Local Funding For Coastal Projects:
An overview of practices, policies, and considerations

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LOCAL FUNDING FOR COASTAL PROJECTS: AN OVERVIEW OF PRACTICES, POLICIES, AND CONSIDERATIONS

The goal of this paper is to help coastal managers and elected officials think about how to fund beach renourishment and coastal restoration projects. The paper briefly reviews the evolution of funding policies, introduces funding considerations based on project characteristics, and outlines funding tools or mechanisms to consider.

THE CONTEXT FOR LOCAL FUNDING

Coastal communities have been restoring beaches for nearly a century. In 1923, the first major U.S. beach nourishment occurred in Coney Island, NY. Over 2.5 million cubic yards of sand was placed on the southern shores of Brooklyn and was held in place by a series of coastal structures, for the astonishingly low cost of $282,275. (1) Adjusted for inflation, this amounts to just $1.64 per cubic yard of sand.

In the decades since, coastal science and engineering have greatly advanced. We better understand the drawbacks and benefits of coastal structures, we know more about the movement of sand, and we have a much greater appreciation for how dredging and sand placement impact coastal ecology. Beach nourishment projects have increased in cost due to stronger environmental protections, prioritizing safe working conditions, improved project specifications, and increased distance to sand sites.

FUNDING RESPONSIBILITY

Several factors contribute to wide variations in the cost of beach restoration projects including regional geology, local erosion rates, shoreline condition, project size, regulatory compliance requirements, and even the time of year the project is done. In general, sand placement projects today range in the $8 to $20 per cubic yard. (2) In areas where sand resources are scarce or elevated environmental concerns exist, projects can cost as much as $40 to $50 per cubic yard. Federal beach nourishment projects attempt to plan for a 50-year project life – the amount of time beach will function at the risk reduction capacity it was designed for; this will include periodic re-nourishments over the project life. Non-federal projects may plan for shorter project life, such as 50 years, and the lifetime cost must take into account the rising price of future renourishment projects.
Who pays for beach projects varies almost as much as the cost. Some projects have been paid for entirely by the federal government, others have been paid for by a single landowner. Most projects use multiple sources of funding; and, except for a few rare cases, the local community seeking to build the project is responsible for part of the cost.

Federally authorized shore protection projects are usually funded with up to 65% federal funds and 35% from the local cost share sponsor. These projects come at a deep discount to the local community, but the community is then reliant on federal funds being regularly appropriated—which is never guaranteed. The federal authorization process can also take years, even decades, and projects need to meet certain economic justifications based on the risk reduction they provide.

Some states – notably New Jersey, Florida, and Texas – have created dedicated state funds to support beach restoration projects which can help offset the costs paid by local governments. Several other states are in the process of developing these dedicated funding streams. State funding can be as fickle as federal funding, with many states having rules requiring balanced budgets and beach funding can dry up in bad economic years or as political priorities change.

There is no right or wrong way to fund beach restoration projects, what works for one community might not for another. Where one community seeks full autonomy over a project, another might refer less control in exchange for drawing funding support from multiple partners.

Any local government wanting to restore their beach should have a clear understanding of what their goals are and engage local stakeholders to better understand the community’s values and commitment to beach management. Engaging with stakeholders and understanding the nature of the community will also help guide what funding streams should be used to pay for the local portion of the project cost.

Funding sources and costs vary by state due to the divers nature of beaches in the United States. Gulf Shores, Alabama; Easton Beach, Rhode Island, and Pacifica, California beaches highlight the different project spaces officials may be working with.
Local Funding Considerations

Successful shoreline management funding strategies must be as persistent as the waves. Shoreline management is not a one-time fix, but on-going long-term commitment; therefore, a successful funding strategy must be equally long-range and predictable.

Typically, a community funding strategy includes some form of new tax revenue. Of course, raising tax revenues attracts a great deal of public attention and can be highly political, especially when done for beach or shoreline management. Understanding “community characteristics” will help establish what type of funding strategy – or new tax revenue – will be seen as fair and equitable by the local community.

Community Characteristics

Before a single public meeting occurs, before the first funding idea begins to take shape, a great deal can be learned about a shoreline community likely to influence and sometimes determine the success or failure of a funding strategy.

Demographics
- Average age, especially percentage of residents on a retirement income
- Overall income levels
- Percentage of owner-occupied structures
- Percentage of vacation homes
- Prevalence of short-term rental properties (e.g. Airbnb or VRBO)
- Presence of government-owned land (parks, pen space, etc.)
- The nature, quality and availability of public access

Population
- Off-season vs. on-season population
- Percentage of registered voters in jurisdiction

Land Use Patterns
- Commercial versus residential properties
- Type of residential shoreline development such as single family, multi-family, high-rise condominium, etc.
- Types of commercial properties especially type, nature and density of hotel or overnight accommodations, prevalence of local “mom and pop” businesses national or regional chains

Huntington Beach, California
Existing Local and State Tax Rates and Structure
- Ad valorem tax rates
- Special district tax rates
- Hotel, accommodation or occupancy tax rates and allowed uses of revenues
- Value of shorefront, near-shore, and “off-beach” properties in the project area
- Percentage value of shore area property in relation to the overall city or county property values
- History state and local investment in shoreline management and source of funds
- Parking or other beach access fees

Shoreline Use Patterns
- Seasonality of use (peak and off-peak season)
- Shoreline user groups, local vs. out-of-towners
- Day trippers versus over-night visitors
- Local users versus out-of-county and out-of-state users
- Location the shoreline project -- mainland or a barrier island
- Type of shoreline user community (“spring break” users, retired or family users, recreational users such as surfers, surf fishermen, boaters, etc.)

Understanding these characteristics will likely impact the nature of the funding strategy and, if properly understood, can help avoid delays and public opposition to the funding plan. At a minimum, understanding these characteristics can help planners anticipate the nature of the discussion to come and balance diverse interests along the shoreline.

An example: Imagine a densely developed sandy beach shoreline separated from the mainland on a barrier island and characterized by high-rise condos and hotels along the water and, off the beach, a mixture of single-family homes, small locally-owned hotels and businesses (restaurants, t-shirt shops and the like), modest-sized owner-occupied duplexes, and several low-rise condos or apartment complexes. Assume the beach has a typical summer peak season where the population rises from 5,000 in the off-season to 55,000 at the peak of summer. Further assume the beach is reasonably accessible to the public but most beach-goers are hotel or overnight guests.

These “community characteristics” will impact the nature of the funding discussion to come and are predictive of likely tensions or fault lines that will arise. The balance between beachfront commercial contributors versus off-beach residential owners would certainly be a focus of the funding discussion. Local residents would likely push to shift costs and taxes to hotel owners along the beach. How local hotel or occupancy taxes are collected and used would also be a significant factor impacting the discussion. The degree of public access available to off-beach residents and their relative economic prosperity are also likely to be powerful factors in the discussion. Debate about the relative financial contribution between the largely commercial beachfront properties and the more residential off-beach owners would certainly be expected.
The community characteristics will not dictate the outcome of a funding strategy but ignoring these factors in the project funding discussion risks embarking a funding path likely to fail. Of course, other factors are equally important such as the political willingness to act or the level of outside funding available.

**Regional Characteristics**

“Regional sediment management” is a phrase capturing the notion that shorelines are typically geomorphologically and hydrologically continuous and cannot be truly managed in bits and pieces or on the basis of “political” jurisdictional boundaries. Looking beyond a project boundary to a broader, more expansive view of the shoreline will prove useful in engineering design and financial planning.

This means examining whether similar shoreline management efforts may be occurring outside the local municipality or county charged with developing a project-specific funding strategy. Economies of scale or project cost-savings may be possible if similar projects within a region are planned and/or executed together. The less money you need spend on a project, the less money you need to raise!

In some states, like Florida, the state contribution to a local beach nourishment project can increase if adjoining local governments act in concert. In addition, cooperative local governments can take advantage of potential cost savings if they plan, execute, and share the cost of:

- Sand or Sediment Search Investigations
- Shoreline Surveys
- Environmental Permitting
- Numerical Modeling
- Mobilization Costs

![Dredge project at Palm Beach, Florida](image)

Shoreline surveys can also be expensive and are always required whether the project is on a beach or a bay shoreline. Expanding the surveys to cover regional areas -- and sharing costs among multiple jurisdictions -- can be advantageous. Logistical considerations such as scope, schedule, and access to results can be coordinated with sufficient foresight. Similarly, permitting and modeling have efficiencies of scale -- it’s cheaper to develop permits and model results for one big project than for two smaller projects.
Whether you are renourishing a beach or “building” a marsh or oyster reef, the project will require material such as sand, marsh sediments, or perhaps oyster shell or rock for breakwater construction of mitigation reefs. Expensive sand search investigations are often required and can run into the millions of dollars per project. By working together to address shoreline problems, adjoining jurisdictions may be able to substantially reduce the cost to both jurisdictions. Similar savings can often be found when locating supplies of oyster shell or material for breakwaters or reefs.

Finally, once the project is permitted and the bids are let, the opportunities to coordinate contractors and share mobilization costs can sometimes be realized. On a beach nourishment project mobilizations costs regularly exceed $2 million and can reach $5 million or more. (4) If adjoining communities coordinate the timing of their “separate” projects and share the same dredging contractor, substantial savings can occur at a minimum by proportionally sharing the mobilization cost of a dredge. While this level of coordination and planning among independent political jurisdictions can be difficult, the potential costs saving can make it worth the trouble.

**Local, State, and Federal Funding Partnerships**

Few shorelines projects are funded by a single source of revenue. Federal shore protection projects are typically funded by the United States Army Corps of Engineers (USACE) paying 65% of the project design and construction cost and the local sponsor (usually a city or county) responsible for the remaining 35%, which in turn may come from multiple sources. Shoreline management costs are typically shared between state and local governments in the absence of federal funding; however, cost can also be shared between adjoining counties and municipalities. Some states offer grant programs to assist in covering the local cost share. Other potential funding partners can be ports, navigation districts, inlet management districts, and other “special” districts depending on the state and local law.

Private sector funding partners may also be involved. Grants, donations, or direct funding from a specific private interest can help fund projects, but these are often one-time
contributions and cannot be relied on for ongoing management. Partnering with companies or universities interested in implementing test sites can help reduce costs. Private or non-profit interest groups at the local and state level may also be cost share partners. Reaching out to surf organizations or gardening committees about supplying funds or labor for smaller vegetation projects or sand fence installations can reduce project costs and increase the investment of the community in continuing the project over several years. Successful and durable funding strategies are typically made up of public and private partnerships. Funding strategies developed with wide public involvement are likely to be better understood and supported in the community.

Stakeholders will typically insist they know who is paying for the project, how the contributions are identified and collected, and the relative weight of the financial burden among the affected parties – federal, state, local and property owners. In the end, the funding strategy must be perceived as “fair” if it is to succeed.

**LOCAL FUNDING TOOLS AND PRACTICES**

**SPECIAL TAXING DISTRICTS**

*Many communities use variations of “special taxing districts” to generate revenue based on who benefits from a project.*

A special taxing or service district is a geographic region established by law in order to raise tax revenue. Typically, the revenues collected through the tax are used to pay for public improvements specifically benefiting the land owners and residents within the district. This tool is often used by local governments to help pay for beach nourishment projects. In Florida, this type of district is called a Municipal Service Benefit Unit or MSBUs.

The government entity establishing the special taxing or service district for a beach nourishment project will determine which properties directly benefit from a beach (or coastal) project. Those property owners will be assessed a fee or pay a higher ad valorem rate than those located outside of the district. At times, multiple service districts may be setup with incremental increases in the tax based on the proximity of properties to the beach. For example, a community may setup one special taxing or service district to include all ocean-front properties within the project area, while a second district could be setup to include all properties within ¼ mile from the beach; potentially even a third district could be set up for landowners with ‘tertiary’ benefits, such as properties behind a certain highway or another geographical feature. Benefit district laws vary state to state but it is the flexibility of this financing tool in defining and allocating benefits which makes it so useful.

A special taxing district can be set up to generate revenue for future projects or for paying off debt on past or current project. When the tax is established for future projects the rates are set, with an estimated – but not exactly known – annual revenue. For example, in the case of an ad valorem-
In Florida, this particular problem of unpredictable revenues does not arise when a Municipal Services Benefit Unit is established because the property owners are assessed a flat annual fee rather than an ad valorem tax.

**Erosion Control Districts**

Erosion Control Districts are taxing districts specifically set up to address coastal erosion and will have specific taxes and beach management plans.

Like all special tax districts, erosion districts are established under specific state and local laws. These laws can include restrictions on how the district can levy and collect taxes, specify uses of collected revenues, or set a cap on the tax rate to be imposed on a property within a district (known as the “millage cap”). Erosion districts are either established as “dependent” or “independent,” a characteristic defining whether the district is under the control of the local county commission or city council (i.e. dependent”) or operates with its own governing board (i.e. “independent”).

Dependent erosion districts are established by the overarching authority responsible for maintaining the beach, and actions within them must be approved by county commissions. For example, in Florida, county governments are designated as the beach and shore preservation authority within their county, and they are authorized to develop districts within the county to address specific local beach erosion issues. (6) These districts can be within one county, or cross county boundaries if both counties agree. The taxes within a district must be spent on erosion control project in that district.

Independent erosion districts are established without specific authority from counties or other higher government entities. In Florida, the Captiva Erosion Prevention District (CEPD) was created prior to the state-wide authority establishing county-dependent erosion control district. It is the only independent erosion control district still operating in the state. The CEPD has the right to tax for general purposes and to make special assessments based on the benefits each property derives. Although there are no other independent erosion districts in Florida, the legal authority to create a
new independent district remains in place. To exercise this authority, the independent district would have to assert and establish the county is no longer the shore and beach preservation authority. Most counties would not want to give up this authority unless the county was close to reaching its millage cap, in which case it may be more willing to give up some authority. Before considering the creation of independent erosion control district, research should be done to see whether the state allows independent taxing districts.

**Geologic Hazard Abatement District**

A Geologic Hazard Abatement District (GHAD, also referred to a Geologic Hazard Assessment District) is a taxing district, which may have an independent government agency administering it, to address multiple geological threats.

GHADs are created to finance projects to prevent, mitigate, and reduce risk of earthquakes, coastal erosion, landslides, and other geologic natural hazards. These have typically been used on the Pacific Coast, but the concept of a hazard abatement district could apply to other hazards such as coastal storms, flooding, etc.

A GHAD is established as a political sub-unit capable of raising revenue similar to a special taxing district; but the geographic boundaries are based on vulnerability to a hazard. A GHAD is able to issue municipal bonds, and repay those bond through an annual charge to every parcel within district. The specific rate for each parcel can vary based on risk and benefit, as established in the formation of the GHAD. Unlike a special taxing district, a GHAD is an agency which can approve and contract work in addition to raising revenue.

Depending on how it was set up, a GHAD has the ability to respond rapidly to emergency situations (for example, it could take action on mitigating an emerging erosion hot-spot without needing approval of all landowners in the GHAD). It can also be locally autonomous – exempt from local permitting requirements – it can own and acquire land and exist for either a set amount of time or in perpetuity.

**Inlet Management Districts**

Inlet management districts are taxing districts established for the construction and maintenance of inlets not federally maintained.
Functionally similar to other special taxing districts, inlet management districts have the power to levy taxes and typically have a governing body controlling funds to maintain the inlet. Since inlets are the source of sand for down-drift beaches and can be filled by sand eroded from up-drift beaches, these districts will often maintain adjoining beaches either as mandated by their charter or simply as means of managing sand able to clog the inlet. Sand management techniques employed by inlet management districts can include back-passing, by-passing, stockpiling sand for future needs, and providing free or low-cost dredged sand to nearby beaches.

Sebastian Inlet Tax District was established by a Special Act of the Florida Legislature in 1919, to maintain the inlet between Brevard and Indian River counties. Sebastian Inlet has 42-acre depression within the inlet system known as a "sand trap" accumulating approximately 200,000 cubic yards of sand every 4-5 years. Per the state’s Beach Management Act, the Sebastian Inlet District is mandated to bypass sand onto downdrift beaches. A 2019 project dredged 153,000 cubic yards of sand from the inlet’s sand trap and navigation channel, placing approximately 113,000 cubic yards of sand on a one and a half mile stretch of downdrift beach and stockpiling 40,000 cubic yards of sand for future emergency beach fill and dune repair. (7) (Image provided by Sebastian Inlet District)

**Inland Navigation Districts**

Inland navigation districts are taxing districts established to develop and fund long-range plans for maintenance of inland waterways, such as the intracoastal waterway, and for disposal of dredge material.

Inland navigation district are the same as inlet navigation districts, but their waterways do not necessarily provide access to open water and therefore are often not adjacent to beaches. While they typically will not provide funding for beach restoration, if they are located close to a coastal project, these districts can be a resource for free or low-cost sand and sediment. They may also fund back-bay projects as means of keeping sediment out of the navigation channel.

*Most of the above taxing revenue tools were based on property value derived from having a restored coast or renourished beach. The following revenue tools are based on use, often called consumption taxes or user fees.*

**Sales, Excise, and Use Taxes**

*Sales, excise, and use taxes are based on goods purchased or services rendered.*
Most states impose, sales taxes are taxes on a commodity or service applied at the time of sale. Often an excise tax is imposed on a particular type of good and the revenues are dedicated to a specific purpose; for example, gas taxes are imposed on fuel sales and revenues spent on highway improvements, or sales tax on fishing and boating equipment is often collected and dedicated to fishery conservation. “Use taxes” are a type of value-based tax collected not when the item is purchased but when the item or service is used in the state. For example, some states require a one-time tax to register a car or a boat in the state if it was purchased in another state.

Sales and use taxes at the state level can be identified for specific purposes, and ballot initiatives across the country have successfully raised states’ sales and excise taxes by fractions of a percent to be used for conservation. (8) However, this has yet to be successfully implemented state-wide exclusively for coastal restoration projects.

Sales and use taxes can also be imposed by counties and local jurisdictions on top of the state tax. Sales, excise, and use taxes can also be combined with the concept of special taxing district, where goods and services in a specific district might have specific rates. For example, a beach front restaurant might be required to have a 1% higher tax rate than a restaurant off the water. Sales, excise and use taxes must pass voter approval but are a consistent source of revenue for project funding.

Florida has an additional transient rental tax at the county level of 5% on hotels, motels, apartments, mobile home parks, and more which remit funds directly to the local county. A percentage of these funds are solely used for beaches and their management.

**Tourism/Bed/Occupancy Taxes**

*The most commonly implemented sales tax used for beach restoration is a tourism or bed tax.*

For many coastal communities, tourism is a major industry and a “bed tax” or “occupancy tax” generates revenue from visitors typically coming from outside the community. These occupancy or bed taxes are imposed on short-term overnight accommodations in addition to the local sales tax. A community must obtain authority to levy such a tax through state legislation. Often the authorizing legislation will place limitations on how the revenue generated can be spent. Typically, a portion of the revenues collected must be used on tourism related services such as beach nourishment.

**User Fees**

*User fees can take many forms but are based on direct use of the beach or coastal resource.*

User fees cover a broad array of revenue generation through fees imposed on one-time, multi-use, or permanent use of a resource. Some of the most basic fees are for simply accessing or using the beach or coastal resource:
Who Can Use These Tools?

Taxes and fees are often thought of in the context of an existing political sub-unit – a city, a county, a state – but as the above examples illustrate, generating revenue can come from more than just a standard government taxing structure. Revenue tools can focus on an area smaller than a municipality (such as an inlet management district), or cross municipal or county lines. Revenue streams can even encompass multiple counties or parishes who join together to address regional coastal issues.

Crossing or including multiple political subunits adds complexity to the development of the funding tool, since the method of revenue generation has to be legal in each political subunit and has to be approved in each subunit. However, generating revenue across municipal or county lines allows more stakeholders to contribute to a solution which spreads the costs more broadly. Regionality also adds to the perception of “fairness” where every stakeholder is contributing at some level. Regional revenue generation can also ensure a project has a broad regionally based solution, often improving the long-term results of the project and its cost effectiveness.

In 2016, nine counties in the San Francisco Bay region proposed a $12 “parcel tax” (an annual tax on every individual property/parcel) to fund shoreline projects which would protect and restore the bay. This is estimated to raise $500 million over 20 years. The ballot measure passed with an overwhelming 70% support. (9)
EMERGING FUNDING TOOLS

New financial options for funding projects are being implemented as project prices increase. Local governments who have identified sources of revenue from previously listed tools can consider bonds and insurance options to diversify their funding strategy. A bond is a debt instrument which allows towns to raise large-scale upfront financing for projects with known revenue streams. In its simplest version, a bond issuer raises a fixed amount of capital, repaying the capital (principal) and accrued interest (coupon) over a set period of time. The issuer will need to generate sufficient cash flows to repay interest and capital.

GREEN BONDS

Green bonds are a subset of conventional bonds. Their unique characteristic is the specification for the proceeds to be invested in projects generating environmental benefits.

Projects funded by green bonds must have clearly sustainable environmental benefits falling into one of the following broad categories: renewable energy, energy efficiency, sustainable waste management, sustainable land use, biodiversity conservation, clean transport, sustainable water management and climate change adaptation. (10)

Ultimately it is the decision of the issuer to label a bond as green because certification is voluntary; however, some green bonds will undergo third-party verification/certification to be labelled as ‘green’ to establish proceeds are funding projects generating environmental benefits.

ENVIRONMENTAL IMPACT BONDS

Environmental Impact Bonds (EIBs) are a pay-for-success debt financing mechanism, designed to reward superior outcomes and provide a means to involve local asset owners in aspects of funding the transaction.

EIBs are a way to expand resources for coastal projects by bringing government and the private sector together in partnership to realize mutual goals. EIBs are akin to a traditional proceeds-based bond with a fixed interest rate, both are designed to be commercially viable and provide capital for government to undertake projects without waiting for revenue to be available. Bond repayment levels depend on the level of successful achievement of desired environmental benefits. This is accomplished through a “performance payment” triggered by meeting a pre-determined threshold measured by an independent evaluator. The performance payment rewards achievement of a superior environmental or social result and is provided by one or more asset owners benefiting from the project’s earlier implementation.
Catastrophe Bonds

Catastrophe bonds, or ‘cat bonds’, are financial instruments designed to help states, cities or other owners of large assets manage the financial risks associated with potentially devastating natural disasters and have been used by private and public sectors sponsors around the globe.

Cat bonds are a tool to transfer some disaster risk to capital markets at attractive prices. These bonds are fixed income security paying periodic coupons to the investor during the life of the bond and insuring the sponsor of the bond against a pre-defined set of natural disasters. If a covered event occurs during the bond’s life, the sponsoring entity retains the bond principal to fund emergency relief and reconstruction work. These bonds pay investors higher interest rates/coupons than other traditional bond alternatives to compensate for the risk of the issuer not having to repay the principal in the event of a major catastrophe. Cat bonds can be used as an alternative to standard insurance coverage for less frequent, but more catastrophic disasters. (12)
Cat bonds can be designed to trigger a payment from any disaster -- hurricanes, floods, etc. Generally, a threshold is established based on loss-and-damage triggers. Payment is based on the total insured or total economic losses experienced by a single firm (indemnity) or an industry (indexed). However, cat bond payments can be based on parametric triggers -- predetermined, independent indicators, such as wind speed or storm surge height measured at specific locations. Locally funded beach nourishment projects are often eligible for FEMA Category G funding for parks and public recreation areas in the event of federally declared disaster, so cat bonds may not be necessary, or could be used to supplement FEMA funds in the event of disaster.

**PARAMETRIC INSURANCE**

A parametric insurance policy compensates the buyer based on measurable physical characteristics of storm being met or exceeded.

Parametric insurance is a solution to short-term liquidity needs of communities and states in the aftermath of natural disasters. Therefore, payments are made based on readily attained data (predefined sustained wind speed or flood height) rather than being based on an assessment of damages which can take days to months after a storm event to capture. The payment can be used for any purpose, including emergency response costs, replacing lost tax revenue; and therefore, could be used for funding a shoreline project. Alabama was the first state to seek parametric insurance coverage for hurricane damages. Different cities or regions can also join together to pool specific risks into a single, more diversified risk portfolio and lower the insurance policy premium cost.

**RESILIENCE BONDS**

Resilience Bonds could become a new catastrophe bond-like product which provides funding for project-based risk reduction solutions.

The new idea, resilience bonds, was conceived by partnership between Re:Focus, Rockefeller Foundation, Swiss Re, Goldman Sachs, and Risk Management Solutions. A resilience bond differs from a catastrophe bond by incorporating an agreed rebate mechanism used to support building resilience projects. (13)

![Resilience Bond Illustration](Source: RE:Focus (2015))

Fundamental to the idea is the ability to monetize both the physical and financial risk reductions associated with investments in flood damage reduction systems. The idea is implementing risk reduction measures lowers expected losses for investors and generates insurance savings. The risk to investors would be defined by independent risk modeling firms using catastrophe models evaluating
the chances of a trigger event occurring and how these probabilities change with the implementation of resilience projects.

For example, consider a beach nourishment project. Assume the benefits from this project to the local government sponsor have been effectively measured. What the restored wider beach would do is drive down the cost of catastrophic insurance over time because there would be a lower likelihood of damaging flooding. This is manifest in the resilience bond as reduced premiums. This translates to investors being less likely to lose their money due to a lower probability of an impact triggering a payment from the bond. The reduced risks and reduced premium are captured as a rebate which can be circled back to finance the restoration project. Given the complexities of resilience bonds of this nature none yet have been transacted.

**SUMMARY**

Funding a beach or coastal project which can run in the tens or even hundreds of millions of dollars over a project’s lifetime can feel daunting. Still, a healthy coastline is an essential part of a coastal community – it reduces a community’s risk from storms and coastal hazards; it’s often an ecologically important area and; as a driver of tourism and recreation, it can underpin the community’s economy. Developing funding mechanisms to successfully raise revenue over the course of decades to manage and maintain a coastline is essential for any coastal community faced with shoreline erosion. Funding mechanisms need to account for community characteristics, local stakeholders’ visions and expectations for their coastline, and must be widely perceived as equitable among coastal constituencies.

Federal, state and/or private sources of funding will likely be part of most coastal projects budget plans, and working across political boundaries to develop regional coastal solutions can keep project costs down. At some level, local funding will be critical to any coastal project. Local communities will need to raise funds through bonds, fees, and taxes- with financial instruments used to leverage funds and/or insure projects.

The various special taxing districts, sales and use taxes, and bonds described in this report are not an exhaustive list of options available to officials for funding coastal projects. Tools listed in this paper are meant to help officials get a basic understanding of some options available at the local level when beginning the funding process. There is no set formula for using the proposed tools and there is no “right answer.” What works for one community, might fail for another. People love their beaches and coastlines, so with solid community outreach, the right set of revenue generating tools, and dogged persistence, any community can fund their coastal projects.
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