27th Annual Mapping Contest Maps

Analytical Presentation

The impacts of state level regulations and policy changes on TRI emissions: a geographic analysis

Kirby Clark and Anna Fiorini

Background

Many facilities that generate large quantities of hazardous waste, including, for example, hospitals, are not regulated through the EPA's Toxic Release Inventory (TRI) program. Individual states have subsequently implemented additional legislation to further regulate emissions. In both Massachusetts and California, facility reports are also reviewed by a third-party auditing agency. Additionally, fourteen states require facilities to report to both the state, as well as to the EPA and to engage in Management Based Regulation (MBR). States that required MBR programs require facilities to engage in planning and programs that enable the facility to take measures to show their efforts to cut emissions and reach recommended state goals.

Locally, in New Jersey, the facilities must also report to the state in addition to the TRI program. In 1996, the New Jersey TRI program underwent review that involved developing plans for pollution prevention programs as well reducing costs at TRI facilities. Despite the positive impacts of the restructuring, the results were not seen equally across all facilities. Smaller facilities that received fewer government subsidies and assistance to develop their pollution programs did not see as significant of benefit from increased pollution prevention. This study focuses on assessing how varied levels of state regulation contribute to emissions releases over a ten year period.

Data

The information for these maps and research was collected from the US Census Bureau county boundaries for California, New Jersey, and Colorado, as well as the TOXMAP TRI Data Set, which provided numeric data related to reported emissions changes between 2000 and 2010.

Acknowledgements: We would like to thank Drew University and Dr. Lisa Jordan for ongoing support and the opportunity to engage in such work, the EPA-TRI University Challenge, Nora Lopez of the EPA, NASA and the Andrew Mellon Foundation for financial support of our research and the funding of the Drew Spatial Data Center, where we conducted much of our research and work.

Conclusion

This study found that states that utilize additional emissions control methods that further the regulatory efforts of the EPA through the TRI program. MBR, which is used as the primary method to further emissions control efforts on the state level, resulted in significant decreases in total pounds of toxic chemicals released at most facilities. In our study, the impacts of MBR were shown in both the maps of California and New Jersey. Although MBR may not be the most effective regulatory tool, it provides significantly better pollution control than the status quo, which is no further state-level regulation of TRI emissions. California, which requires a third party audit of information submitted to the state, and had fewer emissions as a whole than New Jersey, which also has state-level regulation, but does not require a third party to review the accuracy of emissions reports from each facility. State level regulation places increased pressure on facilities to reduce emissions. Nationwide, more efforts must be made to promote the development of state-level policies and encourage more states to implement programs to require facility data related to emissions to be audited by a third party organization.

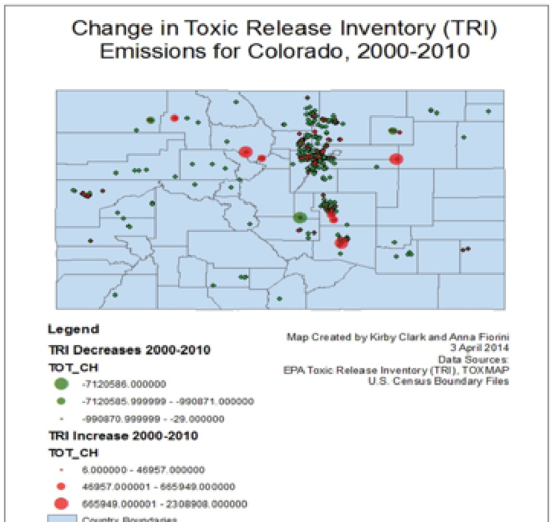


Figure 1: Colorado does not require states to report TRI emissions to any organization outside of the required national TRI program.

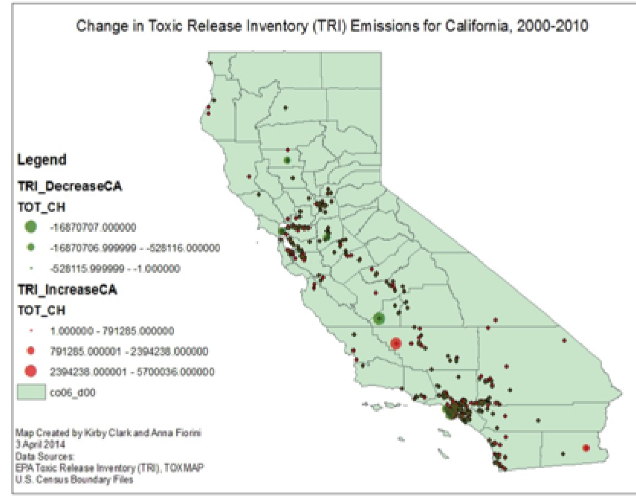


Figure 2: California not only requires facilities to report to the state, but also requires a third party organization to audit reports for accuracy.

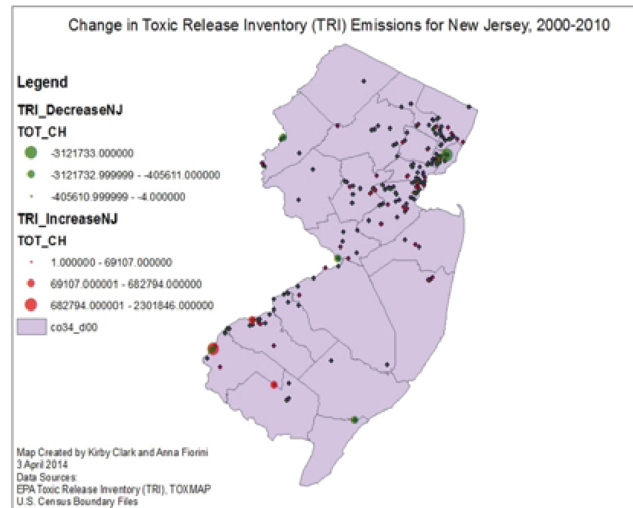


Figure 3: New Jersey requires facilities to report emissions to both the TRI program, as well as the state Department of Environmental Protection.

Comparison of Mercury and Polychlorinated Biphenyl Toxics Release Inventory (TRI) Emissions in New Jersey, 2002-2012

Introduction:

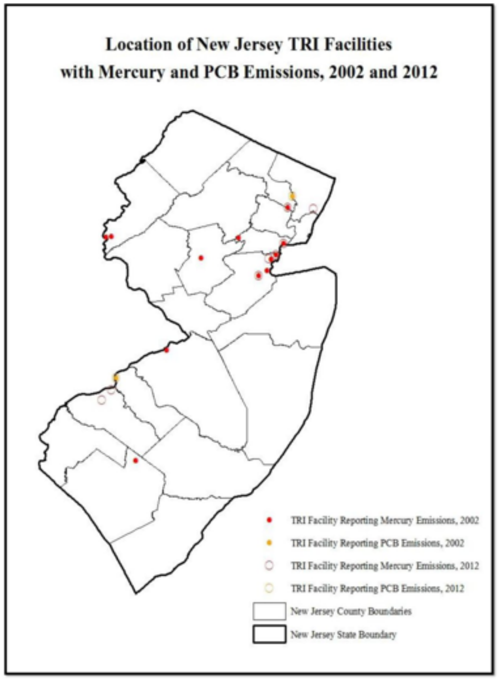
Mercury and Polychlorinated Biphenyl industrial chemical releases are reported annually to the EPA's Toxics Release Inventory (TRI). This project investigates the locations of these releases in New Jersey at two time periods, one decade apart: 2002 and 2012.

Methods:

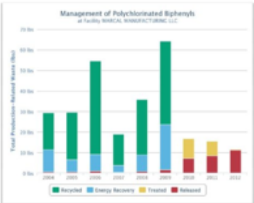
Data for this project were obtained from EPA TRI.NET software and queried by chemical (mercury and polychlorinated biphenyl) and year (2002 and 2012). These data were exported in excel format, and included unique identifiers for the TRIF_ID as well as latitude and longitude. Spreadsheet data were imported to ArcGIS 10.2.1 software, and displayed by their XY coordinates. Summary statistics were calculated for each chemical by year for comparison. New Jersey facilities were selected by location to create a sub-set of the national data set.

Conclusions:

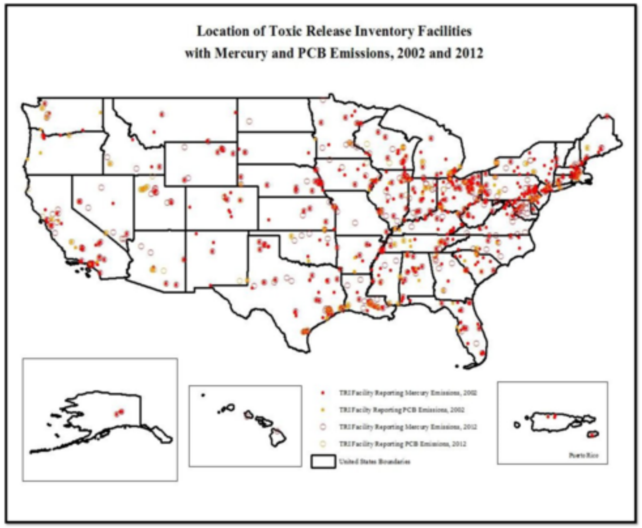
In New Jersey, substantial declines in TRI mercury and PCB emissions took place, between 2002 and 2012. For the U.S. as a whole, mercury emissions declined, but PCB emissions rose substantially.



Time Series of New Jersey Facility PCB Emissions:



Data and charts on PCB Emissions were obtained from EPA's TRI Right2Know website, and from EPA's Envirofacts > Pollution Prevention queries. Both facilities engaged in P2 activities related to PCBs. State Metal Industries filed P2 reports for 1993, 2011, and 2012, most recently describing reductions in PCBs as a results of better maintenance, clean up activity, and handling practices. Marcal Manufacturing provided P2 reports for 2001 and 2002, substituting raw materials and improving team management, but no recent P2 reports of PCBs for Marcal have been filed for PCBs in the past decade.



Changes in Releases of Mercury and PCBs in New Jersey, 2002-2012

	Number of Facilities	Total On- and Off-Site Emissions	Percent Change in Emissions
Mercury (2002)	12	454.10 lbs.	
Mercury (2012)	8	229.26 lbs.	50% decrease
PCB (2002)	2	25.09 lbs.	
PCB (2012)	2	16.02 lbs.	36% decrease

Changes in Releases of Mercury and PCBs across the United States, 2002-2012

	Number of Facilities	Total On- and Off-Site Emissions	Percent Change in Emissions
Mercury (2002)	569	106,427.51 lbs.	
Mercury (2012)	470	75,176 lbs.	29% decrease
PCB (2002)	118	2,021,512.32 lbs.	
PCB (2012)	89	4,653,265.09 lbs.	130% increase

Authors: Christine Marten and Lisa Jordan, Drew University

Analysis of Fastener Use in Boardwalks Affected by Superstorm Sandy

Objective: To suggest optimal materials for rebuilding major boardwalks in New Jersey affected by Superstorm Sandy.

Salt water spray and frequent storms along the coast make it necessary to implement correct fasteners, in the correct applications, for longer lasting construction projects such as boardwalks. Utilizing humidity and salt fog chambers, induced corrosion yielded a practical environment so the fasteners could be tested for adhesive strength implementing a MTS Model 10 Ton / 22 KIP Servo-Hydraulic Load Frame. A post-hoc test using a Tukey's HSD was utilized to compare any significant differences in the maximum pound-force amongst the fastener types. Stainless steel resulted in the least pound-force necessary to remove the fasteners, whereas hot-dipped galvanized required the most pound-force. Trex® was proven to prevent corrosion of the fasteners better than wood materials. Based on adhesive strength and corrosive resistance, the overall recommended fastener use for boardwalks would therefore be hot-dipped galvanized fasteners. However, for boardwalks built with Trex® material, for economic purposes it would also be efficient to utilize steel fasteners, due to their high adhesive strength and Trex®'s effective corrosive resistance.

Stochastic meteorological events such as Superstorm Sandy demonstrate the relevance of this information. Boardwalks are known for their aesthetic, economic, and recreational purposes, so it is necessary to be attentive to the materials put into building these structures. The rebuilding and upkeep on boardwalks is essential to the coastal communities, and so the correct implementation of fasteners will verify a longer lasting and viable asset to the public.

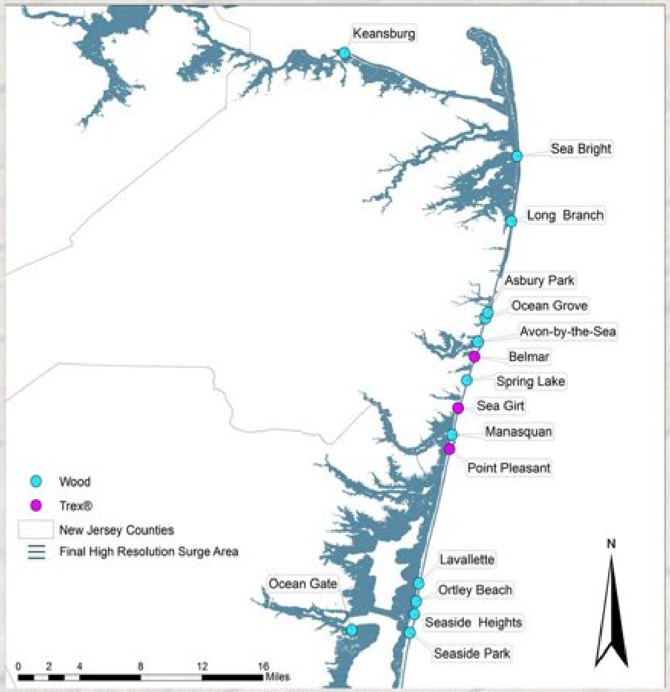


Figure 1: Map of central Jersey boardwalk locations. The map indicates the type of materials that make up each boardwalk.

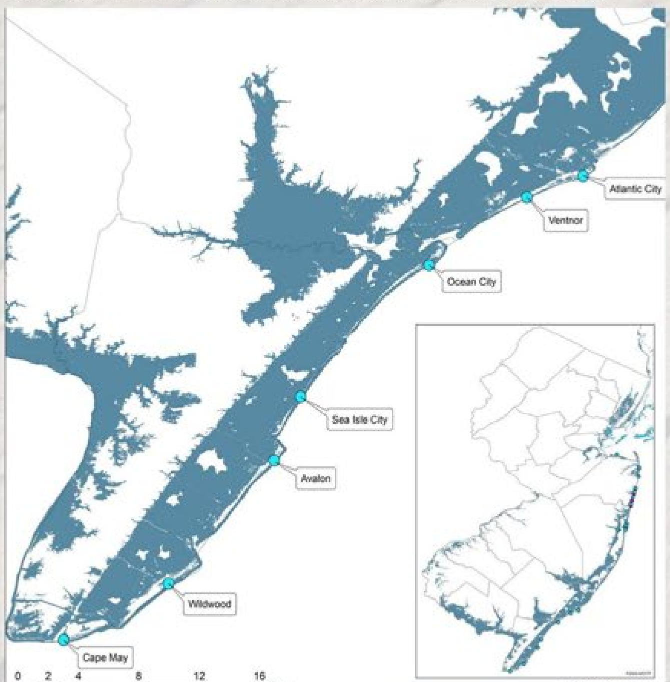


Figure 2: Map of southern Jersey boardwalk locations. The map indicates the materials that make up each boardwalk.

Figure 3: Keansburg boardwalk
Source: keansburgfishingpier.com

Figure 4: Asbury Park boardwalk
Source: jerseyshorepirates.com

Figure 5: Point Pleasant boardwalk
Source: Remax-nj.com

Figure 6: Seaside Heights boardwalk
Source: tripadvisor.com

Figure 7: Atlantic City boardwalk
Source: achotelexperts.com

Figure 8: Ocean City boardwalk
Source: goldcoastsir.com

Figure 9: Wildwood boardwalk
Source: panoramio.com

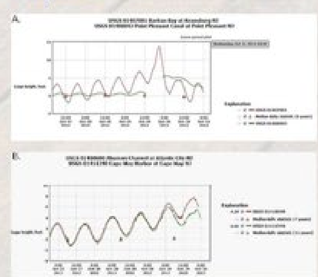


Figure 10: Storm surge gauge height during Superstorm Sandy at A) Keansburg and Seaside Heights and B) Atlantic City and Cape May. These graphs show the extreme extent to which the waters rose during the storm.

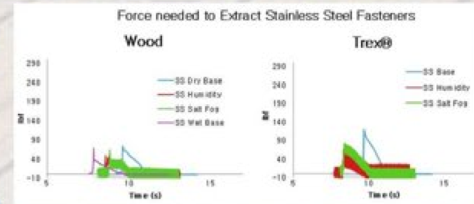


Figure 11: Compares the maximum pound-force needed to pull stainless steel fasteners in various conditions from wood and Trex® maerial.

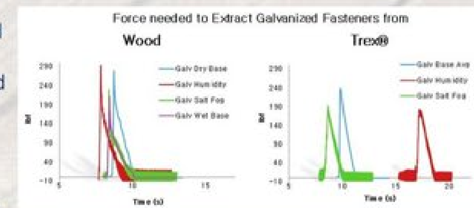


Figure 12: Compares the maximum pound-force needed to pull steel fasteners in various conditions from wood and Trex® material.

Figure 13: Compares the maximum pound-force needed to pull hot-dipped galvanized fasteners in various conditions from wood and Trex® material.

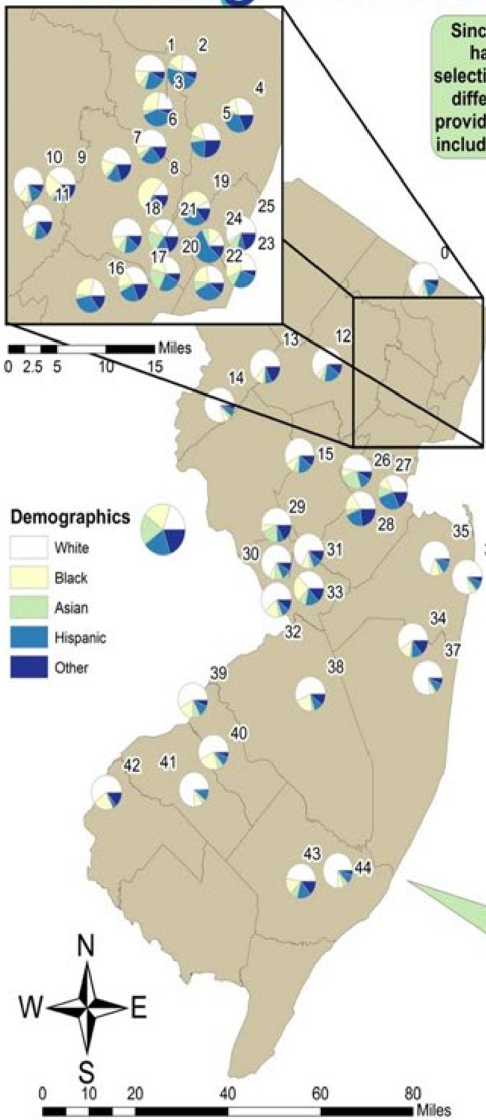
Figure 14: Superstorm Sandy destruction at Casino Pier in Seaside Heights. Similar damage was seen at boardwalk locations throughout the state.
Source: globalpost.com

Data Sources: NJDEP, FEMA, USGS, NJ Boardwalk Guide

By: Emily Beyer, Sarah Jakositz, and Leah Goldsberry

Colleges in New Jersey: Which One is for You?

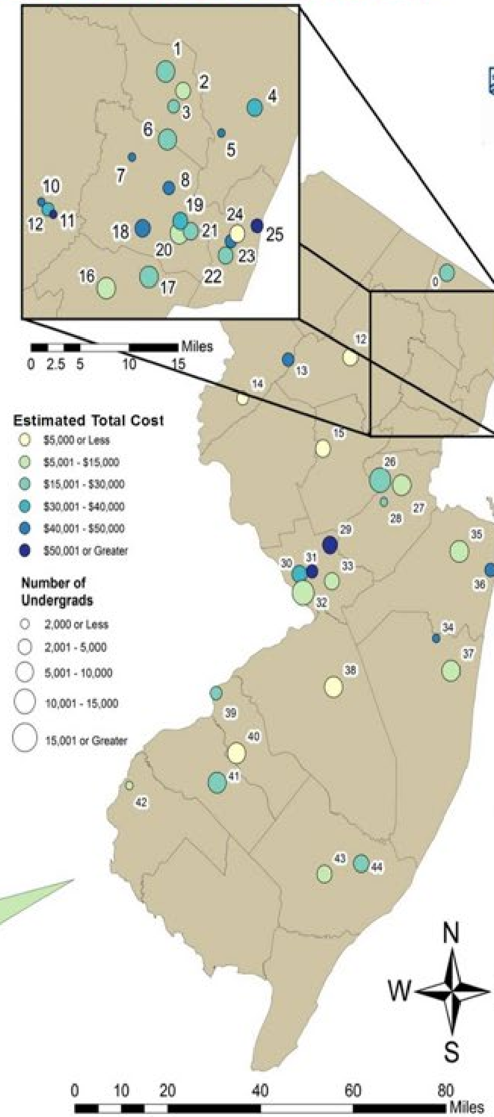
Since the year 2000 the number of students who attend college has increased by approximately 6.5 million students.[1] The selection of a college is a difficult decision because there are many different aspects to choosing a university. The following maps provide a summary of the important aspects of choosing a college, including size, price, and other facts about colleges in New Jersey.



Label #	School	Most Popular Major	In State Students (%)
0	Ramapo	Business/Marketing	95
1	William Paterson University	Business/Marketing	98
2	Passaic County Community College	Liberal Arts	100
3	Berkeley College	Business/Marketing	95
4	Fairleigh Dickenson University- Metropolitan	Liberal Arts	86
5	Felician College	Health Professions	91
6	Montclair State University	Business/Marketing	97
7	Caldwell College	Business/Marketing	92
8	Bloomfield College	Social Sciences	95
9	The College of Saint Elizabeth	Health Professions	97
10	Fairleigh Dickenson University- Florham	Business/Marketing	84
11	Drew University	Social Sciences	65
12	County College of Morris	N/A	99
13	Centenary College	Business/Marketing	84
14	Warren County Community College	Liberal Arts	98
15	Raritan Valley Community College	Liberal Arts	99
16	Union County College	Liberal Arts	97
17	Kean University	Business/Marketing	98
18	Seton Hall University	Business/Marketing	78
19	Essex County College	Health Professions	98
20	Rutgers University- Newark	Business/Marketing	84
21	New Jersey Institute of Technology	Engineering	91
22	New Jersey City University	Business/Marketing	100
23	Saint Peter's University	Business/Marketing	85
24	Hudson County Community College	Liberal Arts	100
25	Stevens Institute of Technology	Engineering	65
26	Rutgers University-New Brunswick	Social Sciences	91
27	Middlesex County College	N/A	100
28	Devry University	Business/Marketing	93
29	Princeton University	Social Sciences	84
30	The College Of New Jersey	Education	91
31	Rider University	Business/Marketing	78
32	Thomas Edison State College	Liberal Arts	41
33	Mercer County Community College	Liberal Arts	98
34	Georgian Court University	Psychology	96
35	Brookdale Community College	Business/Marketing	99
36	Monmouth University	Business/Marketing	88
37	Ocean County College	Liberal Arts	100
38	Burlington County College	Liberal Arts	99
39	Rutgers University- Camden	Business/Marketing	98
40	Camden County College	N/A	99
41	Rowan University	Education	96
42	Salem Community College	Health Professions	81
43	Atlantic Cape Community College	Liberal Arts	100
44	The Richard Stockton College of New Jersey	Business/Marketing	99

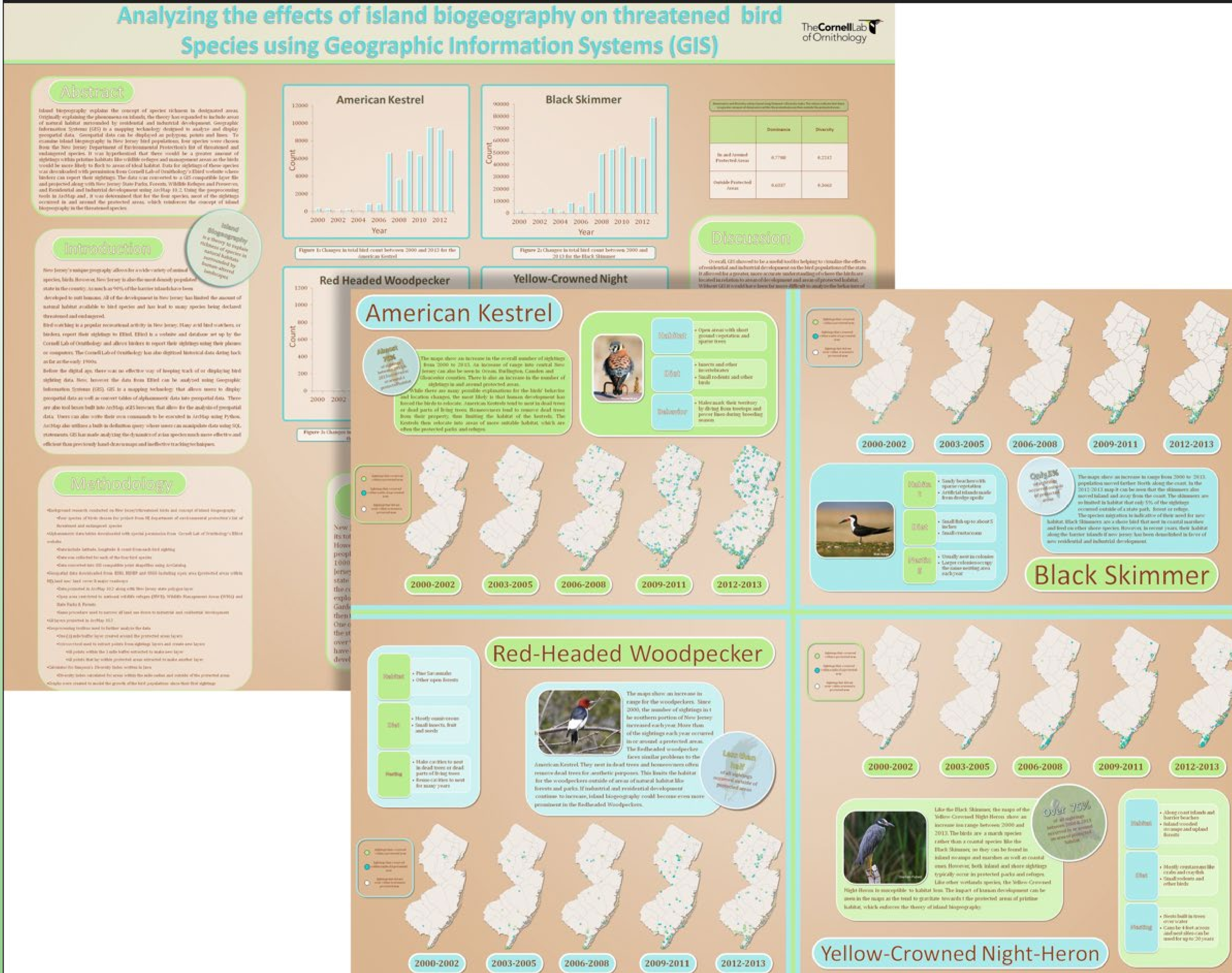
It is important to understand a school's atmosphere and student population. The placement of the charts depict the university's location, while the school's demographics are depicted on the chart.

The price of tuition and student population are also important factors for choosing the right college. The size of the point corresponds with the undergraduate population of the college. The color of the point coincides with the price of tuition at that college.



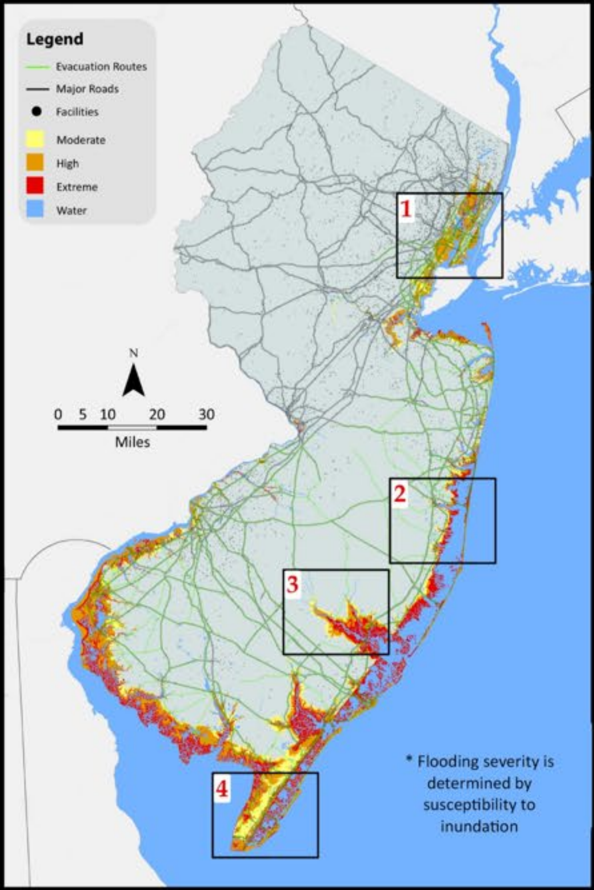
Lindsey Mahnken
Bradley Louth
& Dan King

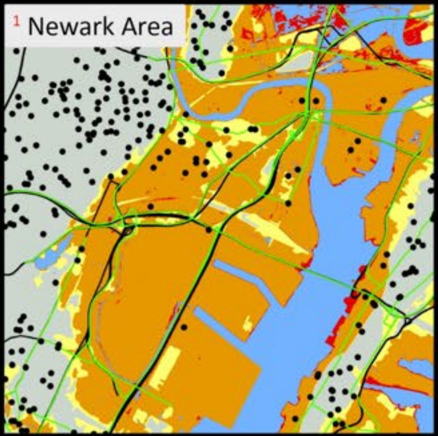
Sources: College Board [1]
New Jersey Geographic Information Network

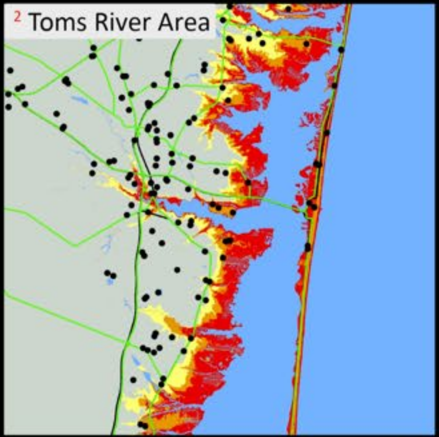


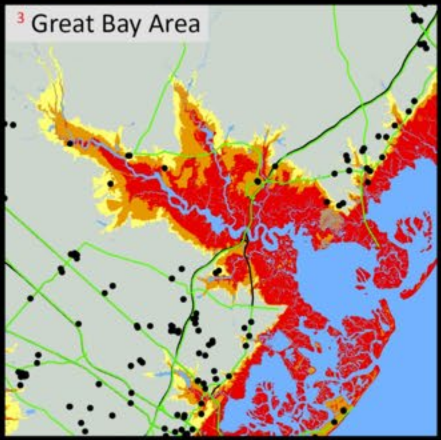
Analyzing the effects of island biogeography on threatened bird Species using Geographic Information Systems (GIS)
The Cornell Lab of Ornithology
Abstract
Introduction
Methodology
American Kestrel
Black Skimmer
Red Headed Woodpecker
Yellow-Crowned Night
Count
Year
Discussion
American Kestrel
Black Skimmer
Red-Headed Woodpecker
Yellow-Crowned Night-Heron
2000-2002
2003-2005
2006-2008
2009-2011
2012-2013

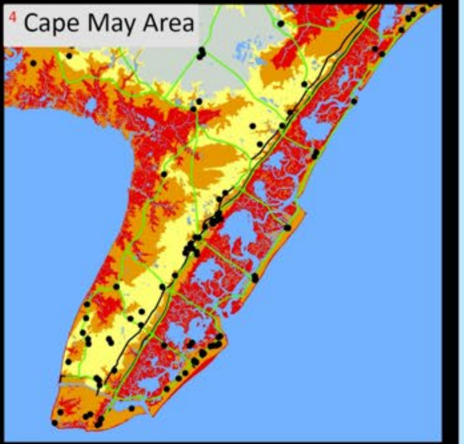
Mapping to Promote Coastal Resiliency: New Jersey Coastal Flooding Exposure Assessment









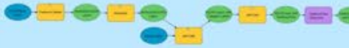


RUTGERS
THE STATE UNIVERSITY OF NEW JERSEY

To help inform coastal resiliency planning in the state of New Jersey, we undertook an assessment of coastal areas most exposed to coastal flooding, storm surge, and sea level rise. Through consultation with an expert panel, we identified criteria for the assessment protocol and ranking scheme (see below).

Protocol Element	Available Data	NJ Ranking
1. Flood Hazard Areas	1 and 0.2% annual Shallow Flood Hazard Area A & V zones from Advisory Base Flood Elevation / Flood Insurance Rate preliminary maps	Extreme: V Zone High: 1% A & V Zones Moderate: -0.2% (500 year or X) zone
2. Storm Surge	Sea, Lake, and Overland Surges from Hurricanes (SLOSH) Category 1-4	Extreme: High: SLOSH Category 2 Moderate: SLOSH Category 3
3. Shallow Coastal Flooding	NOAA/NWS Shallow Coastal Flooding (SCF)	Extreme: SCF High: Moderate:

The assessment distinguishes at least three classes of geographic areas based on variation in exposure to coastal hazards: moderate, high, and extreme risk areas with extreme risk areas as those that are currently exposed to relatively frequent storms or chronic flooding. The layers were processed using ArcGIS model maker and Python to automate the process of data classification.



Also at risk are segments of society that may have limited capacity to prepare for or recover from extreme flooding events. In planning for enhanced coastal resiliency, it is vital to consider the populations, facilities, and resources at risk which can be evaluated for options such as floodproofing, property buy-outs, or other adaptation options.

Infrastructure	Moderate	High	Extreme
Miles of Road Affected			
Major Roads (miles)	222	576	50
Evacuation Routes (miles)	170	461	63
Number of Facilities Affected			
Wastewater Treatment	6	37	5
Coastal Energy Facilities	11	28	0
Schools	126	229	3
Fire Stations	72	150	7
Law Enforcement	33	72	5
Long Term Care / Assisted Living Facilities	14	21	0
Hospitals	5	9	0
Socially Vulnerable Populations (2010 Census)			
Zero Vehicle Households (persons)	17,251	59,223	12,941
Limited English Proficiency (persons)	41,492	114,128	20,028
Over 65 years in age (persons)	36,730	103,751	42,083
Known Contaminated Sites (NJDEP)			
Active Sites with Confirmed Contamination	667	2,063	172
Total (including pending sites)	758	2,295	192
	M-H-E categories combined		
Property Parcels Affected	# affected	$ Land Value	
Commercial Properties	20,310	$12,130,630,476	
Industrial Properties	3,041	$2,458,963,900	
Residential Properties (includes Apartments)	351,002	$80,769,359,867	

Within these areas exposed to coastal flooding, there is a noteworthy amount of infrastructure in terms of major roads/evacuation routes, critical facilities, contaminated sites, and properties that are at risk.

Much of New Jersey's heavily developed Atlantic barrier islands/back bay, Cape May, Delaware Bayshore, Raritan Bay, Newark Bay, and Hackensack Meadowlands communities are exposed to moderate to extreme levels of flooding exposure.

Data sourced from FEMA, NOAA, NWS, NJOIT/OGIS, NJDOT, and CRSSA

Created at the Rutgers University Center for Remote Sensing and Spatial Analysis by Eden Buenaventura under the direction of Dr. Richard G. Lathrop

From Production to Cleanup: Characteristics of Toxics Release Inventory (TRI) Facilities that Become Superfund Sites

Introduction

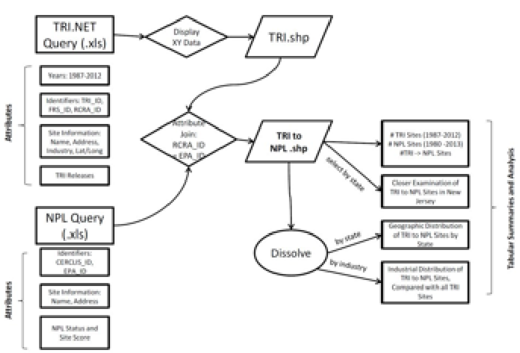
Most superfund (NPL) sites are the unfortunate legacies of former industrial production, often from times when few environmental regulations existed. However, as the EPA Toxics Release Inventory (TRI) program grows in yearly coverage, more information is available to track the transition from production to cleanup. This project links current superfund sites to their counterpart in the TRI, and evaluates the geographic and industrial distribution of TRI sites that have converted to NPL sites.

Data

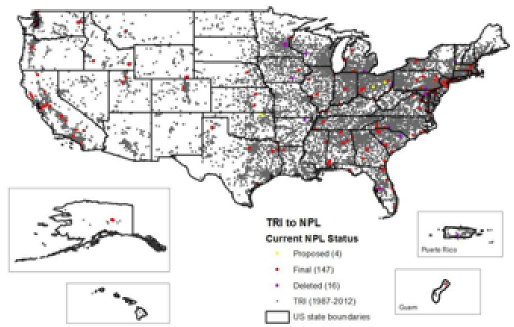
The Toxics Release Inventory (TRI) and the Superfund Program (which prioritizes environmental cleanup sites, through creation of the National Priorities List, NPL) are distinct programs within the EPA. The TRI began in 1987 and requires industries with over ten employees to report on toxic chemical releases, exceeding a certain threshold. Both programs have common facility identifiers, the TRI RCRA_ID and the NPL EPA_ID, which provide a means to join information common to these two programs.

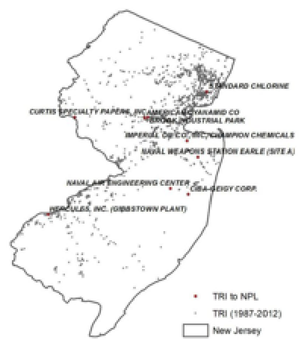
Methods

First, information on TRI and NPL sites were obtained from applications in their respective programs (TRI.NET and the CUMULIS website). These data were imported into ArcGIS 10.2.1, joined, and then analyzed by state and industry.



Data Sources:





Tracking the Transition from TRI to NPL

Type	Number	% TRI to NPL
TRI ID Sites (1987-2012)	56,582	0.3%
NPL Sites (1980-2013)	1,739	9.6%
TRI to NPL	167	-

Tracking the Transition from TRI to NPL, New Jersey

Type	Number	% TRI to NPL
TRI ID Sites (1987-2012)	1,645	0.5%
NPL Sites (1980-2013)	147	6.1%
TRI to NPL	9	-

New Jersey's Share of TRI and NPL

Type of Site	Percent Share
Share of TRI ID Sites	2.9%
Share of NPL Sites	8.5%
Share of TRI to NPL Sites	5.4%

Top 10 States, with TRI to NPL Transitions

State	Count	Rank	Total Releases (lbs.)
California	22	1	12,201,041
Florida	9	2	10,099,318
New Jersey	9	3	9,133,600
Ohio	8	4	44,481,890
Virginia	8	5	177,255,008
Washington	8	6	23,673,426
Alabama	7	7	128,452,937
North Carolina	7	8	42,520,391
Pennsylvania	6	9	18,716,312
Texas	6	10	496,983,628

Site Name	Total Cost Recovery	Total Federal Penalty Assessed or Agreed To	Total Compliance Action Cost
STANDARD CHLORINE			$800,000.00
NAVAL WEAPONS STATION EARLE (SITE A)			$2,572,191.00
IMPERIAL OIL CO., INC./CHAMPION CHEMICALS	$41,738,432.00	$77,500.00	
HERCULES, INC. (GIBBSTOWN PLANT)	$435,000.00	$35,830.00	$520,000.00
NAVAL AIR ENGINEERING CENTER			
CIBA-GEIGY CORP. (Tom's River)	$9,447,266.00	$141,050.00	$112,000,000.00
BROOK INDUSTRIAL PARK	$1,373,000.00	$15,000.00	$1,900,000.00
AMERICAN CYANAMID CO		$19,350.00	$17,300,000.00
CURTIS SPECIALTY PAPERS, INC		$19,125.00	$6,275,000.00

Findings

- Almost 10% of superfund sites were once TRI sites.
- 9 of these sites are in New Jersey: 5% of NJ's NPL sites.
- New Jersey ranks 3rd in TRI to NPL site counts.
- Imperial Oil Co/Champion Chem. has the highest actual federal monetary input for estimated clean up.
- Tom's river has the highest actual compliance contribution from the PRPs (Personally Responsible Parties) .

Conclusions

- It is possible to make a connection between TRI and NPL sites to explore both data sets for future preventative measures.

For future research

- Several of these currently have minor reporting violations. I would like to investigate the severity of these violations
- Use statistical analysis to find trends in the type of emissions/pollution

Author: Jeff Beltran,

Contributors: Lisa Jordan, Nora Lopez

Acknowledgements

This project was made possible through the ESS 302 Geographic Information Systems course, a participant in the EPA TRI-University Challenge program, 2013-2014, and through generous grants from NASA and the Andrew Mellon Foundation, which help finance the computers, software, and general operations of the Spatial Data Center at Drew University, in Madison, New Jersey.

Analysis of TRI Facilities' Participation in Pollution Prevention (P2) And Decrease in Emissions in New Jersey from 1990-2010

Introduction to Project P2

The Pollution Prevention Act of 1990 sought to incentivize facilities around the nation to reduce, and ideally prevent pollution altogether This could be achieved through simple cost-effective modifications in production processes, promoting the use of non-toxic or less-toxic substances, implementing conservation techniques, and reusing materials rather than putting them into the waste stream. The Toxics Release Inventory (TRI), created in 1986 under the Emergency Planning and Community Right-to-Know Act (EPCRA), manages the toxic chemicals hazardous to both humans and the environment. Different facilities across the United States are required to report the amount of toxic chemicals that are released yearly, whether into the air, into the water, or into the land. This project involves the use of the Environmental Protection Agency's Pollution Prevention (P2) tool, which measures the amount and type of pollution prevention actions being taken by each facility. This project is a look at how effective P2 was, and currently is, at reducing toxic emissions by facilities in the state of New Jersey. It compares core facilities' P2 participation by examining the number of core industry facilities participating, the number of P2 actions being carried out by facilities, and the percentage of overall participation in P2. To understand the impacts of P2 on toxic emissions, this project used GIS to map the decrease of toxic release by core industry facilities for the years 1990-2000, when P2 was initially being implemented, and in the years 2000-2010 to see the recent progress.

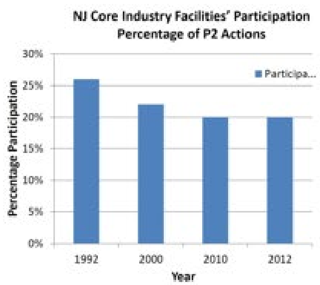


Figure 1

Figure 1
NJ Core Industry Facilities' Participation Percentage of P2 Actions shows a leveling of participation in P2 actions.

Method and Data:

The data collected using EPA's TRI NET tool included query inputs for the years 1992, 2000, 2010, and 2012, the main focus being the total number of P2 activities core facilities in New Jersey participated in. To do this, using TRI NET, each query included the TRI FID, industry type, industry, name, address, city, county, state, zip code, latitude, longitude, selecting all P2 counts, for NJ in each year. Each year's NJ core industry P2 counts were added to Arc Map and allowed comparison throughout the years of the measures of P2 actions. The TRI data was collected from TRI Tox Map and allowed comparison of reduction of emissions within ten year periods.

Figure 3
Change in Toxics Release Inventory Emissions for New Jersey Over a Twenty Year Span determines a greater reduction of toxic emissions from core facilities between the years of 1990-2000.

Results and Conclusion:

Overall, the P2 program has seen adequate participation since its inception in 1990. It saw a 26% participation of facilities in all industries in 1992 which declined 4% by 2000. The P2 participation has remained steady at 20% through 2010 and 2012 (Figure 1). This leveling off of participation in the program may be due to facilities reaching their emission reduction goals or because of a loss of interest in the program because it is now over 10 years old. The steady level of participation at 20% may also be due to internal pressures as an incentive to continue taking P2 measures. There is a greater number of facilities between the years of 1990 and 2000 showing a large reduction in total TRI-reported emissions than between the years of 2000 and 2010 (Figure 3). This may be due to the greater percentage of facilities participating in the P2 program between 1990 and 2000 than from 2000 to 2010 (Figure 2). Questions for further study include determining if the percentage of participation will continue to remain at a steady 20% or will continue to decline as well as determining if the reduction in emissions continues to follow the same trend.

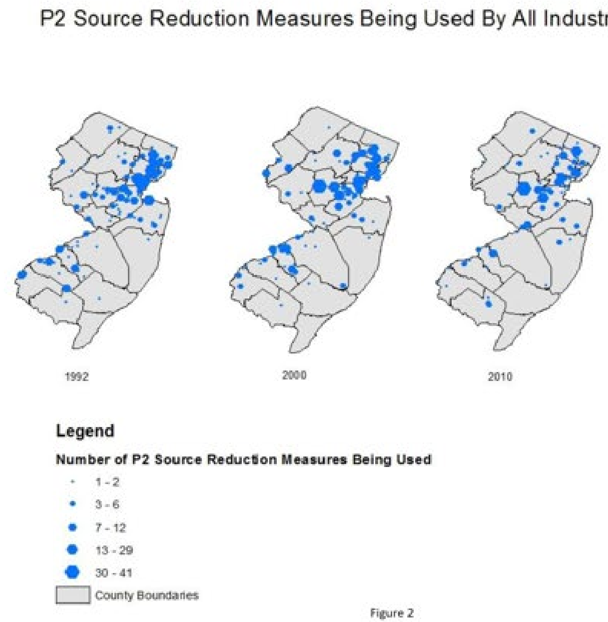


Figure 2
P2 Source Reduction Measures Being Used By All Industries, 1992-2012 demonstrates the number of P2 actions facilities are participating in and concludes that the year 2000 had the greatest number of P2 actions being done.

Data Source:
EPA TRI NET
U.S. Census Boundary Files

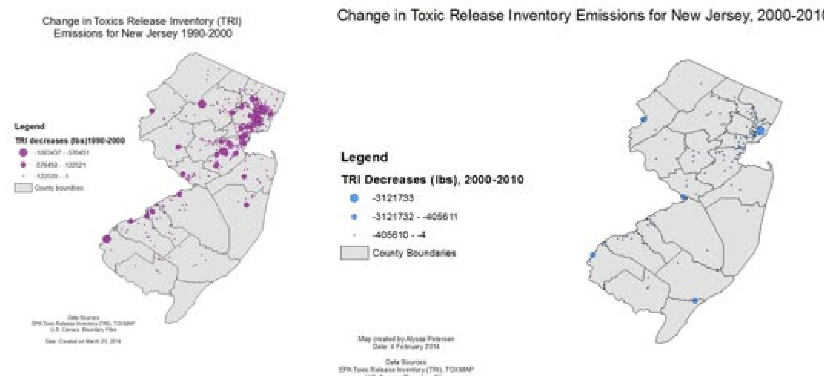


Figure 3

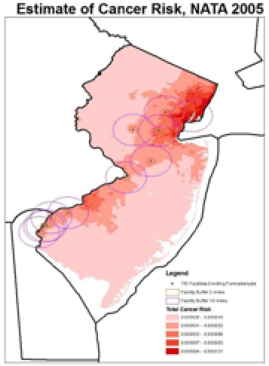
Acknowledgements

We would like to thank the following contributors:
Drew University, Drew University Spatial Center, Professor Lisa Jordan, NASA and the Andrew Mellon Foundation, ArcGIS license, the official EPA-TRI website, and EPA's Nora Lopez.

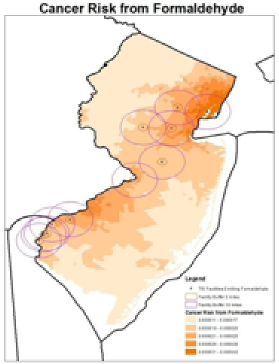
Authors:
Sophia Martinez, Alyssa Petersen, and Kaylie McNeil

TRI Facility Formaldehyde Emissions and Cancer Risk in NJ

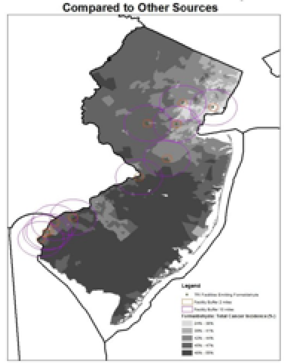
Estimate of Cancer Risk, NATA 2005



Cancer Risk from Formaldehyde

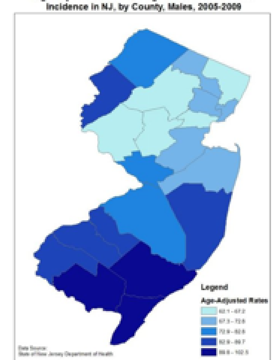


Percent of Cancer Risk from Formaldehyde Compared to Other Sources

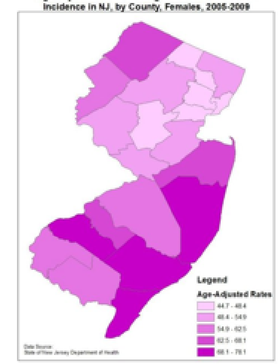


Data Sources:
National-Scale Air Toxics Assessment
Environmental Protection Agency
Toxic Release Inventory
New Jersey Department of Health

Age-Adjusted Rates of Lung and Bronchus Cancer Incidence in NJ, by County, Males, 2005-2009



Age-Adjusted Rates of Lung and Bronchus Cancer Incidence in NJ, by County, Females, 2005-2009



Introduction

The goal of this research project was to determine whether proximity to a Toxic Release Inventory (TRI) facility emitting formaldehyde increases risk of lung cancer. Formaldehyde is a chemical released through air emissions, mainly as a byproduct of pressed wood products containing adhesives or resins. Recently, the World Health Organization announced that air pollution is the "single biggest environmental health risk," accounting for roughly 7 million deaths per year.

Data

Based on data from the EPA, we found that formaldehyde was one of the largest air pollutants in New Jersey. According to the National-Scale Air Toxics Assessment (NATA), formaldehyde is considered to be "likely carcinogenic to humans." We compiled information from the TRI to locate all of New Jersey's facilities emitting formaldehyde between 2005 and 2009.

Authors:
Carly McCrink, Alyssa Reed, Ryan Wilson

Methods

In order to test whether proximity to a TRI facility emitting formaldehyde increased risk of lung cancer, we decided to use a facility buffer in two intervals, 2 miles and 10 miles, and we overlaid our findings with NATA maps displaying cancer risk. We compared this information with data from the New Jersey Department of Health to determine the counties with the greatest incidence of lung cancer to see if it was consistent with counties with TRI facilities emitting formaldehyde.

Results

Our findings are consistent with the risk maps from NATA; that is, higher risk areas in NJ are mainly located within the proximity of TRI facilities emitting formaldehyde. As well, we found that the TRI facilities are located closer together in South NJ, which may account for the fact that formaldehyde accounts for a larger percentage of lung cancer risk than North NJ. It is important to note that North NJ is relatively more industrial than South NJ, with a greater diversity of chemicals being released.

Conclusions

Based on our research, we can conclude that proximity to a TRI facility emitting formaldehyde may increase risk of cancer. Specifically, formaldehyde is a greater contributing carcinogen to cancer risk in South NJ, where TRI facilities emitting formaldehyde are located closer together than North NJ. The one issue with our research is that smoking is one of the main causes of lung cancer. However, we were not able to control for this variable in our research.

Bibliography

Environmental Protection Agency. Site last updated on Friday, February 22, 2013. Web. <http://www.epa.gov/nata/>.

Luo, Juhua, Michael Hendryx, and Alan Ducatman. "Association Between Six Environmental Chemicals and Lung Cancer Incidence in the United States." *Journal of Environmental and Public Health* (2011). Web. 4 Mar. 2014.

New Jersey Department of Health: New Jersey Cancer Registry. Based on data released on June 18, 2013. Web. < http://www.cancer-rates.info/nj/index.php>.

Vidal, John. "WHO: air pollution 'is single biggest environmental health risk '." *The Guardian* 25 Mar. 2014. Web. 27 Mar. 2014.

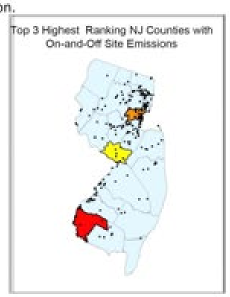
Acknowledgements:
Prof. Lisa Jordan
Nora Lopez
Drew University Spatial Data Center

Demographic analysis of New Jersey counties with the highest reported on and off site TRI emissions: Examining African American, Hispanic and Native American Residential Distributions

Authors and Contributors:
Marra Tripodi, Cassandra Worthington, Danielle Monopoli, and Jayce Lebon

Introduction

Toxic Release Inventory, or TRI, is a database made available to the public by the Environmental Protection Agency (EPA) containing information on the type and amount of chemical(s) released by facilities in the United States that meet the criteria set forth by the EPA. That is, a facility that has more than ten employees and have manufactured or processed more than 25,000 lbs of a toxic chemical emissions. In this research, we investigated if environmental inequality exists in the top three counties with the highest releases (lbs) of TRI on-and-off emissions in New Jersey for minority populations. We brought this data together with information from the 2010 United States Census, which provided the location and population of each race reported in the state of New Jersey. In this report we chose to focus on the African American and Hispanic population.



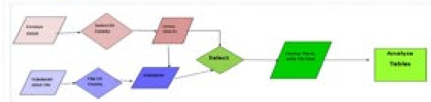
Data

The top three counties with the highest on and off site releases were Mercer with 8 facilities reporting 1,112,780 lbs, Salem with 12 facilities reporting 6,097,830 lbs, and Union with 35 facilities reporting 3,172,185 lbs.

Methods

To begin our analysis on TRI and race population relationships, nine maps were made to display the spatial relationship between TRI sites and Black, Latino, and Native American populations in three New Jersey counties (Salem, Union, and Mercer) that reported the highest on-and-off TRI site emissions. The steps to making our maps began with collecting 2010 Census data from the website. Our research team repeated the following steps nine times to make the maps. Using ArcGIS, our research group selected one of the three counties from the Census 2010 data layer to create a new layer that displays 2010 Census data for that specific New Jersey County. Then we made a second data layer set with TOXIMAP 2010 TRI data, and then clipped one of the three counties using the information from the new layer that was made in the previous step to create a data layer that displays TRI sites in one of the three counties. Next we selected attributes to create a layer that illustrated TRI and population information in Salem, Mercer, and Union. After acquiring these maps, we then chose specific population groups, Black, Latino, and Native American, to make nine final maps that displayed the distribution of one of these minority groups in one of the counties and their spatial relationship to TRI facilities.

Methodology



Figures

TRI Sites and Black Population in Salem County in NJ

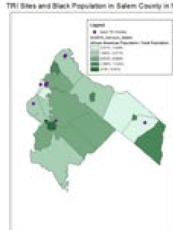


Figure 1- Salem Black Population

[illegible]	[illegible]	[illegible]	[illegible]

Chart 1- Salem Black Population

TRI Sites and Latino Population in Salem County NJ

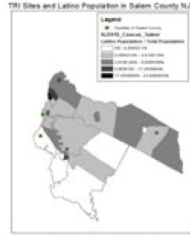


Figure 2- Salem Latino Population

[illegible]	[illegible]	[illegible]	[illegible]

Chart 2- Salem Latino Population

TRI Sites and Native American Population in Salem County NJ

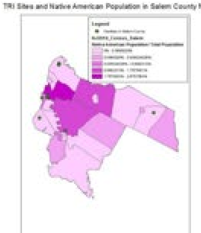


Figure 3- Salem Native American Population

[illegible]	[illegible]	[illegible]	[illegible]

Chart 3- Salem Latino Population

TRI Sites and African American Population in Union County NJ

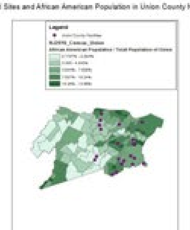


Figure 4- Union Black Population

[illegible]	[illegible]	[illegible]	[illegible]

Chart 4- Union Black Population

TRI Sites and Latic Population in Union County NJ

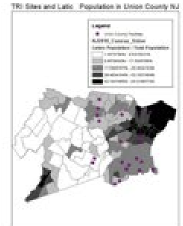


Figure 5- Union Latino Population

[illegible]	[illegible]	[illegible]	[illegible]

Chart 5- Union Latino Population

TRI Sites and Native American Population in Union County NJ

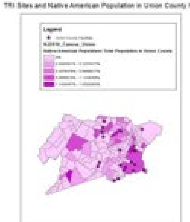


Figure 6- Union Native American Population

[illegible]	[illegible]	[illegible]	[illegible]

Chart 6- Union Native American

TRI Sites and African American Population in Mercer County

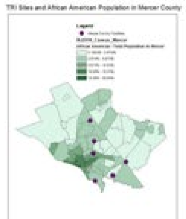


Figure 7- Mercer Black Population

[illegible]	[illegible]	[illegible]	[illegible]

Chart 7- Mercer Black Population

TRI Sites and Latino Population in Mercer County NJ

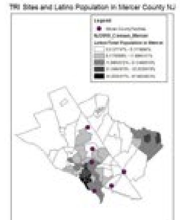


Figure 8- Mercer Latino Population

[illegible]	[illegible]	[illegible]	[illegible]

Chart 8- Mercer Latino Population

TRI Sites and Native American Population in Mercer County NJ

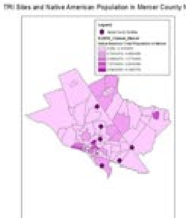


Figure 9- Mercer Native American Population

[illegible]	[illegible]	[illegible]	[illegible]

Chart 9- Mercer Native American Population

Results

After mapping the Black, Latino and Native American population distributions of Salem, Union and Mercer County, we observed substantial differences among our findings. Among these top three ranking counties for TRI on–and-off emissions, a higher percentage of the Native American populations were found in proximity to TRI facilities compared to the total county's population. Additionally, both Union and Mercer County had a higher percentage of Blacks living near TRI sites when compared to the rest of the population. As for the Latino populations, there was no dramatic difference between TRI sites and population distribution.

Conclusions

Though the number of Native Americans within the studied counties are notably smaller than the Black and Latino populations, these results provide preliminary evidence for environmental inequality of Native Americans within Salem, Union, and Mercer. This environmental racism is also present among the Black community within Mercer and Union counties.

These results could provide a foundation for further research in this issue by exploring the movement of racial populations throughout the lifespan of TRI facilities. This research can also be used for research of TRI displacement and income distribution. Further research should also investigate smaller classifications of boundaries using neighborhood data in order to inspect racial minorities on a more micro-scale.

Bibliography

EPA TRI Explorer: Mercer County, NJ (2010), Salem County, NJ (2010), Union County, NJ (2010);
NHGIS Population and Demographic Data;
NIH U.S. National Library of Medicine: TOXMAP TRI Facilities DATA

Acknowledgements

Drew University
Dr. Lisa Jordan
NASA and the Andrew Mellon Foundation
EPA-TRI University Challenge
EPA's Nora Lopez, MPH

The Andrew W. Mellon Foundation

DREW UNIVERSITY / MADISON NJ

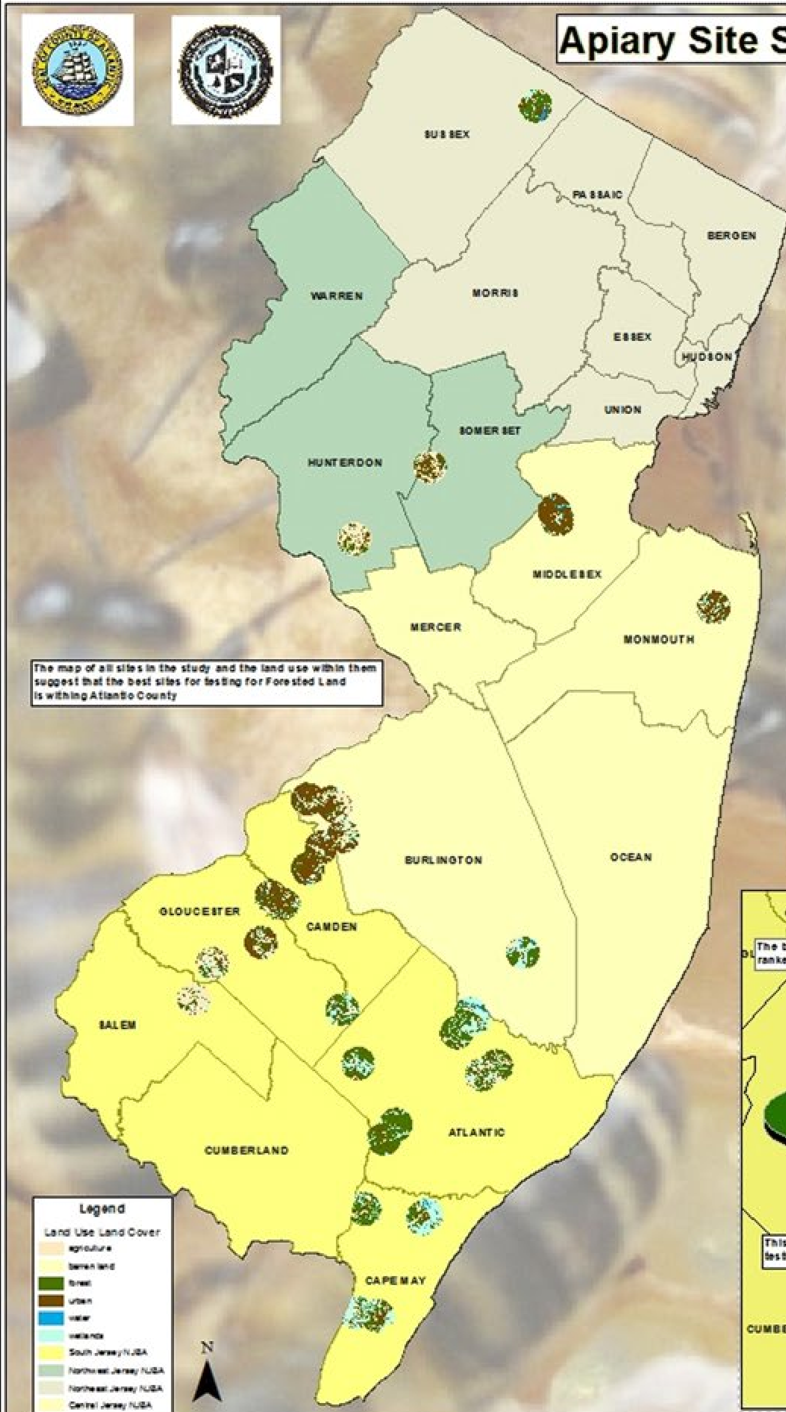
Apiary Site Selection for Pollen Study

The New Jersey Beekeepers Association
www.njbeekeepers.org

This map is to be used for a joint pollen study between The Richard Stockton College, The New Jersey Beekeepers Association and the New Jersey State Apiarist.

The study will select Honey Bee Apiaries based upon the land use land cover that comprises a two mile buffer around the Apiary.

Pollen will then be sampled from the hives and tested for pesticide contaminates.



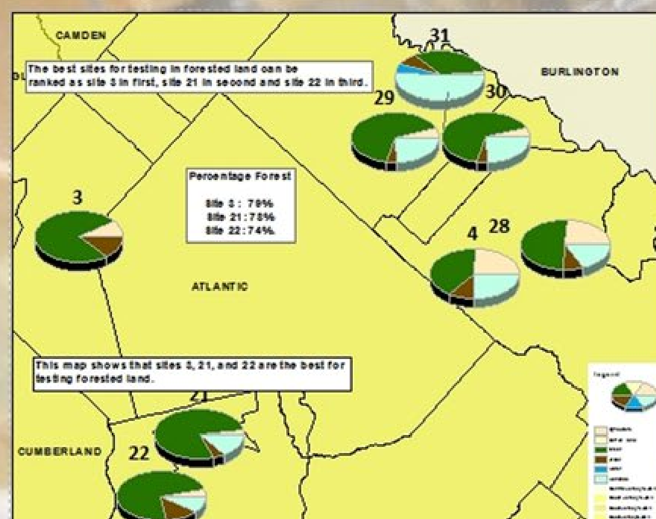
Using the same methods, the best sites to test for pesticide contaminants in Urban, Wetland, Open Space & Barren Land, and Agriculture. and Residential areas can be determined.

The Honey Bee Provides important pollination services for the fruit and vegetable industry in New Jersey.

Land Use Factors such as pesticide use can contaminate bee pollen, kill colonies, and jepordize the multimillion dollar Honey Bee and Agriculture industry.

Because of the known fact that honey bees collect pesticide contaminated pollen, we would like to see if there is any difference in the types and amounts of pesticides collected by honey bees in 5 different land use areas. This is important because if certain land uses have fewer or no pesticides in their environment then a beekeeper could look for bee yard locations in that area to help colonies recover from pesticide exposure.

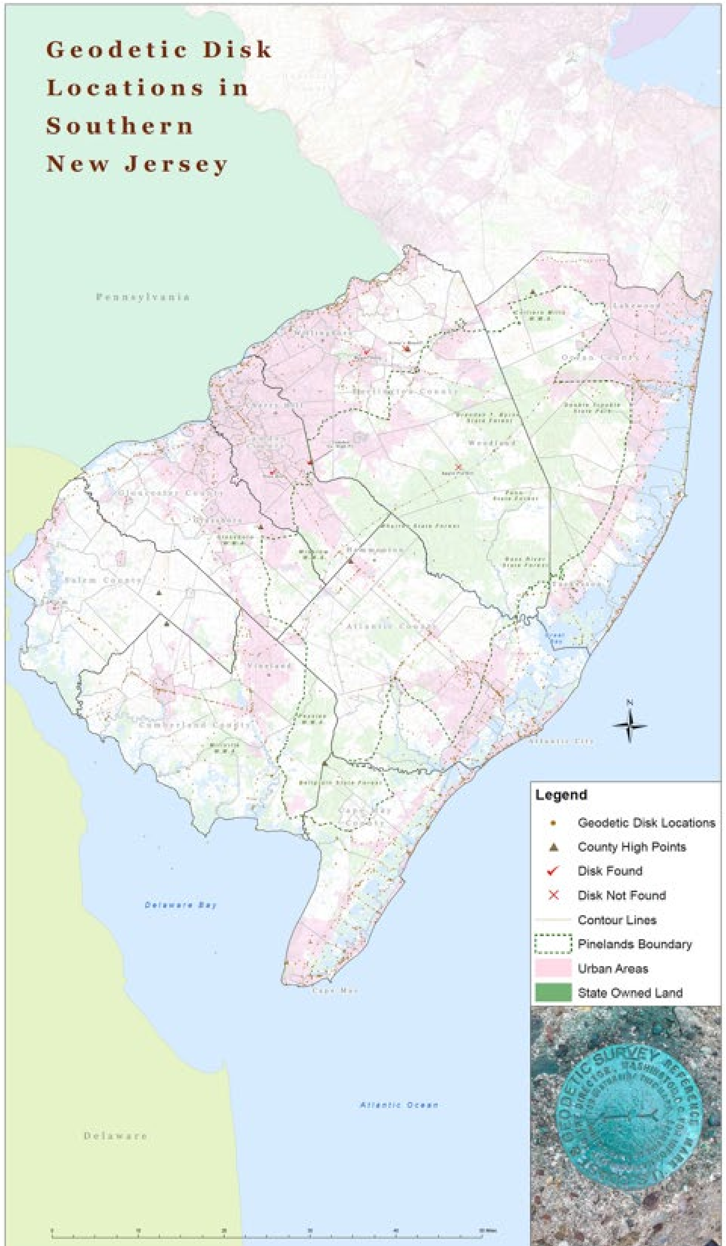
-Tim Schuler
NJ State Apiarist



Now is an especially important time for studying honey bees. They are a remarkable group of insects, and their importance as pollinators for agriculture cannot be overstated. However, European honey bees are currently threatened by CCD (Colony Collapse Disorder), and their numbers are declining catastrophically around the world. While there is no single cause for CCD, habitat oss, parasites, and pesticide contamination have all been shown to be among the factors affecting honey bee survival. The more we can learn about bees and the factors affecting their success and decline, the more likely we are to prevent a massive scale agricultural disaster, which will likely happen if the agricultural plants lose one of their most important pollinators.

Dr. Ekaterina Sedia
Program Director
Professional Science Master's Program Environmental Science
Richard Stockton College

Exploring the Geography of Southern New Jersey



What is a benchmark?

According to www.geocaching.com, benchmarks are placed on points whose positions are known to high degrees of accuracy. Many of these benchmarks look like the geodetic disks displayed on this poster. Some can also be objects like radio masts, metal rods, or church spires. These disks are secure in the ground and are good starting destinations for beginner geocachers. Some are located at significant landmarks such as county high points (which are shown on the map) and other larger hills.

My Idea

A common stereotype about Southern New Jersey is that it is a flat boring place. Many people don't realize the many interesting physical features that actually do reside in the southern portion of the state. For example, most people probably don't know that you can see both the Philadelphia and Atlantic City skylines from the summit of Apple Pie Hill (one of the many benchmark locations in New Jersey). By promoting benchmark geocaching in South Jersey, I think it would encourage people to explore their surrounding geography and discover places they never knew were so close. I plan on setting up a Facebook page or possibly a blog documenting the various disks I find over time.

First Site Visits

Before I began the work on this map, I had already been to Apple Pie Hill several times. I had not thought to look for the benchmark back then so it is marked as unfound on the map. Other areas I visited during the creation of this map included Pine Hill (the disk was removed from the concrete base at the summit, but my location was correct), Mount Holly (two disks were found), the Camden County high point (first disk I ever found), and Arney's Mount (this is the highest point in South Jersey. I could not find the disk but I will return in the future).

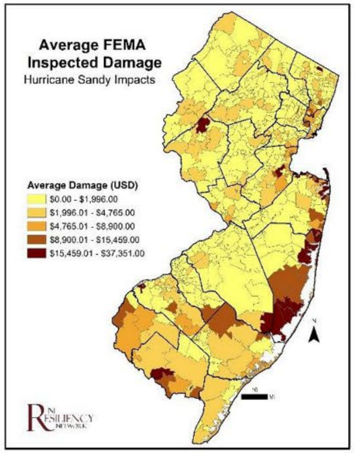
Disk 1: Camden County High Point (March 28, 2014)

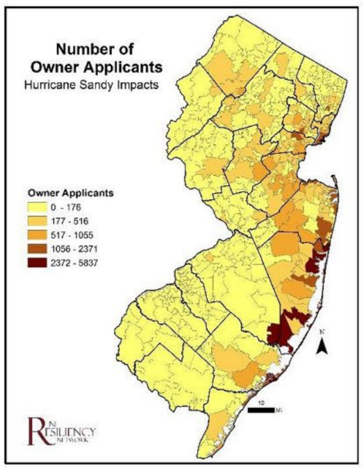
Rowan University

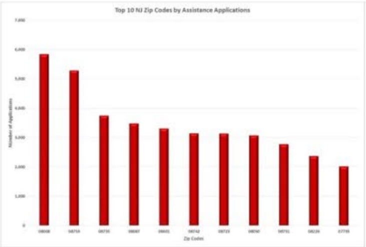
Connor Hornibrook, 06 April 2014

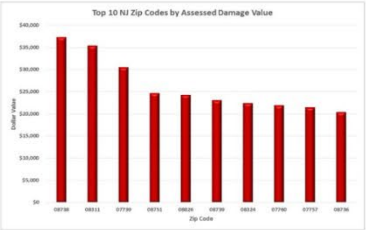
Sources: Rowan Geography Dept., New Jersey DEP

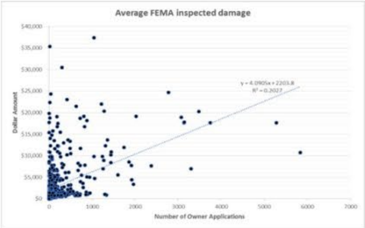
Superstorm Sandy Housing Impact Analysis by NJ Zip Code

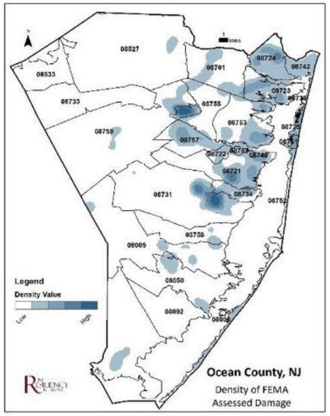


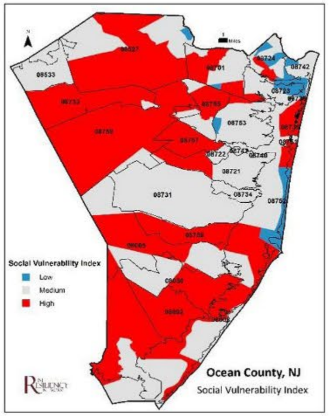




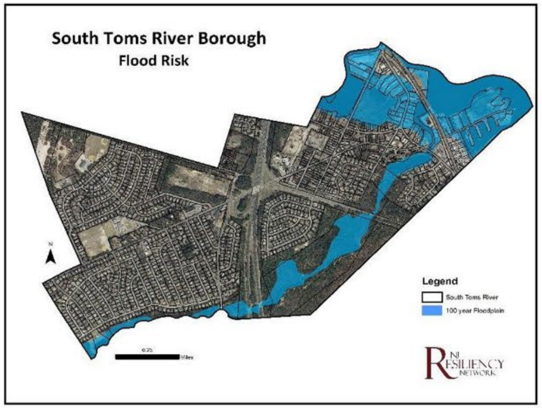


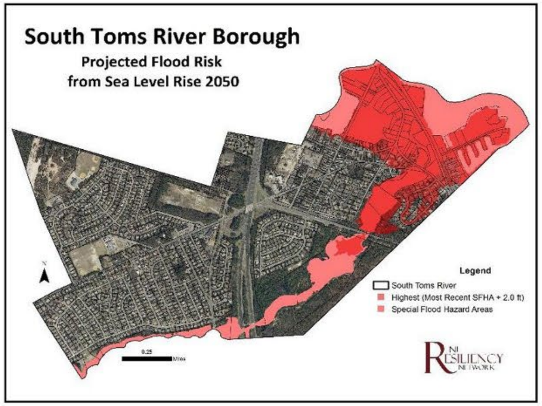






Data Sources: Emrich, C.T., 2013. FEMA-Sandy Social Vulnerability Index (SoVI); FEMA, 2013. Housing Assistance Program for NY and NJ Resulting from Super Storm Sandy; FEMA, 2013. Most Recent SFHA Data; FEMA, 2013. 100 Year Floodplain Data; NOAA, 2012. Flood Risk 2050, NOAA Global Scenarios.

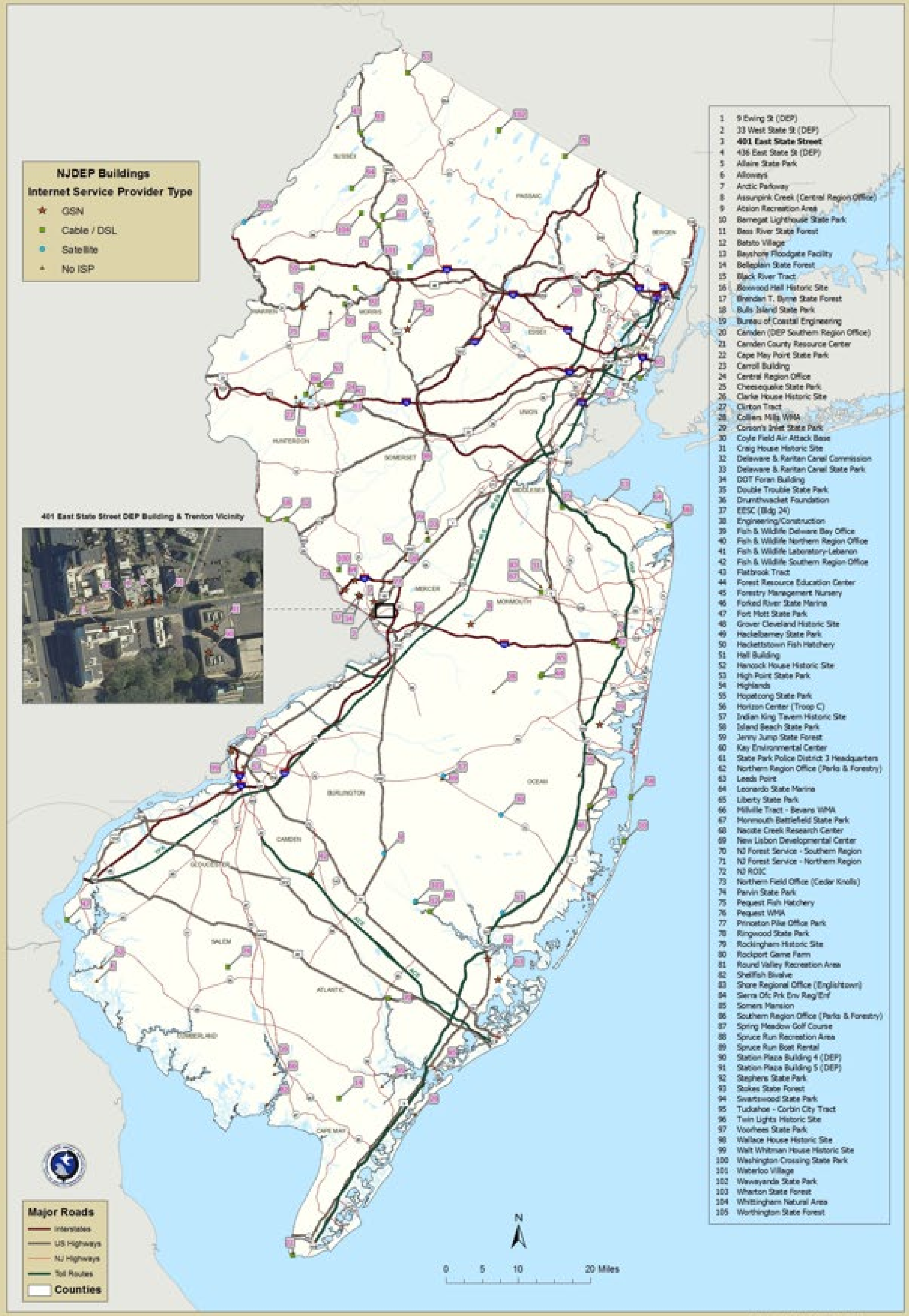




NJ Resilience involves Federal Data Sources → Data Analysis at the County Level → Vulnerability Assessments at Municipal Levels

Data Integration

NJDEP OIRM Supported Buildings



Using a Mobile Device to Collect and Retrieve Pre-Plan Information for Fire Emergencies

Abstract: The New Jersey Meadowlands Commission (NJMC) is a regional planning agency that promotes sharing information and resources with District municipalities and assists Meadowlands towns in managing municipal assets and emergency preparedness. The Emergency Response Information Systems (ERIS) is an interactive web based mapping system with a mobile pre-plan App. The mobile application enables emergency responders to record pre-plan information of buildings and critical facilities in their towns using a tablet or a smart phone. During an emergency they can retrieve the information using the same mobile device. The system also allows emergency responders to retrieve and inspect floor plans of buildings and critical facilities from their smart phones and submit wireless incident reports when the emergency is over.

Dr. Francisco Artigas, Dom Elefante, Sal Kojak, Stephanie Bosits, Marielis Nunez, Jose Baez
New Jersey Meadowlands Commission

1. Capturing Pre-Planning Data

Building information is collected using a mobile device. The data is sent to the server where an authorized emergency official approves all submissions that are posted. Images of buildings can also be uploaded and posted.

FACP Panel


Knox Box

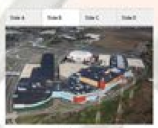

Standpipe System

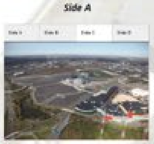
Roof Truss


Fire Hydrant

Data Captured For Pre-Plan		
General Information	Occupancy Type	Smoke Control System
Property Address	Roof Type	Location(s) served by Smoke Control
Building Address	PV Solar Energy System Present	Location of Smoke System Controller
Occupancy Name	Knox Box Location	Fire Protection Notes
Cross Street	Basement	**Building Utilities**
Emergency Contact	Exposures	Electric Service main
Contact Name	**Fire Protection Systems**	Gas service main
Contact Address	FACP Location	PV Solar System Disconnect Locations
Company Name	FACP Reset Code	Generator Location
Hazards	Remote Annunciator Location	Utilities powered by generator
Hazards	Automatic Sprinkler System	Utility Notes
Building Information	Sprinkler Locations	**Elevators**
Roof Trusses	Sprinkler Control Valve Location(s)	Elevator Type
Floor Trusses	Standpipe System	Number of elevator cars
Height	Riser Valve Location(s)	Location of machine rooms
Height Units	FDC Location	Elevator Contractor Contact Information
Area	Control Valve Location(s)	Elevator Notes
Area Units	Building Fire Pump	**Special Occupancy Consideration**
Construction	Location of Fire Pump Controller	Special Occupancy Considerations


Side A


Side B


Side C


Side D

The aerials of American Dream shows an example of uploaded images.

ERIS is a web application using HTML5 and ESRI JavaScript API to display map information from MERI-GIS ArcGIS server. It is created with a responsive design to be easily displayed on desktop and mobile devices. MERI-GIS uses crowd source building information from emergency responders.

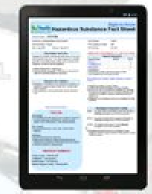
PHP is used to store information.


MERI's SQL Enterprise GIS Database

2. Accessing Pre-Planning Data

On the scene of a fire, emergency personnel can easily access pre-plan information previously posted. Officials can view fire hydrant location and strategic firefighting infrastructure associated with each building, floor plans, types of hazardous substances and the associated fact sheet.


Tablet showing building floor plan.


Tablet showing hazardous substance fact sheet.

3. Incident Report

Once the emergency is over, officials can submit an incident report via their smart phone or tablet, which populates an incident database accessible only to authorized emergency personnel.

Incident Report
Responder Name
Responder Designation
Address
Type of Incident
Occupied
Condition
Condition Locations
Actions Taken
Notes
Location of Command

Coastal Hazard Planning --- Developing a Coastal Vulnerability Index Map for New Jersey

The **Coastal Vulnerability Index (CVI)** is one in a suite of planning tools to provide coastal communities with easily accessible information to inform local and regional planning, hazard mitigation, and emergency management efforts. The CVI is a series of maps representing an analysis that will assist in classifying a range of hazard prone areas, including those susceptible to coastal flooding and impacts to the underlying land. Specifically, the New Jersey CVI presented here is a composite model of geospatial vulnerability indicators, including storm surge inundation (NOAA), mean higher high water surfaces (V_Datum), flood prone areas (FEMA and SSURGO), geomorphology (NJGS), slopes, erosion and soil drainage (SSURGO), and LIDAR elevation models that, together, classify a range of hazard prone areas susceptible to both chronic and episodic hazards. CVI is a planning tool only and does not impact regulatory decisions, nor is CVI appropriate for making site-specific design decisions.

Index Layer Development

Surge Layer

Generate Surface for Category 1-4 Storms From SLOSH Model Points

Combine Storm Surfaces with LIDAR Bare Earth Elevation Model

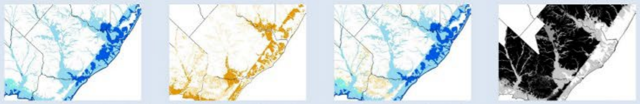
Generate Storm Surge Extents and Depth Grids for Cat 1-4 Storms

Generate MHHW layer from V-Datum Program

Hurricane Storm Surge	Rank	GIS Rank
Areas Outside of Surge	None	0
Category 4	Very Low	1
Category 3	Low	2
Category 2	Moderate	3
Category 1	High	4
Mean Higher High Water	Very High	5

Combine Storm Grids with MHHW Grid and Reclassify to Generate Surge Input Layer for CVI Calculation

Flood Prone Layer



Extract 100 and 500 yr FEMA Flood Zones From Best Available Mapping

Classify SSURGO Soil Map Units Based on Flooding Frequency

Combine Flood Zones and Soil Polygons with Critical Flooding Frequencies

Convert to Raster Layer

Flood Prone Areas	Rank	GIS Rank
Outside of Floodplain and non-flood prone soils	None	0
Occasionally Flooded Soils Outside of the Floodzone	Very Low	1
Frequently Flooded Soils Outside of the Floodzone	Low	2
500-Year Floodplain (X500)	Moderate	3
100-Year Floodplain (A, AE)	High	4
Velocity Zones (V & VE)	Very High	5

Raster is Reclassified for CVI Calculation

Geomorphology

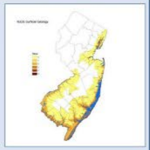
Source: Surficial Geology Layer Prepared by NJ Geological Survey

Selected Morphological Categories Extracted For Model

Selected Polygon Converted To Raster

Geomorphic Region	Rank	GIS Data
Non-Tidally Influenced Watersheds	None	0
Headland Systems	Very Low	1
Freshwater Tidal Systems	Low	2
Back Bays and Open Bay Systems	Moderate	3
Mixed-Energy Barrier Systems	High	4
Spits & High-Energy Barrier Systems	Very High	5

Raster is Reclassified for CVI Calculation



Drainage

Source is SSURGO Soils Layer (NRCS)

Soil Units Mapped by Drainage Characteristics

Map Units in Critical Drainage Classes are Extracted

Selected Polygons Converted to Raster

Soil Drainage	Rank	GIS Rank
Excessively Well Drained	None	0
Well Drained	Very Low	1
Moderately Well Drained	Low	2
Somewhat Poorly Drained	Moderate	3
Poorly Drained	High	4
Very Poorly Drained	Very High	5

Raster is Reclassified for CVI Calculation

Slope

Source is SSURGO Soils Layer (NRCS)

Soil Units Mapped by Major Component Slope Values

Map Units in Critical Slope Classes are Extracted

Selected Polygons Converted to Raster

Slope (%)	Rank	GIS Rank
> 2	None	0
2	Very Low	1
1	Low	2
0	Moderate	3

Raster is Reclassified for CVI Calculation

Erosion

Source is SSURGO Soils Layer (NRCS)

Soil Units Mapped by Erosion Characteristics (KFFACT)

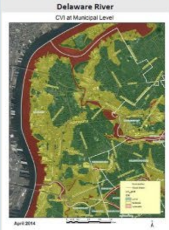
Map Units in Critical Erosion Classes are Extracted

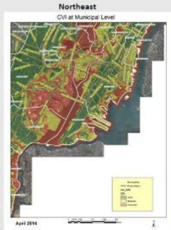
Selected Polygons Converted to Raster

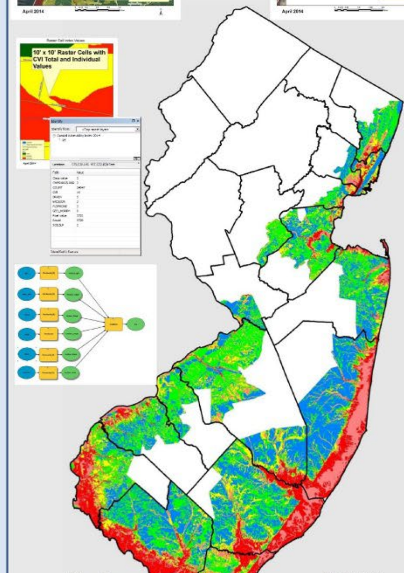
Erosion Prone Areas	Rank	GIS Rank
No Kffact Attribute	None	0
.10 Kffact	Very Low	1
.17 and .15 Kffact	Low	2
.28 and .20 Kffact	Moderate	3
.37 and .32 Kffact, Historic Accretion	High	4
.43 Kffact, Historic Erosion	Very High	5

Raster is Reclassified for CVI Calculation

Final Statewide CVI with Regional, Municipal & Local Scales







CVI as Future Planning Tool

Storm surge and sea level rise maps may help coastal communities visualize flooding threats, but inundation mapping alone does not clearly define most high risk areas in and around a community. Historic flooding and erosion, combined with potential inundation areas and natural features of the landscape help a community determine where property damages and environmental impacts are likely to occur the next time around. Creating an index whereby a "baseline of natural risk" is mapped, community decision makers can start to understand the potential risk to critical infrastructure, natural resources, and populations. In order to delineate high hazard areas, the New Jersey Office of Coastal Management developed a composite overlay model of geospatial hazard indicators, including geomorphology, low slopes, flood prone areas, storm surge inundation scenarios, poorly drained soils, and erosion prone areas. This model is known as a Coastal Vulnerability Index (CVI) and is based on previous vulnerability modeling applications *. The CVI can help land use planners and hazard mitigation planners identify areas of highest development constraints due to natural conditions that are indicative of flooding and erosion.

The CVI created by New Jersey Office of Coastal Management represents one method of assessing natural risk, and therefore could be modified by adding additional layers and/or weighting attributes of those layers such that the sum of the parts more accurately depicts factors of regional importance. CVI is a static model that represents lands that are presently vulnerable to inundation and erosion, but it can be adapted to different sea height scenarios adjusting the storm surge models to visualize how in the future high hazard areas may move further inland overtime. By understanding the vulnerabilities that presently exist in coastal New Jersey, along with potential changes in future conditions, communities will have the opportunity to mitigate existing development and guide future decision-making in a more holistic and sustainable manner.

Sources * Gornitz, V. M.; Daniels, C. R.; White, T. M., and K. R. Birdwell. (1994); Lennon et al. (1996); Thieler and Hammar-Klose (1999); Bush, D.M.; Neal, W. J.; Young, R.S.; and O.H. Pilkey (1999); PSDS. (2001).

CVI Pilot Projects and Protocol

1) 2011 - Coastal Community Vulnerability & Resilience Assessment Pilot: Greenwich Township, Cumberland County, NJ http://www.state.nj.us/dep/cmp/docs/ccvap-greenwich.pdf

2) 2010 - New Jersey Coastal Community Resilience Demonstration Project, Cape May Point; Little Silver; Oceanport http://www.state.nj.us/dep/cmp/docs/ccvap-pilot-final.pdf

3) Coastal Community Vulnerability Assessment and Mapping Protocol http://www.state.nj.us/dep/cmp/docs/ccvamp-final.pdf

April 2014

Map Development: David DuMont and John Tyrawski

Project Team: NJ Office of Coastal Management and Office of Information Resource Management (GIS)

NJ CVI Protocol Development: Ida Leigh Wood NOAA Coastal Management Fellow

Additional Support: NOAA Coastal Service Center, NOAA National Geodetic Survey, Rutgers CRSSA, Delaware Coastal Management, New Jersey Geological Survey

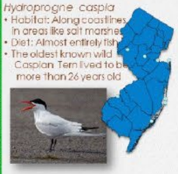
Photo Credit: Delaware Coastal Programs

BIRDING FOR THE SEASONS

Caspian Tern

Hydroprogne caspia

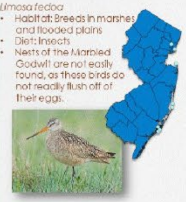
- Habitat: Along coastlines in areas like salt marshes
- Diet: Almost entirely fish
- The oldest known wild Caspian Tern lived to be more than 26 years old

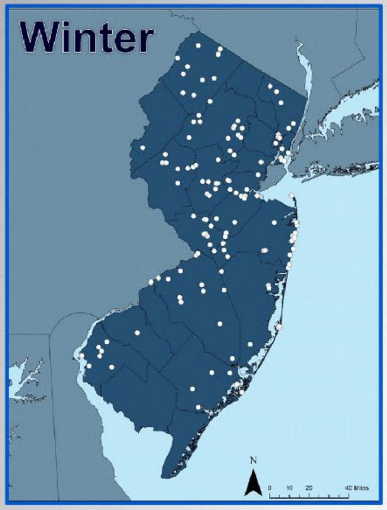


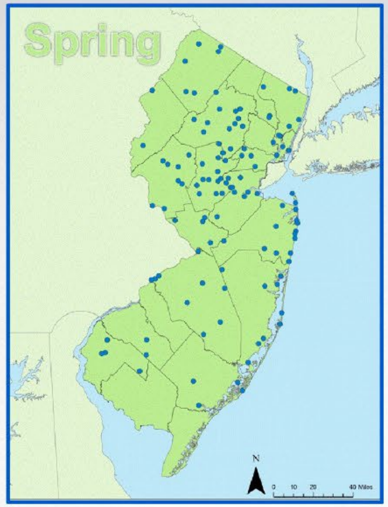
Marbled Godwit

Limosa fedoa

- Habitat: Breeds in marshes and flooded plains
- Diet: Insects
- Nests of the Marbled Godwit are not easily found, as these birds do not readily flush off of their eggs.







American Avocet

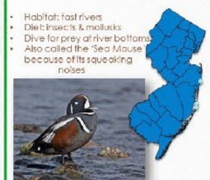
Recurvirostra americana

- Habitat: Marsh
- Diet: Insects
- Series of call notes gradually changes pitch, simulating the Doppler effect and thus making its approach seem faster

Harlequin Duck

Histrionicus histrionicus

- Habitat: fast rivers
- Diet: insects & mollusks
- Dive for prey at river bottoms
- Also called the 'Sea Mouse' because of its squeaking noises



New Jersey's **Wildlife Management Area** System, administered by the Division of Fish and Wildlife's Bureau of Land Management, provide countless outdoor recreational opportunities for New Jersey. Presently there are approximately 343,400 acres in 121 areas, and new properties and additions to existing properties are continually being added. This acreage represents more than 44% of New Jersey's state-owned public open space.

The US Fish and Wildlife Service designates **National Wildlife Refuge** areas for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats.

Assunpink

Assunpink Wildlife Management Area (WMA) consists of a mixture of scrub-shrub, mixed upland forest and several lakes along Assunpink Creek. This 6,300-acre WMA includes man-made and natural lakes, wetlands, former farm fields, hedgerows, and mixed hardwood forests. The three lakes are popular resting spots for migratory waterfowl.

The Edwin B. Forsythe National Wildlife Refuge

The Edwin B. Forsythe National Wildlife Refuge protects more than 47,000 acres of southern New Jersey coastal habitats which is actively managed for migratory birds. Its value for the protection of water birds and their habitat continues to increase as people develop the New Jersey shore for our own use.

Wallkill WMA Liberty Loop Trail

The 2.5-mile Liberty Loop Trail was created on a former sod farm, which, before it was manipulated for agricultural use, had been a forested wetland. The trail loops around several managed wetland units, providing an excellent opportunity to observe a wide variety of waterbirds, (waterfowl, shorebirds and wading birds), as well as numerous species of songbirds along the edges of the trail in spring, summer and fall.

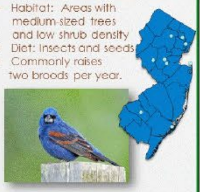
Great Swamp NWR

The Great Swamp NWR is located in Morris County, New Jersey. Today the refuge consists of 7,768 acres of varied habitats, and the refuge has become an important resting and feeding area for more than 244 species of birds. Fox, deer, muskrat, turtles, fish, frogs and a wide variety of wildflowers and plants can be found on the refuge.

Blue Grosbeak

Passerina caerulea

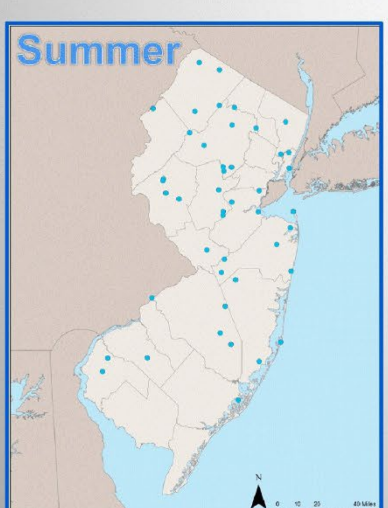
- Habitat: Areas with medium-sized trees and low shrub density
- Diet: Insects and seeds
- Commonly raises two broods per year.

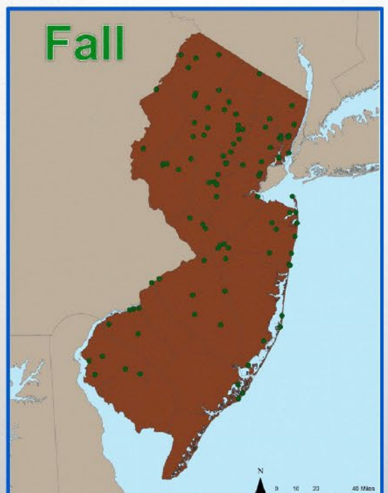


Iceland Gull

Larus glaucoides

- Habitat: Along shores of salt water and less often freshwater lakes and rivers
- Diet: Fish, marine invertebrates, occasionally eggs and young of other birds; some terrestrial plants, algae, and berries in late summer



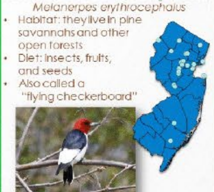


The maps show where birders reported sightings, usually of rare birds in each seasons

Red-Headed Woodpecker

Melanerpes erythrocephalus

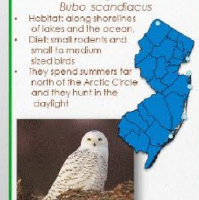
- Habitat: they live in pine savannahs and other open forests
- Diet: insects, fruits, and seeds
- Also called a "flying checkerboard"



Snowy Owl

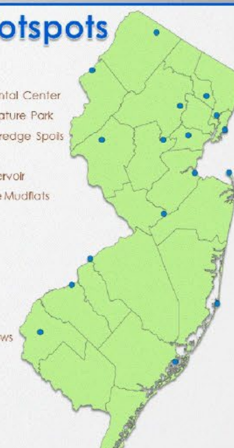
Bubo scandiacus

- Habitat: along shorelines of lakes and the ocean;
- Diet: small rodents and small to medium sized birds
- They spend summers far north of the Arctic Circle and they hunt in the daylight



County Hotspots

Atlantic- Forsythe WMA
Bergen- DeKorte Environmental Center
Burlington- Palmyra Cove Nature Park
Gloucester- National Park Dredge Spoils
Hudson- Liberty State Park
Hunterdon- Spruce Run Reservoir
Middlesex- Morgan Avenue Mudflats
Mercer- Lake Etra
Monmouth- Sandy Hook
Morris- Troy Meadows
Ocean- Barnegat Inlet
Passaic- Garret Mountain
Salem-Mannington Marsh
Somerset- Glenhurst Meadows
Sussex- Wallkill NWR
Union- Lake Lenape
Warren- Old Mine Road



Jillian Hubbard, Meaghan Martin, Daniel Torri

Residential Demographic Differences in New Jersey before and after Implementation of the Toxics Release Inventory (TRI) Program, Results from 1980 - 2010

Introduction

Both the industrial and demographic landscapes of New Jersey have changed significantly over the past thirty years. This study examines both the declines in New Jersey TRI facilities and the evolving population characteristics of residential population living near TRI facilities.

Data

➢The EPA Toxics Release Inventory (TRI), began in 1987 and reports locations and emissions information for industries over ten employees that produce over 25,000 lbs. of chemicals considered hazardous to human and environmental health.

➢The U.S. census counts the population every ten years, and collects information on race and ethnicity. The National Historic GIS (NHGIS) compiles and distributes historic U.S. census data and geographic boundary information.

Methods

➢ Information on TRI locations were extracted from the National Library of Medicine's **TOXMAP**.

➢ Data were selected for New Jersey, for 1990, 2000, and 2010 to match decennial census years. These data were mapped in ArcGIS Online, and ArcMap to identify trends (see **Figure 1 and Tables 1 and 2**).

➢ **NHGIS** data were extracted by total population and by race and ethnicity for New Jersey for 1980, 1990, 2000, and 2010 (Summary 1 Files).

➢ In ArcGIS 10.2.1 a 1 mile **buffer** was created around 1990 TRI Facilities (see **Figure 2**)

➢ An **union** was created between the 1 mile buffer and U.S. census tracts (repeated for each decade, because tracts do change, see **Figures 3 and 4**).

➢ **Proportional areas** for each tract within the buffer zone were calculated (Total Area / Selected Area)

➢ Values for the proportion of tract populations within the TRI buffer were calculated and **summarized** (**Table 3**).

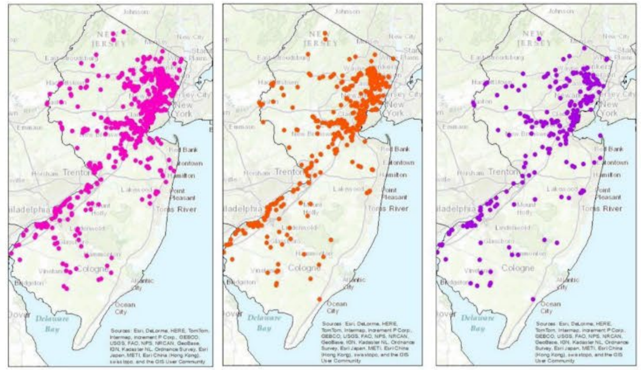


Figure 1. TRI Facilities with > 0 Emissions: 1990, 2000, 2010

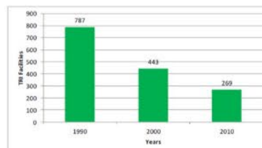


Table 1. Numbers of TRI Facilities with Releases > 0, for New Jersey, 1990-2010

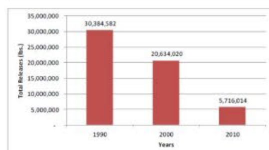


Table 2. Total TRI Releases, for New Jersey, 1990-2010

* Note though the TRI monitored significantly more chemicals in 2010 than in 1990, decreases were still evident

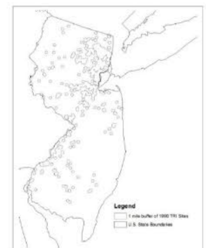


Figure 2. 1 Mile TRI Buffer

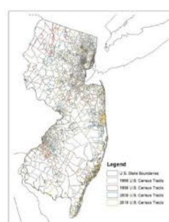


Figure 3. Census Tracts, 1980-2010

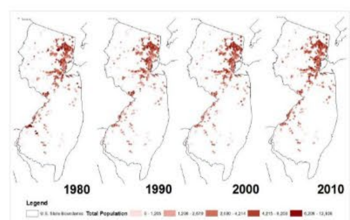


Figure 4. Population within 1 Mile TRI Buffer, 1980-2010

1980 Demographic Compositions in Areas with TRI Sites in 1990 Compared with State-Wide Characteristics

Location of Census Tract	Total Population	Black Population	Row %	Hispanic Population	Row %	Native American	Row %	White Population	Row %
Within 1 mile of TRI Site	3,228,570	592,777	18%	354,043	11%	3,311	0.1%	2,451,778	76%
All Areas	7,362,909	924,824	13%	491,774	7%	8,168	0.1%	6,125,867	83%
Column %	44%	64%		72%		41%		40%	

1990 Demographic Compositions in Areas with TRI Sites in 1990 Compared with State-Wide Characteristics

Location of Census Tract	Total Population	Black Population	Row %	Hispanic Population	Row %	Native American	Row %	White Population	Row %
Within 1 mile of TRI Site	3,203,405	627,610	20%	523,818	16%	110,099	3%	2,259,277	71%
All Areas	7,728,776	1,036,482	13%	739,686	10%	272,495	4%	6,129,473	79%
Column %	41%	61%		71%		40%		37%	

2000 Demographic Compositions in Areas with TRI Sites in 1990 Compared with State-Wide Characteristics

Location of Census Tract	Total Population	Black Population	Row %	Hispanic Population	Row %	Native American	Row %	White Population	Row %
Within 1 mile of TRI Site	3,412,653	661,819	19%	763,038	22%	9,643	0.3%	2,098,223	61%
All Areas	8,414,350	1,141,821	14%	1,117,191	13%	19,492	0.2%	6,104,705	73%
Column %	41%	58%		68%		50%		34%	

2010 Demographic Compositions in Areas with TRI Sites in 1990 Compared with State-Wide Characteristics

Location of Census Tract	Total Population	Black Population	Row %	Hispanic Population	Row %	Native American	Row %	White Population	Row %
Within 1 mile of TRI Site	3,517,377	685,057	19%	1,003,318	29%	16,414	0.5%	2,030,640	58%
All Areas	8,791,894	1,204,826	14%	1,555,144	18%	29,026	0.3%	6,029,248	69%
Column %	40%	57%		65%		57%		34%	

Table 3. Race and Ethnicity by TRI Proximity

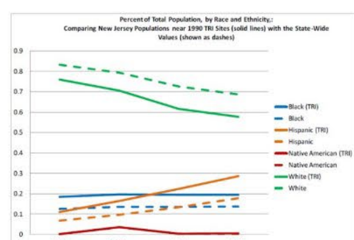


Figure 5. Demographic Compositions

Results

➢The number of TRI facilities and the total TRI releases have substantially ***decreased*** in the last twenty years.

➢*Useful GIS method*: Creating a union between census tracts and a buffer of TRI sites, while also calculating the aerial proportions, enables a demographic analysis across time periods, despite changing tract boundaries.

➢**40%** of New Jersey's population lives within 1 mile of a facility that had TRI emissions in 1990

.

➢From 1980-2010, white populations *comprise the majority* population in residential areas surrounding TRI sites. However, the proportion of the total white population living in areas surrounding 1990 TRI sites has ***significantly declined*** from 76% in 1980 to 58% in 2010.

➢Of populations living by 1990 TRI sites, the proportion that is Hispanic has increased from 11% in 1980 to 29% in 2010, ***well above*** the total state percentages for Hispanics of 7% in 1980 and 18% in 2010. *The majority of the Hispanic population in New Jersey lives within 1 mile of a 1990 TRI site.*

➢The proportion of black or African American populations living near TRI sites has ***consistently remained higher*** than the proportions for the state as a whole, 18% (compared with 13% state-wide) in 1980 and 19% (compared with 14% state-wide) in 2010. *The majority of African Americans in New Jersey live within 1 mile of a 1990 TRI site.*

➢The proportion of the state's Native American population living within 1 mile of a 1990 TRI site has ***grown*** from a minority (41%) to a majority (57%).

Data Sources

Minnesota Population Center. *National Historical Geographic Information System: Version 2.0.* Minneapolis, MN: University of Minnesota 2011. [U.S. Census, Summary 1 Files, 1980-2010.]

TOXMAP. EPA Toxics Release Inventory, web mapping application sponsored by the National Library of Medicine.

Acknowledgements

This project was made possible by participation in ESS 302, Geographic Information Systems, taught at Drew University, and the EPA TRI University Challenge, 2013-2014. We thank Nora Lopez, our regional TRI coordinator for her helpful comments, and for visiting our class and encouraging our work. The software and hardware used were provided by the Spatial Data Center at Drew University, financed with the help of generous grants from the Andrew Mellon foundation and NASA.

ANALYSIS OF NEW JERSEY'S PHOTOVOLTAIC POTENTIAL

Determining New Jersey's Solar Potential , Current Solar Installations, and Consumer Benefits

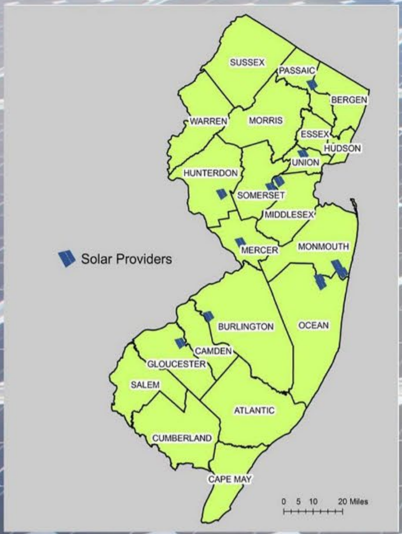


Figure 1: The top ten solar installation providers in New Jersey. These companies have installed the most megawatts in the state.

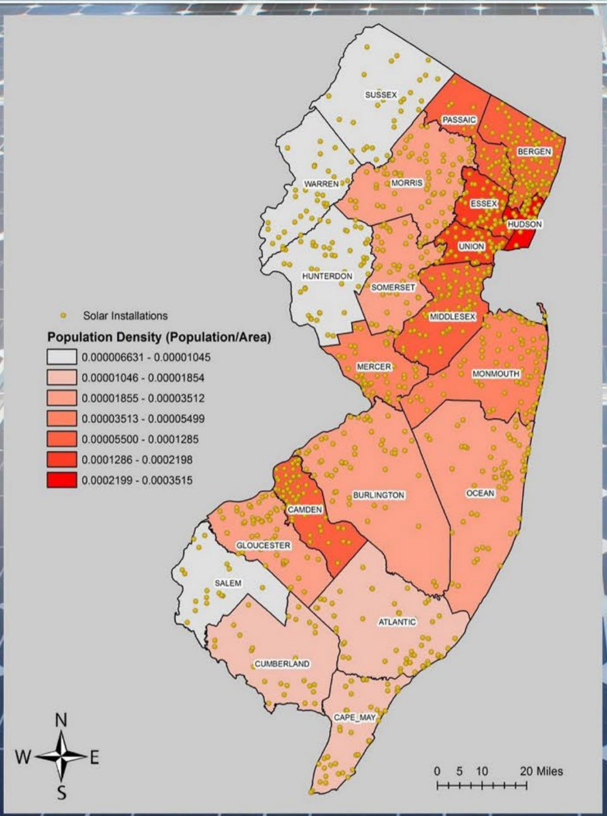


Figure 5: Shows all recent solar installations in New Jersey compared to the population density of the county that they are installed in.

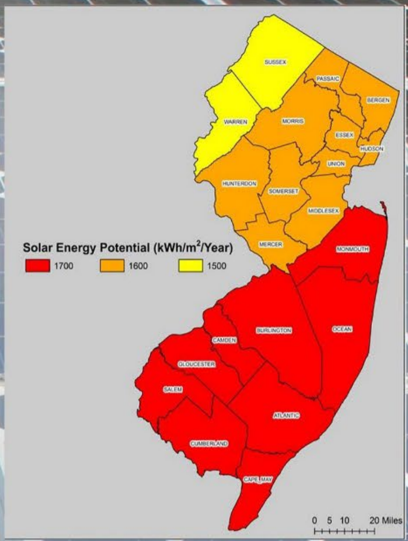


Figure 2: Solar energy potential of New Jersey based on annual solar exposure. All ranges are exceptional for solar absorption.

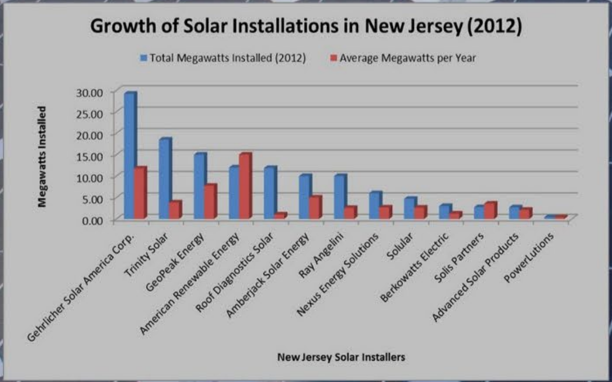


Figure 3: The continual growth of New Jersey's top solar providers based on total average annual megawatt installations.

Cost for Acquiring Your Own Three (3) Kilowatt Solar System

Equipment Costs: $7300

Installation and Permitting Costs: $5000.

Sales, Marketing and Operational Costs: $4000.

Total: $16,300

As a homeowner, you can lower the total cost of your photovoltaic system by 30% from the federal government in the form of a Federal Solar Tax Credit!

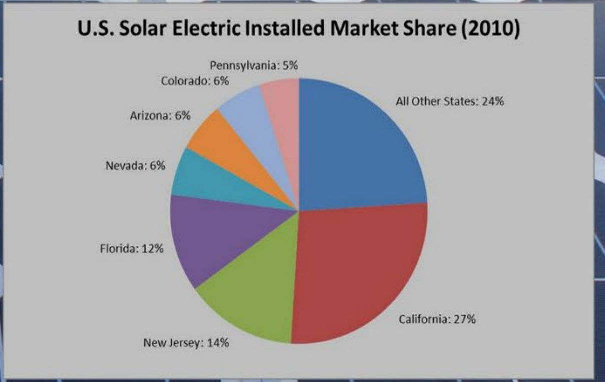


Figure 4: The states with the highest solar market share. It shows that New Jersey possesses an immense amount of the United States' solar market.

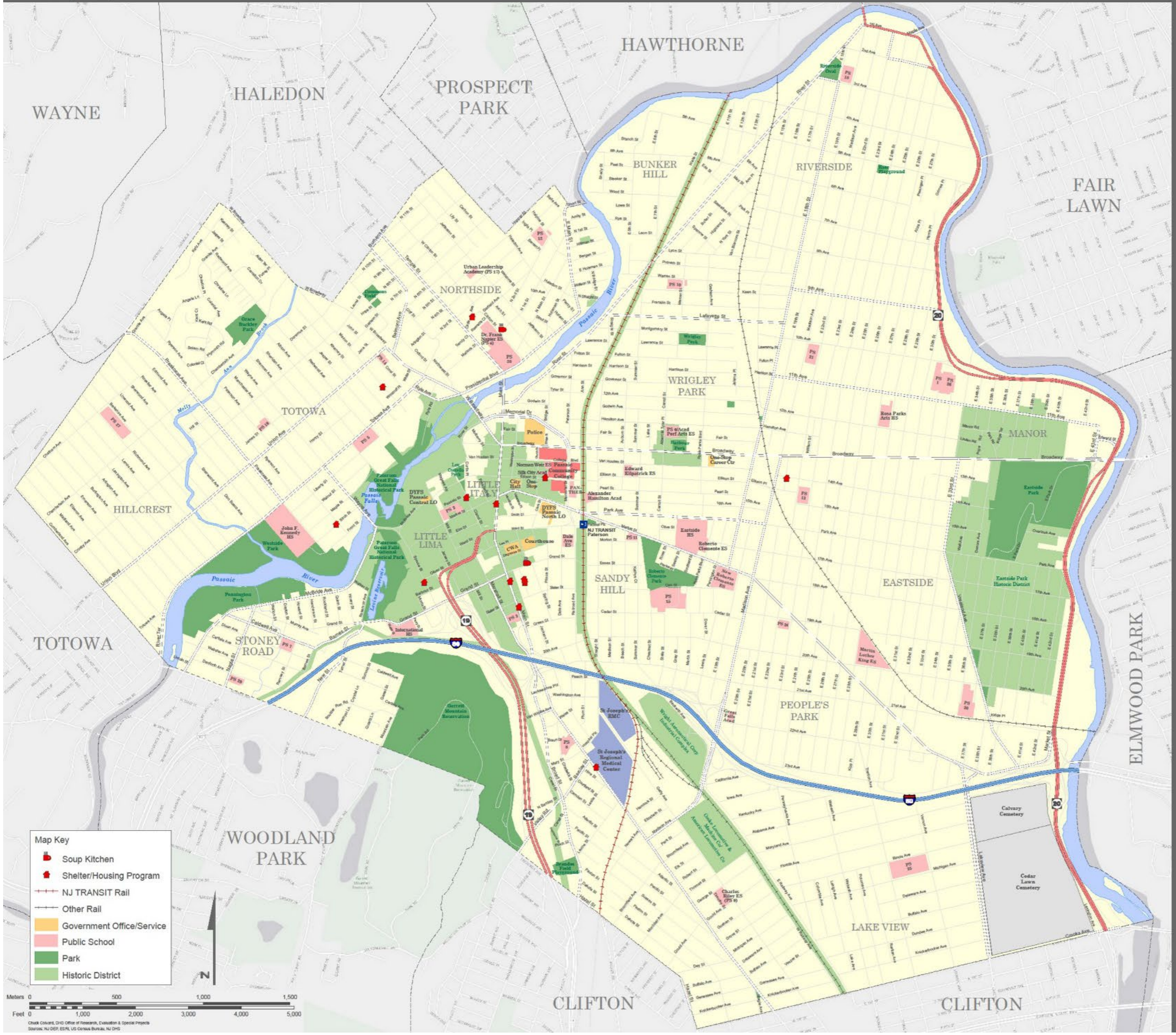
Sources: Sunrun, National Renewable Energy Laboratory

For more information on photovoltaic systems

Dylan Greene and Rahul Syal

City of Paterson

Passaic County, New Jersey

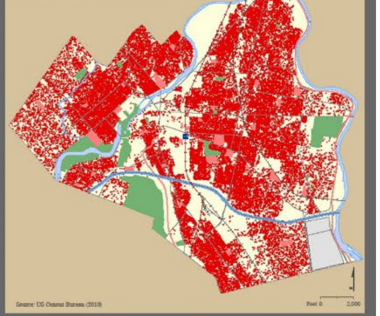


Paterson, NJ

Paterson City is located in southeastern Passaic County, approximately 12 miles northwest of New York City. It is New Jersey's third-largest city, with a 2010 population of 146,999.

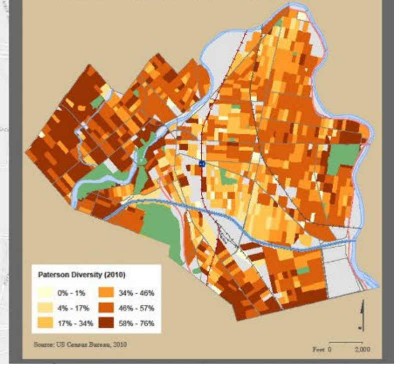
Child Population Density (2010)

Each red dot represents one person under age 18 enumerated on Census Day (April 1, 2010). Dots do not represent actual addresses but are placed at random within the appropriate Census Block.



Racial/Ethnic Diversity by Census Block (2010)

A diversity index estimates the percentage of times that two randomly selected people within one Census Block would differ by race/ethnicity. Lower numbers represent low diversity and higher homogeneity. The eight groups used in the index calculation were White (not Hispanic), Black/African American (not Hispanic), American Indian and Alaska Natives (not Hispanic), Asians (not Hispanic), Native Hawaiian and other Pacific Islander (not Hispanic), Two or more races (not Hispanic), Some other race (not Hispanic) and Hispanic/Latino.



Linking FEMA Records on Hurricane Sandy to the EPA Toxics Release Inventory (TRI): Comparing New Jersey County Impact Analyses and Storm Surge Effects

DREW SPATIAL DATA CENTER

EPA

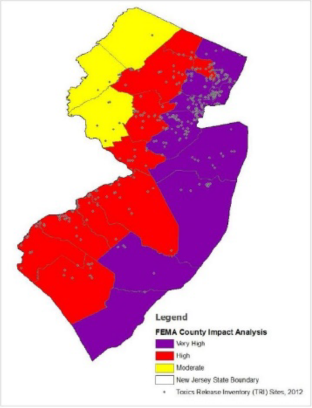
Introduction

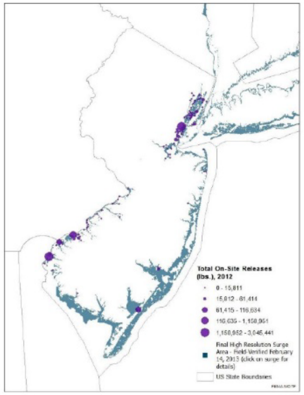
New Jersey, along with the US Eastern Seaboard generally, is at high risk of hurricane damage. In 2012 Hurricane Sandy stormed the Eastern shore line, affecting many people's lives and the land around them. Homes and buildings were destroyed, while the storm left behind debris that was scattered across the state, affecting both humans and wildlife. Hurricane Sandy brought into relief the potential impacts of catastrophic storms to critical infrastructure. New Jersey, specifically, has over 400 Toxics Release Inventory (TRI) sites that were put at risk during the storms surge through the state. This study investigates the relative impact of Hurricane Sandy on New Jersey, with specific attention to facilities reporting to the EPA's TRI.

Data

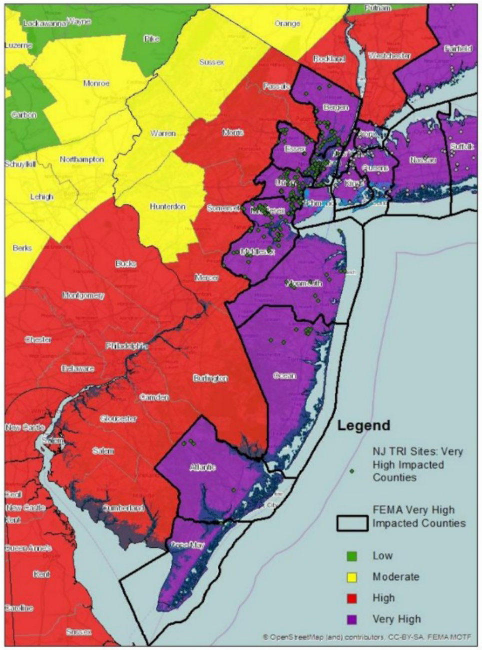
TRI Site	Industry	County	Total On and Off Site Releases (lbs.)
BL ENGLAND GENERATING STATION	2211 Electric Utilities	Cape May, NJ	113,280.02
WATER WORLD FIBERGLASS POOLS	326 Plastics and Rubber	Atlantic, NJ	9,314
ALPHA ASSOCIATES INC	313/314 Textiles	Ocean, NJ	10,295
NESTLE USA INC - BEVERAGE DIV	311/312 Food/Beverages/Tobacco	Monmouth, NJ	3,346
HESS CORP - PORT READING REFINERY	324 Petroleum	Middlesex, NJ	62,136.82
LINDEN GENERATING STATION	2211 Electric Utilities	Union, NJ	44,500.45
TROY CHEMICAL CORP	325 Chemicals	Essex, NJ	249,471
MONDELEZ GLOBAL LLC FAIR LAWN BAKERY	311/312 Food/Beverages/Tobacco	Bergen, NJ	36,446

The surge of Hurricane Sandy crashed through the New Jersey shore line, highly impacting 8 of the counties. There were 225 TRI sites recorded in the FEMA "very high impacted" areas, with 3,335,272 pounds of total on-site releases during the year of Hurricane Sandy. Also, 166 sites were reported in the storm surge, which reported over 7,603,774 lbs. of on-site releases in 2012. A vast variety of chemicals and waste are released from TRI sites across the state, and it is possible releases were additionally affected by the surge of the storm.





FEMA- Hurricane Sandy NJ TRI Impact Analysis

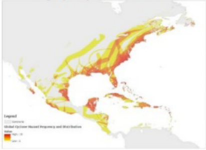


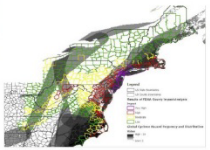
Map Created By: Joe Sollod

Author: Joe Sollod, Drew University

Storm Surge

Highly-Impacted Areas





Methods

Data were collected with the EPA TRI NET tool, creating a query input for the year 2012 in New Jersey. Query inputs focused on the specific TRI sites, industry, county and total releases both on-and-off site. FEMA provided the impacted areas during the storm and the severity it had on each county. Also, the storm surge was available through FEMA.

Results

TRI Sites in New Jersey Counties Affected by Hurricane Sandy

FEMA Designations	Number of TRI Sites	Percentage of State TRI Sites	2012 Total On-Site Releases (lbs.)
Very High Impact	225	56%	3,335,272
High Impact	161	40%	4,773,329
Moderate Impact	15	4%	443,424
Low Impact	0	0%	0
Totals:	401	100%	8,552,025

TRI Sites in New Jersey within Hurricane Sandy's Storm Surge Extent

FEMA Designations	Number of Sites in Storm Surge Extent	Percentage of State TRI Sites	2012 Total On-Site Releases (lbs.)
Very High Impact	113	28%	3,155,065
High Impact	53	13%	4,448,709
Moderate Impact	0	0%	0
Low Impact	0	0%	0
Totals:	166	41%	7,603,774

TRI Sites in All Counties Affected by Hurricane Sandy

FEMA Designations	Number of TRI Sites	Percentage of All Affected TRI Sites	2012 Total On-Site Releases (lbs.)
Very High Impact	362	7%	3,750,025
High Impact	926	17%	26,462,385
Moderate Impact	1,350	25%	61,669,534
Low Impact	2,698	51%	174,021,609
Totals:	5,336	100%	265,903,553

TRI and FEMA data shows that there are high release levels amongst TRI sites in the highest impacted areas during the storm. 56% of New Jersey's TRI sites are in the designated 8 "very high impacted" counties. Roughly 266 million pounds of releases were recorded in all the counties affected by the hurricane, which includes a variety of different elements and waste materials.

Conclusions

Counties amongst the highest impacted during the storm recorded the highest count of TRI sites present. The TRI sites that were in the two highest impacted areas of the storm surge, released the highest levels of waste and elements compared to the lower impacted areas in 2012. EPA regulators and awareness groups should make storm protection for TRI sites a concern for the future, especially in prone areas such as New Jersey and the Eastern coast line. Waste and other TRI releases may become dangerous for the preservation of land in future situations similar to Hurricane Sandy.

Bibliography

Center for Hazards and Risk Research - CHRR - Columbia University, Center for International Earth Science Information Network - CIESIN - Columbia University, International Bank for Reconstruction and Development - The World Bank, and United Nations Environment Programme Global Resource Information Database Geneva - UNEP/GRID-Geneva. 2005. Global Cyclone Hazard Frequency and Distribution. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). http://sedac.ciesin.columbia.edu/data/set/ndh-cyclone-hazard-frequencydistribution.
http://www.state.nj.us/dep/gis/gisemerresp.html.http://www.weather.gov/okx/HurricaneSandy.
http://www.csc.noaa.gov/digitalcoast/geozone/hurricane-sandy-geospatial-resources.

Acknowledgements

I would like to personally thank the following contributors:
Drew University, Professor Lisa Jordan, NASA and the Andrew Mellon Foundation fund, Drew Spatial Data Center, ArcGIS license, EPA-TRI University Challenge, and EPA's Nora Lopez.

NASA

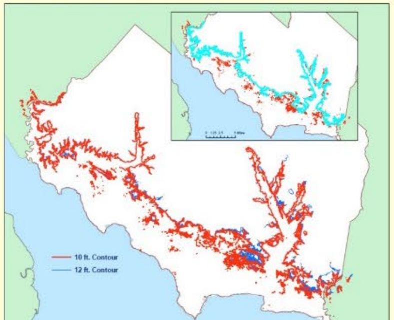
The Andrew W. Mellon Foundation

DREW

DREW UNIVERSITY / MADISON NJ

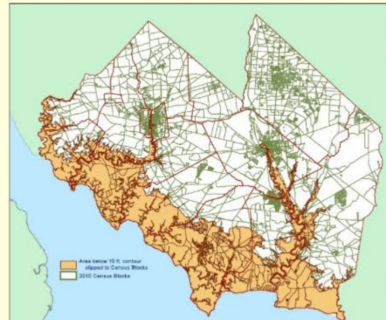
Instructional Presentation

How Many People Live Below the Ten Foot Contour Line: And How the Question Was Answered

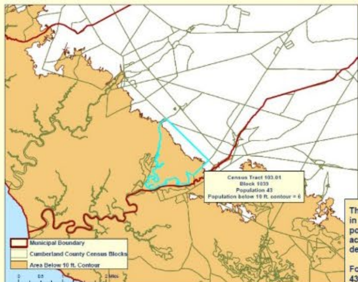


Step 1 Isolate the 10 foot contour

Step 2 Create a polygon



Step 3 Clip to Census Blocks



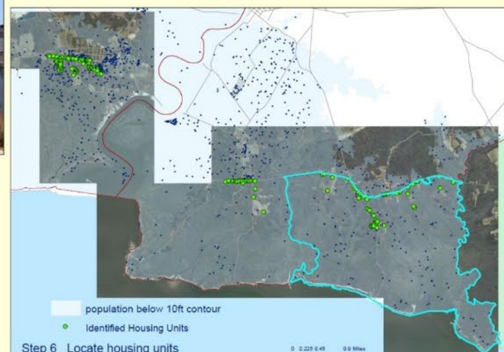
Step 4 Determine population in edge blocks


Fortescue, Downe Township. Home damaged in Hurricane Sandy

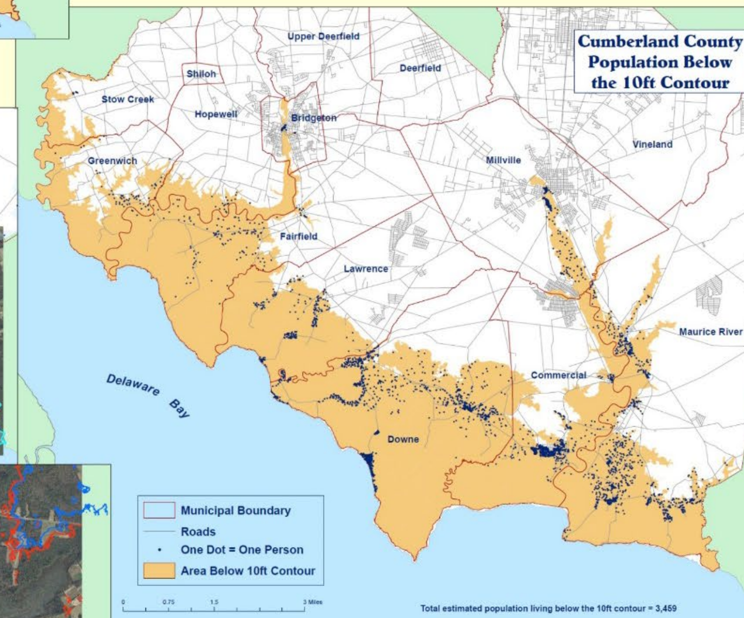
There are many Census Blocks along the edge which are partially in and partially out of the 10 ft. area. When clipped, the entire population is assigned to the clipped area. This means that the actual number of households within the clipped area must be determined.

For example, block 1039 in Census Tract 103.01 has a total of 43 people, but there are only an estimated 6 that live below the 10 ft. contour.

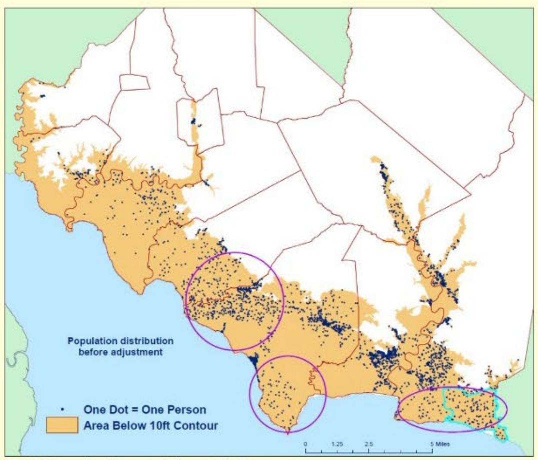
Text block 1



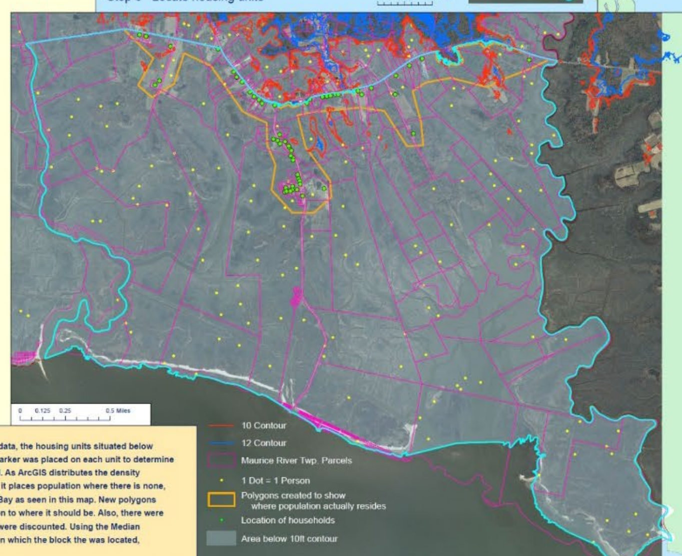
Step 6 Locate housing units



Final Product -- The clusters of population can now be clearly seen.



Step 5 Determine where population actually lives



Using aerial photography and parcel data, the housing units situated below the 10 foot contour were located. A marker was placed on each unit to determine where the population actually resided. As ArcGIS distributes the density evenly throughout the Census Block, it places population where there is none, like in the mud flats by the Delaware Bay as seen in this map. New polygons were created to "corral" the population to where it should be. Also, there were high spots in places and those units were discounted. Using the Median Household size for the Census Tract in which the block the was located, a population was estimated.

Text Block 2

Step 7 Create new polygons

Problem

The need to know how many people reside below the 10 ft. contour and are, therefore, subject to flooding in storms such as Sandy.

Method

Step 1: Isolate the 10 ft. contour

Step 2: Create a polygon

Step 3: Clip the polygon to Census Blocks

Step 4: Determine population in edge blocks (see text block 1.) When clipped to the Census Blocks, the entire population of that block was included in the clipped block. When the correct population was determined, the population in the clipped layer was changed to reflect the correction. (Method used same as in step 7.)

Step 5: Determine where population actually lives. As Census Blocks are large in rural and unpopulated areas, it must be determined where the households actually are.

Step 6: Locate housing units by placing markers on identified units

Step 7: Create new polygons to "corral" population into populated areas. (see text block 2)

Results

A density map showing where the population living under the 10 ft contour actually live. By our method, the estimated population living under the 10 ft. contour is 3,459.

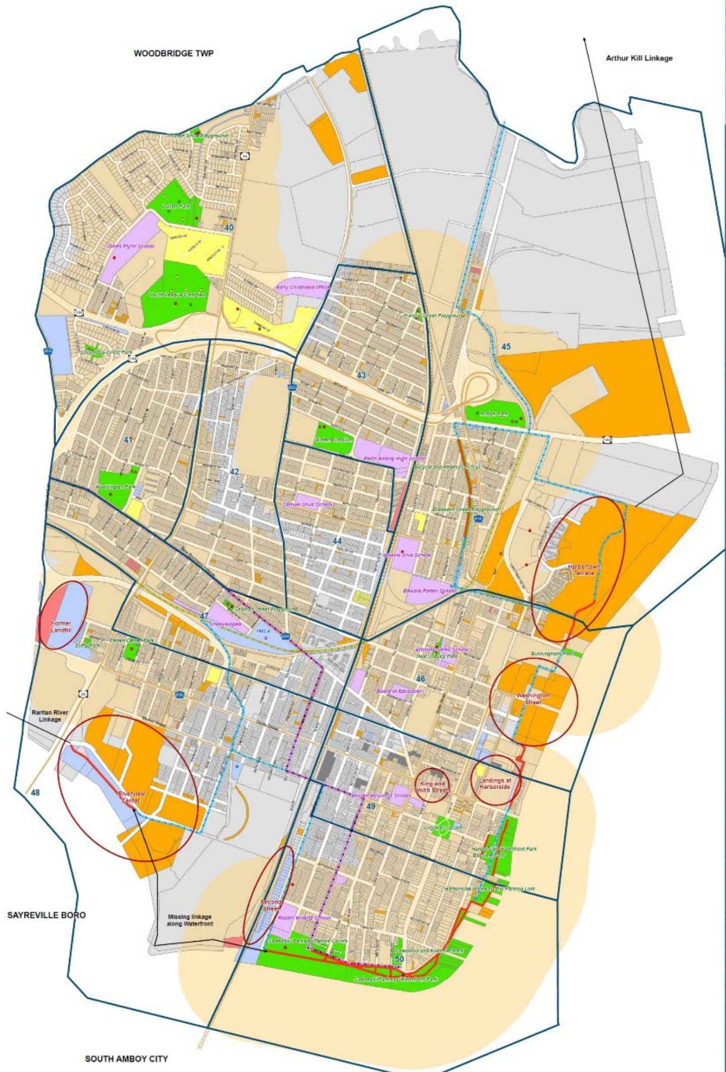
Prepared by:
Cumberland County
Department of Planning
790 East Commerce Street
Bridgeton, New Jersey 08302
Phone: 856-453-2175
www.co.cumberland.nj.us

Sharon Mollick, GISP
Senior Planner
sharonmo@co.cumberland.nj.us

March 2014

Source: US Census Bureau, NJ DEP, NJ OIT, USGS, Cumberland County Dept. of Planning

City of Perth Amboy 2013 Master Plan Recreation Element



6 Over-arching goals were established to address the needs of the community:

1. **Improve the Maintenance of Existing Parks**
2. **Improve Access, Safety and Awareness at Park Facilities**
3. **Ensure the Current Park System Meets the Needs of the Community**
4. **Expand Recreational Opportunities beyond the Existing Inventory**
5. **Pursue Additional Funding Opportunities for Park Improvements**
6. **Promote the Use of Recreational Programs and Facilities**

Facility	Size (Acres)	Location
Bayview Park	1.57	250 Water Street
Bicycle and Pedestrian Trail	2.66	Between Hall and Pulaski Avenues
Buckingham Waterfront	0.52	Buckingham Avenue
Caledonia and Roessler Park	1.44	65 High Street and Lewis Street
City Hall Square	1.00	Market and High Streets
Columbus Circle Park	1.05	679 Columbus Circle
Dalton Park	9.96	659 Franklin Drive and Chamberlain Avenue
Duffy Park	0.45	Morris Street
Francis Street Playground	0.50	966-972 Francis Street
Harborside Walkway and Parking Lots	2.23	Front Street
Harborside Waterfront Park	10.99	Front Street
Neal J. Lucey Park	0.70	149 William Street
Patten Center Park	1.66	339 Read Street
Rudyk Park	7.87	820 State Street
Sadowski Parkway Tennis Courts	3.54	41 Brighton Avenue
Sadowski Parkway Waterfront Park	29.75	105 Sadowski Parkway
Seaman Street Playground	0.46	454-470 Seaman Avenue
Truxton Drive Playground	0.86	1080 Truxton Drive and Florida Cove Road
Washington Park	7.10	660 New Brunswick Avenue
Waters Stadium	5.55	761 Francis Street
Youth League Complex	20.65	617 Dorothy Avenue & 670 Pfiefer Boulevard

Source: NJDEP, Division of Taxation MOD IV data

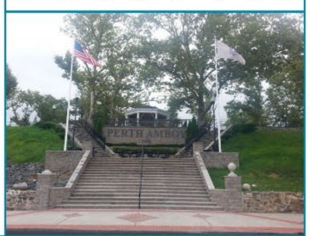
Active Recreation Facilities	Number per 1,000 people	Population of 50,000	Number of facilities Recommended	Facilities within the City: City-owned Parks	Facilities within the City: Other Parks	Deficit
Children's Play Area (with equipment)	1	1,000	50	12	8	30
Tennis	0.5	2,000	25	8	0	17
Basketball (Outdoor)	0.2	5,000	10	11	1	-
Softball	0.2	5,000	10	8	0	12
Baseball	0.2	5,000	10			
Soccer	0.1	10,000	5	5	0	2
Football	0.05	20,000	2			
Outdoor Pool	0.05	20,000	2	0	0	2
Indoor Rec. Building	0.002	50,000	1	1	1	-
Gazebo	0.002	50,000	1	3	0	-
Senior Center	0.002	50,000	1	1	0	-

Source: Taken From standards published in "Recreation, Park and Open Space Standards and Guidelines" National Recreation and Park Association and "Urban Planning and Design Criteria 2nd Edition" by DeChiara/Koppelman

Areas to investigate for the expansion of the existing park system

- Convery Boulevard/Smith Street (City Landfill) has a history of a lack of financial viability and the Perth Amboy Redevelopment Authority continues to search for a developer. Adjacent to Duffy Park, this parcel may be considered for open space.
- Small, infill vacant lots, especially in the central portion of the City, where use as pocket parks may be appropriate.
- King and Smith Streets – Streetscape improvements will include a new park (active and passive), a new public space, a pedestrian path, landscaping, lighting and street furniture.
- Landings at Harborside – A large residential development on the waterfront, originally proposed to contain additional open space and parks. Currently, the project has stalled, and it seems unlikely that the planned improvements will progress as previously contemplated.
- The property on the Northeast Corner of Washington and High Streets to the water should be included as a potential site for a future park or amphitheater. The City may also consider this vacant land for a future boat launch. Riverview Center (88 acres between the Victory Bridge and the CoSteel facility) – the developer will provide a neighborhood park and financial assistance to the City to construct further improvements to the City's linear park along the Raritan Bay, capitalizing on the waterfront views and pedestrian path.
- Second Street Park Acquisition in 2004 – The City acquired the former Goldberg Property with the purpose to remediate and use for recreation improvements/car topper boat launch.

Census Tract	Total households	Family households	Nonfamily households	Households w/ individuals under 18 years	Households w/ individuals 65 years and over	Average household size	Average family size
Census Tract 40	1,418	993	425	505	422	2.88	3.17
Census Tract 41	835	622	213	352	225	3.04	3.51
Census Tract 42	997	784	213	470	233	3.37	3.68
Census Tract 43	1,091	872	219	547	260	3.42	3.69
Census Tract 44	1,259	994	265	647	264	3.50	3.77
Census Tract 45	2,032	1,572	460	1,083	295	3.41	3.74
Census Tract 46	1,704	1,287	417	870	331	3.47	3.79
Census Tract 47	1,084	818	266	503	212	3.21	3.61
Census Tract 48	1,696	1,199	497	779	417	3.39	3.85
Census Tract 49	1,842	1,159	683	695	501	2.70	3.35
Census Tract 50	1,461	1,154	307	739	336	3.61	3.85
Total	15,419	11,454	3,965	7,190	3,496	3.25	3.64



State of New Jersey
Department of Community Affairs
Local Planning Services
101 South Broad Street
Trenton, New Jersey 08625

Date: March 2014

Data Sources: NJ Department of Community Affairs, City of Perth Amboy, NJ Department of Transportation, NJTRANSIT, NJ Department of Treasury, NJ Office of GIS

0 0.25 0.5 1 Miles

N

PERTH AMBOY RECREATION ELEMENT
PREPARED FOR
THE CITY OF PERTH AMBOY PLANNING BOARD
November 6, 2013

Recreation Facilities

- Baseball/Softball (8)
- Basketball Court (13)
- Football/Soccer (5)
- Gazebo (3)
- Indoor Rec Center (3)
- Play Area (21)
- Senior Center (1)
- Tennis Court (8)

- Board of Education
- City Owned Parcels
- Housing Authority
- Parking Authority
- Redevelopment Authority
- Recreation Parcels
- Vacant Parcels
- Other Parcels
- Future Expansion Areas

- Existing Paths

Proposed Bike Routes

- Proposed Connections
- Middlesex Greenway
- East Coast Greenway
- NJTRANSIT Bus Routes
- NJTRANSIT Rail Line
- 1/4 Mile Buffer around Parks
- 2010 Census Tracts

Demographic Data

Raster

LandScan

CIESIN - SEDAC

Gridded Urban and Rural Mapping Project (GRUMP)

U.S. Census Grids, 1990 and 2000 (SF1 and SF3)

Raster data are comprised of grids, and though they are offer a common data model for many types of spatial data (satellite imagery, aerial imagery, etc.), they are less common for population data.

Vector

U.S. Census: NHGIS and TerraPop

Vector data store point, line, and polygon geometries that are also linked to attribute tables. Vector data types are well suited to demographic data, but pose some challenges for querying small area populations.

Details

LandScan
- Global population grid
- Roughly 1km^2 resolution (30’’ x 30’’)
- Updated annually
- Population surface techniques are classified
- Available to purchase from ORNL

GRUMP
- Available for 1990, 1995, 2000 (30’’ x 30’’), GPW (2.5’ x 2.5’)

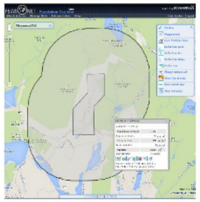
U.S. Census Grids
- Downloadable grids for 1990 and 2000, SF1 and SF3 Files
- Approximately 1km^2 resolution (30’’ x 30’’)

National Historic GIS (NHGIS)
- Digital archive of U.S. census data, 1790-2012
- Historical line files available
- Census tables include “GISJOIN” ID for linking downloaded tables and shapefiles

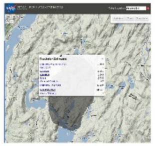
TerraPop
- Enables users to query census data (microdata) and environmental data sets simultaneously
- Environmental data include land cover, land use, and climate data

Web Mapping Applications

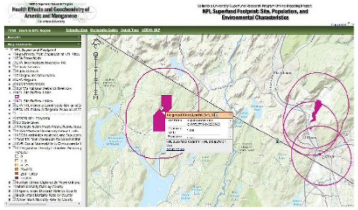
Population Explorer



GPW – Population Estimation Service



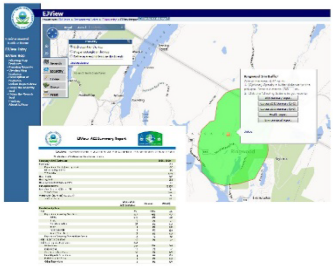
NPL Superfund Footprint Mapper



ESRI Insights

Demonstration of demographic query with network buffer

EPA - EJ View



ACS, 2006-2010 Query with EJView

Comparison

Comparison of Population Estimates for Ringwood Mines/Landfill NPL Site: People within a 1 Mile Buffer

Web Mapping Application:	Data	Estimate	Other Attributes
Population Explorer	LandScan, 2010	1,356	Area, perimeter, population density, age-sex distribution, forecasts
SEDAC - Population Estimation	GPW, 2005	5,464	Min, max, mean, cell count
NPL Superfund Footprint Mapper	US Census Grids, 2000	1,116	Age-sex distributions, poverty and isolation measures, race and ethnicity

- Currently available demographic data sets, accessible through public web mapping applications, vary considerably in age (year of estimate), resolution, estimation and access to other relevant attributes
- The NPL Superfund Mapper is useful for older estimates, and Population Explorer is useful for newer estimates.
- The SEDAC Population Estimation application should probably not be used for small area estimation, e.g. areas less than 15-20 mi^2.

Comparison of Population Estimates for Ringwood Mines/Landfill NPL Site: People within a 1 Mile Buffer

Web Mapping Application:	Data	Estimate	Other Attributes
EJView	ACS, 2006-2010	681	Age-sex distributions, poverty and income, race and ethnicity, education
	US Census, 2010	813	
	US Census, 2000	863	

- ESRI Insights offers interesting buffer and network buffer query techniques, but costs money to access, so it was not included in this demonstration.
- EJView may either use an weighted centroid method to query census data, but this is not confirmed. The lower, overall estimates, when compared with the raster estimates, suggest that it may be just an intersection of the user shape with census block or tract centroids.

Demographic Data Sets and Web Mapping Applications for New Jersey

Author: Lisa Jordan, Drew University

DREW SPATIAL DATA CENTER · FEWS NET FAMINE EARLY WARNING SYSTEMS NETWORK · NASA · The Andrew W. Mellon Foundation · DREW UNIVERSITY / MADISON NJ

The Transformation of NJ State Parks & Forests Trail Maps

Introduction

The New Jersey State Park System (SPS) has over 1,000 miles of official recreation trails in its 53 parks, forests, and recreation areas. A couple of years ago, in order to vastly improve the quality, accuracy, and ease-of-use of trails maps distributed to park visitors, a large-scale mapping project was initiated. Data was collected by DEP employees, interns, and volunteers with both recreational and professional grade GPS's to accurately plot the exact locations and routes of the State Parks' numerous trails. To date, we now have accurate information for over 600 miles of trails and almost 1,500 points of interest in 15 state parks and forests. This data is currently being used to create paper trails maps and a real-time GPS trails map on a mobile App. The procedure includes: GPS data collection in the field; post-processing data; adjusting line work; reviewing field maps with park staff; secondary edits; reformatting to KMZ for mobile App use; and lastly, incorporating the finalized information into new maps for use in printed trails brochures.

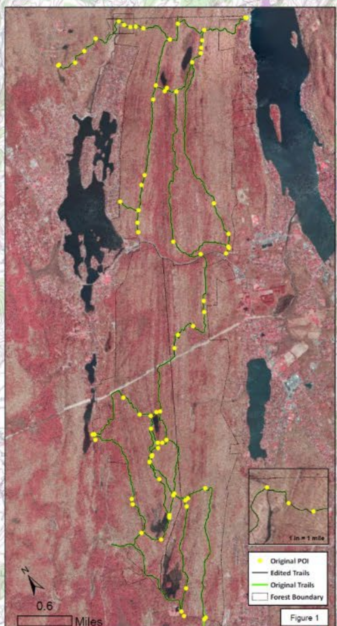


Figure 1

Figure 2

Procedure

For the most accurate and uniform results, the same procedure was followed for each park. As an example, for Abram S. Hewitt State Forest, Mike Tanis (a former Parks seasonal) used a Trimble GeoXH Handheld to record trails and points of interest. This data was post-processed to become a .gdb or .shp file, transferred to our consistent data language (tables 1 & 2), and then reviewed on top of various layers; hillshade, infrared (figure 1), and older aerial photos to adjust lines for necessary corrections. Multiple sources were utilized to ensure precision like old brochure maps, topographic maps, NYNJ Trails Conference, and previous data. When the rough draft (figure 2) was ready, it was printed and reviewed by key park staff - whose comments were used in further editing (this stage was repeated until all parties were satisfied with the final results). If more GPS data is required, it is collected at this stage. After final verification, data was input to our mass New Jersey and Parks by Nature shapefiles, then transferred to a .kmz to be sent to the mobile application (figure 4). At this phase, Dave Smith's (SPS hourly GIS Specialist) new brochure map template was utilized to create the final representation of the park with all its trails and points of interest (figure 3).

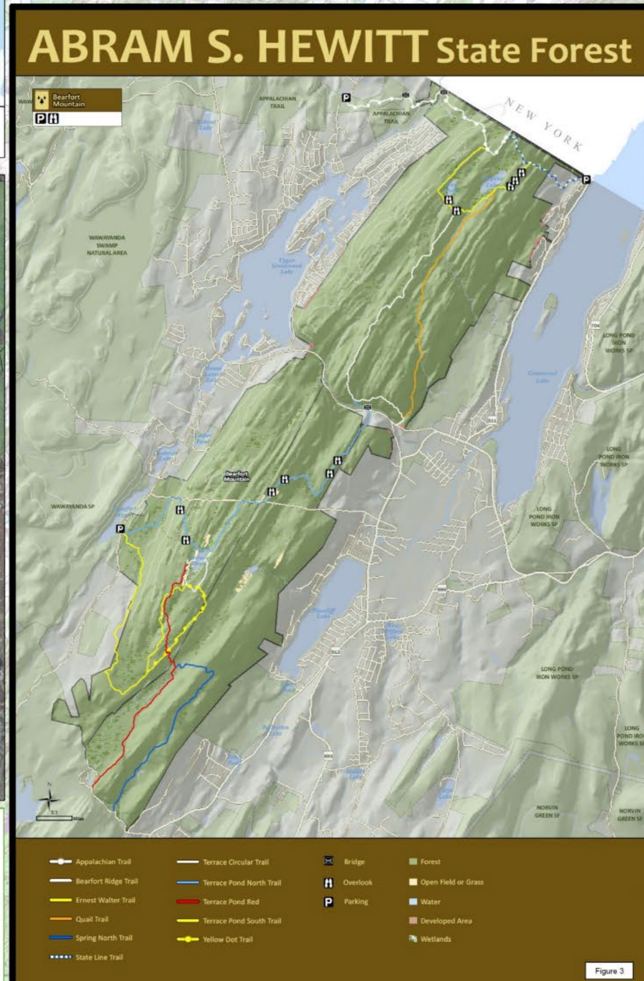


Figure 3

NJ SPS Trails Map Team: Diane Hewlett-Lowrie, Joanne McCarthy, Gail Kenny, Kinney Clark, Michael Tanis, Jonathan Carlucci, Heather Merring, Dave Smith
Brochure Map Design: Dave Smith
Map Compilation by Heather Merring

Importance

Hikers, bikers and horseback riders need accurate maps to safely navigate the 1,000 miles of trails of the NJ State Park System. The old maps comprised a broad range of styles and varying degrees of accuracy. Many had not been updated since mid-1990; others were hand-drawn approximations. Some parks had altered their trails systems on the ground, but the maps were not yet updated. Our new maps contain accurate representations of each trail and point of interest utilizing the GPS data, and a uniform, user-friendly style designed to make the trails easy to follow. In addition to developing new paper maps, we have worked with Parks by Nature to develop a mobile application for NJ State Parks that contains 'live' GPS trails maps. This app, "Pocket Ranger," also includes park information, events, activities, geocaching, and geochallenges. One of the greatest features is a "live" trail map, i.e. a GPS map overlaid with our trails data. With this, a user can see their exact location in real time, send out an alert, see a friend nearby, and most importantly know their exact location so getting lost is much less likely. An up-to-date and accurate map is essential for first responders to be able to reach an emergency situation as quickly as possible.

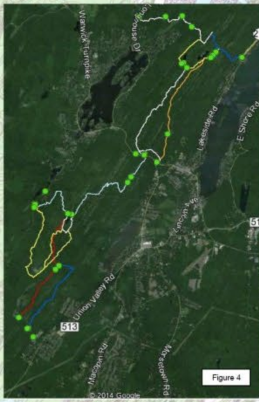


Figure 4

Figure 5

Tables 1 &2 -

NewJersey_trails_PbN

PARK_NAME	SITE_NAME	TRAIL_NAME	PBN_COLOR	BLAZE_TYPE	BLAZE_DESC	TRL_TYPE_S	TRL_LENGTH	TRL_DIFF
Abram S. Hewitt State Forest		Bearfort Ridge Trail	White	plastic	Rectangle	Official	2.77406	difficult
Abram S. Hewitt State Forest		Ernest Walter Trail	Yellow	plastic	Rectangle	Official	1.73748	moderate
Abram S. Hewitt State Forest		Quail Trail	Orange	plastic	Rectangle	Official	2.32464	difficult
Abram S. Hewitt State Forest		State Line Trail	Blue	plastic	Rectangle	Official	1.09284	moderate
Abram S. Hewitt State Forest		Spring North Trail	Blue	plastic	Rectangle	Official	1.97874	difficult
Abram S. Hewitt State Forest		Appalachian Trail	White	painted tree	Rectangle	Official	2.19178	difficult
Abram S. Hewitt State Forest	Bearfort Mountain	Terrace Circular Trail	White	plastic	Rectangle	Official	1.01703	moderate
Abram S. Hewitt State Forest	Bearfort Mountain	Yellow Dot Trail	Yellow	plastic	Circle	Official	0.97908	difficult
Abram S. Hewitt State Forest		Terrace Pond North Trail	Light Blue	plastic	Rectangle	Official	4.1712	moderate
Abram S. Hewitt State Forest	Bearfort Mountain	Terrace Pond South Trail	Yellow	plastic	Rectangle	Official	3.10912	difficult
Abram S. Hewitt State Forest		Terrace Pond Red Trail	Red	plastic	Rectangle	Official	2.48533	difficult

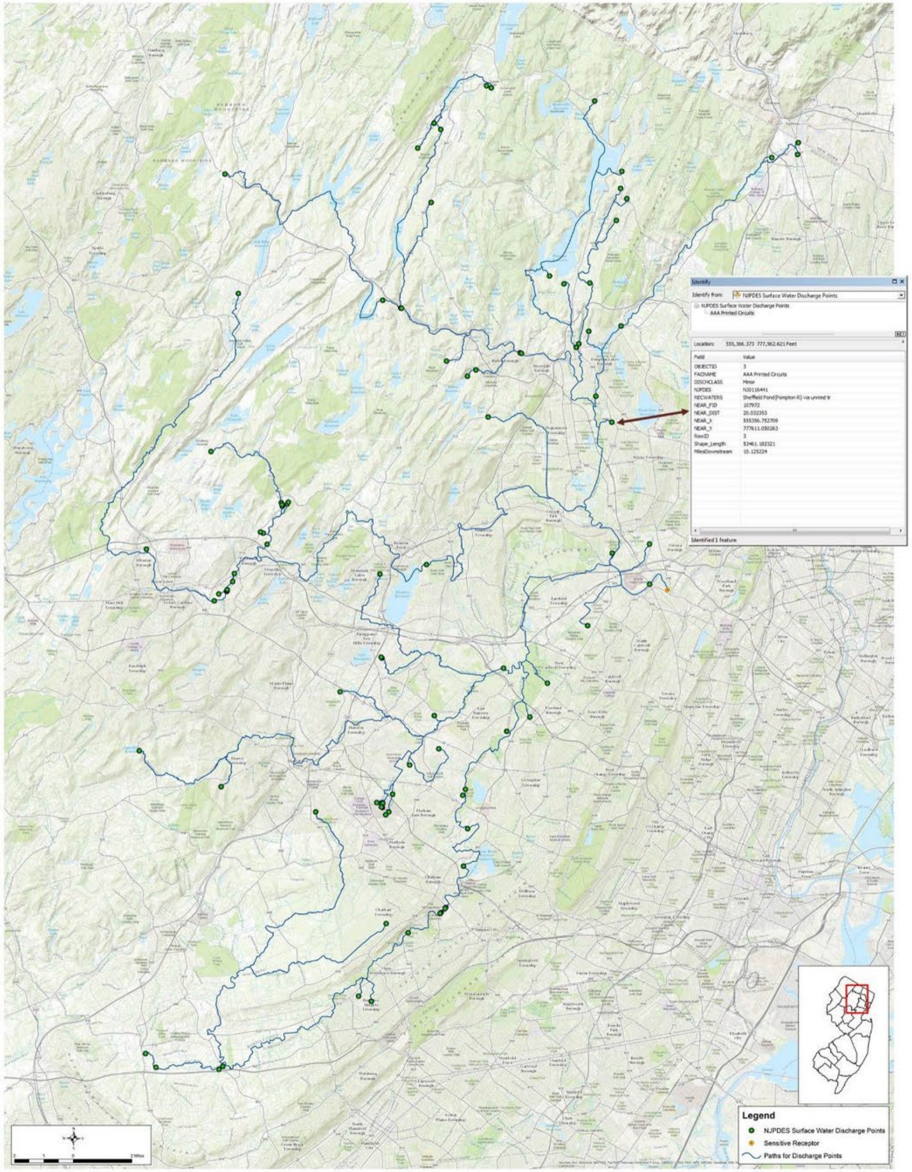
NewJersey_poi

PARK_NAME	POI_NAME	POI_TYPE	OSOURCE	OSRCE_TYPE	ODATE	PBYN	COMMENTS
Abram S. Hewitt State Forest	Trailhead - Spring North	Trailhead	MTn	prof. TRIMBLE gps	4/11/12		blue spring north
Abram S. Hewitt State Forest	Trailhead - Non-state lands	Trailhead	MTn	prof. TRIMBLE gps	4/11/12		blue over white
Abram S. Hewitt State Forest	Trailhead - Terrace Pond Red	Trailhead	MTn	prof. TRIMBLE gps	4/11/12		
Abram S. Hewitt State Forest	Stream Crossing - Clinton Brook Tribut	Stream Cros	MTn	prof. TRIMBLE gps	4/11/12		obstacle - stream crossing / no bridge
Abram S. Hewitt State Forest	Parking	Parking	MTn	prof. TRIMBLE gps	4/11/12		parking
Abram S. Hewitt State Forest	Trailhead - State Line	Trailhead	MTn	prof. TRIMBLE gps	4/11/12		
Abram S. Hewitt State Forest	Parking	Parking	MTn	prof. TRIMBLE gps	4/11/12		parking
Abram S. Hewitt State Forest	Trailhead - Old Coal (Wawayanda)	Trailhead	MTn	prof. TRIMBLE gps	4/11/12		
Abram S. Hewitt State Forest	Scenic Overlook	Overlook	MTn	prof. TRIMBLE gps	4/11/12		Greenwood Lake Overlook
Abram S. Hewitt State Forest	Scenic Overlook	Overlook	MTn	prof. TRIMBLE gps	4/11/12		Greenwood Lake Overlook
Abram S. Hewitt State Forest	Parking	Parking	MTn	prof. TRIMBLE gps	4/11/12		parking

DOWNLOAD OUR FREE APP TO ACCESS OUR MAPS & PARK INFO!

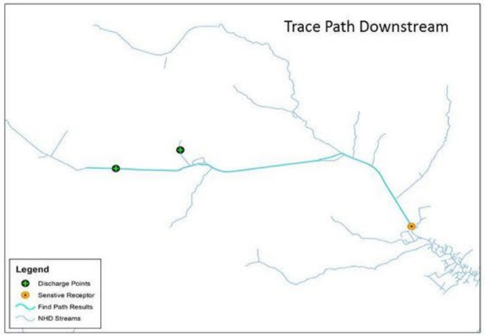
DETERMINE DOWNSTREAM DISTANCE TO SENSITIVE RECEPTORS

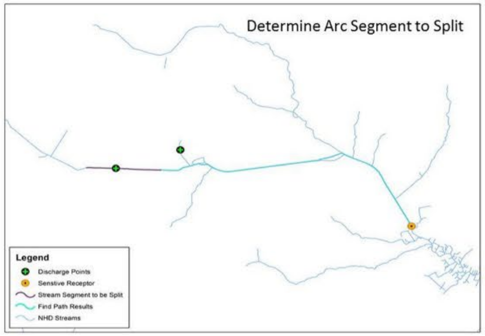
Use Arc GIS tools and Python scripting to iterate through a point feature class to determine shortest downstream path to sensitive receptor point feature class

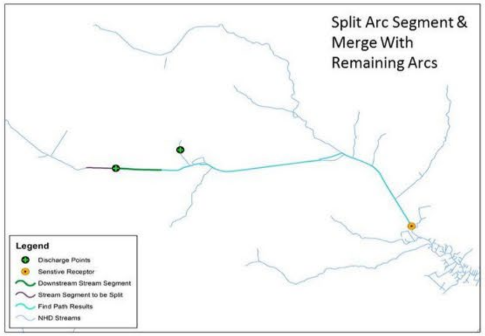


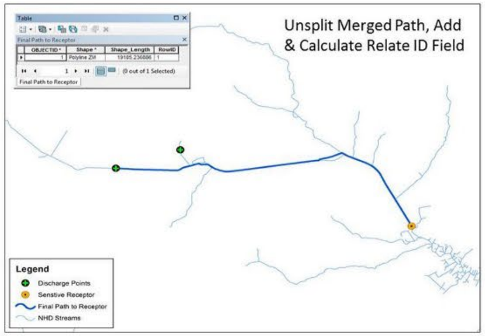
1. Find coordinates for closest stream intersection using the Location option available in the Near Analysis tool.
2. Build a feature class using the intersection coordinates found in the Near Analysis ensuring the discharge point will be located on the stream.
3. Use the stream intersection points to perform Find Path trace between flags using the Trace Geometric Network tool. Stream length is used as a weight to in the geometric network to find the shortest path.
4. The results of the Find Path are shown to the right in cyan.
5. Often the furthest upstream arc segment in the resulting Path will extend beyond the discharge point. The magenta arc segment in the map to the right is an example.
6. This arc is split using the SplitLine AtPoint tool. The script selects the arc which intersects with the discharge point then splits the arc at the point location. The arc segment is deleted from the original Path. The downstream portion of the split line result is merged with the remaining original Path result.
7. The UnsplitLine tool is applied to the merged output. The result is a single arc with the distance between of the shortest path between the discharge point and the sensitive receptor. In this example that distance is shown in the Shape_Length field as 19,105 feet or 3.6 miles.
8. The final arc feature class also is assigned a RowId to enable joins or relates to the original discharge point feature.

```
# Import arcpy module
import arcgisscripting
gp = arcgisscripting.create()
# Local variables:
WorkSpace = "D:\\WorkSpace\\FindDownstreamLengths.gdb"
Geo_Net = WorkSpace + "\\Hydrography\\NHDFlowline_Net"
Flags = WorkSpace + "\\DischargePoint"
FlagLayer = WorkSpace + "\\Flag_lyr"
intakeFlag = WorkSpace + "\\Receptor"
TraceLayer = WorkSpace + "\\trace_lyr"
TraceLayerSelection = TraceLayer + "\\NHDFlowline"
MergeFlags = WorkSpace + "\\MrgFlags"

wk_files = [TraceLayer, TraceLayerSelection, FlagLayer, MergeFlags]

# define deletefunction
def arcdel(DelFile):
   arcpy.Delete_management(DelFile)

FlagList = []

# read flags
fc = Flags
rows = gp.SearchCursor(fc)
for row in rows:
   FlagId = str(row.RowID)
   FlagList.append(FlagId)

for Flag in FlagList:
   FlagSelect = "RowID ='" + Flag + "'"
   arcpy.MakeFeatureLayer_management(Flags, FlagLayer, FlagSelect, WorkSpace)
   #arcpy.CopyFeatures_management(FlagLayer, TestSplitPoint + Flag)
   arcpy.Merge_management([FlagLayer, IntakeFlag], MergeFlags)

   # Process: Trace Geometric Network
   arcpy.gp.TraceGeometricNetwork(Geo_Net, TraceLayer, MergeFlags, "FIND_PATH", "",
      "", "Length", "", "", "NO_TRACE_ENDS", "NO_TRACE_INDETERMINATE_FLOW", "", "",
      "AS_IS", "", "", "", "AS_IS")
   Trace_fc = WorkSpace + "\\Trace" + Flag
   arcpy.CopyFeatures_management(TraceLayerSelection,Trace_fc)
   TraceLayerRte = WorkSpace + "\\TraceRte" + Flag
   arcpy.MakeFeatureLayer_management(Trace_fc, TraceLayerRte)
   arcpy.SelectLayerByLocation_management(TraceLayerRte, "INTERSECT", FlagLayer)
   TraceSegment = WorkSpace + "\\TraceSegment" + Flag
   arcpy.CopyFeatures_management(TraceLayerRte, TraceSegment)
   arcpy.DeleteFeatures_management(TraceLayerRte)
   TraceDeleteSegment = WorkSpace + "\\TraceDeleteSegment" + Flag
   arcpy.CopyFeatures_management(TraceLayerRte, TraceDeleteSegment)
   split_lines = arcpy.SplitLineAtPoint_management(TraceSegment, FlagLayer,
arcpy.Geometry(), "")
   if len(split_lines) == 1:
      FinalRoute = WorkSpace + "\\FinalRoute_" + Flag
      arcpy.Merge_management([TraceLayerRte, TraceSegment], FinalRoute)
   else:
      TraceFinalSegment = Trace_fc + "_final"
      arcpy.CopyFeatures_management(split_lines[1],TraceFinalSegment)
      FinalRoute = WorkSpace + "\\FinalRoute_" + Flag
      arcpy.Merge_management([TraceLayerRte, TraceFinalSegment], FinalRoute)
   FinalRouteUnsplit = WorkSpace + "\\FinaRouteUnsplit_All" + Flag
   arcpy.UnsplitLine_management(FinalRoute, FinalRouteUnsplit)
   arcpy.AddField_management(FinalRouteUnsplit,"RowID", "TEXT", "", "", "10", ""
      , "NULLABLE", "NON_REQUIRED", "")
   calc_exp = "'" + Flag + "'"
   arcpy.CalculateField_management(FinalRouteUnsplit, "RowID", calc_exp,"PYTHON_9.3","")
   for delwk_file in wk_files:
      if arcpy.Exists(delwk_file):
         arcdel(delwk_file)
```



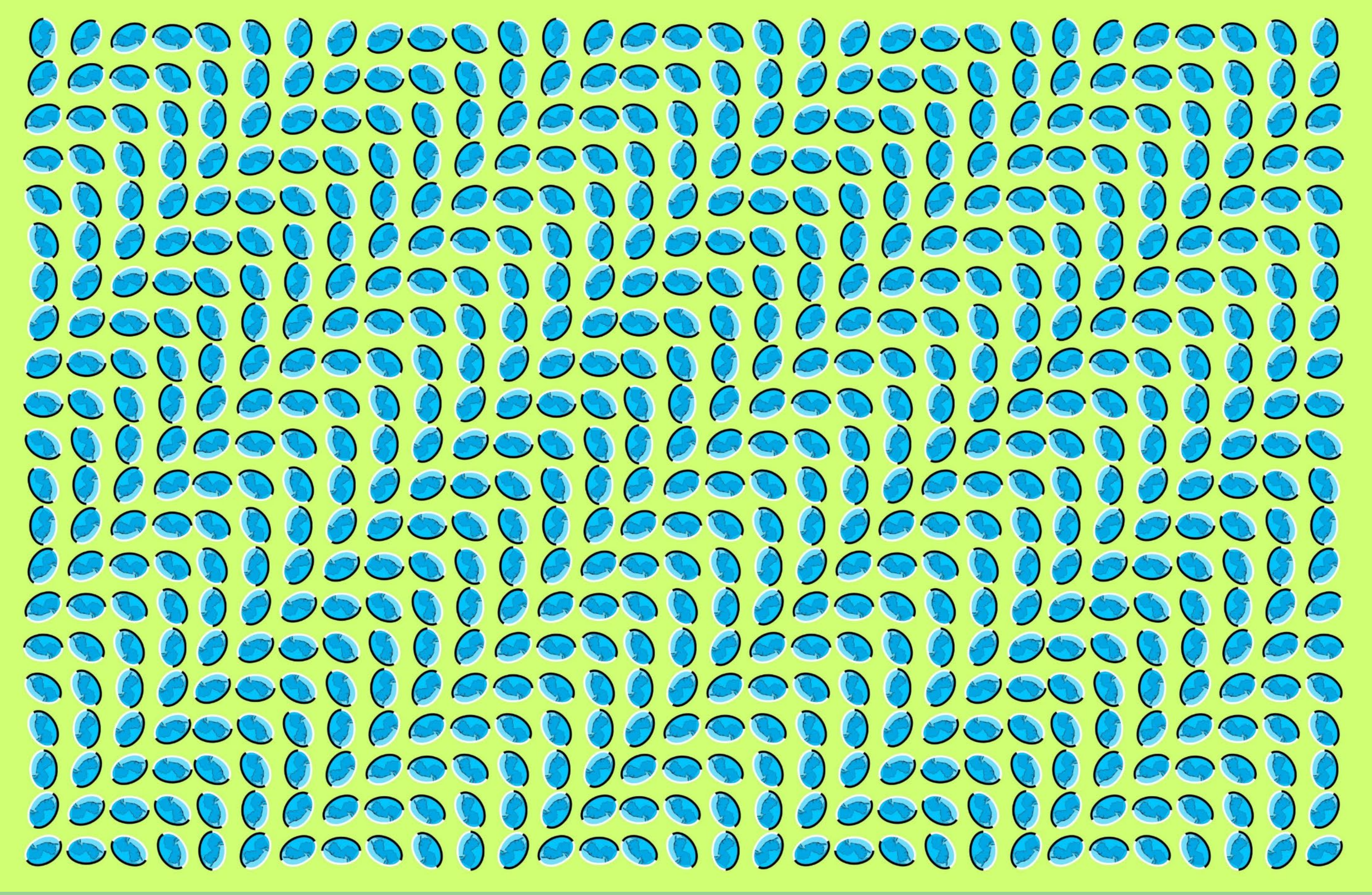




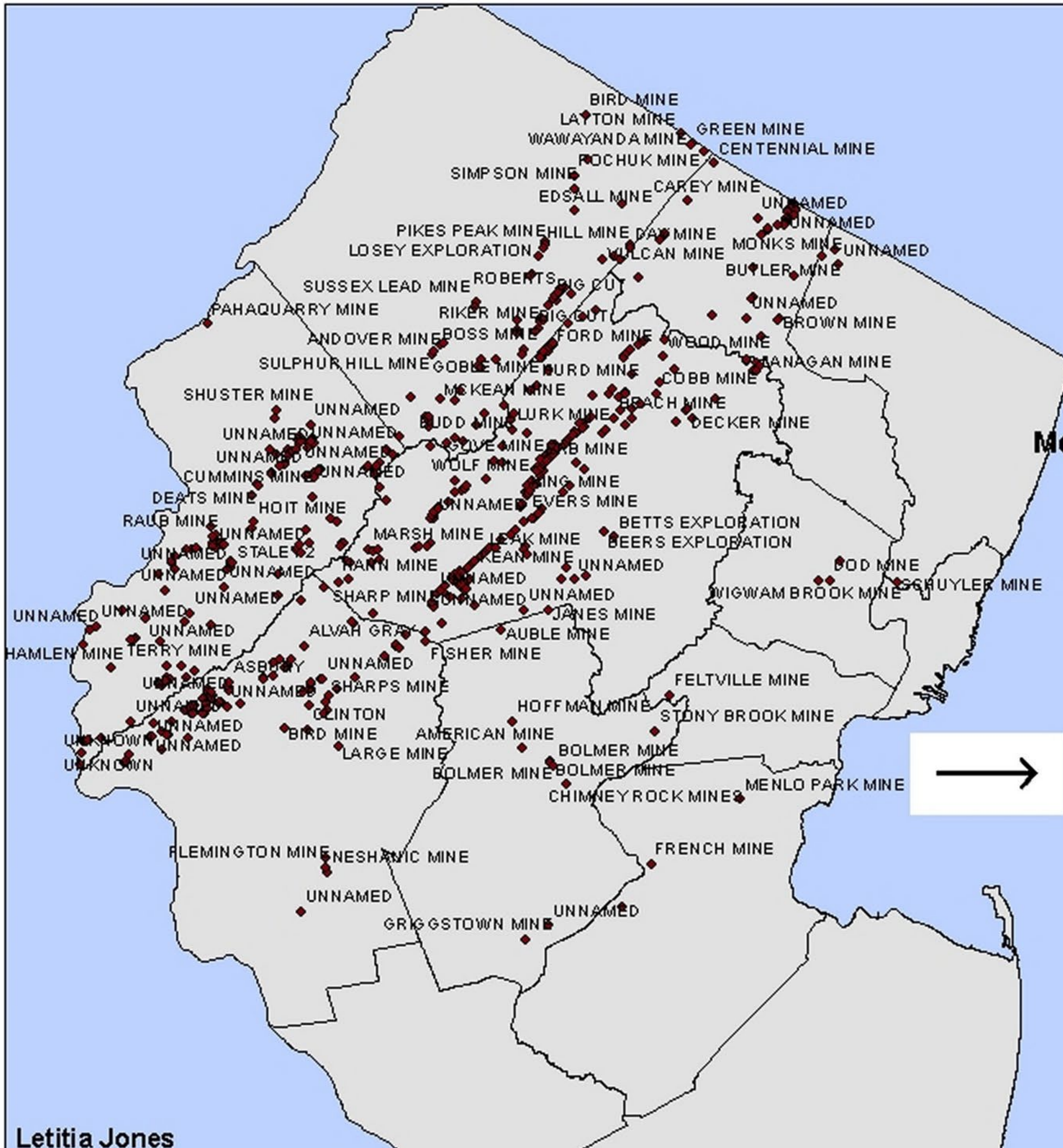


Map Production: Ed Apalinski, NJDEP/BGIS, 4/2014

Most Unique



New Jersey Mines: Did You Know?

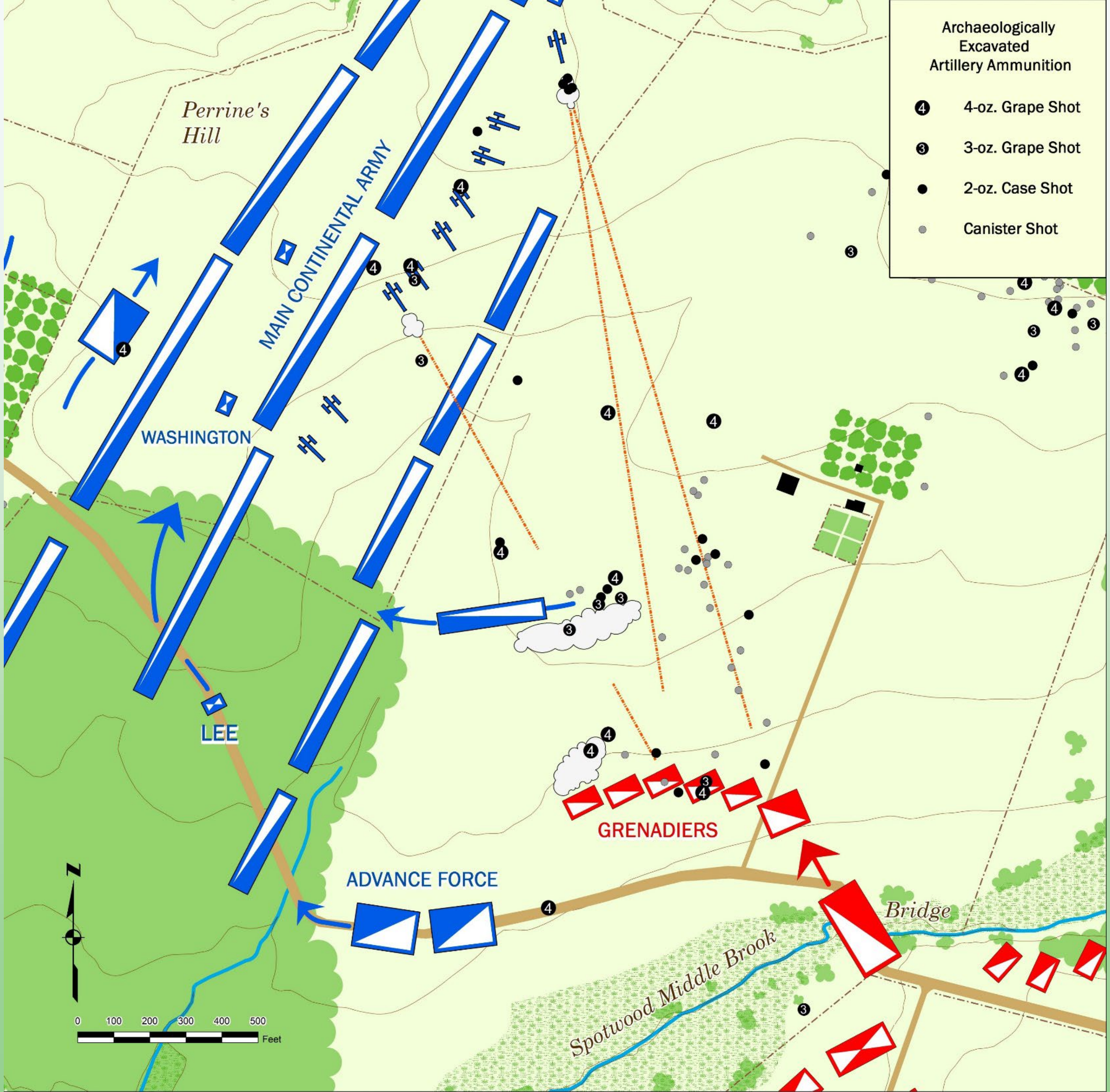


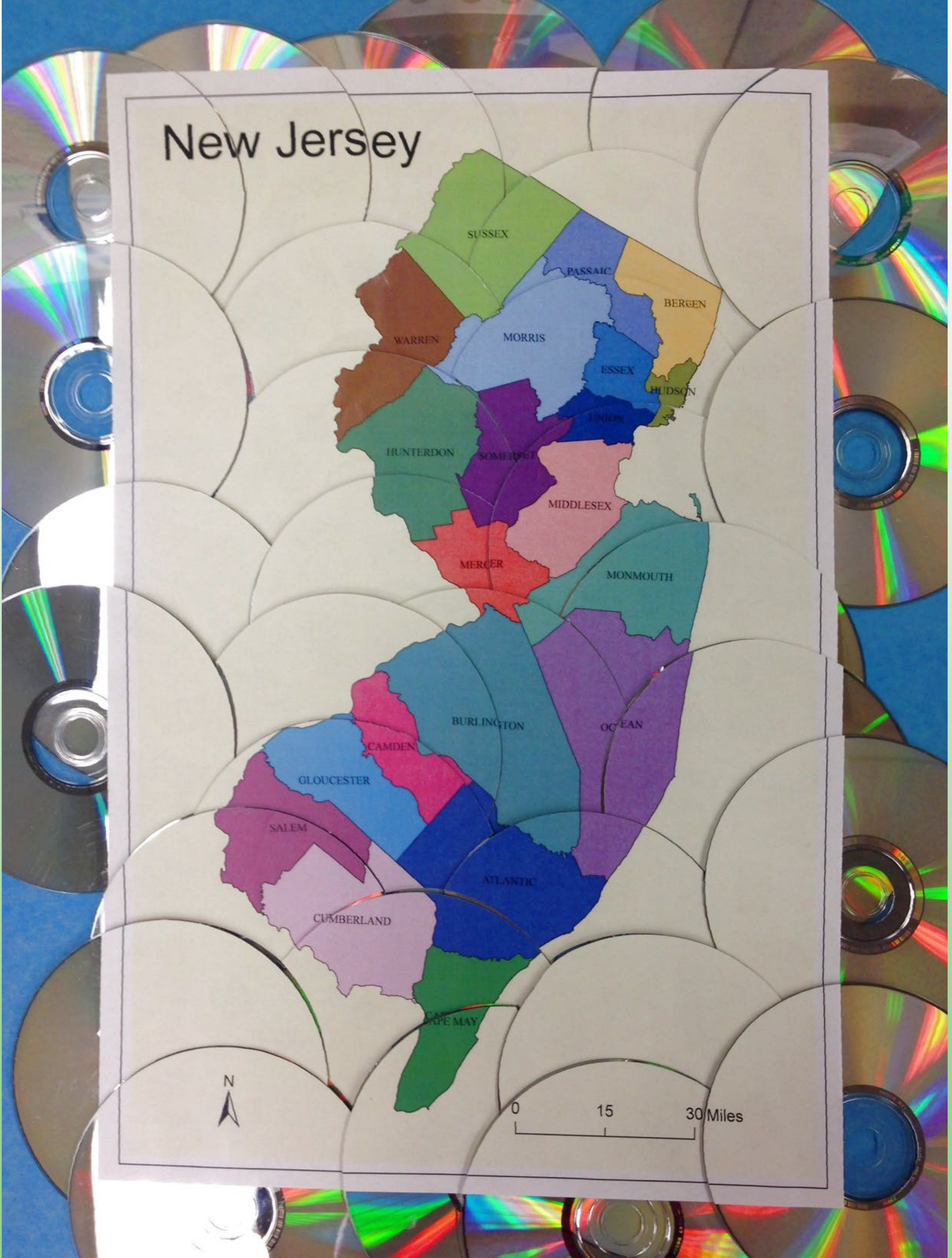
Menlo Park Mine: Mined for copper 1784-1903

Elements Mined in NJ:

Copper	Lead
Iron	Mica
Graphite	Sulfide
Uranium	
Mangan	
Zinc	

Letitia Jones


Archaeologically Excavated Artillery Ammunition
4-oz. Grape Shot
3-oz. Grape Shot
2-oz. Case Shot
Canister Shot
Perrine's Hill
MAIN CONTINENTAL ARMY
WASHINGTON
LEE
ADVANCE FORCE
GRENADIERS
Bridge
Spotwood Middle Brook
N
0 100 200 300 400 500
Feet



New Jersey
SUSSEX
PASSAIC
BERGEN
WARREN
MORRIS
ESSEX
HUDSON
UNION
HUNTERDON
MIDDLESEX
MERCER
MONMOUTH
BURLINGTON
CAMDEN
GLOUCESTER
SALEM
ATLANTIC
CUMBERLAND
N
0
15
30 Miles

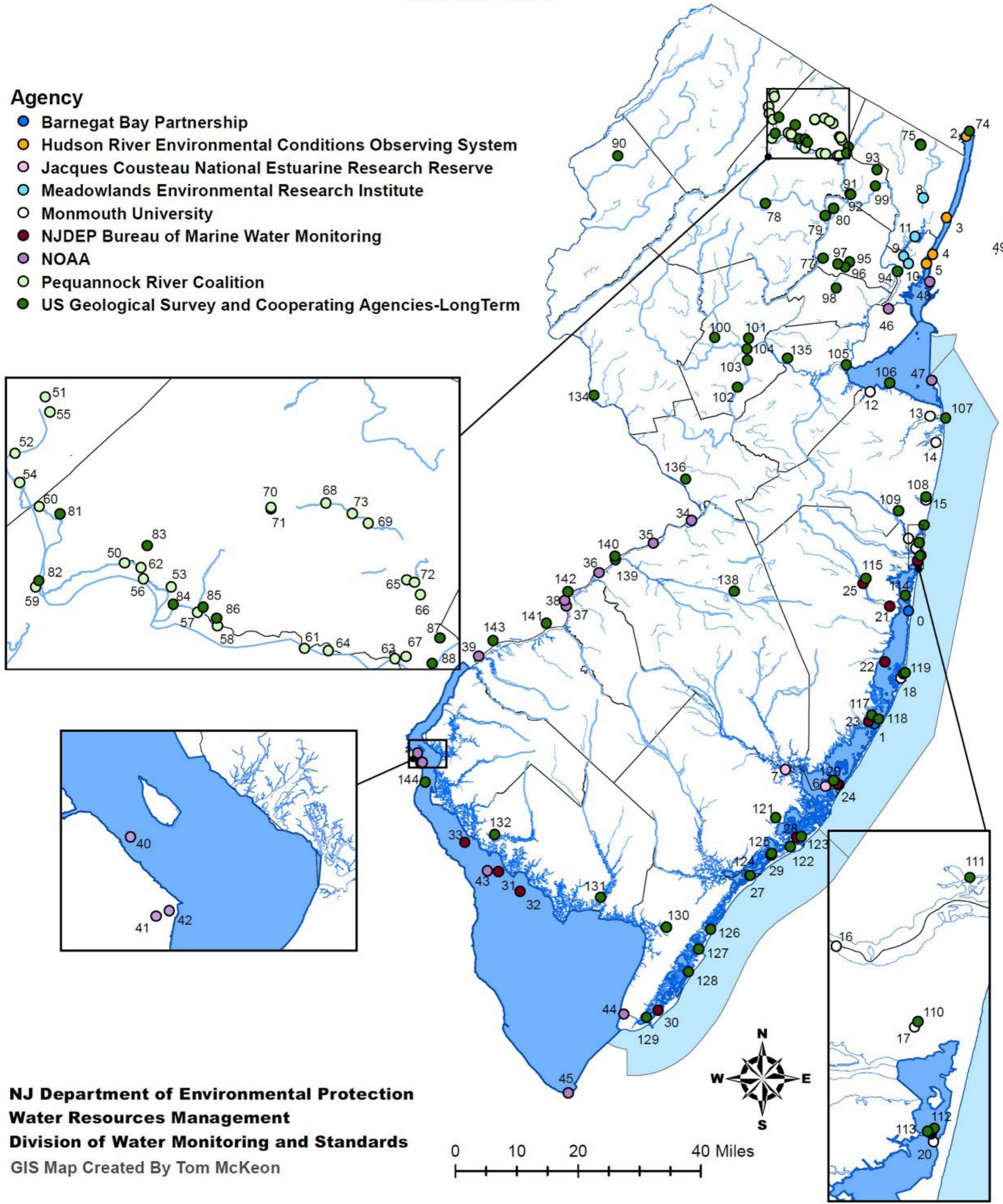
Hunterdon County
- 300 Years -
of Municipal Boundary Changes

Visit our website to view the web mapping application in action: http://gis.co.hunterdon.nj.us

The changes to Hunterdon County Municipal boundaries were compiled by Patricia Leidner, Coordinator, Hunterdon County Division of Geographic Information Systems from: "The Story of New Jersey's Civil Boundaries 1606-1968" by John P Snyder and NJ Geological Survey; Bulletin 67, 1988 supplement, using existing GIS datasets for State of New Jersey, County and Municipal Boundaries, Road Centerline Files and Aerial Photography. This poster depicting the web mapping appliction was created by Patricia Leidner, Coordinator, Hunterdon County, Division of GIS. The web mapping application was created by Patricia Leidner, Coordinator, Hunterdon County, Division of GIS and Jake Skinner, Solution Engineer, ESRI. The data resides in a single feature class. The Feature Class has been added to ArcMap where the layer and map document were time enabled. The Map Document was published to ArcGIS for Server as a map service. The Web Mapping Application was developed using the JavaScript API.

Small Format

Continuous Long-Term Water Quality Monitoring (Greater Than 1 Year) for New Jersey and Shared Waters
March 2014



NJ Department of Environmental Protection
Water Resources Management
Division of Water Monitoring and Standards
GIS Map Created By Tom McKeon

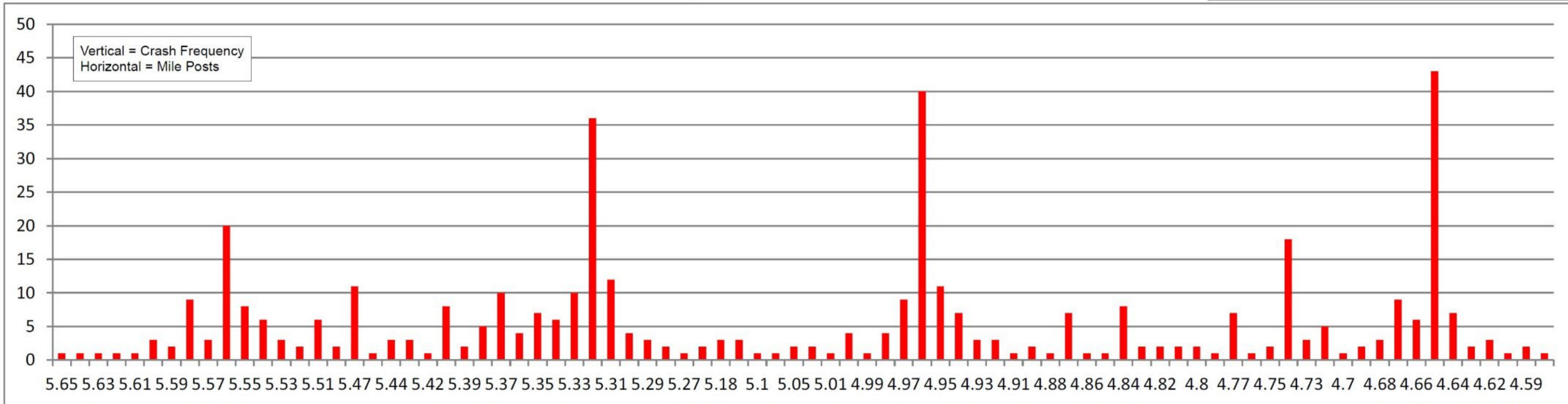
Olden Avenue (CR 622), Crash Frequency 2008-2012, 1/20th Mile Segments, Environmental Constraints

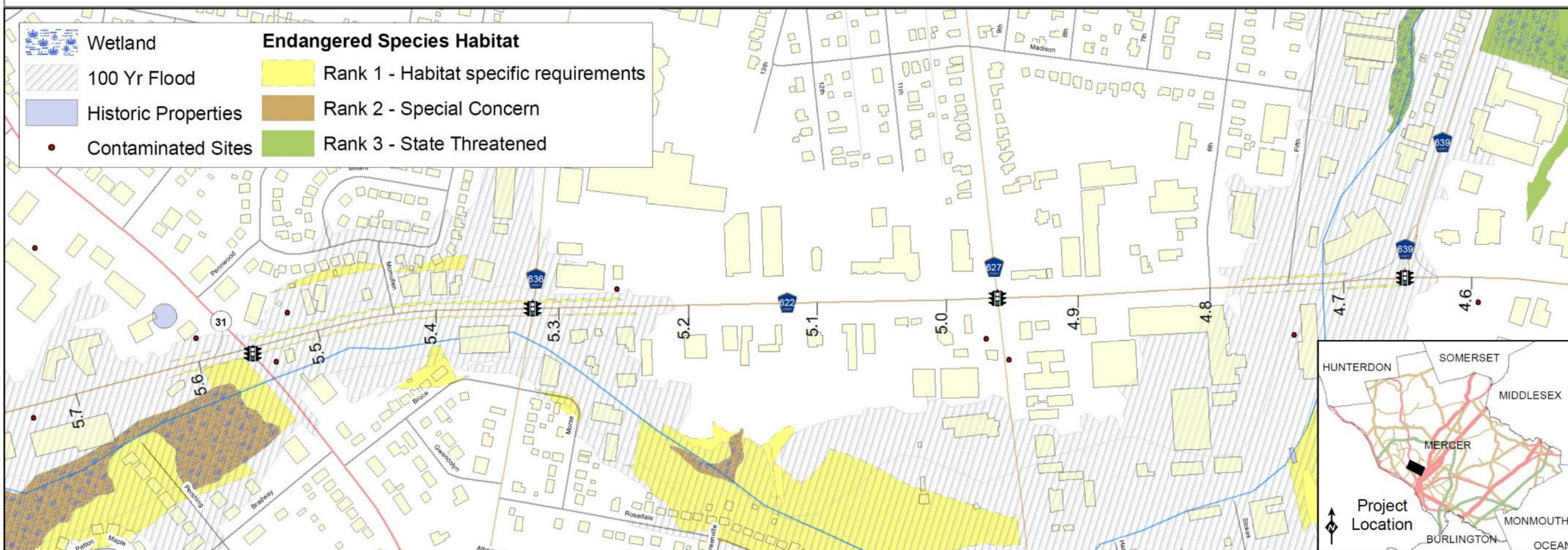
1 in = 400 ft

Miles
0 0.025 0.05 0.1 0.15 0.2

Mercer County
Planning Division
March 5, 2014

Data:
Roads: NJDOT 2012; Crashes: DVRPC 2014;
Buildings: Mercer 2010; Environmental: NJDEP 2008;
Streams & Wetlands: NJDEP 2007





New Jersey Geological and Water Survey
Open-File Report 14-1

Hydrogeologic Framework and Computer Simulation of Ground-Water Flow in the Valley-Fill and Fractured-Rock Aquifers of the Germany Flats Area of Sussex County, New Jersey

New Jersey Department of Environmental Protection

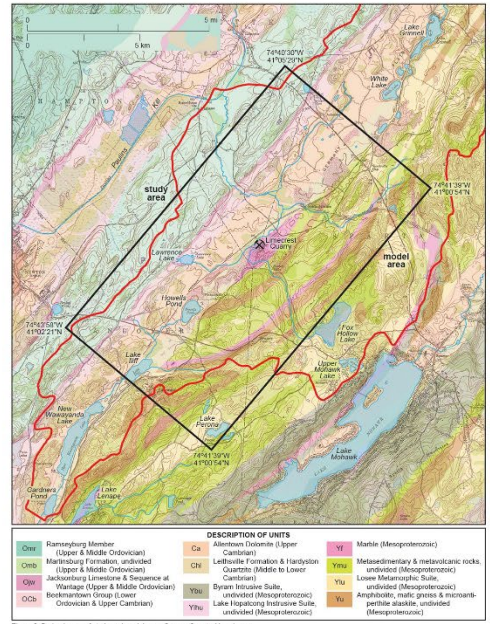


Figure 2. Bedrock map of study and model area, Sussex County, New Jersey.

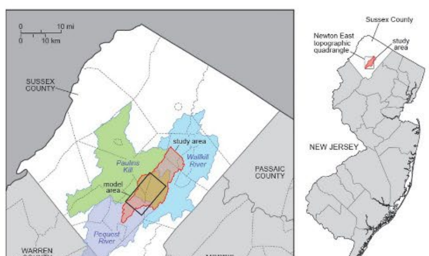


Figure 1. Study area and model area location map including SW basins and inset map showing location with New Jersey.

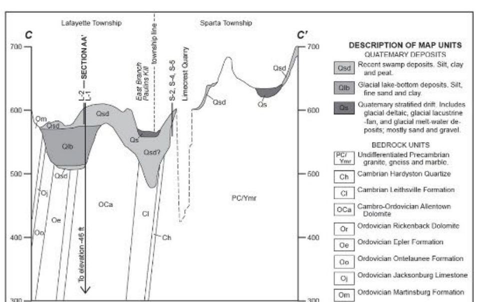


Figure 6. Geologic section C-C' showing valley fill and bedrock units near Limecrest Quarry.

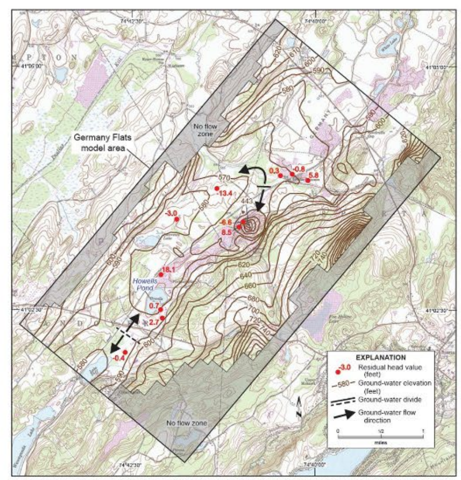
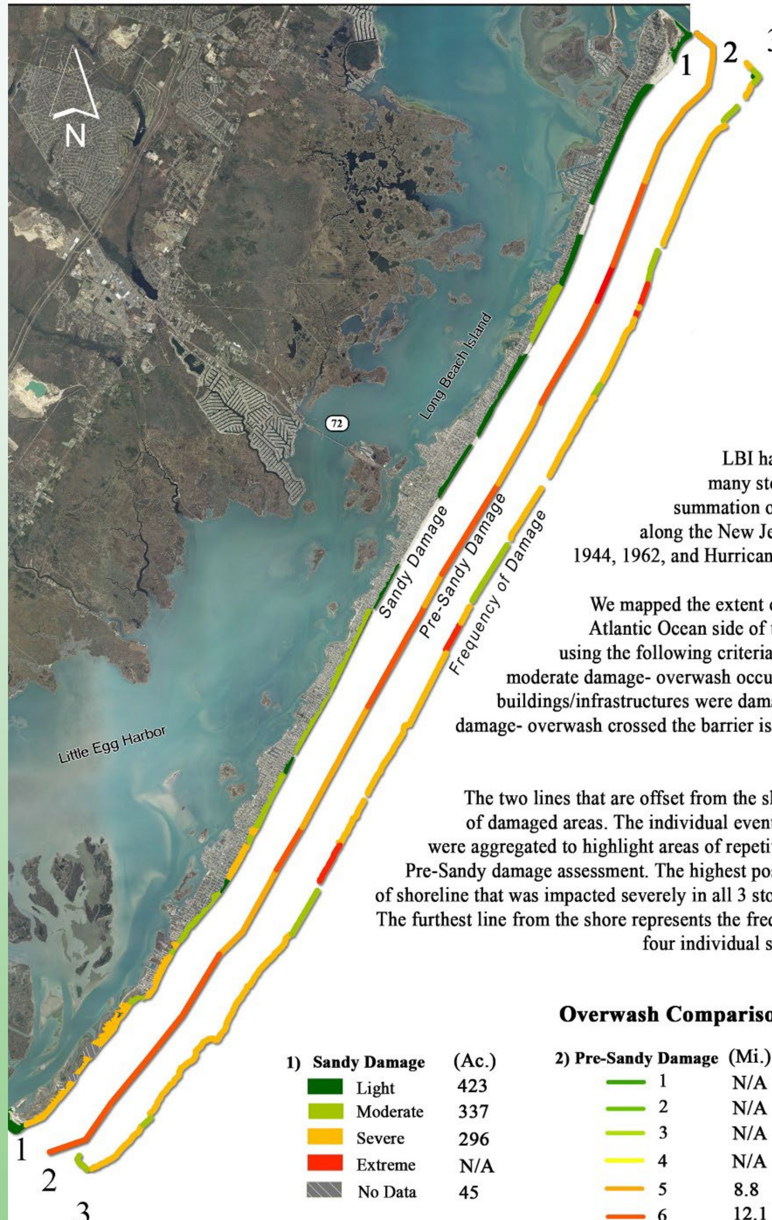
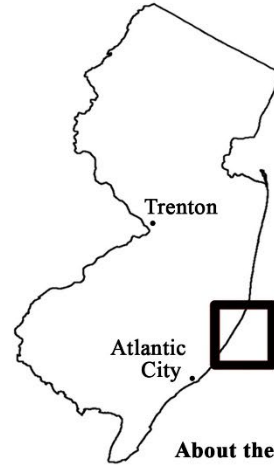


Figure 19. Simulated piezometric surface in Model Layer 1 with Limecrest Quarry pumping 6.5 mgd. The difference between measured and simulated water levels is shown at well locations. (A minus sign indicates that the simulated water level is lower than the measured water level.)

Hurricane Sandy Coastal Overwash Comparison to Historical Storm Events Along New Jersey's Long Beach Island





About the Map:

LBI has been heavily inundated by overwash from many storm events in the past.This map displays the summation of overwash events from previous hurricanes along the New Jersey coast in Long Beach Island from 1920, 1944, 1962, and Hurricane Sandy using historical aerial photography.

We mapped the extent of overwash and rated the damage on for the Atlantic Ocean side of the shore (excluding any back-bay flooding) using the following criteria: light damage- beach and foredune erosion, moderate damage- overwash occurred beyond the dune lines, severe damage- buildings/infrastructures were damaged past the dune lines, and lastly; extreme damage- overwash crossed the barrier island to the bay with extensive infrastructure damage and new inlet formations.

The two lines that are offset from the shore represent the cumulative and frequency of damaged areas. The individual events from the previous years mentioned above, were aggregated to highlight areas of repetitive overwash in both weight and rate, for a Pre-Sandy damage assessment. The highest possible value, a 9, represents the same stretch of shoreline that was impacted severely in all 3 storm events, but did not occur in the analysis. The furthest line from the shore represents the frequency of overwash in a given area from all four individual storms events that were used in this analysis.

Overwash Comparison

1) Sandy Damage	(Ac.)
Light	423
Moderate	337
Severe	296
Extreme	N/A
No Data	45

2) Pre-Sandy Damage	(Mi.)
1	N/A
2	N/A
3	N/A
4	N/A
5	8.8
6	12.1
7	0.6

3) Frequency of Damage	(Mi.)
1	.01
2	3.7
3	15.2
4	1.6

0 1.5 3 6 Miles

Map Produced By: Bryan Serino
Under Direction of Dr. Richard G. Lathrop
Rutgers, Center for Remote Sensing and Spatial Analysis, April 4th, 2014

RUTGERS THE STATE UNIVERSITY OF NEW JERSEY

Data Sourced From: USACE, NOAA, CRRSA

New Jersey Lead Emissions 1990-2010

Introduction:

This project aimed to determine the lead emissions released throughout the state of New Jersey spanning 1990 to 2010. During the project we located two specific TRI sites that were responsible for the majority of the state's lead releases, and tracked change in their emissions throughout the same period.

Methods:

For this project we used the Toxic Release Inventory to track the lead emissions, by looking at the data for 1990, 2000 & 2010. We were able to download on and off site emissions for all of New Jersey as well as the two specific sites; Gerdau Armeristeel Sayreville Inc (Middlesex County) & Glacier Garlock Bearings LLC (Gloucester County). We then visually depicted our TRI data through ArcMap and ArcMaponline. By exporting these maps as JPEG's, we are able to present them in a more legible format.

New Jersey Lead Emissions 1990

New Jersey Lead Emissions 2000

New Jersey Lead Emissions 2010

Conclusion:

The two examined sites, Gerdau Ameristeel Sayreville Inc. and Glacier Garlock Bearings LLC. increased over time. Statewide emissions in contrast, decreased overall from 1990 to 2000 and again from 2000 to 2010. It would seem that there is a pursuit to decrease lead emissions due to health risks outlined in the previous section throughout the state but not at these emission locations.

<u>Works Cited:</u>

Emissions: EPA.gov

Health risks: EPA.gov

Maps created using ArcMap Online and ARC GIS

Glacier Garlock Bearing LLC Facility, Gloucester County NJ

Gerdau Ameristeel Sayreville Inc. Facility, Middlesex County

Results:

We found that the over-all lead emissions throughout New Jersey decreased from 1990 to 2000 and again from 2000 to 2010. Lead emissions were at an all-time low in 2010 with a total in on and off site emissions of 56,176.26.

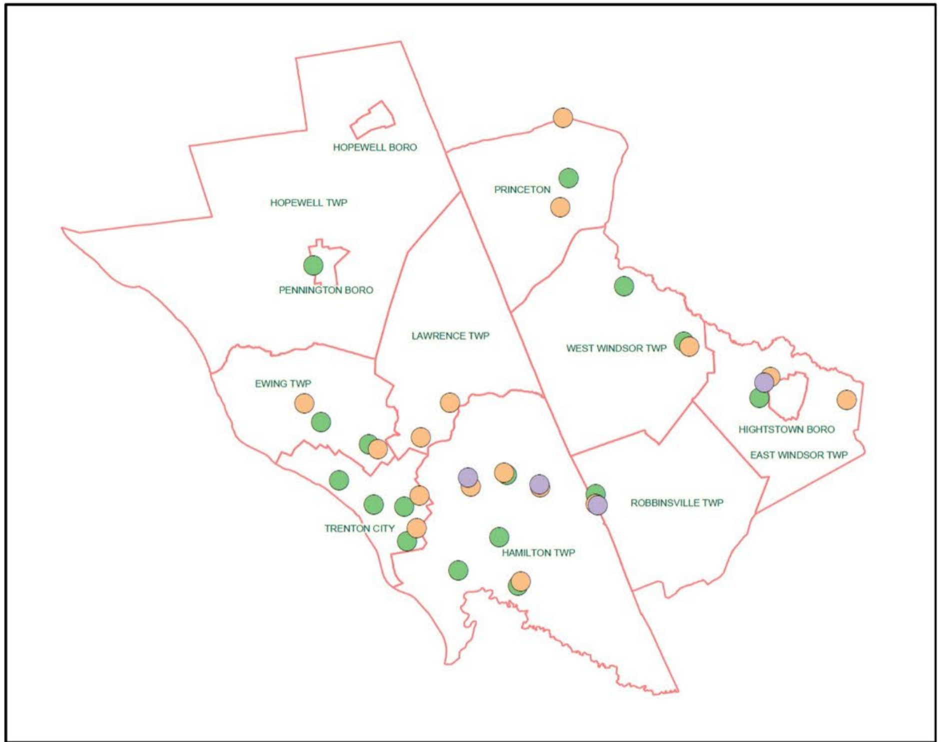
Tracking the emissions for the two largest sites, however, one in North Jersey and the other in South Jersey, both sites increased over-all emissions spanning the 20 years as well. Gerdau Armeristeel Sayreville Inc. starting with 4 total emissions in 1990, increasing to 1595 by 2000 and lastly emitting 37,025 pounds in 2010. Glacier Garlock Bearings LLC fluctuated, starting with 24,255 total emissions in 1990, decreasing to 1,461 by 2000 and lastly emitting 9,260 pounds in 2010.

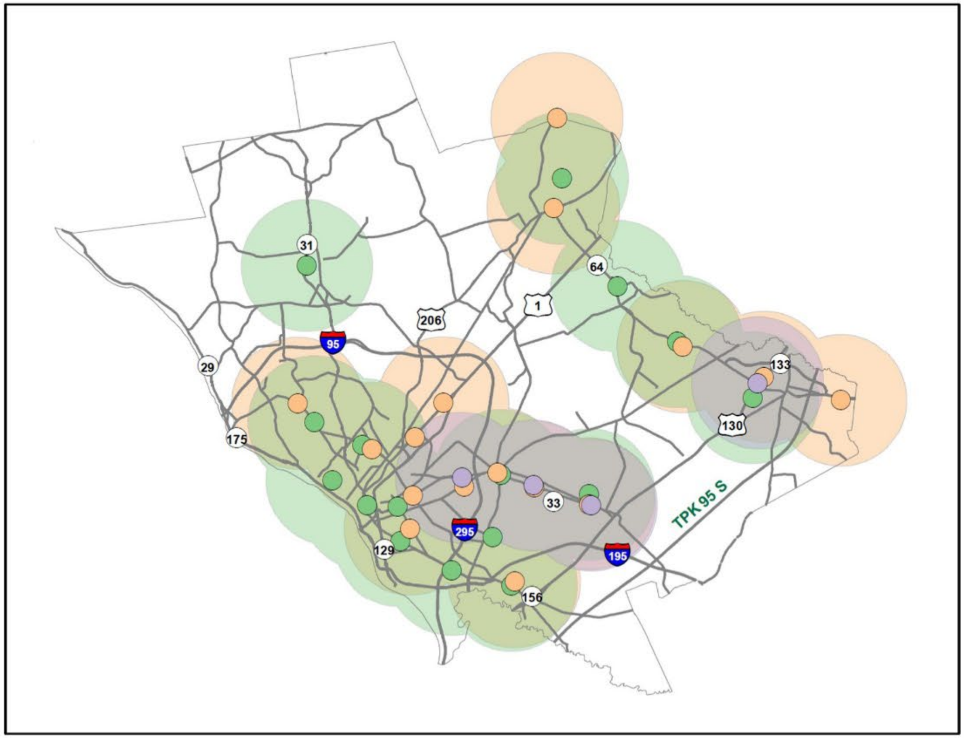
Aside from tracking data and illustrating emissions, we also found the effects lead has on human health. We discovered that even low levels of lead can be detrimental to the neurological development in children causing; behavior and learning problems, lower IQ & hyperactivity, slowed growth, hearing problems & anemia. In rare cases levels of lead in a child's body have resulted in seizures, coma or even death. As lead is stored in our bones, it can be released during pregnancy along with calcium, and can result in reduced growth of fetus and premature birth. Lead does not only effect children but can also effect adults, having Cardiovascular effects, increased blood pressure and incidence of hypertension, reproductive problems in both men and women, decreased kidney function.

Created by Tessa Kennamer and Rachel Dooley 2014

Mercer County's "Cold" War

The influence of the three major pharmacy chains (CVS, Rite Aid, Walgreens) in Mercer County.





Walgreens (4) | Walgreens 2 Mile Buffer

CVS (16) | CVS 2 Mile Buffer

Rite Aid (16) | Rite Aid 2 Mile Buffer

Municipalities | Major Roads

County

0 2 4 Miles

N

The three major pharmaceutical chains in New Jersey's Mercer County form two "blocs" along the Eastern and Western sections of the county. Competition is fierce, and the proximity between the three chains is tight. The two closest pharmacies in the county (shown to the right) are about 400 feet apart. There is only one pharmacy in the county that isn't within 2 miles of another. The density of the chains is attributed to the high populations found within the county.

Data Sources: NJDEP, 2010 Census.
Pharmacy locations derived by the brands' store locator websites and Google Maps.
Dan Oliva

Software Integration

Pre-Incident planning in the all-volunteer North Caldwell Fire Department, NJ

Brian M. Wlodawski

New Jersey Meadowlands Commission (NJMC),
Meadowlands Environmental Research Institute (MERI)
1 De Korte Park Plaza, Lyndhurst, NJ 07071

Abstract

- The 32 members of the all-volunteer North Caldwell Fire Department are charged with the protection of 6,183 residents (Census Bureau) in a topographically diverse area of 3.016mi2 (7.811km2) consisting of residential, commercial and public properties with an aging infrastructure. This set of circumstances demands effective pre-incident plans that are geographically explicit. For example. the first members on scene must know beforehand where to best position apparatus to fight the fire effectively since spatial limitations are made even more limiting by the positions of other fire apparatus, ambulances, police cars and hose lines (Bernocco & Andrus, 2003, Over et al., 2010). Having advance information on lightweight building construction in buildings that fail quickly under fire also require effective pre-incident plans.

Objectives

- The main objectives are to:
  - Provide pre-incident planning information that is field accessible through an online mobile device. Information includes hydrant location, flow rating, static pressure, and residual pressure. Information. .High resolution maps (ArcGIS Mapping) and associated rules about positioning emergency equipment at specific problem locations.

Methodology & Data Source

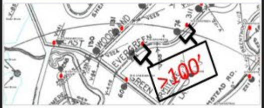
Hydrant locations:

- Maps were created using ArcMap 10 & 10.1 and with data obtained from NJDEP and NJDOT XY coordinates were collected for every hydrant location using a Garmin eTrex30 which is GPS, GLONASS, and WAAS enabled. (Accuracy <3m). The final map included the following layers: Hydrants, Roads, Imagery, PSE&G Transmission lines and Transco Pipeline.

Current Difficulties with Emergency Response

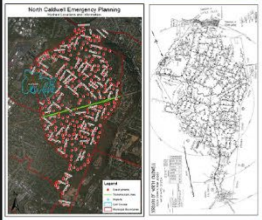
Outdated Fire Hydrant Map

An overlay of the older style map as compared to GPS collected hydrant locations.
On some streets the locations are incorrect by more than 100 feet.



New Vs. Old

New GIS based map is a much more powerful tool in emergency response and planning.

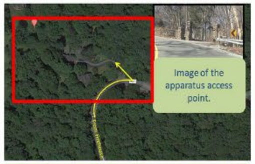


Winter Response

- A snow covered hydrant: when seconds count accurate information is vital to the protection of lives and property.
- Although residents are asked to clear hydrants, images like this are not at all uncommon.

Apparatus Access Difficulties

Narrow and Dead End Streets



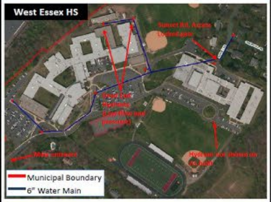
Above: North Caldwell is inundated with difficult apparatus access areas with sharp turns and steep slopes.
There are four homes within the red area of the map, which is only accessible from a >90º turn on a steep downgrade sided by stone walls.

Long and Narrow Driveways

Above: A house recessed from the street with a long narrow driveway

Missing Critical Infrastructure Information

Schools



Information needed: Building information, KNOX-BOX® location, right to know, special occupancy information, sprinkler control locations, alarm panel locations, and utilities shutoff points.

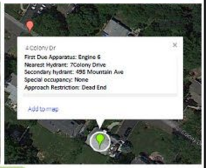
New Construction

Information needed: Trussing of floors and roof, sprinkler control locations, alarm panel locations, utilities shutoff points, and do not enter locations.

Proposed Solutions to Response Difficulties

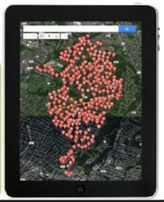
Maps Engine from Google Maps was chosen as the interface for accessing the data. Advantages are: cost and ease of use, file import features (Excel) and the "shareability" offered by Google .
Maps Engine is a cloud based system so edits can be made easily and instantly be shared with other users from both Android and iOS devices.

Field Accessibility and Mobile Interface



Above: Information about a hydrant rendered using Google Maps Engine. The hydrant is marked to within a few feet.
Above right: Information about an address rendered from Google Maps Engine. Nearest hydrant and a first due listing appear when the green marker icon is clicked.

Mobile Rendering of Hydrants



Hydrant information can be easily accessed from any web enabled device while in the field.
In Google Maps Engine marked waypoints and street addresses are made searchable.
Hydrant flow rating, residual pressure, nearest hydrant, secondary hydrant, first due apparatus, approach restriction, and special occupancy are examples of information that can be searched from the maps
Right: All of the hydrants in North Caldwell rendered in Google Maps Engine

Advanced Knowledge of Key Locations for Optimum Apparatus Positioning

Above: Pre-connect hose lines of 200' and 250' are important factors to consider when placing apparatus

Mobile Rendering of Apparatus Positioning Information

Above: Information about hose deployment displayed on the mobile interface .

New Construction in Town

Indicates floor and roof trusses

Lightweight Construction: Lightweight structures are singled out because they burn faster and lose structural integrity faster than the traditional construction counterparts. They burn 35-60% faster according to Izydorek et al., (2009). Also, **Gusset plates** fail more quickly than framing nails

Mobile Rendering of Truss Information

Above: Information about truss roofing in West Essex High School rendered from Google Maps Engine.

Acknowledgments and References

I would like to thank Joseph Abate of the North Caldwell Volunteer fire department for collecting hydrant waypoints.
Data was obtained from NJDEP, NJGIN, NJDOT, North Caldwell town engineer Frank Zichelli, and Fire Chief John D'Ascensio.

Bernocco, S., & Andrus, J. (2003). Safe and effective aerial ladder operations. Fire Engineering, 156(10), 91.

Izydorek, M.S., Zeeveld, P.A., Samuels, M.D., Smyser, J.P., 2009. Report on Structural Stability of Engineered Lumber in Fire Conditions. Underwriters Laboratories Inc., Northbrook, IL.

Over, M., Schilling, A., Neubauer, S., & Zipf, A. (2010). Generating web-based 3D City Models from OpenStreetMap: The current situation in Germany. Computers Environment and Urban Systems, 34, 496–507.

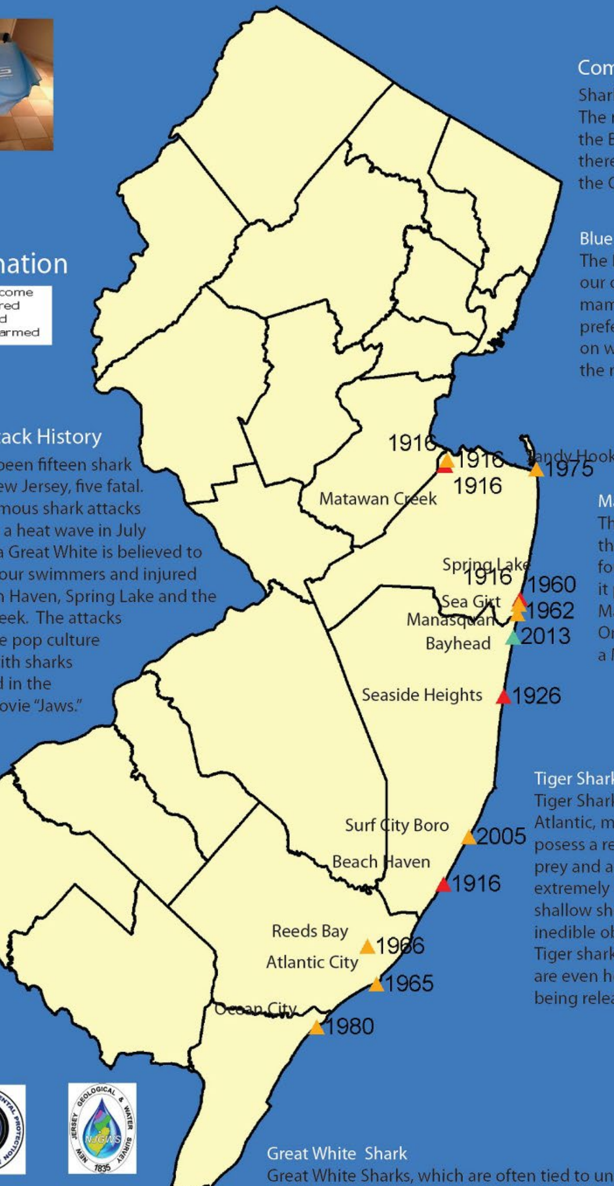
Shark Attacks In New Jersey

Explanation

Outcome
▲ Injured
▲ Killed
▲ Unharmed

Sharks Attack History

There have been fifteen shark attacks in New Jersey, five fatal. The most famous shark attacks were during a heat wave in July 1916 when a Great White is believed to have killed four swimmers and injured one in Beach Haven, Spring Lake and the Matawan Creek. The attacks triggered the pop culture obsession with sharks that resulted in the book and movie "Jaws."



Common Sharks in New Jersey Waters

Sharks can be found along the New Jersey coast. The most common shark species in our waters are the Blue Shark, Mako Shark, and Tiger Shark. Although there are other species of sharks in the Atlantic such as the Great White Shark, they are much rarer.

Blue Shark

The Blue Shark is the most common shark found off our coast. They prefer cool temperate waters. Larger mammals are not the common prey for Blues. They prefer to trail shrimp boats and whaling boats, feeding on waste and bait discards. However they are one of the most aggressive sharks when aggitated.

Mako Shark

There are two versions of the Mako, the longfin and the shortfin. The shortfin is the more common species found in our waters. It will often hunt inshore, making it prey to boat captains and charter fishing trips. The Mako ranks among the most dangerous of sharks. Only experienced sport fisherman should try landing a Mako.

Tiger Shark

Tiger Sharks prowl both the inshore and open waters of the Atlantic, making their way north as the waters warm. They posess a relentless drive to attack and eat any easily available prey and are not overly discriminating. This makes them extremely dangerous to swimmers, as they will prowl the shallow shore waters. TheTiger Shark will eat anything, even inedible objects such as nuts and bolts or license plates. Tiger sharks may try to ram or jump into a boat before they are even hooked in an attempt to get to the chum that is being released.

Great White Shark

Great White Sharks, which are often tied to unprovoked attacks, have been documented throughout the years in the offshore waters of New Jersey. They are considered uncommon. In the past few years, there has been an increase in Great Whites along the East Coast.

Ted Pallis, New Jersey Geological and Water Survey
New Jersey Department of Environmental Protection
April 2014

Hazard Mitigation Grant Program Map Application

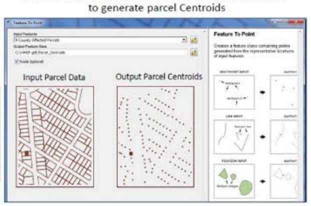
An online map application which generates maps helping New Jersey residents affected by Hurricane Sandy, obtain Hazard Mitigation Grant Program (HMGP) funds provided by the Federal Emergency Management Agency (FEMA) to elevate their homes to protect against future flooding and storms using ESRI tools and NJDEP's NJ-GeoWeb web based mapping application

DATA ANALYSIS

To facilitate the determination of the potential elevation need for properties located in FEMA flood zones and, therefore, eligible for elevation grants, several ArcGIS spatial tools were used. First, centroids for all parcels located in the 9 New Jersey Counties severely affected by Super Storm Sandy were created using the 'Feature to Point' tool within the "Features' toolset of the 'Data Management' tool box.   Importantly, the centroid attribute table contains all attribute data associated with the parcel layer itself, particularly the unique parcel identifier, the PAMS_PIN. Once the centroids were created, a 'Parcel Centroid Bare Earth Elevation' value was attached to each point based on a statewide digital elevation model, the 'LiDAR derived, 10 foot Digital Elevation Model, using the 'Extract Value to Point' tool within the 'Extraction' tool set of the 'Spatial Analyst' extension to ArcGIS. After running this tool, an attribute is added to the centroid feature class with the elevation value extracted from the elevation model at the location of each centroid.

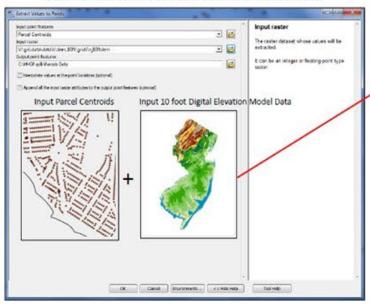
9 Affected New Jersey Counties

Using ESRI's Feature to Point - Data Management Tool to generate parcel Centroids



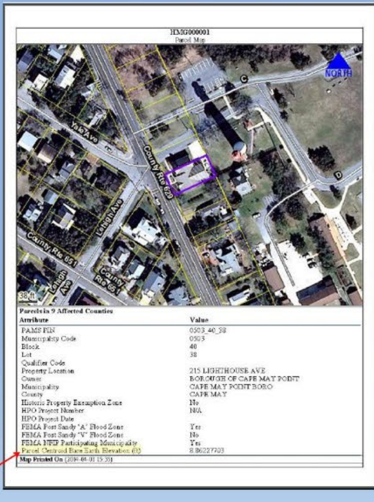
The Base Flood Elevation (BFE) is the elevation to which the first habitable floor of a structure needs to be raised to meet FEMA flood specifications. The BFE for each centroid was determined using the 'Spatial Join' tool within the 'Overlay' tool set of the 'Analysis Tools' tool box of ArcGIS. Similar to the "Extract Values to Point' tool used for the bare earth elevations, this tool adds an attribute to the centroid feature class with the BFE value associate with the target flood zone.

Using ESRI's Extract Values to Points tool within the Spatial Analyst Tools Toolbox to add the Parcel Centroid Bare Earth Elevation to the Parcels Data



Since the BFE is the actual elevation above mean sea level the structure needs to be, the amount a structure on any parcel may need to be raised to meet that elevation target is determined by subtracting the 'Parcel Centroid Bare Earth Elevation', the elevation above mean sea level at which the structure already sits, from the BFE elevation value. With both the BFE and the bare earth elevation values attached to the parcel centroids, the potential amount to raise a structure could be easily determined for each parcel centroid by subtracting the values in the elevation attribute from the values in the BFE attribute. For example, a structure in a parcel with the **centroid ground elevation** of 8 ft. located in a flood zone with a **BFE** of 11 ft., would need to be raised 3 ft. to reach the BFE minimum elevation. Normally, structure are actually required to be raised an additional amount above the BFE, usually 1 foot, to meet flood specifications. The final potential elevation needs at all centroid locations could then be easily determined by adding this value, known as the **freeboard value**, to the difference values. (11 – 8) + 1(freeboard value) = 4 feet

Map 1: Parcel Map
Showing Parcel details including Parcel Centroid Bare Earth Elevation



Parcels in 9 Affected Counties

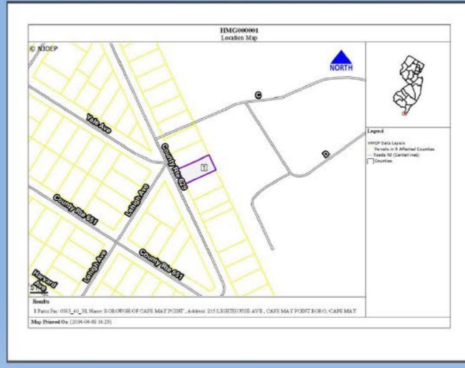
Attribute	Value
PAMS PIN	0503_40_38
Municipality Code	0503
Block	40
Lot	38
Qualifier Code	
Property Location	215 LIGHTHOUSE AVE
Owner	BOROUGH OF CAPE MAY POINT
Municipality	CAPE MAY POINT BORO
County	CAPE MAY
Historic Property Exemption Zone	No
HPO Project Number	N/A
HPO Project Date	
FEMA Post Sandy 'A' Flood Zone	Yes
FEMA Post Sandy 'V' Flood Zone	No
FEMA NFIP Participating Municipality	Yes
Parcel Centroid Bare Earth Elevation (ft)	8.86227703

Map Printed On (2014-04-01 15:35)

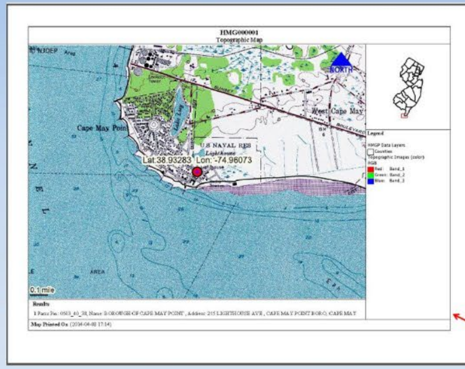
First grants to elevate Jersey Shore homes awarded
April 7, 2014 By Tracey Samuelson, www..newsworks.org

Nearly a year and a half after Superstorm Sandy, New Jersey has announced the first grants from a program that helps homeowners afford to elevate their homes.
Applications for New Jersey's Hazard Mitigation Grant Program closed in September, but the state made its first 26 awards just last week. The grants offer homeowners up to $30,000 toward the cost of lifting their home to meet state and federal standards. ...

Map 2: Location Map
Showing the selected Parcel with the surrounding streets and the Parcel address



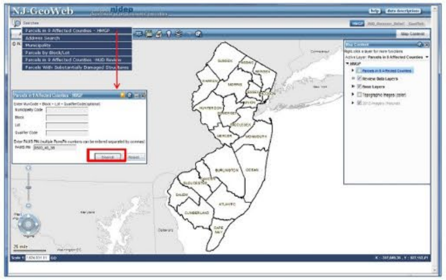
Map 3: Topographic Map
Showing the selected Parcel with the Topography and the Latitude and Longitude information for the Parcel



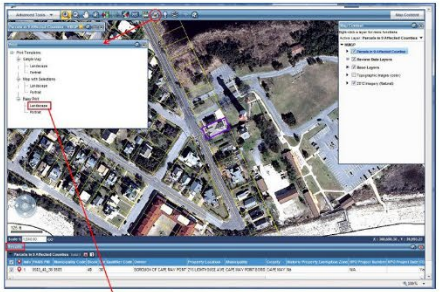
Created by: Seema Gopinathan & John Tyrawski, NJDEP, BGIS, Trenton, NJ on April 09, 2014
Data sources: NJDEP, NJOIT, FEMA
Software Used: ESRI ArcGIS Advanced, ROLTA's OnPoint™ and Adobe.

MAP CREATION

Launch the HMGP Profile within NJDEP's NJ-GeoWeb Application and locate the Parcel of Interest by entering either the Municipality , Block and Lot or the Property Assessment Management System (PAMS) Parcel Identification Number (PIN) ID



The map view zooms to the selected parcel, the 2012 Aerial Photography and the Parcels layer gets turned ON automatically and the details about the parcel are listed in the Results table below the map. Clicking on the Print Tool brings up a Print window that has Print templates listed. We used the Easy Print – Landscape template to generate the 3 HMGP maps.



Map view showing the selected parcel and the Topographic Imagery turned ON