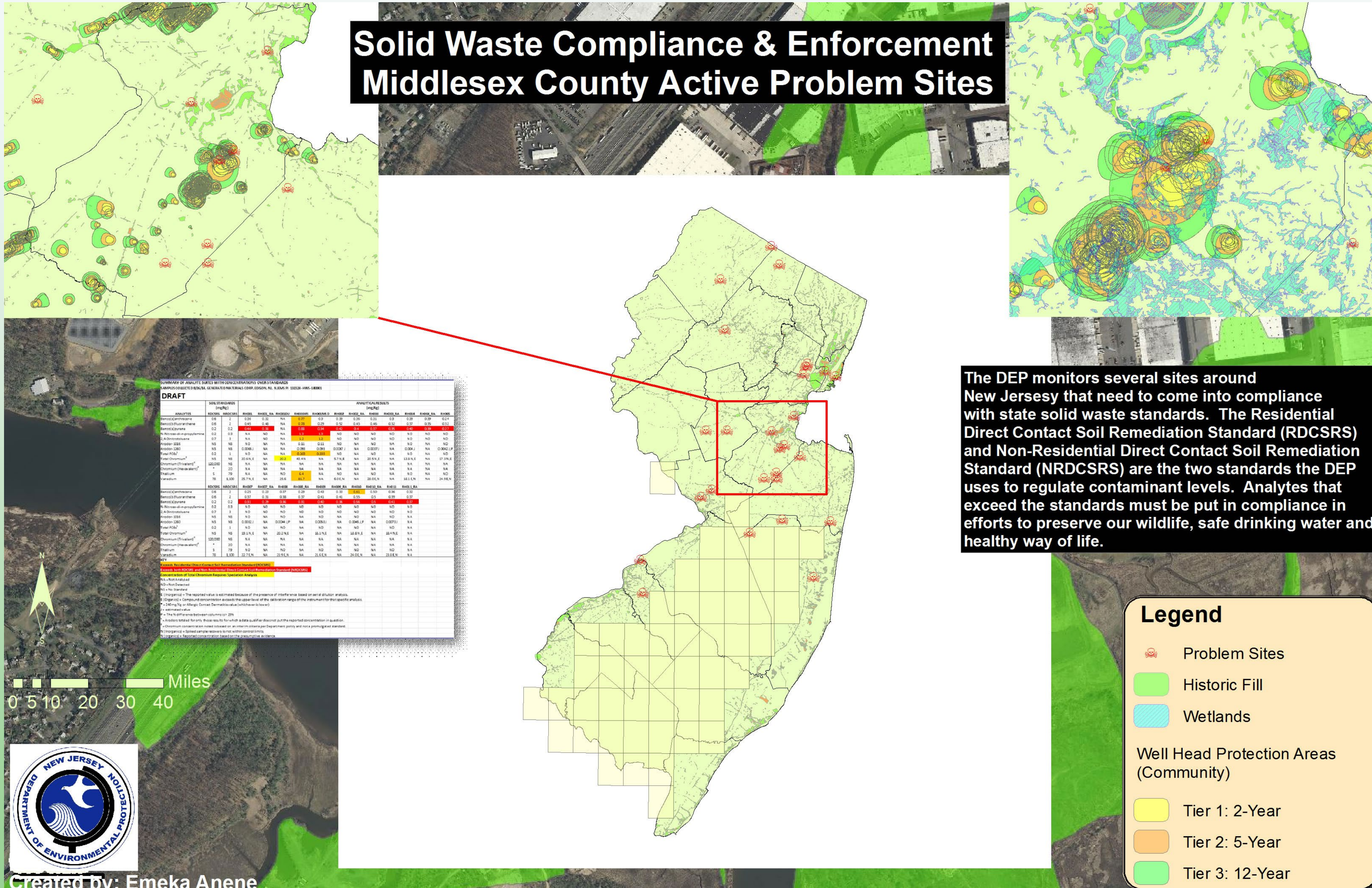
1) Mail drop locations are the resupply locations for food and gear. The number of days in the label repsent the estimated hiking days.

2) GPS coordinates for camping spots were recorded with a smartphone using the app -INSERT NAME OF APP-. Not all camp locations were record along the PCT.

3) Section of trail where GPS coordinates of camping locations were not recorded.

0 50 100 200 Miles

Trail Hiked by Tom Straus during the 2015. Map was produced with the help of Seth Docherty


Solid Waste Compliance & Enforcement
Middlesex County Active Problem Sites
The DEP monitors several sites around New Jersey that need to come into compliance with state solid waste standards. The Residential Direct Contact Soil Remediation Standard (RDCSRS) and Non-Residential Direct Contact Soil Remediation Standard (NRDCSRS) are the two standards the DEP uses to regulate contaminant levels. Analytes that exceed the standards must be put in compliance in efforts to preserve our wildlife, safe drinking water and healthy way of life.
DRAFT
Legend
Problem Sites
Historic Fill
Wetlands
Well Head Protection Areas (Community)
Tier 1: 2-Year
Tier 2: 5-Year
Tier 3: 12-Year
Miles
0 5 10 20 30 40
N
NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
Created by: Emeka Anene

NJ Brewery Location & Information

What is Beer?

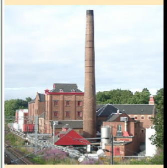
Beer is an alcoholic drink brewed mainly from malted barley, hops, yeast and water although other sources of fermentable carbohydrate (eg. maize, wheat, rice) and other natural ingredients may be added to create different styles and flavours.

The process of making beer is known as brewing. A dedicated building for the making of beer is called a brewery, though beer can be made in the home and has been for much of its history. A company that makes beer is called either a brewery or a brewing company. Beer made on a domestic scale for non-commercial reasons is classified as homebrewing regardless of where it is made, though most homebrewed beer is made in the home.

History

Beer is one of the oldest beverages humans have produced, dating back to at least the fifth millennium BC and recorded in the written history of ancient Egypt and Mesopotamia. As almost any cereal containing certain sugars can undergo spontaneous fermentation due to wild yeasts in the air, it is possible that beer-like beverages were independently developed throughout the world soon after a tribe or culture had domesticated cereal. Chemical tests of ancient pottery jars reveal that beer was produced as far back as about 7,000 years ago in what is today Iran. This discovery reveals one of the earliest known uses of fermentation and is the earliest evidence of brewing to date. In Mesopotamia, the oldest evidence of beer is believed to be a 6,000-year-old Sumerian tablet depicting people drinking a beverage through reed straws from a communal bowl. A 3900-year-old Sumerian poem honouring Ninkasi, the patron goddess of brewing, contains the oldest surviving beer recipe, describing the production of beer from barley via bread.

Today, the brewing industry is a global business, consisting of several dominant multinational companies and many thousands of smaller producers ranging from brewpubs to regional breweries. More than 133 billion liters (35 billion gallons) are sold per year—producing total global revenues of $294.5 billion (£147.7 billion) in 2006.



The Caledonian Brewery, founded in 1869, Edinburgh, Scotland

Health Benefits

Styles

Beer style is a term used to differentiate and categorize beers by various factors including appearance, flavour, ingredients, production method, history, or origin. The term "beer style" and the structuring of world beers into defined categories is largely based on the work done by writer Michael Jackson in his 1977 book The World Guide To Beer. Fred Eckhardt furthered Jackson's work publishing The Essentials of Beer Style in 1989.

There is no universally agreed list of beer styles as different countries and organisations have different sets of criteria. Organisers of beer competitions such as CAMRA's Champion Beer of Britain, the Beer Judge Certification Program (BJCP) local homebrewing competitions, the Brewers Association's World Beer Cup, and the Brewing Industry International Awards have categories in which beers are judged. The categories are varied and include processes or ingredients not usually regarded as defining styles in themselves, such as "Cask Conditioned Ale" (cask ale) for the Brewing Industry International Awards, "Gluten Free Beer" (gluten-free beer) for the World Beer Cup, and "Spice, Herb, or Vegetable Beer" (adjuncts) for the BJCP homebrewing competitions.

A number of ethnic beers, such as chhaang and cauim are generally not included on beer style groupings.

Some beer terms such as ale, lager, cask ale cover a wide variety of beer styles.

Breweries

902 Washington St, Hoboken

10 Millpond Dr #6, Lafayette Twp

302 White Horse Pike, Atco

699 Challenger Way, Forked River

801 Main St, Belmar

84 Leonardville Rd, Belford

220 S White Horse Pike, Berlin

262 Wanaque Ave, Pompton

65 Railroad Ave, Ridgefield Park

4 Alsan Way, Little Ferry

1120 Route 206, Shamong

1288 Hornet Rd, Cape May

6 E Washington Ave, Atlantic Highlands

112 Valley Rd, Roselle Park

15 Minneakoning Rd #202, Flemington

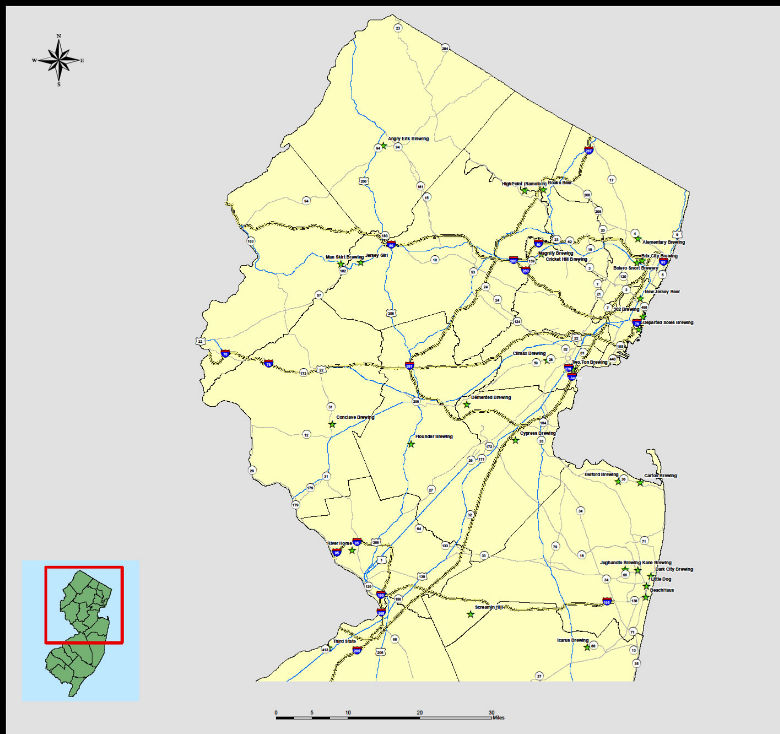
24 Kulick Rd, Fairfield

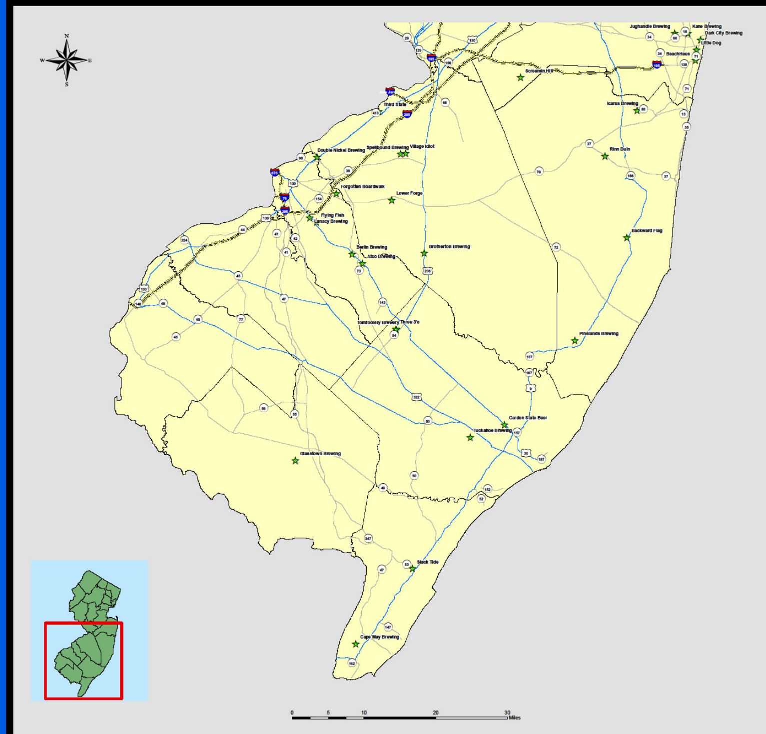
30 Nixon Ln #1E, Edison

801 2nd Ave, Asbury Park

600 Lincoln Blvd, Middlesex

150 Bay St, Jersey City





1585 NJ-73, Pennsauken Twp

120 Stryker Ln, Hillsborough Twp

1940 Olney Ave #100, Cherry Hill

900 Kennedy Blvd, Somerdale

247 E White Horse Pike, Galloway

247 E White Horse Pike, Galloway

22 Park Place GPS, 14 Kiel Ave, Butler

426 Sand Shore Rd, Hackettstown

4057 Asbury Ave, Tinton Falls

1750 Bloomsbury Ave, Ocean Twp

42 High St, Mt Holly

14 S Main St, Medford

1790 Swarthmore Ave, Lakewood

2543 Brunswick Ave Building 8D, Linden

3092 English Creek Ave, Egg Harbor

334 Washington St N #24B, Hammonton

50 13th St, Hammonton

362 High St, Burlington

56 Voorhis Ln, Hackensack

10 Lippincott Ln #12, Mt Holly

1072 NJ-53 #3, Clermont

63 Emley's Hill Rd, Cream Ridge

2 Graphics Dr, Ewing Twp

1540 Rte 37 W, Toms River

140 South 7th Avenue #15, Little Egg Harbor

4201 Tonnelle Ave, North Bergen

1275 Bloomfield Ave #40C, Fairfield

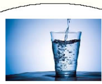
144 Main St, Hackettstown

214 Davis Rd, Magnolia

141 Steiner Ave, Neptune City

Beer : The Four Main Ingredients

Water



Beer is composed mostly of water. Regions have water with differentmineral components; as a result, different regions were originally better suited to making certain types of beer, thus giving them a regional character. For example, Dublin has hard water well-suited to making stout while the Plzen Region has soft water well-suited to making Pilsner (pale lager),

Hops

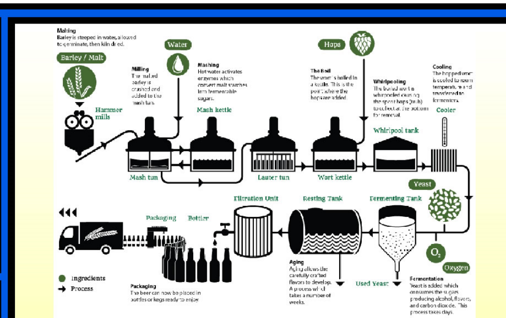
Hops contain several characteristics that brewers desire in beer. Hops contribute a bitterness that balances the sweetness of the mal. Hops contribute floral, citrus, and herbal aromas and flavours to beer. Hops have an antibiotic effect that favours the activity of brewer's yeast over less desirable microorganisms and aids in "head retention."

Barley

Nearly all beer includes barley malt as the majority of the starch. This is because its fibrous hull remains attached to the grain during threshing. After malting, barley is milled, which finally removes the hull, breaking it into large pieces. These pieces remain with the grain during the mash, and act as a filter bed during lautering, when sweet wort is separated from insoluble grain material.

Yeast

Yeast is the microorganism that is responsible for fermentation in beer. Yeast metabolises the sugars extracted from grains, which produces alcohol and carbon dioxide, and thereby turns wort into beer. In addition to fermenting the beer, yeast influences the character and flavour



Ales — When the yeast ferments at higher temperatures and stays at the surface, it produces an ale.

Super toasty yeast sits at the top

Popular ales include Pale Ale, Stout, Porter, Hefeweizen, Blonde, IPA, Belgian Ale, and Amber

Lagers — When it ferments at a lower temperature and does not float at the surface, it produces a lager.

Not-so-toasty yeast floats around

Popular lagers include Pilsner, Bock, Marzen, Helles, Doppelbok and Dunkel.

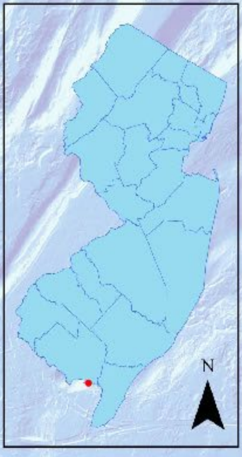
Small Format

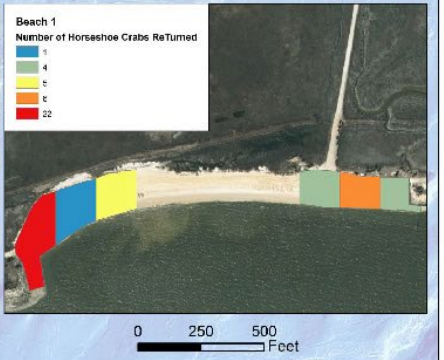
ReTurn the Favor

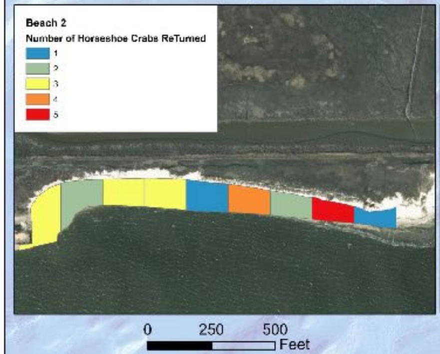
Rescue Stranded Horseshoe Crabs

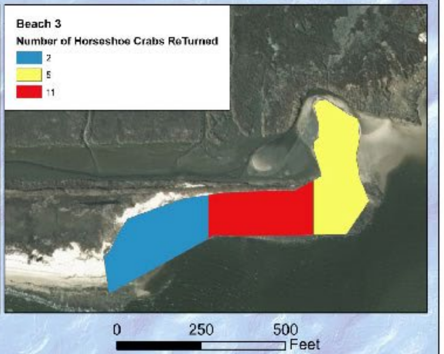
The Wetlands Institute works in conjunction with The Division of Fish and Wildlife and the Conserve Wildlife Foundation to organize a collective volunteer effort called "ReTurn The Favor" to aid the horseshoe crab population along the Delaware Bay. The volunteer season starts in May and extends through July. Horseshoe crabs are often left stranded and impinged upon beaches due to wave action, jetties, debris, or birds. ReTurn The Favor is an effort to help them back to the sea without breaking conservation laws, compromising the crabs' ecological niche, impacting migratory shorebirds, or harming the crabs, themselves. I volunteered at Thompsons Beach in Maurice River Township, Cumberland County. A total of 84 horseshoe crabs were turned over during my trek across the beach.

The following maps represent the distribution and approximate location of where the horseshoe crabs were turned over at Thompsons Beach.







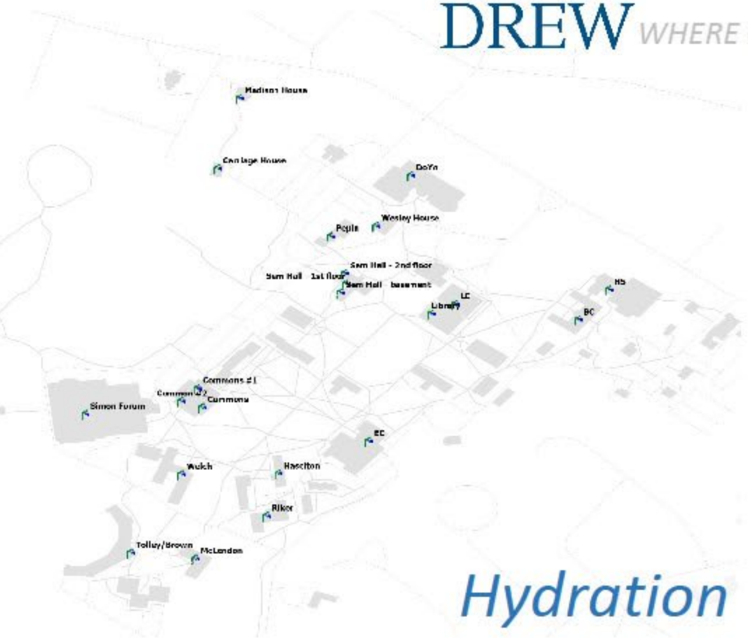


Data Sources: State of NJ and field data.

By William Smith, NJDEP

DREW *WHERE OUR COLORS ARE* ***BLUE*** *AND* ***GREEN***

S U S T A I N A B I L I T Y

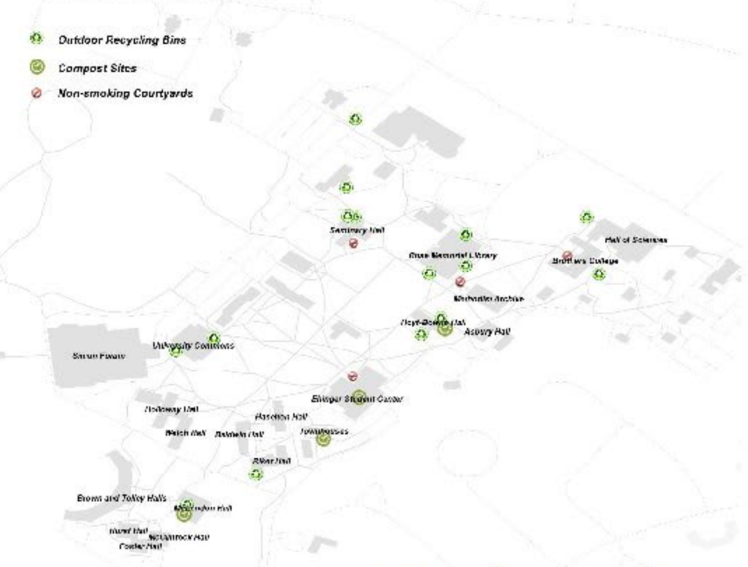


Hydration

The sustainability committee has committed to a "drink local" campaign, guiding campus to a phase out of disposable bottled water sales. All components in the life cycle of disposable water bottles are harmful to a wide diversity of communities and ecosystems (e.g. oil extraction, bottle production, water extraction, and disposal). In support of this movement, Drew University has increased the availability of filtered water bottle refill stations on campus and encourages students to use refillable water bottles.

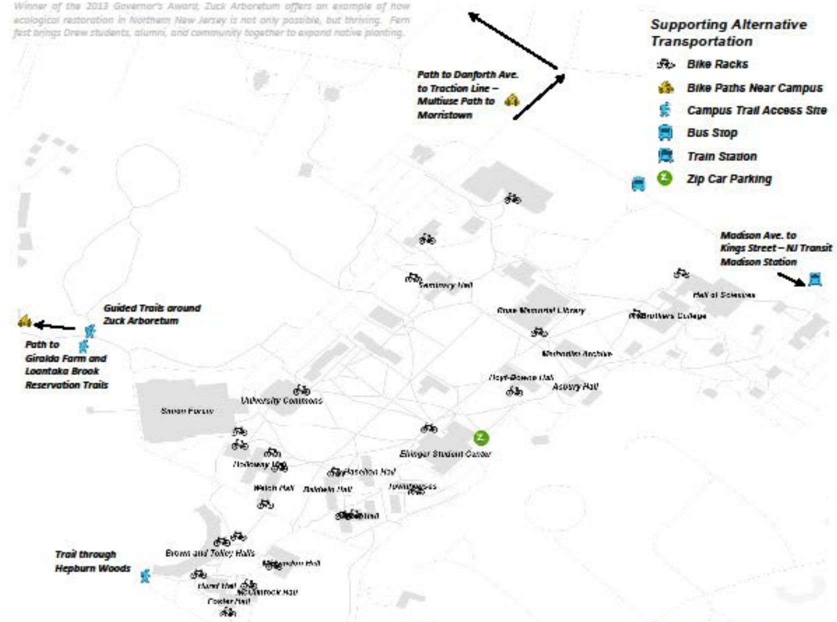
Restoration

Winner of the 2013 Governor's Award, Zuck Arboretum offers an example of how ecological restoration in Northern New Jersey is not only possible, but thriving. Fern fest brings Drew students, alumni, and community together to expand native planting.



Reclamation

In 2016, Drew University claimed the #1 title in our state for recycling, and placed in the top 20 nationally. We follow the reduce – recycle – reuse mantra. If you don't need it – don't buy it. If it's food waste, compost it to help generate rich soil for our gardens.



Transportation

Downtown Madison, with a variety of options for food and entertainment, is just a short walk from Drew. The university is also wonderfully situated with access to public transportation – NJ Transit offers a direct line to Penn Station in Manhattan. See too the beautiful nearby biking and walking trails.

Software Integration

Page1

INTRODUCTION

The New Jersey Geological and Water Survey (NJGWS) maps the State's offshore geology and identifies offshore sand deposits by acquiring, analyzing and interpreting marine geologic and geophysical data. With support from its parent agency, the New Jersey Department of Environmental Protection (NJDEP) and from the U.S. Department of Interior, Bureau of Ocean Energy Management (BOEM), NJGWS is preparing assessments of offshore sand resources for beach nourishment in a series of maps by county at a scale of 1:80,000. These maps are developed to support the cooperative sand resource assessment by NJDEP and the United States Army Corps of Engineers (USACE).

This map identifies and quantifies nearshore sand shoals offshore Monmouth County, New Jersey, located in both State and Federal waters (within and beyond the 3-mile State/Federal jurisdictional boundary, respectively). The USACE had previously identified five borrow sites in this map area, including the large site offshore Sea Bright and a group of small sites offshore Belmar (USACE, 1989,1993), most of which are located within State waters. Sand volumes for these areas were calculated by previous USACE studies and are listed in the Map Explanation. The State of New Jersey has accessed sand from the large site offshore Sea Bright and several of the smaller sites offshore Belmar. The goal of this survey was to find additional sand resources in the area offshore central and southern Monmouth County, including sites in Federal waters, where sites had not previously been identified.

This map identifies 14 additional shoal features. Sand volumes at these sites, calculated based on a 5-foot minimum thickness, range from 295,000 to 31,337,000 cubic yards (cu. yds.). Sand volumes at these sites, calculated based on a more constrained 10-foot minimum thickness, range from 53,000 to 27,028,000 cu. yds.

The 1:80,000 map scale corresponds to the scale common to nautical charts. Likewise, the level of detail presented in these maps and the goal of depicting a regional view are best achieved at this scale. In addition, Plates 1 and 2 include larger-scale views of each of the 14 shoal features, along with grain-size data on vibracores acquired at each shoal to ground-truth the seismic data and for sediment characterization.

METHODS

NJGWS collected the seismic sub-bottom data used in this analysis in 2000 and 2001, using an Octopus 360 Sub-Bottom Processor. The grid of sub-bottom profiles extends from Sea Bright to just south of Manasquan Inlet. The seismic signal was recorded in real time as an analog paper copy and also recorded on tape. Post-survey, a number of tapes were found to be defective or incomplete. For completeness and consistency, NJGWS recently converted the analog data into digital seg-y files using ImagetoSegy™ software. This allowed for the data to be processed and analyzed in SonarWiz5™ seismic processing software.

A total of 61 Vibracores were collected in the map area in three acquisition phases in 2000, 2001, and 2002. Analysis of these cores was completed in the sediment labs at NJGWS. For each core, lithologic and photographic logs were prepared and samples for grain-size analysis were collected and processed. A 5-cm-long quarter-round of the core was extracted at 30-cm intervals down-core and analyzed for grain-size. Sediment samples were analyzed following procedures outlined by Folk (1980). Grain size distribution focused on sand-sized and coarser material, with weight percents of full phi sizes ranging from -2 to >4 (from gravel to silt/clay; see Table 1), cumulative curves, and the textural statistics derived from these data (median, mean, sorting, skewness, and kurtosis). Of these statistics, median grain size is listed in the core tables; the other calculated statistics are on file at NJGWS. Several cores in these tables list multiple runs. These are cores drilled at sites where the pneumatic drill did not penetrate the full 20-foot depth of the core. After extracting the retrieved core segment from the coring apparatus, the platform would be re-positioned as close as possible to the original seafloor drilling location. The coring device would be jetted down to the depth where resistance was hit originally, and then would collect the remaining amount of core. As a result of this process, there can be slight discrepancies in the median grain size of sediment at the same depth in different runs. Radiocarbon samples were collected and analyzed, where available. The vibracores reported in this map are archived at the NJGWS Core Storage Facility.

CORRELATION OF SEISMIC DATA AND SEDIMENT ANALYSIS

NJGWS correlated changes in sediment character with acoustic impedance changes and major reflectors observed on the sub-bottom profiles. For each of the sand shoals identified on this map, cores were used to locate which reflector represented the base of sand. That reflector was traced for the entirety of the shoal, or for as long as the data clarity would allow (Figure 1).

INCORPORATING PREVIOUS ANALYSIS INTO CURRENT, STANDARDIZED SHOAL ASSESSMENT PROTOCOL

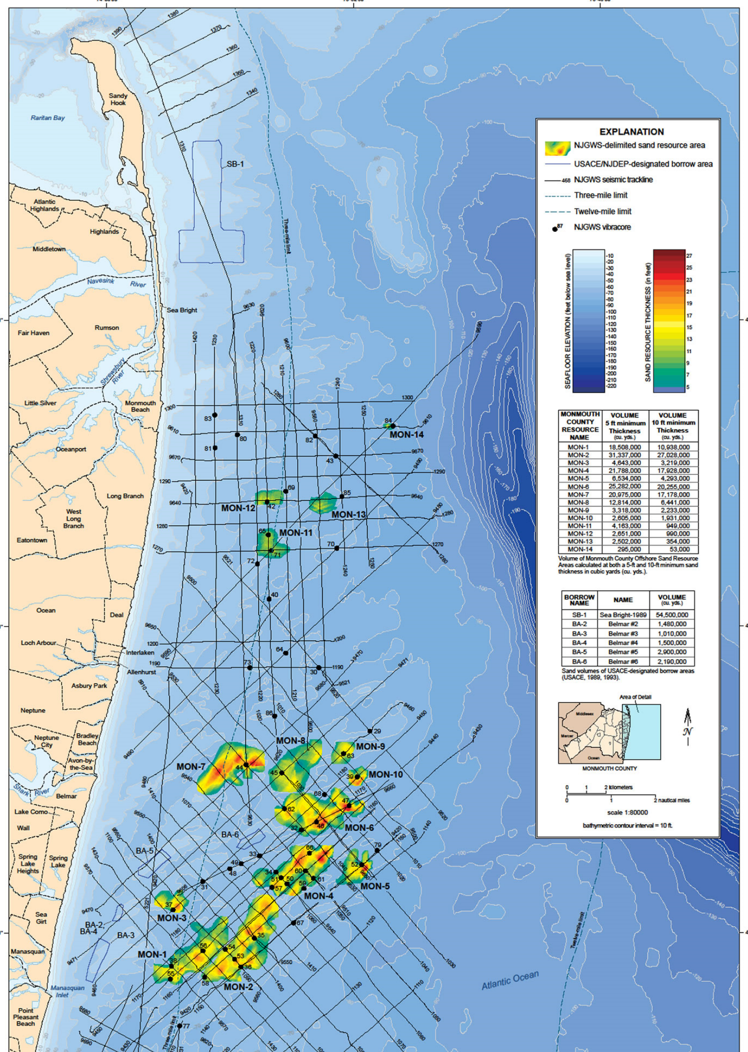
Previously, we performed initial analysis of the shoal areas offshore Monmouth County by transforming the data from analog seismic records into digital files using the Didger™ and Surfer™ imaging and contouring software. This initial analysis targeted shoal areas where the sand thickness was in excess of 10 feet. In this analysis, two sand volumes are computed for each shoal: 1) areas with a 5-foot minimum thickness of sand; and 2) areas with a 10-foot minimum thickness of sand. On the 14 large-scale sand thickness plots, the 5-foot minimum thickness is the practical boundary of the contour plots, and the 10-foot minimum thickness contours are indicated with a solid black line. On each geo-referenced and depth-referenced sub-bottom profile, NJGWS delineated the base of sand, correlated to the vibracore lithology, to generate sand thickness data for all profiles that cross the feature. These data were then contoured in Surfer™ to further delimit the shoal and to calculate sand volumes.

NJGWS determined that it is most practical to trace the reflector interpreted as the base of the sand deposit across its full extent (Figure 1). This method provides additional data in the contouring analysis, resulting in a more complete and realistic representation of the shoal. In calculating sand volume, the minimum thickness was selected and all areas of less than this thickness are excluded. The resulting sand volumes for the area of 5-foot minimum thickness and the area of 10-foot minimum thickness are listed in the map explanation and on each sand thickness contour plot.

Sand thickness contour plots of each shoal feature are shown on Plates 1 and 2, with accompanying median grain-size values (in mm and phi) for sediment samples collected at 30-cm (approximately 1 ft) intervals from a 6-meter (20-foot) long vibracore. This high-frequency sampling increases the accuracy for determining the base-of-sand on the sub-bottom profiles.

Use of brand, commercial, or trade names is for identification purposes only and does not constitute endorsement by the New Jersey Geological and Water Survey.

[1] New Jersey Geological and Water Survey
[2] Previously of New Jersey Geological and Water Survey
[3] Retired, New Jersey Geological and Water Survey
[4] Office of Energy and Sustainability, New Jersey Department of Environmental Protection



MONMOUTH COUNTY RESOURCE NAME	VOLUME 5 ft minimum Thickness (cu. yds.)	VOLUME 10 ft minimum Thickness (cu. yds.)
MON-1	18,508,000	10,938,000
MON-2	31,337,000	27,028,000
MON-3	4,643,000	3,219,000
MON-4	21,788,000	17,928,000
MON-5	6,534,000	4,293,000
MON-6	25,282,000	20,255,000
MON-7	20,975,000	17,178,000
MON-8	12,814,000	6,441,000
MON-9	3,318,000	2,233,000
MON-10	2,605,000	1,931,000
MON-11	4,163,000	949,000
MON-12	2,651,000	990,000
MON-13	2,502,000	354,000
MON-14	295,000	53,000

Volume of Monmouth County Offshore Sand Resource Areas calculated at both a 5-ft and 10-ft minimum sand thickness in cubic yards (cu. yds.).

BORROW NAME	NAME	VOLUME (cu. yds.)
SB-1	Sea Bright-1989	54,500,000
BA-2	Belmar #2	1,480,000
BA-3	Belmar #3	1,010,000
BA-4	Belmar #4	1,500,000
BA-5	Belmar #5	2,900,000
BA-6	Belmar #6	2,190,000

Sand volumes of USACE-designated borrow areas (USACE, 1989, 1993).

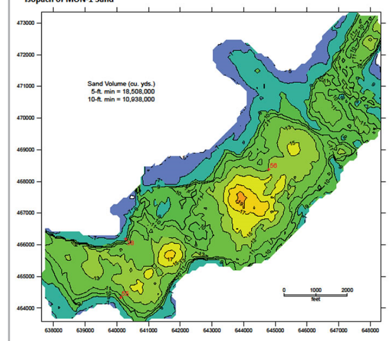
SIGNIFICANT SAND RESOURCE AREAS IN STATE AND FEDERAL WATERS OFFSHORE MONMOUTH COUNTY, NEW JERSEY

by

Michael V. Castelli[1], Daniel Latini[2], Jane Uptegrove[1], Jeffrey S. Waldner[3], David W. Hall[3], Andrea L. Friedman[4]

2015

Contour Plot of MON-1
Isopach of MON-1 Sand



Core 55 Depth bsf (cm)	Median (phi)
0	1.46
30	1.67
60	1.78
90	1.72
120	1.97
150	1.73
180	1.64
210	1.77
240	1.75
270	1.87
300	1.91
330	1.88
360	4.23
390	2.36
420	4.17
450	3.25
480	3.27
510	3.22
540	3.19
570	3.41
600	3.56

Core 38 Run 1 Depth bsf (cm)	Median (phi)
0	1.33
30	1.39
60	1.37
90	1.61
120	1.46
150	1.55
180	1.06
210	1.39
240	1.57
270	1.48
300	1.07
330	1.35
360	1.40
390	1.23
420	2.06
450	2.20
480	2.32
510	2.43
540	-2.62

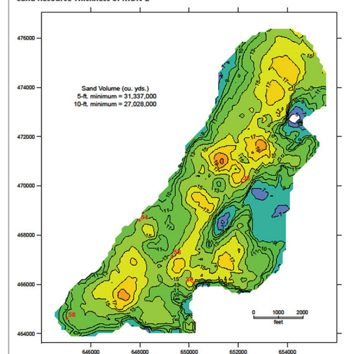
Core 38 Run 2 Depth bsf (cm)	Median (phi)
360	-2.40
390	2.31
420	-2.31
450	1.69
480	3.44
510	3.38
540	3.34
570	3.70
600	3.61
630	3.71
660	4.02

NJGWS reports grain-size median values by depth in core runs, as recorded in the driller's log. In some cases, core depths on different runs may not exactly coincide. Due to this possibility, there may be discrepancies in grain size median values at specific depths on different drilling runs.

Core 56 Run 1 Depth bsf (cm)	Median (phi)
0	1.46
30	1.67
60	1.78
90	1.72
120	1.97
150	1.73
180	1.64
210	1.77
240	1.75
270	1.87
300	1.91
330	1.88
360	1.60
390	1.71
420	2.49

Core 56 Run 2 Depth bsf (cm)	Median (phi)
360	4.23
390	2.36
420	4.17
450	3.25
480	3.27
510	3.22
540	3.19
570	3.41
600	3.56

Sand Resource Thickness of MON-2



Core 35 Depth bsf (m)	Median (phi)	(mm)
0.0	1.68	0.31
0.3	1.32	0.40
0.6	1.38	0.38
0.9	1.69	0.31
1.2	1.81	0.29
1.5	1.62	0.33
1.8	1.38	0.39
2.1	1.82	0.28
2.4	1.81	0.28
2.7	1.84	0.28
3.0	1.73	0.30
3.3	1.57	0.34
3.6	1.46	0.36
3.9	1.67	0.32
4.2	1.45	0.36
4.5	1.78	0.29
4.8	1.40	0.38

Core 36, Run 1 Depth bsf (m)	Median (phi)	(mm)
0.0	1.58	0.33
0.3	1.42	0.37
0.6	1.50	0.35
0.9	1.70	0.31
1.2	1.62	0.32
1.5	1.43	0.37
1.8	1.58	0.34
2.1	1.56	0.34
2.4	1.70	0.31
2.7	1.47	0.36
3.0	4.08	0.06
3.3	1.48	0.36
3.6	1.50	0.35
3.9	1.63	0.32
4.2	1.81	0.29

Core 36, Run 2 Depth bsf (m)	Median (phi)	(mm)
3.6	1.85	0.28
3.9	2.01	0.25
4.2	2.00	0.25
4.5	1.86	0.27
4.8	4.19	0.05
5.1	2.92	0.13
5.4	4.18	0.06
5.7	4.23	0.05
6.0	4.23	0.05
6.3	4.23	0.05
6.6	4.14	0.06

Core 58 Depth bsf (m)	Median (phi)	(mm)
0.0	0.98	0.51
0.3	1.13	0.46
0.6	1.19	0.44
0.9	1.04	0.49
1.2	1.09	0.47
1.5	1.22	0.43
1.8	1.27	0.41
2.1	1.09	0.47
2.4	1.15	0.45
2.7	1.50	0.35
3.0	1.69	0.31
3.3	1.62	0.33
3.6	2.10	0.23
3.9	-2.85	7.21
4.2	-2.64	6.23
4.5	-2.73	6.63
4.8	-1.55	2.92
5.1	-1.13	2.19
5.4	2.89	0.14
5.7	3.37	0.10
6.0	3.07	0.12

Core 53 Depth bsf (m)	Median (phi)	(mm)
0.0	1.28	0.41
0.3	1.15	0.45
0.6	1.09	0.47
0.9	1.18	0.44
1.2	1.01	0.50
1.5	1.42	0.37
1.8	1.01	0.50
2.1	1.34	0.40
2.4	1.18	0.44
2.7	1.58	0.33
3.0	1.35	0.39
3.3	1.45	0.37
3.6	1.35	0.39
3.9	1.64	0.32
4.2	2.37	0.19
4.5	1.79	0.29
4.8	1.92	0.26
5.1	1.66	0.32
5.4	2.16	0.22

Core 54 Depth bsf (m)	Median (phi)	(mm)
0.0	0.84	0.56
0.3	0.95	0.52
0.6	0.87	0.55
0.9	0.85	0.55
1.2	1.01	0.50
1.5	0.98	0.51
1.8	1.13	0.46
2.1	1.02	0.49
2.4	1.09	0.47
2.7	1.00	0.50
3.0	1.06	0.48
3.3	1.38	0.38
3.6	0.93	0.53
3.9	0.98	0.51
4.2	1.18	0.44
4.5	1.02	0.49
4.8	-2.88	7.37
5.1	-3.04	8.21
5.4	1.71	0.31
5.7	1.77	0.29

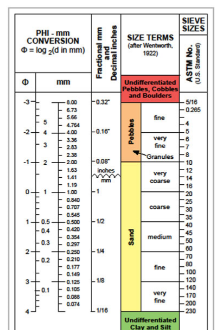


Table 1. Unit conversions of sediment sizes differentiated in this study (modified from Wentworth, 1922).

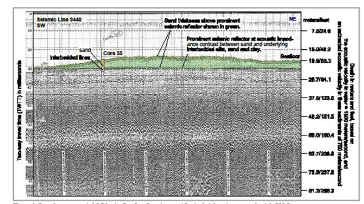
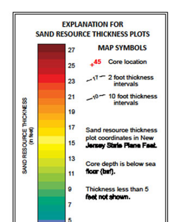


Figure 1. Speed over ground at 3.5 knots; time/location stamps at 2-minute intervals = approximately 700 ft.



ACKNOWLEDGEMENTS

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Kimberly Bishop, Michael Schumacher, Laurie Whitesell, and Matt Wojtko participated (with the authors) in seismic data acquisition and core processing/analysis during 2000 and 2001. Dr. Robert E. Sheridan (Rutgers University) advised the team on seismic acquisition and stratigraphic analysis of the resource area. In addition, Dr. Sheridan provided a very helpful and informed review of the map as part of the Geologic Map Series review protocol.

Zehdreh Allen-Lafayette, Cartographer/GIS Specialist created the base map and incorporated the sand volume data into a NJGWS standard-format GIS map at 1:80,000 scale.

DEPARTMENT OF ENVIRONMENTAL PROTECTION
WATER RESOURCES MANAGEMENT
NEW JERSEY GEOLOGICAL AND WATER SURVEY

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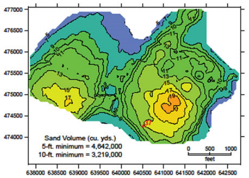
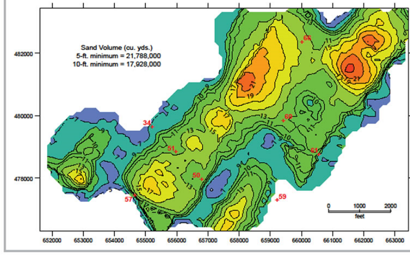
Sand Resource Thickness of MON-3



Core 37		
Depth	Median	
bsf (m)	(phi)	(mm)
0.0	2.37	0.19
0.3	2.30	0.20
0.6	2.35	0.20
0.9	2.33	0.20
1.2	2.36	0.19
1.5	2.25	0.21
1.8	2.42	0.19
2.1	2.43	0.19
2.4	2.42	0.19
2.7	2.44	0.18
3.0	2.37	0.19
3.3	2.18	0.22
3.6	2.28	0.21
3.9	3.70	0.08
4.2	2.16	0.22
4.5	2.71	0.15
4.8	2.79	0.14
5.1	3.69	0.08
5.4	4.12	0.06
5.7	3.89	0.07

Sand Resource Thickness of MON-4



Core 34		
Depth	Median	
bsf (m)	(phi)	(mm)
0.0	1.09	0.47
0.3	1.38	0.38
0.6	1.38	0.38
0.9	1.18	0.44
1.2	1.71	0.31
1.5	1.53	0.35
1.8	4.13	0.06
2.1	4.21	0.05
2.4	4.18	0.06
2.7	3.63	0.08
3.0	4.20	0.05
3.3	0.97	0.51
3.6	1.26	0.42
3.9	0.54	0.69
4.2	0.95	0.52
4.5	1.34	0.40
4.8	1.46	0.36
5.1	1.16	0.45
5.4	1.61	0.33

Core 50		
Depth	Median	
bsf (m)	(phi)	(mm)
0.0	1.39	0.38
0.3	1.44	0.37
0.6	1.41	0.38
0.9	1.71	0.31
1.2	1.40	0.38
1.5	1.40	0.38
1.8	1.51	0.35
2.1	1.30	0.41
2.4	1.12	0.46
2.7	1.71	0.31
3.0	1.58	0.33
3.3	1.69	0.31
3.6	2.09	0.23
3.9	2.14	0.23
4.2	2.87	0.14
4.5	2.81	0.14
4.8	1.36	0.39
5.1	1.79	0.29
5.4	1.67	0.31
5.7	-3.05	8.25

Core 51		
Depth	Median	
bsf (m)	(phi)	(mm)
0.0	1.42	0.37
0.3	1.38	0.38
0.6	1.40	0.38
0.9	1.51	0.35
1.2	1.62	0.33
1.5	1.57	0.34
1.8	1.01	0.50
2.1	1.17	0.44
2.4	1.29	0.41
2.7	1.31	0.40
3.0	1.63	0.32
3.3	1.02	0.49
3.6	0.87	0.55
3.9	1.28	0.41
4.2	0.80	0.57
4.5	1.40	0.38
4.8	1.34	0.40
5.1	1.39	0.38

Core 57		
Depth	Median	
bsf (m)	(phi)	(mm)
0.0	1.00	0.50
0.3	1.08	0.47
0.6	1.17	0.44
0.9	0.90	0.54
1.2	1.32	0.40
1.5	1.24	0.42
1.8	1.09	0.47
2.1	0.89	0.54
2.4	0.87	0.55
2.7	0.87	0.55
3.0	1.24	0.42
3.3	1.44	0.37
3.6	1.46	0.36

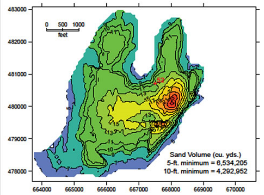
Core 59		
Depth	Median	
bsf (m)	(phi)	(mm)
0.0	2.13	0.23
0.3	1.40	0.38
0.6	1.14	0.45
0.9	2.09	0.24
1.2	2.12	0.23
1.5	1.76	0.30
1.8	1.98	0.25
2.1	2.17	0.22
2.4	2.20	0.22
2.7	0.76	0.59
3.0	2.06	0.24
3.3	2.11	0.23
3.6	2.16	0.22
3.9	2.20	0.22
4.2	2.12	0.23
4.5	2.23	0.21
4.8	1.51	0.35
5.1	1.55	0.34
5.4	2.11	0.23
5.7	2.28	0.21
6.0	2.11	0.23

Core 60		
Depth	Median	
bsf (m)	(phi)	(mm)
0.0	1.93	0.26
0.3	1.84	0.28
0.6	1.89	0.27
0.9	2.05	0.24
1.2	1.89	0.27
1.5	1.94	0.26
1.8	1.87	0.27
2.1	1.71	0.31
2.4	1.84	0.28
2.7	1.88	0.27
3.0	1.88	0.27
3.3	1.80	0.29
3.6	1.86	0.28
3.9	1.73	0.30
4.2	1.97	0.26
4.5	2.06	0.24
4.8	2.11	0.23
5.1	2.19	0.22
5.4	2.07	0.24
5.7	-0.44	1.36
6.0	1.81	0.29

Core 61		
Depth	Median	
bsf (m)	(phi)	(mm)
0.0	1.46	0.36
0.3	2.24	0.21
0.6	2.19	0.22
0.9	2.23	0.21
1.2	2.02	0.25
1.5	2.38	0.19
1.8	2.49	0.18
2.1	2.47	0.18
2.4	2.33	0.20
2.7	2.48	0.18
3.0	2.63	0.16
3.3	2.62	0.16
3.6	2.58	0.17
3.9	2.50	0.18
4.2	1.67	0.31
4.5	-3.00	8.00
4.8	0.57	0.67
5.1	2.26	0.21
5.4	2.29	0.20
5.7	2.19	0.22

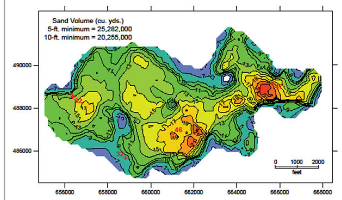
Core 66		
Depth	Median	
bsf (m)	(phi)	(mm)
0.0	1.69	0.31
0.3	1.74	0.30
0.6	1.70	0.31
0.9	1.69	0.31
1.2	1.73	0.30
1.5	1.56	0.34
1.8	1.71	0.31
2.1	1.83	0.28
2.4	1.93	0.26
2.7	1.95	0.26
3.0	1.77	0.29
3.3	1.98	0.25
3.6	1.47	0.36
3.9	1.26	0.42
4.2	1.66	0.32
4.5	1.97	0.25
4.8	1.88	0.27
5.1	4.19	0.05
5.4	4.23	0.05
5.7	4.23	0.05
6.0	4.23	0.05

Sand Resource Thickness of MON-5



Core 52		
Depth	Median	
bsf (m)	(phi)	(mm)
0.0	1.86	0.28
0.3	1.80	0.29
0.6	0.86	0.55
0.9	2.08	0.24
1.2	1.99	0.25
1.5	2.19	0.22
1.8	2.20	0.22
2.1	2.06	0.24
2.4	2.09	0.24
2.7	0.91	0.53
3.0	2.65	0.16
3.3	0.80	0.57
3.6	1.29	0.41
3.9	1.37	0.39
4.2	1.52	0.35
4.5	1.43	0.37
4.8	1.07	0.47
5.1	0.94	0.52
5.4	1.14	0.46
5.7	-1.41	2.65

Sand Resource Thickness of MON-6



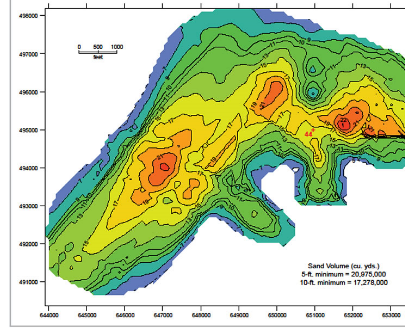
Core 32		
Depth	Median	
bsf (m)	(phi)	(mm)
0.0	0.87	0.55
0.3	1.02	0.49
0.6	1.35	0.39
0.9	1.19	0.44
1.2	1.41	0.38
1.5	1.88	0.27
1.8	0.90	0.53
2.1	2.52	0.17
2.4	1.99	0.25
2.7	1.93	0.26
3.0	1.68	0.31
3.3	1.48	0.36
3.6	1.60	0.33
3.9	1.71	0.31
4.2	0.17	0.89
4.5	3.03	0.12
4.8	1.40	0.38
5.1	0.61	0.65

Core 46		
Depth	Median	
bsf (m)	(phi)	(mm)
0.0	1.23	0.43
0.3	1.07	0.47
0.6	1.50	0.35
0.9	1.74	0.30
1.2	1.63	0.32
1.5	1.29	0.41
1.8	1.15	0.45
2.1	0.94	0.52
2.4	0.80	0.58
2.7	1.29	0.41
3.0	0.40	0.76
3.3	0.72	0.61
3.6	0.47	0.72
3.9	1.27	0.42
4.2	0.99	0.50
4.5	1.14	0.45
4.8	1.32	0.40
5.1	1.41	0.38

Core 47		
Depth	Median	
bsf (m)	(phi)	(mm)
0.0	1.82	0.28
0.3	1.90	0.27
0.6	1.97	0.26
0.9	0.50	0.71
1.2	0.34	0.79
1.5	2.00	0.25
1.8	1.94	0.26
2.1	2.12	0.23
2.4	2.05	0.24
2.7	2.15	0.23
3.0	2.05	0.24
3.3	2.07	0.24
3.6	2.04	0.24
3.9	2.14	0.23
4.2	2.14	0.23
4.5	1.98	0.25
4.8	1.94	0.26
5.1	2.25	0.21
5.4	2.04	0.24
5.7	2.02	0.25
6.0	2.04	0.24

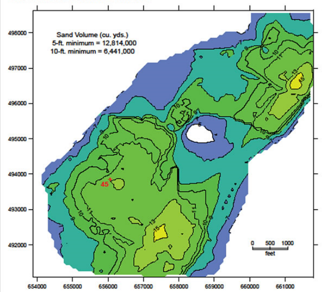
Core 62		
Depth	Median	
bsf (m)	(phi)	(mm)
0.0	1.38	0.38
0.3	1.38	0.39
0.6	1.30	0.41
0.9	0.80	0.57
1.2	1.46	0.36
1.5	1.29	0.41
1.8	1.23	0.43
2.1	1.49	0.35
2.4	1.69	0.31
2.7	1.98	0.25
3.0	1.57	0.34
3.3	1.81	0.28
3.6	2.19	0.22
3.9	1.69	0.31
4.2	2.52	0.17
4.5	2.59	0.17
4.8	2.55	0.17
5.1	-2.46	5.49
5.4	1.16	0.45
5.7	0.89	0.54
6.0	2.94	0.13

Sand Resource Thickness of MON-7



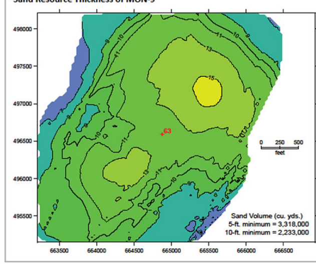
Core 44		
Depth	Median	
bsf (m)	(phi)	(mm)
0.0	1.87	0.27
0.3	1.66	0.32
0.6	2.17	0.22
0.9	2.29	0.20
1.2	2.17	0.22
1.5	2.27	0.21
1.8	2.25	0.21
2.1	2.25	0.21
2.4	2.21	0.22
2.7	2.25	0.21
3.0	2.29	0.20
3.3	2.23	0.21
3.6	2.25	0.21
3.9	2.21	0.22
4.2	2.28	0.21
4.5	2.31	0.20
4.8	2.27	0.21
5.1	2.34	0.20
5.4	2.33	0.20

Sand Resource Thickness of MON-8



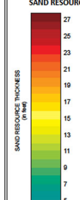
Core 45		
Depth	Median	
bsf (m)	(phi)	(mm)
0.0	1.50	0.35
0.3	1.42	0.37
0.6	1.69	0.31
0.9	1.62	0.33
1.2	1.68	0.31
1.5	1.76	0.30
1.8	2.13	0.23
2.1	2.07	0.24
2.4	2.59	0.17
2.7	2.69	0.15
3.0	2.73	0.15
3.3	2.70	0.15
3.6	1.73	0.30
3.9	-2.65	6.26
4.2	1.64	0.32
4.5	1.74	0.30
4.8	1.67	0.31
5.1	1.88	0.27

Sand Resource Thickness of MON-9



Core 63		
Depth	Median	
bsf (m)	(phi)	(mm)
0.0	1.31	0.40
0.3	1.27	0.42
0.6	1.37	0.39
0.9	1.40	0.38
1.2	1.53	0.35
1.5	1.43	0.37
1.8	1.32	0.40
2.1	1.76	0.30
2.4	2.17	0.22
2.7	1.63	0.32
3.0	2.20	0.22
3.3	2.05	0.24
3.6	0.34	0.79
3.9	1.34	0.40
4.2	2.12	0.23
4.5	2.35	0.20
4.8	-0.63	1.54

EXPLANATION FOR SAND RESOURCE THICKNESS PLOTS



MAP SYMBOLS

+45 Core location

2 foot thickness intervals

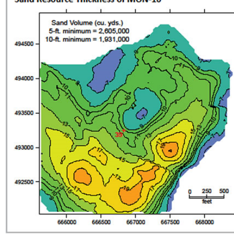
10 foot thickness intervals

Sand resource thickness plot coordinates in New Jersey State Plane Feet.

Core depth is below sea floor (bsf).

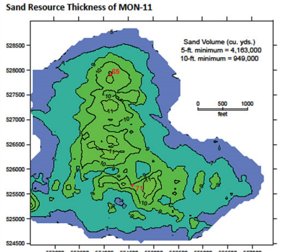
Thickness less than 5 feet not shown.

Sand Resource Thickness of MON-10



Core 39		
Depth	Median	
bsf (m)	(phi)	(mm)
0.0	1.61	0.33
0.3	1.84	0.28
0.6	1.97	0.26
0.9	2.08	0.24
1.2	1.95	0.26
1.5	1.58	0.33
1.8	1.88	0.27
2.1	1.68	0.31
2.4	1.67	0.31
2.7	1.99	0.25
3.0	4.13	0.06
3.3	1.82	0.28
3.6	2.03	0.24
3.9	-2.56	5.89
4.2	-0.43	1.35
4.5	1.67	0.32
4.8	1.84	0.28
5.1	1.77	0.29
5.4	1.50	0.35

Sand Resource Thickness of MON-11

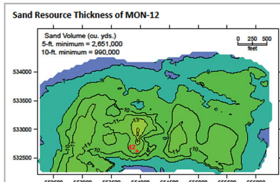


Core 65, Run 1		
Depth	Median	
bsf (m)	(phi)	(mm)
0.0	1.15	0.45
0.3	1.33	0.40
0.6	0.87	0.55
0.9	1.29	0.41
1.2	1.31	0.40
1.5	1.19	0.44
1.8	1.17	0.44
2.1	1.41	0.38
2.4	1.10	0.47
2.7	0.99	0.50
3.0	1.34	0.40
3.3	0.97	0.51
3.6	1.38	0.38
3.9	1.01	0.50
4.2	1.19	0.44

Core 65, Run 2		
Depth	Median	
bsf (m)	(phi)	(mm)
3.3	0.56	0.68
3.6	0.81	0.57
3.9	-0.21	1.16
4.2	0.74	0.60
4.5	0.65	0.64
4.8	0.84	0.56
5.1	1.12	0.46

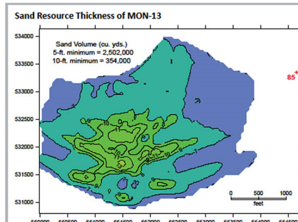
Core 71		
Depth	Median	
bsf (m)	(phi)	(mm)
0.0	1.18	0.44
0.3	0.83	0.56
0.6	1.27	0.42
0.9	0.66	0.63
1.2	1.49	0.36
1.5	1.03	0.49
1.8	1.49	0.36
2.1	1.24	0.42
2.4	1.35	0.39
2.7	1.70	0.31
3.0	1.74	0.30
3.3	1.70	0.31
3.6	1.69	0.31
3.9	2.48	0.18
4.2	2.79	0.14
4.5	3.08	0.12
4.8	2.28	0.21
5.1	1.81	0.28
5.4	1.84	0.28
5.7	1.91	0.27

Sand Resource Thickness of MON-12



Core 42		
Depth	Median	
bsf (m)	(phi)	(mm)
0.0	1.41	0.38
0.3	1.34	0.40
0.6	1.04	0.49
0.9	1.31	0.40
1.2	1.49	0.36
1.5	1.41	0.38
1.8	1.38	0.38
2.1	1.51	0.35
2.4	1.42	0.37
2.7	1.34	0.40
3.0	1.68	0.31
3.3	1.48	0.36
3.6	1.53	0.35
3.9	1.28	0.41
4.2	1.50	0.35
4.5	1.48	0.36
4.8	1.74	0.30
5.1	1.70	0.31
5.4	1.63	0.32
5.7	1.56	0.34
6.0	1.34	0.39

Sand Resource Thickness of MON-13

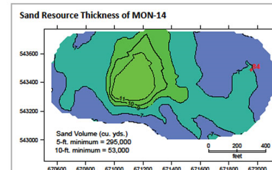


Core 85, Run 1		
Depth	Median	
bsf (m)	(phi)	(mm)
0.0	1.58	0.33
0.3	1.63	0.32
0.6	-3.04	8.22
0.9	0.95	0.52
1.2	4.02	0.06
1.5	1.54	0.34
1.8	0.93	0.53
2.1	1.12	0.46
2.4	0.89	0.54
2.7	1.60	0.33
3.0	1.51	0.35
3.3	1.41	0.38
3.6	0.60	0.66

Core 85, Run 2		
Depth	Median	
bsf (m)	(phi)	(mm)
4.2	0.71	0.61
4.5	1.10	0.47
4.8	1.29	0.41
5.1	1.23	0.43
5.4	0.91	0.53
5.7	1.26	0.42
6.0	0.13	0.91

Although core 85 is not inside the five-foot sand-thickness minimum at which all shoal features were clipped, it does show useful information about MON-13. The change from medium grained sand to pebbles seen in Core 85 clearly matched up with reflectors on seismic lines passing through this shoal feature. It is an exploration level resource that was found using confirmatory geologic data from the eastern flank of the shoal. NJGWS would highly recommend additional coring of this resource if it is considered for the design level phase.

Sand Resource Thickness of MON-14



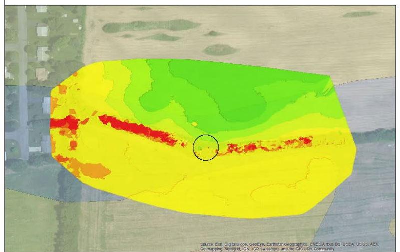
Core 84		
Depth	Median	
bsf (m)	(phi)	(mm)
0.0	1.58	0.33
0.3	1.54	0.34
0.6	1.88	0.27
0.9	1.97	0.26
1.2	2.04	0.24
1.5	2.27	0.21
1.8	2.27	0.21
2.1	2.37	0.19
2.4	2.62	0.16
2.7	2.99	0.13
3.0	4.00	0.06
3.3	3.58	0.08
3.6	3.57	0.08
3.9	4.03	0.06
4.2	4.12	0.06

USING AERIAL IMAGERY CAPTURED FROM A DRONE TO ANALYZE KARST-BASED SINKHOLES

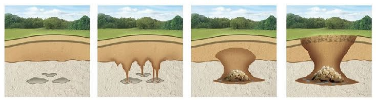
Purpose/Hypothesis:

The purpose of this project was to see if images taken from a drone could provide further analysis in the event of a sinkhole. Also, how helpful would this data potentially be to those involved, and could this data be used to test for sinkhole susceptibility in surrounding areas.

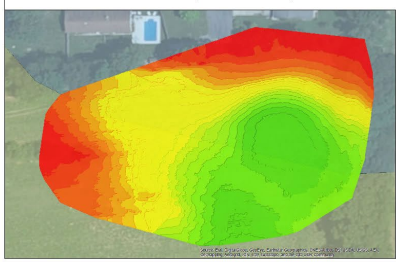
All of the following images are DSM mosaics (Digital Surface Models). The red to green color scheme represents higher to lower relative elevation. The layer underneath the DSM image is the soil layer. The blue layer is Hanford fine sandy loam, which translates to great farming soil.

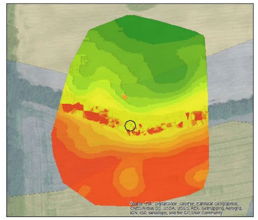


This test consists of 34 images taken of the sinkhole and its surrounding area at the same elevation. Here, the software picked up the branches from the surrounding trees. Even though there wasn't a clear view of the sinkhole from the sky, the software was still able to distinguish changing elevations on the ground level.

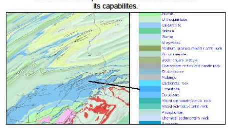


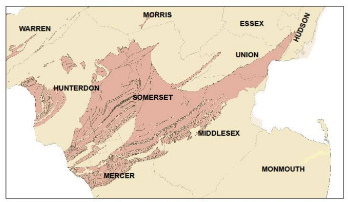
This image is dealing with an area of farmland roughly 100 meters southwest from the known sinkhole. This area was surveyed due to its noticable depressions and rolling hills. (These images were taken at an altitude of 50 meters. The other images were taken at 100 meters.)





This image is comprised of 18 images taken on March 25th. Here, the sinkhole is clearly identifiable by its lower elevation colors. This image was part of the first series of tests meant to test the power of the Pix4D software and its capabilites.



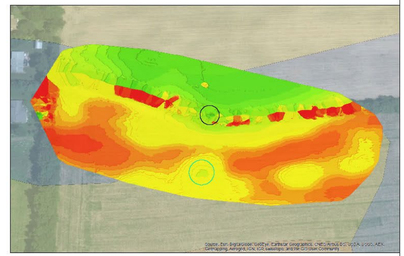


KEY

- Other geologies
- Limestone-rich areas
- Counties

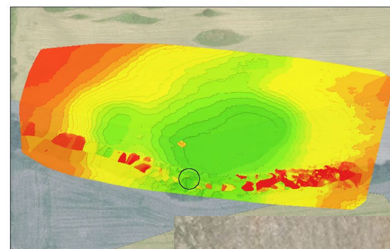
The map you see above is of New Jersey and all of the limestone-rich regions it contains. As you can see, almost all of the limestone is in the northern section of New Jersey. With the large amounts of limestone in this area, it is clear how drone imagery analysis could help in identifying potential future sinkhole locations.

By: Tejay Marsh
In collaboration with: Professor Albert Sarvis
Sources: USGS, Pix4D, ESRI



In this test, most of the imagery was focused on the ground south of the sinkhole. What is interesting to note is that even though the sinkhole is clearly defined within the tree line, another depression has appeared roughly 50 meters away. In order to test if this depression is growing, or to see if this is a natural formation in the land, imagery would have to be acquired once or twice a year for a few years to possibly a decade to note changing elevations. Presently this could possibly be where the next sinkhole forms. But it is far too early to tell.

In this image, more land to the north of the sinkhole was photographed. What is interesting to note in this DSM, is that along the east side of the tree line, another depression can be seen. Could this be a sinkhole forming? More pictures of the area would have to be taken to prove or disprove this hypothesis.



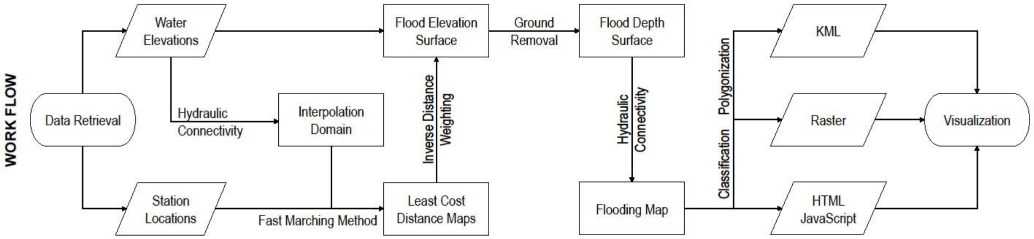
Sandy Flooding in Hoboken and Jersey City, NJ

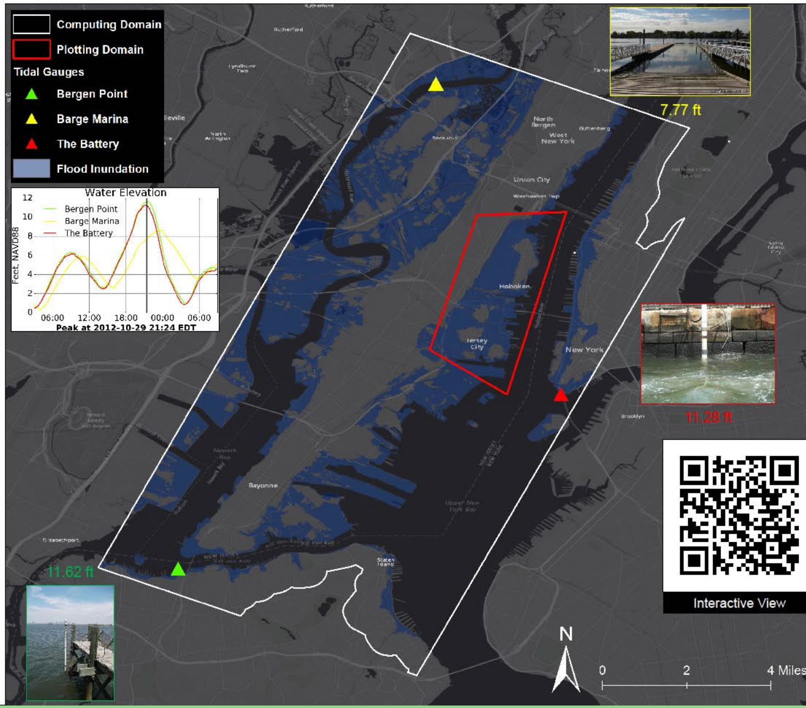
Larry Yin   Nickitas Georgas   Alan F. Blumberg   Philip M. Orton   Thomas O. Herrington   Yifan Wang   Email: lyin1@stevens.edu

The flooding map shows where was flooded and how deep the water was over ground at 21:24 EDT on Oct 29, 2012, when the Hudson River off Hoboken and downtown Jersey City reached its historic high because of the superstorm Hurricane Sandy.

The flood surface was interpolated from the observation data from 3 tidal gauges, at the Battery Park, NY (NOS), Bergen Point West Reach, NY (NOS) and Barge Marina at Carlstadt, NJ (MERI). Interpolation was done by inverse distance weighting (IDW) with consideration of barriers, the places that stayed dry. For each station, a least cost distance map was created by fast marching method (FMM) to supply a matrix of distance weights. Hydraulic connections were also computed and the real flood zone, one that links to the ocean, was selected by a simple classification algorithm based on weighted ranking of maximum depth, average depth and area. The topography and bathymetry was from FEMA Region II Storm Surge Project working DEM, in which the land elevations came from USGS/Sanborn LiDAR conducted between 2006 and 2007.

Most of the work flow was automated by Python scripts. The output was written to a KML file and displayed in Google Earth with 3D Buildings. The supplementary map was plotted with ArcGIS. Flood in the full computing domain can be viewed online interactively through Google Maps JavaScript API at http://hudson.dl.stevens-tech.edu/njdemo/.





Using Citizen Science to Monitor Global Jellies Populations: An Evaluation of the JellyWatch Database

Olivia Blondheim

Introduction

As citizen science has become a common practice for collecting scientific data, it is important to evaluate how effective those sources are at providing reliable information. This project aims to evaluate the effectiveness and organization of the JellyWatch citizen science project, as well as to encourage New Jersey citizens to contribute jelly sighting to this growing database.

Data

Reported jellies sightings between the years 1974 and 2016 were compiled from the JellyWatch database. The Global Annual Representation of Commercial Shipping Activity was published by the University of California Santa Barbara as an open access layer available on arcgis.com. Their study converted summed ship tracks collected from 2004-2005 to raster data. The major public ports in New Jersey were obtained from worldportsource.com.

Methods

JellyWatch data entries were downloaded as a CSV text file and were initially sorted in Excel by the pre-assigned titles users selected when entering data (focusing solely on jellies-related entries). Entries titled as "Other" were further sorted and classified into more specific groupings based on Phylum, Order, or Genus to evaluate whether the JellyWatch database was effective at depicting trends in jellies populations. The fourteen major ports in New Jersey were geocoded using Google Fusion Tables. All maps were created in ArcMap and arcgis.com.

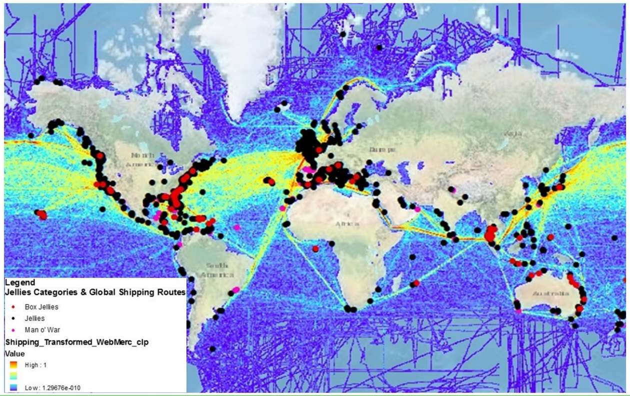


Fig 1. Shows the global distribution of jellies as they correlate with global commercial shipping activity.

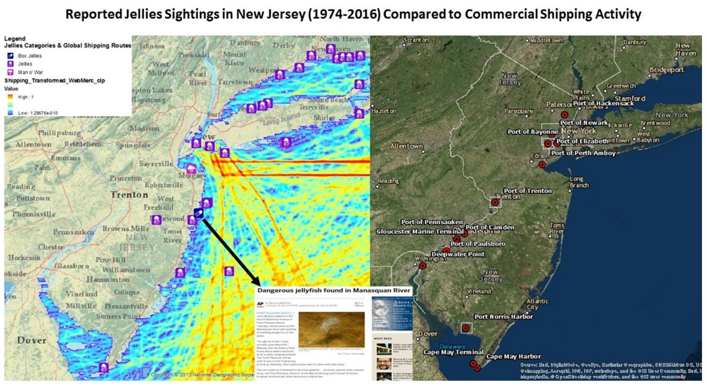


Fig 2. Areas with greater commercial shipping activity did not always tend to have more jellies sightings. Many of the major ports in New Jersey did not appear to have reported jellies sightings, possibly due to a lack of awareness of the JellyWatch database.

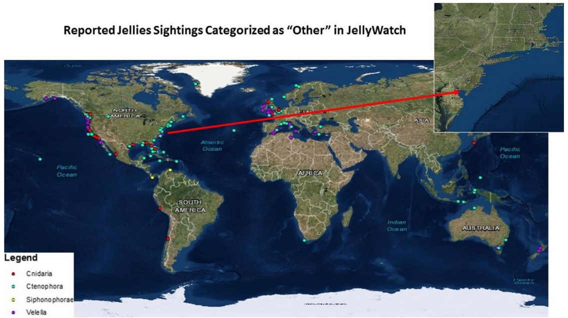


Fig 3. Demonstrates how the "Other" category on JellyWatch can be effective in showing more descriptive patterns for jelly populations. Currently, there appears to be no "Other" jelly sightings in New Jersey.

Results

1). There appears to be a correlation between global commercial shipping activity and reported jellies sightings from 1974 to 2016. Heavily traveled shipping routes tended to have more sightings of jellies. In New Jersey, major public ports did not seem to be hubs for increased jelly activity.
2). Most of the JellyWatch data entries were sorted by pre-assigned titles (Table 1) with only 776 entries categorized as "Other." From the "Other" category, more specific categories of jellies could be defined based on Phylum, Order, or Genus that may not have been provided for entries given pre-assigned titles (Table 2).
3). While jellies are being reported in New Jersey, there may be a lack of awareness of the JellyWatch database which leads to fewer jellies reported.

Table 1:

Type	Reported Sightings
Jellies	3344
Man o' War	311
Box Jellies	152

Table 2:

Type	Reported Sightings
Cnidaria	28
Ctenophora	159
Siphonophorae	13
Velella	317

Conclusions

The JellyWatch database is an effective tool to measure global jelly populations as its expansive database can be used to discuss possible trends with global oceanic impacts, such as commercial shipping activity. In this case, it appears that jelly activity increases in areas with greater commercial shipping activity. While the "Other" category may have been viewed as a source of error, it was a useful way to classify jellies into more specific categories than the pre-assigned titles. As jelly sightings are focused around coast lines in New Jersey (which are most accessible), future work may look to create new ways to consistently monitor and record jellies in the JellyWatch database, particularly around major ports.

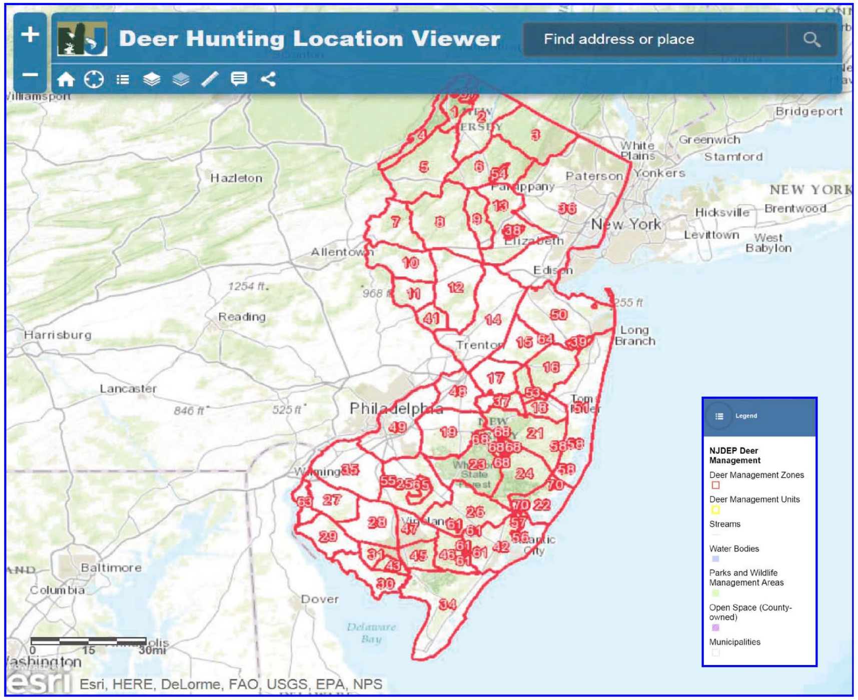
References:

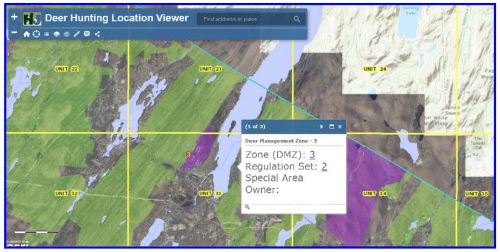
JellyWatch: www.jellywatch.org
Global Shipping Routes Base Map: http://www.arcgis.com/home/item.html?id=f3adfba57f1b4a798a1d52d5fce669f5
Major Ports in New Jersey: http://www.worldportsource.com/ports/USA_NJ.php
Box Jelly News Article: http://www.nj.com/ocean/index.ssf/2014/10/dangerous_jellyfish_found_in_manasquan_river.html

New Jersey Department of Environmental Protection
Automated Deer Harvest Report System (AHRS)
AGO Application

http://www.njfishandwildlife.com/ahrs_deer_viewer.htm

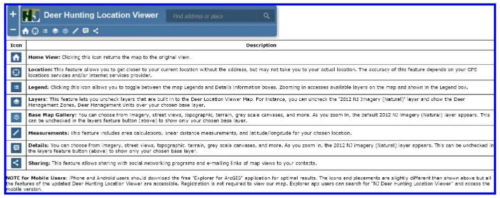
NEW JERSEY DIVISION OF
Fish and Wildlife





ZONE	SPECIAL AREA
37	Dix-McGuire section of Joint Base McGuire-Dix-Lakehurst, U.S. Air Force, that formerly consisted of Fort Dix Reservation
38	Great Swamp National Wildlife Refuge
39	Earle Naval Weapons Station
53	Lakehurst section of Joint Base McGuire-Dix-Lakehurst, U.S. Air Force, that formerly consisted of Lakehurst Naval Air Engineering Station
54	Picatinny Arsenal (Dept of the Army)
56†	Edwin B. Forsythe National Wildlife Refuge (Southern portion)
57†	Edwin B. Forsythe National Wildlife Refuge (Central portion)
58†	Edwin B. Forsythe National Wildlife Refuge (Northern portion)
61†	Atlantic County Parks System
64†	Monmouth Battlefield State Park
66†	Federal Aviation Administration Technical Center
67	High Point State Park
68	Franklin Parker Preserve and Four Mile Spring Preserve
70†	Edwin B. Forsythe National Wildlife Refuge (northern portion, southern section)

† Not shown on map



Deer Hunting Location Viewer

Icon	Description
	Home View: Clicking this icon returns the map to the original view.
	Location: This feature allows you to get closer to your current location without the address, but may not take you to your actual location. The accuracy of this feature depends on your GPS locations services and/or internet services provider.
	Legend: Clicking this icon allows you to toggle between the map Legends and Details Information boxes. Zooming in accesses available layers on the map and shown in the Legend box.
	Layers: This feature lets you uncheck layers that are built in to the Deer Location Viewer Map. For instance, you can uncheck the '2012 NJ Imagery (Natural)' layer and show the Deer Management Zones, Deer Management Units over your chosen base layer.
	Base Map Gallery: You can choose from imagery, street views, topographic, terrain, grey scale canvases, and more. As you zoom in, the default 2012 NJ Imagery (Natural) layer appears. This can be unchecked in the layers feature button (above) to show only your chosen base layer.
	Measurements: This feature includes area calculations, linear distance measurements, and latitude/longitude for your chosen location.
	Details: You can choose from imagery, street views, topographic, terrain, grey scale canvases, and more. As you zoom in, the 2012 NJ imagery (Natural) layer appears. This can be unchecked in the layers feature button (above) to show only your chosen base layer.
	Sharing: This feature allows sharing with social networking programs and e-mailing links of map views to your contacts.

NOTE for Mobile Users: iPhone and Android users should download the free "Explorer for ArcGIS" application for optimal results. The icons and placements are slightly different than shown above but all the features of the updated Deer Hunting Location Viewer are accessible. Registration is not required to view our map. Explorer app users can search for "NJ Deer Hunting Location Viewer" and access the mobile version.

This Deer Hunting Location Viewer on-line application, map, was created using ESRI ArcGIS and ArcGIS Online (AGO) Application. It can be used to locate and identify deer hunting spot to obtain harvest location information (DMZ, Unit, County, Township). This data is required when reporting deer via the Division of Fish and Wildlife's Automated Harvest Report System. It can be accessed from desktop PC and/or mobile device. iPhone and Android users should download the free "Explorer for ArcGIS" application for optimal results.

This application was created and presented jointly by Dan Roberts, NJDEP Deer Management Program, Harry Chen, Craig Coutros, and Dnyanada Bhide, NJDEP BGIS Staff.