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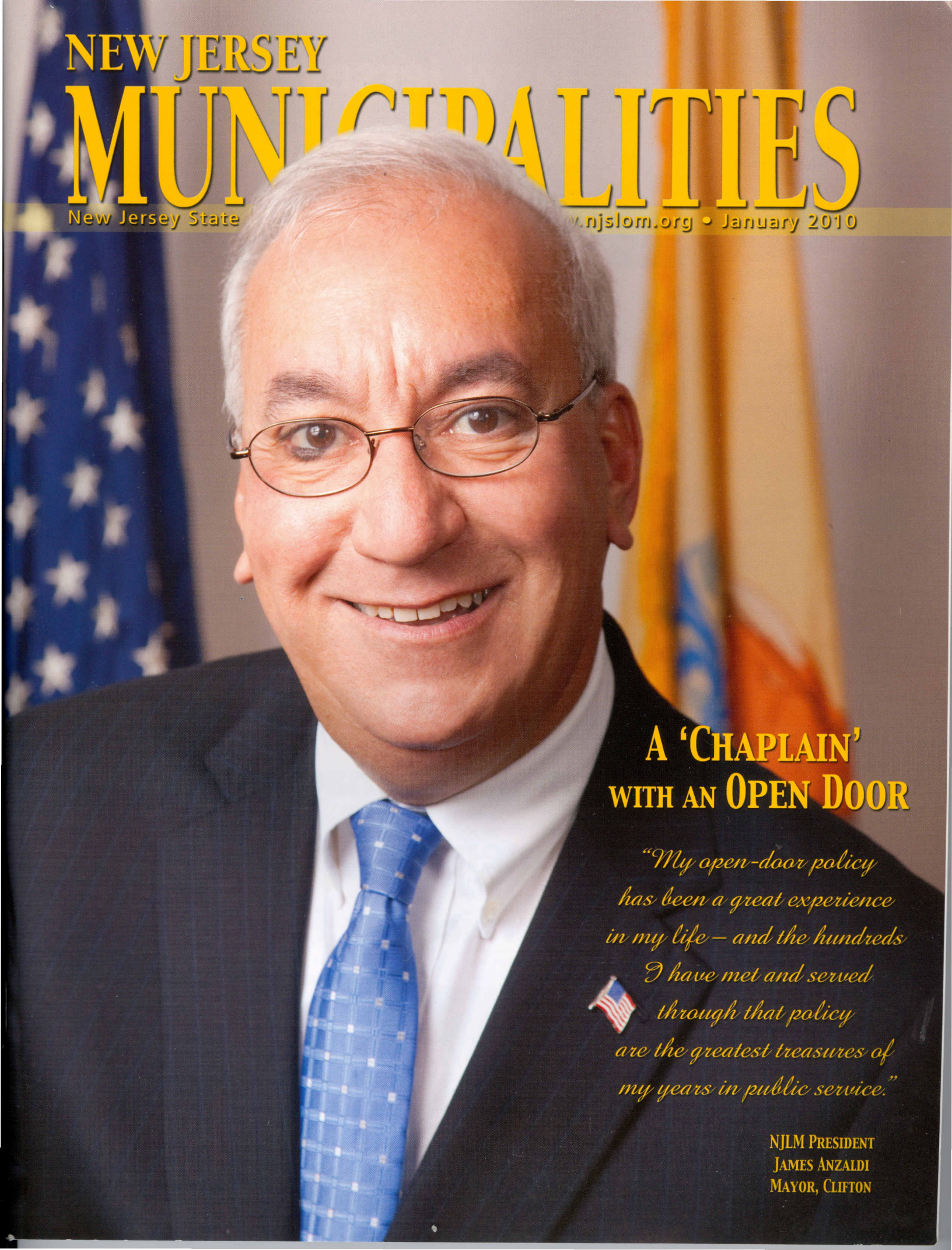


A 'Chaplain' with an Open Door

"My open-door policy has been a great experience in my life – and the hundreds I have met and served through that policy are the greatest treasures of my years in public service."

NJLM President
James Anzaldi
Mayor, Clifton

How the Army Corps is Protecting Our Coast

By JoAnne Castagna, Editor-Writer,
U.S. Corps of Army Engineers

The 2009 Atlantic Ocean Hurricane Season officially ended November 30, but the U.S. Army Corps of Engineers is working on safeguarding coastal states in the Northeast from storm events that can occur now and in the future.

The Army Corps is using Geographic Information System (GIS) to reduce storm related problems such as flooding, beach erosion, destroyed homes and businesses and loss of life.

These were the end results of Hurricane Isabel in 2003. Isabel's powerful winds and rough waves bombarded the Atlantic Coast and was the deadliest and costliest hurricane that year, taking the lives of 51 people and costing taxpayers $4.22 billion, according to 2009 figures.

Geographic Information Systems is a computer application and tool that enables operators to capture, store, analyze, and display localized information.

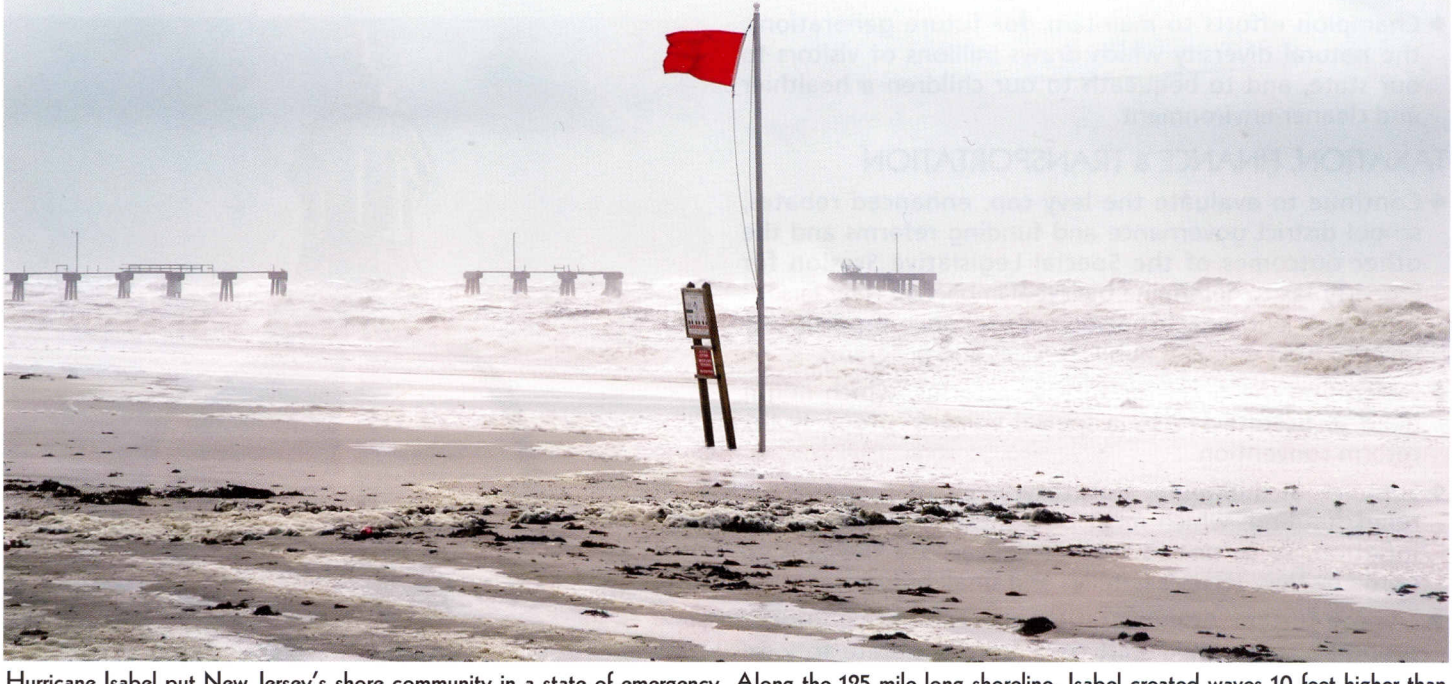
GIS takes information from various sources, such as aerial photographs and electronic data, and combines these layers of information in various ways to perform analysis.

The GIS produces products such as electronic maps, reports and charts that show the results. Individuals can use this analysis to perform many different missions and solve complex problems.

THE ARMY CORPS IS TAKING HURRICANE PREPAREDNESS INTO THE 21ST CENTURY WITH GIS TECHNOLOGY AND REDUCING THE DISASTROUS OUTCOMES THAT HAVE BEEN THE RESULT OF PAST STORMS, INCLUDING FLOODING, BEACH EROSION, DESTRUCTION OF HOMES AND BUSINESSES AND LOSS OF LIFE.

Reducing Beach Erosion The Philadelphia District is using GIS to protect New Jersey's shore from beach erosion.

Hurricane Isabel put New Jersey's shore community in a state of emergency. Along the 125 mile long shoreline, Isabel created waves 10 feet higher than normal, killing one surfer and causing flooding and severe beach erosion.



Hurricane Isabel put New Jersey's shore community in a state of emergency. Along the 125 mile long shoreline, Isabel created waves 10 feet higher than normal, killing one surfer and causing flooding and severe beach erosion.

To restore the New Jersey shore and help protect it from future storms requires replacing sand along the shoreline. Beach nourishment is a costly process that includes obtaining sand from the ocean off shore using a dredging process and placing it on the shore.

To minimize the cost and better manage the sand replenishment work, the district, in collaboration with the State of New Jersey, initiated a study to consolidate its beach nourishment efforts and prioritize sources of sand for beach nourishment projects. In addition, they have created a website using GIS tools, which is helping to make this study a success, said J. Bailey Smith, project manager, Philadelphia District, Army Corps.

"The goal of the New Jersey Alternative Long Term Nourishment Alternative Study is to address New Jersey's beach nourishment issues on a multi-project level rather than on a project-by-project basis," said Smith.

"Planning beach nourishment projects with a system-wide, regional mindset, including the use of GIS helps to reduce shore protection costs and resources utilized and minimize environmental impacts, as well as help to identify and critique alternative shore protection strategies for the New Jersey coast," said Smith.

To help the district share their beach nourishment information with each other as well as with stakeholders and the public, they developed the New Jersey Regional Sediment Management website.

The website is an interactive map with layers of various data including aerial photos, bathymetry, environmental and geotechnical data, to name a few—from the study area with a "base map" of the New Jersey coast as a backdrop. The link is https://w3.nap.usace.army.mil/NJALTN/default.aspx

A map of the study area was created using ArcMap, a computer mapping software application. ArcMap is used to organize the data to provide meaningful information about the project and it provides the ability to visualize the data.

Using ArcGIS Server technology, the map was published to the web, allowing anyone with access to an internet browser the ability to view the data. The interactive nature of the map helps engineers, scientists and stakeholders review, manage, and analyze the geographically referenced data from multiple perspectives. Using the website, allows them to see a base map which shows the New Jersey state boundaries and waterways. From there, they have the option to study additional map layers that show the district's available coastal data, including:

Surf Clams & Fishery Data: Project managers are using this information to identify where sea life resides in the ocean. This will determine where they can and can't dredge sand, so as not to harm any sea life.

Archaeological Data: Project managers are using this information to locate ship wrecks and other historical artifacts. This will help determine where sand can be dredged so as not to harm historically valuable sites and sea life habitats in the area.

Sediment Samples: Project managers are using this information to identify the properties of sand sediment, such as its size. They need to know this so they can match the size of the sand they dredge with what's needed to replenish the shore. Matching the sand size is a way of maintaining the shore's environment. This information is also showing them how sand is moving along the beaches and inlets on the New Jersey coast.

Bathymetry Data (ocean depth measurements): Project managers are using this information to identify areas of the ocean with potentially large quantities of sand to help prioritize dredging locations.

Borrow areas (dredging areas): Project managers are using this information to identify consistent, reliable sources of sand.

Additionally, the website provides features that help users better view the information they need. For example, users can adjust their map views by panning in and out, magnifying, and they can use a measuring tool that allows them to obtain the actual size of land and water features.

In the near future, the website will include data from additional Philadelphia district coastal projects, as it is collected. Historic data will also be converted as needed. The website is already proving to be a valuable resource for the district, their stakeholders, and the public.

Safely Evacuating Communities The Baltimore District is using GIS to safely evacuate communities around the Chesapeake Bay, in Maryland and Virginia.

One of Hurricane Isabel's worst victims was the Chesapeake Bay. Waves in the bay peeked at eight feet above normal, causing severe flooding that destroyed homes, vehicles, boats, businesses and even caused millions of gallons of raw sewage to run into the Bay.

If another Isabel were to hit today, the bay will be better prepared because of work being accomplished by the U.S. Army Corps of Engineers Baltimore District.

The district is creating Storm Surge Inundation Maps or flooding maps using GIS for the Federal Emergency Management Agency's (FEMA) National Hurricane Program (NHP).

Federal partners in the NHP include the Army Corps' Planning Center of Expertise for Coastal Storm Damage Reduction, based at the Army Corps' North Atlantic Division, and the National Oceanic and Atmospheric Administration.

Community leaders will be able to use these maps to find out what communities may be vulnerable to flooding and quickly determine how citizens can safely evacuate.

By using GIS Storm Surge Inundation Maps, community leaders can see which areas may be vulnerable to flooding during different categories of hurricanes. They will be able to do this by overlaying the Storm Surge Inundation Maps with population data and aerial photography.

Areas of concern include hospitals, fire and police stations, housing units, hotels, emergency shelters, bridges and roadways.

From this information they can create route maps showing the best roadways for citizens to evacuate and flooding maps to show citizens if their homes are in danger of flooding.

The Storm Surge Inundation Maps are a critical part of the National Hurricane Program that has a mission to help protect communities and residents from hurricane hazards through various projects and activities. This includes conducting assessments and providing tools and technical assistance to state and local agencies in developing hurricane evacuation plans.

According to Jared Scott, a GIS Analyst with the Army Corps' Baltimore District, the Storm Surge Inundation maps are bringing hurricane evacuation plans into the 21st century.

"In the past, these maps were crafted in multiple ways, including manually calculating and drawing data by hand and updating these maps took months or even years," said Scott. "With GIS, these maps can be updated instantly with new information and provide quick results, which is important in emergency situations."

The Baltimore District's GIS staff completed worst case scenario storm surge inundation maps for the State of Maryland (Chesapeake Western Shore), District of Columbia and Northern Virginia (counties located along the Potomac River). These maps have proven to be extremely useful for preparedness for a hurricane or other natural disasters.

The Army Corps is taking hurricane preparedness into the 21st Century with GIS technology and reducing the disastrous outcomes that have been the result of past storms, including flooding, beach erosion, destruction of homes and businesses and loss of life. ▲

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