

An aerial photograph of a coastal city and its estuary system. The image shows a complex network of waterways, marshlands, and urban areas. The sky is filled with soft, white clouds, and the water reflects the light. The city below is densely packed with buildings, roads, and green spaces. The estuary system is a prominent feature, with numerous channels and islands. The overall scene is a mix of natural and urban environments.

A Blueprint *for* Coastal Adaptation

UNITING DESIGN, ECONOMICS, AND POLICY

Edited by

CAROLYN KOUSKY, BILLY FLEMING, and ALAN M. BERGER

A Blueprint for Coastal Adaptation

Uniting Design, Economics, and Policy

**Edited by Carolyn Kousky, Billy Fleming,
and Alan M. Berger**

© 2021 Carolyn Kousky, William Fleming, and Alan M. Berger

All rights reserved under International and Pan-American Copyright Conventions. No part of this book may be reproduced in any form or by any means without permission in writing from the publisher: Island Press, 2000 M Street NW, Suite 480b, Washington, DC 20036

The editors gratefully acknowledge support for this project from the MIT Norman B. Leventhal Center for Advanced Urbanism, the Ian L. McHarg Center for Urbanism and Ecology, and the Wharton Risk Management and Decision Processes Center of the University of Pennsylvania.

Carolyn Kousky thanks the National Science Foundation (award number 1939913) for support in the writing of chapter 7 of this volume.

Library of Congress Control Number: 2020944709

All Island Press books are printed on environmentally responsible materials.

Manufactured in the United States of America

10 9 8 7 6 5 4 3 2 1

Keywords: abandoned property, adaptation, community engagement, climate change, disaster financing, drinking water, dynamic shoreline, environmental impact bonds, equity, flood insurance, floodplain, flood risk reduction, insurance, land use, National Flood Insurance Program, natural hazards, mitigation strategies, public funding, Rebuild by Design, resilience, salt line, sea level rise, urban planning, water management, wetland protection, zoning

Contents

FOREWORD	ix
<i>Jeff Goodell</i>	
INTRODUCTION	xiii
The Changing Risks of Coastal Communities	
<i>Carolyn Kousky, Billy Fleming, and Alan M. Berger</i>	
PART I Designing for Equitable Resilience	1
Chapter 1 A Comprehensive Framework for Coastal Flood-Risk Reduction: Charting a Course Toward Resiliency	2
<i>Samuel Brody, Kayode Atoba, Wesley Highfield, Antonia Sebastian, Russell Blessing, William Mobley, and Laura Stearns</i>	
Chapter 2 Designing for Resilience in Rich Coastal Cities (and Beyond)	29
<i>Matthijs Bouw</i>	
Chapter 3 For Whom Do We Account in Climate Adaptation?	55
<i>Karen M'Closkey and Keith VanDerSys</i>	
Chapter 4 Preparation, Adaptation, and Retreat in Miami Beach and Buras	80
<i>Joyce Coffee and Sarah Dobie</i>	
Chapter 5 Head of Bay Coastal Resilience: Adaptive Design for Jamaica Bay, New York	106
<i>Catherine Seavitt Nordenson, Rennie Jones, Paul Lewis, and Guy Nordenson</i>	

PART II	Adapting Public Policy and Finance	125
Chapter 6	Public Funding of Coastal Adaptation: A Review of US Public Sources—and the Case for More	126
	<i>Carlos Martín</i>	
Chapter 7	Insurance and Coastal Adaptation	154
	<i>Carolyn Kousky</i>	
Chapter 8	Environmental Impact Bonds: An Innovation in Financing Climate Adaptation	169
	<i>Shannon Cunniff, Benjamin Cohen, and Carolyn duPont</i>	
Chapter 9	Adapting Coastal Drinking Water to Rising Seas	192
	<i>Allison Lassiter</i>	
Chapter 10	Take Out the Trash When You Leave: Cleaning Up Properties Abandoned to Rising Seas	213
	<i>Thomas Ruppert</i>	
Chapter 11	Flux Zoning: From End-State Planning to Zoning for Uncertainty	240
	<i>Fadi Masoud and David Vega-Barachowitz</i>	
Chapter 12	Coastal Urbanism: Designing the Future Waterfront	259
	<i>Rafi Segal and Susannah Drake</i>	
CONTRIBUTORS		277
INDEX		282

CHAPTER 10

Take Out the Trash When You Leave: Cleaning Up Properties Abandoned to Rising Seas

Thomas Ruppert

SEA LEVEL RISE WILL TAKE SOME places from us. How will we clean up the residential areas we leave behind so that our coastlines are not foul, toxic, dangerous places? Who is responsible for cleaning up abandoned properties? How will this be funded? Why? What might an effective cleanup program look like? And could we really consider a program “effective” without that program integrating social justice, equity, and disparate impacts concerns (i.e., equitable resilience)? Are there models we can look to for insight on how to address these challenges? This analysis begins a conversation about these and related issues with the hope that we can plan with enough foresight to achieve cleanups that protect coastlines for future generations and allow at least some coastlines to evolve naturally with rising seas. And while rising seas motivated development of the ideas in this chapter, similarities to flooding challenges we face more generally also present themselves, and some of the work may apply there as well.

Rising sea levels already impact urban areas all around the world. The rate of sea level rise (SLR) continues to increase¹ and is expected to continue doing so for a very long time. While mitigating the greenhouse gases that fuel climate

change remains a critical and under-addressed need in the United States, substantial greenhouse gas mitigation will significantly decrease the amount and speed of SLR only in the long run. Past emissions have already “baked in” a significant amount of SLR for the near future,² with estimates ranging from less than 1 foot to 2.7 feet.³

Discussion of SLR often occurs in the context of the rhetoric of protection, adaptation, or retreat/relocation. Typically, relocation⁴ loses out in the conversation due to objections to it; some of the objections to relocation away from natural hazards involve the “social and psychological difficulties in displacing people from their homes, ‘the central reference point of the human existence,’” as well as “cultural-heritage loss . . . and decision-makers . . . shy[ing] away from the political contention.”⁵ Such objections and dynamics often lead to conversations focused primarily on protection and accommodation of flooding.⁶ But conversations that may currently be suppressed or ignored in areas of astronomical property values like Del Mar, California, and Miami Beach, Florida, seem increasingly inevitable in smaller towns of modest means like Satellite Beach, Florida; Tybee Island, Georgia; or Nags Head, North Carolina. Such communities cannot raise the funds for major infrastructure projects such as constructing seawalls, elevating roadways, or installing extensive stormwater pumping systems, nor do they have the political clout to convince others to pay for such infrastructure for them.⁷

Regardless of how or when we leave areas behind, we need to consider the impacts of leaving an area. Who cleans up what we leave behind? What happens if we do not plan for how we will clean up abandoned areas? Hurricanes and floods spread contamination and toxins throughout our environment and put public health at risk.⁸ Toxic releases come from storage, manufacturing, and waste sites. Toxins and other pollution also come from items found in garages and under sinks in residential homes and even from the building materials themselves and objects in the house.⁹ Failure to clean up such pollution means “new” oceanfront property created by sea level rise may come burdened with a toxic stew of water and unsightly, smelly, and dangerous construction debris that can become projectiles due to wind and wave action.

Avoiding this scenario requires cleaning up abandoned properties *before* these problems occur.

Commercial and industrial properties and toxic sites are extremely important to clean and remediate prior to loss. A report of the Government Accountability Office indicates that almost 1,000 Superfund sites are threatened by climate change, including 202 that are vulnerable to a coastal hazard or to coastal and wildfire hazards; a further 626 sites are vulnerable when flood hazard and wildfire hazard are considered.¹⁰ And while the law known as Superfund, the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), has many lessons to teach in the realm of cleaning up commercial properties, its lessons in situations involving homeowners seem limited. Indeed, while cleaning up commercial and industrial properties is important, the dynamics and finances of such cleanups differ greatly from most residential cleanup issues. The focus here is on the challenge of financing local government cleanup of *residential* properties, including multifamily, condominium, and mixed-use parcels.¹¹ The planning, legal, and financial contexts that influence how—or if—we effectively clean up areas abandoned to rising seas reside in large part at the state level as planning law, property law, and local tax/special assessment law are state law. This chapter uses Florida law as the context for its discussion. Aside from the author's expertise in Florida law related to sea level rise challenges, use of Florida as an example makes sense because Florida is, by some metrics, the most at-risk state in the country from sea level rise.¹² While the exact specifics of state law vary somewhat on property law, more on local tax/special assessment, and even more widely in planning law across the United States, the general financial, political, and legal dynamics discussed in this chapter have something to offer to almost any coastal state in the United States.

Authority, responsibility, and burden for cleanup of abandoned residential properties vary. Generally, according to long-standing legal precedent, if the property as abandoned is above the mean high water line, the property still belongs to the holder of the property title. If the title owner has abandoned the property and the property violates local codes or becomes a public nuisance, the

local government has the authority to impose fines and remedy the code violation or abate the nuisance if the property owner fails to do so. However, as will be discussed further, code violation processes will likely not provide an effective or efficient means for cleanup of abandoned properties. This is because, unlike usual code violations, brownfields, or properties that fail to pay property taxes, properties abandoned to SLR have little to no current value *nor* any prospects of having *future value* that someone would be willing to bet on.

For property below mean high water, long-standing precedent says the land, with a few exceptions, belongs to the state. Reality, however, does not always seem so clear.¹³ Lawsuits have sometimes ensued when local governments or the state attempt to remove houses on the beach or below mean high water, or, in one case, when the state *did not* remove a destroyed house.¹⁴ Many properties will likely be abandoned by their legal owner prior to the structure on the land being located below mean high water since extensive, frequent flooding, storms, surge, infrastructure damage, and structural damages will likely make properties uninhabitable before land disappears below the sea. This would mean that the land and buildings are still legally private property, leaving local governments burdened with the pollution, blight, social problems, and financial costs of abandoned properties.¹⁵

Can local governments, in Florida or any other state, bear these costs and burdens? By the time local governments are losing habitable land area to rising seas, they will likely already be experiencing economic crises. These local governments will have been spending vast sums for years on protective infrastructure that has finally been overwhelmed and will have been spending far more money than in the past for infrastructure maintenance.¹⁶ They will be losing income due to dropping property values and properties disappearing from the property tax rolls; the impacts of this will be particularly acute in Florida and Texas, which do not have a state personal income tax, and so these states—and their local governments—are even more reliant on property taxes. Such local governments will probably already have imposed as much—or more—than residents can bear in taxes and fees trying to generate sufficient local government revenue to stay afloat.

State government may lack resources due to the cascading economic impacts from local governments up the chain to states. Will the federal government come in to pay the costs? This seems unlikely across the board due to the sheer scale of the cleanup costs required. If, as happened with Hurricane Katrina and Superstorm Sandy, a single, defined area suffered, history would indicate that the federal government would likely foot the bill through supplemental disaster funding. But thousands of communities clamoring for assistance with long-term cleanups could mean that federal resources may be stretched too thin to fund all cleanups. Even if local, state, or federal taxpayers could foot the bill for residential cleanups, what are the impacts of such policies? An existing federal program already does contribute to some marine debris cleanups, but these programs currently focus more on debris in the water rather than proactively avoiding residential buildings becoming marine debris.¹⁷ We turn now to issues of who should pay for cleanups of residential properties and why.

The Costs of Cleanup: Who Should Pay and Why

The outline of financing a cleanup program presented here presumes the cost of cleanup of abandoned residential properties should, in general, be borne by the individual properties requiring cleanup. Some background helps explain this premise. Cleanup of abandoned property, like the rest of sea level rise adaptation, involves large losses and costs. Too often the questions asked remain limited to technical issues of how to accomplish an adaptation goal such as floodproofing an area or even relocation out of an area. A fundamental part of the “how” issues should, however, include two very basic questions: 1) Who bears the costs? and 2) Why?

When assigning costs, we typically want to consider whether someone caused the need for the cost and whether the same person or persons received a benefit for creating that cost. In such a case, we might assign the cost to that person as they are to “blame” for the cost. There seems to be plenty of “blame” to go around for the costs that sea level rise will impose on coastal communities. Currently several lawsuits¹⁸ seek to make fossil fuel companies bear some

of the burden for damages caused by climate change because for decades they knowingly profited from products whose dangers they intimately understood. One might place blame with property owners for buying properties subject to coastal risks exacerbated by sea level rise. But maybe the property had never flooded before, or no one ever told the buyers about the risk, and the buyers did not investigate enough before buying. Even if buyers investigated very carefully just three to five years ago, there would often have been little or no information available about localized future impacts in many places. Furthermore, stormwater flood risks and sea level rise impacts are constantly increasing due to more rapid rising of the seas combined with heavier rainfall events of greater intensity and frequency.

One might blame the local government for allowing development in places at risk of loss from sea level rise impacts. But it is hard for a local government to deny proposed development since this means both risking a lawsuit for not allowing proposed development—a potentially large cost—while also forgoing enhanced revenue from greater property taxes.¹⁹ One might also place blame with the developers. Developers sometimes purchase hazard-prone property and then sell quickly after developing, allowing them to pocket the rewards of their activity and leave the problems and costs of the newly developed and hazard-prone property to uninformed purchasers and the uninvolved taxpayer. In such situations, developers privatize the benefits of their development activity while socializing the long-term costs of increased exposure to hazards and human suffering.

Of the actors already identified in contributing to creation of the increased risk from SLR—fossil fuel companies, property purchasers, local governments, and developers—no one party can, or probably should, bear 100 percent of the cost since all played a part in creation of the risks and future abandonment we now face. Careful tailoring of policy could help reverse incentive structures that continue to generate development that is already at risk now or will be in the future. Comprehensive discussion of all these various actors and how to address why they contribute to creation of risk extends beyond the scope of this discussion. For our current purposes, suffice it to say that the focus here is on

assigning costs of future cleanup to the property itself. This may not be ideal in all circumstances, but assigning the costs to property has some broad practical and theoretical support and advantages. The likelihood of financing most property cleanups over the long term by successful lawsuits against fossil fuel companies seems dubious at best. Local governments, even if liable, will likely not have the funds once abandonment is occurring at any significant scale. Thus, assigning costs to the properties that will require cleanup makes the most sense for properties that were developed well before sea level became a common topic. Arguably, the costs would be better assigned entirely to the developer for new developments that might be at risk of sea level rise impacts within the next one hundred years or so since forcing the developer to pay the costs ensures that the long-term cost is borne by the property (in decreased property value), by the developer (in higher development costs), and by the initial purchasers of developed properties (in higher cost for purchase due to passed-on increased costs of developer).²⁰ Similarly, providing clear, definitive notice of current and future risks to potential property purchasers would provide additional support for assigning cleanup costs to the property since the property purchaser was aware of this possible cost prior to purchasing the property.²¹

As previously noted, the intersection of SLR and private property development create great costs for society. Critically, prospectively burdening property with the costs of cleaning it up after abandonment avoids taxpayers at the local, state, or federal level being left liable for these costs. At one level, this approach represents little more than operationalizing the basic tenet of economics that for efficient decision making, the costs of an activity should be internalized rather than externalized onto those that are not responsible for creating the costs. This idea aligns with Florida's statutory requirement that coastal local governments articulate "principles, guidelines, standards, and strategies . . . to . . . [l]imit public expenditures that subsidize development in coastal high-hazard areas."²² It also aligns well with other potential policies that seek to make the cost of owning property that is subject to serious hazards directly pay the cost for the risks of such hazards. Maybe the clearest example of efforts to move away from externalization of risk-related costs is the move to make flood insurance rates

reflect actual risk, thus placing the high costs of flood risk more on the owners of property rather than on other taxpayers.²³

Efforts to ensure that taxpayers do not pay the costs for cleanup of private use of property that is subsequently abandoned could take various forms. One possibility would be for states to establish statutory programs similar to Texas's Open Beaches Act²⁴ and impose the costs of relocating structures off of the beach on the property owners.²⁵ However, such an approach presents serious potential shortcomings. For example, in Florida, as in some states but not others, a legislative act similar to the Texas Open Beaches Act would almost certainly face lawsuits as a taking of private property; such suits might be successful. Furthermore, even after over fifty years in statutes that codified over a century of practice, the Texas Supreme Court in 2012 dramatically altered and undermined the Texas Open Beaches Act in response to a lawsuit against the state when the state attempted to enforce the Open Beaches Act against a property owner.²⁶

Another option would be for local governments to assess the costs of risk to the property. Such an approach would have widely varying impacts on the lives of current owners of the land; those with the most resources will easily absorb what would probably be a modest increase in the annual cost of owning property. But for those living closer to the economic margins, seemingly small annual cost increases can provoke serious hardships. Not coincidentally, those on the economic margins also typically include people and groups that have historically been discriminated against in housing markets and marginalized or excluded from decision making and policy development that affects them.²⁷

As a threshold issue, what "affordability" means and how it can be measured must be decided. Affordability is not an objective measure but rather reflects policy decisions.²⁸ And the scope of available policy choices may be limited by the availability of data supporting possible implementation of a policy choice. Additional questions related to social justice, equity, and disparate impacts of policy through affordability include "who will receive assistance, what type of assistance will be provided, how assistance will be provided, how much assistance will be provided, who will pay for assistance, and how an assistance

program will be administered.”²⁹ Ongoing efforts to reform the National Flood Insurance Program by eliminating or minimizing subsidies and yet protecting “affordability” provide valuable insight into the work of developing effective, realistic policies to equitable resilience.³⁰

The Costs of Cleanup: How the Law Currently Operates Will Not Work for SLR

How will communities clean up properties abandoned to rising seas or increased recurrent flooding? Before describing one potential—if currently unlikely—method for funding cleanups, it is worth considering the significant weaknesses of some known tools used by local government that will not likely be up to the task. Currently, if a property is abandoned or violates codes, local governments might use the laws and regulations related to code violations. For example, if a property owner does not clean up a property that violates code, the property owner will be fined; if the fines are not paid in a timely manner and the property cleaned up, the local government may conduct the cleanup and place a lien on the property for the cost of the fines and cleanup. The property lien allows the local government to collect what it is owed in fines, late fees, and costs when the property is sold or may even allow the local government to force sale of the property in order to collect what the local government is owed. For this system to work, the property must have sufficient value to cover the cost of the fines for code violations and other costs and back taxes assessed to the property. This approach will likely not work under conditions of abandonment due to SLR as these properties will likely no longer have enough value to cover the costs of cleanup. An analogous dynamic has occurred in Detroit and other urban areas that were historically grounded in heavy manufacturing that faltered over the past several decades. In such areas, the system of liens, fines, and tax sales has already long broken down as abandoned properties are so ubiquitous and worth so little that they cannot even support their own back taxes and cleanup costs. As a result, local programs, often with federal grant support, are cleaning up abandoned properties.³¹

Other typical local government funding mechanisms in Florida will also likely not be up to the task.³² Property taxes alone will not be sufficient since the need to clean up abandoned properties will come after years of local government spending on protective infrastructure and increased infrastructure maintenance costs that consumed significant resources and yet was overwhelmed by rising seas. Furthermore, property tax receipts will be shrinking due to declining property values. Property values will decline due to multiple factors: decreased quality of life associated with increased flooding; unavailable or prohibitively expensive flood insurance; and unavailable or higher-cost mortgage financing. In addition, the Florida Constitution³³ and Florida Statutes³⁴ present numerous and complex limitations on the feasibility and legal ability of local governments to increase property taxes.³⁵ These limitations come primarily in the form of “millage” caps. The millage rate represents the amount of tax for each \$1,000 of taxed property value.

Municipal Service Taxing Units (MSTUs) potentially offer another funding source.³⁶ MSTUs are specially created areas in a local government’s jurisdiction created by the local government when a part of the jurisdiction seeks additional services or infrastructure that the jurisdiction has not otherwise funded. MSTUs must serve a public purpose, and cleanup of abandoned properties should meet this requirement. MSTUs also offer the benefit of being created for specific areas, allowing a local government to use them in areas specifically expected to be lost to rising seas. However, MSTUs are subject to a significant drawback: as taxes, they are constrained by millage limits in the Florida Constitution³⁷ and in Florida Statutes,³⁸ resulting in the same challenges for MSTUs as for property taxes noted above.

Stormwater and drainage fees already fund—and will fund much more—drainage infrastructure improvements to address SLR in Florida communities; for example, significant portions of the \$600 million that Miami Beach is spending on elevating roads and reengineering and adding pumps to its drainage infrastructure have been funded by increased stormwater fees.³⁹ However, statute requires that stormwater utility fees are tied to the capital and operating requirements for stormwater and drainage systems.⁴⁰

Bonds represent a typical funding mechanism for large capital outlays by local governments. However, bonds are not themselves a source of revenue. Rather, they represent a method for securing large amounts of funding based on a promise to repay bondholders using future income. The future income proposed for bond repayment usually comes from sources such as special assessments, user fees, or property taxes. As bonds push repayment further down the road, this would only exacerbate the already noted challenges for use of repayment sources like special assessments, user fees, or property taxes. Furthermore, bond ratings are eventually likely to decrease for local governments that are seeing property loss and property value declines.⁴¹ So-called green bonds have also become a hot topic in the past few years. And while green bonds support climate, sustainability, resiliency, and environmental projects and may receive favorable tax treatment to increase their appeal, they, like standard bonds, still require a future payback plan. Two more promising funding mechanisms in the Florida context include special districts and special assessments, though each has its limitations and drawbacks.

The Costs of Cleanup: Are “Special Districts” or “Special Assessments” Up to the Task?

Special districts present a potential source of funding for local governments. Florida law allows for creation of special districts.⁴² In one sense, special districts could serve as an excellent tool for cleanup of abandoned properties since a special district could be created by a local government with the express purpose of prospectively generating funds for cleanup of properties expected to be abandoned in the future. However, as with property taxes, a major potential drawback of special districts is that they are subject to significant limitations in the form of property tax caps.⁴³ The potential for special districts to serve as *ex ante* sources of cleanup funding will depend, in part, on whether the local government is already at or so close to its maximum millage rate that insufficient capacity exists to generate the necessary funding.

Special assessments on properties offer another potential source of funding

for cleanup of abandoned properties. Special assessments are useful as they are not taxes⁴⁴ and thus not subject to millage limits. Second, special assessments are also not subject to Florida's homestead exemption,⁴⁵ which decreases certain tax revenues to local governments by providing an exemption for part of the value of a legally recognized homestead. The strengths of special assessments and their widespread use merits further consideration as a potential cleanup financing tool. Since special benefits and property law are creatures of state rather than federal or constitutional law, the discussion here is in the context of Florida state law, acknowledging both broad-brush similarities with other states yet also important distinctions that matter in specific implementation and cases.

Municipalities and counties have statutory authority to levy special assessments.⁴⁶ Florida Statutes state that "the governing body of a municipality may levy and collect special assessments to fund capital improvements and municipal services, including, *but not limited to*, fire protection, emergency medical services, *garbage disposal*, sewer improvement, street improvement, and parking facilities."⁴⁷ Special assessments are a "revenue source used to construct and maintain capital facilities and to *fund certain services*."⁴⁸

Despite their potential for funding cleanup, special assessments face hurdles as a funding source. First, statutes list the specific allowed uses for which special assessments may be used.⁴⁹ Listed uses do not include cleanup of abandoned property specifically, but the list of municipal uses for municipalities provides examples "including, but not limited to . . . garbage disposal." With this nonexclusive list's inclusion of "garbage disposal," it should be reasonable to argue that cleanup of abandoned properties qualifies. Second, a special assessment must pass a two-prong test.⁵⁰ The first prong requires that "the property assessed must derive a direct, special benefit from the service provided."⁵¹ In order to show that that a property receives a direct and special benefit, "there should be a logical relationship between the provided service and the benefit to [that] real property."⁵²

The second prong requires that the special assessment be "in proportion to the benefits to be derived therefrom."⁵³ Case law indicates it would be relatively

easy to meet this second prong of the test, but the first prong's "special benefit" could prove a real obstacle. Representing assessment and sequestering of funds to guarantee eventual cleanup of a property when or if it is abandoned clearly represents a benefit to neighboring parcels and the surrounding community. How to represent such assessment and guarantee as a benefit to the property itself for preexisting development presents a potential impediment to use of special assessments. For redevelopment or new development, the story might be different. If existing zoning and building regulations limited development or redevelopment due to projected future inundation of the area that would make the property a nuisance, then the benefit to the property would be to allow development/redevelopment that otherwise would not be allowed but for the guaranteed source of funding to clean up the property should it be abandoned. This, however, raises the specter of a challenge based on an "exaction" in the permitting process. Addressing exactions in land use as a way of potential funding goes beyond the scope of this discussion. Others have analyzed exactions as a land use tool to address climate change and SLR.⁵⁴

Should property owners challenge that such benefits are not "special benefits" under the statutory language of benefits that are "different in type or degree from benefits provided to the community as a whole,"⁵⁵ the judicial standard of review is whether the finding is "arbitrary."⁵⁶ Even under such an easy review standard, it might be possible for a challenger to convince a court that it would be "arbitrary" for a local government to state that levying an assessment for something that may or may not come to pass at some point in the future is *not* a benefit to the assessed property. Thus, arguably the safest way to ensure local government authority would be for the state legislature to amend state statutes to clearly create local government authority for establishing *ex ante* cleanup assessments.

In sum, the requirement that "the property assessed must derive a direct, special benefit from the service provided" presents a serious potential roadblock to use of special assessments to guarantee cleanup of abandoned property. However, since case law also indicates that determination of a "special benefit" is a legislative rather than judicial decision, the state legislature in statute

could define the “special benefit” to assessed properties as the guarantee that the property will not 1) be subjected to the financial burden of cleaning up *other* properties and 2) that the property is free from the risk of being surrounded by or impacted by abandoned properties. Based on the experience of Detroit and other cities dealing with thousands of abandoned properties, such properties clearly pose massive public health and public safety concerns, impose huge cleanup and management costs for local government, and dramatically drive down property values and quality of life.⁵⁷ Such impacts merit attention by state legislatures that could empower local governments to be proactive in avoiding these problems.

Overall, consideration of several potential funding options for cleanup of abandoned residential properties indicates a core challenge: cleanup funds need to be generated *prior* to abandonment of the properties since once the properties are abandoned, they will likely lack sufficient value to fund their own cleanup. As this problem will appear contemporaneously with decreasing tax revenue for the local government *and* a long-term increase in infrastructure maintenance and services costs, cleanup will likely be haphazard and inconsistent, particularly in communities or areas that lack either very wealthy adjacent property owners or major tourism income from the beach or coastal area that help drive and fund cleanups. Ultimately, special districts and special assessments appear as potential funding mechanisms for locally funded cleanup programs. Special district usage, however, will depend on whether the local government is already close to or at its capped property tax rates, while special assessment usage would be facilitated by statutory changes.

The Costs of Cleanup: Creating Local Policies for Proactive Funding of Cleanup

Development of a locally funded cleanup program for abandoned properties requires careful construction of an administrative process that protects the due process rights of citizens, meets the needs for cleanup, and ensures that funds generated are sufficient and properly utilized for the intended purposes.

Essentially, a cleanup program would: 1) determine which properties are at significant risk of abandonment and over what timeline; 2) generate parcel-/building-specific cleanup estimates; 3) select a period over which to amortize collection of the cleanup costs; 4) implement an administrative and accounting process that would effectively sequester collected funds for exclusive use for cleanup of the funds' specified property; 5) provide for refunds, interest, and/or stopping of assessments should a demonstrated change in the situation or projections for a property occur; and 6) address economic impacts, equity, and social justice concerns, as was touched upon earlier.

Initially, local governments need to determine which properties might be subject to abandonment due to SLR impacts.⁵⁸ As more and more coastal local governments in Florida now form part of regional collaboratives that have adopted regional projections for SLR over specific planning time horizons, these SLR projections and time horizons could form part of the data for this initial analysis.⁵⁹ The analysis should map projected timelines for permanent inundation. In addition, properties that are barely above the permanent inundation level should be assessed for viability. The assessment would examine factors such as the existing drainage capacity serving the parcel and surrounding areas as decreased efficacy of stormwater drainage may lead to as many or more problems as permanent inundation by higher sea levels. Such analysis should form part of a local government's stormwater master plan.⁶⁰ The map should also include areas where infrastructure services (road access, potable water, sewer/septic systems, etc.) are likely to be inundated or so heavily impacted as to potentially render the local government incapable of reasonably keeping the infrastructure services functioning during the planning time horizon used. Such analysis should include the existing infrastructure and capital improvements plan for the local government as projects in these may mitigate impacts to areas that otherwise might be flooded.

And what should be the planning time horizon? Local governments may well vary on their choices in this regard. Local governments could consider the strengths and weaknesses of longer and shorter planning horizons. Shorter time horizons provide greater certainty of projected impacts and allow for more

accurate assessments of cleanup costs based on labor and disposal costs. Longer time horizons allow longer amortization periods for estimated cleanup costs, resulting in smaller annual assessments for property owners. Longer time horizons also provide a sense of “notice” to potential property purchasers of likely future impacts on a property.

To understate the obvious: the processes and implementation of identifying parcels likely to be abandoned at estimated times in the future will engender significant political and emotional involvement from the community. As a result, it will be imperative for communities to design extremely robust public engagement processes for this stage of the work. Initially, public engagement should include listening sessions and discussions about the physical and financial realities driving the local government to consider not defending some areas from SLR impacts and driving the need to soberly evaluate undesirable future scenarios, such as the need to finance cleanup of abandoned areas. These discussions could lead to other outcomes in some instances. For example, maybe a community would seek to tax themselves more to create additional structural protection. After working toward acceptance by a segment of the community that SLR may eventually claim some of their community, the discussion could shift to discussing how to determine what residential areas may eventually be abandoned due to SLR impacts and the inability to fund protection. This should include development of a list of criteria and inputs for estimating where abandonment might take place rather than just immediately circling areas on a map.

Once initial data and inputs have been selected for parameters to estimate potential abandonment, this will result in identification of impacted parcels with estimated dates of potential abandonment. From a process perspective, it will be important to present this information broadly to the community for public comment. Such information will likely cause serious consternation among affected property owners; lawsuits claiming a taking of property based on the information and its impacts may ensue. However, local governments should be aware that providing information alone is very unlikely to result in a successful property rights claim. A “taking” of private property that violates the Fifth Amendment to the US Constitution typically involves either direct

appropriation of property (eminent domain) or a “regulatory taking” so serious that it is akin to an actual “taking” of private property.⁶¹ As providing information does not involve regulating the use of property nor appropriation or invasion of property, it will not qualify as a “regulatory taking.” Even if legal, the *political* costs of such action virtually everywhere in the United States still make this option extremely unlikely today. But maybe not forever.

After identification of parcels, a program needs to estimate cleanup costs. As with so many administrative decisions, ease of administration and accuracy compete: the most accurate estimates would result from a parcel-by-parcel analysis. This, however, would be costly and time consuming compared to estimates based on existing property appraiser database information such as type of construction, construction materials, and square footage. As experience with demolition and disposal increases, the accuracy of parcel-specific estimates based on data available from property appraiser databases will increase, leading to less need for possible on-site, parcel-by-parcel analysis. The next step is amortizing the estimated cleanup cost over the number of years before projected abandonment of the property. This provides the amount of the annual assessment to be added to the yearly tax bill for each property. It is key that the charge for future cleanup be included on the annual tax bill and prioritized in state law to allow the same methods for collection of unpaid charges as with property taxes.

Adequate administrative structure is crucial to the success of any cleanup program and funding mechanism. The administrative structure must ensure that funds collected from each property are properly credited to that property with bookkeeping processes that ensure full transparency for the overall estimated cleanup costs for the property, the yearly assessment, and the balance of the account. Further, the program requires safeguards to ensure that the funds collected cannot be raided to pay for other expenses of the local government. It would seem foolish to allow the value of collected funds to not draw interest. However, any use of the money to generate interest would have to ensure the safety of the principal so that money paid into the system for the benefit of a property would not be lost. This need for safety will limit the potential rate of return on the money.

Estimates of time and cost for cleanups will seldom be exact. This further demonstrates the need for careful administrative procedures that safeguard collected funds expressly for their intended use; carefully define the intended use; determine if, when, and how to take advantage of efficiencies of scale; and delineate how any costs that exceed the estimate cost are covered, how to periodically evaluate whether current cost and timing estimates remain reasonably valid, and how to refund any excess funds to property owners once property is abandoned. While some of these are self-explanatory, others merit further discussion.

The intended use of the funds is to remove residential development elements and associated infrastructure most likely to cause harm or contamination. This requires careful consideration of scope. Must all structures, regardless of construction method, be removed? Or might poured concrete buildings be allowed to stay if adequately stripped of other materials? Must building slabs or building pilings be removed or may they remain? What about driveways? Is the answer different if the driveway is a poured slab versus brick? Must septic systems, including drain fields, be removed? May septic tanks be left in place if cleaned out?

Will the local government seek to take advantage of economies of scale in contracting and cleanup by aggregating multiple properties for simultaneous cleanup? While this may save money in contracting and execution, it may also mean additional costs for “maintaining” abandoned properties until enough adjacent properties have actually been abandoned to create an economy of scale. The challenges of abandoned properties in Detroit provide background on some of the challenges for such a program.⁶²

Finally, when funds remain, these funds need to be returned to the last property owner(s) of record. Before refunding any remaining money, the local government should ask the property owner(s) to voluntarily sign a quit-claim deed over to the local government for the property. This would relieve the property owner of any other potential liability associated with the property such as taxes or should someone be injured on the property. If the property owner chooses to retain ownership, the local government might rezone the property to

the special classification of “impacted by sea level rise and abandoned,” which would allow the owner to maintain legal possession but dramatically limit the ability to develop the land. This might also include notice that the local government disclaims certain legal obligations, such as providing public services to the property through maintenance of roads, drainage, electricity, sewer, or potable water.

Concluding Thoughts

If you have been shaking your head and thinking all of this sounds crazy and politically impossible, you are correct—for the moment. But it may not seem so crazy or politically impossible in the future. As I write this, COVID-19 reshapes what we see as politically and socially acceptable. The clearest lesson this pandemic has for this discussion is: Sometimes we need to make the difficult decision to take high-cost actions *before* we experience suffering to avoid much more suffering that will result if we wait until we feel the pain to make the hard decisions. Our species has many examples in our history of only responding to a problem once our back is against a wall. If we wait until our back is against the wall to organize ourselves for cleaning up areas lost to the sea, it may not happen, or only sporadically and incompletely. If we wait to figure out how to finance the cleanup of abandoned properties until they are already plaguing our coastal areas, many local governments will not be capable of bearing the financial burden as those local governments will already be in severe financial straits. If we arrive at that point, achieving cleanups will, yet again, require taxpayers from other areas of coastal states—and probably the rest of the country too—to subsidize such cleanups if we do not want to lose our coastal areas. Otherwise, we could lose the beautiful coastlines where we love to recreate as they become a toxic and tangled mess of contaminants and pollution, including chemicals, insulation, wood, electrical components, shingles, drywall, and cement—and that is just from the residential structures. We could oversee the loss of lagoons, salt marshes, and wetlands that serve as the nurseries for many of our fish species, further undermining coastal ecosystems already under increasing pressure

from climate change and speeding the loss of ecosystems that provide significant human protein.

We have no shortage of current and future crises to address, but let us not forget how important—economically, spiritually, and physically—our coastlines are. Let us begin the dialogue to protect our coastlines from abandoned development.

Endnotes

1. See, e.g. Peter Folger and Nicole T. Carter, Congressional Research Service, Sea-level rise and U.S. Coasts: Science and Policy Considerations 1 (September 12, 2016); Shimon Wdowinski, Ronald Bray, Ben P. Kirtman, and Zhaohua Wu, *Increasing Flooding Hazard in Coastal Communities Due to Rising Sea Level: Case Study of Miami Beach, Florida*, 126 *Ocean & Coastal Management* 1 (2016).
2. See, e.g. Peter U. Clark, Jeremy D. Shakun, Shaun A. Marcott, Alan C. Mix, Michael Eby, Scott Kulp, Anders Levermann, Glenn A. Milne, Patrik L. Pfister, Benjamin D. Santer, Daniel P. Schrag, Susan Solomon, Thomas F. Stocker, Benjamin H. Strauss, Andrew J. Weaver, Ricarda Winkelmann, David Archer, Edouard Bard, Aaron Goldner, Kurt Lambeck, Raymond T. Pierrehumbert, and Gian-Kasper Plattner, *Consequences of Twenty-First-Century Policy for Multi-Millennial Climate and Sea-Level Change* 361, *Nature Climate Change* 2923, (2016) (noting that “Initial interest in climate change from post-twenty-first century greenhouse gas (GHG); forcing came with the recognition that both the carbon cycle and the climate system have large inertia, such that even if carbon emissions are stabilized or reduced, atmospheric CO₂ concentrations and surface temperatures would remain high and sea level would continue to increase for millennia.”).
3. Intergovernmental Panel on Climate Change, Fifth Assessment Synthesis Report, *Climate Change 2014 Synthesis Report*, Figure SPM.6, page 11 (2014) (noting that sea level rise will “likely be in the ranges of 0.26 to 0.55 m for RCP2.6, and of 0.45 to 0.82 m for RCP8.5 [medium confidence]”), at https://archive.ipcc.ch/pdf/assessment-report/ar5/syr/AR5_SYR_FINAL_SPM.pdf. More recent projections put these numbers much higher.
4. I choose to use the word “relocation” instead of retreat despite the dominant use of “retreat” in the literature. This semantic choice is intentional. As noted, the barriers to relocation are already high enough, so I—along with others—have struggled for years to substitute “relocation” for “retreat” as the word retreat comes with significant negative connotations of losing a battle. It appears counterproductive to

saddle the description of a potential policy choice with negative connotations about being for “losers” when the policy choice, despite many potential benefits to the larger society, already faces such innate challenges.

5. Miyuki Hino, Christopher B. Field, and Katharine J. Mach, *Managed Retreat as a Response to Natural Hazard Risk*, 7 *Nature Climate Change* 364 (<https://doi.org/10.1038/NCLIMATE3252>, 2017).
6. Cf. e.g. Nathan Rott, “Retreat” Is Not an Option as a California Beach Town Plans for Rising Seas, National Public Radio (December 4, 2018) (discussing how the City of Del Mar in California did not want to talk about possible relocation) (radio segment available online at <https://www.npr.org/2018/12/04/672285546/retreat-is-not-an-option-as-a-california-beach-town-plans-for-rising-seas>).
7. Cf. A. G. Keeler, D. E. McNamara, and J. L. Irish, *Responding to Sea Level Rise: Does Short-Term Risk Reduction Inhibit Successful Long-Term Adaptation?* 6 *Earth’s Future* 618, 620–21 (2018) (noting the differential ability to use beach nourishment as a protective strategy depending on the value of the properties being defended). See, also, e.g. Christopher Flavelle and Patricia Mazzei, *Florida Keys Deliver a Hard Message: As Seas Rise, Some Places Can’t Be Saved*, NY Times, December 4, 2019; Rick Lyons, *Fury as Coastal Towns Left to Fall Into the Sea with Authorities Giving Up on Areas*, Express, November 17, 2019, at <https://www.express.co.uk/news/uk/1205509/uk-floods-climate-change-flooding-environment-agency-Norfolk-coastal-defence>.
8. See, e.g. Jen Christensen, *The Hidden Dangers of Flooding*, CNN (September 13, 2018); Associated Press, *Hurricane Harvey’s Toxic Impact Deeper than Public Told*, Tampa Bay Times (March 22, 2018).
9. See, e.g. Christopher Flavelle, “Toxic Stew” Stirred Up by Disasters Poses Long-Term Danger, *New Findings Show*, NY Times (July 15, 2019), at <https://www.nytimes.com/2019/07/15/climate/flooding-chemicals-health-research.html?action=click&module=MoreInSection&pgtype=Article®ion=Footer&contentCollection=Climate and Environment>.
10. Government Accountability Office, *SUPERFUND: EPA Should Take Additional Actions to Manage Risks from Climate Change* 19, Figure 3 (October 2019).
11. Multifamily housing and condominiums present some special considerations as the assessments of overall cleanup costs will need to occur on a parcel basis with proportionate charges to each unit. While mixed-use parcels may also contain commercial units that might otherwise be considered for alternative cleanup financing, their mix with residential uses most likely would militate toward use of the same overall assessment of cleanup costs and relative apportionment among units even as the apportionment might also require modification as commercial units might have higher per-square-foot cleanup costs than residential units. As with many

- aspects of all the proposals presented here, further research, consideration, and experience will inform the best way to proceed.
12. See, e.g. Union of Concerned Scientists, *Underwater: Rising Seas, Chronic Flood, and the Implications for US Coastal Real Estate*, pp. 5–6 (detailing an estimated sixty-four thousand homes at risk of chronic flooding within thirty years and up to one million homes by 2100), at <https://www.ucsusa.org/sites/default/files/attach/2018/06/underwater-analysis-full-report.pdf>.
 13. See, e.g. Christopher Flavelle, *The Fighting Has Begun Over Who Owns Land Drowned by Climate Change*, *Bloomberg Businessweek* (April 4, 2018) available at <https://www.bloomberg.com/news/features/2018-04-25/fight-grows-over-who-owns-real-estate-drowned-by-climate-change>.
 14. See, e.g. Thomas Ruppert, *The Challenges of Destroyed Properties Along the Coast and Ownership of Land Going Underwater*, *Florida Sea Grant Coastal Planning Newsletter* (December 2018) available at <https://mailchi.mp/ddcef45dbddf/cstl-planning-newsletter-of-fla-sea-grant> (discussing legal cases of destroyed homes along the water).
 15. On the problems of vacant properties generally, see, e.g. Allan Mallach, *The Lincoln Institute of Land Policy, The Empty House Next Door* (2018). The same publication also addresses the fiscal impacts of abandoned properties. *Id.* at 19–20.
 16. In fact, many local governments *have not* been spending adequately on infrastructure maintenance for many years, resulting in very poor infrastructure grades from the American Society of Civil Engineers. Deferred maintenance already includes massive looming bills for infrastructure even without SLR. See, e.g. The Volcker Alliance, Jerry Zhirong Zhao, Camila Fonseca-Sarmiento, and Jie Tan, *America’s Trillion-Dollar Repair Bill: Capital Budgeting and the Disclosure of State Infrastructure Needs* (November 2019 working paper) (noting that states contribute about 80 percent of US public infrastructure funding and yet the deferred maintenance at the state level is estimated at \$873 billion, or 4.2 percent of US GDP), at <https://www.volckeralliance.org/sites/default/files/attachments/Americas%20Trillion-Dollar%20Repair%20Bill%20-%20Capital%20Budgeting%20and%20the%20Disclosure%20of%20State%20Infrastructure%20Needs.pdf>. Cf. also, Report Card Committee, American Society of Civil Engineers, *2016 Report Card for Florida’s Infrastructure* (noting, for example, that from 2016 to 2019 ASCE estimated Florida needed \$1.1 billion to keep up with stormwater improvement needs), at https://www.infrastructurereportcard.org/wp-content/uploads/2017/01/2016_RC_Final_screen.pdf.
 17. See, *Marine Debris Program*, National Oceanic and Atmospheric Administration, at <https://marinedebris.noaa.gov/current-efforts/removal> (last visited April 7, 2020). Note that the program does have a Marine Debris Prevention program.

- See, e.g. Notice of Federal Funding: FY 2020 Marine Debris Prevention, at <https://marinedebris.noaa.gov/sites/default/files/NOAA-NOS-ORR-2020-2006200%20NOFO%20Report.pdf> (last visited April 7, 2020). While the examples listed in the FY 2020 call for proposals does not list abandoned residential structures as a type of possible marine debris, *id.*, such work would fit within the FY 2020’s call for proposals’ listed “principal objective” of providing “federal financial and technical assistance to organizations with the expertise to identify, evaluate, and execute marine debris prevention projects that improve living marine resource habitats, with the end goal of providing the knowledge and resources necessary to change behaviors, raise awareness, and promote the long-term prevention of marine debris.” *Id.* at 3.
18. See, e.g. list of “Common Law Claims” in the US Climate Change Litigation database of the Sabine Center for Climate Change Law at Columbia Law School, at climatecasechart.com/us-climate-change-litigation/ (last visited January 6, 2020).
 19. Virginia Beach, Virginia, denied a rezoning request by a developer that wanted to develop land whose only access road already floods during the highest tides. The city had requested the developer to analyze stormwater issues for the development with 1.5 feet of SLR and heavier rainfall events. On May 24, 2019, a Virginia Circuit Court dismissed the suit with a finding that the city acted within its authority. *Argos Properties II, LLC v. City Council for Virginia Beach*, Docket No. CL18002289-00 (Va. Cir. Ct. 2019).
 20. See, e.g. Peter J. Byrne and Kathryn A. Zyla, *Climate Exactions*, 75 Maryland L. Rev. 758 (2016) (discussing use of exactions to address climate change and sea level rise costs created by new development).
 21. For more on notice, see, e.g. Thomas Ruppert, *Reasonable Investment-Backed Expectations: Should Notice of Rising Seas Lead to Falling Expectations for Coastal Property Purchasers?*, 26 J. Land Use & Envtl. Law 239 (2011).
 22. Fla. Stat. § 163.3177(6)(g)6 (2019).
 23. See, e.g. Congressional Budget Office, *Value of Properties in the National Flood Insurance Program 1–2* (June 2007); United States Government Accountability Office, *FEMA: Action Needed to Improve Administration of the National Flood Insurance Program 52*, GAO-11-297 (June 2011); United States Government Accountability Office, *Overview of GAO’s Past Work on the National Flood Insurance Program*, letter to The Honorable Randy Neugebauer, Chairman, Subcommittee on Housing and Insurance, House of Representatives (April 9, 2014). Note that each of these documents emphasizes that some policies within the NFIP are subsidized by other policies. Note that FEMA has borrowed heavily over the past fifteen years from the United States Treasury to pay NFIP claims; billions of dollars of such loans have been forgiven by the US Treasury as there was no hope that

- NFIP could ever repay the loans. Such loan forgiveness constitutes a subsidy from the federal taxpayer to NFIP policyholders.
24. Tex. Nat. Res. Code § 61.025(a) (2020).
 25. *Id.* at 61.0184(c) (2020).
 26. *Severance v. Patterson*, 370 S.W. 3d 705 (Tex. 2012).
 27. Richard Rothstein, *The Color of Law* (Liveright Pub. Co., 2017).
 28. *See, e.g.* Committee on the Affordability of National Flood Insurance Program Premiums, National Research Council, *Affordability of National Flood Insurance Program Premiums: Report 1*, 79 (The National Academies Press, 2015).
 29. Committee on the Affordability of National Flood Insurance Program Premiums, National Research Council, *Affordability of National Flood Insurance Program Premiums: Report 2*, 101 (The National Academies Press, 2016).
 30. *See generally* Committee on the Affordability of National Flood Insurance Program Premiums, National Research Council, *Affordability of National Flood Insurance Program Premiums: Report 1* (The National Academies Press, 2015) and Committee on the Affordability of National Flood Insurance Program Premiums, National Research Council, *Affordability of National Flood Insurance Program Premiums: Report 2* (The National Academies Press, 2016).
 31. Allan Mallach, *The Lincoln Institute of Land Policy, The Empty House Next Door 20* (2018).
 32. For more information on typical funding mechanisms used by Florida local governments and how they might be used for SLR adaptation, see Houston Endowment, Thomas Ruppert and Alex Stewart, *Sea-level rise Adaptation Financing at the Local Level in Florida* (September 2015), at https://www.flseagrant.org/wp-content/uploads/Local-Gov-Financing_FINAL_10.8.15_1.pdf.
 33. Florida Constitution, Article 7, Sec. 9.
 34. Fla. Stat. § 200.065 (2019).
 35. To drastically oversimplify, the maximum millage rate a Florida local government can set via a simple majority vote of the governing body is the higher of the previous year's maximum allowable majority-vote-eligible millage or the actual millage rate (if it was higher due to a greater-than-majority vote) plus the calculated rate of change in per capita Florida personal income. *See, e.g.* Florida Department of Revenue, *Maximum Millage Levy Calculation History and General Information* (undated), at <https://floridarevenue.com/property/Documents/maxmillhistory.pdf>. If a local government seeks to use a higher millage rate than this, it can assess up to 110 percent of the majority vote limit with a two-thirds vote or up to their constitutional or statutory maximum by a unanimous vote or a referendum. *See, e.g.* Florida Department of Revenue, *Maximum Millage Levy Calculation History and General Information* (undated), at <https://floridarevenue.com/property>

/Documents/maxmillhistory.pdf. Since these limitations apply to the *millage rate* rather than the actual aggregate dollar amount of taxes collected in the previous year, any meaningful decline in property values and number of taxable parcels almost certainly would require millage rate increases greater than that allowed by a majority vote simply to *maintain* the previous year’s revenue stream. Thus, once actual property value declines begin and parcels are actually lost to rising waters, current law would serve to drive down local revenue even as the fiscal needs of local governments for cleanup and major infrastructure is *increasing*.

36. MSTUs allow Florida local governments to “[l]evy and collect taxes, both for county purposes and for the providing of municipal services within any municipal service taxing unit . . . ; borrow and expend money; and issue bonds, revenue certificates, and other obligations of indebtedness.” Fla. Stat. § 125.01(2)(q) (2015) as cited in Houston Endowment, Thomas Ruppert and Alex Stewart, *Sea-level rise Adaptation Financing at the Local Level in Florida 4* (September 2015).
37. See Florida Constitution, Art. 7, section 9 for millage limits.
38. See, e.g. Fla. Stat. § 200.065(1) and (5)(a) (2019).
39. Florida Statutes provide clear authority for local government to charge stormwater fees to fund drainage infrastructure and improvements. Fla. Stat. § 403.0893 (2019). Miami Beach has leaned heavily on increasing stormwater fees to fund the estimated \$600 million the city has dedicated to raising roads, reengineering drainage, and adding stormwater pumps. In nineteen years, Miami Beach’s stormwater fee increased from \$3.25 per equivalent residential unit (ERU) to \$24.82/ERU. Most of this increase—from \$9.06/ERU to \$24.82/ERU—occurred from 2014 to 2019 and provided much of the recent \$600 million.
40. Fla. Stat. § 403.0893(1) (2020).
41. Cf. e.g. Paul Goldsmith-Pinkham, Matthew T. Gustafson, Ryan C. Lewis, and Michael Schwert, *Sea Level Rise and Municipal Bond Yields* (October 2019), at https://paulgp.github.io/papers/ggls_munis_10_30.pdf.
42. Florida Statutes, Chapter 189 (2019).
43. Florida Statutes, Chapter 200 (2019). Florida local governments vary widely in how much overall millage caps would hamper the ability to raise their property tax rates. For example, county millage rates in 2019 in Florida ranged from a low of 2.58 mills in Monroe County (a.k.a. the Florida Keys) to the constitutional limit of 10 mills in Dixie, Hamilton, and Union Counties. Florida Department of Revenue, *Millage and Taxes Levied Report* (2019), available at https://floridarevenue.com/property/Pages/DataPortal_DataBook.aspx. As a general rule of thumb, the lower the value of property in the local government, the higher its millage rate already is.
44. Fla. Stat. § 197.3632 (1)(d) (2019). While this section specifically defines “non-ad

valorem assessments,” special assessments are merely a subtype of non-ad valorem assessments, so the definition still applies.

45. Fla. Const. Article 7, §6(a).
46. Fla. Stat. § 170.201 (1) (2019); Fla. Stat. § 125.01 (1) (2019).
47. Fla. Stat. § 170.201 (2019) (emphasis added).
48. The Florida Legislature’s Office of Economic and Demographic Research, *Local Gov’t Financial Information Handbook 2011*—“Special Assessments,” Page 15 <http://edr.state.fl.us/content/local-government/reports/lgfih11.pdf>.
49. For municipalities, these uses are listed in Florida Statutes §170.01 and include roads, sidewalks, lighting, landscaping, signage or other amenities; swales, sanitary sewers, storm sewers, canals, drains, water bodies, or marshlands; water supply; relocation of utilities; parks/recreation facilities; seawalls; drainage and reclamation of land; parking; mass transit; and navigation. Municipalities may also levy special assessments to “fund capital improvements and municipal services, including, but not limited to, fire protection, emergency medical services, garbage disposal, sewer improvement, street improvement, and parking facilities.” Fla. Stat. § 170.201(1) (2019). The statutory recognition of county authority to levy special assessments does not contain a detailed list of potential uses. Fla. Stat. § 125.01 (1)(r) (2019).
50. *Morris v. City of Cape Coral*, 163 So. 3d 1174, 1176 (Fla. 2015).
51. *Donnelly v. Marion County*, 851 So.2d 256, 259 (Fla. 5th DCA 2003) (citing *City of North Lauderdale v. SMM Props, Inc.*, 825 So.2d 343 [Fla. 2002]); *Workman Enters., Inc. v. Hernando County*, 790 So.2d 598 (Fla. 5th DCA 2001).
52. *Morris v. City of Cape Coral*, 163 So. 3d 1174, 1177–78 (Fla. 2015) (“In evaluating whether a special benefit is conferred to property by the services for which the assessment is imposed, the test is not whether the services confer a ‘unique’ benefit or are different in type or degree from the benefit provided to the community as a whole; rather, the test is whether there is a ‘logical relationship’ between the services provided and the benefit to real property.” (citing *Lake County v. Water Oak Mgmt. Corp.*, 695 So. 2d 667 [Fla. 1997])).
53. Fla. Stat. § 170.02 (2019). *See also* Fla. Stat. § 170.201 (2019) (providing that costs may be determined either by “the front or square footage of each parcel of land,” or “an alternative methodology, so long as the amount of the assessment for each parcel of land is not in excess of the proportional benefits as compared to other assessments on other parcels of land.”).
54. *See, e.g.* Peter J. Byrne & Kathryn A. Zyla, *Climate Exactions*, 75 Maryland L. Rev. 758 (2016).
55. Fla. Stat. § 170.01(2) (2019).
56. *Morris v. City of Cape Coral*, 163 So. 3d 1174, 1176-77 (Fla. 2015) (noting that “[t]he standard to be applied to both prongs is that the legislative findings should

- be upheld unless the determination is arbitrary.” *Id.* at 184. “Even an unpopular decision, when made correctly, must be upheld.” Internal citations omitted).
57. On the problems of vacant properties generally, *see, e.g.* Allan Mallach, *The Lincoln Institute of Land Policy, The Empty House Next Door* (2018). This publication notes that Detroit in 2013 had 48,289 vacant buildings and in 2017 had an estimated 120,000 vacant lots. *Id.* at 16, table 3 and page 4. This report also emphasizes the direct costs of vacant buildings: “Detroit is spending nearly \$130 million of federal funds already committed to demolish vacant properties. At the beginning of 2016, the city of Baltimore and the state of Maryland announced Project C.O.R.E., a \$94 million program to demolish vacant properties in that city. Vacant properties are a massive drain on public resources, hitting hardest those cities already struggling to meet payrolls and invest in their future.” *Id.* at 20.
 58. As local governments face infrastructure maintenance challenges due to SLR and climate change impacts, many local governments already confront looming crises due to deferred maintenance of infrastructure. *See, e.g.* endnote 16 and sources cited therein.
 59. Section 1 of Florida Senate Bill 7016, introduced but not passed in Florida’s Senate in 2020, would have provided for a “State Sea-Level Rise Taskforce” that, among other things, would have been tasked with developing a scientifically based recommendation for statewide sea level rise projections. If adopted as provided for in the law, the projection(s) then would have “serve[d] as the state’s official estimate of sea-level rise and flooding impacts along the state’s coastline and [would have been] used for the purpose of developing future state projects, plans, and programs.” *Id.* at lines 87–90. Even if this bill had passed, it would have presented numerous questions about how the “official” state SLR projection would have interacted with the projection methodologies that have already been adopted by regional collaboratives in Florida such as the Southeast Florida Climate Compact, the East Central Florida Regional Resilience Collaborative, and the Tampa Bay Regional Resiliency Coalition.
 60. Including “future conditions” in a jurisdiction’s stormwater master plan can save property owners money on their flood insurance policies if the local government also participates in the National Flood Insurance Program’s Community Rating System.
 61. *Cf., e.g.* *Love Terminal Partners v. United States*, 97 Fed. Cl. 355, 376 (Fed. Cl. 2011) (“... [C]ourts ‘aim[] to identify regulatory actions that are functionally equivalent to the classic taking in which government directly appropriates private property or ousts the owner from his domain.’ Lingle, 544 U.S. at 539.”).
 62. *See, e.g.* Allan Mallach, *supra* note 57.