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Another walk on the beach

Coastal restoration project gives threatened coastal plant another chance



Dag Madara holding the once endangered Bald Eagle in the early 2000's. While working with the NJDEP – between two stints with the Army Corps - he helped to save the Bald Eagle that was on the endangered species list. Credit: Dag Madara.

Another walk on the beach

Coastal restoration project gives threatened coastal plant another chance

By JoAnne Castagna, Ed.D.

Back in 2000, Dag Madara, a geographer with the U.S. Army Corps of Engineers, New York District, was walking on Monmouth Beach, New Jersey, the location of the agency's Atlantic Coast of New Jersey Sandy Hook to Barnegat Inlet Beach Erosion Control Project. He was monitoring the federally threatened bird—the Piping Plover (*Charadrius melodus*), one of several environmental conservation measures performed by the agency on all coastal restoration projects to ensure wildlife is not harmed.





Loggerhead Sea Turtle.
Credit: Marco Giuliano, Fondazione Cetacea.

Sandy Hook to Barnegat Inlet, Sea Bright to Manasquan, NJ – March 2024 Coastal Storm Risk Management Project

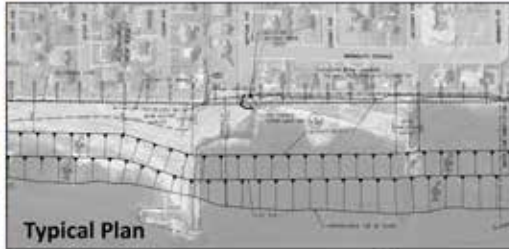


Section I: Sea Bright to Ocean Township – 12 Miles
Section II: Asbury Park to Manasquan – 9 Miles

Initial construction of Section I was completed in 1999; and Section II was completed in 2001. Renourishment cycles are authorized at 6-year intervals, pending the availability of Federal and non-Federal funds.

Following Hurricane Sandy, the constructed portion of Sections I and II were restored to their design profile (8M cubic yards) at 100% Federal expense, per the “Sandy Bill”, P.L. 113-2.

Funds were received in FY22 for periodic re-nourishment in Elberon, which began in December 2022 and was completed in April 2023. FY23 funds were be used for contract options, which included renourishment for reaches in Elberon-North, Monmouth Beach and Sea Girt. Placement was completed March 2024 with a total of 2 million cubic yards placed under this contract.



Typical Plan



Typical Cross-Section



Project Map of the Atlantic Coast of New Jersey Sandy Hook to Barnegat Inlet Beach Erosion Control Project. Credit: USACE.

While doing this he spotted what looked like spinach sprouting out of the sand by his foot. “My colleagues taught me how to search for and identify various endangered wildlife in the area, but I wasn’t expecting to find this,” Madara says.

Madara discovered the federally threatened coastal plant—the Seabeach Amaranth (*Amaranthus pumilus*) - that hadn’t been seen in the region for almost a century. Since his discovery, the plant’s population has grown tremendously in the region, and it is attributed to the success of this project and the environmental conservation measures performed on it that helps to protect endangered wildlife that play a vital role in coastal resiliency and ecosystem health.

The Seabeach Amaranth does its part. Its branches grow low along the ground,

holding the sand in place, which strengthens beaches from erosion caused by coastal storms that have become stronger and more frequent due to sea level rise.

This annual flowering plant has red stems and thick, waxy, greenish-red leaves that are somewhat reminiscent of spinach. The plant is native to the beaches along the Atlantic coast of the U.S.—from South Carolina north to Massachusetts.

But over the years, the species has vanished in most of these states, including the State of New Jersey. In 2000 when Madara spotted the plant, the last time it was seen in the area was in 1913.

Its population decline has been attributed to several factors including coastal development, beach driving and foot traffic, competition with other plant species, beach

stabilization projects without best management practices, sea-level rise, and natural disasters such as tropical storms and nor’easters that can inundate or wash away plants from beaches before, they can set seeds.

The plant’s return in this region of New Jersey is being attributed to the successful Atlantic Coast of New Jersey Sandy Hook to Barnegat Inlet Beach Erosion Control Project that began in 1994.

The project increased the size of the habitat for the plant, as well as performed environmental conservation measures to protect it. It encompasses 21-miles of the Monmouth County, New Jersey shoreline that extends from the Township of Sea Bright down the shore to the Manasquan Inlet.

The highly populated stretch of coast has experienced extensive erosion or sand

loss, due to old hard structures, including a seawall, and frequent storms including most recently Superstorm Sandy in 2012.

An eroded coast puts the shoreline community at risk for flooding from storms, so the Army Corps has been replenishing the eroded sand and increasing the size of the beach to help protect the community.

The Army Corps is working on this project in cooperation with its non-federal sponsor, the New Jersey Department of Environmental Protection and with the U.S. Fish and Wildlife Service since the plant is protected under the Federal Endangered Species Act.

To replenish the lost sand and increase the height and width of the beach berm, sand was dredged from the ocean and pumped onto the shore and distributed around. A berm is the flat area of the beach between the landward shore and the ocean where beach goers typically sunbathe.

An enlarged beach acts as a buffer, protecting the structures and infrastructure behind the beach from the storm surges and flood damages.

In 2012, 18 miles of the 21-mile project was completed. It was at this time that Superstorm Sandy devastated the region, removing 5 million cubic yards of sand from the shore, enough sand to fill New Jersey's MetLife Stadium.

The following year, the Army Corps received funding from the Hurricane Sandy Disaster Relief Appropriation Act of 2013, or what's referred to as the "Sandy Bill" to not only replenish the sand this project lost during Sandy, but to restore it to its original design profile.

With this funding, the Army Corps replenished 8 million cubic yards of sand to 18 miles of the project and completed the remaining 3-miles.

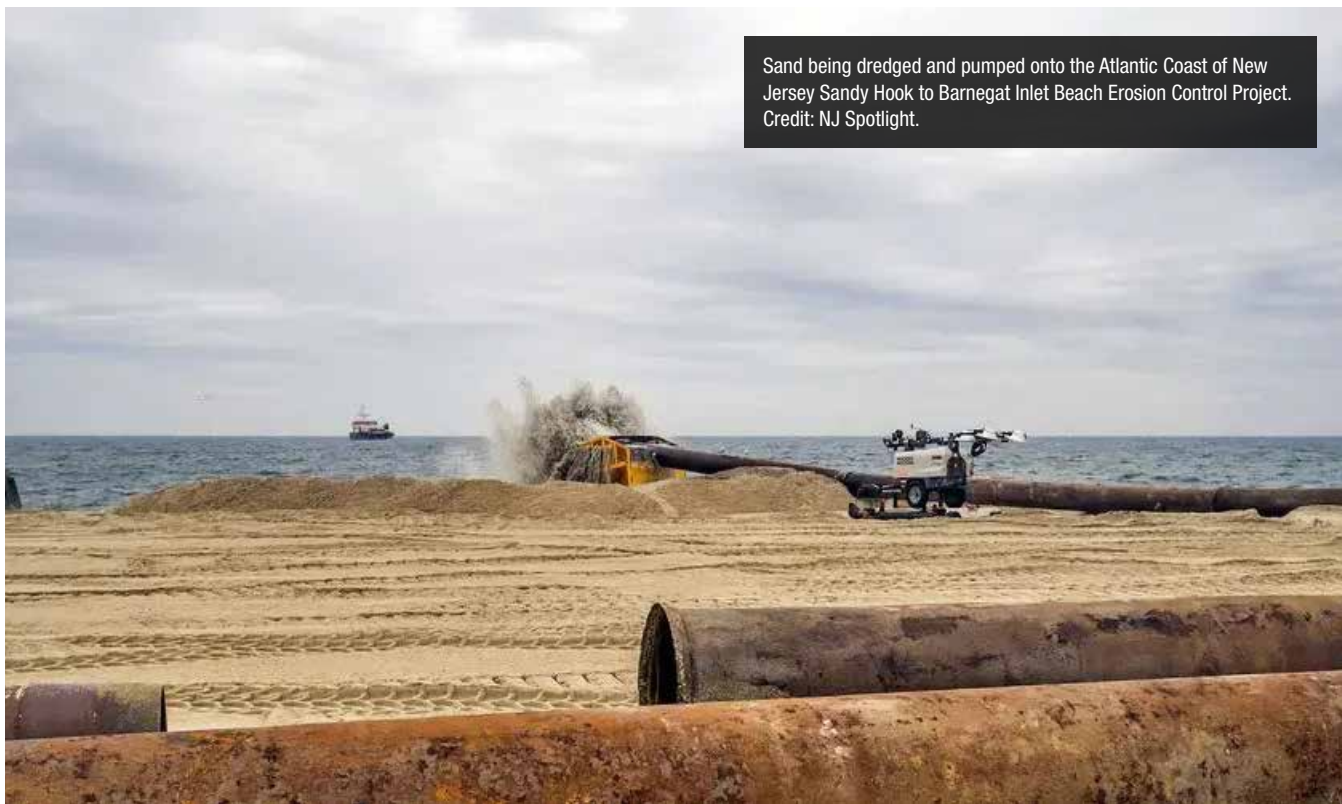
Since then, the agency has been performing periodic sand replenishment to

ensure that the beach provides continued protection from storms and hurricanes. "This continued renourishment will help protect local communities, prevent damages from hurricanes and nor'easters, and benefit the economy," says Jason Shea, project manager, New York District, U.S. Army Corps of Engineers, who is referring to the world's biggest beach-fill project in terms of sand volume.

The project also included the notching of several existing groins. These are structures that extend out perpendicular from the shore into the water and interrupts water flow and limits the movement of sand, to prevent beach erosion. Notching the groins helps to facilitate the movement of the sand and water.

In addition, 10 existing storm water outfall pipe extensions were lengthened. These pipes carry storm water from the land to the ocean. Recently, the Army Corps started a study to re-assess the project and to see if additional measures can

Sand being dredged and pumped onto the Atlantic Coast of New Jersey Sandy Hook to Barnegat Inlet Beach Erosion Control Project. Credit: NJ Spotlight.





Routine onboard Sea Turtle Observer operations.
Credit: ERDC.

be done to make the project even stronger and more resilient.

On this project, as well as with all Army Corps coastal restoration projects, the agency performs environmental conservation measures to protect and minimize impacts to rare, threatened, and endangered species that play an important role in coastal resiliency and ecosystem health.

Measures on this project, are helping to protect not just the Seabeach Amaranth, but also migratory birds including the Piping Plover, the State endangered Least Tern (*Sterna antillarum*), and the State Special Concern Species the American oystercatcher (*Haematopus palliatus*).

Offshore measures are being used to help protect marine species that include the Loggerhead Sea Turtle (*Caretta caretta*), the Kemp's Ridley Sea Turtle (*Lepidochelys kempii*),

the Green Sea Turtle (*Chelonia mydas*), the Leatherback Sea Turtle (*Dermochelys coriacea*), the Atlantic Sturgeon (*Acipenser oxyrinchus oxyrinchus*), the North Atlantic Right Whale (*Eubalaena glacialis*) and the Fin Whale (*Balaenoptera physalus*).

Environmental conservation measures used to help protect these species include monitoring, public education, following environmental windows, and constructing symbolic (post and string) beach fencing.

Monitoring

If Madara wasn't monitoring the beach in 2000, the Seabeach Amaranth wouldn't have been discovered.

Surveying a beach to identify rare, threatened, and endangered wildlife is one of several tasks' monitors perform. In the beginning of a project, they create a monitoring

plan in cooperation with the project team and during the project they monitor and document wildlife behavior, movement, and potential threats on and near the project site.

Besides this plant, monitors on this project have also observed the return of the American Oystercatcher.

Monitoring also occurs offshore. This project has a successful sea turtle monitoring program where trained, certified monitors accompany the project team on hopper dredges to make sure endangered sea turtles, as well as whales, dolphins, and seals, are not harmed during the offshore sand dredging and placement process. This is done with the help of turtle excluder devices that are placed at the drag head of the dredge to prevent turtles and other wildlife from being entrained in the hopper dredges.

Public Education

Using beach signs to educate the public on ways that can avoid and minimize potential impacts to wildlife and ecological communities on the project site is good for the plants and animals.

It's also good for the project. For example, an educated beach visitor may be more tolerant of any inconveniences, such as temporary beach closings, that are associated with protected beach areas. A tolerant on-site crew is also desirable, which can also be done through education. Several years ago, when the project was experiencing the successful return of the American Oystercatcher, a monitor at the time associated this in part to an educated crew.

Educating the crew, sparked their interest in the bird, which helped to contribute to the bird's return to the area. The crew purchased binoculars and bird books and made notes about their bird observations that they provided to the monitors.



American Oystercatcher chick.
Credit: Amy S. Greene Env. Consult.

Follow Environmental Windows

Environmental windows are months out of the year where construction on a project is halted to protect endangered species. For example, on this project, sand is not placed on the shore between March 15th and August 15th because this is the time of the year that the Piping Plover nests on the shore. During this time, sand placement may still occur only in portions of the project where Piping Plovers were determined not to be nesting.

Symbolic (post & string) Beach Fencing

Placing symbolic (post & string) beach fencing on a beach delineates areas used by wildlife and alerts the public to the presence of a protected area.

Katherine Pijanowski, biologist, New York District, U.S. Army Corps of Engineers, says, in the case with plants, placing fencing around protected species also prevents the project crew from inadvertently running over or burying it. "If the project is unable to avoid impacting the species, the Army



Piping Plover. Credit: USFWS.

Corps works with the USFWS to either move the plant, stockpile the seedbank, or other recommended action.”

Fencing can provide multiple benefits. “For example, Peter Wepler, Chief of the Environmental Analysis Branch, Planning Division, New York District, U.S. Army Corps of Engineers, says that when you fence off an area for breeding migratory birds. This also provides a protected habitat for Seabeach Amaranth and

other rare coastal plants they co-habitat with. “It’s a win-win for multiple species.”

According to the USFWS, fencing can create successful results. For example, fencing installed on a beach in Long Beach Township, New Jersey resulted in a 300% increase in the Seabeach Amaranth plant.

Besides these environmental conservation measures, the successful work performed on this coastal restoration project

has also contributed to the return of the Seabeach Amaranth and other species. Prior to building up the beach, there was barely a habitat for plants and other wildlife to thrive.

Pijanowski says building the beaches back has provided ample space and opportunities for plants to grow, and for birds to rest, forage and nest. A larger beach also draws more people to the shore. To balance the needs of the public, tourism, local communities, and imperiled species, the Army Corps funded the development of Beach Management Plans.

Protecting coastal wildlife also helps increase the protective resiliency of the shore. For example, the Seabeach Amaranth has branches that provide natural binding properties that make the coast more erosion resistant to storms.

If it wasn’t for Madara monitoring the beach in 2000, the threatened Seabeach Amaranth would not have been discovered, showing the important role environmental conservation measures play on coastal restoration projects.





Kemps Ridley Sea Turtle. Credit: EPA.

This shows how people and wildlife that make the coast their home, truly do rely on each other for survival.

So that other coastal restoration projects can experience the same success as this project, Pijanowski suggests that biologists and engineers work together to integrate their expertise in vegetation, wildlife, geomorphology, and coastal engineering to design a project that restores coastal processes and provides habitats for listed species.

She also said that before construction work begins, a baseline survey should be carried out to note the species present and she suggests that dredging pipes and equipment be placed in minimally invasive locations.

Last she said that as work continues, monitor the beach for new plant and wildlife growth throughout the duration of the project, and provide a weekly presence or absence assessment of the species.

If it wasn't for Madara monitoring the beach in 2000, the threatened Seabeach Amaranth would not have been discovered, showing the important role environmental conservation measures play on coastal restoration projects.

Continued use of these measures and a successful coastal restoration project helped the plant to flourish again so that it can perform its natural abilities that contribute to coastal resiliency and ecosystem health. If Madara took a walk on the

beach today, he would be sure to find the plant again by his feet, its branches firmly gripping the sand, strengthening the coast from today's stronger and more frequent storms caused by sea level rise. **FC**

For more information about the Seabeach Amaranth, visit the U.S. Fish and Wildlife Service website at: www.fws.gov/species/seabeach-amaranth-amaranthus-pumilus

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