The Value of the Federal Role in Beach Nourishment

Maintaining a strong Federal role in coastal storm risk management projects[1] is critical for the people, infrastructure, and environmental resources of the Nation. Our coastlines are the Nation's first line of defense, parrying rising seas and eroding beaches from encroaching on our highly populated coastal regions. The post-Sandy Performance Evaluation Report documented the success of those federally-authorized projects that had been constructed and renourished under agreements between the Corps and the non-federal interest(s). That is not surprising since reports going back decades to Hurricane Francis in 1971 had provided similar evidence that modest pre-storm expenditures to nourish sandy shorelines while building dune systems produce far more post-storm cost savings for taxpayers than the cost of pre-storm mitigation.

Coastal Risks: There is a wealth of information about what is at risk in various regions of the country. For example, in New York, coastal counties account for 86% of employment, 87.6% of wages, and contribute nearly $1 billion to New York's GDP (87.6%). In New Jersey, coastal counties account for 77% of the state's GDP along with 78% of its employment. Both states were hit hard by Hurricane Sandy, having profound impacts on their coastal communities. In 2013 New Jersey counties, Monmouth and Ocean, lost an estimated $950 million in tourism dollars and reduced total output by $1.2 billion. Employment in these counties also dropped by an estimated 11,000 people. According to the New York Times, New York incurred $50 billion in economic losses due to Hurricane Sandy. This figure is compounded by the additional $20 billion in property damage inflicted by the super storm.

Delaware's coastal counties generate 100% of the state's GDP, employment, and wages. Delaware, which has seven federal shore protection projects, is fully dependent on its coastal economy to function as a state.

All three states have bustling energy industries that have plants on the coasts and are susceptible to excessive damage. In New York 17 natural gas power plants, one solar plant, and one hydroelectric plant sit along coastlines. New Jersey's coastline is home to 13 plants related to the fossil fuel industry, three nuclear plants, and four solar and wind plants. Delaware's smaller coastline still contains eight power plants connected to the fossil fuel industry, along with a wind plant and three solar plants.

The federal government has spent enormous sums of money to repair damages caused by coastal storms. For the Corps of Engineers' programs alone, the price tag Sandy in Construction funds post-Sandy was nearly $3.5 billion. The $100 million in annual non-disaster appropriations for the Corps' sand nourishment program is less than 3% of that total. Various analyses over the past decade have shown that the annual federal funding for Corps coastal studies, sand nourishment, and data collection is one-third or more below the funding needs for authorized studies and projects. Therefore, assuming a tripling of annual pre-disaster coastal storm damage mitigation expenditures, as unlikely as that possibility is, would still be miniscule compared to the cost of post-disaster spending necessitated by under-funding this critical resilience program.

[1] Beach nourishment, coastal storm risk management, shore protection, and other similar terms used herein are intended to have the same meaning.

Beach nourishment projects not only provide national economic benefits; they also save lives. According to NOAA, 39% of the Nation's population lives in coastal counties. Even with threats of sea level change and strong storms, by 2020 NOAA predicts an additional 10 million people will move to coastal areas. This influx will only increase the susceptibility for loss of life during a storm or flood event. Sandy beaches with vegetated dunes are the most effective non-structural means of breaking the destructive forces of strong waves.

According to the North Atlantic Coast Comprehensive Study (NACCS), during a hurricane it is the elderly, young, those below the poverty threshold, and those who are not proficient in English that are most vulnerable.

Benefits of Beach Nourishment: There is no definitive study of the national benefits of beach nourishment. Various regional or State studies have used different methodologies, making it difficult to compare or combine them. A study commissioned by OMB in 2001 but never released to the public found that two-thirds of the benefits of federal shore protection projects flow to the national level. Even with that conclusion, the study ignored the benefits that jobs created by the coastal environment result in federal taxes just as the profits of businesses who transport, house, feed, care for, or otherwise serve coastal residents and tourists also result in federal tax revenues. The inference from state studies that have tracked the flow of benefits to the national government and from studies focused on the national economic benefits generated by coastal tourism, is that there is a significant economic benefit to the nation from beach nourishment. It is erroneous to view these jobs, profits and tax revenues as transferable (i.e., they would go to another region if one or more coastal regions were severely impacted). If we think of each coastal regional economy as a multi-faceted industry, severe damages to a region cost jobs and tax revenues while disrupting vital industries and infrastructure. The damages will have the potential to impact people and their safety, jobs, hospitals, refineries, shipping, the electric grid and so much more, not to mention the losses incurred by the insurance and re-insurance industries and post-disaster assistance provided by the government. Those losses will not be replaced by a transference to another region because other coastal regions are already substantially developed and inland regions are not as desirable.

The Role of the Federal Government: The Corps has been involved in constructing shore protection projects for nearly 70 years. Its program covers 500 miles of what were found in a 1971 federal study to be about 2,700 miles of critically eroded coastline.

It has been estimated that the federal government received over $344 billion in employment and business profits tax revenues in 2014 from coastal regions. Nevertheless, less than $100 million is invested in the Corps of Engineers' programs annually to protect the Nation's coasts. Sand nourishment is by no means the only tool to foster coastal resilience and sustainability, but where it is employed it has proven to be both successful and cost-effective.

Even prior to Sandy, the Corps needed an estimated $125 million per year just to fund the federal share of the renourishment of the New Jersey projects that had already been constructed. This would have consumed 83% of the average annual federal budget dedicated to beach nourishment, leaving the remainder for all the other states that are part of the federal program.

Those who support decreased federal funding for sand nourishment often claim that its benefits are primarily local and, therefore, the federal government should have no fiscal role in initiating or maintaining these projects. However, a basic evaluation of the lives, industries, and revenues at stake coupled with the risks described above shows how baseless that position is. Our coasts

are home to an ever-increasing number of people and businesses. Coupled with sea level change, this is a national problem that requires a more coherent multi-agency intergovernmental approach that is beyond the scope of this paper. Suffice it to say that beach nourishment is among the tools that must continue to be used to reduce coastal risks.

What is the Alternative to a Federal Role in Beach Nourishment?

Appendix A provides a list of non-federal beach nourishment projects. Most are protecting communities that do not allow public access to the beach and therefore would be ineligible for the federal program. In a few cases, communities have chosen to adopt a long-term plan for sand nourishment that uses non-federal funds to construct, may or may not involve a commitment to periodic renourishment, and relies on FEMA to replace sand post-storm. Those who have Corps projects are not eligible for FEMA sand. In addition, rising sea levels and increased flooding from minor storms or tidal increases have fostered several uncoordinated efforts in some communities to adopt protection measures that will provide some measure of resilience over the next several decades. Measures such as the raising of homes to reduce National Flood Insurance Program (NFIP) premiums as well as the incorporation of natural and nature-based features into raised highways or back bay protections are initiatives that appear to be promising. The understandable interest in environmental restoration is also sparking initiatives such as the measure recently approved by communities in the San Francisco Bay Area, which has the largest GDP in the country (19th in the world) has recently levied a special property tax to restore 30,000 acres of wetlands, to slow down the encroaching seas, and protect industry, human life, and $52 billion in property. Miami Beach has put into action an aggressive and expensive plan to combat the effects of sea level rise. Norfolk has recently turned to the Dutch for ideas on how to raise roadways in an environmentally responsible way, and New York City has developed innovative and elaborate plans to protect the residents, workers, and economy of lower Manhattan.

Although these and many other case studies provide clear evidence of the political will of regions to deal with rising tides, it would be naïve to believe that all coastal communities can float the necessary finances nor the technical expertise to protect themselves. Equally important, these measures suffer from the same defect that is inherent to the Corps' shore protection program – they are isolated measures that NACCS concluded lack the effectiveness of the kind of regionally-based systems approach that has been supported by the National Academies of Science and many others for more than two decades.

There are communities with Corps shore protection projects that are reaching the end of their 50-year period for federal fiscal participation. Given the fact that OMB has not permitted the funding of studies to extend federal funding, it remains to be seen what these communities will do. For the short run, they will use local and perhaps state funding to do one or two nourishments that may or may not meet the same level of design as the federal project. Arguably, these projects are permanent projects which require the non-federal interest to meet the contractual commitments even after the federal government stops contributing its funds and its expertise. All but the wealthiest of communities will find that local and state funds will not sustain that effort over time.

With existing projects that reach their 50-year limit, we will likely see efforts to alter renourishment plans so that the projects are primarily for their recreational purpose, as opposed to their storm damage reduction purpose, with dunes as part of the design solely because they were inherited from the Corps' design. This will lower the amount of sand needed, and therefore, the cost. We

will also see some communities restricting or eliminating public access, and others using various forms of hard structures that may appear to offer cost-savings over long-term robust beach nourishment. It is not likely that there will be a reversal to the overall trend in coastal residential population increase, but it is possible that there will be some disruptions of current tourism based on long-term deterioration in beach conditions.

To summarize, with federal participation, a very few communities will be able to replace federal funds dollar-for-dollar. Most will reduce their level of protection to focus on the immediate need to maintain tourism. Some may adopt structural measures to protect property to the extent allowed by state law and regulations.

Creating Efficiencies: Even at current levels of federal spending, more efficient measures can both save money and improve management of coastal resources. One method is cost savings from dredge mobilization coordination. Beach renourishment projects require $3 million to $4 million to mobilize and demobilize the dredge vessels, landside equipment, and personnel needed to complete a project. Dredging can be responsible for 10% to 65% of total project costs. Under the current federal budget structure of line item allocations to the Corps, millions of dollars are wasted in unnecessary mobilization and demobilization fees. Using a regional approach to coordinate the mobilization of dredging equipment would save millions in tax payer dollars. In Delaware, there are three renourishment projects that lie within a 20-mile radius of each other. The three projects are not on the same dredging cycles and collectively require 31 nourishment cycles over a 44-year span. Coordinating the dredging cycles would eliminate 17 contracts, saving upwards of $68 million, or 10-15% of project costs.

Another method of reducing federal budget inefficiencies is significantly increasing the beneficial use of dredged sediment. The current practice of disposing of sediment extracted from channel dredging is done under the least-cost method. The least-cost method only takes into account an individual project's expenses, not considering alternative uses for the dredged sediment. This comes at a deep cost as 70% to 80% of the Army Corps dredging projects dispose of valuable sediment in preapproved disposal sites or in open water. In some cases, these sites can involve subsequent dredging to bring sediment back to the shoreline at a later date, generating additional costs and unnecessary environmental impacts. Implementing more beneficial use could drastically reduce project costs and preserve valuable sand resources.

Beach Renourishment Prioritization: The Office of Management and Budget has made clear that this and past administrations place a low budget priority on shore protection projects. Due to federal fiscal constraints and the opaqueness of the process by which renourishment projects, non-federal sponsors cannot rely on the federal government to provide funding for periodic nourishment. The fiscal result has been dramatic. Since 2004, more shore protection projects have been renourished using disaster funds than via the regular appropriations process.

The prioritization of periodic nourishments based on scientific metrics of people, infrastructure, and environmental resources at risk will enable the rational allocation of scarce federal funds. This can be done through the Corps' Coastal Systems Portfolio Initiative that tracks all federally authorized shoreline protection and coastal navigation projects, along with their status and provides a basis for a prioritization of projects over a 5- to 10-year period. If this data were readily available to States and other key non-federal sponsors, they will know when a project is due for renourishment based on actual conditions. The database can also be thought of as a multi-year planning tool for non-federal stakeholders to be aware when non-federal funding will be needed

and apprised of the likelihood that funds will be available for a project that needs to be renourished and act to find alternative funds to replace federal funds that are not likely to be available.

Conclusion: Our Nation is blessed with thousands of miles of coastlines that attract tens of millions of residents and tourists as well as all the businesses and infrastructure to support them and industries that locate there to take advantage of ports and other coastal transportation. It is important to provide the necessary funding to protect these areas from storms and rising seas. While the annual funding of $100 million or less is inadequate, the use of a systems approach to managing our coasts together with a prioritization for maintaining existing projects will enable states to collaborate in more long-range plans for regional coastal resilience.

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Appendix A: Non-Federal Shore Protection Projects

Note: There is no database of projects built without federal funds to provide long-term shore protection. The list below is culled from publicly-available data. It is believed to be accurate but it may not be complete. It excludes beaches at state parks which would generally not be eligible for authorization and funding as federal shore protection projects. Note that many of the listed projects would not qualify for the federal shore program due to lack of public access and/or parking. Projects involving a total cost in 2014 dollars of less than $5 million where there have not been at least two nourishments since 1995 have been excluded. Either these are pocket beaches that are not equivalent to federally-authorized so-called 50-year shore protection projects or the project sponsor has not shown a commitment over the past two decades to periodically nourish the beach. As such, they are not equivalent to federal shore protection projects.

Alabama
Gulf Shores

Florida
Naples
Palm Beach
Bal Harbour
Key West
Destin
Marco Island
Pensacola Beach
Jupiter Island
Volusia County
Amelia Island

Georgia
Sea Island

North Carolina
Kill Devil Hills*
Nags Head*
Figure Eight Island
Emerald Isle
North Topsail
Topsail

South Carolina
Kiawah
Isle of Palms
Hilton Head
Seabrook Island

** There is an authorized federal shore protection project that encompasses these communities but it has not been constructed.*