



Protecting New Jersey's Environment:
A Record of Accomplishment
2010-2018

New Jersey Department of Environmental Protection
Bob Martin, Commissioner

MESSAGE FROM THE COMMISSIONER

Dear Friends and Colleagues,

As my time as Commissioner of the New Jersey Department of Environmental Protection (DEP) comes to an end, I find myself reflecting on how this agency has changed. When I arrived at DEP in January 2010, I did not know what to expect. Of course, I had my own preconceptions of DEP, but what I found was an agency with lots of potential and a passionate, well-educated staff that was committed to improving New Jersey's environment.

Under Governor Christie's support and direction, we have leveraged our resources over the past eight years to make DEP a more effective—and more efficient—agency. With our staff, stakeholders and the strong support of Governor Christie, we identified new, innovative ways to change DEP for the better. With so many unique and diverse interests in our state, this was hardly an easy task. Yet, I have repeatedly seen DEP staff and our partners rise to the occasion to create workable solutions that both protected and preserved our environment and encouraged economic growth. During my time as Commissioner, each of our programs has undergone major changes, making DEP more productive. Even with our eye on efficiency, DEP has never lost sight of its core mission to protect the air, water, land and natural and historic resources of New Jersey. During the past eight years, DEP never relaxed a single environmental standard. In fact, we have both reformed needlessly complex regulations and rules while also adding new standards to advance our ongoing mission of protecting New Jersey's environment. We have transformed DEP and New Jersey's environment for the better.

As you look through this booklet I hope you are as impressed as I am with all the work DEP has done to protect public health and the environment. Moreover, I hope that the next administration continues to advance the work that we have done at DEP during the past eight years. I have every hope that DEP will continue to evolve to meet the needs of our state's environment and its residents just as the Christie Administration has done.

I want to thank Governor Christie for his leadership over the past eight years and for his commitment to protecting the environment, economy and quality of life for all New Jerseyans. I am immensely grateful to the Governor for allowing me to be part of this chapter of DEP's history and to my staff who brought these accomplishments to fruition.

Sincerely,



Bob Martin
Commissioner



EXECUTIVE SUMMARY

As the Christie Administration nears an end, it is worth looking back to see how much DEP has changed. Over the past eight years, we have fulfilled our core mission to protect New Jersey's air, water, land and natural and historic resources and improved each of these resources in significant, meaningful ways. Under Commissioner Martin's leadership and with constant support from Governor Christie, this agency is more effective and more efficient.

To begin this transformation, it was critical for us at DEP to realign our priorities and change our culture by developing a foundation for customer service. To achieve this goal, all DEP employees—including Commissioner Martin—participated in customer service training. This was done to ensure that our constituents receive efficient service, prompt answers to their questions, and to help promote compliance with New Jersey's environmental regulations.

DEP also made it a priority to reinvigorate three key offices: the Office of Local Government Assistance, the Office of Permit Coordination and Environmental Review and the Office of Alternative Dispute Resolution.

Through DEP's Office of Local Government Assistance, DEP has built much stronger relationships with our local officials to address our shared goals of improving New Jersey's environment. With so much of our work occurring at the local level—including everything from permitting to site remediation—it only made sense to find ways to work together.

Additionally, we revitalized the Office of Permit Coordination and Environmental Review to help

individuals, towns and businesses with complex projects to navigate the permitting process and identify potential flaws early on. This office also helps create consistency, predictability and ensures that business is conducted in a way that protects the environment.

Lastly, we enhanced the Office of Dispute Resolution. This office connects DEP programs with the regulated community to resolve legal issues before they go to an administrative law judge or the courts. This reduces costly legal and court action, saving time and money.

Most important, we reformed many of our rules and regulations so that they made sense. While streamlining regulations, we were always committed to protecting the environment and have never lowered any environmental standards. We made all our decisions based on science, facts and data.

Additionally, DEP has focused on compliance to avoid violations of regulations in the first place. Through education and outreach, we have worked with the regulated community to promote compliance. However, we have also taken strong enforcement action if needed.

We also leveraged and deployed new technology to help us reach the public. In 2014, we launched the "Don't Waste Our Open Space" campaign. For this campaign, DEP created a free, web-based application that allows people to report instances of illegal dumping to us from their smart phones. This helps us cleanup debris quicker and catch the dumpers who are responsible.

Furthermore, in 2013, we developed our first ever online camping reservation system. This system has been incredibly popular and increased camping revenue by about 10%.

DEP also created a comprehensive data management system to compile data collected by our Coastal Monitoring Program. This data is published on an interactive website to give the public the most up-to-date water quality information and status of our recreational waters. Additionally, DEP has been deploying a Slocum Glider during the summer months to give a 3-D profile of New Jersey's coastal waters.

We also made it easier to apply for and receive permits. Today, there are more than 170 permits and applications that can be completed online, saving time and speeding up DEP's approval process.

Our efforts to communicate with the public have also undergone a major transformation. One of our most significant changes was to create Facebook pages for our program areas. Here our programs can give the public simple and valuable information about events and other environmental updates, including historical reenactments and air quality updates.

But our communications efforts did not stop there. In 2016, we created a podcast called "Discover DEP" to give listeners the opportunity to learn more about DEP in a casual setting. These conversations give the public the opportunity to learn about some of DEP's most exciting activities on their own time. And in Summer 2017, DEP launched a YouTube page



You can take a drone tour of High Point State Park on our YouTube page! <https://www.youtube.com/watch?v=jtrM2UL7qug>

also called “Discover DEP” which includes aerial drone tours of several of our state parks and informational videos about some of our most innovative programs.

We also made many impressive efforts to give back to our local communities, particularly in Trenton. Over the course of this administration, we have supported many service-based initiatives to educate Trentonians about New Jersey’s environment and provide support to those in need.

While we have committed to making meaningful changes to our agency and our culture, DEP is ultimately here to protect the air, water, land, and natural and historic resources of New Jersey. Over the past eight years, we have followed data and science-driven trends to improve each of these resources tremendously.

Today, our air is cleaner than ever before. In cooperation with the Board of Public Utilities, DEP updated New Jersey’s Energy Master Plan in 2011 and 2016 using an innovative portfolio approach

to reduce emissions from our energy sector. We also made sure that New Jersey power plants meet the toughest emissions controls.

DEP has also been responsible for taking aggressive measures to address air transport—dirty air brought to New Jersey from other states by prevailing winds. We have been actively pursuing polluters to control their emissions and achieved some amazing results. New Jersey is the only state to have successfully filed a 126(b) Petition with the United States Environmental Protection Agency (U.S. EPA) to compel the Portland power plant in Pennsylvania to lower its emissions. This is a huge win for the people of New Jersey.

We made similar advancements to our transportation sector. Through programs like “It Pays to Plug In,” which provides grant money for electric car charging stations, and the Mandatory Diesel Retrofit program, which retrofitted older diesel vehicles with equipment to decrease their emissions, DEP continued to reduce New Jersey’s emissions. And our hard work has paid off—New Jersey’s power sector has some of the lowest emissions rates in the country for sulfur dioxide, nitrous oxides and carbon ranking as the 45th, 45th and 40th lowest in the nation, respectively.

We also made a sizeable investment in solar energy. Today, New Jersey is 5th in the nation for installed solar capacity and 74% of our renewable electricity is supplied by solar energy—far more than most of the nation.

Like our air, New Jersey’s water quality is also better than ever because of DEP’s work.

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With regard to our recreational waters, our actions speak for themselves—our beaches were open 99.9% of the time this past year, we have restored waterbodies such as Wreck Pond, Shark River and the Shrewsbury River, and have taken a very active role in protecting Barnegat Bay.

Barnegat Bay has a special importance to the Christie Administration. Since the first day of this administration, Governor Christie always made Barnegat Bay a top priority. Governor Christie cemented his commitment to the Bay by charging DEP with implementing the Barnegat Bay 10-Point Action Plan. This plan has been responsible for closing key data gaps needed to help assess the environmental health of the Bay. Now that the first phase of this plan has been completed, DEP is moving that science into action to restore, protect and enhance this vitally important environmental treasure.

Our drinking water is also better protected. Recently, DEP began the regulatory process to establish Maximum Contaminant Levels for Perfluorooctanoic Acid (PFOA), Perfluorononanoic Acid (PFNA) and 1,2,3 Trichloropropane (1,2,3 TCP). New Jersey is one of the first states to recommend limits for these compounds in drinking water.

We are also doing a much better job of protecting our drinking water from lead contamination. In 2016, DEP drafted New Jersey's Lead Work Plan to enhance our compliance with the federal Lead and Copper Rule. We also formed a dedicated "Lead Team" which has developed technical and guidance documents as well as provided training to the public about how to deal with lead.

This administration is also the first to address the historic problem of Combined Sewer Overflows, or CSOs. During heavy rain, combined sewer systems, which carry stormwater and sanitary water in one pipe, can be rerouted to nearby water bodies without treatment. This can cause many public health issues. In 2015, DEP issued the final permits to address all of New Jersey's CSOs. These permits will ultimately eliminate all 210 CSO outfalls, reduce flooding, provide opportunities

for green infrastructure, and enhance asset management and operations and maintenance.

DEP has also worked with other state agencies to improve our response to Harmful Algal Blooms (HABs). In cooperation with the Department of Health and the Department of Agriculture, we created a new strategy to address HABs in freshwater bodies across the state to protect the public from these blooms and their toxins.



Governor Christie signing bills to protect the health of Barnegat Bay in Waretown, 2011.

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Another accomplishment DEP made for New Jersey's waterways was to begin the process to remediate and restore the lower eight miles of the historically contaminated Passaic River. DEP pursued the River's polluters in court to make them pay for past costs and to protect the people of New Jersey from paying for any other costs associated with the cleanup.

DEP also worked with the U.S. EPA to develop the Focused Feasibility Study—which contains New Jersey's preferred remedy for the lower eight miles of the river. As part of this study, DEP required that the contaminated river sediment be removed and treated outside of New Jersey and that the remaining sediment be capped, which is the most protective measure available. Now that the Feasibility Study is complete, the final remedy for the \$1.4 billion cleanup can be designed.

Our cleanup efforts on land have been equally impressive. Through the Site Remediation Reform Act and the Licensed Site Remediation Professional Program, the Christie Administration has made a lasting impact on how remediations are conducted in New Jersey. The program has been incredibly successful with over 26,000 cases closed. Also, the number of contaminated sites in New Jersey has decreased from about 20,000 at the start of this administration to about 14,000, even as new sites are identified. Today more sites are actively being worked on than ever before.

Our land use policies and procedures have also undergone major transformations. Over the past eight years, we have seen our land use practices undergo a major regulatory reform and

successfully cut out the “red tape” from our policies and procedures. To this effect, DEP has held many stakeholder meetings with the public to address key land use issues. Because of these stakeholder sessions, we made more effective procedural and regulatory changes. For instance, DEP has made 19 land use permits available for submission online and standardized the language for more of our permits so that they are easier to understand.

We also made key improvements to the Flood Hazard Area Control Act Rules to enhance the procedures for building in flood hazard areas. DEP also helped coastal communities by changing our land use policies to make it easier to construct living shorelines and providing Coastal Vulnerability Assessments to local communities, helping them plan for future flooding events.



DEP employees working at the seedling nursery.

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Our efforts to remediate unregulated heating oil tanks have been an overwhelming success as well. Under this administration, responsible parties have stepped up to close these tanks, very few of which were remediated through grants from the Underground Storage Fund, representing a huge savings to the state.

DEP has also been responsible for closing and remediating several legacy landfills. These clean properties have been transformed into open space while others are now candidates for redevelopment.

One of our most successful landfill closures and redevelopments was led by DEP's Community Collaborative Initiative (CCI) at the former Harrison Avenue Landfill in Camden. Through CCI, DEP leveraged important private and public partnerships to complete the nearly \$26 million remediation at this site to pave the way for the 120,000-foot Kroc Development Center that was built in 2014.

The remaining 62 acres of the former Harrison Avenue Landfill are scheduled to be remediated and will eventually be transformed into a public park and greenway.

Improvements to our natural and historic resources have also been exceptional. Our natural and historic resources represent more than a million acres of land and waterways and generate billions of dollars for the state annually.

To protect our forests, DEP partnered with the U.S. Forest Service to create the Forest Inventory and Analysis Program to implement effective monitoring of all of New Jersey's

forests. Our Forest Fire Service has also been incredibly active during this administration—responding to over 1,400 forest fires—and has used a new fire detection camera system and aircraft patrols to diligently monitor for fires.

Our Forest Service also distributed nearly 500,000 free tree seedlings to New Jersey residents who lost trees during Superstorm Sandy.

Our historic sites are also better preserved. DEP has overseen many historic preservation projects and awarded nearly \$13.1 million to assess and repair damage to historic places as a result of Superstorm Sandy.

Our Green Acres program has also achieved several impressive accomplishments. During this administration, we added nearly 48,000 acres of land to contribute to the nearly 1.5 million acres of open space across New Jersey. This means that nearly a third of all the land in New Jersey is preserved from future development. We have also provided millions of dollars to 31 cities to support local recreation and open space initiatives. DEP is especially proud to have provided \$91 million for urban parks development and preservation.

Our state parks have also undergone an impressive effort to become more efficient and more profitable. In 2011, DEP introduced the Sustainable Parks Initiative (SPI). The SPI's main goal was to make our parks self-sustaining and to be less dependent on the state's General Fund. The first part of the initiative was to seek new revenue sources. Examples of these efforts include increasing amenities at many of our parks, such as a tiki

bar at Island Beach State Park, and expanding marina rental incomes.

The second part of the SPI called on DEP to improve its internal processes. Some of the improvements included revising lease and concession rates to reflect fair market prices and updating and streamlining the process for qualified non-profit agencies to become Friends Organizations.

Also, all of our state parks have successfully recovered from Superstorm Sandy and we have completed the \$19.3 million restoration of the Liberty State Park terminal. DEP also has several Major Capital improvements underway to improve some of our other state parks.

In fact, our efforts within our parks have been so successful that we were able to increase the size of our park system in 2016 with the addition of Tall Pines State Park, which is the first ever state park in Gloucester County.

Fish and wildlife policies have also been incredibly successful. Over the past eight years, DEP's Comprehensive Black Bear Management Policy has been extremely effective at managing the black bear population in New Jersey. DEP updated this policy to emphasize the need for a sustainable bear population in order to decrease human and bear encounters.

We have also continued to oversee an impressive restoration of bald eagles and are home to 150 nesting pairs and protected many other species, such as ospreys, red knots and horseshoe crabs.

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Earlier this year, New Jersey won a huge victory on the federal level to protect our recreational summer flounder industry—which generates \$1.5 billion to our economy and supports 20,000 jobs. DEP’s science and data-driven appeal of an overly restrictive limit on summer flounder was granted by the United States Secretary of Commerce. This was the first time a decision by the multi-state body that sets fishing limits was overturned.

Education has always been a cornerstone of all of our fish and wildlife policies and we have made major efforts to expand our educational outreach. Through programs like the NJ WILD Outdoor Expo and the “Hooked on Fishing-Not on Drugs” program, DEP can reach people of all ages and backgrounds to give them more opportunities to enjoy our natural resources.

We also distributed 5,500 DVDs and classroom kits designed to educate school children about how New Jersey residents can coexist with bears.

We have made similarly impressive efforts to educate the public about fire prevention and have participated in many national and state public education programs, such as Firewise Communities, Fire Adapted Communities, as well as Ready Set Go and Sustainable New Jersey, so that New Jersey residents are better informed about how to prevent fires. Because of these efforts, our Forest Fire Service is regarded as one of the top programs in the nation.

As an offshoot of our popular “Don’t Waste Our Open Space” campaign, DEP launched the “Don’t Let Our Parks Go to Waste” public

education campaign to help people report instances of illegal dumping in our parks. With the help of an increased number of WiFi hotspots, this app has helped debris be picked up quicker and helped our State Park Police catch the dumpers.

Finally, we cannot possibly forget Superstorm Sandy. As devastating, complex and intense as this storm was, this event was also perhaps one of our finest hours.

In the aftermath of the storm, we dealt with the second worst oil spill in New Jersey’s history. Two tanks at the Motiva Sewaren terminal facility ruptured, spilling 378,000 gallons of ultra-low-sulfur diesel fuel into the Arthur Kill, Smith Creek and Woodbridge Creek. DEP worked with the U.S. Coast Guard, and contractors were immediately sent out to put booms in place and began vacuuming oil.

One of the most significant challenges DEP faced was dealing with the nearly 100 wastewater systems, serving about 3.5 million people in all 21 counties, that sustained damage or were running on backup generators after the storm. The Passaic Valley Sewerage Commission, which serves approximately 1.4 million people, experienced a complete shutdown. As a result, more than 500 million gallons per day of untreated wastewater was discharged for several days into nearby waterways. DEP worked with the Passaic Valley Sewerage Commission, the U.S. Army Corps of Engineers and contractors to ensure that necessary equipment was available and that repairs were made. Additionally, about 70 drinking water systems had some level of damage, and all were up and running on backup generators.

Immediately after the storm, DEP coordinated one of the largest and most complex disaster cleanups in the nation’s history.

The damage New Jersey sustained due to this storm was catastrophic. More than 365,000 homes were damaged or destroyed. After the storm, DEP coordinated with towns and contractors for the removal of more than 6.2 million cubic yards of building materials and household and vegetative debris while also coordinating the removal of more than 2 million cubic yards of sand from streets, parking lots and other property in the nine affected counties.

In addition, we coordinated the removal of 103,000 cubic yards of debris from New Jersey waterways. This was one of the largest undertakings of its kind in the nation. More than 371,000 cubic yards of sediment were removed from Barnegat Bay, other waterways and marinas up and down the New Jersey coast. We were also dealing with massive infrastructure damage in addition to tidal, coastal flooding and beach damage.

After the storm, Governor Christie laid out a vision for a long-term plan for resiliency across New Jersey post-Sandy that included:

- Rebuilding and elevating homes
- Providing a full coastal protection system
- Protecting energy infrastructure
- Rebuilding water and wastewater infrastructure
- Buying of homes in flood-prone areas

DEP had the lead in carrying out the Governor’s vision of providing a full coastal protection

system along our 127-mile long Atlantic coast. We have coordinated with the U.S. Army Corps of Engineers, federal, state, county and local officials as well as thousands of private property owners along the Jersey Shore to construct this comprehensive shore protection system. This system will provide a new level of protection from future storms along our entire Atlantic coastline. It represents an investment of more than \$1 billion, funded largely in part by the federal government as well as New Jersey.

This shore protection system includes everything from the construction of a steel sheet piling wall in Brick and Mantoloking, to the repair of a sea wall in Sea Bright, to five major projects to create new engineered beaches and dunes in dozens of coastal communities. The U.S. Army Corps of Engineers is also designing and constructing comprehensive flood control projects in Union Beach and Port Monmouth, two of the communities hardest hit by Superstorm Sandy.

The DEP-led Blue Acres Program has been a huge success. It targeted more than 1,200 properties in flood-prone areas. So far, offers have been made to 893 homeowners with closings completed on 611 properties.

Additionally, DEP is leading two major flood control projects along the Hudson River and the Meadowlands. Using \$380 million awarded by the U.S. Department of Housing and Urban Development, these two “Rebuild by Design” projects will provide flood protection to Hoboken, Jersey City and Weehawken along the Hudson River Waterfront and to the

Meadowlands area near Little Ferry, Teterboro, Moonachie and Carlstadt.

While Sandy was a defining moment in this administration and for DEP, we are not defined by this event alone. Despite the unforeseen challenges that came our way, DEP has never veered off its original agenda: protecting the air, land, water and natural and historic resources of New Jersey. The Christie Administration is proud to leave all of New Jersey’s environmental treasures cleaner and in better condition than when we arrived.

1



Transforming Government

- ❖ **Customer service focus across DEP**
- ❖ **Enhanced three key offices: Office of Local Government Assistance, Office of Permit Coordination and Environmental Review and the Office of Alternative Dispute Resolution**
- ❖ **Improved our rules and regulations eliminating “Red Tape”**
- ❖ **Implemented new technology across our program areas**
- ❖ **Made our communications more accessible**
- ❖ **Decisions based on science, facts and data**

Before we can possibly begin to understand how DEP has changed, we must look back at what our goals originally were for this transformation. At the beginning of this administration, we saw that DEP needed to be a more efficient, customer service driven agency to help us satisfy our core mission to protect the air, water, land and natural and historic resources of New Jersey.

But how could we do this?

First, we began to change our culture by making customer service the cornerstone of our agency. We did so by requiring every DEP employee—including the Commissioner—to attend a series of customer service training seminars that taught our staff how to engage with the public, perform their jobs and make sure that people feel comfortable contacting DEP with any environmental issues or concerns they may have.

Second, we underwent a major regulatory reform and “cut the red tape” from as many of our processes as possible.

Third, after addressing DEP’s internal culture, we enhanced three key offices to improve our relationship with many different stakeholder groups. Doing so allowed us to create critical dialogs and resolve many issues between DEP and other government or private entities.

Fourth, to guarantee that our vision of an approachable and comprehensive DEP endures, we instituted many new regulatory reforms to eliminate duplicative or unnecessary processes.

Fifth, we leveraged new technology to make necessary improvements to many DEP program

areas, improving the way we engage with the public and how we communicate all our exciting programs to them.

Lastly, we were able to make all of these decisions using the best science, facts and data available.

Enhancing Key Offices: In the past, DEP missed opportunities to have meaningful discourse with our regulated communities. Problematically, this can lead to misunderstandings, misinterpretations and other disputes over DEP’s procedures. Rather than allow this to continue, DEP revamped the following offices to facilitate these necessary dialogs:

Office of Local Government Assistance

Our Office of Local Government Assistance is charged with engaging local communities and acting as a liaison between them and DEP’s various program areas. This office creates a single point that allows local governments to express their needs to DEP and allows us to offer our support to those communities when needed. For instance, before severe storms this office will reach out to communities likely to be effected by inclement weather to provide them resources to enhance their preparedness and see if these communities may have any specific requests to ask of DEP.

Office of Permit Coordination and Environmental Review

Permitting projects, especially large ones, can be challenging as they may need many different federal, state and local permits to be in compliance with all appropriate laws and regulations. DEP has helped persons with these large-scale permitting projects through our

Office of Permit Coordination and Environmental Review. This office works on these permitting projects, often from their inception, to create a “One Stop” process that ensures that all necessary permits are acquired in a timely manner. Since 2011, we have seen a steady increase in the number of projects that are processed through the Office of Permit Coordination and Environmental Review, nearly quadrupling the amount of newly assigned projects (**Figures 1, 2 and 3**).

Figure 1

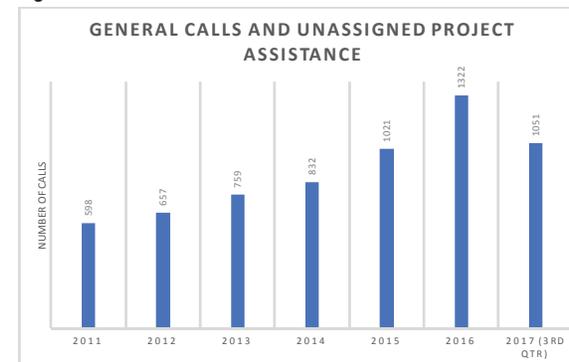


Figure 2

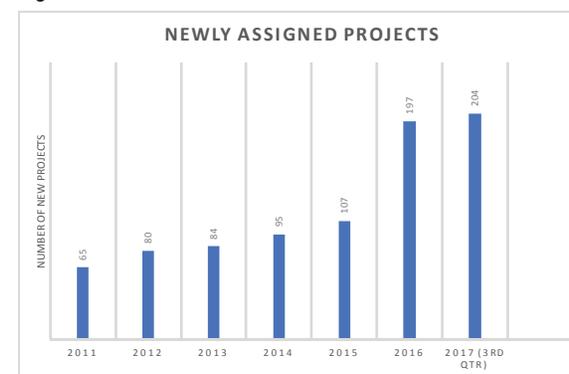
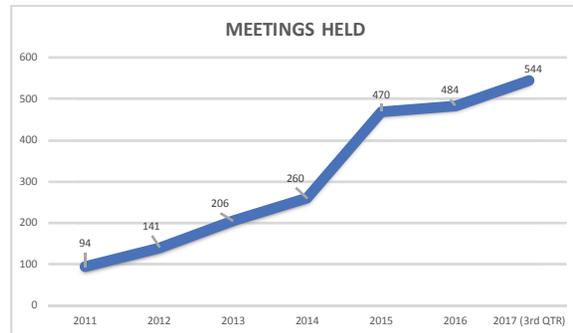


Figure 3



Office of Dispute Resolution

DEP also established the Office of Dispute Resolution to provide yet another resource to New Jersey stakeholders. This office serves as a forum for DEP and regulated entities to discuss and resolve disagreements without entering the court system. This office allows DEP and complainants to avoid the intense time commitments and steep fees that litigation often entails. But perhaps more importantly, this office has obtained substantial results. The Office of Dispute Resolution handled over 380 cases during the past eight years with a success rate of more than 80%. This past year has been especially impressive; over 90% of cases brought to this office were resolved.

Regulatory Reform: Reforming DEP’s regulations has been a keystone achievement for the Christie Administration during the past eight years. Although New Jersey’s environmental laws all serve a purpose, as times change so do our stakeholders’. This made some of our older rules ineffective, and sometimes unworkable.

During this administration, we made many key regulatory reforms; from revising old rules to

adopting new ones. Today our rules are more effective and more understandable than they have ever been before.

Revising the Water Quality Management Planning Rules: DEP revised the previously unworkable Water Quality Management Planning (WQMP) rules. We worked with county planning departments to identify and protect environmentally sensitive lands—primarily wetlands and threatened and endangered species habitats—that were previously listed as appropriate for sewers. This means that some of our most sensitive areas could have been used for high-density development. Because of our efforts, more than 200,000 acres of sensitive lands were removed from sewer service areas, ensuring that they are protected from future development.

Adopting the Waiver Rule: The Waiver Rule establishes limited circumstances under which DEP may waive strict compliance with some of our environmental regulations. The Waiver Rule is especially effective because it makes compliance more attainable for stakeholders without diminishing the importance of state and federal environmental laws. It has also paved the way for more cooperative relationships between DEP and permit seekers.

Adopting the Shellfish Growing Water Classification Rule: In 2016, the Shellfish Growing Water Classification rule was adopted. This rule continues to establish the procedures for the classification of shellfish waters and the boundaries of those waters. Among the changes to the rule was the inclusion of a new subchapter that outlines the requirements for shellfish

DID YOU KNOW?

New Jersey collects 12,000 samples from 1,700 monitoring stations across the state to ensure that shellfish in New Jersey are healthy.

DID YOU KNOW?

Shellfish represent a \$700 million industry in New Jersey.

license holders for the harvest, handling, and transport of shellfish. This ensures that the harvest is safe for human consumption. In addition, to conform with national standards, the rule added, deleted, and modified permits for various growing and harvesting activities, including shellfish aquaculture.

Adopting New Regulations for the Use of Nuclear Medicine:

In March 2016, DEP adopted new regulations for nuclear medicine to reduce the regulatory burden on medical facilities. The new “Fusion Imaging Computerized Tomography (CT) Technology” category allows a nuclear medicine technologist—who has obtained additional, appropriate education and experience—to perform the CT portion of a fusion image procedure. Fusion imaging combines imaging data from nuclear medicine and an x-ray into a

WHAT IS NUCLEAR MEDICINE?

Nuclear medicine is a medical specialty that uses radioactive tracers to assess bodily functions as well as diagnose and treat disease.¹

single, superimposed image that is used to develop a patient's cancer treatment plan. Prior to this rule, two different technologists were needed to perform the procedure which resulted in added costs and wait times for patients undergoing this type of imaging. Under the new rule, only one technologist is needed thereby saving both time and money.

Leveraging New Technology: New technology is yet another tool we have used at DEP to improve our relationship with the public. As the public has become more immersed in technology, DEP followed suit to connect with our stakeholders in more meaningful ways. Recent technology has not only helped revitalize DEP's public presence but it has also given our stakeholders greater opportunities to help our environment.

One area where technology has been critical to us was in making our regulations more accessible. Our agency is largely dependent on the public understanding and engaging with our rules, yet, many times it can be difficult to give them the tools they need to do so. Technology provided an the opportunity to make our rules and regulations more accessible and engaging. A perfect example of this is the "Don't Waste Our Open Space" campaign which we launched in 2014.

This campaign coordinates the efforts of many different DEP programs, including Fish and Wildlife, Compliance and Enforcement, and the State Park Police, to shed light on the issue of illegal dumping by having citizens participate in the process. DEP created a free web-based application that allows people to report



WHAT IS THE COMPLIANCE AND ENFORCEMENT GROUP?

The Compliance and Enforcement Group is charged with enforcing New Jersey's environmental law, rules and regulations. This group also works to deter violations of those laws by engaging with and educating the regulated community.

instances of illegal dumping quickly and easily from their smart phones. This has helped us clean up debris more quickly and to catch the dumpers who are responsible.

Through outreach and education, we launched this app with enormous success, attracting national and international interest.

In addition to citizen involvement, motion sensor cameras have been strategically placed throughout state owned land to support the work of the State Park Police and Conservation Officers. Thus far, State Park Police have arrested 102 people and charged over 150 people with dumping on state property. Most of the individuals charged were issued monetary penalties, posted online as offenders, and charged site cleanup fees. This has resulted in over \$1 million in fines to violators.



But more importantly, because of these two initiatives, over 1,200 cubic yards of illegally disposed debris was removed—which is enough to fill over one hundred dump trucks! Moving forward both of these strategies can be used as a training modules for other local and county governments to develop their own illegal dumping programs to aid in the deterrence of illegal dumping across New Jersey.

Increasing Our Online Presence: We have also made significant advancement to DEP’s online presence across most of our program areas.

Through our parks system, we developed DEP’s first online camping reservation system in 2013. This system allows visitors to search all available campsites and cabins across our state and has been highly successful, increasing camping revenue by about 10%.

We have also put a large portion of our parks’ educational material online.



DEP’s Slocum Glider.

In our Water Resources Management Program, DEP created a comprehensive data management system to compile the state’s Cooperative Coastal Monitoring Program. Through this program, the public is made aware of potential water quality health issues in the form of beach advisories and closings. This information is made available in real-time and results are entered into an interactive website which can be immediately viewable to the public. We also began annual summer deployments of a Slocum Glider in the ocean to spatially measure temperature, salinity, chlorophyll, and dissolved oxygen. The glider travels from Sandy Hook to Cape May and gives a 3-D profile of conditions in New Jersey’s coastal waters to support algal bloom monitoring and oxygen health assessment.

We have also made it a point to put many of our permits, across all our program areas, online. As of August 2017, there are 172 online services for permits and a dozen more are scheduled to be added by the end of the year.

Communications: One challenge DEP has faced throughout the years is how to connect with New Jerseyans. Often, our communications efforts have a very niche focus to convey complicated scientific or legal developments to regulated communities and other stakeholders. Consequently, many non-experts were precluded from hearing about some of DEP’s most exciting achievements. With the emergence of many new types of media, we found several opportunities to connect with audiences of all levels of expertise on a day-to-day basis as well as provide concise but informative information about our agency.

One of the most substantial steps we took was to create an array of Facebook pages that are monitored and maintained by their respective program areas. These pages provide quick and valuable information about events and other updates, everything from historical reenactments to air quality updates, from most of our program areas.

In 2016, we further expanded our outreach by creating a podcast called “Discover DEP” to give listeners the opportunity to learn more about DEP and our resources. The conversational tone of the podcast allows listeners to learn more about DEP in a casual setting, such as on their morning commutes, at their own convenience. Podcast topics have been quite varied over time and have touched on many subjects, ranging from the historical, to scientific and even artistic. We have recorded over 70 episodes which have been listened to by 25,000 people.

Some of our podcasts are also available on our YouTube page which is called “Discover DEP” as well. In addition to our podcasts, our YouTube page features several drone videos of some of our state parks as well as informational videos about DEP’s most innovative programs.

Giving Back: Going out into the community and giving back to New Jerseyans is also a huge source of pride for DEP. Every year, we have regularly made opportunities available to local communities and DEP employees alike to donate their time and energy to make our communities better places to be. Over the course of this administration, DEP has sponsored, hosted and supported many different service activities such as the following:

TRANSFORMING GOVERNMENT

Youth Fishing Derby

DEP and the City of Trenton have been co-sponsoring a youth fishing derby for local children and their families. This family-friendly event attracts as many as 100 registrants, from Grades 2 through 8, who compete to win in an array of categories, such as the first catch of the day, largest fish and smallest fish. The event also provides children a unique opportunity to learn more about fishing, water quality and New Jersey's aquatic flora and fauna.



Two children participating in the 2014 Youth Fishing Derby.

Litter March

Each year dozens of DEP employees participate in the Trenton Litter March. As part of this annual event, teams of people from all ages and backgrounds come together to spend the day cleaning up Trenton to make our capital city a cleaner place to be.

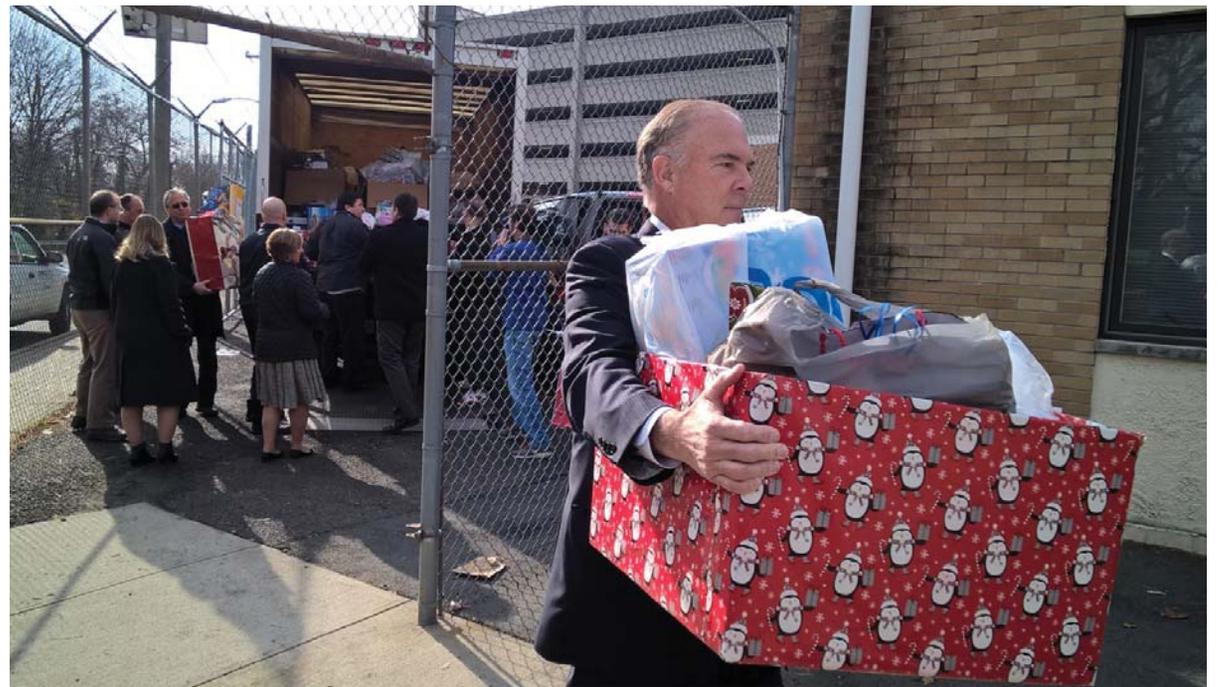
Veterans Outreach

DEP has also made an effort to assist our veterans. Since 2014, we have hosted several job fairs specifically for veterans to give them the chance to learn about career opportunities at DEP. But our efforts to aid the men and women who have served our country did not stop there. In 2016, DEP provided training to

homeless veterans to help them build the skillsets needed to find employment, including resume-building and helping them develop new interviewing techniques.

Salvation Army Angel Tag

Since 2011, DEP has been a proud participant in the Salvation Army's Angel Tree program. Each year, DEP employees have generously given new toys and clothes to needy families in the Trenton area. Since then, DEP employees have been responsible for filling 960 gift wishes and delivered over 4,000 presents that have helped hundreds of families during the holiday season.



Commissioner Martin and staff delivering donated toys to the Salvation Army.

2



Cleaner Air and Sustainable Energy

- ❖ **First administration to update New Jersey's Energy Master Plan since the 1990s**
- ❖ **Provided new, innovative programs to reduce emissions from our energy and transportation sectors**
- ❖ **45th, 45th and 40th lowest emissions in the nation for SO₂, NO_x and carbon from power plants**
- ❖ **First state to have successfully filed a 126(b) Petition with the U.S. EPA to combat interstate air transport**

CLEANER AIR AND SUSTAINABLE ENERGY

Air pollution is a difficult problem to characterize; it is visible and invisible, solid and gaseous, and has lasting, adverse effects for human health and the environment. It is also incredibly complex to deal with since it can arise from a variety of sources including emissions from combustion sources, chemicals, dusts, and even pollen. Although some air pollution is created naturally, like that caused by wildfires and volcanic activity, a disproportionate amount of modern air pollution is created from human activity—particularly from energy production and transportation.

Cleaner Energy: The state's 2011 Energy Master Plan (EMP), which was updated in 2016, made a major contribution to improving New Jersey's air quality. The EMP outlined this administration's plan to accelerate New Jersey's transition to cleaner sources of energy by creating a diverse energy portfolio. The keystone of this plan is to begin to transition our state from coal generated electricity to natural gas. Why natural gas? Science shows that natural gas burns cleaner than coal and produces half as much carbon dioxide (CO₂).^{3,4} Natural gas is also a more reliable source of energy than some renewable energy sources and it is found in abundance across the United States. In fact, as of 2013, the United States was ranked 5th in the world for proven natural gas reserves.⁵

The increased use of clean-burning natural gas has significantly reduced CO₂ emissions across a variety of economic sectors. Additionally, the EMP has a clear policy that no new coal-fired power plants will be allowed in New Jersey, thereby compelling energy generators to use cleaner options. We are



DID YOU KNOW?

Data shows that about half of all carbon dioxide emitted into the atmosphere by human activity remains there. The other half dissolves in the ocean or is taken up by plants or soil.

WHAT IS THE DIFFERENCE BETWEEN GOOD AND BAD OZONE?

Ozone occurs in two layers of the atmosphere. The layer closest to the Earth's surface is the troposphere. Here, ground-level, or "bad" ozone, is an air pollutant that is harmful to breathe and can damage crops, trees and other vegetation. It is also the main ingredient of urban smog. The troposphere generally extends to about 6 miles up, where it meets the second atmospheric layer: the stratosphere. The stratosphere, or "good" ozone layer, extends upward from about 6 to 30 miles and protects life on Earth from the sun's harmful ultraviolet (UV) rays.

WHAT IS PM_{2.5}?

Fine particulate matter, or PM_{2.5}, are small, inhalable particles that are typically 2.5 micrometers or smaller. They can be emitted from a variety of sources including construction sites, fields and vehicles. If inhaled, these particles can easily enter the lungs and eventually pass into the cardiovascular system. Health issues associated with PM_{2.5} can cause emphysema, pneumonia or exacerbate asthma.

WHAT ARE AIR TOXICS?

Air toxics are air pollutants that have the potential to cause adverse health effects and are not regulated through a National Ambient Air Quality Standard.

WHO AT DEP IS RESPONSIBLE FOR OUR AIR QUALITY?

The Office of Air Quality, Energy and Sustainability's (AQES) mission is to evaluate and support the development and implementation of secure, resilient energy systems and sustainable environmental practices, while protecting the public from unnecessary radiation exposure and ensuring the state's air is clean and safe. AQES is divided into two divisions: one side focuses on efforts to control and reduce air quality pollutants and air toxics from varied sources, and the other side focuses on reducing public exposure to radiation from naturally occurring and manmade sources, as well as promoting clean and renewable energy and sustainable practices.

especially proud to say that today less than 2% of electricity generated in New Jersey comes from coal-burning power plants.

In tandem with the EMP's emphasis on natural gas usage, electricity prices among New Jersey's four major electrical distribution companies have dropped considerably. New Jersey has dropped from having the 4th highest electric costs in the nation to the 10th.⁶ Furthermore, in 2016, natural gas accounted for more than half of all the electricity generated in New Jersey. In combination with other clean sources, such as nuclear power and renewable energy, clean energy now comprises 93% of New Jersey's total annual electricity consumption. Additionally, 96% of annual in-state electrical energy is made by clean sources.

New Jersey's dramatic move towards cleaner energy sources demonstrates our commitment to environmental stewardship and economic growth. Over the past eight years, driven by the EMP, New Jersey's power sector has become one of the cleanest in the nation. In fact, New Jersey's 2015 emissions rates for sulfur dioxide, nitrogen oxide and CO₂ rank 45th, 45th and 40th lowest in the nation, respectively.

Additionally, the goal to reduce New Jersey's greenhouse gas (GHG) emissions by 20% in 2020 that was set forth under the New Jersey Global Warming Response Act was achieved in 2012, eight years ahead of schedule.

Targeting Out-of-State Air Pollution: During the past eight years, New Jersey has taken a very aggressive stance against air pollution.

Unfortunately, other states do not share New Jersey's success in reducing their own in-state air pollution which can cross over into New Jersey and negatively affect us and our air quality.

To protect our air quality, DEP has actively worked to ensure that the air entering New Jersey is cleaner and meets our state's air quality standards. In 2010, DEP successfully petitioned the United States Environmental Protection Agency (U.S. EPA) under Section 126 of the federal Clean Air Act to require a power plant in Pennsylvania to control its air emissions.

This section of the federal law allows a state to petition the U.S. EPA Administrator to compel major sources of air pollution to control their emissions if the levels of those emissions violate the interstate transport provisions of the Clean Air Act. If the petition is successful, the U.S. EPA

DID YOU KNOW?

The transportation sector represents the second largest greenhouse gas emitting sector in the United States behind the electric sector at 27%. However, in New Jersey, transportation is the largest source of greenhouse gas emissions.



An electric car charging station in use.

Administrator can compel the source of those emissions to comply with any site-specific limits and compliance schedules that the U.S. EPA deems appropriate.

In its petition, DEP alleged that emissions from the nearby Portland Generating Station (Portland) located in Upper Mount Bethel Township, Pennsylvania were crossing into Warren County in New Jersey, and preventing the county from meeting its air quality standards.

Among the many issues noted by DEP, the fact that the coal-fired Portland plant did not have any air pollution controls for sulfur dioxide was a major concern. In 2009 alone, a year before DEP's petition was filed, Portland's sulfur dioxide emissions were greater than sulfur dioxide emissions from all of New Jersey's electrical generation facilities combined for that same year. Additionally, a July 2007 report conducted by the Environmental Integrity Project ranked Portland as having the 5th highest sulfur dioxide emissions per megawatt generated in the country in 2006.⁹

In 2011, the U.S. EPA granted DEP's petition and ordered Portland to lower its sulfur dioxide emissions by 81% over a three-year period. Eventually in May 2013, Portland's owners announced that the plant's coal fired operations would be shut down by June 2014.

This remains the only successful Section 126 petition in American history.

New Jersey is also proud to be part of the Ozone Transport Commission, a multi-state organization created under the Clean Air Act to advise the U.S.

EPA on air transport issues and to implement regional solutions to the ground-level ozone problem in the Northeast and Mid-Atlantic regions.

DEP has also regularly worked with the U.S. EPA and upwind states to identify potential emissions reduction opportunities for future implementation to completely remedy the ozone transport issue.

Reducing Emissions from Transportation:

The Christie Administration has worked to reduce emissions from our transportation sector by encouraging the adoption of electric vehicles. One such example of DEP's efforts to improve air quality in our transportation sector is the "It Pays to Plug In" grant program. In 2016, DEP and the Board of Public Utilities worked together to launch this program which offers employers reimbursement grants to buy and install electric car chargers so employees can recharge their electric vehicles at work. The program operates on the premise that if consumers have more places to charge electric cars then they will be more likely to purchase them. Consequently, as more electric vehicles are used on New Jersey roads then emissions from our transportation sector will decrease. To date, grants totaling \$850,000 have been awarded and 77 charging stations have been installed. There is also a waiting list for additional awards pending new funding.

To further reduce emissions from our transportation sector, DEP implemented the Mandatory Diesel Retrofit Program which reduced annual PM_{2.5} emissions by 73 tons

DID YOU KNOW?

The Energy Master Plan called on New Jersey to maintain a standard of at least 22.5% of energy from renewable sources by 2021. Optimizing our use of solar energy is critical to achieving this goal.



Commissioner Martin in front of the solar panels located on the roof of the DEP Headquarters in Trenton.

through the installation of 5,679 tailpipe retrofits on diesel vehicles. This is equivalent to removing 3 million cars from the road. Solid waste vehicles, commercial buses and public utility vehicles were targeted to maximize health benefits because they regularly circulate through residential neighborhoods. Because of this program, diesel dependent vehicles in New Jersey are much cleaner and peoples' chronic exposure to their exhaust has been greatly reduced.

DEP also recognized that diesel emissions may

DID YOU KNOW?

DEP has made a concerted effort to guarantee that sites slated to be developed for solar installations are carefully chosen to minimize the use of productive land, such as farms and open space, in favor of such sites as landfills. Together, DEP's Air Quality, Energy and Sustainability and Land Use Management Programs developed a "Solar Siting Analysis" to differentiate between sites where DEP would encourage or discourage solar installations based on various land characteristics and other factors.

enter the passenger space of school buses. This problem is particularly concerning because school buses transport large numbers of school aged children who may ride the bus for up to 20 miles. In light of this concern, DEP retrofitted 7,428 school buses with Closed Crankcase Ventilation Systems which reduced the intrusion of diesel emissions into the interior of school buses.

DEP's efforts were not limited to cars and trucks. Over the past eight years, we have awarded \$15 million in grants to help businesses reduce diesel emissions from old marine and construction equipment through retrofits and replacements. We are also working with SeaStreak to repower three passenger ferries that operate in the Atlantic Highlands with the newest, cleanest marine engines. Once all these efforts are complete, the emissions reductions achieved by DEP's ferry and marine construction projects are comparable to taking nearly 1 million cars off the road.

Renewable Energy: Renewable energy sources are naturally replenishing and essentially inexhaustible. They include such sources as hydro, wave, tidal, geothermal, wind, biomass and solar. Additionally, they do not produce GHGs, ozone precursors, PM_{2.5} or air toxics while making energy. Although there have been major advancements and impressive growth of renewable power capacity, renewable technologies are not yet sufficient to completely replace fossil fuels. Nevertheless, the Christie Administration has aggressively pursued investment in renewable energy, particularly in the field of solar energy.

This administration's strong support for carbon-free solar energy has made New Jersey a national leader in the field. Today, New Jersey is ranked 5th in the nation in total installed solar capacity. Also, in 2016, solar

WHAT IS THE CLEAN AIR ACT?

The Clean Air Act, also known as the Clean Air Act of 1963, is a United States federal law designed to address air pollution nationally. Important and major amendments were added to the Clean Air Act in 1970 and 1990, creating the comprehensive federal air pollution legislation that guides us today. Today, it sets standards for emissions from stationary sources (such as power plants) and mobile sources (such as motor vehicles) as well as standards for noise pollution and acid rain. Although this is federal law administered by the U.S. Environmental Protection Agency (U.S. EPA), it also incorporates state, local and tribal governments.



Aerial view of the Portland generating station in Pennsylvania.

WHAT IS GROUND-LEVEL OZONE?

Also known as smog, ground-level ozone is New Jersey's most persistent air pollution problem. Ground-level ozone is formed when oxides of nitrogen (NOx) and volatile organic compounds (VOCs) known as ozone precursors, react in the presence of sunlight. This ozone is often "transported" from its point of formation upwind, causing problems for areas far from the original sources.

power supplied 74% of New Jersey's renewable electricity generation, outpacing much of the rest of the nation.^{7,8}

But the benefits of solar energy are not just seen at the state level. Solar homeowners and commercial businesses can earn money using Solar Renewable Energy Certificates (SRECs) for the energy that their solar panels create. A SREC represents the clean energy benefits of electricity generated from a solar electric system with one SREC issued for each 1,000-kilowatt-hour generated. SRECs are then sold or traded, separately from the sale of power, providing solar system owners with a source of revenue to help offset the cost of installation.

Electricity suppliers in New Jersey must also meet solar Renewable Portfolio Standard (RPS) requirements through purchase of SRECs or pay a solar alternative compliance payment. By 2028, the solar RPS requires 5 suppliers and/or providers serving retail customers to procure at least 4.1% of the electricity it sells from solar electric power generators in the state, which is estimated to be 4,038 gigawatt-hour of solar power.

3

Cleaner Water



- ❖ **New Jersey beaches were open on average 99.9% of the time every year since 2010**
- ❖ **Restored many coastal lakes**
- ❖ **Successfully implemented the Barnegat Bay 10-Point Plan and prepared to move science into action**
- ❖ **Proposed new Maximum Containment Limits for PFOA, PFNA and 1,2,3 TCP**
- ❖ **Improved our compliance with the federal Lead and Copper Rule**
- ❖ **First administration to address Combined Sewer Overflows**
- ❖ **Created new guidance to address Harmful Algal Blooms**
- ❖ **Helped clean up the lower Passaic River and held polluters accountable**

New Jersey is proud to have some of the cleanest and most highly monitored water in the nation. From ocean waters to tap water, DEP works every day to ensure that our water remains one of our state's finest assets. Millions of people depend on the cleanliness of our waters. In spite of the weight of that responsibility, DEP has successfully cared for New Jersey's water and its myriad uses by using sound science, utilizing our expertise and developing a robust dataset to empower policy makers to make the best decisions. During this



The Barnegat Bay and its watershed.

WHO IS RESPONSIBLE FOR PROTECTING OUR WATER AT DEP?

The Water Resource Management Program is DEP's program area that is responsible for ensuring that all of New Jersey's water, including drinking water, wastewater, waters for recreation (rivers, streams, lakes, estuaries and the ocean), and water supply systems, is clean and that appropriate state and federal laws are being followed.

administration, we kept our eye on the future but also revisited and overcame past problems.

Barnegat Bay: Barnegat Bay is one of New Jersey's greatest treasures. Even before the state's inception, the bay was a frequent destination for Native Americans, such as the Lenni Lenape, who would use shells to create wampum beads.¹¹ Since that time the bay has remained critical to New Jersey's tourism, economy, and quality of life for our residents.

Over the years, development and pollution from runoff have impacted parts of the bay. At the onset of the Christie Administration, it was clear that new management strategies would need to be implemented to ensure that Barnegat Bay remains a resource for future generations.

In 2010, DEP was directed by Governor Christie to develop a Comprehensive Action Plan to address the ecological health of the 660-square mile Barnegat Bay watershed. Together, Governor Christie and DEP have been committed to protecting Barnegat Bay by developing and implementing the following 10-point plan as Phase One of DEP's Comprehensive Action Plan to safeguard the bay's long-term use and sustainability:

1. Closing the Oyster Creek Nuclear Power Plant

The Oyster Creek Nuclear Power Plant was first opened on December 23, 1969 and is currently

the oldest nuclear power plant in the United States. It is also responsible for diverting cooling water to the Barnegat Bay, which can alter the Bay's temperature impacting local flora and fauna. In 2010, DEP was able to reach an agreement with the plant's owner to close the facility by December 31, 2019, 10 years ahead of its Nuclear Regulatory Commission license expiration.

2. Fund Stormwater Runoff Mitigation Projects

Most of the deterioration of Barnegat Bay has been caused by pollutants from runoff. To combat this issue, the Christie Administration made it a priority to make financial resources available to retrofit older stormwater basins with the equipment to reduce runoff. To date, DEP



The Oyster Creek generating station.

has invested close to \$24 million in stormwater projects in Ocean County alone.

3. Reduce Nutrient Pollution from Fertilizer

On January 5, 2011, Governor Christie signed legislation establishing The New Jersey Fertilizer Law (N.J.S.A. 58:10A-61 et seq.) which made New Jersey's fertilizer content standards for nitrogen and phosphorus some of the most restrictive in the nation. This law helps reduce the



Top: Governor Christie and Commissioner Martin announce the adoption of legislation that will make \$650 million in no-cost loans for water quality projects in the Barnegat Bay watershed, 2011.

Bottom: Commissioner Martin examining a newly installed stormwater basin in Ocean County.

DID YOU KNOW?

Nitrogen and phosphorus may deplete the amount of oxygen in marine water which in turn can lead to the deaths of marine life.

amount of fertilizer that can enter the Bay by decreasing the total amount of nitrogen in fertilizer and increasing the amount of slow release nitrogen that is used. Furthermore, this law requires that fertilizer have a zero-phosphorus content.

4. Require Post-Construction Soil Restoration

Governor Christie signed a law that required the Secretary of Agriculture and Commissioner Martin to modify the state's existing soil erosion and sediment control standards to address soil compaction in Barnegat Bay and its watershed. To satisfy the Governor's mandate, on June 12, 2017, the New Jersey Department of Agriculture and the State Soil Conservation Committee adopted amendments to the Soil Erosion Sediment Control Plan (N.J.A.C. 2:90) incorporating post-construction soil restoration standards which promote stormwater infiltration and reduce stormwater runoff and nonpoint source pollution.

5. Acquire Land in the Watershed

The Christie Administration has also acquired ecologically sensitive land along Barnegat Bay

WHAT IS A WATERSHED?

A watershed is an area of land that drains into a body of water, such as a river, lake, stream or bay.¹⁰ New Jersey's watersheds are divided into 20 Watershed Management Areas.

and its tributaries. Through the Green Acres program, DEP has identified many areas for acquisition which will prevent developmental activities from potentially degrading the Bay and its resources. Since 2011, more than 11,000 acres have been acquired in the Barnegat Bay watershed.

6. Special Area Regional Planning

DEP developed a strategy that allows for condition-specific approaches to help develop Barnegat Bay. Rather than prohibiting all development in the Barnegat Bay's watershed, we rely on science to make nuanced, situational decisions about developments by using land use data, practices and policies which are shared with municipalities and counties.

7. Adopt More Rigorous Water Quality Standards

On December 21, 2010, DEP adopted narrative nutrient criteria for coastal waters which required a comprehensive ambient monitoring effort to determine if water quality standards were being met. As a result, DEP and our partners launched a new comprehensive ambient water quality monitoring project to collect and analyze 5,000 samples taken in the Barnegat Bay watershed.

8. Educate the Public

DEP has actively worked to ensure that the Bay's residents and visitors are aware of how their actions can influence the Bay. Through public service announcements, websites, listservs and other service activities, including the Barnegat Bay Blitz, we have engaged all sorts of people to become actively involved in protecting the Bay. The Barnegat Bay Blitz is also one of DEP's most popular and visible campaigns, engaging nearly 32,000 volunteers who cleaned

DID YOU KNOW?

There are as many as 45 monitoring stations located throughout the Barnegat Bay and its watershed to help scientists model relationships between pollutants and observed water quality standards.

DID YOU KNOW?

DEP sponsors the NJ Watershed Ambassadors program to promote watershed stewardship through education and direct community involvement. Ambassadors are assigned to each of New Jersey's 20 watershed management areas to serve those communities. Our ambassadors conducted over 40 volunteer stream monitoring training sessions, completed 87 partnership projects, helped residents build 320 rain barrels and performed 670 visual and biological stream assessments.

up almost 5,000 cubic yards of trash and recyclables in the Barnegat Bay watershed over the last eight years.

9. Fill in the Gaps on Research

Although DEP needed to collect new data about Barnegat Bay and its watershed, we also needed to coordinate older data to fill in several key data gaps. To address this issue, we took an inventory of all our collected data and compiled an extensive bibliography which helped address some gaps and set forth a trajectory for new research projects.

10. Reduce Water Craft Impacts

In 2012, DEP identified sixteen ecologically sensitive areas throughout the Bay which we mapped using GIS software. These areas,



Commissioner Martin speaking to the local media from Barnegat Bay about the importance of the Barnegat Bay Blitz.



Volunteers participating in the Barnegat Bay Blitz.

consisting of waterfowl nesting grounds, finfish habitats and aquatic vegetation, are often found in areas frequented by recreational boats. We used our marine enforcement officers to conduct several compliance and education sweeps to ensure that these habitats are protected from impact and educate boaters on reducing watercraft impacts.

DEP is now transitioning from Phase One of the Comprehensive Action Plan to Phase Two. Phase Two will focus on taking what was learned during Phase One to move science into action, securing the health of Barnegat Bay and its watershed. By building on the data, modeling results and research conducted during Phase One, Phase Two has begun with a series of objectives that include immediate

DID YOU KNOW?

DEP's Waterway Enforcement Teams strive to strengthen the enforcement of all environmental regulations along New Jersey's rivers, streams and bays. This enables us to get a view of the regulated community, pollution sources, and impacted river banks/coastal regions, not otherwise or normally seen from "the street."





Governor Christie announcing the beginning of Phase Two of the Barnegat Bay 10-Point Plan, 2017.

“on-the-ground” implementation actions as well as a framework for future projects.

Improving Our Coastal Management: New Jersey’s 127 miles of coastline are a natural and recreational resource which represent a significant economic asset to the state. DEP’s main task with our beaches, during the last eight years, has been to ensure that our shores remain useable to beachgoers. Through the Cooperative Coastal Monitoring Program, DEP and coastal counties regularly monitor the state’s ocean water quality to ensure that our beaches continue to be among the cleanest in the nation. This program requires that we regularly collect data from 217 of our



New Jersey beaches are generally pristine and were open on average 99% of the time during the Christie Administration.

recreational bathing stations which are sampled at least once a week during the summer season.

DEP also maintains an interactive GIS powered website that shows the location of each of our monitoring stations and informs our beachgoers which beaches are open, if there are any water quality advisories or if some beaches have closed. Because of our efforts, not only is the public better informed but between 2010 and 2017 our beaches were on average open 99.9% of the time.

Aside from water quality, our coast has also been threatened by potential industrialization. Although industry plays a key role in New

Jersey, Governor Christie and DEP feel that its place is not along our coast. In support of this vision, this administration vetoed a deep-water liquefied natural gas operation that would have been placed 16 miles off the coast of Asbury Park and maintained unwavering opposition to any off-shore oil drilling or exploration activities near our coast.

Wreck Pond Restoration Action Plan and Coastal Lake Restorations: Although New Jersey beaches are generally pristine, Wreck Pond has been a challenge on our shoreline for many years.

This 73-acre, tidally influenced pond connects

DID YOU KNOW?
New Jersey has a \$42 billion tourism economy.

CLEANER WATER



The Asbury Park coastline.

to the Atlantic Ocean and has a watershed that encompasses 13 square miles between four towns. From the 19th century until the 1960s, the pond was used for many different recreational activities, such as fishing, crabbing, rowing, rafting and swimming. However, over the years sedimentation filled in part of the pond; that combined with

pollution from stormwater runoff, have led to poor water quality. Water from the pond can slowly discharge into the Atlantic Ocean which caused beach closures in nearby Sea Girt and Spring Lake. In fact, discharges from Wreck Pond between 2001 and 2014 were responsible for the majority of beach closures in the state. Consequently, this administration

was determined to create a plan that would rectify the situation once and for all.

To achieve this goal, DEP worked with many different Monmouth County organizations and agencies to install 14 stormwater manufactured treatment devices in the watershed, conduct a fish study and complete four phases of dredging to remove 80,000 cubic yards of sediment. Also, in cooperation with the U.S. Army Corps of Engineers, we installed an 8-foot by 5.5-foot by 600-foot sluice gate and knife gate to prevent a coastal surge from entering the pond, double the pond discharge, increase tidal flow to improve water quality and create greater storage capacity prior to a storm.

Even though Wreck Pond is our most significant coastal lake restoration, DEP has overseen many restorations at many other coastal lakes during the past eight years. For instance, at Lake Takanassee in Monmouth County, DEP retrofitted an existing outfall pipe, stabilized the shoreline, refortified the eastern end of the lake with steel sheet piling and dredged 667 cubic yards amongst other actions. And at Twilight Lake in Ocean County we replaced a force main from the lake's pump station, installed a stormwater manufactured treatment device and dredged and removed 25,000 cubic yards of sediment.



Wreck Pond outfall project extending into the Atlantic Ocean. Courtesy of Simpson and Brown.

Drinking Water: In addition to our unique marine ecosystem, New Jersey is proud to boast one of the most comprehensive and closely monitored public drinking water supplies in the nation. DEP works every day to ensure that the nearly 1,500 public water supply systems that provide 1.2 billion gallons of water that are

WHAT IS A NON-TRANSIENT NON-COMMUNITY WATER SYSTEM (NTNCWS)?

A NTNCWS is a type of public water system that regularly supplies water to 25 or more of the same persons for more than six months each year. Examples of these types of systems are schools, factories, office buildings or other such facilities that have their own water source, such as a drinking water well.

delivered to nearly 8 million New Jersey residents, who are serviced by community water systems, receive the cleanest water possible. DEP is also responsible for ensuring that the state's 747 non-transient non-community water systems, which serve an additional 350,000 people in New Jersey, satisfy all the appropriate state and federal requirements.

Private wells, of course, are not exempt from meeting our state's stringent drinking water quality standards. To make sure that private wells are clean throughout our state, New Jersey adopted the Private Well Testing Act in 2001. This law requires that people who wish

WHAT IS AN MCL?

A maximum contaminant level, or "MCL," is the limit of any substance allowed in drinking water. An MCL is developed to limit the health risks that specific chemicals may pose. Because every substance has its own unique chemical and physical properties, MCLs are specific to each contaminant.

to buy or sell properties with private wells must test the untreated well water for several water quality parameters before closing on a sale. Additionally, landlords are required to test private wells on their properties every five years and provide their tenants with the results of those tests. Nearly 87,000 wells have been tested between 2002 and April 2014. Most recently, 85% of private wells met their required primary Maximum Contaminant Levels (MCLs).

DEP is also responsible for compiling data gathered from the Private Well Testing Act. Part of the Public Well Testing Act requires the laboratories that analyze these private well samples to submit the results to DEP electronically. These are then summarized, published online and made accessible to the public via an online, interactive map.

But it is not enough to monitor our drinking water quality. To maintain our exceptional water quality standards, DEP recognizes that long-term financial strategies are essential to maintaining our drinking water infrastructure. Consequently, DEP partnered with other state agencies to promote and support local drinking water projects. Through the New Jersey Environmental Infrastructure Financing Program, our state has provided over \$1.35 billion in low-interest, long-term loans and \$181 million in short-term loans to local governments for various drinking water projects. Furthermore, since 2010, more than \$500 million in loans were awarded to potable water suppliers for drinking water projects throughout the state. These funds are directly responsible for approximately 150 projects across New Jersey, of which 65 are actively under construction.

Aside from providing financing for water infrastructure projects, DEP has also begun requiring asset management for some of our regulated water systems. In 2016, we conducted a baseline survey of water systems to assess the status of asset management activities amongst them. Fortunately, we were greeted with positive results. Of the systems that responded to the survey, 76% have done some inventory of their physical assets, 74% have mapped more than half of their assets and 90% intend to complete some component of asset management in the next three years.

Recognizing Emerging Issues for Drinking

Water: DEP has also been considerably proactive in identifying new drinking water pollutants. Since July 2015, the New Jersey Drinking Water Quality Institute has recommended establishing MCLs for three compounds in drinking water: Perfluorooctanoic Acid (PFOA), Perfluorononanoic Acid (PFNA) and 1,2,3 Trichloropropane (1,2,3 TCP). PFOA and PFNA are water soluble industrial chemicals which can accumulate in human tissues and adversely affect the immune and reproductive systems and 1,2,3 TCP is a man-made, industrial solvent which may interfere with the liver and kidneys.

Although none of these compounds have federally established MCLs yet, DEP recognizes that these substances may be hazardous to human health and the environment, which is why we have taken the initiative to propose MCLs for them at the state level.

Adoption of these MCLs is pending and further research is being conducted.



Recently, Commissioner Martin announced the new proposed MCLs for PFOA, PFNA and 1,2,3 TCP.

Lead: Prior to lead becoming a national matter of concern, DEP was reevaluating its policies and procedures to ensure that New Jersey is in compliance with all facets of the Lead and Copper Rule.

In 2016, DEP drafted New Jersey's Lead Work Plan to enhance our state's compliance with the federal Lead and Copper Rule. This plan includes various assessments and new policies which identify drinking water systems for increased lead monitoring. The plan also requires DEP to conduct periodic reviews of New Jersey's lead policies to demonstrate continuing compliance with the federal rule.

In addition to the Lead Work Plan, DEP has monitored potential impacts to water quality from corrosion as part of the permitting process for all new drinking water or water treatment facilities that require a water supply permit.

Additionally, we continue to improve our public education and communication about issues surrounding lead and copper. DEP maintains a webpage, has worked with industry partners to solve problems and provides guidance documents for water systems, schools, labs and consumers to learn more about lead.

Additionally, DEP created the "Lead Team," a group within the Division of Water Supply and Geoscience, to develop technical and guidance resources, respond to public inquiries and give training to the public about lead in New Jersey.

WHAT IS THE LEAD AND COPPER RULE?

The Lead and Copper Rule (LCR) was first issued in 1991 and is the federal regulation which legally limits the lead and copper concentrations allowed in public drinking water systems. Lead is typically found in older water pipes or plumbing fixtures which over time can corrode, releasing lead into the water supply. These two metals were singled out because they are often found in plumbing; copper in the form of piping and lead as a solder to connect pipes. As water passes through the plumbing, both metals can corrode and enter drinking water. Over time, prolonged exposure to these metals can cause blood poisoning, developmental defects and kidney disease.

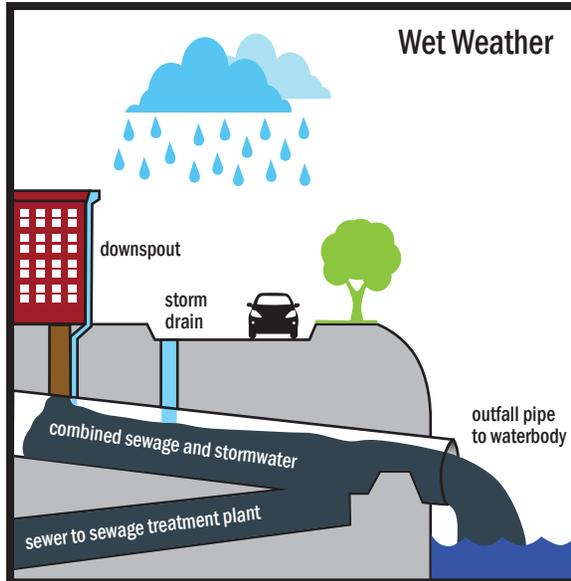
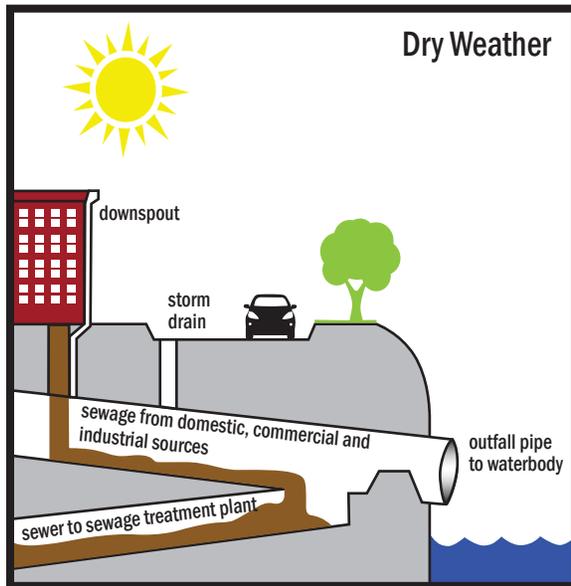


In November 2017, DEP and the Environmental Justice Advisory Council coordinated with the City of Irvington to distribute door hangers to help raise awareness about the issue of potential lead in drinking water.

Combined Sewer Overflows and Municipal Separate Storm Sewer System Improvements:

Due to the age of some of New Jersey's infrastructure, we are home to several combined sewer systems (CSSs). These systems carry both sanitary and stormwater flow in one pipe which during heavy rain can be rerouted from sewage treatment plants and overflow into nearby waterbodies, without treatment. These flows are known as Combined Sewer Overflows (CSOs).

The Christie Administration is the first administration to develop a comprehensive approach to addressing this historic problem.



How do CSOs work?

First, DEP worked with the CSO municipalities to consolidate or close CSO outfalls. Then, on March 12, 2015, we issued 25 final permits to address the remaining CSOs which became effective in July of that same year. These new permits require CSO owners to develop Long-Term Control Plans to reduce—and ultimately eliminate—CSO discharges.

In addition to eradicating CSO outfalls, the permits are designed to help reduce flooding, provide opportunities for green infrastructure, and enhance asset management and maintenance. DEP has taken a novel approach by putting together multidisciplinary teams to work closely with permittees and provide assistance as needed. Active community engagement and collaboration with other agencies and organizations has also been key in promoting and supporting the efforts of the permittees to reduce or eliminate CSOs. This ensures the timely completion of approvable long-term control plans in 2020. Additionally, this approach has helped and encouraged permittees to fast track solutions that will reduce CSO flows even before completion of their Long-Term Control Plans.

DEP is taking a similar approach to changing our Municipal Separate Storm Sewer System (MS4) permits. This permit emphasizes proper operation and maintenance of stormwater facilities to better control the release of nutrients, pathogens, solid and floatable materials, and other pollutants to reduce stormwater runoff quantity. The permit was also reorganized to improve readability, clarity and enforceability.

To encourage compliance with this renewed permit, DEP provides several free online

training courses on our website. These training modules include an interactive training tool for municipal boards and governing bodies, training for municipal employees, stormwater management videos and a video explanation of DEP’s stormwater maintenance guidance materials. We also finalized the development of an application for tablets and smartphones to assist municipalities with system mapping and inventory and will be providing licenses for its use.

Enhanced Capability for Freshwater Harmful Algal Bloom Response and Laboratory Analyses:

Seeking to minimize health risks for people and animals, DEP worked with the New Jersey Department of Health and Department of Agriculture to develop and implement a strategy for responding to incidents of Harmful Algal Blooms (HABs) across our state. In August 2017, the “Cyanobacterial Harmful Algal Bloom (HABs) Freshwater Recreational Response Strategy” was created to provide a unified, statewide approach for responding to cyanobacterial HABs in freshwater recreational waters and sources of drinking water to protect the public from risks associated with exposure to cyanobacteria and their toxins. In addition to protecting human health, this strategy provides information and recommendations about how to prevent domestic animals, wildlife, and livestock from exposing themselves to HABs and their toxins.

DEP also launched a new HAB website. Together, the HABs strategy and website contain lots of valuable information about how to report a HAB, fact sheets, contact information and other informational resources. DEP was also

responsible for developing a laboratory capacity for HAB analysis, including taxonomic identification, cell concentration, pigment and toxin analysis.

Lower Passaic River Cleanup: One monumental challenge DEP faced during the last eight years was how to remedy contamination in the Passaic River, particularly in the lower eight miles.

This section of the river has been highly-industrialized since the 19th century and served as one of the major centers of the American Industrial Revolution. Throughout the course of its history, this section of the river has been occupied by many different manufacturing plants. Although the industrialization of the Passaic River brought thousands of jobs to the region, industrialization also brought chemicals like dioxin, furans, PCBs, mercury, DDT, copper, dieldrin, polycyclic hydrocarbons, and lead which contaminated the water.

Many of these compounds were left in the river's sediments and have bioaccumulated in the local

WHAT IS DIOXIN?

Dioxin is a group of several hundred toxic chemical compounds that look like small, crystal needles. They are among the most highly toxic chemicals ever made by man and can interfere with the endocrine system, immune system and cause cancer.

WHAT IS FURAN?

Furan is a highly flammable, carcinogenic liquid. It has been used in disinfectants, herbicides and fungicides.

DID YOU KNOW?

The Great Falls of the Passaic River inspired Alexander Hamilton to use its power for industry and to make Paterson the first planned industrial city in the United States.

aquatic life, such as fish and crabs. Because of the severity of these longstanding problems, DEP has worked to develop a plan to remediate and restore the river.

Because the cost of this project is significant, by continuing to fund a longstanding lawsuit, the Christie Administration sought compensation from the river's polluters to pay for past costs and to protect the state from incurring any future costs. Thus far, DEP and the U.S. EPA identified over 100 potential dischargers to the river.

After identifying these dischargers, the state filed a successful lawsuit against the polluters seeking to cover past costs and damages sustained by our state. In 2015, this lawsuit concluded successfully in favor of New Jersey and brought \$355.4 million to the state. As part of the settlement, the state received protection from any future costs associated with the cleanup of the Passaic River, ensuring the polluters—not the public—would pay for the future remediation of the river. Furthermore, on December 13, 2013, a Superior Court judge approved two settlements in the Passaic River litigation that will provide an additional \$165.4 million and will permit DEP to immediately proceed with its substantial legal claims against another defendant.

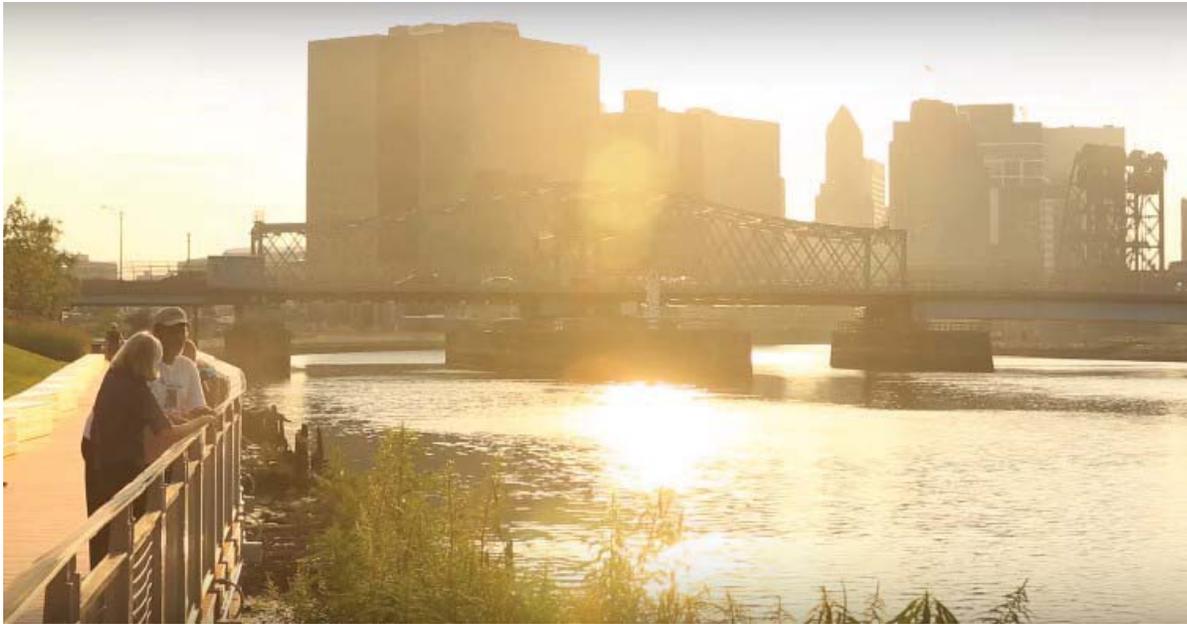
Aside from obtaining damages from the river's polluters, we ensured that \$67.5 million dollars of this settlement were given back to local communities as Natural Resource Damages to support public access along the Passaic River. These monies are being used to develop walkways, fishing areas, and restore natural resources to bring communities back to the river.

Following these lawsuits, DEP continued to work with the U.S. EPA to develop a Focused Feasibility Study. Under the Focused Feasibility Study, goals were set for the remediation, source delineation, and consistency evaluations were performed. DEP also continued to support local communities along the Passaic by recommending that sediment from the river be removed, taken out of the state and managed in a way that will not burden local communities. Additionally, we have made it a priority to ensure that the remediation is consistent with the long-term goals for the Passaic River area. We have been especially insistent that all of the remaining contaminated river sediments be capped to achieve the greatest risk reduction.

Then in March 2016, the U.S. EPA rendered its Record of Decision for the river, which

WHAT IS "CAPPING"?

Capping is covering over contaminated materials, like soil or waste, to prevent people from coming into contact with contamination and to prevent rain and wind from mobilizing, transporting, or activating chemicals that may be at a site.



A view of the Passaic River in Newark.

contains the state's preferred plan for the cleanup of the lower eight miles of the Passaic River. The U.S. EPA will oversee the responsible parties' implementation of a nearly \$1.4 billion bank-to-bank cleanup of this segment of the river. This is the first part of a comprehensive strategy to address a larger 17-mile stretch of the river.¹⁵

Although this project will require continued attention from DEP, the foundation that we and our public and private partners have established to address the lower Passaic River will allow the project to progress in a smooth and timely manner.

Now that the Feasibility Study has been completed, design for the final remedy for the river has begun.

4



Protecting Our Land

- ❖ **Successful implementation of the Site Remediation Reform Act and the Licensed Site Remediation Professional Program**
- ❖ **Closed 26,000 cases**
- ❖ **More sites being cleaned than ever before**
- ❖ **Dramatically improved land use permitting process**
- ❖ **Made major improvements to the Flood Hazard Control Act Rules**
- ❖ **Fewer unregulated heating oil tanks required financial assistance from the state, representing a huge savings**
- ❖ **Closed and remediated several legacy landfills**
- ❖ **Used the Community Collaborative Initiative to successfully remediate the former Harrison Avenue Landfill**

PROTECTING OUR LAND

Although New Jersey is far from the largest state in the Union, it is the most densely populated which makes protecting our land a fairly substantial challenge. Our 8,729 square miles of land have many diverse uses, from undisturbed natural habitats to cities teeming with people. Each location requires great dedication and expert management to guarantee that our land is well used. DEP achieves this goal by relying on and enforcing New Jersey's environmental

DID YOU KNOW?

Between 1986 and 2012, nearly 37 acres a day were redeveloped in New Jersey for a total of 350,000 acres during that 26-year period.

laws—which also happen to be among some of the strictest in the nation. During the Christie Administration, the DEP transformed many of our regulations as well as its permitting and internal processes to align DEP more with our local and private partners in order to protect and preserve our land.

Licensed Site Remediation Professional Program: New Jersey has been home to many different industries over the years. As a result, we are home to thousands of contaminated sites.

At the beginning of the Christie Administration, there were approximately 20,000 known contaminated sites in New Jersey, each with a unique set of contaminants and geological makeup. This made it challenging for DEP's Site Remediation and Waste Management Program to address all these sites in a timely manner. Clearly, something needed to change—and

those changes came through the Site Remediation Reform Act (SRRA) and the creation of the Licensed Site Remediation Professional Program.

SRRA placed responsibility for environmental cleanups back on polluters rather than the state and created a category of remediation professionals known as Licensed Site Remediation Professionals (LSRPs). LSRPs are environmental professionals who meet certain educational and professional requirements that demonstrate their expertise in environmental cleanups. If a person interested in becoming an LSRP satisfies these requirements, they are eligible to sit for the LSRP licensing exam. The topics in this exam include implementing the technical, scientific, and regulatory aspects of site remediation, plus managing each phase of the remedial process. If an individual passes this exam, they are then licensed to conduct site cleanups in the state.

SRRA also puts people responsible for completing remediations in the driver seat of their cleanup. Under SRRA, the remediating party does not need to wait for DEP's direction and pre-approvals to initiate and continue cleanups. Instead, they can complete site cleanups under the direction of an LSRP, who is responsible for the day-to-day oversight of the environmental investigation and remediation. LSRPs can effectively implement remedial strategies without having to wait for DEP's preapproval, so long as they comply with all appropriate rules and guidance.

Today, cleanups are being completed more quickly. Over 26,000 cases have been completed

WHAT IS THE SITE REMEDIATION AND WASTE MANAGEMENT PROGRAM?

The Site Remediation and Waste Management Program (SRWMP) oversees all necessary actions performed by responsible parties to investigate and clean up any known or suspected discharges. Additionally, using public funds, the program implements response actions at contaminated sites where the responsible party is unknown, unwilling or unable to perform the necessary actions. The program is also responsible for the licensing of solid waste haulers and the permitting and oversight of solid waste facilities. The program also administers several grants, including grants to assist counties and municipalities with the goal of maximizing recycling in the state.



DEP employees in action at a contaminated site.

DID YOU KNOW?

DEP maintains an online list of active LSRPs which can be accessed at any time showing real-time information on currently licensed LSRPs. From this list, a person can contact any of the 688 currently licensed LSRPs.

and the number of contaminated sites in New Jersey has decreased from 20,000 to 14,000 sites, even as new sites are discovered.

Improving Our Land Use: Of course, ensuring that our land remains diverse and well protected starts with land use management. As land is developed from its natural state to a developed or disturbed condition, such development can cause major environmental impacts (**Figure 4**). These impacts can include habitat loss and changes to flood dynamics. To best prevent

these damages from occurring it is key to implement an effective and comprehensive land use strategy. This was largely achieved in New Jersey by transforming our land use regulatory program.

Since 2008, we have been working with stakeholders to identify key behaviors that may result in major harm being done to the environment. Additionally, we have worked with our stakeholders to identify new ways to perform activities so that there would not be an impact on the environment. Because of these stakeholder sessions, DEP strengthened protections to our floodplains and coastal resources. These changes included making more of our land use applications available online. Currently, there are two freshwater wetlands general permits, 15 flood hazard permit by certifications and two coastal general permits that are available. DEP also

standardized the language for three of our permitting programs. By using the clear, well-organized provisions from each program, we made it easier for applicants to understand and comply with our permitting rules.

New Jersey’s coastal communities have also benefitted from our land use regulatory changes. One of the most substantial changes was made in May 2013, when DEP proposed amendments to the Flood Hazard Area Control Act Rules. These amendments created more efficient procedures for authorizing people to construct, reconstruct, relocate and elevate buildings and other structures in flood hazard areas. By improving the methods for people to flood-proof their buildings DEP has equipped our coastal residents with more opportunities to avoid severe flood damage like that experienced during Superstorm Sandy.



Figure 4: Over the years, New Jersey's Land Use and Land Cover have changed. Staying up-to-date on these changes has been critical to helping us adopt land use policies that make sense.

Coastal communities have also lost significant amounts of their tidal wetlands. To address this loss, in July 2013, we improved our rules making it easier to use living shorelines as a shore protection measure. A living shoreline is a shoreline management practice that addresses the loss of vegetated shorelines by providing for the protection, restoration or enhancement of these habitats. Through the strategic placement of vegetation, sand, or other structural and organic materials, living shorelines provide protection while promoting the security of those habitats. DEP also continued to provide substantial amounts of public outreach to communities prone to flooding. Through our Land Use Management program, DEP has provided planning and technical assistance to 80 communities and Coastal Vulnerability Assessment mapping to 239 coastal communities. These resources help communities by providing decision-making tools to take informed action in response to coastal hazards. We continue to meet with interested groups, whether they be business, legal or environmental stakeholders,

WHAT IS THE LAND USE MANAGEMENT PROGRAM?
 The Land Use Management Program (LUM) is the branch of DEP responsible for implementing New Jersey's land use regulations, regional land use planning, coastal resource management and funding projects that result in improvements to the quality of the state's environment. Land Use Management strives to balance responsible land development and protection of New Jersey's valuable natural resources.

and have quarterly meetings addressing potential rule changes and business proposals.

Addressing Unregulated Heating Oil Tanks:

There are countless unregulated heating oil tank systems throughout New Jersey which can corrode and leak over time. Heating oil can escape into the environment and contaminate the surrounding soil and ground water, posing a number of environmental and health risks. During this administration, approximately 22,000 heating oil tank cases were closed—an average of over 3,000 per year (Figure 5). However, closing and removing unregulated heating oil tanks can be very expensive, prohibiting otherwise responsible people from removing their tanks when necessary. DEP offers grants to close their tanks through the Underground Storage Tank Fund. Most of the 22,000 tanks that were remediated during the Christie Administration were funded by responsible parties or insurance companies.

Landfill Closures: Historically, DEP has required parties give as much control as possible to people responsible for conducting remediations, there are a few instances where DEP has been left with no choice but to step in to protect human health and the environment.

Nearly two decades after closure, DEP and the New Jersey Sports and Exposition Authority (NJSEA) successfully closed the former Kingsland Landfill. This landfill is part of the larger Kingsland Redevelopment area that spans across the Meadowlands through Kingsland, Rutherford East, Rutherford West, Lyndhurst and North Node. Originally, this area was slated for redevelopment during the early 2000s but after

WHAT IS AN UNREGULATED HEATING OIL TANK?
 Unregulated heating oil tanks are either above ground or underground storage tanks that contain heating oil used exclusively for on-site consumption in a residential building, or one or more tanks with an aggregate capacity of 2,000 gallons or less at the same non-residential property.

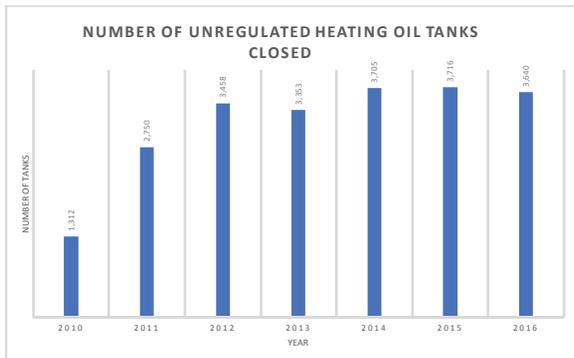


Figure 5



DEP employees from the Site Remediation Waste Management Program conducting an inspection.

a series of financial mishaps the project ultimately stalled and the landfills fell into various states of disrepair.

To restore this blighted land, DEP and the NJSEA remediated the 158-acre site so that the larger 1,300-acre landfill complex would no longer degrade the fragile marshlands in the Meadowlands region. This remediation was especially important because it stopped leachate—a brown liquid that can seep out of landfills into the surrounding area—from entering parts of the Meadowlands watershed. To achieve this, the site was capped with processed dredged materials. This cap has a very low permeability and prevents water from entering the landfill thereby creating more leachate. Additionally, the leachate is now properly being managed by the Passaic Valley Sewerage Commission.

Now that the site has been properly remediated, it can be redeveloped and made useable again. In fact, part of the Kingsland Redevelopment Area may be suitable for a solar energy field.

In Roxbury Township, DEP successfully completed the remediation of another legacy landfill. After we repeatedly attempted to compel the owner of the former Fenimore Landfill to address the hydrogen sulfide (H₂S) gas that was emanating from this site, DEP was ultimately left with no other option but to take control and abate the gas ourselves. After, the H₂S levels at the site dropped significantly and by 2015, the site was capped and no longer poses an immediate risk to the surrounding community.

Recycling: New Jersey is a national leader in recycling. Under the Christie Administration, we

WHAT IS A “LEGACY LANDFILL”?

In New Jersey, a legacy landfill is a landfill that ceased operations prior to 1982 and is not subject to the state’s landfill closure requirements. However, following legislation passed by the Christie Administration, DEP may now take control of legacy landfills in the event that they present an environmental hazard.

have worked to increase recycling rates across the state, focusing on communicating with our partners, educating the public and making recycling information easier to understand.

We are also in the process of implementing a state-wide communication tool that compiles recycling program information from many different levels of government then making it accessible to the public on various platforms and devices. The application, “Recycle Coach” offers an advanced collection reminder system as well as a “What Goes Where” database, ensuring that every New Jerseyan has access to current, accurate information about recycling. New Jersey is also a national leader in e-waste recycling.

Our recycling rates are also similarly impressive. In 2015, New Jersey reported a solid waste recycling rate of 63% and municipal solid waste recycling rate of 43%.

Additionally, we are changing the way \$21 million worth of recycling grants are administered by requiring more timely use of the grant funds and more accountability for how the money is spent.

Kroc Community Center: The Christie Administration has always recognized that industrialization has left our state with many underutilized brownfields sites which would be better redeveloped and returned to the tax rolls. Through DEP’s Community Collaborative Initiative (CCI), DEP has worked with many different public and private partners to bring a bevy of resources and innovative solutions to complicated projects. Our inaugural—and one of our most successful—projects was the redevelopment of a former landfill into what is now the Kroc Community Center in Camden.

In 2007, the Camden Chapter of the Salvation Army received a \$59 million grant from the Ray and Joan Kroc Foundation to build a new community center in Camden’s Cramer Hill neighborhood. The location that was sited for

WHAT IS A BROWNFIELD?

A “brownfield” is an urban planning term used to describe an industrial or commercial property that was previously exposed to hazardous substances. As defined under New Jersey state law (N.J.S.A. 58:10B-23.d), a brownfield is a former or current commercial or industrial site that is currently vacant or underutilized and on which there has or may have been a discharge.

CHECK IT OUT:

Get more information about CCI through the Discover DEP Podcast at njdep.podbean.com (Episode 6 Camden Collaborative Initiative with Frank McLaughlin) and on our DEP YouTube page (CCI Trenton).

PROTECTING OUR LAND

what would eventually become the Kroc Center was the former Harrison Avenue municipal landfill, had been out of operation for 35 years. DEP originally closed the landfill in 1971 due to the its lack of environmental controls; however, because of financial constraints the City of Camden was never able to properly close the 85-acre site. Once the Ray and Joan Kroc Foundation made its generous offer to endow the City of Camden with a new community center, it created a unique opportunity for DEP, the City of Camden and numerous other public and private partners to collaborate and complete this nearly \$26 million remediation.



The former Harrison Avenue Landfill during remediation.

On October 2, 2014, after our thorough remediation, this 120,000 square-foot community center was completed and made available for use. The center now regularly provides an array of activities for people of all ages, including various sports leagues, camps, arts education and worship services for Camden residents.

The remaining 62 acres of the former Harrison Avenue Landfill, that were not part of the Kroc Center redevelopment project are scheduled to be closed and remediated in the near future. As part of this estimated \$25 million project we will again work closely with local officials to develop

this portion of the property into a park and greenway along the river which will provide trails, wetlands and a living shoreline to help connect residents to nature—including bald eagles!



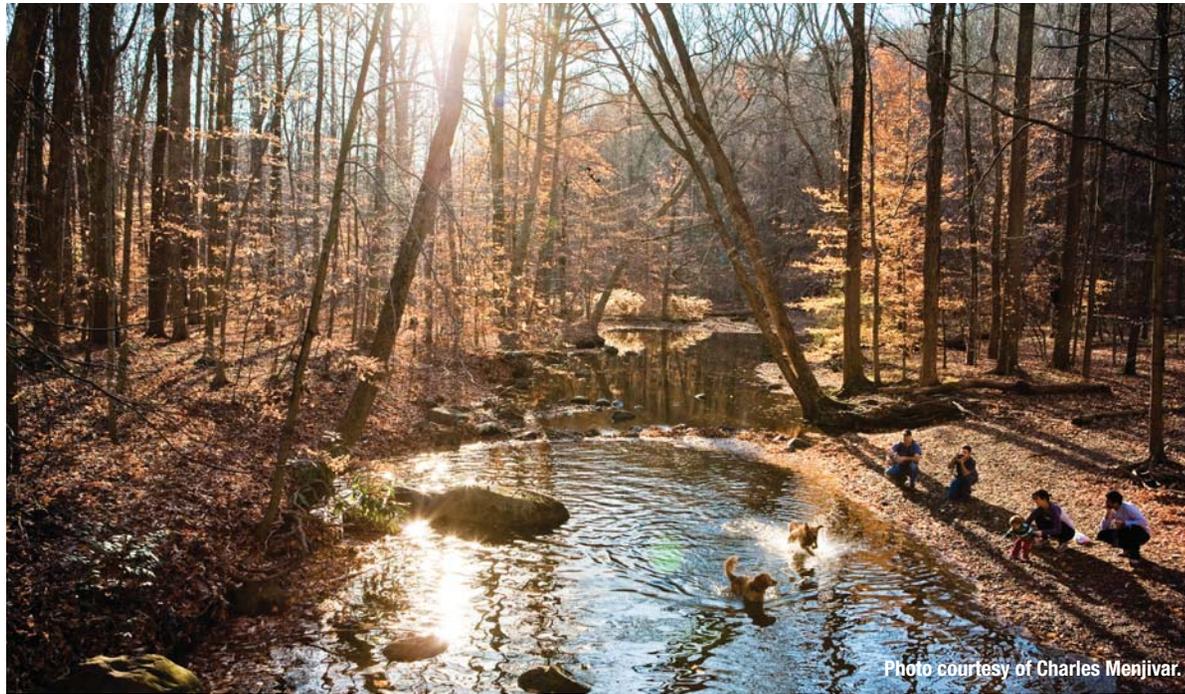
The completed Kroc Center in Camden.

5



Protecting Our Natural and Historic Resources

- ❖ **Implemented active forestry management approach, including controlled burns**
- ❖ **Completed 82 historic preservation projects, approved over \$500 million in certified rehabilitation costs and supported the recovery of historic properties after Superstorm Sandy**
- ❖ **Added 47,000 acres of land to our open space inventory**
- ❖ **Made our parks more self-sustaining and considerably more profitable through the Sustainable Parks Initiative**
- ❖ **Increased the size of our parks system**
- ❖ **Successfully implemented and defended many science-driven fish and wildlife management policies**
- ❖ **Used new technology and education programs to help the public understand and protect our natural resources**



New Jersey has many historic and natural resources that DEP is responsible for managing. With over 830,000 acres of public property to manage, millions of visitors to our state parks and forests and hundreds of different plant and animal species to protect, this has never been an easy task—especially considering that we are the most densely populated state in the nation. Not only do our natural and historic resources contribute to the aesthetic value of our state, they also represent an immense economic value. A study conducted by DEP in 2004 estimated that our state parks and forests generate on average \$1.2 billion annually. In addition, a 2013 study conducted by Tourism Economics found that heritage tourism

generated nearly 11 million visits in 2012, resulting in \$2.8 billion in visitor spending.

The last eight years were an especially critical time for DEP's Natural and Historic Resources Group; from funding challenges to a lack of modernization, it was clear from the onset of the Christie Administration that DEP must make meaningful changes to this group.

By making a conscious effort to preserve New Jersey's natural and historic resources, this administration ensured that New Jersey residents and visitors to our state are provided the best service and that our parks, forests, historic sites, and fish and wildlife will be here for years to come.

Through the promotion of educational resources, using innovative technology, developing more efficient policies and relying on the expertise of our dedicated staff we have made notable improvements to a myriad of our natural, ecological and cultural resources.

DID YOU KNOW?

DEP actively oversees, manages and protects 40 State Parks, 11 State Forests, 122 wildlife management areas, 3 recreation areas, over 50 historic sites and districts, 2 burial grounds, 6 State Marinas and 17 other miscellaneous areas that encompass over 830,000 acres.

WHAT IS THE NATURAL AND HISTORIC RESOURCES GROUP?

The Natural and Historic Resources Group is charged with preserving and protecting New Jersey's natural, ecological and cultural resources. This includes our state parks and forests, fish and wildlife management areas and historic sites that are valued by our residents and visitors to the Garden State. This group also promotes the responsible use and utility of our natural and historic resources to safeguard them for future generations.

NEW JERSEY FLORA AND FAUNA FACTS

State Tree: Northern Red Oak
State Bird: Eastern Goldfinch
State Fish: Brook Trout
State Flower: Common Meadow Violet
State Insect: European Honey Bee
State Mammal: Horse
State Dinosaur: Hadrosaurus
State Cryptid: Jersey Devil
State Fruit: Blueberry

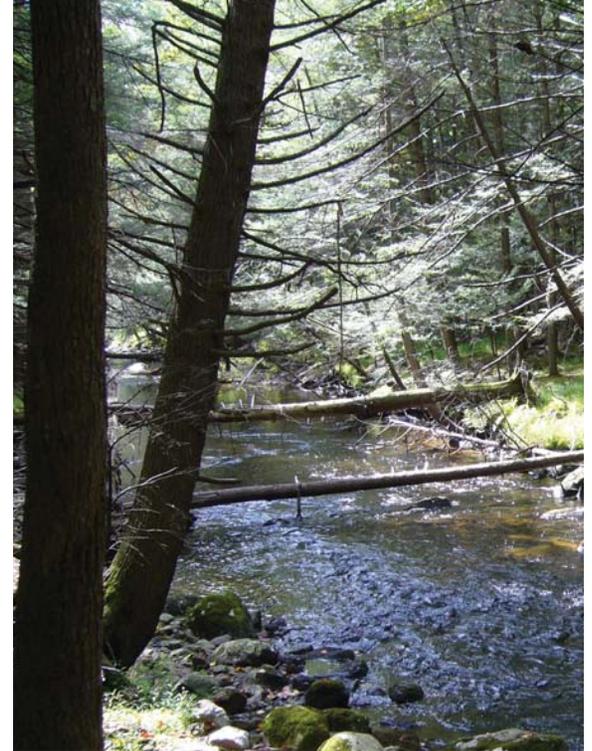
PROTECTING OUR NATURAL AND HISTORIC RESOURCES

Actively Managing Our Forests: In New Jersey, there are nearly 2 million acres of forested lands —public and private—with approximately 400,000 acres managed directly by DEP. Not only are our forests a beautiful recreational resource, they are also an integral part of the carbon cycle. It has always been important for us to manage the state's acreage; however, rather than limit ourselves to state-owned forests, DEP's Forest Service also provides assistance to private owners to help all of our state's forests remain healthy.

During the past eight years, the Forest Service revamped its efforts to ensure that all forested lands are better served by DEP. To support this effort, DEP partnered with the U.S. Forest Service to create Forest Inventory and Analysis Program to enact long term monitoring of all New Jersey

forests. Consequently, DEP developed the Forest Action Plan as a strategic plan to monitor and maintain all forested lands, which in turn made New Jersey eligible for additional funding. To further actualize our revitalization effort, DEP's Forest Service established a process for developing Natural Resource Stewardship Plans for all state managed forests. This process incorporates input from stakeholders inside and outside of DEP so that all our partners have input.

The Forest Fire Service responds, on average, to over 1,400 wildfire incidents a year and is currently testing a new fire detection camera system. The program further implemented enhancements to fire detection by using aircraft patrols on high fire danger days. The Forest Fire Service has also been responsible for constructing all its own unique wildland fire



Stokes State Forest in Branchville.



DID YOU KNOW?

Healthy forests periodically need to be burned to thrive and reduce wildfire hazards. This reduces the stress of overcrowding, removes built-up flammable materials, like dried leaves and pine needles and allows fire-dependent species to germinate. In fact, the pitch pine, a pine tree found frequently throughout the pine barrens, is a fire dependent species. Since 2008, the NJ Forest Fire Service has prescribed burned over 124,000 acres of forest and grass.

engines at its research and development facility. The program has built approximately 39 wildland fire engines over the past eight years. Building in-house saves approximately \$60,000 per wildland vehicle. Overall, in-house building has saved approximately \$2 million.

Unfortunately, our forests suffered major losses in the aftermath of Superstorm Sandy. Many trees across the state were seriously harmed or destroyed from wind or the storm surge. As many as 16,000 acres of forested lands were affected by the surge alone. Accordingly, the New Jersey



Host Bob Bostock interviews Assistant Regional Forester Bernie Isaacson about forestry in New Jersey for the "Discover DEP" Podcast. To listen visit njdep.podbean.com (Episode 35 Forestry in New Jersey with Bernie Isaacson)



Sometimes our wildland fire engines, like this one, are lent to western states during fire seasons.

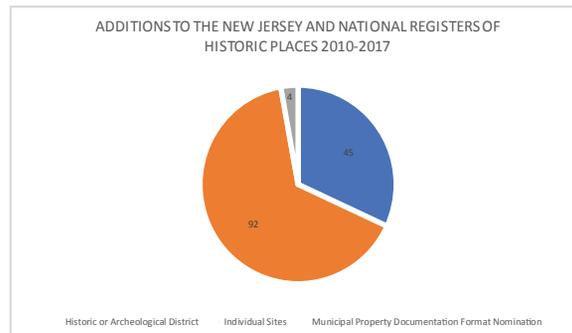
DID YOU KNOW?

Trees regularly remove CO₂ from the atmosphere via photosynthesis thereby decreasing its concentration in the air and increasing the amount of carbon that trees themselves store.

Forest Service partnered with the Arbor Day Foundation to create the New Jersey Tree Recovery Program. This program provides free seedlings to homeowners so that they can replace trees lost during Superstorm Sandy. DEP distributed over 459,000 free tree seedlings between 2014 and 2017 to New Jersey residents in 128 municipalities.

Preserving Our Heritage: Under the Christie Administration, 3,250 historic and archeological resources were added to the New Jersey and National Registers of Historic Places (**Figure 6**). This number represents historic buildings, structures, archaeological sites, objects and historic districts in each of our 21 counties. Through our Historic Preservation Office, DEP reviewed over 25,000 submittals pursuant to a

Figure 6



variety of historic preservation laws and regulations, including Section 106 of the National Historic Preservation Act and the New Jersey Register of Historic Places Act. The Federal Historic Preservation Tax Credit program promotes reinvestment in historic buildings, and is administered by the National Parks Service through the New Jersey Historic Preservation Office.

In addition to supporting private investment, DEP awarded nearly \$600,000 to 16 municipalities for a variety of activities, including cultural resource surveys, master plan elements, and preservation plans. The Historic Preservation Office continued to add data to the cultural resources Geographic Information System, with a 50% growth in mapped cultural resources statewide from 2010 to 2017.

Furthermore, after Superstorm Sandy, the National Park Service awarded New Jersey a \$13.1 million Emergency Supplemental Historic Preservation Fund Disaster grant to fund surveys and assessments, damage repair, and review streamlining activities. DEP also worked with the New Jersey Historic Trust to help historic places

DID YOU KNOW?

There are 50,523 individual properties listed on the New Jersey and National Registers of Historic Places and 61 National Historic Landmarks in New Jersey.

DID YOU KNOW?

Visitors to New Jersey's historic properties contributed over \$2 billion to our economy in 2012.

PROTECTING OUR NATURAL AND HISTORIC RESOURCES

recover from Superstorm Sandy, by funding storm recovery, repairs and rehabilitation of historic places. To date, over \$6 million has been paid to 39 historic preservation recovery projects statewide.

Environmental Justice: Connecting New Jersey residents in urban areas to our environment has also been incredibly important to DEP. Through our Office of Environmental Justice, DEP ensures the fair treatment of all races, cultures and incomes in the development, implement and enforcement of all of our environmental laws and regulations. This office has also been championing urban redevelopment and revitalization throughout New Jersey. During the last eight years, we have refocused the Environmental Justice Advisory Council to help us meet the needs of our urban



Fall volunteer day under way through the PEAS Initiative in partnership with Groundwork Elizabeth, 2017.

areas and recruited exceptional people to form the council.

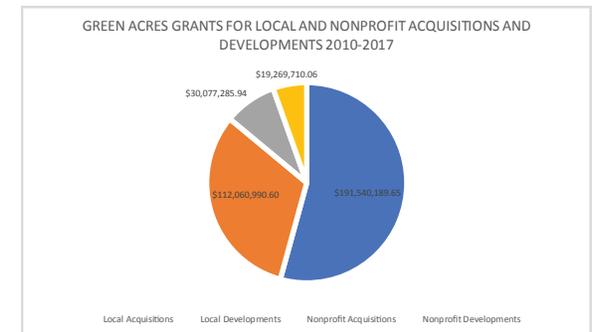
Urban agriculture has been particularly important to this office, since many urban areas are also “food deserts”—meaning that healthy, fresh fruits and vegetables are regularly unavailable in these areas. To address this problem, DEP awarded \$250,000 to fund the Permaculture Education Agricultural Systems (PEAS) initiative to support urban agriculture. In cooperation with Groundwork Elizabeth, PEAS has created learning laboratories, micro-farms, mobile agricultural labs and community gardens to support and sustain environmental stewardship efforts in our urban areas.

Additionally, in October 2017, DEP hosted the Environmental Justice Advisory Council’s Agriculture Symposium to discuss emerging concerns for urban agriculture in New Jersey. The goal of this symposium is to expand urban agriculture in New Jersey and to make strategic recommendations to DEP to help us focus our efforts to support the agricultural needs of our urban communities. We are especially proud to have provided \$91 million to urban parks and open space initiatives.

Preserving Our Open Space: DEP has also added to New Jersey’s open space inventory to guarantee that our state’s ever increasing recreational and conservation needs are met.

Green Acres was created as a result of an innovative bond referendum and is the oldest continuing program of its kind in the nation. Together, Green Acres and its partners have preserved nearly 1.5 million acres of open space

Figure 7



across the state, protecting that land forever from future development—that’s nearly one-third of all the land in New Jersey. In the most densely populated state in America, this is a substantial and enduring accomplishment.

Moreover, the Green Acres Program has helped local governments and qualified non-profits fund acquisitions and park developments. The funding Green Acres has provided has been critical in allowing governments and nonprofits to complete preservation projects by providing additional preservation dollars to those entities through matching federal, state, county and local funds, and some monies from private sources (**Figure 7**).

In keeping with the Green Acres Program’s long tradition of preserving New Jersey’s open space, over the past eight years the Christie Administration has been responsible for adding an additional 47,000 acres—or 73 square miles—to our open space inventory. More than 32,000 of those acquired acres were additions to state parks, forests, wildlife management areas and natural areas.

WHAT IS WILDLIFE MANAGEMENT?

Wildlife management is human-led effort to balance the needs of humans with those of wildlife by drawing from a wide range of scientific disciplines, such as biology, chemistry, ecology, climatology and statistics.

In 2016 alone, the Christie Administration made \$93.3 million in Green Acres Program funding available for open space acquisitions and recreational development projects across the state. This administration then went on to approve nearly \$81 million in funding for Green Acres projects in 2017, continuing to support our dedication to open space projects across all levels of government.

This was also the first time that DEP has ever offered funding for land stewardship projects—activities that exceed the scope of routine maintenance to restore and enhance lands for recreational or conservation purposes.

Our Green Acres Program has also made profound impacts in many of our urban areas. In 2017, DEP provided matching grants of at least \$1 million to 31 cities to support many of their recreation and open space initiatives. We have made particularly notable impacts on the cities of Camden and Newark.

In Camden, some of these funds went on to support continued enhancements to the North Camden Waterfront Development Project, a 2.4-mile park and greenway along the Delaware, to build the new RCA Pier Park from a former industrial pier. And in Newark, we

WHAT IS THE HAZARDOUS DISCHARGE SITE REMEDIATION FUND (HDSRF)?

The HDSRF is a fund that was established in 1993 to provide financial assistance to public, private, and non-profit entities in the form of a grant or loan to remediate a site. The HDSRF is funded through a portion of the New Jersey Corporate Business Tax and is administered through a partnership between DEP and the New Jersey Economic Development Authority.

awarded the City a \$1 million grant to purchase 13 properties along the Passaic River to expand the popular Passaic Waterfront Park. This park was originally created through a \$1.8 million Hazardous Discharge Site Remediation Fund grant through our Site Remediation Waste Management Program.



Island Beach State Park.

Improving Our Parks: It has been a challenge to make our state parks self-sustaining. Among some of the major challenges the park system has faced were how to create low-cost, safe and enjoyable recreational opportunities while operating with an \$18 million annual deficit. Clearly our parks needed to find new and innovative ways to generate revenue and improve accessibility to park goers.

In 2011, DEP introduced the Sustainable Parks Initiative (SPI) to address this issue. The SPI was determined to move our parks away from reliance solely on the General Fund. Without additional funding, our parks system often faced funding difficulties that hampered their ability to protect, preserve and promote their assets.

First, the SPI required parks to seek out new revenue sources. DEP expanded marina rental incomes at Leonardo Marina and reopened the Island Beach State Park Marina. We also

PROTECTING OUR NATURAL AND HISTORIC RESOURCES

expanded amenities at our parks. At Island Beach State Park we expanded food concessions, added a wine and beer bar, created a beach shop and revitalized the Friends of Island Beach State Park Organization. Because of these efforts, Island Beach State Park now generates \$3 million annually, to support its operations.

The second part of the SPI called on DEP to enhance many of its internal park processes. Some of the improvements included revising lease and concession rates at our parks to reflect fair market prices, updating and streamlining the process for qualified non-profit agencies to become Friends Organizations and proposing major changes to the Administrative Code to increase revenue. Through the SPI, an incentive program was also created where Park Superintendents retained a percentage of their earned income above revenue goals.

Today, revenue from our state parks helps them contribute nearly a third of their operating budgets and are on track to increase that percentage in coming years.

DEP also has several major capital improvements underway. We recently completed a renovation

WHAT IS A "FRIENDS ORGANIZATION"?

Friends organizations are non-profit, volunteer organizations formed to improve interpretive, educational, recreational and research programs and events at various state parks. They are also able to fundraise on behalf of their respective parks without being part of DEP.

and restoration of the historic Central Railroad of the New Jersey Terminal at Liberty State Park as well as the new Monmouth Battlefield State Park Visitors Center, which is the first certified Leadership in Energy and Environmental Design project for the department. We also completed recovery of all its damaged assets from Superstorm Sandy, which incorporates best design standards for storm resiliency and new FEMA flood elevations.

In addition to creating a sustainable parks system, DEP also increased the size of our park system. In 2016, we opened Tall Pines State Park, the first ever state park in Gloucester County bringing our grand total of parks to 40. Before this land was acquired, it was a golf course that once was targeted for a new housing development. Rather than lose the opportunity to preserve this land, we worked with our partners to create Tall Pines State Park. Today, its 110 acres of grasslands, woodlands, small



Lieutenant Governor Kim Guadagno, Deputy Commissioner David Glass and Brigantine Mayor Philip J. Guenther observe a home elevation in Brigantine.



Tall Pines State Park in Gloucester County.

ponds and freshwater wetlands have been made available for public enjoyment.

Committing to Responsible Fish and Wildlife Management:

DEP has many diverse fish and wildlife species to protect in our forests, lands and waters. New Jersey's impressive biodiversity includes approximately 450 species of vertebrate wildlife, 85 freshwater fish, 28 marine mammals and 336 marine finfish. To ensure that our diversity endures, DEP has initiated many successful fish and wildlife

PROTECTING OUR NATURAL AND HISTORIC RESOURCES

management policies. Three of the most outstanding fish and wildlife management strategies DEP adopted during the last eight years were the Comprehensive Black Bear Management Policy, bald eagle restoration and defense of New Jersey's summer flounder fishing season:

Comprehensive Black Bear Management Policy

On July 10, 2010, Commissioner Martin approved the New Jersey Fish and Game Council's (Council) comprehensive Black Bear Management policy which included reinstating the state's annual bear hunt and many other non-lethal measures. The hunt was reinstated due to the growing population of black bears in

the state leading to an increased number of human-bear interactions. In addition to reopening New Jersey's annual bear hunt, the policy emphasized public education and research to ensure the continued presence of bears in New Jersey and to reduce the amount of human and bear encounters. Now several years after the first hunt, we have seen measurable results. A 2016 study conducted by Utah State University confirmed that after nearly three years of analysis the hunt, public education and research have successfully decreased the number of human/bear encounters while maintaining a sustainable and healthy population of bears.

WHAT IS THE NEW JERSEY FISH AND GAME COUNCIL?

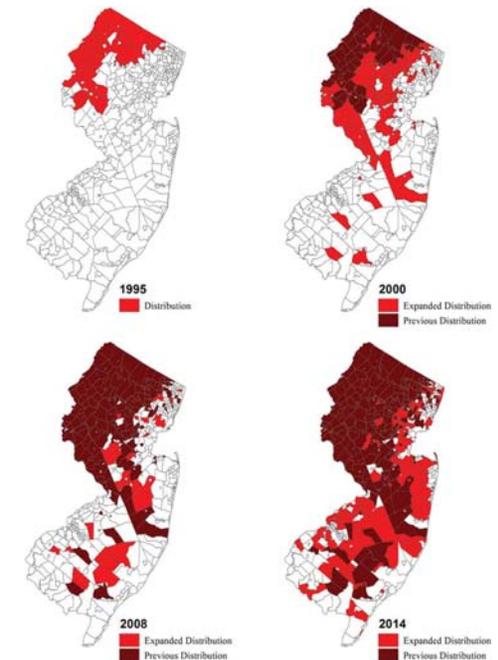
The Fish and Game Council was created by Law in 1945 (N.J.S.A.13:1B-24) and succeeded the former Board of Fish and Game Commissioners. This council has the authority to adopt and amend regulations which govern hunting, freshwater fishing and trapping. The council can also develop comprehensive policies concerning fish and wildlife and advise or consult with the DEP Commissioner and the director of the Division of Fish and Wildlife about new policies.



Bears can be drawn to improperly maintained trash and unwittingly come into contact with people.



Hikers will occasionally encounter bears on trails. To stay safe follow our bear safety tips: www.state.nj.us/dep/fgw/bearfacts_safetytips.htm.



The Comprehensive Black Bear Management Policy is designed to decrease the number of human and black bear encounters which have been on the rise during the last two decades.

PROTECTING OUR NATURAL AND HISTORIC RESOURCES

Bald Eagle Restoration

The bald eagle population in New Jersey was severely damaged by chemical use after World War II from persistent chemicals like DDT and PCBs, which pushed the species to the brink of extinction in New Jersey. By 1970, the situation was so dire that there was only one nesting pair of eagles in the entire state. Although bald eagles are still endangered in New Jersey, the population has made a substantial rebound over the last 40 years. Because of DEP's efforts, there are now 172 nesting sites in New Jersey and 150 nesting pairs. Some of the techniques DEP has used to support the bald eagle population range from artificial incubation to restricting access near nesting sites. Additionally, from 2010 until 2015, the number of bald eagles that were fledged has



A bald eagle being released back into the wild.

nearly tripled and the number of active nests has doubled from the five previous years. In cooperation with the Conserve Wildlife

Foundation of New Jersey, we also maintain an eagle watch camera at Duke Farms in central New Jersey that gives viewers an intimate look at eagles, which you may view by using the following link: www.conservewildlifenj.org/education/eaglecam/.

Ospreys

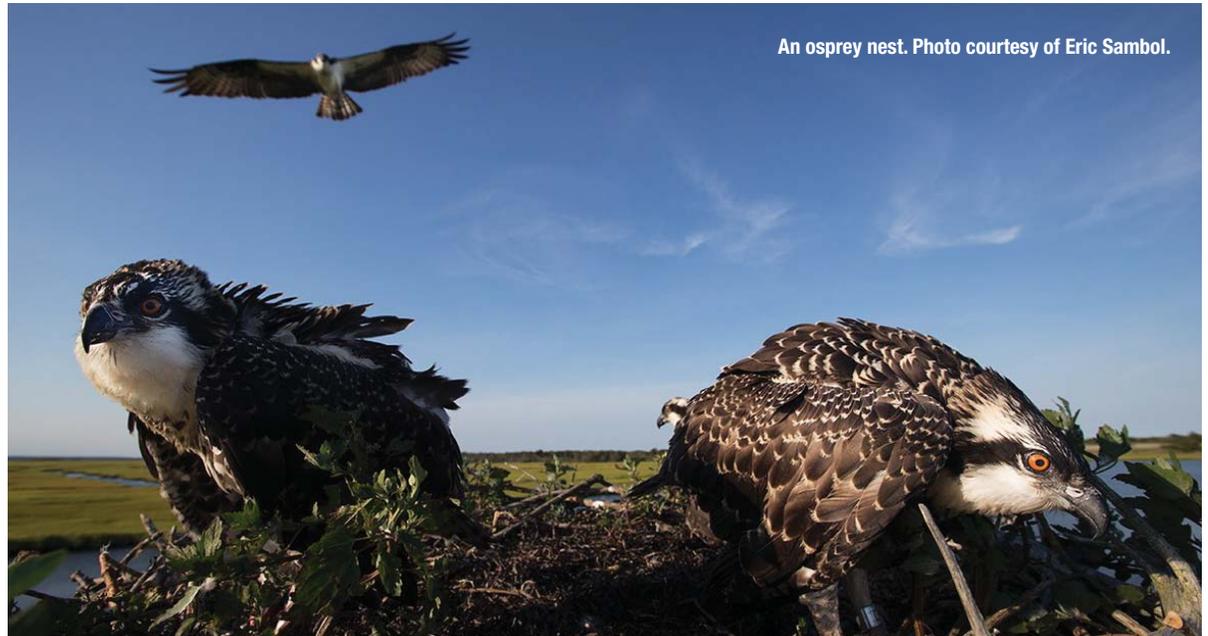
Like Bald Eagles, Ospreys were also threatened by DDT and PCBs. After DDT was banned in 1970, the osprey population began to rebound and has experienced a major resurgence in recent years. A survey of nesting pairs in New Jersey conducted by DEP's Endangered and Nongame Species Program in 2013 found there were 542 nesting pairs in New Jersey—far more than the 60 pairs that were counted in 1974.

WHAT IS DDT?

Dichlorodiphenyltrichloroethane (DDT) is a type of insecticide that was used extensively throughout the United States until it was banned in 1972. DDT is listed as a probable carcinogen and is suspected to be a potential cause of liver, testicular and breast cancers.

WHAT ARE PCBs?

Polychlorinated Biphenyls, or "PCBs," are a group of man-made chemicals made in the United States between 1929 and 1979 for electrical equipment, plasticizers, pigments, dyes and rubber products. They were ultimately banned once it was discovered that PCBs are toxic, bioaccumulate and do not readily degrade in the environment. In humans and animals, PCBs have been linked to reproductive difficulties.



An osprey nest. Photo courtesy of Eric Sambol.

PROTECTING OUR NATURAL AND HISTORIC RESOURCES

Horseshoe Crabs

Horseshoe crabs are also incredibly important to our ecosystem in New Jersey. During the spring and summer, they lay their eggs on the beach which are used as a food supply by migrating shorebirds, such as the red knot. To support the Horseshoe Crab population, DEP launched the “reTURN the Favor” initiative. As part of this initiative, our Division of Fish and Wildlife and other nonprofit groups coordinated nearly 500 volunteers to search for horseshoe crabs along the Delaware Bay and rescue crabs in distress. Because of this effort, nearly 10,000 horseshoe crabs were saved.

Red Knots

In 2016, the red knot was classified by the United States Fish and Wildlife Service as a threatened species. Red knots also happen to be frequent visitors to the Delaware Bay area as a stop on



Horseshoe crabs along the Delaware Bay.

their long journey to their Arctic breeding grounds. Red knots stop here predominantly to feast on the eggs laid by horseshoe crabs. To support the red knots and provide a new avenue for public access, DEP is in the process of purchasing and protecting a 206.8-acre bay-front property. We



A red knot being examined by DEP scientists.

will also make a portion of this property available for leaseholders within the state Aquaculture Development Zone (ADZ). This will also give aquaculturalists easy access to the beach without disturbance to red knots and other migratory shorebirds.

Summer Flounder

This year, the summer flounder fishing season in New Jersey began on May 25th and ran through September 5th, with an 18-inch minimum length

requirement and allowing three flounder to be taken per person per day. Although DEP conducted a significant amount of research indicating that these figures would be protective of the summer flounder population, the Atlantic States Marine Fisheries Commission (ASMFC) disagreed with DEP's proposed limits. This commission coordinates the conservation of 27 nearshore fish species from Maine to Florida. Instead of accepting New Jersey's proposed season, the ASMFC originally set a precautionary default measures of 20 inches and a bag limit of two; eventually, the Commission reduced its recommended minimum length to 19



Rally to save the New Jersey Summer Flounder fishing season, 2017.



PROTECTING OUR NATURAL AND HISTORIC RESOURCES

inches but maintained that the bag limit should be 2 fish per day per person. Knowing that the ASMFC's standards were derived from imprecise data, DEP used its own more accurate data to defend our original standards for the summer flounder season limitations.

Ultimately, after appealing the issue to the National Oceanic and Atmospheric Administration (NOAA), NOAA agreed with DEP's proposed summer flounder size, bag limits and season instead of the ASMFC's recommendations. This decision was also affirmed by U.S. Secretary of Commerce Wilbur Ross who concurred with NOAA that New Jersey complied with management of summer flounder. To continue to support our summer flounder, DEP launched an educational campaign "If You Can't Keep It, Save It!" to educate the fishing public on the proper methods and equipment to use to reduce unintentional mortality rates and improve our summer flounder population. The campaign encourages anglers to follow three simple techniques:

1. Plan ahead: Expect to release fish and have the necessary equipment to do so, including de-hookers and nets; more experienced anglers may also consider using a recompression tool, a device that allows fish to be returned to the water at a safer depth.

2. Use appropriate gear: Use gear suited to the size of the fish that you are trying to catch; 5/0 to 7/0 size hooks are recommended to successfully land bigger fish and reduce discards. DEP worked with the American Sportfishing Association and Eagle Claw Fishing and Tackle Co. to provide 20,000 free,

larger sized "J hooks" to anglers to help anglers hook larger flounder and protect the smaller fish from being caught.

3. Handle fish carefully: Use knotless, rubberized landing nets and rubberized gloves to avoid removing the protective slime layer on fish and help ensure survival when the fish is returned to the water.

Education: Nearly all of DEP's fish and wildlife policies emphasize public education. DEP relies on its educational programs as a key resource to teach New Jersey residents about our state's fish and wildlife. In fact, the success of these policies, our forest fire awareness and the cleanliness of our parks are all largely dependent on how informed the public is about DEP's rules. However, with such an array of diverse life and concerns in New Jersey it is impossible to have a "one-size-fits-all" style of educational outreach which is why we employ many different styles to connect with New Jersey residents.

To support this effort, DEP hosts the NJ WILD Outdoor Expo every year. This annual event helps people connect with the natural world by providing them a unique blend of conservation information, education and hands-on opportunities to learn outdoor skills and activities that can be enjoyed on state lands. The Expo has attracted 45,000 visitors during the past eight years.

In 2012, Governor Christie signed legislation creating the "Hooked on Fishing-Not on Drugs" program. The program is administered by DEP's Division of Fish and Wildlife and is designed to encourage school-age children to



NJ WILD Outdoor Expo demonstrations.

PROTECTING OUR NATURAL AND HISTORIC RESOURCES

avoid drugs, alcohol and tobacco by providing fishing as an alternative activity. In addition to learning how to fish, children learn about different aquatic ecosystems, outdoor ethics and respect for the natural world. The program has been nationally recognized by the Future Fishermen Foundation which acknowledges this program as the foundation's flagship youth education program.

We have also made sure that our educational outreach is extended to schools. For instance, following the reimplementation of the state's annual bear hunt as part of the Comprehensive Black Bear Management Policy, DEP produced a black bear documentary and classroom curriculum to educate school aged children about black bears in New Jersey. More than 5,500 DVDs and 260 classroom kits were produced and made available online. More than 4,700 copies of the DVD and more than 210 copies of the curriculum have been distributed to schools, municipalities, and the public to teach residents how to coexist with black bears.

We also made a concerted effort to educate the public about fire prevention. Over the past eight years, we have participated in many national and state public education programs, such as Firewise Communities, Fire Adapted Communities, as well as Ready Set Go and Sustainable New Jersey, so that New Jersey residents are better informed about how to prevent fires. Because of these outreach efforts our Forest Fire Service was ranked as one of the top five programs in the nation. With the Fire Adapted Communities Learning Network based in Colorado, New Jersey was selected to host one of the only 18 "learning hubs" nationwide, which has led to

the establishment of the first ever municipal fire safe council. With the Forest Firewise and Community Wildfire Protection Plans, we have been awarded \$2.5 million in competitive grants. Each of these programs give citizens resources and their communities the resources to prepare for and prevent fires.

DEP also leveraged new technology in our parks to provide an illegal dumping app as part of the

"Don't Let Our Parks Go to Waste" public education campaign, which is part of our larger "Don't Waste Our Open Space" campaign. With the increased number of Wi-Fi hotspots in our parks accessing the app will help get debris cleaned up sooner, and it is more likely that our conservation officers and state park police will be able to catch the dumpers.



State Park Police help hunters during the season.

6

Superstorm Sandy



- ❖ **DEP led one of the most complex disaster cleanups in the nation**
- ❖ **Removed millions of cubic yards of debris from our land and waterways**
- ❖ **Carried out Governor Christie's vision for a full coastal protection system**
- ❖ **Improved our water infrastructure**
- ❖ **Used the DEP Blue Acres programs to purchase properties at risk for flooding and to move occupants out of harm's way**
- ❖ **Leading two "Rebuild by Design" projects in North Jersey totaling \$380 million to protect the Hudson Riverfront**

SUPERSTORM SANDY

On October 29, 2012, Superstorm Sandy made landfall in New Jersey. In addition to 80 mph winds, the storm brought with it massive amounts of flooding, power outages and infrastructure impact. Problematically, storm forecasts of how large it would be and where it would make landfall varied wildly, from Tropical Storm to Category 2 Hurricane, from Cape Charles, Virginia to Fire Island, New York. Some models even showed the storm would turn out to sea. With so much disparity in the forecasts even 24 hours before Sandy hit New Jersey, it was particularly challenging to identify the top

priorities for pre-storm planning and to develop response plans.

Now, five years later Superstorm Sandy is remembered as the most powerful and destructive storm the state has ever weathered. In its wake, it left New Jersey with the challenge of recuperating from staggering devastation. DEP and the Christie Administration were able to provide short term relief and undertake significant, long-term actions to prepare our state for future storms.

SANDY FACTS:

- The storm caused losses to the state upward of \$30 billion.
- Over 2 million households lost power.
- 1,400 vessels were sunk or abandoned.
- 346,000 homes were damaged or destroyed.
- 70 drinking water systems were affected by power loss and damages.
- 80 wastewater treatment plants were affected by power loss and damages.
- Several Jersey Shore attractions, including Casino Pier in Seaside, were destroyed.

Short Term Responses: As soon as it was safe to do so, DEP sent staff to every town affected by Superstorm Sandy to assess damages, triage needs, identify and mobilize resources, and try to begin to return a sense of 'normalcy' as quickly as possible. Extended power outages and severe flooding affected critical infrastructure throughout the state. In between Sandy and a nor'easter that followed just a week later, DEP had the U.S. Army Corps of Engineers deliver sand to several hard-hit towns to replenish their beaches before the nor'easter hit.

We were also keen to ensure that we made an appropriate response to protect our infrastructure and other resources by taking the following actions:



Governor Christie, Lt. Governor Kim Guadagno, Commissioner Martin, senior staff and cabinet members met to discuss preparations for Superstorm Sandy, October 27, 2012.



Damage from Superstorm Sandy.

Beach replenishment underway.

Dams

Evaluating the integrity of the numerous dams across the state was a top priority following the storm. DEP contacted owners of high hazard dams, large dams, dams under construction and dams that had reported concerns in the past to assess any storm impacts. We were fortunate that no damages were reported to any dam.

Contaminated Sites

To determine whether any of the contaminated sites across the state suffered damage that would pose a threat to public health and safety, DEP contacted responsible parties and LSRPs after the storm to have them address any new immediate environmental concerns or changes in site conditions that the storm may have caused.

Preparing to Rebuild

In response to the Governor's clear direction to expedite repairs to critical public infrastructure such as roads and bridges, Commissioner Martin promptly signed an Administrative Order temporarily easing paperwork requirements that could have delayed such repairs. In addition, in consultation with the Governor's Office and FEMA, DEP analyzed appropriate rebuilding standards in coastal zones and flood hazard areas. New Jersey has 231 municipalities in 16 counties that are in tidally flowed areas (this includes both coastal towns and municipalities that lie along major rivers and their tributaries). DEP quickly issued Emergency Coastal and Flood Hazard Rules to help advance recovery efforts in those areas. Commissioner Martin also assigned

four senior-level DEP staff with extensive technical knowledge to the Governor's Office of Recovery and Rebuilding to assist that office with its efforts.

Shellfish

As soon as practical following the storm, DEP performed water quality sampling and shellfish tissue sampling to assess damages to the state's shellfish beds. Based on the results of that testing, all shellfish beds in the state were able to be reopened less than six months after Sandy.

State Parks

Almost all of New Jersey's state parks and forests suffered some storm-related damage, with 35 of these facilities sustaining heavy damage to lands,

SUPERSTORM SANDY

trees, buildings and other infrastructure, including roadways and trails. Storm surges and severe inland winds damaged or destroyed buildings, docks, bulkheads, dunes, vehicles, equipment and utilities, and over 300 miles of trails. Among those parks suffering the greatest damage were Liberty State Park and Island Beach State Park. At Liberty, the entire park was under six feet of water, significantly damaging the historic Terminal Building, the ferry slip, and the Hudson River Walkway. Island Beach sustained severe beach and dune erosion as well as the destruction of

boardwalks and other infrastructure. Despite the enormous damage done across the entire state park system, all parks were reopened.

Expedited Cleanups: One of the most obvious and immediate repercussions of Superstorm Sandy was the amount of debris it created. The storm generated about 8 million cubic yards of debris in the hardest hit counties in the state. Rather than allowing the storm's wreckage to remain in the streets and the sides of roads, DEP immediately tasked

dozens of staff from across programs to go out to each municipality to assist with identifying sites to serve as Temporary Debris Management Areas. Then, DEP quickly issued 326 temporary debris management area approvals. Temporary debris management areas are locations that are used to temporarily stage and or process debris that cannot be immediately taken to a disposal or recycling facility, unlike permanent facilities that address debris year-round. DEP also assigned Single Points of Contact (POCs) to work as liaisons with municipalities to assist them with their status and needs, and to monitor debris removal contractors and debris monitoring operations.

To increase waste-hauling capacity, DEP issued Temporary Solid Waste Vehicle Registrations to 249 companies for nearly 1,300 pieces of equipment. DEP identified multiple sites to stage thousands of storm-impacted vehicles.

But our cleanup efforts were not just limited to our land. Cleanup of waterway debris—everything from lawn chairs to sunken boats and even houses—was also a massive undertaking. Side scan sonar was conducted in 196,000 acres of water to identify the debris so it could be removed. More than 103,000 cubic yards of debris were removed from New Jersey waterways, not including cars, boats and homes—one of the largest undertakings of its kind ever in the nation. Additionally, more than 371,000 cubic yards of sediment were removed from Barnegat Bay, other waterways and marinas up and down the New Jersey coast.



Post-Sandy debris removal.

DEP's decisive move to immediately begin clearing debris became essential to create a foundation for the state's recovery.

Beach Construction: In the aftermath of Superstorm Sandy, beaches up and down the Jersey Shore suffered significant damage, but inspections carried out after the storm found that engineered and maintained beaches fared significantly better than those that were not, and that homes and businesses in those towns were better protected. Clearly, future disasters could be prevented by investing in shoreline resiliency. Properly designed beaches and dunes can absorb impact from storm surges and prevent damage to surrounding buildings and infrastructure. This meant that the administration was tasked with the responsibility of not only determining appropriate locations for beach construction but also procuring resources to realize its ambitions of creating a more resilient shoreline. In the five years since Superstorm Sandy, DEP has worked closely with the U.S. Army Corps of Engineers on the massive undertaking to repair beaches and to build the most comprehensive coastal protection system New Jersey has ever had. Specifically, the state completed eight major repair projects at engineered and constructed beaches.

In 2017, DEP and the U.S. Army Corps of Engineers began construction on two major beach projects in Northern Ocean County and Absecon Island. The project in Ocean County will cover approximately 14 miles of coastline and will be responsible for protecting nine different coastal communities. As part of this project, DEP was funded by the New Jersey Department of Transportation and the Federal

WHAT IS AN ENGINEERED BEACH?

An engineered beach is a beach that has a specific performance or design life expectation. The design is based upon the stakeholder's expectations, whether that is for recreational beach enhancement, habitat mitigation or erosion mitigation. Engineered beaches can feature hard structures, such as wood and rock groins, or soft structures, such as dunes and vegetation.

WHO AT DEP MANAGES COASTAL PROTECTION?

The Engineering and Construction Program is DEP's program area responsible for administering shore protection, dam restoration and flood control projects throughout New Jersey. This program has been responsible for managing more than \$1.5 billion in federal post-Sandy projects.

WHAT IS THE U.S. ARMY CORPS OF ENGINEERS?

The U.S. Army Corps of Engineers is a federal agency that delivers engineering services to a variety of customers, including over 130 foreign countries. The Corps is guided largely by sustainability concepts which it believes strengthens our nation's national security and infrastructure.



Beach construction along the Jersey Shore.

SUPERSTORM SANDY

Highway Administration to build a secondary line of shore protection in the form of a four-mile steel wall in Mantoloking and Brick. This will provide additional protection to Route 35, the main artery of the coastal evacuation route, which was severely damaged during Superstorm Sandy. The \$63 million project on Absecon Island will also serve as protection for several key shore resort communities much like the North Ocean County project will.

In total, DEP has invested \$1.24 billion in beach construction, dune construction and other flood control projects across the state.

Improvements to Water and Wastewater Infrastructure: At the height of DEP's response, nearly 100 wastewater treatment plants serving about 3.5 million people in all 21 counties reported treatment or operational issues due to Sandy, with damages estimated to be more than \$3 billion. Some 70 water supply facilities also were in distress. With a few notable exceptions, most facilities did not suffer structural damage; the challenge was the widespread power outages and uncertainty about how long they would last, requiring that they operate on backup power. These facilities are required to keep 24-48 hours of backup fuel on hand, but nearly all the facilities that lost power were without power for a week.

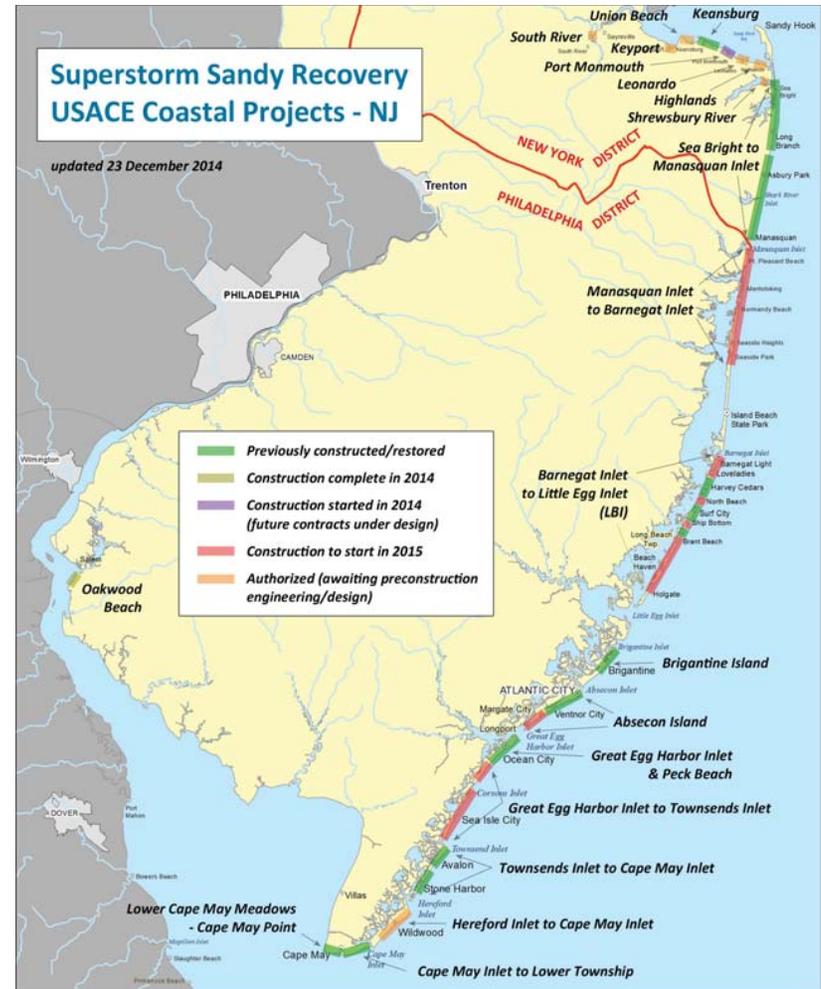
Governor Christie issued an Executive Order declaring a water emergency. It was the first time in New Jersey that water restrictions were required, not due to a lack of water, but to limit the volume going into the stressed wastewater treatment plants. A total of 35 water systems were subject to Boil Water Advisories in the wake of Sandy, affecting 362,200 people. Fewer than

five of those advisories were triggered due to flooding impacts to source water or treated water; the vast majority were the result of utility power disruptions affecting operations.

DEP, working with State Police and the National Guard, led the effort to keep generators and fuel available for uninterrupted operation, and assisted with interconnections. Thirty generators were dispatched and ran 24/7 for 14 days. DEP also helped coordinate the transport of 35,000 gallons of diesel per day for 10 days.

Long-Term Recovery and Rebuilding: To ensure that New Jersey is better able to weather future superstorms, we have been working every day since Sandy to improve the state's ability to protect life, property and infrastructure and ensure that we are well prepared to quickly recover from future storms. These efforts have included moving people and property out of harm's way, creating a comprehensive coastal protection system, and working with a wide variety of partners to increase the resilience of critical infrastructure.

In recent years DEP has been working closely with U.S. Army Corps of Engineers, federal, state, county and local officials, and thousands of private property owners along the Jersey shore to construct a comprehensive shore protection system. When completed, this system will



USACE Superstorm Sandy Coastal Recovery Projects in New Jersey, 2014.



Home demolition in Ortley Beach.

provide an unprecedented level of protection from future storms along our entire 127 miles of Atlantic coastline. It represents an investment of more than \$2 billion, funded in large part by the federal government as well as by New Jersey. The system includes everything from a steel sheet piling wall in Brick and Mantoloking, to a rock sea wall in Sea Bright, to five major new engineered beaches and dunes in dozens of coastal communities. In addition, USACE is designing and constructing comprehensive flood control

projects in Union Beach and Port Monmouth, two of the communities hardest hit by Sandy.

To further our preparedness, the U.S. Department of Interior has provided more than \$7 million in matching grants for coastal resiliency projects, with New Jersey providing an additional \$6 million. The projects funded by these monies include the reuse of dredged materials to restore 90 acres of salt marsh for Avalon, Stone Harbor and Fortescue, and the

creation and improvement of Liberty State Park's 40 acres of salt marsh and 100 acres of upland habitat in Jersey City. DEP is also supporting the Department of the Interior's efforts to dredge a majority of the state's 206 navigation channels, most of which required significant dredging prior to Sandy and were further impacted by the storm.

DEP is also leading two "Rebuild by Design" projects, funded by the U.S. Department of Housing and Urban Development (HUD), to provide flood protection to Hoboken, Jersey City and Weehawken along the Hudson River waterfront and to the Meadowlands area near Little Ferry, Teterboro, Moonachie, and Carlstadt. HUD is providing a total of \$380 million for the two projects.

Through DEP's Sandy Blue Acres program, the Christie Administration has committed \$300 million to give homeowners the option of selling their properties damaged by Superstorm Sandy in tidal areas of New Jersey at pre-storm value so they can relocate out of harm's way. Once acquired, the properties are demolished and then converted to open space, accessible to the public for recreation or conservation and to serve as natural buffers against future flooding.

DID YOU KNOW?

The Blue Acres Program made offers to 882 homeowners and of those offers 677 were accepted. DEP completed closing on more than 600 properties and demolished 459 homes. 64 short sales or payoff approvals were granted from 32 lenders for a total debt forgiveness of \$4.5 million.



Commissioner Martin and the U.S. Army Corps of Engineers announces the beginning of beach replenishment in Sea Isle City.

To date, the Blue Acres program has secured \$375 million in federal and state funding for buyouts, made buyout offers to nearly a thousand homeowners and closed on over 600 properties in 14 municipalities in 8 counties. Thus far, DEP has purchased more than 600 homes. This program has also facilitated short sale/payoff approvals from 32 lenders for 66 homeowners who were upside-down on their mortgages with total debt forgiveness surpassing \$5.1 million.

7



Additional Resources

- ❖ **Web Resources**
- ❖ **Works Cited**
- ❖ **Endnotes**
- ❖ **Acknowledgements**

ADDITIONAL RESOURCES

WEB RESOURCES

Air and Sustainable Energy

Facebook: https://www.facebook.com/pg/NJDEPAQES/posts/?ref=page_internal
Air Quality, Energy and Sustainability Website: <http://www.nj.gov/dep/aqes/>
NASA Global Climate Change: <https://climate.nasa.gov/>
NJ Energy Master Plan 2011: http://nj.gov/emp/docs/pdf/2011_Final_Energy_Master_Plan.pdf
NJ Energy Master Plan 2016 Update: http://nj.gov/emp/docs/pdf/New_Jersey_Energy_Master_Plan_Update.pdf
NJDEP Section 126 Petition Fact Sheet: http://www.nj.gov/dep/docs/portland/nj126petition_fs.pdf
NJDEP Signed 126 Petition: <http://www.state.nj.us/dep/baqp/petition/126-Petition-051210%20signed.pdf>

Clean Water

Barnegat Bay Phase One 10 Point Plan: <http://www.nj.gov/dep/barnegatbay/index.htm>
Wreck Pond Data Map: <http://www.nj.gov/dep/wreckpond/datamap.htm>
Wreck Pond Restoration Action Plan: <http://www.nj.gov/dep/wreckpond/actionplan.htm>
Wreck Pond Implementation Plan: http://www.nj.gov/dep/wreckpond/docs/final_addendum_implementation_report.pdf
Private Well Testing Data: <http://njdep.maps.arcgis.com/apps/MapSeries/index.html?appid=826ec9fae77543caa582a787d5f088e7>
PFNA: <http://nj.gov/dep/dsr/pfna/draft-final-pfna-support-document.pdf>
1,2,3-TCP: <http://www.nj.gov/dep/watersupply/pdf/123-tcp-recommend.pdf>
Federal Lead and Copper Rule: <https://www.epa.gov/dwreginfo/lead-and-copper-rule>
DEP Lead in Drinking Water: <http://www.nj.gov/dep/watersupply/dwc-lead.html>
EPA Focused Feasibility Study:
<http://passaic.sharepointspace.com/Public%20Documents/2014-03-10%20LPR%20Focused%20Feasibility%20Study%20Report.pdf>
HABs: <http://www.state.nj.us/dep/wms/HABS.html>

Protecting Our Land

Site Remediation Program Website: <http://www.nj.gov/dep/srp/>
Land Use Management Program Website: <http://www.nj.gov/dep/lum/>
Waste Management Website: <http://www.nj.gov/dep/dshw/>
LSRP Hiring Guide: http://www.nj.gov/l srpboard/board/licensure/l srp_hiring_guide.html
UST Fund: <http://www.nj.gov/dep/srp/finance/ustfund/>
EPA Lower Passaic Record of Decision:
<http://passaic.sharepointspace.com/Public%20Documents/Passaic%20Lower%208.3%20Mile%20ROD%20Main%20Text%20396055.pdf>
EPA Focused Feasibility Study:
<http://passaic.sharepointspace.com/Public%20Documents/2014-03-10%20LPR%20Focused%20Feasibility%20Study%20Report.pdf>
EPA Remedial Investigation Report for the Focused Feasibility Study:
<http://passaic.sharepointspace.com/Public%20Documents/2014-02-05%20LPR%20Remedial%20Investigation%20Report.pdf>

Natural And Historic Resources

Division of Fish and Wildlife: <http://www.state.nj.us/dep/fgw/>

ADDITIONAL RESOURCES

Division of Parks and Forestry: <http://www.state.nj.us/dep/parksandforests/>
Prescribed Burn: <http://www.state.nj.us/dep/parksandforests/fire/whm-burning.htm>
Firewise USA: <http://www.firewise.org/usa-recognition-program.aspx>
Fire Adapted Communities: <http://www.fireadapted.org/>
Ready, Set, Go!: <http://www.wildlandfirersg.org/>
Sustainable New Jersey: <http://www.sustainablejersey.com/>
Fish and Wildlife Facebook: <https://www.facebook.com/NJFishandWildlife/>
NJ Parks, Forests and Historic Sites Facebook: <https://www.facebook.com/NewJerseyStateParks/>
Website: <http://www.state.nj.us/dep/fgw/>
Avoiding Bears: http://www.njfishandwildlife.com/bearfacts_avoid.htm
“If You Can’t Keep It, Save It!”: <http://www.state.nj.us/dep/fgw/fluke.htm>

Superstorm Sandy

U.S. Army Corps of Engineers: <http://www.usace.army.mil>
Damage Assessment Report on the Effect of Hurricane Sandy on the State of New Jersey’s Natural Resources:
<http://www.nj.gov/dep/dsr/hurricane-sandy-assessment.pdf>
NJDEP Superstorm Sandy Website: <http://www.nj.gov/dep/special/hurricane-sandy/>
Blue Acres Acquisitions Website: http://www.nj.gov/dep/greenacres/blue_flood_ac.html
Coastal Blue Acre Website: <http://www.nj.gov/dep/greenacres/blue.html>

Other Dep Resources

NJDEP Website: <http://www.nj.gov/dep/>
Discover DEP Podcast: <http://njdep.podbean.com/?source=pb>
Discover DEP Youtube: <https://www.youtube.com/channel/UC2C01I04mVInYzqqwevFvSw>
NJDEP Youtube: https://www.youtube.com/channel/UC2C01I04mVInYzqqwevFvSw?view_as=subscriber
NJDEP Dataminer: <https://www13.state.nj.us/DataMiner>
Environmental Trends Reports: <http://www.nj.gov/dep/dsr/trends/>

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"Open PV State Ranking ." The Open PV Project, openpv.nrel.gov/rankings.

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U.S. Environmental Protection Agency. "EPA Secures \$165 Million Agreement with Occidental Chemical to Conduct the Work Needed to Start the Cleanup of the Lower Eight Miles of the Passaic River." United States Environmental Protection Agency, 10 Oct. 2016, www.epa.gov/newsreleases/epa-secures-165-million-agreement-occidental-chemical-conduct-work-needed-start-cleanup.

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ADDITIONAL RESOURCES

ENDNOTES

¹ Source: U.S. Department of Health and Human Services; "Nuclear Medicine"

² Source: U.S. EPA; Sources of Greenhouse Gas Emissions

³ Source: U.S. EIA; Natural Gas Explained

⁴ Source: U.S. EIA; How much carbon dioxide is produced when different fuels are burned?

⁵ Source: U.S. EIA; U.S. Crude Oil and Natural Gas Proved Reserves, Yea-end 2015

⁶ Source: U.S. EIA; Rankings Total Energy Consumed per Capita 2015

⁷ Source: The Open PV Project State Rankings

⁸ Source: U.S. EIA; New Jersey State Energy Profile

⁹ Source: Environmental Integrity Project; Dirty Kilowatts: America's Most Polluting Power Plants

¹⁰ Source: U.S. Geological Survey; "What is a watershed?"

¹¹ Source: Geological Survey of New Jersey; "A Preliminary Report on the Archaeology Survey of the State of New Jersey"

¹² Source: Ocean County Board of Chosen Freeholders; "Welcome to the Oyster Creek Generating Station"

¹³ Source: U.S. EPA; Lead and Copper Rule

¹⁴ Source: National Parks Service; "The Birthplace of the American Industrial Revolution"

¹⁵ Source: U.S. EPA; "EPA Secures \$165 Million Agreement with Occidental Chemical to Conduct the Work Needed to Start the Cleanup of the Lower Eight Miles of the Passaic River"

¹⁶ Source: Forest Commission of England; "How trees can help reduce climate change"

¹⁷ Source: U.S. Department of Agriculture; "Human Behavior on Aspects of Fish and Wildlife Conservation"

¹⁸ Source: Tourism Economics; "The Economic & Fiscal Impacts of Heritage Tourism in New Jersey"

¹⁹ Source: Science; Soil Carbon Sequestration Impacts on Global Climate Change and Food Security

²⁰ Source: Utah State Today; USU Scientists say Regulated Hunting key to Black Bear Conservation

²¹ Source: NJDEP Office of Science; Damage Assessment Report on the Effects of Hurricane Sandy

²² Source: Christopher H. Smith Floor Statement

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