

Rolling Easements

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ROLLING EASEMENTS

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DISCLAIMER

Any mention of a given option for responding to sea level rise does not constitute endorsement for implementing the option anywhere, much less in a particular location. This primer focuses on options for state and local government and the private sector. This document does not represent any regulatory policy of the United States Government, nor does it provide recommendations for regulatory action. Any legal discussion herein is provided solely for the purpose of helping readers understand the implications of rolling easements, and is not necessarily the position that the U.S. Government has taken or will take in any legal action. The discussion of tax laws in this report cannot be used to avoid tax penalties imposed on any taxpayer.

This document is not legal advice: Those interested in pursuing the options discussed should seek legal counsel. Coastal law is continually changing. Anyone interested in the implications of rolling easements in a specific state should research how the law has changed since the beginning of the year 2011. As this report went to press, courts and government officials in Texas were revising and refining how the rolling easement applies along the Gulf of Mexico coast.

PREFACE

Rising sea level is inundating low-lying lands, eroding beaches, and exacerbating coastal flooding. In undeveloped areas, landowners have generally allowed wetlands, beaches, and barrier islands to adjust naturally to rising water levels, by migrating inland. In developed areas, by contrast, governments and landowners have usually attempted to hold back the sea by adding sand to eroding beaches or erecting dikes, seawalls, revetments, and other shore protection structures. Very little developed land has been given up to the rising sea—especially along estuaries where individual landowners can usually protect their own property without government assistance.

Coastal development continues, as new communities replace forests and farms, and large houses replace small seaside cottages. With few exceptions, the new residents believe that they (and their heirs) can own the land forever if they choose. But permanent coastal development might not be economically or environmentally feasible everywhere. Most scientists expect a warmer climate to cause the sea to rise more rapidly in the future. Defending coastal development from the rising sea would prevent wetlands from migrating inland, expose large numbers of people to the hazard of living below sea level, and often cost more than what the property being protected is worth.

This document presents an alternative vision, in which future development of some low-lying coastal lands is based on the premise that eventually the land must give way to the rising sea. We provide a primer on more than a dozen approaches for ensuring that wetlands and beaches can migrate inland, as people remove buildings, roads, and other structures from land as it becomes submerged. Collectively, these approaches are known as *rolling easements*.

The question about which—if any—of these approaches *should* be adopted is beyond the scope of this primer. We do not evaluate how much of the coast should be protected or how much of it should give way to the rising sea. Our objective is merely to provide a summary of the tools that *could* be adopted and their possible rationales, to help encourage a thorough consideration of the many available options for responding to rising sea level. We do not exclude possible approaches merely because they have not been tested or would require existing policies to change. We hope that this primer helps communities to consider the full range of options for anticipating the consequences of a rising sea.

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CHAPTER 1

INTRODUCTION

1.1 POSSIBLE RESPONSES TO A RISING SEA

Along almost the entire U.S. coast, sea level is rising¹—and the rate of that rise is expected to accelerate in the coming decades.² Even today, rising sea level is inundating low-lying lands, eroding beaches, exacerbating coastal flooding, and increasing the salinity of estuaries and aquifers.³

Over the last several thousand years, shallow-water estuaries have gradually submerged tidal wetlands, which in turn have survived by migrating inland, onto low-lying coastal plains (see Figure 1). Barrier islands and other beach ecosystems have also remained intact by migrating inland. In areas with few if any people, floodplains and tidal ecosystems will probably continue to move inland as sea level rises. In developed areas, however, human activities will complicate—or perhaps prevent—this landward migration.

Communities can respond to sea level rise by any of three or four pathways (See Box 1):⁴

1. Shore Protection

- a. *Shoreline armoring.* Protect land and buildings from erosion and flooding using dikes, seawalls, bulkheads, and other hard structures. Wetlands and beaches are eliminated as they are squeezed between the rising sea and the shoreline armoring.
- b. *Elevation of land surfaces.* Elevate land and buildings as the sea rises. Efforts to protect oceanfront communities usually involve beach nourishment, which elevates

the surface of the beach. In theory, the land surfaces of wetlands can also be elevated, though shore protection projects along wetland shores rarely do so.

2. *Accommodation.* Do not try to prevent tidal inundation, erosion, or flooding. But instead of moving people out of harm's way, develop coping strategies that enable continued human habitation in spite of the increased hazards. Wetlands and beaches migrate inland, though they may be impaired by the presence of homes on pilings.
3. *Retreat.* Allow wetlands, beaches, and other coastal habitats to migrate naturally as the sea encroaches inland; move people out of harm's way; and prevent new construction in vulnerable areas.

Because accommodation would rarely be sustainable,⁵ the fundamental question is: Which communities will be *protected* and where will people have to *retreat*?

Beach nourishment is common along developed ocean shores, and shoreline armoring is common along developed estuarine shores. Although retreat often occurs in undeveloped areas, it is uncommon along developed ocean beaches and very rare along developed estuarine shores. Shore protection is common because it generally costs less than what the protected property is worth. But protecting all developed lands from a rising sea would eventually eliminate tidal wetlands, destroy ocean habitat through dredging, expose millions of people to the hazards from living below sea level, and become

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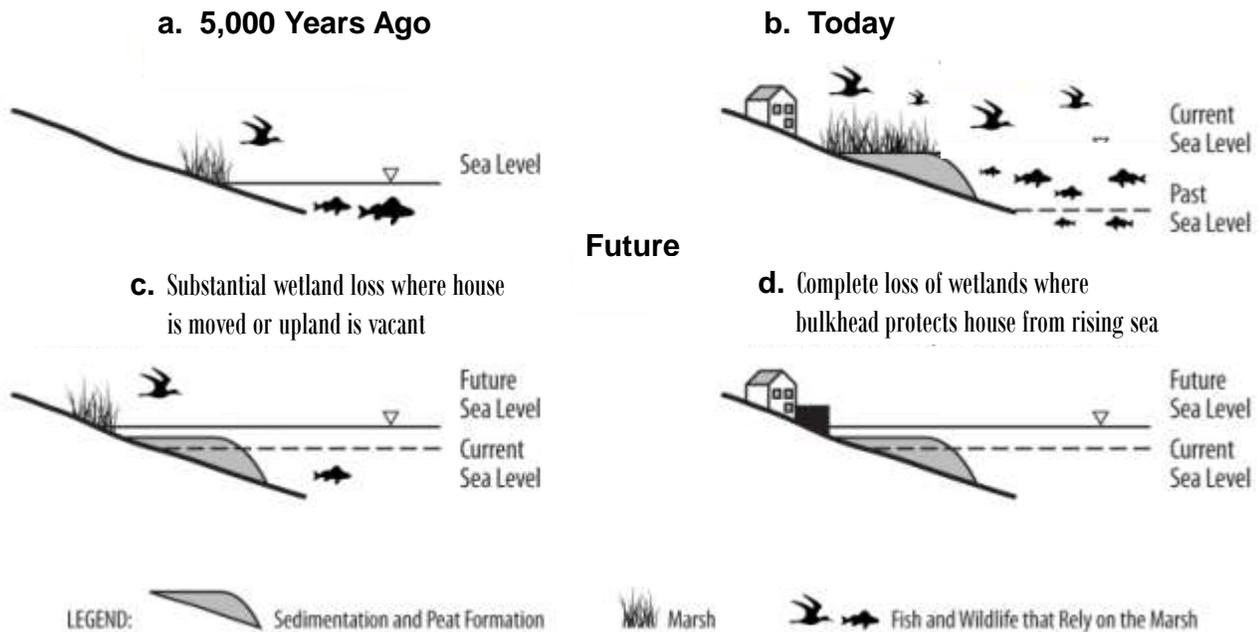


Figure 1. Evolution of a Marsh as Sea Level Rises. Tidal wetlands are found where the elevation of the land is between high and low tides, with tidal marshes generally above mean sea level and tidal flats below mean sea level. **(a)** When sea level was rising rapidly, tidal wetlands tended to be a narrow fringe along the shore, determined by tide range and the slope of the land, as both the landward and seaward boundaries migrated inland. But vertical accretion through sedimentation and peat formation have enabled wetlands to keep pace with the relatively slow rate of sea level rise during the last several thousand years. As sea level rose, the landward boundary migrated inland as wetlands formed on newly flooded lands; but the seaward boundary of tidal wetlands did not retreat to the same extent, and the area of tidal wetlands increased. **(b)** Today, the area of tidal wetlands—i.e., the land between the high and low tide shorelines—is much greater than the amount of dry land within a similar elevation range above the high tide shoreline. Yet there is a limit to vertical accretion and the rate of sea level rise with which tidal wetlands can keep pace. **(c)** If the sea rises more rapidly, most of the existing tidal wetlands will be lost and the total area of tidal wetlands will decline to the narrow fringe determined by the tide range and slope of the land. **(d)** Finally, in places where developed lands along the shore are protected from tidal inundation, new wetlands may not form inland and almost all tidal wetlands may be lost. Alternatively, **(c)** if the development is subject to a rolling easement, then the people who live along the shore will have to relocate and the wetlands will be able to migrate inland. Because the tidal wetlands support fish and wildlife, loss of tidal wetlands could cause populations of birds and fish to decline or relocate.

Box 1. Fundamental pathways for responding to sea level rise

As rising sea level threatens coastal lands, people must decide whether to attempt to hold back the sea or allow shores to shift naturally. People can respond to sea level rise through one of four pathways:

Shoreline armoring. Protect development with structures such as dikes, seawalls, and bulkheads. This approach maintains existing land use, but can increase the loss of wetlands and beaches. It can also eliminate public access along the shore.



Elevate. Raise structures and land surfaces, including beaches and possibly wetlands.



Accommodate. Make no additional efforts to prevent tidal inundation, erosion, or flooding. Instead of moving people out of harm's way, develop coping strategies that enable continued human habitation in spite of the increased hazards.



Retreat. Allow wetlands and beaches to migrate inland. Avoid building in the most vulnerable areas or remove structures that are already there.

Combinations of these approaches are also possible. Each approach will be more appropriate in some locations than in others. Shore protection costs, property values, the environmental values of habitat, and the feasibility of protecting shores without harming the habitat all differ, depending on the location.



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economically unsustainable in many areas where it initially seemed successful.⁶

What can society do if individual communities and property owners are inclined to protect more land than would be in society's long-run interest? Logically, there are three ways to limit the portion of our coast eventually subject to shore protection:⁷

1. *Setbacks*. Prevent development of some lands vulnerable to sea level rise, either through regulation or by purchasing land (or development rights) from the current owners.
2. *Rolling easements*. Make no effort to restrict land use but prevent shore protection of some coastal lands either through regulation or by transferring any right to hold back the sea from owners inclined to do so to organizations that would not.
3. *Laissez-faire*. Make no effort to prevent either development or shore protection, but curtail government subsidies for both, and hope that eventually the forces of nature and economics will lead owners to allow their lands to be submerged.

Each way is appropriate in some circumstances.

Landowners tolerate setbacks as long as they can build somewhere on their property. Thus setbacks can be practical where parcels are large or the land is steep enough so that each lot can have a building site high enough to be safe for the next few centuries. But in most places with setbacks, development is only set back by at most a few hundred feet or enough to keep a home out of harm's way for a few decades.⁸ In the United States, more than ten thousand square miles of land are within two meters above the sea.⁹ The expectation of additional development is reflected in the high prices of undeveloped coastal lands. To prevent development of these lands would impose a great cost either on landowners unable to put their land to its most profitable use, or on governments and private parties who purchase or otherwise pay landowners to refrain from development. Buying most of the nation's

undeveloped coastal lands seems unlikely and economically infeasible.

The laissez-faire approach is based on the assumption that investors are more likely to appropriately manage known risks if they bear all of the burdens of bad decisions and reap all of the rewards of good decisions. This approach can reduce eventual shore protection in places where government subsidies would otherwise fund shore protection or coastal development. The Coastal Barrier Resources Act¹⁰ removed federal subsidies for certain barrier islands,¹¹ causing some to remain undeveloped and reducing the likelihood of shore protection for several that have been developed without the subsidies.¹² Some ocean beach communities have funded their own shore protection or would do so if federal and state subsidies were unavailable.¹³ Other oceanfront communities are unlikely to be protected without public funds; so a laissez-faire approach would reduce the extent of beach nourishment along the ocean. But along estuaries, private landowners generally pay for shore protection. Therefore, laissez-faire is unlikely to provide much vacant land for a gradual upslope migration of wetlands and beaches along estuarine shores. Planners view shore protection as likely for at least 60 percent of the low land along the Atlantic coast if sea level rises three feet in the next century.¹⁴ Many landowners will eventually decide to yield their lands to the sea, as shore protection costs escalate,¹⁵ but only after interim shore protection have blocked the inland migration of wetlands and compromised use of the beach.

1.2 ROADMAP

This primer focuses on rolling easements. If it is unrealistic to prevent development of low-lying coastal lands that could eventually be submerged by a rising sea, an alternative is to allow development with the conscious recognition that land will be abandoned if and when the sea rises enough to submerge it. This approach combines the strengths of the other two approaches:

- From now until the land is threatened, valuable coastal land can be put to its highest use, as with the *laissez-faire* approach;
- Once the land is threatened, it will convert to wetland or beach as if it had never been developed.

Rolling easements enable ecosystems to migrate inland and allow society to avoid the costs and hazards from protecting low lands from a rising sea. Like *laissez-faire*, rolling easements are generally based on the assumption that private investors in a free market *could* reasonably manage the risks of sea level rise. But unlike *laissez-faire*, rolling easements are also based on the assumption that to incorporate the risk of sea level rise, the market needs some clearly defined rules about which lands may be protected. Otherwise, uncertainty about future government activities (e.g. subsidizing or regulating shore protection) can overwhelm an investor’s ability to manage the risk of sea level rise.

The following chapters examine many options for ensuring that wetlands, beaches, or barrier islands migrate inland. But the question about which—if any—of these options *should* be adopted is beyond our scope. We merely provide a summary of the tools that could be adopted and their possible rationales, to help encourage a thorough consideration. We have not excluded options merely because they have not been tested or would require existing policies to change. Because modern civilization has not faced a rapid rise in sea level, sometimes the best response may be to do something new. The mention of a given option in this report does not constitute endorsement for implementing the option anywhere, much less in a particular location. Although the federal government could—in theory—adopt a rolling easement policy, this primer focuses on options for state and local government and the private sector.¹⁶

A rolling easement would generally prohibit shore protection and require removal of pre-existing structures seaward of a specific migrating

shoreline such as the dune vegetation line, mean high water, or the upper boundary of tidal wetlands. This primer uses the term “rolling design boundary” for the shoreline that defines where the restrictions of a particular rolling easement apply. “Submergence” means dry land becoming wetland or open water, whether through actual submergence or shoreline erosion. The term “submerge date” refers to the day the rolling design boundary migrates inland of the main building on a parcel of land subject to a rolling easement.¹⁷

“Submergence” means dry land becoming wetland or open water, whether through actual submergence or shoreline erosion. “Submerge date” refers to the day the rolling design boundary migrates inland of the main building on a parcel of land subject to a rolling easement.

The next two chapters look at the purpose of a rolling easement and how it could work. Chapter 2 provides an overall picture for why rolling easements may be appropriate in areas where it is important to allow beaches, wetlands, developed barrier islands, and access along the shore to migrate inland. The chapter also includes a brief overview of the legal boundaries that define private land ownership or public access along the shore. In some cases, legal boundaries migrate as the shoreline changes; so public rights along the shore remain the same, albeit inland. But in other states, the inland boundary of public access is fixed as the shore erodes. Shoreline erosion can leave the only means of (legal) pedestrian access seaward of where ocean waves regularly wash and even break at high tide.

Chapter 3 presents specific ways to put rolling easements into practice. Overall, a rolling easement is a legally enforceable expectation that the shore or human access along the shore can

How much of this report should I read?

This primer examines more than a dozen different legal approaches to rolling easements. It differentiates opportunities for legislatures, regulators, land trusts, developers, and individual landowners. We also consider different shoreline environments (e.g. wetlands, barrier islands) and different objectives (e.g. public access, wetland migration). So most of the possibilities described in this primer might not apply to your situation.

For a general understanding of what a rolling easement can *accomplish*, see Chapters 1, 2, and 6. Sections 3.1 and 3.2 explain what a rolling easement *is*—but they are much more detailed.

If you are considering rolling easements for a particular location, you might start with the particular section in Chapter 2 that addresses your objectives—plus Sections 2.2.1 and 2.2.2, which explain public and private property rights along the shore. Regulatory options are examined in Sections 3.1 and 4.1. Options for landowners, developers, land trusts, and government resource managers are discussed in Sections 3.2, 4.2, and 5.2. Chapter 8 looks at some of the issues a land trust may face managing a rolling easement. Chapters 6 and 9 discuss practical issues that may arise with any type of rolling easement,

If you are considering rolling easements for many locations, it may be best to read the same sections of Chapter 2, 3, and 4 as you would read for a particular location, plus Chapter 7.

migrate inland instead of being squeezed between an advancing sea and a fixed property line or physical structure. The “rolling easement holder” could be the government agency whose regulations prohibit shore protection, or the person, land trust, or government agency who obtains the property rights embodied in a rolling easement.

“The rolling easement holder could be either the government agency whose regulations prohibit shore protection, or the person, land trust, or government agency who obtains the property rights embodied in a rolling easement.”

The term “rolling easement” refers to a broad collection of legal options, many of which do not involve easements. Usually, a rolling easement is either (a) a regulation that prohibits shore protection or (b) a property right to ensure that wetlands, beaches, barrier islands, or access along

the shore moves inland with the natural retreat of the shore. Although the regulatory approach is the more common way to prevent shore protection, the non-regulatory approach may sometimes work better. Private land trusts, government agencies, and (for some approaches) even private citizens can buy (or secure donations of) rolling easements from property owners. An owner who has voluntarily engaged in the creation of the rolling easement is more likely to perceive the arrangement as fair than a landowner subjected to government regulation.

Regulatory rolling easements include:

- Local zoning that restricts shore protection;
- Regulations that prohibit shore protection by state coastal or wetland programs, or require removal of structures standing on the beach or in the wetlands;
- Permit conditions that require public access along the dry beach in return for a building permit; and

- Permit conditions that require public access along the inland side of a new shore protection structure, in return for a permit to build such a structure.

The property rights approach includes:

- Affirmative easements that provide the public with the right to walk along the dry beach even if the beach migrates inland;
- Conservation easements that prevent landowners from erecting shore protection structures or elevating the grades of their land;
- Restrictive covenants in which owners are mutually bound to avoid shore protection and allow access along the shore to migrate inland;
- Future interests that transfer ownership of land whenever the sea rises to a particular level;
- Migrating (ambulatory) property lines, which move as the shore erodes, enabling waterfront parcels to migrate inland so that inherently waterfront activities can continue.
- Legislative or judicial revisions and clarifications regarding the inland migration of public access along the shore and the rights of landowners to hold back the sea; and
- Transferable development rights—especially along migrating barrier islands—that provide those who yield land to the rising sea the right to build on land nearby.

The regulatory and property rights approaches are not mutually exclusive; a land trust could acquire a rolling easement on lands where regulations currently prohibit shore protection, to ensure that future changes in public policy do not put ecosystem migration in jeopardy.

Usually a rolling easement would involve wetlands, beaches, and open water migrating onto areas that are dry land today. In some cases, however, islands and peninsulas could migrate onto areas that are open water today. Thus a comprehensive rolling easement policy may have to manage newly created land, as well as the loss of land.

“A rolling easement is a legally enforceable expectation that the shore or human access along the shore can migrate inland instead of being squeezed between an advancing sea and a fixed property line or physical structure. The term refers to a broad collection of legal options, many of which do not involve easements. Usually, a rolling easement would be either (a) a law that prohibits shore protection or (b) a property right to ensure that wetlands, beaches, barrier islands, or access along the shore moves inland with the natural retreat of the shore.”

The ability to implement rolling easements depends on state law, which varies considerably, as we see in Chapter 4. In some states, local governments have broad powers, while in other states their authority is limited. In some states, local governments can obtain a conservation easement as a condition for a building permit, or through eminent domain. In other states, local governments can only obtain such an easement from a donor or willing seller. Even if a government has the regulatory authority to prohibit shore protection, doing so might be a “taking of private property,” which would require compensation under the U.S. Constitution. Section 4 does not evaluate the “takings question” in detail, beyond pointing out that the most important question would often be whether coastal property owners have a right to hold back the sea. This question has not been settled in any coastal state. A key reason for government agencies and land trusts to acquire a rolling easement is that doing so would resolve the legal uncertainty about whether a particular landowner has the right to shore protection. Even in states where a rolling easement regulation or statute does take away an

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existing property right, the requirements would have a more modest impact on landowners (and hence require less compensation) if they were enacted long before landowners would have otherwise attempted to hold back the sea.

The greatest obstacle to implementing a planned retreat from the coast is that few landowners choose to give up their homes or businesses to a rising sea (see Photos 1 to 4), unless the means of defending their land costs more than their property is worth. Therefore, at first glance, it seems implausible that landowners would agree to eventually allow their lands to become submerged, especially along estuarine shores where holding back the sea is likely to be cost-effective. But as Chapter 5 shows, for the typical parcel of coastal land, a rolling easement would decrease the property value only slightly, because the eventual submergence is so far in the future. Therefore, a relatively modest near-term inducement can lead a reasonable farmer or developer to agree to a rolling easement—especially if the landowner is more skeptical than the land trust about a large rise in sea level and hence views the eventual submergence as a distant possibility. If a rolling easement is part of the permit condition, for example, approval for subdivision of a large parcel of land may be more than an adequate inducement. Cash payments amounting to less than 5 percent of the land’s value may be adequate for farms whose owners have no intention of developing the land.

In a small number of cases, a landowner may actually benefit by donating a rolling easement. A conservation easement sometimes has tax benefits that more than offset its cost to the landowner. But land trusts are not necessarily interested in managing every conservation easement that a landowner might wish to donate. If a rolling easement enticed a land trust to accept a conservation easement that it would otherwise not accept, then the rolling easement could economically benefit the donating landowner.

Chapters 6–9 discuss some of the key considerations for those designing a rolling easement. Chapter 6 examines the restrictions: The “rolling design boundary” can be based on whatever shoreline most closely corresponds to the particular resources the rolling easement is meant to preserve. Along a beach, for example, the rolling design boundary is often the dune vegetation line, which separates the dry sand beach from the dunes. A rolling easement can specify that the public will have access to the beach and that homes encroaching onto the beach as a result of shoreline erosion will be removed within a defined period of time. Chapter 7 looks at ways to identify the lands where a rolling easement would be most useful.

This primer uses the term “rolling design boundary” for the shoreline that defines where the restrictions in a particular rolling easement apply.

The final two chapters discuss some of the issues related to managing a rolling easement once it is created. Chapter 8 examines what the land trust or government agency would have to do between now and sometime in the future when a given parcel of land will be threatened. The chapter focuses on inspection, enforcement, and possible efforts by property owners to have a rolling easement invalidated.

Chapter 9 looks at the endgame: management of the rolling easement from the time when submergence of a parcel becomes imminent until it is finally submerged. The ultimate cost of yielding land and home to the sea can be minimized if the rolling easement leads landowners to gradually alter what they do when the eventual submergence is still a few decades away, and continue to adjust how they use the land and structures as the submerge date approaches (Section 9.1). Whether the owner actually prepares, however, will depend

largely on what the rolling easement holder does (9.2). Because people will not always prepare optimally for the loss of a home to the rising sea, some form of relocation assistance may also be necessary (9.3).

Internal Revenue Service (IRS) regulations require that restrictions from tax-deductible conservation easements apply *in perpetuity*. The restrictions in a rolling easement would also be *in perpetuity*, but unlike the standard conservation easement, the

entire purpose of a rolling easement is to prepare for the day when the easement is no longer relevant. If the landowner complies with the rolling easement, then eventually the land will convert to tidal wetlands, beaches, or open water. This conversion will subject the land to existing wetland protection rules and (in most cases) eventually transfer title of the land from the owner to the state. At that point, the mission of the rolling easement will be accomplished. A rolling easement can set ground rules for this transition.



Photos 1 to 4. Few landowners choose to give up their homes to a rising sea. Top left and right: A home on pilings in front of shore protected by a stone revetment (left) and two homes protected by seawalls (right) on land extending into the Gulf of Mexico, along Bluewater Drive north of Surfside, Texas (May 2003). Bottom left: a home on pilings on an eroding beach at Kitty Hawk, North Carolina (October 2002) Bottom right: homes behind a bulkhead whose toe is protected by a stone revetment at North Beach, Maryland (September 2008). Photo source: ©James G Titus, used by permission.

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We hope that this exposition does not leave the impression that rolling easements are easy to enact or enforce. A large rise in sea level would eventually require communities to either hold back the sea or move inland. Neither of these options seems feasible today, given what we know about the forces of nature and human nature. Yet those are the only logical possibilities. If some lands must give way to the rising sea, the economic, environmental, and human consequences could be much less if the abandonment occurs according to a plan rather than unexpectedly.

The merits of planning do not guarantee, however, that the plan will be carried out everywhere that lands are subject to a rolling easement. People rarely give up a home voluntarily, even when they have notice.¹⁸ Governments may relax rolling easement regulations instead of preventing shore protection, especially if the public sympathizes more with the waterfront landowners losing their homes than with the environmental resources threatened by shore protection. Courts are often skeptical about previous generations' efforts to use land deed restrictions to limit what people can do today with their land.¹⁹ Even restrictions recorded onto a land deed in return for a fair payment may eventually be overturned by a court, especially if the original purpose of the restrictions no longer

seems to benefit society. Yet some legal agreements and regulations continue to have force for a long time, when succeeding generations continue to find the rules reasonable. The principle that property boundaries move as the shore erodes, for example, is more than 500 years old.²⁰

Thus an underlying premise of this report is that some rolling easements will be enforced, some will be modified, and some will be invalidated. Rolling easements would generally involve permanent restrictions. But the overall objective of a rolling easement policy need not be to force future generations to give up homes to a rising sea against their better judgment. It is simply to ensure that they will have the option to retreat or hold back the sea as they see fit in the circumstances they face, instead of having their options limited by the decisions that our generation makes today.

If some lands must give way to the rising sea, the economic, environmental, and human consequences could be much less if the abandonment occurs according to a plan rather than unexpectedly.

NOTES AND REFERENCES

¹ See, e.g., NOAA (NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION), SEA LEVEL VARIATIONS OF THE UNITED STATES 1854–1999 (NOAA TECHNICAL REPORT NOS CO-OPS 36, 2001). This report and subsequent updates displayed on NOAA's website. Available at:

<http://tidesandcurrents.noaa.gov/sltrends/sltrends.shtml>.

² See, e.g., INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CONTRIBUTION OF WORKING GROUP I TO THE FOURTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE 7 Table SPM.1; *id.* at 13 Table SPM.3, and *id.* at 820 Table 10.7 (2007).

³ CLIMATE CHANGE SCIENCE PROGRAM, COASTAL SENSITIVITY TO SEA LEVEL RISE: A FOCUS ON THE MID-ATLANTIC REGION 2 (U.S. Environmental Protection Agency 2009) [*hereinafter* CCSP].

⁴ INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE: THE IPCC RESPONSE STRATEGIES, 146–149 (1990).

⁵ If people were not moved out of harm's way as sea level rises, buildings that are in low-lying areas today would eventually be standing in open water. There is probably a limit to the number of dock homes a given community would tolerate.

⁶ See CCSP, *supra* note 3, at 97–103.

⁷ See, e.g., James G. Titus, *Rising Seas, Coastal Erosion, and the Takings Clause: How to Save Wetlands and Beaches without Hurting Property Owners*, 57 MD. L. REV. 1281, 1308–1318 (1998) [*hereinafter* MARYLAND LAW REVIEW]. That article used the phrases “deferring action” instead of “laissez-faire” and “preventing development” instead of “setbacks.” See also IPCC, *supra* note 4, at 147 (using the terms “preventing development”, “planned phaseout”, and “no direct government role”).

⁸ See notes 293–300 and accompanying text.

⁹ See J.G. Titus, R. Park, S.P. Leatherman, R. Weggel, M. Greene, P. Mausel, M. Treehan, S. Brown, C. Gaunt, & G. Yohe, *Greenhouse Effect and Sea Level Rise: The Cost of Holding Back the Sea*, 19 COASTAL MGMT. 171, 189–92 & Tables 2 and 9 (1991).

¹⁰ 16 U.S.C. §3501 *et seq.*

¹¹ See, e.g., CCSP, *supra* note 3, at 171.

¹² See, e.g., ENVIRONMENTAL RESEARCH LETTERS, *infra* note 14, Table S3 (projecting that 26 miles of ocean shoreline along developed barrier islands covered by Coastal Barrier Resources Act in Currituck, Hyde, and other counties are less likely to be protected than similar barrier islands not covered by the act) and

id. Table S5 (concluding that being covered by the Coastal Barrier Resources Act reduces the likelihood of shore protection from “almost certain” to “likely,” based on interviews with local planners).

¹³ See, e.g., NOAA COASTAL SERVICES CENTER, BEACH NOURISHMENT: A GUIDE FOR LOCAL GOVERNMENT OFFICIALS, section on “Federal Cost Participation” (undated), <http://www.csc.noaa.gov/beachnourishment/html/human/socio/shares.htm>, cited April 1, 2011 (discussing sources of beach nourishment funding in Florida which include special taxing districts) and CARTERET COUNTY, NORTH CAROLINA, ADOPTED BUDGET 2011–2012 222 (mentioning Salter Path Special Taxing District for Beach Nourishment).

¹⁴ E.g., J.G. Titus, D.E. Hudgens, D.L. Trescott, M. Craghan, W.H. Nuckols, C.H. Hershner, J.M. Kassakian, C.J. Linn, P.G. Merritt, T.M. McCue, J.F. O'Connell, J. Tanski, & J. Wang, *State and Local Governments Plan for Development of Most Land Vulnerable to Rising Sea Level along the U.S. Atlantic Coast* 4 ENVIRONMENTAL RESEARCH LETTERS 044008 V (2009).

¹⁵ Cf. CCSP, *supra* note 3, at 87, 102, and 149 (questioning the sustainability of shore protection).

¹⁶ Many federal agencies are starting to consider how to adapt to changing climate. WHITE HOUSE COUNCIL ON ENVIRONMENTAL QUALITY, PROGRESS REPORT OF THE INTERAGENCY CLIMATE CHANGE ADAPTATION TASK FORCE (2010). For a brief discussion of federal opportunities to adopt a rolling easement, see James G Titus, [*Does the U.S. Government Realize that the Sea is Rising? How to Restructure Federal Programs so that Wetland and Beaches Survive*](#), 30 GOLDEN GATE UNIVERSITY LAW REVIEW, 717, 752–769 (2000).

¹⁷ In the case of future interests in land where the entire parcel transfers at once to the rolling easement holder, “submerge date” means the day the property transfers.

¹⁸ See, e.g., *Severance v. Patterson*, 566 F. 3d 490 (5th Cir. 2009) and *Brannan v. State*, No. 01-08-00179-CV, (Tex. App.–Houston [1st Dist.] Feb. 4, 2010, pet. filed).

¹⁹ Legal scholars generally use the term “dead hand control” when referring to efforts by previous generations to limit what present owners can do. See, e.g., Andrew Dana and Michael Ramsey, *Conservation Easements and the Common Law*, 8 STAN. ENVTL. L. J. 1, 22–24 (1989). The planning literature appears to have no comparable term for similar long-term effects caused by investment decisions. Boston's streets, for example, follow the paths that early settlers used to take cows to pasture or grain to the mill. See

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D.B. FRADIN, *SAMUEL ADAMS: THE FATHER OF AMERICAN INDEPENDENCE* (1998), and Megan Woolhouse, *Seeing Double in Quest to Map Boston's Roads*, *BOSTON GLOBE* (March 19, 2008).

²⁰ See *infra* note 65.

CHAPTER 2

WHAT CAN A ROLLING EASEMENT ACCOMPLISH?

The combination of rising sea level and coastal development could threaten wetlands, beaches, access along the shore, and perhaps eventually, the integrity of barrier islands.

This chapter examines how rolling easements could be part of a sustainable strategy to mitigate these impacts. Preventing seawalls, bulkheads, and other shore protection structures can enable beaches to migrate inland (Section 2.1). A rolling easement can ensure that the public (or a private party) continues to have access along the shore as a beach erodes (Section 2.2), or that people can relocate roads, infrastructure, and parks inland if necessary (Section 2.3). Wetlands can have room to migrate inland if landowners refrain from

erecting shore protection structures and elevating the surfaces of their land (Section 2.4). Towns on barrier islands can move inland rather than attempt to keep the islands in their current locations (Section 2.5).

This chapter focuses on what people might do differently on account of a rolling easement. We defer the legal approaches for creating a rolling easement until Chapter 3. Some aspects of coastal property law are unavoidable in this chapter, however, because one of the resources threatened by sea level rise—access along the shore—is itself a legal right.

2.1 PRESERVE BEACHES AND OTHER ERODING SHORES

Seawalls, revetments, and other structures have eliminated ocean beaches even at low tide in a few locations,²¹ and narrowed the beach in many areas to the point where there is little or no dry beach at high tide (see Photo 5). When a seawall is placed between homes and an eroding beach, eventually the eroding shore reaches the seawall and the beach is eliminated. The elimination of estuarine beaches is so commonplace that several communities with “Beach” in their names no longer have a beach.²²

The importance of recreational beaches has led most coastal states to replenish some eroding ocean beaches with sand dredged from nearby



Photo 5. Galveston Seawall. (May 2003).
Photo source: ©James G. Titus, used by permission.

ROLLING EASEMENTS

shoals, or transported by truck from inland sources; this activity is known as “beach nourishment.”²³ Several states have also enacted rolling easement statutes and regulations, which prohibit seawalls, revetments, and other hard shore protection structures.²⁴ Because beach nourishment is a type of shore protection while rolling easements facilitate retreat, the combination of both approaches does not necessarily put a community onto a long-term path toward either retreat or shore protection. But together they ensure the continued existence of a recreational beach more effectively than either approach by itself: the rolling easement prevents the beach from being squeezed by a seawall at the landward edge, while the beach nourishment offsets erosion of the seaward edge.

The typical characteristics of rolling easements along eroding beaches may include:

- No shoreline armoring;
- A rolling design boundary (e.g. dune vegetation line), seaward of which the owner’s property rights are reduced;
- No new structures seaward of the rolling design boundary;
- Encouragement or requirement to remove pre-existing structures when erosion leaves them seaward of the rolling design boundary;
- Warnings about the policy to prospective buyers of coastal property;
- Provisions for public access (we address this issue in Section 2.2); and
- Indication whether beach nourishment and adding sand to dunes are allowed.

The relative importance of these features is different for ocean and bay shores.

Along ocean shores, at least seven states prohibit seawalls (and other shoreline armoring).²⁵ Some flexibility is often necessary for homes left standing on the beach after the dunes erode out from under them (see Photos 6 to 8). Such homes are hazards and impair public use of the beach. Yet if they remain useable, officials find it difficult to order their demolition—especially if the houses



Photos 6 to 8. Retreat. Houses along the shore in Kitty Hawk, North Carolina, where regulations prohibit seawalls. Geotextile sand bags protect a septic tank buried in the dunes. Homes stand on the beach until the septic system fails. Top: June 2002. Middle: October 2002. Bottom: June 2003. Photo source: ©James G. Titus, used by permission.

are still on private land, or if the beach is likely to be restored through natural or artificial processes. A rolling easement can require a home to be removed once it encroaches seaward of the dunes or once the land on which it sits is flooded at high tide; or it can provide for a waiting period during which the beach might be rebuilt or relocation of the home can be negotiated.²⁶ Actual removal of the house may be precipitated by other factors: Erosion may leave a home's septic tank inoperable (see Photo 9), for example; or storms may destroy the home.

Along estuarine shores, rolling easements are rare. As with rolling easements along the ocean, the key feature is the prohibition of shoreline armoring. One significant difference, however, concerns the fate of pre-existing structures. Homes on pilings could continue to stand on bay beaches or even in a bay for decades. If a community intends to retreat, then the rolling easement must require that homes be removed at some point after the land is submerged. But if the community is on the accommodation pathway, then the rolling easement might allow the homes to stand in the water indefinitely. (Access along estuarine shores is often a lower priority than along the ocean.)



Photo 9. Exposed septic tank makes beach home uninhabitable. Kitty Hawk, North Carolina (June 2002). Photo source: ©James G. Titus, used by permission.

A stricter form of rolling easement is to ban all forms of shore protection—even beach nourishment and other nonstructural shore protection. Along ocean shores, beach nourishment generally occurs wherever funding is available, based on the assumption that adding sand to a sandy beach protects private property while preserving the community's most important environmental asset: the beach.²⁷ In a few cases, ocean beach nourishment projects have been stopped because of their environmental consequences.²⁸ And along estuaries, beach nourishment can significantly alter the coastal environment.²⁹ If beach nourishment is impractical or undesirable, or if continued shore erosion is an essential policy goal,³⁰ a rolling easement can prohibit all forms of shore protection—including beach nourishment.

2.2 PRESERVE ACCESS ALONG THE SHORE

Eroding beaches can impair the legal right to access along the shore, whether or not the beach is eliminated. We first summarize existing public rights to access along the shore (Section 2.2.1); then we describe the possible impact of sea level rise (Section 2.2.2) and examine how rolling easements can preserve public access along the beach (Section 2.2.3).

2.2.1 Existing Access along the Shore

The general right of access to tidal waters and shores is defined by the “Public Trust Doctrine”, which is part of the common law of property in all of the United States. According to the Public Trust Doctrine, navigable waters and the underlying lands were publicly owned at the time of statehood³¹ and remain so today³² unless the state has consciously transferred ownership to someone else.³³ Even if a land deed seems to say that someone's property extends into the water, the Public Trust Doctrine often overrides that language, and the public still owns the shore.³⁴

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(Many scholars and a few courts have suggested an expanded Public Trust Doctrine that prevents the government from privatizing submerged land.³⁵ In this report, “Public Trust Doctrine” refers to the collection of laws governing public and private property rights along the shore, not legal theories about legitimate governmental power.)

Figure 2 illustrates some key terminology used in this report. The *wet beach* lies between *mean high water* and *mean low water*. More precisely, the wet beach is seaward of the line along the beach whose elevation is the same as mean high water, which is sometimes called the “mean high water

line”³⁶ or the “mean high tide line.” The wet beach extends seaward to the comparable *mean low tide line*, below which the landscape is often called *open water* because it is covered by water during the typical low tide. Immediately inland of the wet beach is the *dry beach*. The dry beach extends from the mean high water line inland to the seaward edge of the dune grass or other terrestrial plant life, sometimes called the *vegetation line*.³⁷ The dune grass generally extends inland from the point where a storm in the previous year struck with sufficient force to erode the vegetation,³⁸ which is inland of the high water mark of the average daily tide and well above mean high water.

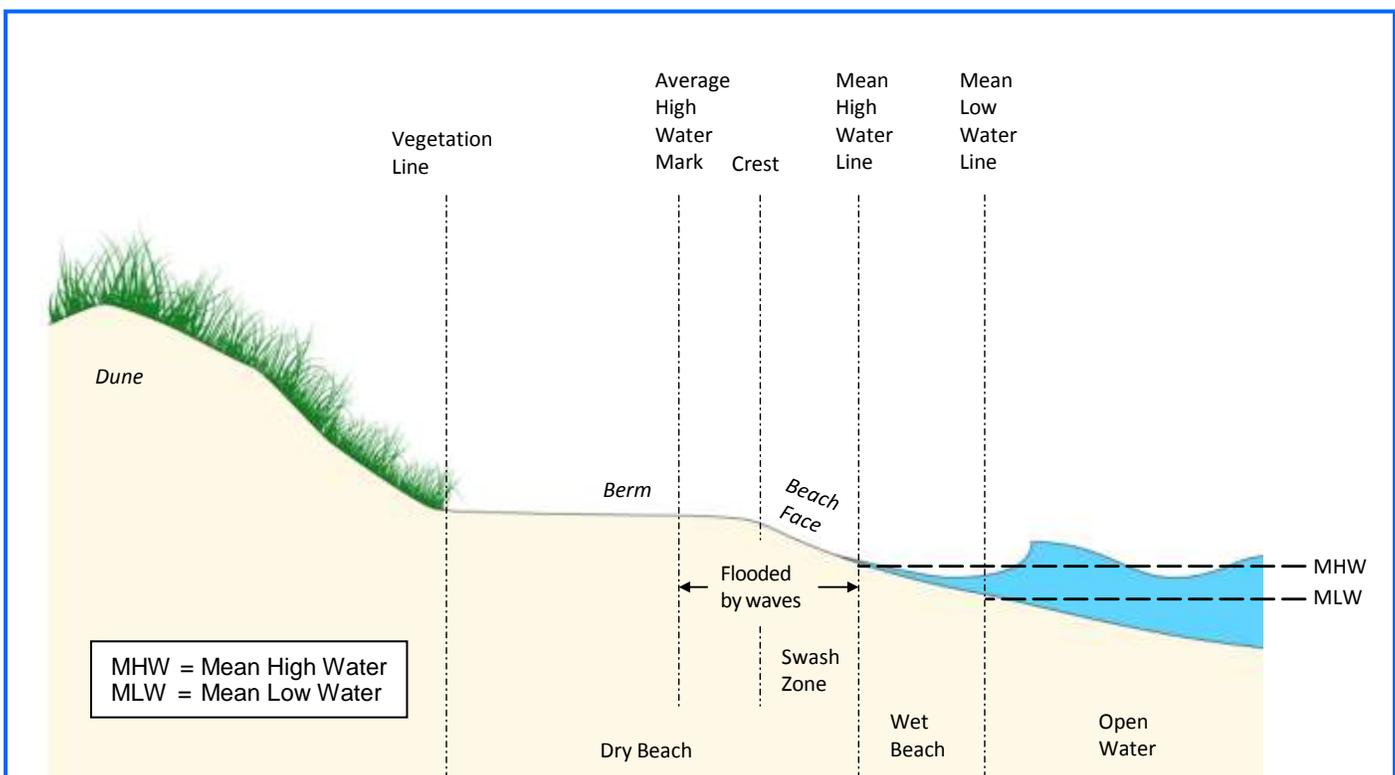


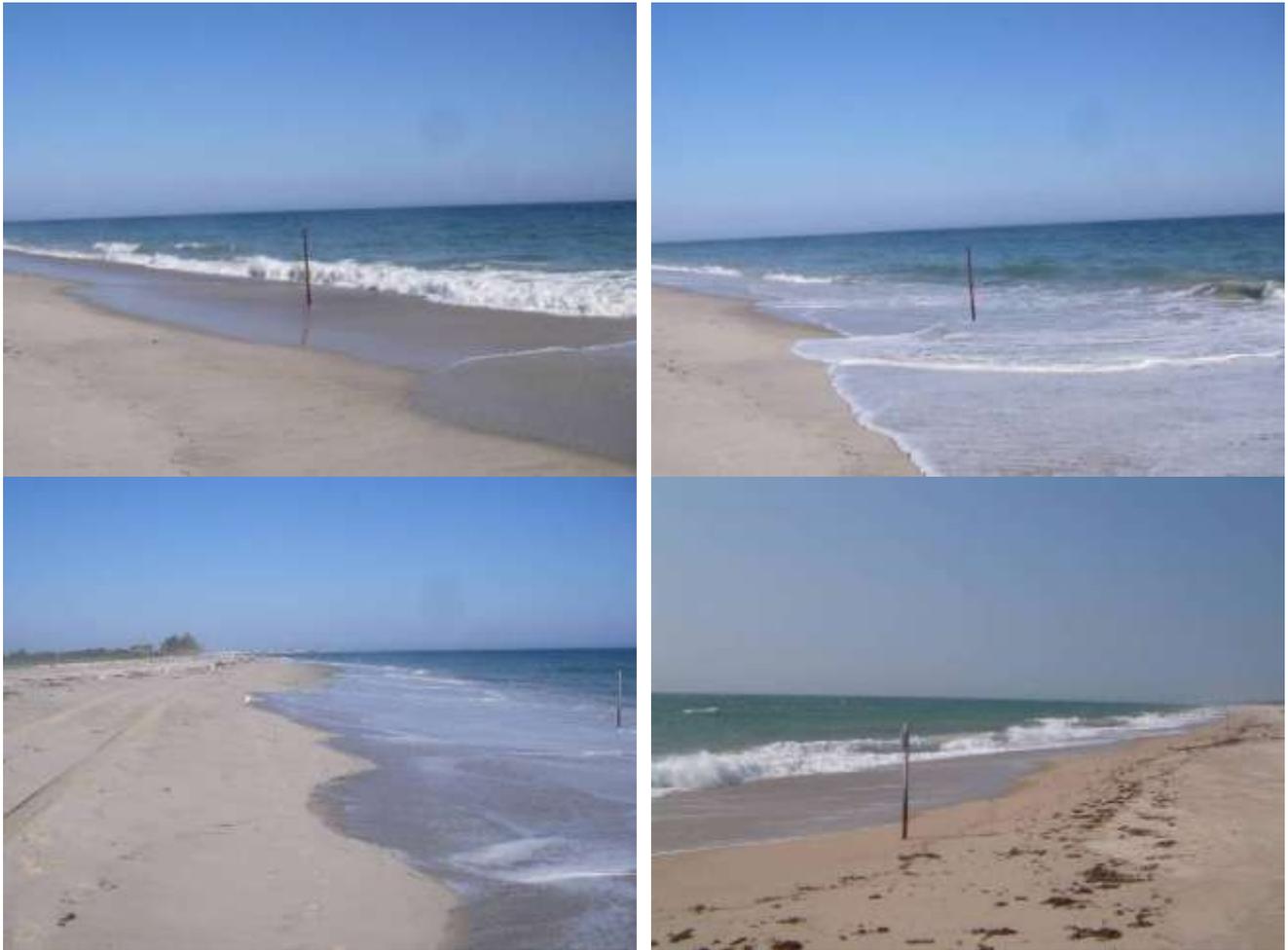
Figure 2. Legal and Geological Zonation along a Beach.

Wet beach is defined as the land between the *mean low water line* and the *mean high water line*. *Dry beach* is defined as the land between the dune *vegetation line* and the mean high water line. The term is a misnomer because along ocean shores, a large part of the dry beach is wet. The *swash zone* is generally saturated as waves run up the *beach face*. During an average high tide, several waves generally run up over the *crest*, leaving a water mark on the sand and sometimes debris such as seaweed at the *average high water mark*. Unusually high tides or heavy seas can bring waves inland of the average high water mark, preventing dune vegetation from becoming established seaward of the vegetation line. Under the public trust doctrine, the public owns the land below the “ordinary high water mark” in all but a handful of states. Courts in different states have defined “ordinary high water mark” differently.

What Can a Rolling Easement Accomplish?

The term “dry beach” is a misnomer.³⁹ Along beaches with large waves, such as the Atlantic and Pacific Oceans, *wave run-up* regularly washes well inland of the mean high water line (see Photos 10 to 13). A person standing on the dry beach a step inland of the mean high water line during the average high tide would regularly experience waves bringing water levels between the shin and the waste. The beach is regularly saturated to the crest

of the berm, which is typically a few feet higher and tens of feet inland of the mean high tide line. The highest wave of a given high tide generally leaves a high water mark which can be readily observed by anyone walking along the beach. In this report, we use the term *average high water mark*⁴⁰ to indicate the high water mark left by the average high tide during average seas (i.e. typical wave heights). The portion of the dry beach



Photos 10 to 13. How wet is the dry beach? The U.S. Fish and Wildlife Service surveys the mean high water line at Trustom Pond National Wildlife Refuge (South Kingstown, Rhode Island) each year, and places posts along the survey line. The dry beach is everything inland of the posts. The top two photos show one of those posts before (top left) and after (top right) a typical wave, at mid-tide on a day with average seas. At high tide, the water would have been almost two feet deeper (September 5, 2008). The lower left photo shows an adjacent post (about a minute earlier), with waves running up the beach face, and gulls feeding along the drift line where waves deposited floating vegetation at the last high tide. (September 5, 2008). The lower right photo shows the same location during average seas when water levels were at approximately the neap low tide level. Even at low tide, the waves are almost reaching into the dry beach. Photo Source: Janet Freedman, Rhode Island Coastal Resources Management Council.

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between the average high water mark and the dune line truly is dry on an average day (assuming no rain).

Box 2 (on page 27) shows the corresponding classes for wetland shores. Mudflats are found between mean low water and mean sea level, *low marsh* is found between mean sea level and mean high water, and *high marsh* extends from mean high water to *spring high water*.⁴¹ Mangroves extend up to spring high water, but zonation between different types depends more on salinity and temperature than the tides.⁴² Collectively, the lands between mean high water and mean low water (mudflats, low marsh, and wet beaches) are commonly known as *tidelands*.

In all but five states, the public owns the land below the “ordinary high water mark,” which state courts have defined differently.⁴³ The most common definition is the mean high water line. Until the 20th century the term “ordinary high water mark” did not have a specific legal definition,⁴⁴ which led people to assume that it referred to something tangible, such as an actual mark or the impact of water on the land’s suitability for specific uses.⁴⁵ But in 1935, the U.S. Supreme Court endorsed the approach of calculating the ordinary high water mark based on an elevation survey of the mean high water line.⁴⁶ (The case concerned a tract of land originally granted by the federal government along a shore without substantial wave runup). The elevation of mean high water is estimated using tide gauge data over an 18.6 year tidal epoch. Several state courts subsequently endorsed using the mean high tide line for a variety of reasons.⁴⁷ Texas uses variations of the mean high tide line⁴⁸ as a starting point, but will consider other factors if they regularly cause higher water levels.⁴⁹

Along ocean shores, parts of the privately owned *dry beach* are regularly flooded, to the extent that wave runup causes the *average high water mark* to be inland of the *mean high tide line*. Courts in some states have not yet decided whether the public owns the part of the beach between the mean high tide line and the average high water

mark.⁵⁰ This distinction is unimportant along estuaries with no waves, because the average high water mark is the mean high tide line.

Some states use neither the average high water mark nor the mean high tide line. In states where the original land grants were made during French, Spanish, or Mexican rule, the public trust boundary is often farther inland, because under the civil law, more of the beach was publicly owned than under English common law.⁵¹ Hawaii and Washington have taken account of the particularly large waves along the Pacific Ocean by defining the ordinary high water mark as the dune vegetation line or the mark of floating debris left by the high tide.⁵² In areas where mangroves dominate, the ordinary high water mark can be especially difficult to ascertain and surveyor’s meander lines are sometimes the only practical boundary.⁵³ In five states, by contrast, original land grants from the King of England provided land down to mean low water, so private landowners own the wet beach and low marsh, as well as the dry beach and high marsh.⁵⁴ (See Figure 3.)

Finally, regardless of the original land grants and the public trust doctrine, the public has obtained ownership to some dry beaches through government purchase, land dedication by a developer⁵⁵, or beach nourishment projects that created beaches from publicly owned waters.⁵⁶ On the other hand, many state governments have conveyed some bay bottoms and tidal wetlands to private landowners for residential and commercial development, especially in Florida.⁵⁷ **Unless otherwise stated, this primer assumes that the state has not conveyed tidelands or other submerged lands to a private party**

Ownership, however, is only part of the picture. Along the ocean coasts of New Jersey and Oregon, the public trust doctrine (or the similar doctrine of custom) provides for public access along the privately owned dry beach.⁵⁸ In the five states where private property extends to mean low water, the Public Trust Doctrine provides an easement along the land below the ordinary high water mark for hunting, fishing, and navigation.⁵⁹ Most of the

20th century cases that defined the boundary of private lands as the mean high water line did not address public access along ocean shores, so it is unclear whether the public has access to the regularly flooded part of the “dry” beach (i.e. between the mean high water line and the average high water mark).⁶⁰ Finally, when government agencies transfer ownership of tidelands to private owners, the public still has access along the shore for fishing, hunting, and navigation, unless the state explicitly indicates an intent to extinguish the public trust.⁶¹

The public also has access along many specific beaches for reasons other than the public trust doctrine. Along most of the Texas Gulf Coast,⁶² and parts of other states,⁶³ the public has obtained an easement to the beach because of longstanding use. Elsewhere, state or local governments have purchased easements for access along the dry beach, or property owners have provided public easements in return for beach nourishment. Federal policy precludes funding for shore protection unless the public has access to the entire dry beach.⁶⁴ Figure 3 summarizes the variation of public access and ownership of the beach.

2.2.2 Impact of Sea Level Rise on Access

The potential impact of rising sea level on public access depends on how the public obtained access.

If the public trust doctrine is the source of public access, then the impact of sea level rise on access is similar to the impact on wetlands and beaches. Where there is no shoreline armoring or other obstruction, shoreline erosion causes the landward boundary of public access to move inland. Any seaward boundaries for specific types of access move inland as well: For example, if driving on the beach is prohibited within 50 feet inland of the high water mark, then as the shore erodes, that boundary will migrate inland. Similarly, pedestrian

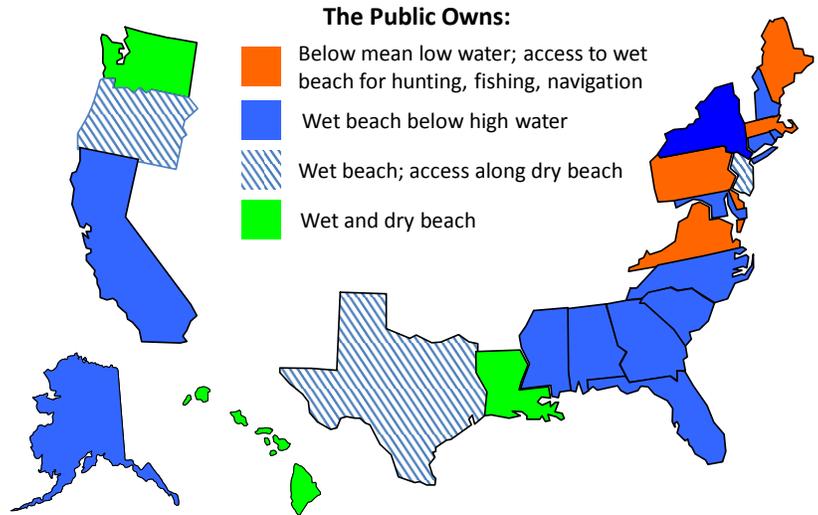


Figure 3 Public ownership and public access to beaches based on the public trust doctrine or other common law doctrines. The public has access along some dry beaches in most states, in addition to the six shown here, where access is universal.

access is generally impractical seaward of the mean high tide line in areas of wave runoff: as the shore erodes, the mean high tide line retreats as well. Wherever the shore is armored, pedestrian and vehicular access can be eliminated as the access ways are squeezed between the retreating shore and the shoreline armoring.

Wherever the public has access for reasons other than the public trust doctrine, shore erosion can eliminate access whether or not the shore is armored.

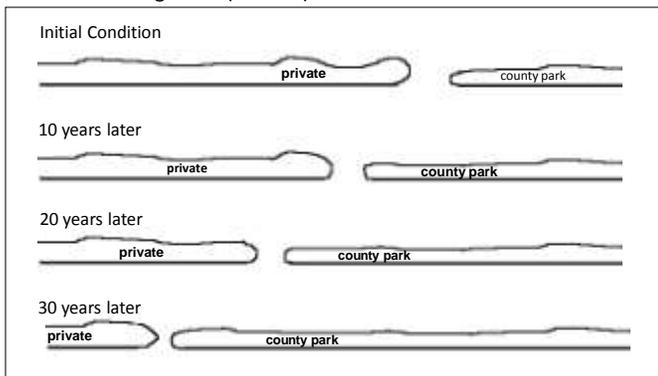
Public Trust Lands. Where property lines follow a shoreline, the rule for several centuries has been that the property lines advance or retreat whenever shores gradually advance or retreat.⁶⁵ The principal is generally known as the “law of accretion and reliction (sea level drop)” because the law originally evolved as courts decided cases between the King of England and waterfront landowners regarding the ownership of newly created lands.⁶⁶ But the same rule applies when the shore erodes, which is part of the rule’s justification.⁶⁷

When the shoreline migrates suddenly, by contrast, the property line does not move, under

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the “law of avulsion.”⁶⁸ Although somewhat counterintuitive,⁶⁹ courts treat avulsion and accretion differently for several reasons. Originally all lands had fixed boundaries,⁷⁰ so when large areas of land suddenly appeared over what had been water, early courts had little reason to change the rule that what had been the King’s water was now the King’s land.⁷¹ When the state fills a body of water to create land, the state owns that land under the law of avulsion,⁷² although there may be provisions to ensure that the littoral landowner continues to have access to the water.⁷³ The courts in some states, however, view the new land as an artificial accretion and award it to the waterfront landowner.⁷⁴ Another example of avulsion would be a river changing course⁷⁵ or the sudden creation of an inlet through a barrier island. If one’s home is originally west of a channel, and a storm causes the channel to switch to a point west of the home, then under the law of avulsion the same person still owns the home (see Figure 4).

Gradual inlet migration (erosion)



Inlet breach followed by inlet closing (avulsion)

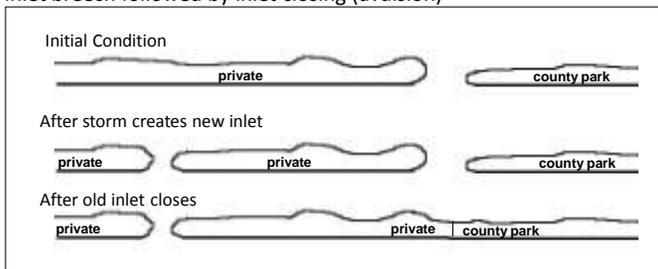


Figure 4. Impact of Inlet Migration and Inlet Breach on Land Ownership, According to the Doctrines of Accretion and Avulsion. In this example, the island to the west is privately owned while the island to the east is a county park.

The law of avulsion has a clear rationale when land is created or a channel switches, but the logic for the rule is not as clear in the case of a sudden retreat of the shoreline. Most ocean beaches have had at least one storm that caused substantial erosion since the land was originally transferred from the government to a private landowner. If courts follow the doctrine of avulsion, then boundaries remain out in the ocean at the location where they had been before the avulsive storm. Finding such boundaries would be difficult. Moreover, if the original intent of a land grant from a state (or the King) was for the public to own the wet beach below the high water mark, it seems unlikely that the state would want continued public ownership of the wet beach to depend on whether shore erosion was caused by severe storms or more gradual processes. For this reason, Texas has decided not to follow the rule of avulsion for the impact of shore erosion on the seaward boundary of privately owned land.⁷⁶

Many states that observe the law of avulsion provide the waterfront land owner with the right to fill and thereby recover the lost dry land,⁷⁷ but eventually move the boundary inland if the owner fails to do so. The right to recover lost land has limited utility: Federal and state laws require a landowner to obtain a permit before filling open water or wetlands with soils to create or reclaim land from the sea, and obtaining such a permit may be difficult.⁷⁸ Nevertheless, the landowner’s right to reclaim land implies that when a governmental beach nourishment project reclaims the land shortly after it is lost, the reclaimed land belongs to the private landowner, though otherwise land created by beach nourishment would be an avulsion that belongs to the state.⁷⁹

Access along Privately Owned Lands. As we discuss in the previous subsection, the public has access to many privately owned beaches, for one of two reasons: (a) under the public trust doctrine of a few states, the public retained access to the beach when the state (or King) transferred the land to a private owner or (b) the public re-acquired access from a private landowner. The impact of sea level

rise on access along the shore is different for those two situations:

- The public access way reserved by the public trust doctrine migrates inland as shores erode.
- A public access way acquired from a private landowner does not migrate if that landowner's parcel is submerged; so access along a beach can become impractical.
- The impact on access is ambiguous (depends on state-specific law and site-specific facts) if public access is acquired from a private landowner and only a portion of her parcel is submerged.

Under the public trust doctrine, the inland boundaries of public access are based on environmental features of the shore. Therefore, when the shoreline moves gradually, the inland boundary of public access also moves. In New Jersey (and possibly Oregon), as the dune vegetation line retreats, the public has access to the new area of beach that was formerly part of the dune.⁸⁰ In the five states where private land extends to mean low water, the public continues to have access up to mean high water (for fishing, hunting, navigation) as the ordinary high water mark advances inland.⁸¹ The impact of avulsive shore erosion on public access is less clear. If avulsion does not change a property boundary, one might assume that it would not change the inland boundary of public access. Yet the practical need for access along a beach depends on where the shoreline is now, while the need for established property lines for mineral royalties or port facilities would not require boundaries to move instantaneously to be effective. Few if any cases have addressed the distinction between access and ownership as defined by the public trust doctrine in the context of an avulsive loss of land.⁸²

Public access usually does not migrate inland where it has been obtained by means other than the public trust doctrine. As a general rule, a landowner can grant someone else the right to

cross her own land. (Such a right is generally called an "easement." Chapter 3 discusses easements in greater detail.⁸³) But a waterfront owner cannot sell what she does not own, such as the right to cross a neighbor's land. Therefore, the dry beach easement conveyed by the owner of one parcel cannot migrate to an inland parcel. Consider the many communities where government agencies have purchased or otherwise acquired public access along privately owned beaches whose title extends to mean high water. The public access is along beaches over parcels that are waterfront today, but not across parcels that are not even along the water. Suppose the shore erodes so that today's beaches become water and the beach migrates onto land that currently is the second row of lots back from the ocean. The public will not have access along the new dry beach.⁸⁴ It will still have access across land that was previously the dry beach; but pedestrian access will not be feasible if the mean high tide line is regularly flooded by the runup from large waves.

There is no clear rule about whether existing public easements migrate inland within a given parcel of land.⁸⁵ If the normal rule for easements applies, then the inland boundaries probably do not move inland.⁸⁶ Some state courts have explicitly declared that easements do not roll.⁸⁷ In Texas, the public access boundary within a given parcel moves if the shore erodes gradually, but does not move if the shore retreats suddenly during a hurricane.⁸⁸ If avoiding such ambiguities is important, deeds that provide public access should specifically say whether the access migrates with the changing shore.

Shoreline Structures. Homes standing on the beach can impair access along the shore, by blocking vehicles and creating a hazard to anyone on the beach (see Photos 14 and 15). Where the shore is armored, pedestrian and vehicular access along an eroding shore is generally lost because the beach is eliminated (see Photos 16 to 18).⁸⁹

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Photos 14 to 15. Homes on the beach also impair access along the shore. Left: West Galveston, Texas (March 2006). Right: Surfside Texas (March 2006). [Photo source: ©James G. Titus, used by permission].



Photos 16 to 18. Shoreline armoring can make vehicular and pedestrian access along the shore impractical. Top left: a seawall protecting some high-rise buildings along the Gulf of Mexico on North Padre Island prevents automobile traffic on the beach (March 2010). Top right: At first, traffic was restricted to one-way (March 1998). Bottom: a stone revetment makes walking along the shore impractical north of Surfside, Texas (May 2003). Photo source: ©James G. Titus, used by permission.

2.2.3 How Rolling Easements Can Preserve Public Access along the Shore

Rolling easements prevent sea level rise from eliminating public access either by (a) prohibiting shore protection structures that eliminate public trust wetlands and beaches, or (b) changing (or clarifying) the rules about how the upper boundary of public access migrates inland as the shore erodes. We discuss the first approach in Section 2.1; so here we focus on the second approach.

A rolling easement can ensure that shoreline armoring does not eliminate public access along the shore even if the armoring does eliminate the public trust wetlands and beaches to which the public currently has access. The Texas Open Beaches Act requires pedestrian access inland of seawalls in a few specific locations (including the seawall shown in Photos 16, 17, and 24).⁹⁰ New Jersey requires public paths along the waterfront inland of new bulkheads and revetments in some locations.⁹¹ Washington requires waterfront owners who build docks to ensure that people walking along the shore have a reasonable way to walk over, under, or around the docks at all tides.⁹² Maryland's Department of Natural Resources takes the position that when a stone revetment covers the intertidal beach, people still have the right to walk over that beach on the boulders that comprise the revetment.⁹³ (See Photos 19 and 20.)

A rolling easement can also ensure that eroding shores do not eliminate public access in those cases where the inland boundary of public access currently does not migrate as shores erode. The rolling easement must simply make it clear that the public access boundary does migrate inland, even if the shoreline migrates onto an inland parcel across which the public does not currently have access—regardless of whether the erosion is gradual or episodic. A rolling easement can require homes to be removed once they impair public access, or tolerate existing homes while allowing no additional structures. The term “rolling easement” originated with policies in Texas under

which the public had access up to the dune vegetation line because people had walked or driven along the beach for many decades, not because of the public trust doctrine.⁹⁴ Under the Texas rolling easement policy, access has migrated inland as the dunes retreated.⁹⁵



Photos 19 and 20. Public Access along armored shores in Maryland. Top: A revetment along the shore of Chesapeake Beach protects a private residential community (April 2010). Although the revetment is privately owned, some officials believe that the public may have a right to walk along the portion of the revetment built over the water and intertidal beach. Bottom: immediately to the north in the town of North Beach, the public does have access inland of the shore protection structures along a boardwalk known as Atlantic Avenue (May 2006). [Photo source: ©James G. Titus, used by permission].

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2.3 FACILITATE LANDWARD RELOCATION OF ROADS AND OTHER INFRASTRUCTURE

Many coastal communities have public roads (or other infrastructure) parallel to the shore. If a road is not essential, then a local government with a retreat policy could allow the sea to reclaim it, after which the eroding shore would reclaim land that today is inland of that road. But what if the road is essential? If the retreat policy makes no provision for its relocation, then that policy may become ineffective once the shore erodes up to the road. The alternative, which we consider here, is for the boundary of the rolling easement to be far enough inland to include the public roadway, as well as the public beach.

Most existing cases of a rolling easement concern the boundary between a public beach and private land.⁹⁶ But the concept of a moveable boundary can be applied to public roads (Section 2.3.1), driveways (Section 2.3.2), and shoreline parks and buffers (Section 2.3.3).

2.3.1 Public Roads

The implications of sea level rise for roads along an eroding shore are similar to the case where public access along the shore was obtained by means other than the public trust doctrine. Governments do not have an automatic right to relocate a washed-out road inland across private property.⁹⁷ But a rolling easement could provide such a right.

Consider a road along the shore that is both a through-street for the community and the sole means of egress for most homes along that road (Figure 5a), in a community where driving on the beach is not practical. If a storm removes part of the road (Figure 5b), then homeowners left without access may have to negotiate with neighbors to run driveways or *private* roads through the side yards of the homes behind them (Figure 5c), or through the front yards of homes along the washed-out part of the old road (Figure 5d). The common law would help to motivate an

agreement among the neighbors: The law of property presumes that no parcel is inaccessible and when a parcel is somehow left without road access, courts order an “easement by necessity” through an adjacent landowner’s land⁹⁸ (assuming that there is some intervening dry land between the roadway and the parcel that lost access⁹⁹). But litigation costs could be considerable—and neither the negotiations nor the easement by necessity would re-establish the *public* road.

Under a rolling easement, by contrast, the road could be rebuilt inland wherever necessary to maintain road access along the shore (Figure 5e). The risks of eroding shores would be transferred from the owners of the road to the owners on the landward side of the road. Instead of providing shore protection for the road—possibly at the expense of the beach—the town could locate the roadway inland just as it would in an undeveloped area. Although the cost of relocating homes—often within a given lot—would not be avoided, everyone would be able to plan for the road’s relocation, rather than possibly be subjected to an unexpected road through a side yard (Figure 5c).

The same concepts apply to public bike paths, pedestrian access ways, and utilities, which are sometimes built along the shore.

2.3.2 Driveways and Other Private Roads

Similarly, if a driveway connecting one person’s home to a public street passes between another person’s lot and the water, erosion of the driveway could deprive an owner of road access. There is no guarantee that a judge would find a rolling easement by necessity. Access from the water¹⁰⁰ and/or pedestrian access might be sufficient,¹⁰¹ the doctrine might not recognize erosion as a qualified cause of necessity,¹⁰² and even if there was an easement by necessity, a judge might pick a different route to preserve access to the homes. To avoid the uncertainty about how access will be resolved, a buyer who wants the driveway to follow the shore as it erodes could negotiate with the seller a rolling easement.

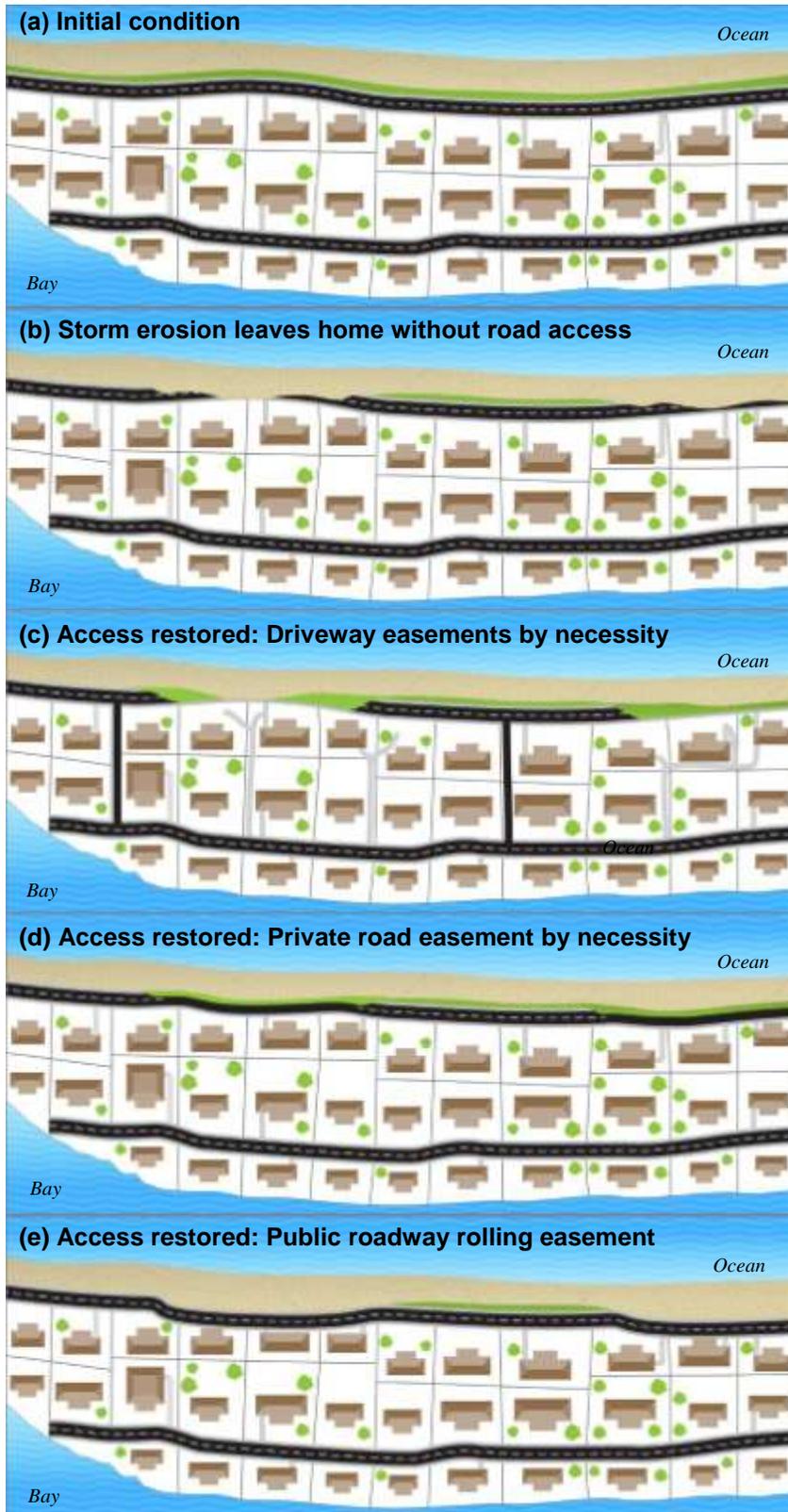


Figure 5. Options for restoring access to shorefront lands when road along the shore is lost in places to erosion. (a) Initially, the neighborhood depicted has a road along the shore, with dunes on the seaward side and homes on the landward side. (b) After a storm, the shorefront road has been reclaimed in two places, leaving some lots without road access. (c) A court might declare, or owners might negotiate, an easement by necessity along the sides of adjacent lots, and a new through street might be necessary to ensure that traffic could pass from east to west. (d) Alternatively, a court might find an easement by necessity for a private road along the shore just inland of the beach. (e) The agency responsible for the road could obtain a rolling easement enabling the roadway to be relocated inland when shoreline erosion necessitates doing so (or condemn land through eminent domain later). Some owners would lose front yards unless they moved their homes back. The end result would be analogous to the situation in Texas, except there would be a paved road on dry land rather than the dry beach being the road.

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2.3.3 Shorefront Parks and Buffers

A rolling easement could also accompany the landward boundary of a shorefront park, shorefront conservation buffer, or any type of shorefront land reserved for conservation reasons. Today, shorefront parks and conservation areas often act, in effect, as sacrificial erosion buffers. If a waterfront park or conservation buffer covers the land within (for example) 100 feet of the shore, and the shore erodes, then the park or buffer area will be reduced in size or eliminated. The waterfront land delays the need for eventual shoreline armoring—but whatever function it was designed to serve is lost. If the community needs a park along the water as the shore migrates, it could obtain a rolling easement for the park's landward boundary. As with a rolling road easement, a rolling buffer or park boundary would transfer the risk of erosion and sea level rise from the park or conservation buffer to the development immediately inland of that buffer.

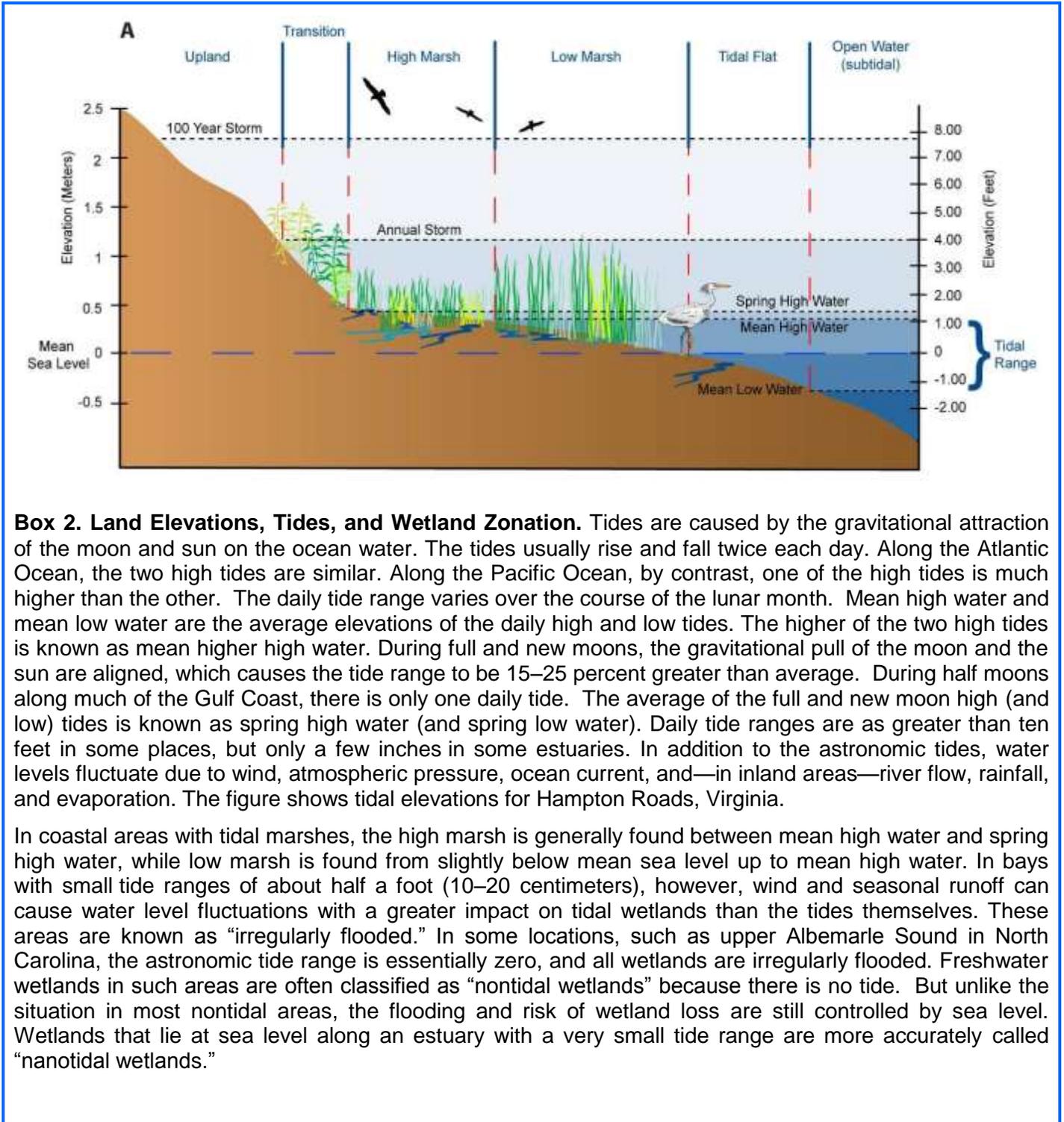
These rolling boundaries might involve removal of nonconforming structures. But less drastic remedies could be pursued, as with homes left standing seaward of the dunes.¹⁰³ A rolling buffer could mean that a home can remain, but all pavement must be removed and no landscaping is allowed. Major repairs could be disallowed, or the structure could be put on a 20-year timetable once it is seaward of the rolling boundary.

2.4 HELP WETLANDS TO MIGRATE INLAND

For purposes of rolling easements, a key difference between wetland shores and ocean beaches is that tidal flooding, rather than waves, governs the conversion from dry land to intertidal habitat (see Box 2).

Several consequences follow from this distinction:

- Land elevation rather than distance from the shore is the key predictor for how long a rising sea will take to convert dry land to wetlands. Land elevation is something that an owner can change by adding sand, soil, or other fill materials.
- Similarly, although the width of a natural beach is fairly constant for a given wave climate and sand size, the width of the strip of wetlands can vary greatly. While the inland and seaward boundaries of a beach retreat together, the inland and seaward boundaries of tidal wetlands can migrate independently: Migration of the inland wetland boundary as sea level rises depends primarily on land elevations, while retreat of the seaward boundary depends on wave erosion and the ability of the wetlands to keep pace through sedimentation and peat formation.
- Although beach nourishment and dune construction can move the beach seaward, they generally do not narrow the beach after an initial adjustment.¹⁰⁴ By contrast, efforts by owners to elevate dry land can narrow the wetlands by preventing their inland migration even while the seaward boundary erodes. Boat traffic can erode the *seaward* wetland boundary without causing the *inland* boundary to move inland.
- The inland boundary of tidal wetlands is not a straight line that is easy to discern.
- While storms often destroy homes along an eroding ocean shore within a few years after they encroach seaward of the dune vegetation line, homes along wetland shores are less vulnerable to storms.
- The confusing “law of avulsion”¹⁰⁵ is usually not an issue along wetland shores (except possibly in the five states where private land extends to mean low water). Although the seaward edge of tidal wetlands may erode suddenly during a storm, the mean high tide line retreats gradually inland as sea level rises.



Box 2. Land Elevations, Tides, and Wetland Zonation. Tides are caused by the gravitational attraction of the moon and sun on the ocean water. The tides usually rise and fall twice each day. Along the Atlantic Ocean, the two high tides are similar. Along the Pacific Ocean, by contrast, one of the high tides is much higher than the other. The daily tide range varies over the course of the lunar month. Mean high water and mean low water are the average elevations of the daily high and low tides. The higher of the two high tides is known as mean higher high water. During full and new moons, the gravitational pull of the moon and the sun are aligned, which causes the tide range to be 15–25 percent greater than average. During half moons along much of the Gulf Coast, there is only one daily tide. The average of the full and new moon high (and low) tides is known as spring high water (and spring low water). Daily tide ranges are as greater than ten feet in some places, but only a few inches in some estuaries. In addition to the astronomic tides, water levels fluctuate due to wind, atmospheric pressure, ocean current, and—in inland areas—river flow, rainfall, and evaporation. The figure shows tidal elevations for Hampton Roads, Virginia.

In coastal areas with tidal marshes, the high marsh is generally found between mean high water and spring high water, while low marsh is found from slightly below mean sea level up to mean high water. In bays with small tide ranges of about half a foot (10–20 centimeters), however, wind and seasonal runoff can cause water level fluctuations with a greater impact on tidal wetlands than the tides themselves. These areas are known as “irregularly flooded.” In some locations, such as upper Albemarle Sound in North Carolina, the astronomic tide range is essentially zero, and all wetlands are irregularly flooded. Freshwater wetlands in such areas are often classified as “nontidal wetlands” because there is no tide. But unlike the situation in most nontidal areas, the flooding and risk of wetland loss are still controlled by sea level. Wetlands that lie at sea level along an estuary with a very small tide range are more accurately called “nanotidal wetlands.”

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Thus, for a rolling easement to ensure preservation of wetlands, it would generally have to prevent the landowner from adding fill to elevate the grade of the yard, or at least ensure a return to the original grade at some point in the future. As with a beachfront rolling easement, shore protection structures that stop the landward edge of the wetlands from migrating inland (e.g., bulkheads) must also be prohibited. Breakwaters, sills, and biologs that slow erosion of the outer marsh edge, by contrast, could be compatible with a rolling easement. Whether a rolling easement would have to directly require removal of homes in the wetlands would depend on site-specific factors beyond our scope here—but if removal is important, responsibility cannot be easily shifted to the next hurricane. Similarly, responsibility for site cleanup may have to be specifically allocated.

Figure 6 shows how this rolling easement could play out over time for the typical case where the private/public boundary is mean high water,¹⁰⁶ and therefore the high marsh is privately owned while the low marsh is publicly owned. A rolling easement allows construction near the shore, but requires the property owner to recognize nature's right-of-way to advance inland as sea level rises. In the case depicted, the high marsh reaches the footprint of the house 40 years later. Because the house is on pilings, it can still be occupied, assuming that it is hooked to a sewerage treatment plant. (A flooded septic system would probably fail, because the drain field must be a minimum distance above the water table.) After 60 years, the marsh has advanced enough to require the owner to park her car along the street and construct a catwalk across the front yard. After 80 years, the marsh has taken over the entire yard; moreover, the footprint of the house is now seaward of mean high water, and hence is on public property. At this point, additional reinvestment in the property is unlikely. Twenty years later, the particular house has been removed, although other houses on the same street may still be occupied. Eventually, the entire area returns to nature.

This primer assumes that the mission of a rolling easement is accomplished once the rising sea

submerges a given parcel.¹⁰⁷ In most cases, a rolling easement designed to allow wetlands to migrate inland will also enable the public/private boundary to move inland, because that boundary is either the mean low tide line (in five states), the mean high tide line (in most states), or another point defined based on the characteristics of the shore. At some point of submergence, privately owned land will become publicly owned water. Because an owner can never transfer that which she does not own, a rolling easement does not restrict what the state can do with the land once it is submerged and becomes wetland. In the rare case where a land trust believes that a state is likely to fill the wetlands once they become publicly owned, a rolling easement might not be advisable.¹⁰⁸

As with sandy beaches, the public has an interest in both publicly and privately owned wetlands. The environmental interest includes all tidal wetlands, which generally extend inland to at least the spring high water line. But public ownership and public access generally only extends inland to mean high water under the public trust doctrine (ordinary high water for most states).¹⁰⁹ Hence, any restrictions may have to distinguish between migration of the upper edge of tidal wetlands and migration of the boundary between public trust wetlands and privately owned wetlands. (Chapter 6 considers the rolling design boundary in more detail.)

2.5 FACILITATE THE INLAND MIGRATION OF BARRIER ISLANDS

2.5.1 Possible Responses to Sea Level Rise

Most discussions about the effects of sea level rise focus on retreating shores.¹¹⁰ But geologists have long pointed out that the impact of sea level rise can be more complicated than the simple inundation—or even erosion—of lands along the shore.¹¹¹ New land can be created under several

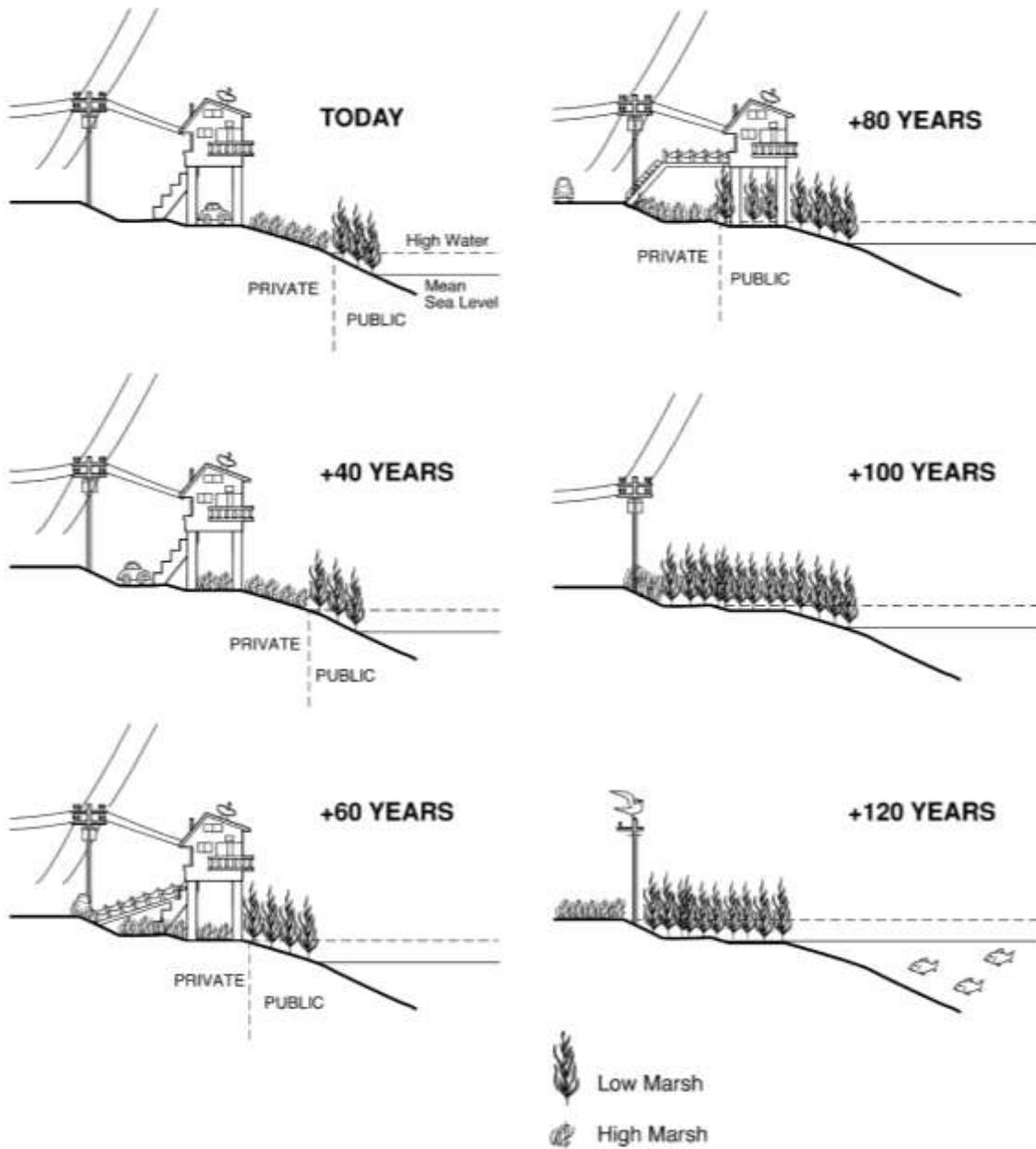


Figure 6. Migration of Wetlands and Boundary between Public and Private Land, with a Property Subject to a Rolling Easement. Source: MARYLAND LAW REVIEW. See note 7.

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situations.¹¹² This section focuses on the most commonly discussed example: the landward migration of barrier islands. Figure 7 shows four general responses to rising sea level.¹¹³

- Encircle the island with a *dike*;
- Protect the existing development by elevating land surfaces, with sand replenishment projects for beaches, and fill material added to the dry land (*island raising* or “elevate island”);
- Allow the island to erode on the ocean side, but create new land by filling shallow waters on the bay side (*engineered retreat*); or
- Allow the island to erode on the ocean side, become submerged on the bay side, and possibly disintegrate and become uninhabitable (*abandonment*).

By “fill” we mean placing sand, mud, or other soil materials onto dry land to elevate its surface, or into wetlands or a shallow body of water to create new dry land from what had been wetlands or open water.

Dikes and *island raising* do not involve rolling easements, while an *engineered retreat* or *abandonment* could. Dikes are unlikely to be the primary response to sea level rise on barrier islands,¹¹⁴ so this section only discusses the other three approaches.

Before the 1960s, creating new land by filling the bay sides of barrier islands was common¹¹⁵ and beach nourishment was rare.¹¹⁶ Communities were not engaged in a conscious engineered retreat at the time: Oceanside erosion was a fact of life along lightly populated barrier islands, and states allowed (or encouraged) people to convert wetlands on the bay sides to developable dry lands.¹¹⁷ Concerns about the environmental impacts of filling wetlands and shallow waters generally ended that method of creating developable dry land. Nevertheless, the practice of filling bay sides has been part of the effort to prevent undeveloped barrier islands in Louisiana from disintegrating.¹¹⁸ The cost of creating (or saving) land by filling the ocean side is inherently many times the cost of filling the bay side.¹¹⁹

At about the time people stopped filling bay sides of barrier islands, sand replenishment projects to fill the ocean sides became commonplace.¹²⁰ This practice is expected to continue.¹²¹ The environmental consequences of dredging sand and filling ocean shores are often noted,¹²² but government agencies have almost always decided that those impacts are acceptable, given the alternative of oceanside erosion. Yet as sea level continues to rise, the cost of shore protection will increase. Many geologists doubt that sand replenishment will be a sustainable response for most barrier islands if sea level rise accelerates.¹²³ Even if it is sustainable, the costs will accelerate as annual sand requirements increase and sand becomes more costly when least-cost supplies are exhausted.¹²⁴

If sand replenishment becomes too costly, those who pay for it will logically look for less expensive alternatives. Although environmental regulations currently favor sand replenishment over an engineered retreat, no study outside Louisiana has directly compared the environmental impact of filling the bay with filling the ocean.¹²⁵ Another alternative would be to allow an island to erode and make no effort to build additional land on the bay side. On some narrow islands, natural processes can create new bayside lands known as “overwash fans” as storms and winds bring sand from the ocean beach to the bay.¹²⁶ But common land use practices on developed islands have stopped the overwash process.¹²⁷ Restoring overwash might enable an island to migrate inland as with an engineered retreat; but such restoration is more difficult than creating the same land artificially.¹²⁸

Along islands where new bayside lands are not created, narrow islands may erode on both the bay and ocean sides, and either disintegrate, become segmented with more inlets, or otherwise become uninhabitable.¹²⁹ The relatively wide islands would generally narrow until reaching a critical width, at which point they would migrate (or disintegrate) like other narrow islands.¹³⁰ Barrier island residents

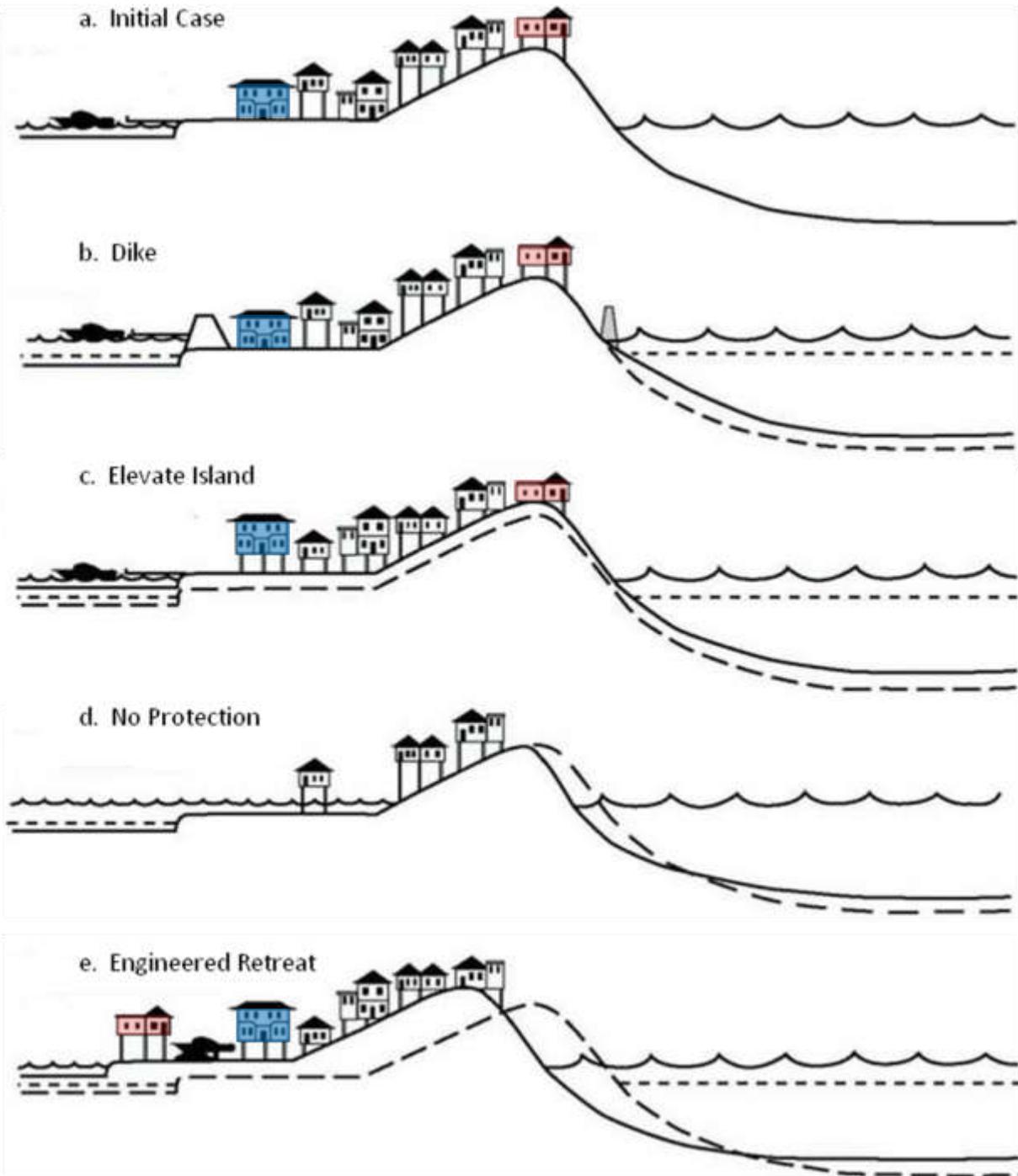


Figure 7. Four General Pathways for Responding to Rising Sea Level on a Barrier Island. The initial case (a) shows the cross section of a developed barrier island. If sea level rises, (b) lowlands could be protected with a dike, but a barrier island below sea level would be hazardous. A more common approach is to (c) elevate the beach profile with a sand replenishment project; and individual landowners may also choose to elevate their lots to prevent increased flooding. If no shore protection occurs (d) the islands may become narrower as the ocean side erodes and the bay side becomes submerged, which would reduce the number of developable lots. An alternative is (e) to imitate the natural overwash process by creating a new bayside parcel to replace the parcel lost on the ocean side. Source. SEA LEVEL RISE AND BARRIER ISLANDS. See note 113.

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and businesses would strongly oppose the elimination of their communities.¹³¹

There is no general rule about whether allowing a previously developed barrier island to disintegrate is environmentally preferable to artificially maintaining the island. The restoration of disintegrating barrier islands in Louisiana was undertaken primarily to protect estuarine wetlands from storm waves.¹³² Some scientists have expressed concern about the impact of increased salinity and tide range in Pamlico and Albemarle Sounds from a deterioration of the Outer Banks barrier islands.¹³³ These concerns may justify efforts to prevent those islands from deteriorating. But the question has not been evaluated in detail for most estuaries.

Given the absence of analysis to demonstrate that any of the three options would be clearly superior, this primer assumes that island raising, engineered retreat (or a similar retreat caused by natural overwash), and abandonment could each be a preferred option in some cases. Because Sections 2.1 to 2.4 have examined the issues that can arise with a generally retreating shore, we now turn our attention to some additional issues that may be associated with the creation of bayside land from either an engineered retreat or from natural bayside accretion.

2.5.2 How Rolling Easements Might Facilitate a Retreating Barrier Island

Along a retreating mainland shore or a shrinking island, the essential feature of a rolling easement is the set of rules under which open water, wetlands, beaches, and public access migrate inland. Along a migrating barrier island, a rolling easement policy would do the same thing on the ocean. But on the bay side, it would do the opposite, establishing expectations for shallow waters and wetlands to become privately owned dry land. The bayfront owners would not be confronted by the loss of land and home. They may have to prepare, however, for

eventual loss of waterfront access or views of the water, or for bayward relocation of their homes onto newly created land, to retain access and view.

The simplest possibility would be an incremental landward migration, with new bayside parcels offsetting the loss of oceanside parcels. That possibility is depicted along with other responses to sea level rise in Figure 7, which originally appeared in a study of Long Beach Island, New Jersey, a narrow barrier island with single family homes on small lots. The study concluded that elevating the island in place will be the most feasible pathway at first, but after the sea rises a few feet, the cost savings from an engineered retreat is likely to outweigh the considerable administrative challenges.¹³⁴

Larger and less frequent land reclamation may be more cost-effective and better facilitate possible long-term plans. Even if the community is satisfied with existing land-use, it may still be more efficient to create an entirely new city block on the bay side, and eventually move all homes on the existing bayside block to the new bayside block. Otherwise, creating new bayside lots would harm yacht clubs, community parks, waterfront owners, and even people who like their views of the water.

Larger-scale land creation could also encourage transitions to more sustainable development possible.¹³⁵ Instead of moving oceanside homes to the bay side, communities could use newly created land for some combination of higher-density housing and open space, to achieve any number of possible public policy goals, including:

- Decreased traffic and more walkable communities;
- Allowing the island to narrow, by creating less land on the bay side than the ocean side loses;
- Restoration of coastal wetlands and other habitat; and
- Gradual depopulation of another part of the barrier island or a nearby barrier island.

NOTES AND REFERENCES

²¹ See, e.g., CCSP, *supra* note 3, at 90 (photos along the Texas coast). See also photos before major beach nourishment projects at Miami Beach (FL) and Sea Bright (NJ) available from the Corps of Engineers.

²² See, e.g., David A. Fahrenthold, *In Maryland: Eco-Bills Come Due at Bay's Beaches*, WASHINGTON POST, March 19, 2009 (Dares Beach, Columbia Beach, Mason's Beach, and Scotland Beach) and Josh Harkinson & Kate Sheppard, *Buh-Bye East Coast Beaches*, 35 (4) MOTHER JONES 40 (July 2010) (Chesapeake Beach, Pamlico Beach, and Tolchester Beach).

²³ See, e.g., CCSP, *supra* note 3, at 92 & 102.

²⁴ See, e.g., *infra* notes 352 & 355.

²⁵ See *infra* notes 352 and 355 and accompanying text.

²⁶ For example, the Texas Open Beaches Act generally requires removal of homes seaward of the dune vegetation line, but administrative relief is possible for up to two years. The relief is not available, however, for homes seaward of the high tide line. See *infra* § 3.1.2.2

²⁷ CCSP, *supra* note 3, at 165–166 & 202.

²⁸ E.g., *Surfrider, Inc. v. Town of Palm Beach*, Florida. Florida Division of Administrative Hearings Decision #08-1511 (Department of Environmental Protection Administrative Order #09-0729, July 15, 2009) (denying the town a permit for beach fill because of the project's potential to harm environmental and recreational resources).

²⁹ Jeroen Speybroeck (and 12 others), *Beach Nourishment: An Ecologically Sound Coastal Defence Alternative? A Review*, 16 AQUATIC CONSERVATION: MARINE AND FRESHWATER ECOSYSTEMS 419–435 (2006).

³⁰ E.g., because a species depends on an eroding bluff. See *infra* note 286 and accompanying text.

³¹ In 1842, the United States Supreme Court stated that all 13 original states followed the public trust doctrine. See *Martin v. Lessee of Waddell*, 41 U.S. (16 Pet.) 366, 410 (1842) (“For when the revolution took place, the people of each state became themselves sovereign; and in that character hold the absolute right to all their navigable waters, and the soils under them, for their own common use.”) Chief Justice Taney pointed out that submerged lands had originally been “held by the king . . . as the representative of the nation, and in trust for them.” *Id.* at 409. New states were granted submerged lands upon statehood. *Pollard v. Hagan*, 44 U.S. (3 How.) 212, 229–30 (1845). A century later, the Supreme Court held that the federal

government had retained tidelands along the ocean coasts of all new states. *United States v. California*, 332 U.S. 19, 38–41 (1947). Congress overruled this decision with the Submerged Lands Act of 1953, 43 U.S.C. §§ 1301–1356, which grants the states the ocean floor out to the three-mile limit, see 43 U.S.C. § 1312.

³² In some cases, the public that owns the tidelands is a Native American tribe, in which case the tribe rather than the state owns those public trust tidelands today. See, e.g., *U.S. v. Milner*, 583 F. 3d 1174, 1190 (9th Cir. 2009).

³³ See generally Richard J. Lazarus, *Changing Conceptions of Property and Sovereignty in Natural Resources: Questioning the Public Trust Doctrine*, 71 IOWA L. REV. 631 (1986) and Carol Rose, *The Comedy of the Commons: Custom, Commerce, and Inherently Public Property*, 53 U. CHI. L. REV. 711, 715–23 (1986).

³⁴ See *Martin*, 41 U.S. (16 Pet.) at 410; see also DAVID C. SLADE ET AL., PUTTING THE PUBLIC TRUST DOCTRINE TO WORK 175 & 180–81 nn.5–10 (1990) (discussing judicial limitations on the ability of states to convey public trust lands to private parties); cf. *United States v. Denver & Rio Grande Ry. Co.*, 150 U.S. 1, 14 (1893) (“It is . . . the well-settled rule of this court that public grants are construed strictly against the grantees, but they are not to be so construed as to defeat the intent of the legislature . . .”).

³⁵ See, e.g., Joseph L. Sax, *The Public Trust Doctrine in Natural Resource Law: Effective Judicial Intervention*, 68 MICH. L. REV. 471, 473 (1970) (describing an expanded public trust doctrine) and James L. Huffman, *Speaking of Inconvenient Truths—A History of the Public Trust Doctrine*, 18 DUKE ENVL. L. & POL'Y F. 1, 4–7, 37–69 (2007) (summarizing legal commentaries advocating an expanded public trust doctrine and discussing court opinions that adopted that expanded doctrine or mentioned it while basing their rulings on other grounds).

³⁶ The scientific and legal literature do not mean the same thing by “high water line”. Scientific papers generally mean a visually discernible line in the land made by the high water. See e.g. Elizabeth H. Boak & Ian L. Turner, *Shoreline Definition and Detection: A Review*, 21 JOURNAL OF COASTAL RESEARCH: 690–697 (2005). Court opinions generally mean an elevation contour. See *infra* note 46 and accompanying text.

³⁷ See e.g. *Severance v. Patterson*, No. 09-0387 (Tex. 2010) (“The area from mean low tide to mean high tide is called the “wet beach,” because it is under the tidal waters some time during each day. The area from mean high tide to the vegetation line is known as the “dry beach.”); *City of Long Branch v Liu*, No A-9

(N.J. 2009) (“The mean high water mark, generally, is the boundary line that divides private ownership of the dry beach and public ownership of tidally flowed lands”); and Stephanie Reckford, *Limiting the Expansion of the Public Trust Doctrine in New Jersey: A Way to Protect and Preserve the Rights of Private Ownership*, 36 SETON HALL L. REV. 249, 249 n.2 (2005) (same).

³⁸ Cf. ORRIN H. PILKEY, JR. AND WILLIAM J. NEAL, EDITORS, *LIVING WITH THE EAST FLORIDA SHORE* 25–28 (1984) (explaining that storms erode the beach and dunes by washing sand offshore, but that after the storm subsides, fair-weather waves rebuild the beach and dunes). The vegetation line tracks the inland reach of the most severe storm of the year, because recently eroded dunes and beaches typically lack vegetation until the next year. *Id.* at 25.

³⁹ See e.g. BOAK & TURNER at 690 (showing that the divide between wet and dry land is inland of mean high water).

⁴⁰ The more common terms in the scientific literature are “high water line” and “wet/dry line.” See e.g. BOAK & TURNER at 690–697 (finding that the most commonly used shoreline reference had been the “high water line”, which is sometimes called “wet/dry line”). But “high water line” could easily be confused with “mean high water line” or “high tide line,” which are based on surveyed elevations. See *supra* note 36 and accompanying text. The term “wet/dry line” has been criticized as imprecise. *Id.* at 697.

⁴¹ Maurice W. Provost, *Tidal Datum Planes Circumscribing Salt Marshes*, 26 BULLETIN OF MARINE SCIENCE 583 (1976) (explaining that low marsh extends up to mean high water, while high marsh extends up to unusually high tides).

⁴² See, e.g., T.J. Huisman, F. Van Langevelde, & W.F. De Boer, *Local positive feedback and the persistence and recovery of fringe Avicennia marina (Forssk.) vierh. Mangroves* 17 WETLANDS ECOL. MANAGE. (2009) 601, 603 (citing W.F. De Boer et al., 428 HYDROBIOL 187–196 (2000) and P.J. HOGARTH, *THE BIOLOGY OF MANGROVES*. (1999)).

⁴³ See SLADE ET AL, *supra* note 34, at 59 & 64 n.8 (listing cases from all 23 tidewater state courts defining the landward boundary of the public trust).

⁴⁴ See, e.g., Frank E Maloney & Richard C Ausness, *The Use and Legal Significance of the Mean High Water Line in Coastal Boundary Mapping*, 53 N.C. L. REV. 186, 204 (1974); and George M Cole, *Tidal Water Boundaries Symposium on Sovereignty Lands*, 20 STETSON LAW REVIEW 165, 166 (1990).

⁴⁵ See generally Charles E. Corker, *Where Does the Beach Begin, and to What Extent Is This a Federal Question*, 42 WASHINGTON LAW REVIEW 33 (1966).

⁴⁶ *Borax Consolidated, Ltd et al. v. Los Angeles*, 296 U.S. 10 (1935). The Court’s analysis focused on the distinction between neap high tide, mean high tide, and spring high tide and held that the ordinary high water mark referred to the average high tide. The opinion did not address the question whether wave runup causes an actual water mark but simply asserted “This does not mean, as petitioners contend, [that the ordinary high water mark is] a physical mark made upon the ground by the waters; it means the line of high water as determined by the course of the tides,” *id.* at 23, and cited opinions that distinguished various tide levels. *Id.*, but did not address wave runup or actual water marks. The case involved Mormon Island within Los Angeles Harbor, *id.* at 12, where wave runup is not significant. Thus the holding did not necessarily create a rule of law that federal grants extend to the mean high water line when there is significant wave runup. But a few federal courts have assumed that *Borax* created such a rule along the ocean coast. See e.g., *U.S. v. Washington*, 294 F. 2d 830, 834 (9th Cir. 1961) (“the high-water mark means the line of high water as determined by the course of the tides, not as determined by physical markings made upon the ground by the water. The latter method of making this determination, which was followed by the district court, is appropriate only in the case of streams and other nontidal waters which have no absolute ascertainable level because of variations of flow from a multitude of causes.”) and *Sotomura v. County of Hawaii*, 460 F. Supp. 473, 478–479 (D. Haw. 1978) (relying on *Borax* and *U.S. v. Washington*). Several courts have stated in passing that *Borax* implies that federal grants extend to mean high water along an ocean shore, while deciding cases that do not depend on whether it does or not. See e.g. *Hay v. Bruno*, 344 F. Supp. 286, 287 (D. Or. 1972); *California ex rel. State Lands Comm’n v. United States*, 457 US 273, 289 (1982) (J. Rehnquist, concurring); *U.S. v. Alaska*, 521 US 1, 23–25 (1997); and *Udall v. Oelschlaeger*, 389 F. 2d 974, 975–976 (D.C. Cir. 1968).

⁴⁷ Some courts have defined “ordinary high water mark” as the mean high tide line without providing a reason or indicating a recognition that the mean high tide line is not a water mark along ocean shores. E.g. *O’Neill v. State Hwy. Dept.*, 50 N.J. 307, 323–324 (1967); *Purdie v. Attorney General*, 143 N.H. 661, 664–667 (1999); and *State v. Fain*, 259 S.E. 2d 606 (S.C. 1979). Some adopt the rule because (ignoring shore

erosion) the mean high tide line can be determined more precisely than the visual observation of a water mark. *State v. Ibbison*, 448 A.2d 728, 732 (R.I. 1982) (public access case) “The mean-high-tide line represents the point that can be determined scientifically with the greatest certainty”. *Ibbison* at 732. Another common reason has been that the litigants had asked the court to choose between the mean high tide line and either a watermark or vegetation mark that was created by spring high tide, or the annual storm tide that generally defines the dune vegetation line; neither litigant proposed the line of ordinary wave runup as the ordinary high water mark. *E.g.*, *Purdie* at 664–665 and *Carolina Beach Fishing Pier, Inc. v. Town of Carolina Beach*, 177 SE 2d 513, 516 (N.C. 1970) (takings case). Finally, courts sometimes pointed to older cases involving calm waters where the ordinary high water mark and the mean high tide line were the same, to conclude that the law had already settled on the use of the mean high water line. *Ibbison* at 730–31. The academic literature on these cases has also focused on increased sophistication of measuring mean high water but not on the higher actual water levels caused by wave runup. *E.g.*, MALONEY & AUSNESS, *supra* note 44, at 206 and COLE, *supra* note 44, at 165–167.

⁴⁸ *Luttes v. State*, 324 S.W. 2d 167, 191–192 (Tex. 1958) (holding that Spanish and Mexican grants extend only to the line of mean higher high tide, while later grants extend to the mean high tide line).

⁴⁹ *Id.* at 192.

⁵⁰ See *infra* note 60.

⁵¹ LA. CIV. CODE ANN. ART. 451 (West 1980) (“Seashore is the space of land over which the waters of the sea spread in the highest tide during the winter season”). For Texas, see *supra* note 48. *But see Adams v. Crews*, 105 So.2d 584, 593 (Fla. Court of Appeals 1958) (holding that private rights extended only to the high water mark under both English and Spanish Law).

⁵² *In re Ashford*, 440 P.2d 76, 77 (Haw. 1968) (defining seaward boundary of private land as “the upper reaches of the wash of waves, usually evidenced by the edge of vegetation or by the line of debris left by the wash of waves”); *Hughes v. State*, 67 Wash. 2d 799, 811 (1966) (defining mean high tide line as the vegetation line and denying landowners the benefits of accretion). *But cf. Hughes v. Washington*, 389 U.S. 290 (1967) (holding that federal law, which sets the boundary at the mean high tide line, governs in the case of federal grants).

⁵³ See, *e.g.*, *Trustees of Internal Improvement Fund v. Wetstone*, 222 So.2d 10 (Fla. 1969).

⁵⁴ In Delaware, Pennsylvania, and Virginia, private land extends down to mean low water. See SLADE ET AL, *supra* note 34, at 69–70. n.22 (citing cases). In Maine and Massachusetts, private land extends to mean low water or 100 rods (1650 feet) seaward of the mean high water line, whichever is more inland. *Id.* at 70 (citing cases).

⁵⁵ *E.g.*, *Borough of Neptune City v. Borough of Avon-By-the-Sea*, 294 A.2d 47 (N.J. 1972) (discussing borough-owned beach while acknowledging that the source of the title was not in the record); and *Dept. of Natural Resources v. Ocean City*, 274 Md. 1, 7 (1975) (discussing beach dedications and implied dedications).

⁵⁶ See the discussion of avulsion in *infra* § 2.2.2.

⁵⁷ Florida’s Riparian Act of 1856 transferred title of submerged lands to any riparian owner who filled those lands and made improvements “to fill up from the shore, bank or beach as far as may be desired ... to erect warehouses or other buildings.” *Theisen v. Gulf, F. & A. Railway*, 75 Fla. 28, 78 So. 491 (1917). The Butler Act of 1921 extended those grants to include some lands that had not been filled, such as the land under a dock. *Jacksonville Shipyards v. Dept. of Natural Resources*, 466 So.2d 389, 391–392 (Fla. 1985). Many developers took advantage of this statute by creating waterfront communities on what had been wetlands and shallow waters. See, *e.g.*, G.A. ANTONINI, D.A. FANN, & P. ROAT, *FLORIDA SEA GRANT, A HISTORICAL GEOGRAPHY OF SOUTHWEST FLORIDA WATERWAYS VOL. 1 AND 2* (2002) (pictures, maps, and a discussion of the historic conversion of shallow estuaries and coastal wetlands to dry land for development). See also *Hayes v. Bowman*, 91 So.2d 795 (Fla. 1957) (reconciling the history of dredge-and-fill developments to the public trust doctrine in Florida).

⁵⁸ See *Matthews v. Bay Head Improvement Ass’n*, 471 A.2d 355, 358 (N.J. 1984) (expanding the public trust inland along the ocean by recognizing a right to sunbathe and otherwise enjoy the dry beach between mean high water and the vegetation line) and *State ex rel. Thornton v. Hay*, 462 P.2d 671, 672–74 (Or. 1969) (under the doctrine of custom, public access extends inland to the 16-foot contour, which is similar to the dune vegetation line).

⁵⁹ SLADE ET AL, *supra* note 34, at 49–50 n.61 (listing cases for each of the five states).

⁶⁰ See the references listed in *supra* notes 44–47. Uncertainty remains about whether the public access extends farther inland than mean high water, for two reasons. First, court opinions have not yet addressed the paradox of the law requiring modern survey techniques to implement a centuries-old doctrine of

property law, while scientists continued to rely on visual observation methods that have always been available. See *supra* notes 36, 39, 40, 46, and 47. It is therefore possible that for uses that depend on the visually observable shore, future cases in some states will clarify that the public easement is defined by readily observable boundaries, even where land ownership boundaries are based on surveys. Second, there is no clear rationale for basing public access on the mean high tide line along beaches where pedestrian passage is regularly infeasible along the mean high tide line, given that the actual water mark defines a path where pedestrian passage is feasible.

⁶¹ SLADE ET AL, *supra* note 34, at 197–199 nn. 39–40 (listing cases for 9 coastal states).

⁶² See *infra* § 3.1.2.2 (discussing Texas Open Beaches Act). Longstanding use has entitled the public the right of access along beaches both due to the doctrine of custom and the doctrine of proscriptio. TEX. NAT. RES. CODE § 61.011. Many of these beaches have eroded since the public originally obtained those rights. Although the public access way does not necessarily migrate inland to the new dry beach as the shore erodes, see *infra* note 88 and accompanying text, the public can independently obtain access to the new beach (which was formerly dune) through continuous use. *Severance v. Patterson*, No. 09-0387 (Tex. 2010). No one has quantified the portion of public beaches in Texas where access has been lost.

⁶³ See, e.g., *City of Daytona Beach v. Tona-Rama Inc.*, 294 So.2d 73, 78 (Fla. 1974) (holding that in the particular area under consideration, the public had an easement to the privately owned dry sand beach based on the doctrine of custom).

⁶⁴ See, e.g., U.S. ARMY CORPS OF ENG'RS, DIGEST OF WATER RESOURCES POLICIES AND AUTHORITIES 14-1 (1996) (explaining that Public Law No. 84-826 authorized federal erosion control assistance only for publicly owned shores, or for private shores if such protection would result in public benefits).

⁶⁵ See J.L. Sax, *Changing Currents: Perspectives on the State of Water Law and Policy in the 21st Century: The Accretion/Avulsion Puzzle: Its Past Revealed, Its Future Proposed*, 23 TULANE ENVIRONMENTAL LAW JOURNAL 305, 306 (2010). See also *County of St. Clair v. Lovington*, 90 U.S. (23 Wall.) 46, 66–69 (1874) (quoting the Institutes of Justinian, Code Napoleon, and Blackstone for the universal rule that a boundary shifts with the shore). In England, three 14th century cases established the rule that gradual accretions of land belong to the waterfront landowner: *The Eyre of Nottingham Case* (1348), *The Abbot of Peterborough's Case* (1367), and *The Abbot of Ramsay's Case* (1369). SAX at 313–320.

⁶⁶ See SAX, *supra* note 65, at 313–334.

⁶⁷ “Every proprietor whose land is thus bounded is subject to loss by the same means which may add to his territory, and as he is without remedy for his loss in this way he cannot be held accountable for his gain.” *Lovington*, 90 U.S. (23 Wall.) at 68 (quoting Mayor of New Orleans v. United States, 35 U.S. (10 Pet.) 662, 717 (1836)).

⁶⁸ See, e.g., *Stop the Beach Renourishment, Inc. v. Florida Department of Environmental Protection*, 130 S. Ct. 2592, 2611–2612, 560 U.S. ___, ___ (2010) (discussing the Florida law of avulsion) and *City of Long Branch v. Liu*, 833 A.2d 106, 363 (N.J. Super. 2003), *aff'd City of Long Branch v. Jui Yung Liu*, No. A-9 (N.J. 2010) (holding that beach nourishment does not change title from the state to the littoral landowner).

⁶⁹ *Stop the Beach Renourishment, Inc. v. Florida Department of Environmental Protection*, 130 S. Ct. at 2612 560 U.S. at ___ 2010 (“The result under Florida law may seem counter-intuitive. After all ... property has been deprived of its character (and value) as oceanfront property by ...an avulsion.”).

⁷⁰ Professor Joe Sax pointed out that in the common law, property originally had fixed boundaries whether or not it was along the shore. SAX, *supra* note 65, at 311. When the king granted property up to the shore, that meant up to where the shore was at the time of the grant. As the law evolved, courts adopted the idea that boundaries move with a slowly eroding or accreting shore (rule of accretion), in part because awarding narrow and slowly evolving strips of land to the crown seemed inefficient. *Id.* at 341–343. But the old rule of fixed boundaries was not changed for those cases where the King filled open water to create land or other cases where the creation of land was abrupt (avulsion), because the reasons for the newer rule of accretion did not apply to avulsion. *Id.* at 322, 325 & 342–43.

⁷¹ *Id.* at 321 (“[T]he ground which was the King’s when it was covered with the waters, is his also when the waters have left it” (quoting THE READINGS OF THE FAMOUS AND LEARNED ROBERT CALLIS, ESQ, UPON THE STATUTE OF SEWERS, 23 HEN. VIII C.5, AS IT WAS DELIVERED BY HIM AT GRAY’S INN, IN AUGUST 1622 (4th edition, William John Broderip, 1824))).

⁷² See, e.g., *Stop the Beach Renourishment, Inc. v. Florida Department of Environmental Protection*, 130 S. Ct. 2592, 2611–2612, 560 U.S. ___, ___ (2010) (discussing the Florida law of avulsion) and *City of Long Branch v. Liu*, 833 A.2d 106, 363 (N.J. Super. 2003), *aff'd City of Long Branch v. Jui Yung Liu*, No. A-9 (N.J. 2010) (beach nourishment does not change title from the state to the littoral landowner). *Cf.* *New Jersey v.*

New York, 523 U.S. 767 (1998) (holding that portions of Ellis Island created by filling the Hudson River are in New Jersey because the island is within the New Jersey side of the river and the doctrine of avulsion applies to boundaries between sovereigns).

⁷³ *Walton County v. Stop Beach Renourishment*, 998 So.2d 1102, 1119–1120 (Fla. 2008), *aff'd* *Stop the Beach Renourishment, Inc. v. Florida Department of Environmental Protection*, 130 S. Ct. 2592, 560 U.S. ___, (2010) (discussing Florida waterfront access rights, and how the Florida Beach and Shore Preservation Act preserves the those rights).

⁷⁴ E.g., 342 Mass. 251, 173 N.E.2d 273 (1961) *Benjamin Michaelson & others v. Silver Beach Improvement Association, Inc.*, Supreme Judicial Court of Massachusetts, Barnstable (land created by filling shallow waters as part of a navigation project belongs to private landowner not the state) *and* *State v. Gill*, 66 So.2d 141, 142–43 (1953) (same).

⁷⁵ “Where a stream, which is a boundary, from any cause suddenly abandons its old and seeks a new bed, such change of channel works no change of boundary; and that the boundary remains as it was, in the centre of the old channel, although no water may be flowing therein. This sudden and rapid change of channel is termed, in the law, avulsion.” *Nebraska v. Iowa*, 143 U.S. 359, 361 (1892).

⁷⁶ *City of Corpus Christi v. Davis*, 622 SW 2d 640 (Tex. App. 1981) (concluding that the doctrine of avulsion should not be applicable to eroding Gulf Coast Beaches but declining to adopt such a holding because it is a matter more appropriately addressed by the Texas Supreme Court). *Severance v Patterson*, No. 09-0387 (Tex. 2010). (“This holding shall not be applied to use the avulsion doctrine to upset the long-standing boundary between public and private ownership at the mean high tide line. That result would be unworkable, leaving ownership boundaries to mere guesswork. The division between public and private ownership remains at the mean high tide line in the wake of naturally occurring changes, even when boundaries seem to change suddenly”).

⁷⁷ See, e.g., MD. CODE ENVIRONMENT §16-201(a) (preserving right to reclaim land lost to shoreline erosion since January 1, 1972); *and* *Walton County v. Stop Beach Renourishment*, 998 So.2d 1102, 1117 (Fl. 2008) (“Significantly, when an avulsive event leads to the loss of land, the doctrine of avulsion recognizes the affected property owner’s right to reclaim the lost land within a reasonable time.”). See generally 1 HENRY PHILIP FARNHAM, THE LAW OF WATERS AND WATER RIGHTS § 74 at 331 (1904). This common law rule dates back at least to the 17th century writings of

England’s Lord Chief Justice Robert Hale. “If a subject hath land adjoining the sea, and the violence of the sea swallow it up, but so that yet there be reasonable marks to continue the notice ... [and] if it be by art or industry regained, the subject does not lose his propriety, and so it was held ... though the inundation continue forty years.” Robert Hale, *De Jure Maris*, in STUART A. MOORE, A HISTORY OF THE FORESHORE AND THE LAW RELATING THERETO, 3d ed. 1888, at 381 (citing Cooke and Foster, M. 7 Jac. C. B.).

⁷⁸ See generally CCSP, *supra* note 3, at 147–149 and 166–168 (discussing tidal wetland protection regulations with a focus on adapting to sea level rise).

⁷⁹ See, e.g., *Dept. of Natural Resources v. Ocean City*, 274 Md. 1, 14–15 (1975).

⁸⁰ See *Matthews v. Bay Head Improvement Ass’n*, 471 A.2d 355, 358 (N.J. 1984) (holding that public trust access includes the dry beach between mean high water and the vegetation line). *State ex rel. Thornton v. Hay*, 462 P.2d 671, 672–74 (Or. 1969) (holding that under the doctrine of custom, public access extends inland to the 16-foot contour, which is similar to the dune vegetation line). Whether public access derived from the doctrine of custom migrates inland is unclear. See *infra* note 85.

⁸¹ See *supra* note 54.

⁸² Courts have distinguished the impact of avulsion on the boundary of tideland from access created for reasons other than the public trust doctrine. See, e.g., *Severance v Patterson*, No. 09-0387 (Tex. 2010).

⁸³ See *infra* § 3.2.2.1.

⁸⁴ This question could be more complicated if access is acquired when waterfront parcels are large, and the parcel is subsequently subdivided. If the owner conveys an easement for public access along the dry sand beach with language indicating an intent for the easement to migrate, then such an easement will apply to the entire parcel, even if it is subdivided.

⁸⁵ *Trepanier v. County of Volusia*, 965 So.2d 276, 292–293 (Fla. App. 2007) (holding that public easement resulting from custom does not migrate inland if evidence does not show that people have customarily shifted their use of the beach inland as the shore erodes).

⁸⁶ “Easement boundaries are generally static and attached to a specific portion of private property.” *Severance v Patterson*, No. 09-0387 (Tex. 2010). “As a general rule, once the location of an easement has been established, neither the servient estate owner nor the easement holder may unilaterally relocate the servitude.” *Id.* (quoting JON W. BRUCE & JAMES W. ELY, JR., THE LAW OF EASEMENTS AND LICENSES IN LAND §

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7:13 at 7-30 (2009)). See also P. Burka, *Shoreline Erosion: Implications for Public Rights and Private Ownership*, 1 COASTAL ZONE MANAGEMENT JOURNAL 175, 182 (1974) (arguing that public easements along the shore would not migrate inland, with the possible exception of those reserved under the public trust doctrine). But cf. *infra* notes 414–418 and accompanying text (suggesting that some courts place a higher priority on achieving the intent of the parties who negotiated the easement than the specific route that the easement holder uses to cross).

⁸⁷ *Smith v. Bruce*, 241 Ga. 133, 147 (1978) (“Once an easement in a specific area is conveyed to lot owners in a beach subdivision as a beach or recreational area, or such an area has been offered for dedication for public use and accepted by the public for such use it may, nevertheless, be lost by gradual erosion and avulsion.”)

⁸⁸ “Texas does not recognize a ‘rolling’ easement on Galveston’s West Beach. Easements for public use of private dry beach property do change along with gradual and imperceptible changes to the coastal landscape. But, avulsive events such as storms and hurricanes that drastically alter pre-existing littoral boundaries do not have the effect of allowing a public use easement to migrate onto previously unencumbered property.” *Severance v. Patterson*, No. 09-0387 (Tex. 2010).

⁸⁹ See generally MARYLAND LAW REVIEW, *supra* note 7.

⁹⁰ TEX. NAT. RES. CODE ANN. § 61.017(c) (providing for public access inland of seawall on North Padre Island in the aftermath of *State of Texas v. Padre Island Development Corporation* (28th Judicial District, July 29, 1974)); and TEX. NAT. RES. CODE ANN. § 61.017(d) (providing for public access landward of a revetment constructed by the Corps of Engineers). The pedestrian access is also shown in *infra* Photo 24.

⁹¹ NEW JERSEY ADMINISTRATIVE CODE § 7:7E-8.11. See also CCSP, *supra* note 3, at 209.

⁹² “Owners of docks located on state-owned tidelands or shorelands must provide a safe, convenient, and clearly available means of pedestrian access over, around, or under the dock at all tide levels.” WASH. CODE ANN. 332-30-144(4)(d).

⁹³ Bhaskaran Subramanian, Natural Resources Manager, Riparian and Wetland Restoration, Maryland Department of Natural Resources, Personal Communication, June 9, 2010, summarized in email from Jim Titus to Bhaskaran Subramanian, January 2, 2011.

⁹⁴ See *infra* notes 191–192 and accompanying text.

⁹⁵ An opinion by the Texas Supreme Court in 2010, however, implied that implementation of this policy had exceeded the authority granted by the Texas Open Beaches Act. See *infra* notes 167–194 and accompanying text.

⁹⁶ See, e.g., *infra* notes 352 and 355 and accompanying text (listing statutes that prohibit hard shore protection structures) and *infra* §3.1.2 (discussing the rolling easement for dry beach access along the Texas Gulf Coast. But see the text accompanying *infra* note 274, and notes 266 and 361 (discussing a case where the tidal wetlands were owned by a private party and the right to shore protection was decided based on nuisance law).

⁹⁷ See *Scureman v. Judge*, 747 A.2d 62, 68 (Del. Court of Chancery, Sussex 1999) (rejecting town’s theory that road along the shore had a rolling easement because roadway was on a specific dedicated parcel of land rather than on an easement across private land, and nothing in the conveyance suggested that the boundaries would roll); *Town of South Hero v. Wood*, 898 A.2d 756, 762 (Vermont) 2006 (rejecting town’s theory that road along shore had a rolling easement because an implied dedication of an easement does not shift without the consent of the servient owner).

⁹⁸ Cf., e.g., Peter G. Glenn, *Implied Easements in the North Carolina Courts: An Essay on the Meaning of Necessary*, 58 N.C. L. REV. 223–254 (1980).

⁹⁹ The easement by necessity only provides an easement across dry land to provide access to a parcel that would otherwise lack road access. It does not provide a right to build a bridge or causeway across navigable water to an island. Neither rolling easements nor easements by necessity help in the case where rising sea level completely cuts off one or more parcels from the rest of the community with an intervening channel or tidal wetlands.

¹⁰⁰ Kirstin Kanski, *Property Law—Minnesota’s Lakeshore Property Owners without Road Access Find Themselves up a Creek without a Paddle—In Re Daniel for the Establishment of a Cartway*. 30 WM. MITCHELL L. REV. 735–52 (2003) (discussing variation among states as to whether water access is sufficient access to defeat demand for cartway or easement by necessity and pointing out that older cases generally find water access as sufficient while newer cases find water access as insufficient).

¹⁰¹ *McCormick v. Schubring*, 267 Wis. 2d 141, 149, 672 N.W.2d 63, (2003) at 11 (holding pedestrian access through ¼ mile of woods not sufficient access). But see *Stansbury v. MDR Development, L.L.C.*, 161 Md. App. 594, 871 A.2d 612 (April 4, 2005) (easement by

necessity justified when only access available is by boat or walking along a channel at low tide).

¹⁰² The necessity must be apparent at the time the two parcels are severed, which allows for the inference that the easement was implied or intended when the land was subdivided. See, e.g., *Stansbury v. MDR Development, L.L.C.*, 161 Md. App. 594, 871 A.2d 612 (2005). The longstanding rule that property boundaries migrate along with shifting shorelines may lead a court to hold that shore erosion has long been apparent.

¹⁰³ See *infra* notes 186–188 and accompanying text.

¹⁰⁴ Assuming that the new sand is similar to what was already on the beach. The width of the beach depends on the grain size of the sand and the wave climate, with fine-grained sands and larger waves both causing a wider beach. See Per Bruun, *Sea Level Rise as a Cause of Shore Erosion*, 88 JOURNAL OF WATERWAYS AND HARBOR DIVISION. American Society of Civil Engineers 117–130 (1962).

¹⁰⁵ See *supra* § 2.2.1 for a discussion of the boundaries of public ownership and public access along tidal shores.

¹⁰⁶ In five states, the boundary is mean low water; and in a few states the boundary is a natural high water mark that may be above mean sea level due to waves. See *supra* notes 51–54 and accompanying text. In a few places, where states have conveyed submerged lands to the owners of the adjacent dry land, the boundary no longer moves with the shoreline. See *supra* note 57 and accompanying text.

¹⁰⁷ The goal of the rolling easement is to prevent shore protection that would eliminate the intertidal wetland, beach, or public access. Once the parcel is submerged, shore protection is only possible if the land re-emerges and then begins to submerge once again. If the land re-emerges suddenly (or gradually as an island), the state is the new owner. If it emerges gradually and is connected to some other land, it would belong to the owner of the adjacent land and generally be subject to whatever conservation easements (if any) applied to that parcel.

¹⁰⁸ A land trust and landowner may agree to elevate the grade of high marsh, for example, which would be environmentally preferable to the state filling the land and would also allow the landowner to retain title to the land. Living shoreline approaches may also be viable. But these issues are generally best left to those who manage the rolling easement when the land submerges: a current inclination by the state to fill wetlands would have little bearing on what the state will want to do 100 years hence.

¹⁰⁹ See § 2.2.2 for a discussion of the boundaries of public ownership and access along tidal shores

¹¹⁰ E.g., U.S. GLOBAL CHANGE RESEARCH PROGRAM, GLOBAL CLIMATE CHANGES IMPACTS IN THE UNITED STATES, 88, 109, 152 (2009). INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2001: IMPACTS, ADAPTATION, AND VULNERABILITY 357–360 (2001). In this context, “retreating shores” includes the inland migration of floodplain boundaries as well as wetlands and beaches.

¹¹¹ E.g., M.L. Schwartz, *The Multiple Causality of Barrier Islands*, 79 JOURNAL OF GEOLOGY 91–94 (1971). Stephen P. Leatherman, *Barrier Island Evolution in Response to Sea Level Rise: Discussion*, 53 JOURNAL OF SEDIMENTARY RESEARCH (1983).

¹¹² Other possibilities that we do not consider in this primer include tidal deltas from new inlets, the land created as inlets migrate, and new deltas created when rivers change course.

¹¹³ James G. Titus, *Greenhouse Effect, Sea Level Rise, and Barrier Islands*, 18 COASTAL MANAGEMENT 65, 69 Fig 4 (1990) [hereinafter SEA LEVEL RISE AND BARRIER ISLANDS].

¹¹⁴ *Id.* at 73. U.S. ENVIRONMENTAL PROTECTION AGENCY, POTENTIAL EFFECTS OF GLOBAL CLIMATE CHANGE ON THE UNITED STATES 131 (1989) [hereinafter EPA]; CCSP, *supra* note 3, at 204; and COASTAL AREAS AND MARINE RESOURCES SECTOR TEAM, THE POTENTIAL CONSEQUENCES OF CLIMATE VARIABILITY AND CHANGE ON COASTAL AREAS AND MARINE RESOURCES 53–56 (U.S. Global Change Research Program 2000).

¹¹⁵ Richard A. Davis, *History: Coastal Geomorphology*, in MAURICE L. SCHWARTZ (EDITOR), ENCYCLOPEDIA OF COASTAL SCIENCE 523 (1995). Examples include Long Beach Island and New Jersey; Coney Island, New York. R.A. Davis, R.A. & P.L. Barnard, in K. PYE, ET AL. (EDITORS). COASTAL AND ESTUARINE ENVIRONMENTS: SEDIMENTOLOGY, GEOMORPHOLOGY AND GEOARCHAEOLOGY. GEOLOGICAL SOCIETY SPECIAL PUBLICATION NO. 175 293–303 (2000).

¹¹⁶ The first artificial beach project was at Coney Island in 1922. U.S. ARMY CORPS OF ENGINEERS. COASTAL ENGINEERING MANUAL I-3-13 (2008). A few sand replenishment projects took place during the next few decades, but beach nourishment did not account for the vast majority of shore protection costs until the 1970s. *Id.* at I-3-21. Many Atlantic Coast communities received emergency beach nourishment after the “Ash Wednesday Storm” of 1962. See, e.g., INSTITUTE FOR WATER RESOURCES, U.S. ARMY CORPS OF ENGINEERS, DYNAMIC SUSTAINABILITY: SHORELINE MANAGEMENT ON MARYLAND’S ATLANTIC COAST 37 (2009). NATIONAL

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RESEARCH COUNCIL, BEACH NOURISHMENT AND PROTECTION 102 (1995).

¹¹⁷ See, e.g., *supra* note 57 (Florida); RICHARD A. DAVIS, JR. & GARY A. ZARILLO, HUMAN-INDUCED CHANGES IN BACK-BARRIER ENVIRONMENTS AS FACTORS IN TIDAL INLET INSTABILITY WITH EMPHASIS ON FLORIDA. U.S. Army Corps of Engineers 5–8 (2003) (Florida and Texas); and KARL F. NORDSTROM, PAUL A. GARES, NORBERT P. PSUTY, ORRIN H. PILKEY JR., WILLIAM J. NEAL, & ORRIN H. PILKEY, SR., LIVING WITH THE NEW JERSEY SHORE 51 (1986) (New Jersey).

¹¹⁸ Fortification of deteriorating barrier islands in Louisiana has focused on adding sand to the islands themselves and shallow waters on their bay sides, rather than to the beaches. See, e.g., LOUISIANA COASTAL WETLANDS CONSERVATION AND RESTORATION TASK FORCE, ISLES DERNIERES RESTORATION EAST ISLAND (TE-20) (2002, revised 2010); <http://lacoast.gov/reports/gpfs/TE-20.pdf>, cited on November 1, 2010; TASK FORCE, WHISKEY ISLAND BACK BARRIER MARSH CREATION (TE-50) (2010); TASK FORCE, EAST TIMBALIER ISLAND SEDIMENT RESTORATION, PHASE 2 (TE-30) (2010); and TASK FORCE, PASS CHALAND TO GRAND BAYOU PASS BARRIER SHORELINE RESTORATION (BA-35), (2010).

¹¹⁹ See SEA LEVEL RISE AND BARRIER ISLANDS, *supra* note 113.

¹²⁰ See *supra* notes 115 and 116.

¹²¹ See ENVIRONMENTAL RESEARCH LETTERS, *supra* note 14 and CCSP, *supra* note 3, at 198, 203–204, 213, & 236–38.

¹²² See, e.g., M. BURLAS, G.L. RAY, & D. CLARKE, THE NEW YORK DISTRICT'S BIOLOGICAL MONITORING PROGRAM FOR THE ATLANTIC COAST OF NEW JERSEY, ASBURY PARK TO MANASQUAN SECTION BEACH EROSION CONTROL PROJECT. FINAL REPORT (2001); and U.S. ARMY ENGINEER DISTRICT, NEW YORK AND U.S. ARMY ENGINEER RESEARCH AND DEVELOPMENT CENTER, WATERWAYS EXPERIMENT STATION, DRAFT ENVIRONMENTAL IMPACT STATEMENT SEPTEMBER 2009, BEACH NOURISHMENT PROJECT, TOWN OF NAGS HEAD, NORTH CAROLINA.

¹²³ E.g., ORRIN H. PILKEY & ROB YOUNG, THE RISING SEA (Washington, DC, Island Press. 2009) and CCSP, *supra* note 3, at 49, 54.

¹²⁴ The following factors that contribute to the cost are all expected to rise: The rate of sea level rise, see, e.g., IPCC, *supra* note 2; the amount of sand required per foot of sea level rise, see, e.g., CCSP, *supra* note 3, at 101–102; and the unit cost of sand as least-cost supplies are exhausted, see, e.g., EPA, *supra* note 114, at A-5-32 to A-5-36 (1989). See generally SEA LEVEL

RISE AND BARRIER ISLANDS, *supra* note 113. In addition, shore erosion and sand requirements may respond to sea level rise with a lag. See EPA at A-5-18 to A-5-20.

¹²⁵ Such analyses would have to weigh the environmental importance of the estuarine habit lost and the potential environmental benefits from restoring the bulkheaded bay shores to a more natural shoreline, against the environmental impacts of dredging sandy shoals on the continental shelf and filling the nearshore ocean waters.

¹²⁶ CCSP, *supra* note 3, at 51–55.

¹²⁷ Robert Dolan, Paul J Godfrey, & William E Odum, *Man's Impact on the Barrier Islands of North Carolina*, 61 AMERICAN SCIENTIST 152–162 (1973).

¹²⁸ Completely restoring the overwash (and related windblown processes) would require lowering dune elevations in many places so that storms would be able to push sand toward the bay side. Efforts may be necessary to ensure that roads and buildings do not block the bayward flow of sand either. When sand washes from the beach onto the streets, people would have to stop returning sand to the beach (or to a landfills) but instead allow it to remain so that it could eventually blow into the bay.

¹²⁹ CCSP, *supra* note 3, at 54–56.

¹³⁰ Frances A. Galgono & Stephen P. Leatherman, *Modes and Patterns of Shoreline Change*, in MAURICE L. SCHWARTZ (EDITOR), ENCYCLOPEDIA OF COASTAL SCIENCE 651, 653 (2005).

¹³¹ Highway departments may also attempt to close inlets to keep roads along the shore intact.

¹³² See *supra* note 118.

¹³³ CCSP, *supra* note 3, at 71–72

¹³⁴ E.g., SEA LEVEL RISE AND BARRIER ISLANDS, *supra* note 113, at 63–68. See especially *id.* Tables 3 and 4.

¹³⁵ Figure 12, *infra* § 3.4.2, illustrates these possibilities.

CHAPTER 3

LEGAL APPROACHES FOR CREATING A ROLLING EASEMENT

Most public policy goals can be accomplished through regulation or contract.¹³⁶ When land is involved, altering the land title is usually the most effective way to make a contract. Hence, the objective of ensuring that shores migrate inland can be accomplished through either regulation or a property right recorded as an interest in land.

A rolling easement can be either (a) a government regulation that prohibits shore protection or (b) a property right to ensure that wetlands, beaches, barrier islands, or access along the shore moves inland with the natural retreat of the shore.¹³⁷ A rolling easement regulation restricts what landowners are allowed to do, while a property right can either restrict a landowner's activities or authorize someone else to use the property for a particular purpose. A regulation that prohibits shore protection would enable wetlands and beaches to migrate inland; because the public trust boundary generally follows the shore, public access derived from the public trust doctrine would migrate inland as well. Conversely, the right to ensure that wetlands, beaches, or access along the shore can migrate inland inherently includes the legal power to prevent shore protection structures, which would otherwise stop that migration.

We now examine various ways to create a rolling easement as a regulation (Section 3.1) or a recorded interest in land (Section 3.2). We then examine combinations of rolling easements (Section 3.3) and combinations of rolling easements with other land use policies that also encourage a retreat (Section 3.4).

3.1 REGULATION

3.1.1 Rolling Easement Zoning and Other Local Regulations

Except in parts of Texas,¹³⁸ a local government has zoning authority in every coastal community in the United States.¹³⁹ Zoning typically involves a map that divides all land into several categories, called “zones.” The land in a given zone need not be contiguous, but zoning requirements are uniform within the zone.¹⁴⁰ Common names for zones include agricultural, residential, rural residential, commercial, commercial miscellaneous, industrial, conservation, and open space.¹⁴¹ Localities often publish large tables that list all the activities that are prohibited, allowed, or allowed only with a variance or special permit.¹⁴² Zoning may control densities of development, sizes of lots,¹⁴³ shapes of land parcels,¹⁴⁴ and particular activities on the land.¹⁴⁵ If an activity is prohibited in all zones, it may be shown as prohibited in the zoning table, or simply prohibited by ordinance.

Some localities have overlay zones, which are—in effect—a second set of maps and requirements.¹⁴⁶ For example, a floodplain map with associated requirements for buildings in the floodplain is a type of overlay zone. The actual requirements are the same as if every zone were subdivided into two zones, floodplain and non-floodplain; but it is often administratively easier to enact a second set of requirements than to modify each of the zones. Courts have occasionally rejected overlay zoning,

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in effect requiring localities to explicitly subdivide each zone to achieve the same result.¹⁴⁷ For generality, we assume that a rolling easement is added to the regular zoning, rather than as an overlay district.

Consider a locality that has five zones today: open-space/conservation (O/S), agricultural (A), rural estate (RE), residential single family (RS), and commercial mixed use (CM) (see Figure 8a). Suppose the locality creates a land use map defining the existing land use, as shown in Figure 8b: The O/S lands are all owned by either a federal wildlife refuge or The Land Conservancy (TLC). (In this primer, TLC is a hypothetical local land trust that that buys and accepts donations of land and conservation easements for environmental purposes.) The CM lands are entirely developed, with a combination of commercial, high-density residential and single-family homes that could be converted to a higher density in the future under the existing rules. The RS and RE are each partly developed with residential homes, and partly agriculture, which is a permitted land use in residential areas. Let us suppose that the locality decides that the existing development should be protected, while the A, O/S, and undeveloped RE lands should not be protected but instead should be available for wetland migration. Let us also suppose that no decision is reached regarding undeveloped RS lands: On the one hand, it may be feasible to require an agreement to allow wetland migration as a condition for future construction; but on the other hand, protecting the moderate-density development is more likely to be cost-effective than protecting the low-density RE. (Table 1 summarizes these planning assumptions.) Figure 8d maps the three categories of shore protection.

Figure 8c shows a simple rolling easement zoning scheme, which:

- Splits the RE zone into two zones: rural estate protect (REP) and rural estate retreat (RER) based on Figure 8d;

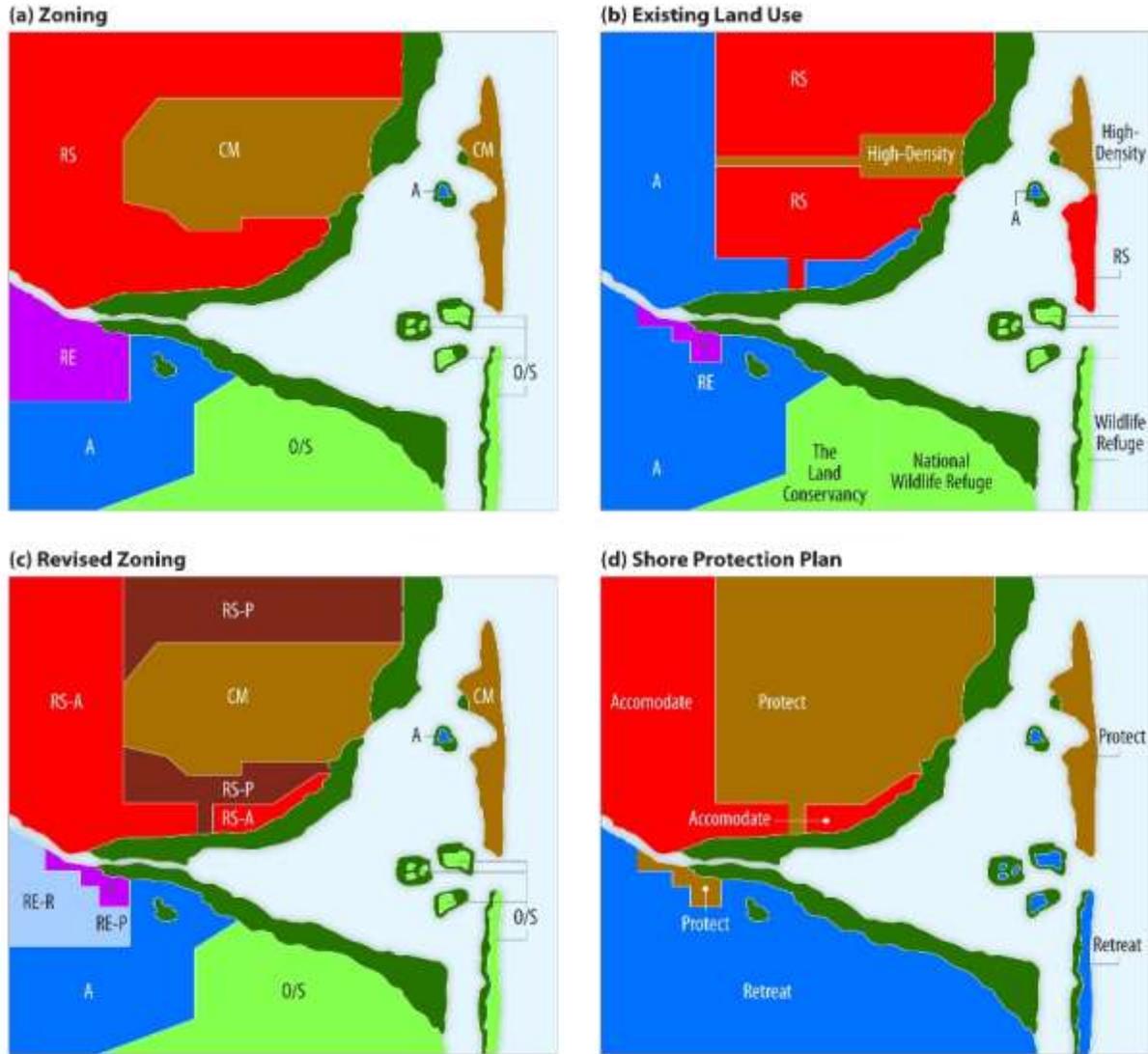
- Splits the RS zone into two zones: residential single-family protection (RSP) and residential single-family accommodation (RSA);
- Amends the zoning ordinance to add “shore protection structures” and “increases in land elevation grades” to the list of prohibited activities for zones A, OS, and RER.

If the locality is also interested in preserving access along shores where protection is allowed, it can amend the zoning to prohibit shore protection except where a public pathway is immediately inland of the shore. The logical result will be that any landowner who wants a building permit for shore protection will dedicate a public pathway.

For this report, TLC is a hypothetical local land trust that buys and accepts donations of land and conservation easements for environmental purposes.

The actual zoning scheme may have to be more complicated to avoid unintended consequences. A community intending to prevent shore protection will not usually intend to prohibit waterfowl impoundment dikes in OS lands. Some re-grading may be necessary for roadbeds. A levee designed to prevent flooding along a stream 100 feet above sea level may look like a dike, but it will not prevent inland migration of wetlands. Re-grading along hills may be needed for home construction or farm drainage.

Two common procedures can help avoid unintended consequences. First, activities that sometimes have an approved purpose can be permitted only with a special exception.¹⁴⁸ Second, all the zones can be divided into a coastal zone and an inland zone, with the rolling easement restrictions only applying within the coastal zone. Some localities already have coastal zones within their land use zoning ordinances.¹⁴⁹ Elsewhere, state laws have created coastal overlay zones, with state requirements, which we discuss in the next section.



A: Zoning	B: Land Use	C: Revised Zoning	D: Shore Protection Plan
Commercial/High-Density Mixed Use (CM)			Protect
Residential Single Family (RS)	RS-A	RS-P	
Rural Estate (RE)		Accommodate	
		RE-P	
		RE-R	
Agriculture (A)			Retreat
Open Space and Conservation (O/S)			
Wetlands			

Adding R, A, or P to an abbreviation means "retreat," "accommodate," or "protect," respectively

Figure 8. Rolling Easement Zoning. Map **a** shows the original zoning for an example locality. Map **b** shows existing land use (including all approved permits). Map **c** shows a possible revised zoning map that incorporates the plan for sea level rise, based on the assumptions in Table 1. In this case, the plan is to protect all existing development, allow shores to retreat along all O/S and A lands, as well as undeveloped lands with RE zoning, and to defer the decision on undeveloped lands with residential single-family zoning (designated “accommodation”). Instead of subdividing the zones as in Map **c**, the locality could adopt a shore protection overlay zone in states that permit overlay zoning as shown in Map **d**.

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Table 1. Example Sea Level Rise Plan for Various Zoning and Land-Use Categories

Zoning	Existing Land Use	Planned Response to Sea Level Rise		
		Protect ¹ Shore	Accommodate ²	Retreat ³
Commercial Mixed Use	High-Density	✓		
Commercial Mixed Use	Residential	✓		
Residential Single Family	Residential	✓		
Residential Single Family	Agriculture		✓	
Rural Estate	Residential	✓		
Rural Estate	Agriculture			✓
Agriculture	Agriculture			✓
Conservation/Open Space	Conservation/Open Space			✓

Source: See text.

1. Shore protection could be either shoreline armoring (e.g., dikes and bulkheads) or grade elevation (including beach nourishment).
2. Accommodation implies neither shore protection nor a specific effort to return lands to nature. It may imply either deferring the decision whether to protect or retreat, or a conscious policy to allow individual landowners to decide whether to abandon their property or continue to occupy an increasingly wet coastal zone. In the latter case, rolling easement zoning may be appropriate.
3. Rolling easement zoning would be appropriate in an area where retreat is planned.

Zoning is not the only form of local land use regulation. Communities that participate in the National Flood Insurance Program have floodplain regulations.¹⁵⁰ Some of these regulations sharply discourage development in floodplains.¹⁵¹ Many localities also have wetland regulations designed to avoid harm to beaches and mudflats, as well as vegetated wetlands. In Massachusetts, the wetland protection rules for several towns prohibit both shore protection structures and grade elevation within 50 feet of the shore, with the explicit purpose of ensuring that wetlands and beaches migrate inland as sea level rises.¹⁵² Calvert County, Maryland has cliff retreat regulations that prohibit cliff armoring, to preserve the habitat of Tiger Beetles.¹⁵³

In Massachusetts, the wetland protection rules for several towns prohibit both shore protection structures and grade elevation within 50 feet of the shore, with the explicit purpose of ensuring that wetlands and beaches migrate inland as sea level rises.

3.1.2 State Coastal Management

Land use is generally a regulatory responsibility of local government.¹⁵⁴ But tidal waters and intertidal wetlands are both owned¹⁵⁵ and regulated by the states. Therefore, most coastal state governments have issued regulations concerning construction along the shore and public access. Some states regulate development of dry lands near the coast, in effect creating zoning by the state.¹⁵⁶

3.1.2.1 Regulating Shore Protection

Virtually all coastal states regulate shore protection. The objectives of those regulations vary widely: Several states (e.g., Oregon, Maine, North Carolina, South Carolina, and Texas) sharply restrict new hard shore protection structures along the ocean shores and within the

dunes, but allow them along estuaries.¹⁵⁷ New Jersey reaches the same result by allowing shore protection structures as long as they are consistent with the shore protection master plan,¹⁵⁸ which calls for beach nourishment rather than hard structures along the developed oceanfront. By contrast, California explicitly allows shoreline armoring along the Pacific Ocean to protect “existing structures”.¹⁵⁹ Rhode Island and Massachusetts prohibit additional hard shore protection structures along both the ocean shore and some estuarine shores, but allow them along other estuarine shores.¹⁶⁰ Grade elevation and beach nourishment are allowed in parts of Massachusetts where shoreline armoring is prohibited; along most of its marsh shorelines, the land slopes are high enough for wetland migration to be minimal even without grade elevation. Maine and Rhode Island explicitly contemplate ecosystem migration in their regulations for some areas where structural shore protection is prohibited.¹⁶¹

Some states (e.g., Maryland and Virginia¹⁶²) regulate shore protection as part of their wetlands regulatory programs. The jurisdictions of those programs are generally similar to the jurisdiction of the federal wetlands regulatory program, which includes wetlands and other areas flooded by the tides, but not activities on dry land. The Maryland wetlands statute has long conferred upon littoral owners a statutory license for structural shore protection.¹⁶³ That statute presumably preempts the ability of local governments to prohibit shore protection for which a state permit is issued. But it does not necessarily prevent shore protection activities taking place outside the jurisdiction of the statute.¹⁶⁴ Thus, it did not prevent one county from prohibiting the armoring of cliffs which, in effect, mandated a policy of retreat.¹⁶⁵ In 2008, Maryland enacted its Living Shoreline Protection Act, under which the Department of Environment must create maps that differentiate the type of shore protection allowed.¹⁶⁶ In some areas, hard structures such as revetments continue to be allowed, while in other areas only nonstructural measures are allowed, such as living shorelines and beach nourishment.

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The Texas Open Beaches Act prohibits private shore protection structures¹⁶⁷ as part of its rules designed to enhance public access to beaches along the Gulf of Mexico.¹⁶⁸ As we discuss in the next section, Texas has consciously pursued a rolling easement policy for decades. But the Open Beaches Act does not prohibit all shore protection. Adding sand to the beach stabilizes the shore but retains an open beach. Regulations that implement the act explicitly recognize approved beach nourishment projects¹⁶⁹ and allow certain small-scale projects.¹⁷⁰

3.1.2.2 Public Access and the Removal of Structures from the Beach

States can ensure that public access migrates inland either by preventing new construction and requiring removal of old structures that impair access, or by amending state law so that it is clear that public access migrates inland regardless of how the public access was obtained.¹⁷¹ States often are engaged in a debate about whether homes should be abandoned when storms leave them seaward of the dunes. A common request from homeowners is permission to temporarily place geotextile sand bags in front of their homes, until the government rebuilds the beach, the beach recovers naturally, or the home is destroyed by a severe storm or continuing erosion (see Photo 21). State agencies generally decide whether to grant such permits.¹⁷²

Texas is unique in its efforts to preserve public access along eroding shores. The Texas Open Beaches Act¹⁷³ codifies the rolling easement as part of its rules designed to ensure that the public has unfettered access to the dry sand beaches along the Gulf of Mexico.¹⁷⁴ Since before statehood, people walked, rode stage coaches pulled by horses,¹⁷⁵ or drove automobiles over dry sand beaches as if they were public lands. Texans commonly assumed that those beaches were owned by the public,¹⁷⁶ but in 1958 the Texas Supreme Court held that the boundary between private and public land¹⁷⁷ is the mean high tide line,¹⁷⁸ which is seaward of all the dry sand beaches and regularly overwashed by waves.¹⁷⁹ Some owners began building fences

across the dry sand beach, which alarmed the public.¹⁸⁰

Shortly thereafter, the Texas Legislature enacted the Open Beaches Act.¹⁸¹ The act prohibits fences or any structure seaward of the dune vegetation line in those beaches where “the public has acquired a right of use or easement to or over the area by prescription, dedication, or estoppel, or has retained a right by virtue of continuous right in the public since time immemorial as recognized by law or custom.”¹⁸² Courts have found that the widespread use of the beaches for transportation and recreation created a public easement to the dry sand beach in most populated locations.¹⁸³

Enforcement of the Open Beaches Act eventually led to the recognition of a rolling easement along parts of the Texas Gulf Coast.¹⁸⁴ The act allows the state to require removal of structures originally built landward of the vegetation line once that line migrates inland of the structure.¹⁸⁵ It authorizes the General Land Office (GLO) to order removal of any structure that interferes with public use of the beach or threatens health and safety.¹⁸⁶ If the



Photo 21. Geotextile sand bags along the beach in Nags Head, North Carolina. Although the homes were on pilings, the geotextile sandbags were needed to protect the septic tanks. (June 2003). [Photo source: ©James G. Titus, used by permission].

vegetation line migrates inland of a pre-existing structure (see Photos 22 and 23), then the GLO sends a notification to the owner that the structure is subject to an order to remove. Homes are rarely removed because of such orders, but the absence of shore protection makes removal by storms inevitable along the hurricane-prone Gulf Coast as shores continue to erode. The decision to seek removal is discretionary¹⁸⁷ and is sometimes based on whether the home significantly blocks public access¹⁸⁸ (e.g., the home is in the middle of the drivable part of the beach). The statute also gives the GLO the ability to suspend this order for two years if storm erosion leaves a house seaward of the vegetation line, provided that the house is less than 50 percent destroyed, still on private property (i.e., landward of the mean high tide line), and not a threat to health and safety.¹⁸⁹ Administrative rules allow property owners to reclaim as much as 30 feet of the beach by rebuilding dunes after a storm.¹⁹⁰

Although the Open Beaches Act does not use the term “rolling easement,” court opinions interpreting the act’s provisions have held that there is a rolling easement along some (but not all) of the coast. A trial court in Galveston originally used the term in 1964 to describe the *seaward* migration of public access along an accreting beach near a jetty at the entrance to Galveston Bay.¹⁹¹ In 1986, the Texas Court of Appeals endorsed the state’s rolling easement theory that the public’s access along a privately owned beach migrates *inland* as the beach retreats.¹⁹² For the next 25 years, courts and litigants generally assumed that the rolling easement applies to all beaches in Texas with public access.¹⁹³ But in 2010, the Texas Supreme Court held in *Severance v. Patterson* that the act does not necessarily create a rolling easement along the dry beach on West Galveston Island, or other places where the access has been obtained by means other than the public trust doctrine.¹⁹⁴ If the vegetation line retreats suddenly during a storm (i.e., avulsion), then public access does not retreat.¹⁹⁵ If the vegetation line retreats gradually, then public access migrates inland within a given parcel,¹⁹⁶ but it does not migrate

onto the next property back from the shore.¹⁹⁷ The court left open the possibility that the state could order removal of homes on the beach for traditional health and safety reasons.¹⁹⁸

3.1.2.3 Public Access along Armored Shores

If seawalls and other hard shore protection structures are unavoidable, a rolling easement can still be designed to preserve public access along the shore. Whenever a state issues a permit for a shore



Photos 22 and 23. Two Views of House Encroaching Seaward of the Vegetation Line along the Texas Gulf Coast. Surfside, Texas (May 2003). The beach was the primary means of access. Although these homes were subject to removal orders, the state did not actively seek removal. The homes were destroyed by Hurricane Ike in 2008. Photo source: ©James G. Titus, used by permission.

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protection structure, it can require as a condition the dedication of a public path just inland of the new structure. New Jersey follows this approach, requiring public paths to be constructed along the waterfront inland of new bulkheads and revetments in some locations.¹⁹⁹ In Texas, the Legislature has specifically provided for access to be preserved inland of a few seawalls by defining the vegetation line (seaward of which the public has access) as being landward of the seawalls.²⁰⁰ (See Photo 24.) As we discuss in Chapter 2, a few other states have policies to prevent private shore protection structures from eliminating public access,²⁰¹ and Maryland takes the position that shoreline armoring does not eliminate the right to walk along the shore (although public access may require walking on a stone revetment).²⁰²

3.2 INTERESTS IN LAND

Any land use that can be encouraged or prohibited by a government regulation can also be managed by an agreement between the landowner and those who wish to promote or prevent the same activity. One way to effectuate such an agreement is



Photo 24. Public access inland of a seawall on Padre Island, Texas. The beach in front of this seawall is closed to motor vehicle traffic, and sometimes even pedestrian access is impractical because of shore erosion, as shown in Photos 16–17. Therefore, the state requires public access inland of the seawall (March 2004). [Photo source: ©James G. Titus, used by permission].

through a contract in which the owner promises TLC (our hypothetical land trust) that she will comply with the conditions of a rolling easement. Yet contracts are between people (or corporations), so a contractual agreement to allow wetlands to migrate inland would bind the current owner of the land, but not necessarily subsequent owners.²⁰³ If the goal is to prevent the current and all future owners of the land from holding back the rising sea, then one must change the title to the property itself, which is recorded at the local land records office. Rather than signing a contract to not erect shore protection structures, for example, the owner transfers to TLC the property right²⁰⁴ to erect shore protection structures on the land.

In this primer we use the term “recorded rolling easement” to refer to any property interest designed to ensure that shorelines are able to migrate inland. We refer to the owner of this property right as the “rolling easement holder.” For some types of rolling easements, the holder must be a government agency or a qualified land trust; for other types of rolling easements, the holder could also be a private citizen or a for-profit corporation. Depending on the particular type of rolling easement being discussed, a landowner may sell, donate, or bequeath a rolling easement to any eligible holder. Government agencies may also obtain some types of rolling easements through eminent domain or as a condition for a permit to develop land (also known as an “exaction”).

The term “recorded rolling easement” refers to any property interest designed to ensure that shorelines are able to migrate inland as sea level rises.

The law of property offers many different ways for the owner of a parcel of land to transfer some of her ownership rights to someone else. Many of those approaches can create a rolling easement. Even though the end result is largely the same, rolling easements can emphasize the absence of shore protection, migration of the property line, or

preserving access along the shore. This section divides rolling easements into three categories that roughly track those three ways of thinking about a rolling easement:

- Section 3.2.1—*Easements, Conservation Easements, and Covenants*. The owner is precluded from interfering with natural shoreline migration. As a result, the wetlands or beach along which the public has access will retreat; and the boundary line between public and private property will also retreat. If the land is elevated (surreptitiously, inadvertently, or through natural forces), then the submergence and transfer of title will be delayed. (By “transfer of title,” we mean change in ownership.)
- Section 3.2.2—*Defeasible Estates and Future Interests in Land*. A parcel that is currently (for example) one meter above mean high water will be transferred from the existing owner to TLC when sea level rises one meter. Erecting shore protection structures or elevating the grade of the land will not delay the day when ownership is transferred. TLC can later restore the land to what its natural condition would have been, or allow the sea to reclaim it over time. Anticipating the eventual transfer of the land as sea level rises, many owners will choose not to invest in shore protection. The inland boundary of public access migrates inland as the land is allowed to submerge.
- Section 3.2.3—*Ambulatory Boundaries*. As the shore retreats, boundaries migrate. The owner is precluded from interfering with the public access right along the beach. Therefore, no shore protection structures are built, and structures that interfere with public access are removed. The beach, the area along which the public has access, and the boundary between private and public property all migrate inland. Activities that elevate land grades are allowed.

Those options have seen widespread application in other contexts, but not to address sea level rise. Given the large number of possible mechanisms, Section 3.2.4 provides a summary table of our discussion.

3.2.1 Easements, Conservation Easements, and Covenants

The law of property has long had two different mechanisms for neighboring landowners to formally agree to change how one parcel of land may be used to benefit the owner of another parcel of land: easements and covenants. During the 20th century, legislatures created a special type of easement known as a “conservation easement.” Easements and covenants both involve agreements recorded in a land deed that allow one owner either to use the property of another (“The owner of parcel A may walk across parcel B”) or to prevent a specific use (“The owner of parcel B will not erect a building that casts a shadow over the garden on parcel A during the summer”). But the law has separate rules for easements and covenants regarding who can make the agreement, what the agreement can require, and the circumstances under which a court can refuse to enforce the agreement.

As a general rule:

- *Easements* can enable any individual, organization, or government agency to secure private or public access along the shore;
- *Conservation easements* enable a government or land trust to prevent shore protection; and
- *Covenants* enable neighboring landowners and developers to prevent shore protection.²⁰⁵

We discuss each of these options in turn.

3.2.1.1 What is an Easement?

An easement is a property interest that enables someone other than the owner of the land to use the land in a specified way, such as walking or driving across it, running a power line or water line over it, or draining water from one’s own land.²⁰⁶ If someone needs to change the contours of her own land (perhaps for a roadway near the property line) she may find it convenient to also change the contours of a neighbor’s land, in which case she may wish to obtain a grading easement from the owner. If someone wants her property to drain, she

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might obtain a flowage or drainage easement²⁰⁷ entitling her to dig a drainage ditch across a neighbor's land. Easements that give one person the right to do something on someone else's land are known as "affirmative easements."²⁰⁸ Courts have traditionally allowed owners and other parties to create a diverse array of affirmative easements, because ensuring the right of one party to do something on someone else's property facilitates commerce.

Easements that give one person the right to prevent the owner from doing something on her own land are known as "negative easements."²⁰⁹ Because restrictions of land use were thought to impair commerce,²¹⁰ courts traditionally voided negative easements other than those for light, air, view,²¹¹ lateral support, and drainage²¹²—especially when they did not directly benefit an adjacent property.²¹³ (Extremely noxious uses of land could be stopped as a nuisance.²¹⁴) During the middle of the 20th century, there was not always a legally reliable way for a private landowner to permanently forgo development or other activities harmful to the environment.²¹⁵

3.2.1.2 Rolling Easements as Conservation Easements

State legislatures responded by enacting statutes that specifically authorize conservation easements (as well as other special-purpose negative easements such as scenic easements and historic preservation easements).²¹⁶ Although there is some variation, these statutes²¹⁷ generally:

- Allow creation of easements in which the landowner agrees to avoid specific activities that might be harmful to the environment;
- Require the conservation purpose for the restriction to be clearly stated;
- Allow the easements to be temporary or permanent;²¹⁸ and
- Limit the ownership of conservation easements to government agencies and nonprofit conservation organizations.

A rolling easement can be structured as a conservation easement with a relatively modest restriction, such as prohibiting shore protection structures and/or activities that increase the elevation of the land surface. Where such easements are obtained, the public or land trust is assured that wetlands or beaches can migrate inland as sea level rises, while the landowner is assured of the continued enjoyment of her property until the sea reclaims it. Therefore, in theory, developers and even some owners of existing homes may be willing to transfer a rolling easement for a modest price or as a condition of obtaining a permit for an important near-term activity. (For further elaboration on the economics, see Table 3 on page 106.) This primer uses the term "shoreline migration conservation easement" to refer to a rolling easement implemented as a conservation easement, that is, a conservation easement that prohibits shore protection but that otherwise does not restrict the use of dry land.²¹⁹

3.2.1.3 Covenants: An Approach Available to Developers and Ordinary Citizens

Landowners may wish to preserve natural shorelines in neighborhoods where neither conservation organizations nor government agencies are willing to own and manage conservation easements. For example, landowners with deep lots along an estuarine beach may prefer to tolerate a gradual loss of land rather than spend tens of thousands of dollars on a revetment that would also destroy their beach—but only if each can be assured that her neighbors will not build revetments either.²²⁰ Or a developer may conclude that such a neighborhood will be best served if none of the owners are allowed to erect shore protection. But conservation easements are not an option because only land trusts and governments are allowed to own them.

Covenants that run with the land are a common way to bind landowners by a set of restrictions with reciprocal advantage to all.²²¹ (A "covenant" is a contract; "run with the land" means that the terms are written into the land deed and bind each successive owner.) Unlike conservation easements,

which must have a conservation purpose, almost any reasonable restriction could be required by a covenant. So a covenant can prohibit shore protection for navigation²²² or even to ensure that the second row of homes eventually has waterfront property.

The term “shoreline migration conservation easement” refers to a rolling easement implemented as a conservation easement, which prohibits shore protection but otherwise does not restrict use of the dry land.

Covenants are often divided into two categories: *legal covenants* and *equitable covenants* (also known as *equitable servitudes*). This distinction dates back to before the American Revolution, when England had two independent court systems known as “Law” and “Equity.”²²³ As a general rule, law courts award monetary damages for violating a covenant,²²⁴ while equity courts can order enforcement of its requirements.²²⁵ Law and Equity courts also set different criteria for when a covenant runs with the land.²²⁶ The two court systems have been merged in all but two coastal states, but two sets of rules remain.²²⁷

An equitable covenant can be created if a developer writes a restriction that prohibits shore protection onto the deeds of all land sold within a subdivision. Alternatively, neighbors may agree to such a restriction and record it at the local land records office.²²⁸ In either event, if one of the landowners or her heirs starts to engage in shore protection, the other neighbors can go to court to enforce the agreement with an order to restore the land to its original condition. As a general rule, however, courts decline to provide such “equitable relief” if doing so is inequitable—for example, when the enforcement does great harm to one party compared with the benefit to the other party.²²⁹ If the loss of a home harms the homeowner more than it benefits her neighbors, the traditional

approach of balancing equities will lead a court to not enforce the rolling easement. On the other hand, if the owner purchased the land at a discount, other owners have already given up their homes to the sea, or vacant land to which the house can be moved is available, the same court may view enforcement as equitable.

A legal covenant, by contrast, is generally enforced regardless of such subjective assessments. Because the remedy is monetary damages rather than a court order to dismantle the shore protection, a legal remedy is often not as effective at achieving the objective, unless the damages are great enough to motivate compliance.²³⁰ Moreover, a legal covenant is not always as easy to create as an equitable covenant. In the case of a developer placing a restriction on a deed, a legal covenant would be created. But a simple agreement among neighbors generally does not create a legal covenant because legal covenants must be created through the sale of real property.²³¹ One way to avoid that problem is for the owners to mutually convey easements (which qualify as real property) to walk along the privately owned shoreline within (for example) 3 feet above mean high water, when the covenant is created.²³²

3.2.2 Defeasible Estates and Future Interests in Land

A completely different way to ensure that ecosystems and public access migrate inland is for land ownership to terminate when something happens. Homeowners usually own land in *fee simple absolute*, which means that ownership lasts forever. An alternative approach is to split the land title into two periods of time: If a parcel is 4 feet above spring high water, for example, the buyer could own the land until the sea rises 4 feet, after which ownership would be transferred to TLC. Under such an arrangement, the buyer owns a *defeasible estate* while TLC owns a *future interest*. Other parcels with different elevations could transfer when the sea reaches different heights.²³³ (See Figure 9.)

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Figure 9. Example Scheme Showing Possibility of Reverter Based on Elevations for Two Large Parcels. In this example, the owner of the farm to the north has been working with a developer on a specific subdivision proposal. As lots are sold, the owner will retain a possibility of reverter, which she will transfer to The Land Conservancy. The reversion will be based on a different amount of sea level rise for each parcel, as shown in the platted lots. The owner of the farm to the south does not plan to sell during her lifetime, but she has agreed to sell a rolling easement in land for her farm as well. Without any specific subdivision plan, the southern farmer and TLC have agreed to base the reversion on elevations estimated by LIDAR. Thirty-meter grid cells are each assigned an elevation, based on the average of the three lowest 10-meter cells within the 30-meter cell. If the land is never subdivided, the transfer will take place cell by cell. If the farmer's children eventually subdivide the property, their developer will have to tailor lot boundaries and site plans to ensure that homes are entirely located within the part of a lot that reverts last. Alternatively, the children may propose another reversion scheme similar to that shown for the northern farm, which The Land Conservancy can accept if it is more beneficial to the environment than the LIDAR-based reversion shown here.

The eventuality of the land transferring to TLC would tend to ensure that ecosystems and access along the shore migrate inland, for at least two reasons. First, at about the time when a homeowner would otherwise have to engage in shore protection to prevent wetlands or the beach from migrating onto her land, the future interest will transfer ownership to an organization whose mission includes ensuring natural shoreline migration. Second, the prospect of the land reverting to TLC limits any incentive to build shore protection, because the owner will lose the land anyway.²³⁴

The common law of property defined several ways of dividing land ownership into a defeasible estate and a future interest in land. This section examines three:

- Buyer owns a *fee simple determinable* for an unknown period of time (e.g., until sea level rises 4 feet), after which title reverts back to the developer, who retains the *possibility of reverter*.
- Buyer owns a *fee simple subject to a condition subsequent* unless she does something (e.g., erects shore protection) that triggers a *power of termination*, at which point the developer can go to court to demand possession of the land.
- Original owner retains a *fee simple subject to a condition subsequent* by transferring to TLC an *executory interest* entitling it to take over the property when something happens (e.g., sea level rises 4 feet).

Possibility of Reverter. Consider a deed that says that the developer is granting the land to the buyer “for as long as it takes sea level to rise 4 feet above the level that prevailed in the 1980–2001 tidal epoch.” The buyer owns a “fee simple determinable,” which is a type of “defeasible estate”; that is, an interest in land that may end at some point in the future.²³⁵ The developer retains a “possibility of reverter” because the property will revert to the developer if and when sea level rises 4 feet. The developer can sell or donate the

possibility of reverter to TLC or a government agency, in which case the property will revert to that entity whenever the sea rises 4 feet. (If some or all of the land is seaward of the public/private boundary by that time, ownership will have already been transferred to the state; and thus will not be transferred to TLC).

Retaining a possibility of reverter has been common in the case of land provided for railroads.²³⁶ Owners of farms and other large parcels were often more willing (i.e., willing at a lower price) to allow a railroad through their lands than to sell the land, which could leave the eventual use unknown and beyond their control. The railroads preferred to purchase a fee simple determinable at a lower price because they had no need for the land beyond operation of the railroad. Similarly, landowners who wanted to see a church or school nearby often conveyed land “for as long as” the church or school operated.²³⁷ Conveying land “for so long as” the sea does not rise enough to submerge it is analogous to that classic land use arrangement. A would-be land seller concerned about the implications of rising sea level may be more willing to sell if the home will be removed as the sea threatens it, than if the home will be protected at the expense of the environment.²³⁸ The buyer may prefer a fee simple determinable at a lower price because she is not interested in paying extra for the right to maintain a home below sea level.

Providing for land titles to transfer upon a specific event has several advantages over a shoreline migration conservation easement:

- TLC, as the holder of the future interest, does not have to monitor possible efforts by landowners to extend their tenure by surreptitiously adding fill or otherwise thwarting inland migration of the ecosystem, because the property reverts regardless. (The owners can try to extend their tenure by assisting efforts to slow sea level rise, but doing so would not interfere with the environmental purpose of a rolling easement.²³⁹)

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- TLC does not have a duty to manage the property, which can be costly for a conservation easement. (See Chapter 8.) There is no risk that failure to manage the easement before sea level rises 4 feet will be deemed an abandonment of the easement. TLC simply takes over the land when the time comes (if the land has not already reverted to the state). But TLC does have the option of intervening if the landowner does something that unreasonably threatens its interest in the land.²⁴⁰
- Under the common law, anyone may own a possibility of reverter. A community organization or even the owner of the next home back may hold the interest—unlike a conservation easement, which must be owned by a government agency or a qualified conservation organization. (Some states have enacted statutes limiting ownership to charities or government agencies.)
- Although future sea level rise is uncertain, over the short run it is often more predictable than shoreline erosion.²⁴¹ Therefore, in the final decade or so before the property reverts to TLC, the landowner can plan and invest with a reasonable understanding of the property's remaining longevity.²⁴²
- Financial mechanisms are likely to eventually make it possible to hedge against the risk of sea level rise, adding further predictability to the risks faced by a homeowner whose title transfers upon a given sea level.²⁴³
- If buyer resistance unreasonably depresses the value of land subject to a rolling easement, a possibility of reverter can be drafted to ensure (for example) that the reversion does not occur before 75 years hence, without fundamentally changing its character. Such a time limit may be more difficult to accomplish with a conservation easement.²⁴⁴

The most important drawback to the possibility of reverter is that statutes in some states now limit its duration to a few decades,²⁴⁵ which is too short for ensuring that wetlands migrate inland as sea level rises.

A reversion can be based on shoreline erosion instead of sea level rise. Along sandy beaches, elevation alone usually understates how soon the land will be converted to tidelands and open water. Thus, a possibility of reverter based on sea level rise may transfer the land to TLC decades after the owner erects shore protection. Conversely, if the shore erodes more slowly than expected, the home may still be well inland and usable when the future interest awards the land to TLC.

Power of Termination. Another approach is for the land to change hands based on what the landowner does, instead of environmental factors. Whatever activity can be precluded by a shoreline migration conservation easement can also be the activity that triggers a reversion. For example, the property can revert if the owner undertakes shore protection without permission of TLC, and fails to remove it upon TLC's request. The deed can be drafted to say "...but if the grantee or her heirs construct a bulkhead, revetment, or any hard shore protection structure, or deliberately elevate the average elevation grade of the parcel, then the grantor and her heirs shall have the power of termination." The buyer will own a "fee simple subject to a condition" while the seller retains the "power of termination" (sometimes called a "right of re-entry").²⁴⁶ The owner will have a strong incentive to avoid shore protection: With a shoreline migration easement, if the owner erects a shore protection structure, TLC can go to court to seek removal of the structure and monetary damages to cover the costs for challenging the violation. But with a power of termination, TLC can ask the court to award the property to TLC. Removal of the shore protection structure and management of the property would then become the responsibility of TLC.

The Difference between Possibility of Reverter and Power of Termination. The key difference between our two example deeds is that the first deed conveys land for an unknown duration (until the sea rises 4 feet), while the second deed transfers the land back to the seller if the buyer does something (in this case, attempt shore protection). Courts have generally been suspicious

of punitive arrangements that cause land to be forfeited.²⁴⁷ But they have also distinguished forfeitures from the natural termination of an ownership interest when its purpose has been fulfilled.²⁴⁸ Conveying an estate for the needed duration (e.g., the life of a railroad), has been viewed more favorably by courts than arrangements under which land might be forfeited for doing something (e.g., selling liquor)—especially where the harm done was far less than the value of the land being forfeited.²⁴⁹ The common law treated the power of termination as a forfeiture, while the possibility of reverter was simply a natural expiration.²⁵⁰ During the 20th century, the concern about punitive forfeitures led both courts and legislatures in some states to restrict the ability of property owners to create and enforce both of these approaches (although governments and charities are sometimes exempt).²⁵¹ In some cases the two approaches have been merged into a single legal interest.²⁵² Thus to avoid the possible appearance of a forfeiture, rolling easements based on future interests in land should be drafted to distinguish the reversion to nature intended by the rolling easement, from the potentially punitive or arbitrary forfeiture that has traditionally concerned the courts.

Land trusts regularly use conservation easements,²⁵³ but not future interests in land.²⁵⁴ Under most circumstances, a conservation easement with a power of termination clause would seem punitive. Owners who donate or sell typical conservation easements (or buy property with an easement already in place) intend to keep their land and do not generally wish to take the chance of losing the property due to a possible disagreement over cutting trees or enlarging a house. But rolling easements are different: the entire point is to ensure that the land is given over to the migrating wetlands and beaches. A transfer of title from a rolling easement would not be an unreasonable forfeiture for violating a condition but rather a fulfillment of the original intent of the grant.²⁵⁵

Efforts at shore protection signal that the time to allow the land to revert to nature has arrived. An owner willing to promise to not prevent the sea from taking over her land would logically agree that if her heirs did try to prevent the sea from taking over the land, then the land would be awarded to an entity that will ensure that the sea takes over the land. Courts sometimes avoid a forfeiture by ordering the owner to do what the condition requires (e.g., stop selling liquor).²⁵⁶ But in this case, removing the shore protection causes the same result as forfeiting the property. The land becomes submerged, reverts to nature, and becomes part of the public trust whether it is first transferred to TLC or a court simply issues an injunction against the shore protection.

Executory Interest. Rolling easements based on a possibility of reverter or power of termination are future interests in land that the original owner (e.g., the developer) retains when granting the (less than absolute) fee simple interest to new owners (e.g., home buyers). Those future interests can then be sold or donated to a land trust or government agency. In some cases, the opposite transaction may be desired. Suppose the developer cancels the development and sells the entire parcel to a new owner; and the new owner later wants to transfer a rolling easement in which she retains the land until the sea rises 4 feet, after which title goes to TLC. The net effect is the same as if the developer had retained a possibility of reverter and donated it to TLC.²⁵⁷ But in this case, the future interest does not revert to a previous owner, so it is called an “executory interest.”²⁵⁸

Summary. Table 2 summarizes the defeasible estates and future interests in land discussed in this section. As a general rule, courts have been more inclined to enforce a possibility of reverter than either a power of termination or an executory interest.²⁵⁹ It is often possible to create a possibility of reverter that accomplishes the goals of a power of termination or executory interest.²⁶⁰ Thus, for the rest of this primer, wherever we discuss future interests, we focus on a possibility of reverter rather than the other two approaches.

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3.2.3 Ambulatory Boundaries

In the previous two subsections we have considered conservation easements that prevent shoreline armoring and future interests in land that transfer ownership parcel by parcel. Here we explore the option of property owners making agreements to create “ambulatory boundaries,”

that is, boundaries that migrate with a shifting shore. We have already seen that the boundaries for both ownership and public access resulting from the public trust doctrine are ambulatory (Section 2.2.2), and that for two decades people assumed that public access acquired by other means along the beach in Texas is also ambulatory (Section 3.1.2).

Table 2. Summary of Future Interests In Land Discussed in this Report

Future Interests and Defeasible Estates Discussed In This Section

Land Trust Owns	Homebuyer Owns	Forfeiture or Termination?	Violates Rule Against Perpetuities? ¹	Example Conveyance
Possibility of Reverter	Fee Simple Determinable	Natural Termination	No	Buyer keeps land until sea rises 4 feet, then land reverts to TLC. ²
Power of Termination	Fee Simple Subject to a Condition	Forfeiture	No	Buyer keeps land unless her heirs build shore protection, then TLC goes to court to gain possession. ²
Executory Interest	Fee Simple Subject to a Condition	Natural Termination	Yes	Owner keeps land until sea rises 4 feet, then land goes to TLC. ³
Executory Interest	Fee Simple Subject to a Condition	Forfeiture	Yes	Buyer keeps land unless her heirs build shore protection, then TLC goes to court to gain possession. ⁴

Other Interests Provided for Context

N/A	Fee Simple Absolute	N/A	No	The entire estate forever.
Reversion	Estate for Years	Natural Termination	No	Buyer owns land for 12 years, then land goes to TLC. ⁵
Remainder	Life Estate	Natural Termination	No	Buyer owns land for life; land goes to TLC upon her death.

Notes

1. See Section 4.2.2 for a discussion of the Rule Against Perpetuities.
2. Assumes that developer transfers the future interest to TLC after selling the fee simple to homebuyer.
3. Assumes that owner donates executory interest to TLC.
4. Assumes that developer sells fee simple to homebuyer and transferred executory interest to TLC at the same time.
5. Section 9.2 discusses why TLC and the landowner might agree to replace a conservation easement or possibility of reverter with a reversion after an estate for years, once submergence appears to be about a decade away.

We now look at the possibility of voluntary agreements or changes in the law to accomplish the same thing for public beach access (outside of Texas), roads and other infrastructure, wetland migration, and water-dependent land uses. Our discussion of this option is shorter than the other approaches because there is less case law directly on point.

Public Beach Access. Affirmative easements generally do not migrate within a parcel, and an easement sold by the owner of one parcel does not burden land owned by other people. As we show in Chapter 2, access along the shore resulting from the public trust doctrine does migrate with shifting shores even when previously inland parcels become waterfront; but in most states, the access along the dry beach is not based on the public trust doctrine and probably does not migrate inland.²⁶¹ For a time, Texas courts held that public access obtained through other means also migrated as shores erode, but that rule was eventually limited to gradual erosion within a parcel.²⁶² The cases rejecting the rolling easement theory have not indicated that a rolling easement cannot exist, but simply that it had not been acquired.²⁶³

In a new community with public beach access, the developer could dedicate a rolling affirmative easement on the dry beach (instead of the more common public beach with fixed boundaries), before the parcel is subdivided. The deed conveying the beach access could say that the easement migrates with the vegetation line, or extends a fixed distance (e.g., 200 feet) inland of the mean high tide line and migrates as the mean high tide line migrates. For this rolling easement to be effective, it would have to either be dedicated to the public before the other parcels are sold, or explicitly reserved in the deed conveying individual parcels, or both. In existing communities that either lack public beach access or have a non-rolling beach access, a government agency could acquire a rolling beach easement through eminent domain, a purchase from willing sellers, or an exaction in return for building permits or beach nourishment projects.²⁶⁴ Easements for access

always include, by implication, the right to prevent the landowner from erecting structures that defeat the easement,²⁶⁵ so such an easement would also provide a property right to prevent shoreline armoring²⁶⁶ (or at least to travel along the shore inland of any armoring that is erected²⁶⁷). To ensure removal of pre-existing homes, the easement could be drafted to make clear that structures will be removed if they block access, similar to a policy that Texas has sometimes followed.²⁶⁸

Roads and Other Infrastructure. The potential impact of sea level rise on roads along the beach is similar to the impact on public beach access obtained by means other than the public trust doctrine. Erosion of the public roadbed does not automatically entitle the government to rebuild the road farther inland on private property, any more than beach erosion would entitle the public to sunbathe farther inland along those beaches. Courts have declined to find that a roadway had a rolling easement in cases where a rolling easement was not explicitly in the conveyance, while implying that the roadway could have been a rolling easement had that been the clear intent.²⁶⁹ So in a new or redeveloping community, if a developer (or planning department) wants to ensure that the roadway can be relocated inland, then the initial dedication of the public roadway easement should clearly specify that it is a rolling easement which migrates inland as the shore erodes, whether slowly or by avulsion. Instead of defining the rolling boundary of public access as the vegetation line, this approach places the rolling boundary far enough inland from the vegetation line for a road as well.

As with rolling affirmative easements along a beach, a rolling easement for road access is more difficult to obtain in an existing community. There are many more landowners, and the land typically has been developed without buyers expecting that the road will be relocated landward. Nevertheless, obtaining such easements may be feasible if beach erosion is not likely to threaten the road for several decades, especially if existing development is set

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back from the street so that relocating the road would not immediately require moving houses.

One possible complication with a rolling roadway easement is how to handle the unpredictable fluctuations in the shoreline. Public access along a dry beach can respond instantaneously to shoreline migration, but roads and other infrastructure are fixed assets. The rolling boundary probably would have to be a significant distance inland from the dune line, for at least two reasons.

- The *seaward* edge of the rebuilt road would need to be somewhat *inland* from the dunes, so that the road need not be rebuilt every few years as the shore erodes.
- The *landward* edge of the rebuilt road would need to be somewhat *seaward* of the public access boundary, so that a modest temporary advance of the shore into the sea (by accretion or avulsion) would not leave the rebuilt road landward of the boundary when it moves seaward.

Other precautions may be necessary to address possible accretions or avulsions of new land. The easement conveyance could make it clear that the government may only pave roads seaward of the rolling boundary, but that the public also has access to any roadway originally built within the public easement, even if the boundary later migrates seaward of the road. Dune maintenance can move the vegetation line seaward even if the beach itself does not accrete. To prevent such activities from requiring an eventual seaward relocation of the roadway, the easement could include all land that is either, for example, within 100 feet from the vegetation line or within 300 feet from the mean high water line.

Other infrastructure along shorelines can also be dedicated with rolling easements, such as bicycle trails, sidewalks, and public utilities, as well as private driveways and utility connections.

Rolling Boundaries between Landowners. Instead of an easement, it may sometimes be advantageous

for the actual property line to migrate inland. A governmental entity may be certain that it will have a variety of public uses for a parcel along the water, but not be able to articulate all of those needs in a proposed easement. Or a private owner who intends to operate a waterfront facility in an area with a retreat policy may need some assurance that the business can continue as the shore erodes. In such cases, a developer can convey a parcel in fee simple with a boundary that is, for example, 300 feet inland of the mean high tide line, and clearly state that the landward boundary migrates with the mean high tide line. Subsequent purchasers of inland parcels within the development would be subject to this rolling boundary. For most practical purposes, their risk of eventual relocation would be the same as the risk of anyone who buys land in a development subject to a rolling easement, except that the inland migration of the rolling waterfront business—rather than the wetlands or beach—would provide the immediate impetus for relocation.²⁷⁰

Similarly, a fringing marsh that is currently 200 feet wide, for example, can be preserved if a landowner conveys to TLC all land within 200 feet inland of the mean low water mark, specifying that the boundary migrates as the low water mark migrates. Some of that land will be below mean high water and hence (in most states) publicly owned. But if some of this land is also high marsh (above mean high water and privately owned), the rolling boundary will ensure that these wetlands remain within the ownership of TLC. Moreover, if a shore protection structure or fill project prevents the wetlands from migrating inland as the mean low water boundary retreats, the inland boundary of the TLC lands will migrate onto dry land, even though the fill will prevent the mean high tide line (and hence the public trust land) from migrating inland. TLC could then restore the land to its natural elevation and/or remove the structures.

As with a recorded rolling easement, the ambulatory boundary of any purchased conservation lands can only migrate as far as the

inland boundary of the parcel whose owner conveyed this tract, because owners can only convey what they own.

Public Trust Doctrine and other Legal Doctrines. A landowner or government agency may go to court and ask for an easement or a property line to be adjusted inland, or for a shore-protection structure to be removed, on the grounds that the rolling easement is already part of the common law.²⁷¹ Such a holding is beyond the power of state and local governments, conservancies, and citizens to necessarily achieve. But the possibility that this will happen is part of the context of any rolling easement policy. The common law sometimes does evolve to address new situations. In Texas, the state government originally persuaded courts to recognize that public easements along the shore are “shifting and rolling easements” based on the state’s common law, not the Texas Open Beaches Act.²⁷² Florida courts have also implied that easements may roll under limited circumstances, based on the common law.²⁷³

In Washington State, a Native American tribe persuaded a court that there is a rolling easement along shores where the United States owns the tidal lands in trust for the tribe. The court balanced the interests of the property owners on the landward and seaward sides of mean high water, and suggested that the right to shore protection of the upland owners is limited by the interests of the tribe in the landward migration of the tidelands.²⁷⁴ Although the laws of different states have many similarities, there are also differences in how littoral property rights have evolved.

The public trust doctrine has occasionally been construed as limiting the property rights of landowners who obtain public trust lands, if the sovereign’s intent was ambiguous when the land was transferred.²⁷⁵ Hence it is possible that in some states this doctrine would be construed as implying that when the state land office (or King) granted the land to the original owner, the government did not vest the owners with a property right to hold back the sea, which would have thwarted the intent of the original decision to

retain the tidelands in trust for the public. The reason that governments, land trusts, or citizens may want to consider recorded rolling easements to preserve wetlands and beaches is not that property owners otherwise have a right to hold back the sea, but rather that (a) there is legal uncertainty about this question, which a rolling easement can resolve, and (b) whether there is a property right or not, (i) land trusts, individuals, and governments without regulatory authority can prevent shore protection by obtaining rolling easements, and (ii) even agencies with regulatory authority may find the necessary community consensus easier to achieve with a rolling easement than through regulation.

Statutes and State Constitutions. Property rights are a matter of state law. While state courts generally determine what property rights are, state legislatures can adjust property rights as needed unless precluded by the state constitution, in which case the state constitution can be amended.²⁷⁶ For example, a statute or state constitutional amendment could amend a state’s public trust doctrine to provide public access to the dune vegetation line however it may retreat. Legislatures are generally reluctant to alter property rights because doing so might require paying “just compensation” to the affected property owners.²⁷⁷ Nevertheless, legislatures have consciously altered property rights in states that limited the longevity of future interests in land,²⁷⁸ and federal legislation authorizes conversion of abandoned rail lines to multi-use trails even where land is supposed to revert when the railroad stops operating.²⁷⁹ The potential near-term costs of compensating landowners would have to be weighed against the long-term costs of the alternative policies (e.g. shore protection or hazard-mitigation buyouts).

3.2.4 Summary of Rolling Property Interests

Table summarizes the recorded rolling easement options examined in this primer. The most appropriate option depends largely on the

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objectives of the rolling easement and whether a government, land trust, neighbor, or developer is attempting to ensure that ecosystems or access migrate inland. Nevertheless, in most cases, more than one option is available that could serve the purpose. As the final column shows, however, none of the options can be guaranteed to achieve the objective under all circumstances. As we discuss in the next section, combinations of rolling easements may be more reliable than a single option. Careful drafting, study of the law in a given state, and management of the easement once it is created can all increase the likelihood of success.

3.3 COMBINATIONS OF ROLLING EASEMENTS

No legal approach is completely reliable, so often a few approaches operate in tandem to ensure that the goal is obtained. Conservation easements sometimes include a clause that transfers the easement from one land trust to another if the original land trust fails to properly enforce the easement.²⁸⁰ Sometimes conservation easements are acquired in lands that cannot be intensely developed under existing zoning. Possible reasons include:

- The cost of purchasing an easement tends to be less in areas where development is not expected (e.g., more landowners are willing to donate easements);
- Low-density zoning sometimes results from a community process that recognizes the same environmental or preservation reasons to refrain from development that motivate conservancies to seek an easement; or
- Transferable development rights programs may provide someone with the right to build additional units in a developed area in return for permanently refraining from developing a low-density area, with conservation easements being a common mechanism to ensure that an area is permanently preserved.²⁸¹

Even though the conservation easements preserve lands that would remain undeveloped anyway through zoning, the easements provide a longer

term guarantee compared with zoning, which often changes in response to increased market demand.

Conversely, lands with conservation easements can be zoned for agriculture, conservation, or open space. Usually the easements do not encompass all the land in an area because some owners choose not to transfer their property rights. If a large portion of the land is already subject to conservation easements, however, localities are often reluctant to allow intensive development within the inholdings. Subdivisions in the middle of an agricultural area can have adverse effects on farming.²⁸² Concentrating development within growth corridors decreases the cost of providing water, sewer, roads, and other services; and the owners have less of a reasonable expectation of being able to subdivide and develop their land in areas where development of other land has been prevented, than along the fringes of existing development.

These general principles would also apply to rolling easements. We briefly discuss five combinations: rolling easement zoning of land that is already subject to recorded rolling easements; rolling easement zoning of land subject to federal or state regulations that discourage shore protection; recorded rolling easements on land already subject to restrictive zoning; covenants on subdivided parcels of land where a developer has already conveyed a rolling easement on the entire development; and a combination of a conservation easement with a possibility of reverter.

3.3.1 Rolling Easement Zoning of Land Already Subject to Recorded Rolling Easement.

Even if title to all of the property in an area is restricted with a rolling easement, rolling easement zoning can be useful. A private conservancy may need help enforcing the rolling easement; and local residents who see activity inconsistent with an eventual retreat may be more likely to contact their local government than complain to a land trust. Legal challenges to con-

Table 3. Summary of Recorded Rolling Easement Options				
Interest	Who can own or enforce it?	Type of Purpose	Objective	Caveat
Shoreline migration conservation easement	Government or land trust	Conservation or recreation	Prohibit shore protection. May also have provisions for removing homes.	May be costly to enforce unless carefully drafted.
Legal covenant	Developer, maybe a neighbor	Any	Prohibit shore protection or provide for access to migrate inland. But court cannot enforce the agreement; only awards provable damages for failure to comply.	Strict rules for when covenant can be created known as “privity.” Damages only.
Equitable covenant (equitable servitude)	Developer, maybe a neighbor	Any	Prohibit shore protection or ensure that access migrates inland.	Easier to create than legal covenant, but court may decide not to enforce if harm to owner is greater than benefit to neighbor.
Future interest in land ¹	Anyone	Limit duration of land ownership	Terminate ownership when sea rises or shore retreats enough to submerge parcel.	Abolished in some states. Careful drafting needed to show purpose.
Rolling affirmative easement	Neighbor or state	Any	Access along the shore migrates inland; remove structures that block access	Must be clear about intention to migrate inland.
Rolling boundary	Neighbor	Any	Boundary between landowners migrates with shore; preserve width of road or conservation buffer.	Few examples other than for public trust lands.
Abate nuisance or quiet title in court	Neighbor or state	Abate nuisance or enforce a right	Private owner asks court to prevent shore protection or allow access along shore based on common law.	Requires a court to make new law, which courts usually decline.
Rolling conservation easement ²	Government or land trust	Conservation or recreation	Amend existing conservation easements to also prohibit shore protection.	May be costly to enforce unless carefully drafted.
Transferable development rights ³	Government	Any	Compensate owner who yields land to rising sea, with right to develop new coastal lot.	Difficult to define where to transfer the development.
<p>Notes</p> <p>1. Table 2 lists several different types of future interests.</p> <p>2. Discussed in Section 3.3.</p> <p>3. Discussed in Section 3.4.</p>				

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servation easements and future interests in land sometimes succeed,²⁸³ in which case zoning can provide a legal backstop.

One way to combine rolling easement zoning with recorded rolling easements would be for the local government to identify lands whose titles are subject to a rolling easement, and create a new retreat zone which would be subject to rolling restrictions. Alternatively, if a significant portion of all lands in an area have recorded rolling easements, it may be appropriate for zoning to restrict shore protection in the entire area. Otherwise, as sea level rises, the shore could become a patchwork with some land protected and other land submerged.

This combined approach is not yet possible, both because little if any coastal land is subject to recorded rolling easements. We mention this option here because the potential for rolling easement zoning might be relevant when conservancies and governments consider recorded rolling easements.

A related option that may be practical sooner would be rolling easement zoning of lands already subject to conservation easements (which do not necessarily roll).²⁸⁴ A new zone could be created by identifying low-lying areas where most lands have conservation easements, and adding a retreat overlay zone (or adding additional zones to reflect a retreat as shown in Figure 8 on page 31). Such an approach would probably be more practical for jurisdictions where new conservation easements roll, than in areas where shore protection is so valued by landowners that a waiver of the right to shore protection would be a deterrent to providing a conservation easement.²⁸⁵

3.3.2 Rolling Easement Zoning of Land Subject to Federal and State Regulations that Discourage Shore Protection

Another example where rolling easement zoning would be particularly easy to justify would be lands

where state or federal regulations already prohibit or discourage shore protection. Calvert County, Maryland's cliff retreat regulations,²⁸⁶ for example, prohibit cliff protection in areas where shore protection would threaten an endangered species protected by federal law. State regulations sometimes prohibit structural shore protection; zoning the adjacent lands for retreat could help to ensure that development is consistent with the existing state requirements. Similarly, development in existing nontidal wetlands is generally discouraged by federal wetland protection programs. Nevertheless, these areas are sometimes developed. Given the government interest in wetlands, subjecting nontidal wetlands to a rolling easement would be a compromise between prohibiting development and allowing development with shore protection.²⁸⁷

3.3.3 Recorded Rolling Easements on Dry Land with Restrictive Zoning

If existing laws prohibit shore protection (or at least shoreline armoring), then landowners have a reduced expectation of a right to hold back the sea and will tend to be more willing to restrict their titles with a rolling easement than in areas where shore protection is not restricted. Therefore the willingness of landowners to transfer a rolling easement should be greater there than in areas where the right to hold back the sea is established. Yet an eventual relaxation of government regulations is possible;²⁸⁸ so recording a rolling easement can add additional certainty to the eventual shoreline migration.

Another near-term opportunity would be to obtain rolling easements on land where development is prohibited or restricted to very low densities. Low-density zoning such as Maryland's Critical Areas Act makes purchase of rolling easements relatively feasible because the cost of protecting 20 acres of farmland with a single home may be high compared with the alternative of farmland gradually converting to marsh.²⁸⁹ Yet as long as

shore protection is allowed, there is some risk that it will occur.

3.3.4 Covenants along with Conservation Easements or Possibility of Reverter

If a developer retains a recorded rolling easement on a parcel and then transfers the easement to a land trust or government agency, the rolling easement holder will be able to enforce the restrictions. By adding covenants with similar restrictions to the deeds of each parcel when the land is sold, members of the community will also have a right to enforce the terms. Like other combinations, this approach creates a legal backstop in case the land trust is unable to enforce the rolling easement. This approach can make negotiations more complicated if, for example, a land trust and a property owner agree to modify the requirements.²⁹⁰ On the other hand, engaging a community in the negotiations can ultimately increase community acceptance of the policy.

3.3.5 Conservation Easements along with a Possibility of Reverter

Shoreline migration conservation easements and possibilities of reverter have different benefits and risks. The trend in state law to restrict the possibility of reverter—if continued—could invalidate that type of rolling easement. Failure to properly enforce a conservation easement may enable a future owner to assert that the interest has been abandoned. The hostility of courts to forfeitures might lead a court of equity to refuse to order the removal of a home under a conservation easement even if the terms of the easement provide for such a removal. If shorelines erode more rapidly than expected, a possibility of reverter based on sea level might not transfer title until after an owner erects shore protection.

Subjecting a given parcel to both a conservation easement and a possibility of reverter would be more likely to achieve the particular conservation

goal than either of these instruments by itself. In some cases, the tax consequences depend on the order in which these two transactions take place, in which case transferring the conservation easement before creating a possibility of reverter would be less vulnerable to having the tax deduction disallowed.²⁹¹

3.4 COMBINATION WITH OTHER COASTAL POLICIES

Although rolling easement policies are narrowly tailored to ensure a natural migration of shorelines, other mechanisms are more commonly implemented to foster retreat. Moreover, a policy originally implemented for other reasons can become either a *de facto* retreat policy or at least a significant incentive for retreat. Here we consider policies that prevent or limit coastal development; transferable development rights with a focus on migrating barrier islands; and cluster developments.

3.4.1 Setbacks and Other Limits on Development

Regulations and conservation easements that prevent or limit coastal development make future shore protection less likely in some places by discouraging investment that would otherwise make shore protection cost-effective. Although public officials generally do not expect shore protection in these areas,²⁹² protection is still possible. Rolling easements that explicitly prevent shore protection may be generally acceptable to landowners there, who do not expect to engage in shore protection anyway.

3.4.1.1 Rolling Easements on Land with Regulatory Limits on Development

Erosion-based setbacks for new development are required in several coastal states.²⁹³ For example, new construction may have to be located inland from the dune vegetation line a distance of at least 40 times the annual erosion rate. These policies clearly contemplate that shores will erode for the

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next few decades, but they leave open the question of whether homes will be removed or shores protected once the erosion buffer is consumed. Rolling easements can resolve that uncertainty in favor of a gradual retreat.²⁹⁴

Fixed setbacks, size restrictions, and density restrictions. Several states limit development near the shore. In most undeveloped areas, Maryland limits construction to one home in 20 acres²⁹⁵ within 1,000 feet of the tidal wetlands—and prohibits most construction within 200 feet of the shore.²⁹⁶ Elsewhere, the state prohibits construction within 100 feet of the shore.²⁹⁷ North Carolina limits the size of new buildings immediately along the coast to 5000 square feet.²⁹⁸ Many other states have fixed setbacks.²⁹⁹

Density and size restrictions do not necessarily create the same expectation as erosion-based setbacks that property will be abandoned to the sea. But they can decrease the economic justification for shore protection, making it more economically feasible to purchase recorded rolling easements or more politically feasible to adopt rolling easement regulations.

Fixed setbacks are often enacted to create an undeveloped buffer between development and tidal wetlands or open water.³⁰⁰ The setbacks also tend to delay the need to choose between shore protection and loss of waterfront homes. Although shoreline erosion reduces the size of the buffer, losing the buffer may still be preferable to shore protection, which eliminates wetlands seaward of the buffer. Placing a rolling easement on the buffer itself would often be relatively straightforward. A rolling easement on development *inland* of the buffer may also be practicable if, for example, the buffer is likely to take a century or so to erode. The effect would be similar to a rolling easement with a “safety valve,”³⁰¹ with a long-term retreat but no home threatened until the buffer is submerged.

Subdivision with deep shorefront lots and a setback. In areas where the land has a steep slope, it may be possible to subdivide land so that part of each parcel will survive a few centuries even with a

high sea level rise scenario. Such a subdivision can ensure that ecosystems are able to migrate inland, especially if combined with a setback policy. Adding a rolling easement to such lands has no immediate impact on land use, but decreases the risk that the owner will eventually erect a shore protection structure to protect her backyard.

Shorefront parks can have an impact similar to a setback. The main difference is that with a setback, the waterfront owner pays for the land that is placed off-limits to development, while the public pays when there is a waterfront park. Unless the park has boundaries well inland of any conceivable future shoreline, a rolling easement on the land inland of the park will be needed to ensure that ecosystems and public access migrate inland after the sea consumes the parkland.

With all these policies, one caution is in order: Governments generally should avoid purchasing rolling easements by eminent domain in combination with regulations that reduce the value of an easement. If a court concludes that the government has issued a regulation that reduces property values as part of an effort to take the land through eminent domain, it will either invalidate the regulation or award the owner the fair-market value of the land before the regulation.³⁰² Thus it would not be advisable for a government to purchase a rolling easement shortly after issuing a rolling easement regulation. (An independent purchase by a private land trust would not face this constraint.) Conversely, if a government takes a rolling easement as part of an activity that enhances land values (e.g. beach nourishment), a court will generally consider both the reduced land value from taking the easement and the increased value from the associated project.³⁰³

3.4.1.2 Rolling Conservation Easements

Conservation easements currently prevent some owners from developing coastal lands. Many of these lands are farms. The farmer agrees not to subdivide the property for development but continues to farm, with a specific limitation on the amount of residential structures that can be built

on the property. As with regulatory restrictions on development, conservation easements make shore protection less likely. But conservation easements do not necessarily prohibit shore protection. In some cases they explicitly allow shore protection structures,³⁰⁴ dikes,³⁰⁵ and drainage,³⁰⁶ often because the model easement promoted by state agencies previously encouraged such language.³⁰⁷

Rolling conservation easements are traditional conservation easements with both immediate conservation benefits and a provision ensuring that ecosystems migrate inland, generally by prohibiting shore protection.³⁰⁸ To ensure that ecosystems can eventually migrate onto lands preserved by new conservation easements, some states have modified their standard conservation easement model language to explicitly prevent³⁰⁹ (or at least be silent about) shore protection.³¹⁰ Therefore, an increasing proportion of new conservation easements in the coastal zone are likely to be rolling conservation easements.

Several approaches can ensure that wetlands and beaches can migrate onto dry land that is currently subject to non-rolling conservation easements:

- The landowner and easement holder agree to an amendment that converts the conservation easement to a rolling conservation easement by striking provisions that allow shore protection, and adding the same restrictions as would be found in a shoreline migration easement.
- The landowner transfers a shoreline migration easement (or possibility of reverter) to the holder of the existing conservation easement.
- The landowner transfers a shoreline migration easement (or possibility of reverter) to an organization other than the land trust that holds the existing conservation easement.

The first option appears to be the most straightforward, especially in states where the model language for new easements implies a rolling conservation easement. But modifying easements can sometimes be problematic.³¹¹

3.4.2 Transferable Development Rights

To avoid or reduce the adverse economic impact on a landowner from sharply restricting development, some localities have adopted transferable development rights (TDR) policies.³¹² In their simplest forms, these policies divide a jurisdiction into a sending area (where development is discouraged) and a receiving area (where development is encouraged).³¹³ The receiving area is zoned for relatively high-density development, while the sending area is zoned for agriculture and very low-density housing, e.g., 1 home per 10 acres. Under traditional zoning, landowners in the 10-acre zoning area have often complained that the zoning harmed them economically relative to owners in the high-density area,³¹⁴ and that the eventual 10-acre home lots did not preserve agricultural land as intended. Under a TDR policy, owners would be compensated for the downzoning, for example, with development rights to build 10 housing units in the receiving area (beyond what the zoning allows) for every 10 acres of land placed off-limits to development.³¹⁵ Provided that there is demand for additional units in the receiving area,³¹⁶ most owners would prefer to sell their development rights rather than build one home on 10 acres.

TDR policies can be used to decrease the hazards from sea level rise by designating a coastal retreat zone as the sending area:

- A locality may decide to concentrate coastal growth in a coastal protection zone while discouraging it in a coastal retreat zone.³¹⁷ In that case, the retreat zone would be a sending area and the protection zone would be the receiving area for transferable development rights. The greater density in the receiving area would also improve the economics of shore protection there.
- A locality may decide to discourage development in the coastal retreat zone but attempt to channel it inland rather than into a coastal protection zone.

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In the ordinary TDR scheme, the land in the sending area where development is foregone remains undeveloped. In a coastal TDR scheme, however, the sending area may already have some development; and the policy could be designed to prevent additional investment that would make shore protection more likely. For example, a barrier island with moderate-density small cottages may be in the midst of a conversion to high-end housing. A TDR scheme could provide transferable development rights in return for placing the property under a rolling easement and avoiding any increases in the building footprint (or usable floor area). Another possibility is for owners to exchange rolling easements for a transferable development rights that will not take effect until their homes are lost to the rising sea. On a migrating barrier island, the receiving area could be the bay side of the island, so that the development right effectuates the relocation of oceanfront residents.

3.4.3 State Management of Public Trust Lands to Facilitate Barrier Island Migration

Barrier island towns that wish to relocate inland with the landward migration of the island itself would need cooperation of the state government, which owns the lands beneath the tidal waters. Unlike the typical TDR scheme, the receiving area would be lands that are—at least initially—publicly owned. Here we consider two rolling easement approaches for migrating barrier islands:

- Replacement of land lost on the ocean side with similar parcels of newly created land on the bay side; and
- Transfer of development rights so that the landward migration gradually replaces low-to-moderate-density development on the ocean side with a combination of high-density development and open space on newly created bayside lands.

While rolling easements along an eroding shore would involve restrictions of shore protection or grading, facilitating the landward migration of a barrier island would involve conversion of shallow waters or wetlands into developable dry land. In many states, environmental regulations prevent or discourage the filling of navigable waters.³¹⁸ The purpose of those rules was historically to halt the previous practice of converting large portions of back barrier bays into development, not to prevent a gradual landward migration of barrier islands. Nevertheless, existing rules do not have an exception for barrier island migration; so they currently prevent it. The environmental implications of creating new land on the bay side would depend on opportunities to mitigate other environmental stressors,³¹⁹ whether the bay is wide or narrow, and whether the bay will also migrate onto the mainland.³²⁰

The question whether landward migration of barrier islands would be better or worse for the environment than the alternatives is beyond the scope of this report. Instead, we attempt to describe a few ways that such a migration *could* be organized, so that the desirability of a landward migration can be better evaluated.

Parcel-by-Parcel. Under Roman Law, if “the violence of the stream sweeps away a parcel of your land and carries it down to the land of your neighbor, it clearly remains yours....”³²¹ Although courts have never extended that principle to the case where a hurricane washes a parcel from the ocean to the bay side of an island, the same framework could apply to barrier islands. Rolling easements could facilitate the landward migration of a barrier island in ways similar to the retreating shores we have already examined—except that they must address the advancing bay shore, as well as the retreating ocean shore. The mechanics of an advancing bay shore would in some ways be the mirror image of the rolling easement along the ocean shore.

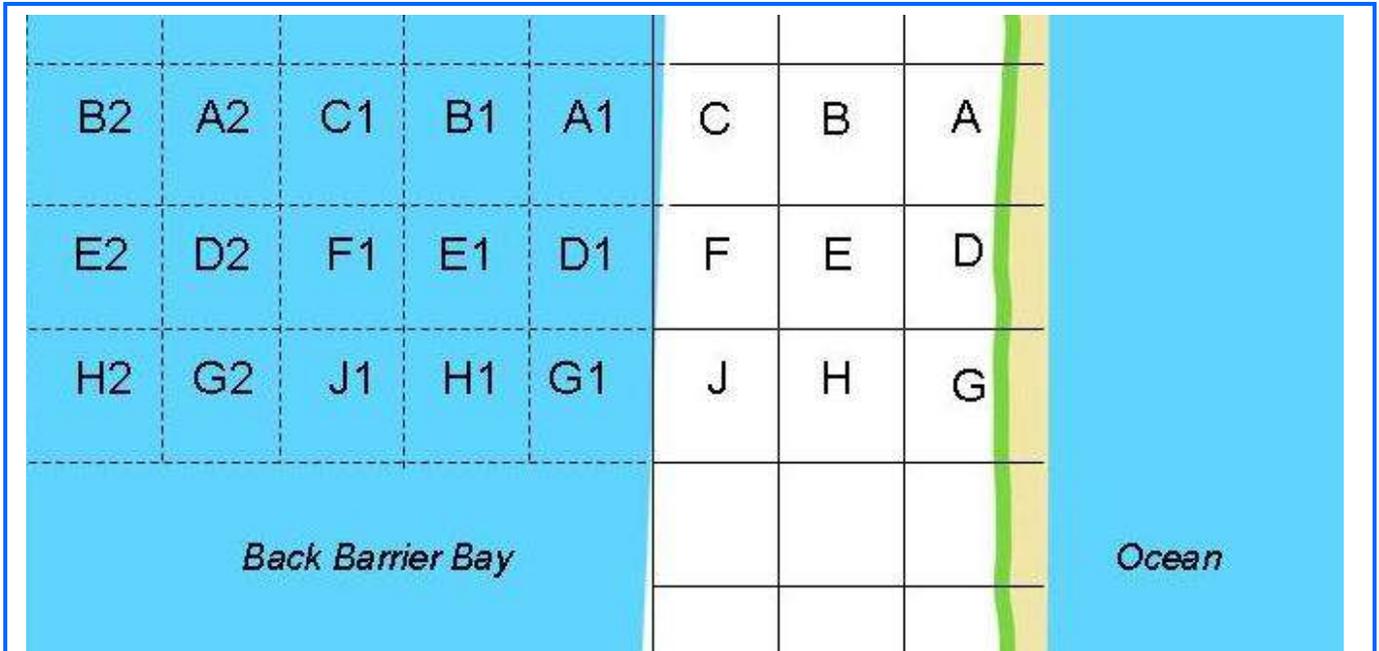


Figure 10. Sketch of Parcel Boundaries for Hypothetical Rolling Easement Arrangement on a Migrating Barrier Island. Under the traditional common law of property, if the state wanted to facilitate landward migration, it could sell the owners of parcel A a future interest in the currently submerged parcel A1 that transfers ownership (for example) when 75% of parcel A is seaward of the dune vegetation line and parcel A has been transferred to the state; and a future interest in parcel A2 that similarly transfers as parcel A1 is eroded and transfers to the state.

To illustrate how rolling easements might facilitate landward migration of a barrier island, we start with a possible approach under standard property law for a newly developed barrier island. Figure 10 shows hypothetical parcels, with solid lines showing proposed subdivision lots and dashed lines showing possible future lots if the island migrates inland. One approach is to structure rolling easements as a possibility of reverter, in which the reversion is based on shoreline erosion, as discussed in section 3.2.2. The chief difference is that, in addition to parcel **A** reverting from the buyer to the state as the shore erodes, the buyer would also receive a future interest in parcel **A1** that vests when parcel **A** is submerged. To address the eventual loss of lot **A1** as well, the interest in **A1** could terminate as the shore erodes, and the buyer would also receive a future interest in parcel **A2**, which (i) would vest after both **A** and **A1** have submerged and (ii) terminate as the shore erodes, and so on. Alternatively, the buyer might receive

(i) parcel **A** in fee simple absolute subject to a shoreline migration conservation easement, which prevents shore protection, (ii) a future interest in parcel **A1** that vests when parcel **A** is submerged, which would also be subject to a shoreline migration easement, and so on. In a state where future interests are no longer feasible, the owner might initially purchase all of the parcels (**A**, **A1**, **A2**, ...) in fee simple, with conservation easements that prohibit (i) shore protection along the ocean, (ii) occupancy of more than one parcel, and (iii) filling that makes the island wider than a specified width.

With a *newly developed* (or redeveloped) barrier island, buyers would have notice that the nature of their homes will change over time. Bayfront home **C** will eventually lose its water access when lot **A1** becomes developed, but once lot **B** is vacated in favor of lot **B1**, **C** will be along the ocean. In *existing* towns, by contrast, those who inhabit the

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bay sides of barrier islands have no reason to expect the considerable disruption that could occur from creating developable lots between their homes and the bay. Because these barrier islands were not developed with the expectation of a landward migration, property law (rather than deeds drafted by a developer and state land office) would govern who owns any newly created land.

Most state courts follow the traditional common law rule and treat lands filled by the state as an avulsion, which awards land to the state.³²² But several state courts view it as an artificial accretion, partly because it is unfair for the state to deprive a littoral landowner of her waterfront access.³²³

If the state owns the newly created land, it could sell the land to the highest bidder or transfer parcels to those who lose land on the ocean side, possibly at a reduced cost (see Figure 11). In effect, the rolling easement would provide new land on the bay side to offset land lost on the ocean side. One challenge for this approach would be that the previous bayfront owner would lose the waterfront benefits of her property. While generally harmful to bayfront interests, it would be particularly harmful to marinas, yacht clubs, parks, harbor facilities, and conservation lands³²⁴ that depend on bayfront access. If the land is sold at fair market value, those facilities could buy the new waterfront land and sell some of their old land. But this option might not be affordable to community organizations. Relocating harbors can be costly. Moreover, the new bayfront land that the facilities would have to buy would command a higher price than the formerly bayfront land that they would sell. In effect, the premium associated with waterfront property would shift to the newly created land. The problem of shifting waterfront premiums could be avoided if the state swapped the new bayfront land for what had been bayfront

land, and transferred the former bayside land to the displaced oceanside owners.

If the newly created land is owned by the bayfront owner, the loss of bayfront ownership will not be an issue. The bayfront owner could sell the newly created lot to someone else, such as the former oceanfront owner (Figure 11c), possibly retaining an easement for access to the water (Figure 11d), or move her house to the new bayside lot and sell (or rent) the former bayfront lot to someone else (Figure 11e). Without modification, such a policy could leave the bayfront owner in possession of the entire width of the island from ocean to bay once the ocean shore eroded up to today's bayfront parcel. Even if the bayfront owner subdivided the newly created land, the economic effect of barrier island migration would be to award the land to the bayfront owner. The apparent inequity of effectively giving the entire migrating island to the bayfront owners could lead states to condemn the rights to any artificially accreted lands before reclaiming land from the bay.

As an alternative, the bayfront owners could negotiate an arrangement with the state in which the oceanward boundary of the bayfront owner's land becomes ambulatory, so that once a new bayfront lot is created, the bayfront owner takes title to that lot—but yields the pre-existing lot, which would become available to the state, possibly to transfer to the ocean front owner losing her lot to beach erosion. Such an approach would protect the bayfront owner's access—but owners with waterfront *views* who do not own property immediately along the water might feel they were losing near-access to the bay. Another problem is that this approach would involve repeatedly moving bayfront facilities 50–100 feet bayward every time an oceanfront lot was lost to the ocean and a new bayside lot created.

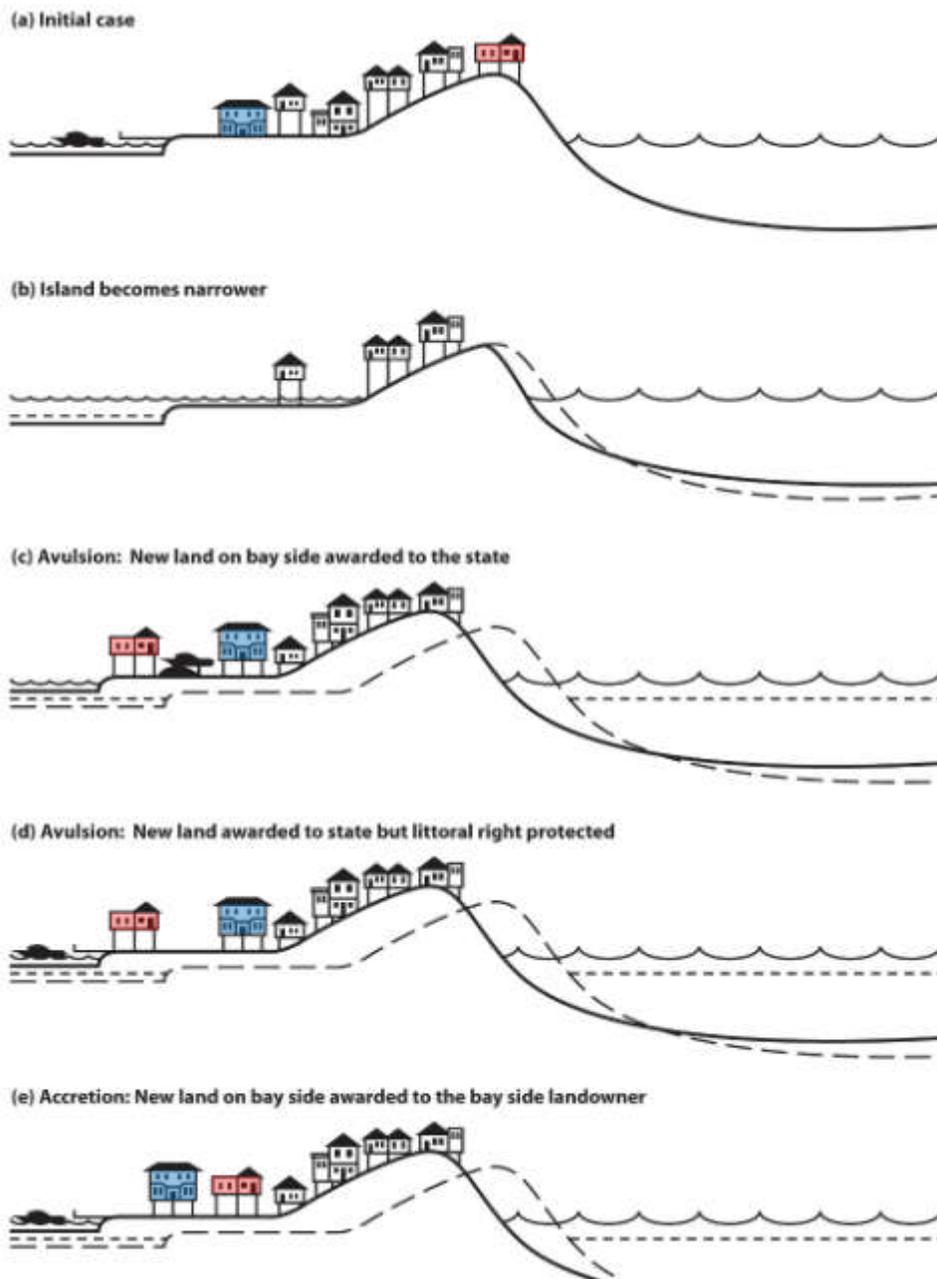


Figure 11. Four Options for the Fates of the Oceanfront and Bayfront Homes on a Developed Barrier Island if Shore Protection along the Ocean Becomes Economically or Environmentally Unacceptable. The initial case (a) shows the cross section of a developed barrier island. If sea level rises, (b) some barrier islands become narrower as the ocean side erodes and the bay side becomes submerged. An alternative is to create a new bayside parcel to replace the parcel lost on the ocean side. In most jurisdictions, state courts would award this newly created lot to the state under the doctrine of avulsion. The state could (c) provide the new lot to the owner of the oceanfront lot. In some states, the original bayfront owner would still have the right to bay access (d), which in this case could mean continuing to have a dock with a boat. Alternatively, the state could award the newly created bayfront lot to the original bayfront owner (e) in return for the formerly bayside lot, which could be provided to the original oceanfront owners.

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Larger-Scale Reclamation. Less frequent but larger-scale land reclamation would allow greater flexibility to achieve community goals. Rather than moving homes piecemeal as small areas of bay are filled, it may be more cost-effective to create an entire city block bayward of existing development, and allow people inhabiting the existing bayside block of land to move their homes bayward to the new block to maintain their pre-existing distance to the bay. In addition to largely preserving existing waterfront access and views, shorefront facilities would only have to be relocated every time a block of land eroded, rather than every time a parcel of land eroded.

Alternatively, larger scale reclamation along with a TDR policy can encourage a more sustainable redevelopment, for example, by replacing existing low-to-moderate-density housing with a combination of high-density development and open space or conservation lands. Figure 12 shows three examples of how transferable development rights could facilitate the landward migration of a developed barrier island. Under natural circumstances, many barrier islands would narrow as they migrated inland. In Figure 12b, the creation of new bayside land is less than half the land lost to oceanside erosion. The new land is thus developed more densely. In this example, the original bayside park's boundaries also migrate landward, but leave less residential land between the park and the ocean than before. Another alternative is to open new conservation-oriented parks on some of the newly created bayside land, and leave the original park's oceanward boundary where it had been (Figure 12c).

A final possibility is to use transferable development rights to return (for example) half of the island to nature. In Figure 12d, new bayside lands are created on the eastern half of the island,

but very little new land is created on the western half (and that land is wetlands similar to what might have been created naturally had human activities not disabled the overwash process). All new development takes place on the eastern half of the island. A gradual depopulation takes place on the western half of the island, with no new development. As the shore erodes, eventually there will be no homes along the western end of the island; so that end of the island could be returned to nature. Possibly an inlet will eventually separate the undeveloped west end from the developed east end. Similarly, transferable development rights could facilitate shifting all development on one island to an adjacent island. Such a redevelopment scheme could increase the amount of natural barrier island habitat, reduce the amount of ocean shoreline requiring costly shore protection, and increase the economic feasibility of protecting the island to which the development is transferred.

3.4.4 Cluster Development

Cluster development is a common way to preserve open space, albeit on a much smaller scale than transferable development rights. Rather than convert a parcel to a subdivision with uniform density, a developer sets aside a portion of the land for a permanent park or preserve, while developing the rest of the parcel at a higher density.³²⁵ Sometimes condominium apartment buildings, townhouses, or row houses are built on land that would otherwise have free-standing single-family homes, so that the development occupies a small fraction of the parcel. If the parcel is large enough, a cluster development can leave substantial land vacant for wetland migration—provided that a rolling easement is placed on the land that remains vacant as a result of the cluster. (See Figure 13.)

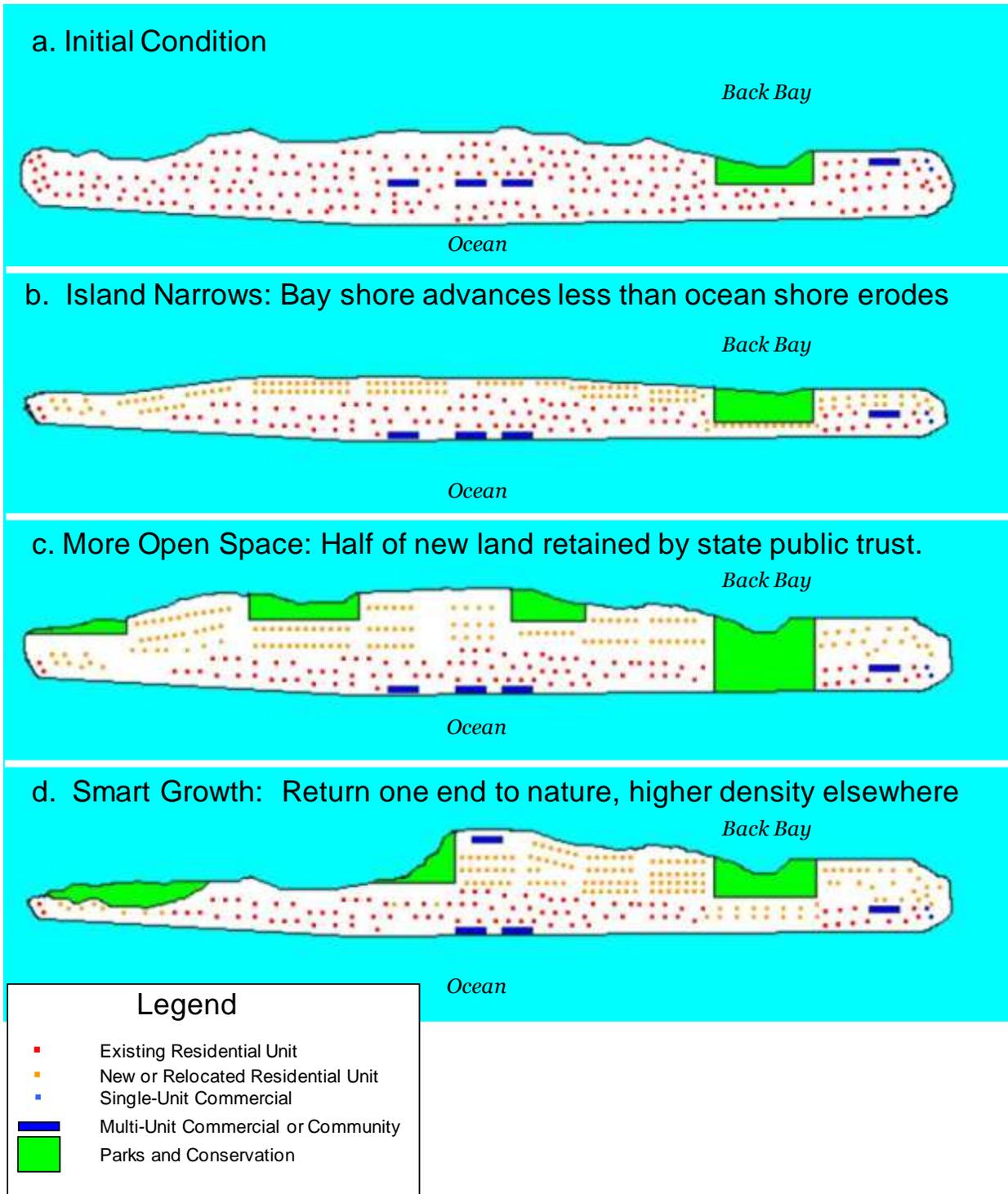


Figure 12. **Options for Changing Land Use on a Retreating Barrier Island.** The large buildings depicted in blue provide a reference for how far north the island migrates. (a) shows the existing land use pattern. One possibility is (b) increased density and creating less bayside land than the area lost to oceanside erosion, because under natural conditions, most barrier islands would narrow. If the original area is maintained (c), additional parks and conservation land could be created. Finally, (d) one portion of the barrier island could be entirely left to natural processes with no new construction or shore protection, as displaced owners move to the other end, which becomes more densely populated.

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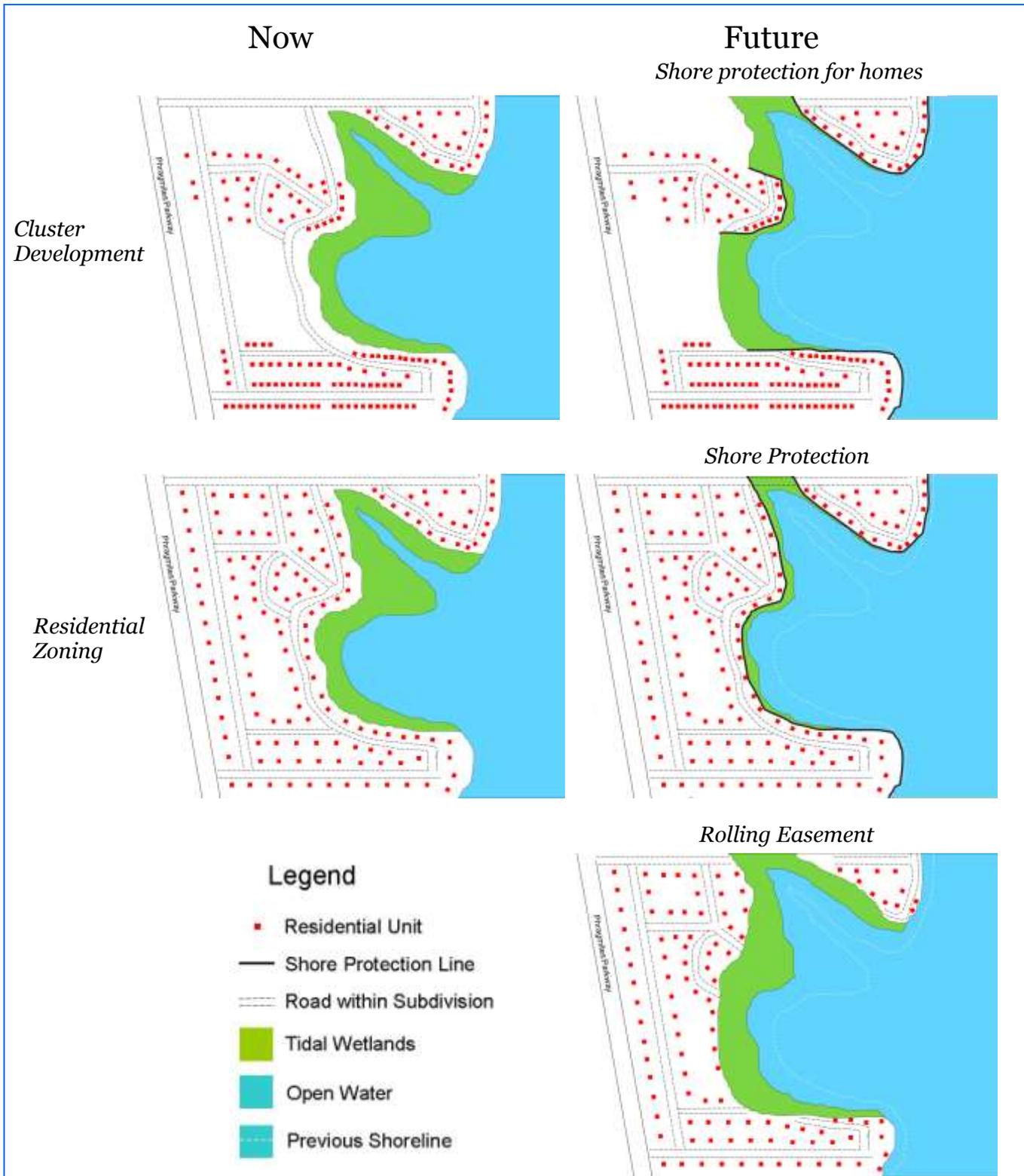


Figure 13. Cluster development increases the feasibility of rolling easements. With a cluster development, no homes will be lost as sea level rises, and wetlands will be able to migrate inland along most of the shore, especially if the undeveloped portion of the development has a rolling easement. With residential zoning, shore protection also means that no homes will be lost, but most of the wetlands will be lost. A rolling easement with residential zoning will allow more wetland migration than the cluster development, but many homes will be lost.

NOTES AND REFERENCES

¹³⁶ Unilateral voluntary measures motivated by altruism, environmental ethics, religion, or the desire to be a good citizen are important, but they are outside the scope of this handbook.

¹³⁷ See CCSP, *supra* note 3, at 248 (glossary definition of “rolling easement”).

¹³⁸ In Texas, municipalities have zoning authority, TEX. LOC. GOV'T CODE ANN. § 211, but counties only have such authority in a few places, such as parts of Padre Island in Cameron and Willacy counties. See also JENNIFER EVANS, *GUIDE TO TEXAS ZONING* (College Station, Texas A&M Real Estate Center 1999). Most undeveloped and lightly developed lands are not within a municipality.

¹³⁹ Roger A. Cunningham, *Land-Use Control—The State and Local Programs*, 50 IOWA L. REV. 367, 368 (1965).

¹⁴⁰ STANDARD STATE ZONING ENABLING ACT § 2.

¹⁴¹ See, e.g., PRINCE GEORGE'S COUNTY [MARYLAND] ZONING CODE § 27-441.

¹⁴² See, e.g., *id.*

¹⁴³ STANDARD STATE ZONING ENABLING ACT § 1.

¹⁴⁴ See, e.g., PRINCE GEORGE'S COUNTY [MARYLAND] ZONING CODE § 27-441 at 14 (specifying zones where flag lots are allowed or not) and PRINCE GEORGE'S COUNTY [MARYLAND] SUBDIVISION REGULATIONS § 24-138.0 (flag lot specifications). A flag lot is a parcel with no true front yard along the street, with a narrow strip for a driveway to connect the parcel to the street. A sketch of such a lot often resembles a flag (the main parcel) on a pole (the driveway).

¹⁴⁵ STANDARD STATE ZONING ENABLING ACT §§ 1–2.

¹⁴⁶ JULIAN CONRAD JUERGENSMEYER & THOMAS E. ROBERTS, *LAND USE PLANNING AND CONTROL LAW*, § 4.21, Hornbook Series, West Publishing (1998). See also JOHN R. NOLAN, *WELL GROUNDED: USING LOCAL LAND USE AUTHORITY TO ACHIEVE SMART GROWTH*, 209–213 (Environmental Law Institute, 2001).

¹⁴⁷ E.g., *Marble Technologies, Inc. v. City of Hampton*, 690 S.E. 2d 84, 88–90 (Va. 2010) (rejecting an overlay zone based on map boundaries delineated under the Coastal Barrier Resources Act, based on the Dillon Rule) and *Farmers for Fairness v. Kent County*, 2007 Del. Ch. LEXIS 56 (Del. Ch., May 1, 2007) (holding that the Coastal Zone Protection Overlay Ordinance violated the uniformity requirement of the zoning statute).

¹⁴⁸ A special exception is a use permitted within a zoning district, but subject to certain, specific conditions. A public hearing is necessary for collecting the necessary information on whether the exception will be granted. See, e.g., STANDARD STATE ZONING ENABLING ACT §7 (authorizing a Board of Adjustment to grant special exceptions) and PRINCE GEORGE'S COUNTY [MARYLAND] ZONING CODE § 27-441 (allowing some uses only with a special exception). A common standard for “determining whether a requested special exception ... should be denied is whether there are facts and circumstances that show that the particular use proposed at the particular location proposed would have any adverse effects above and beyond those inherently associated with such a special exception use irrespective of its location within the zone.” *Schultz v. Pritts*, 291 Md. 1, 22 (1981).

¹⁴⁹ See e.g. CRITICAL AREAS COMMISSION FOR THE CHESAPEAKE AND ATLANTIC COASTAL BAYS, FREQUENTLY ASKED QUESTIONS, http://www.dnr.state.md.us/critical_area/faq.html#18, (undated) (explaining that localities in Maryland have generally incorporated Chesapeake Bay Critical Area Act limitations into their zoning); *Town of Eastham, Massachusetts, ZONING BY-LAWS: FLOOD PLAIN ZONING*; and *Marble Technologies, Inc. v. City of Hampton*, 690 SE 2d 84, 88–90 (Va. 2010).

¹⁵⁰ See e.g. FEDERAL EMERGENCY MANAGEMENT AGENCY, THE NATIONAL FLOOD INSURANCE PROGRAM, <http://www.fema.gov/plan/prevent/floodplain/index.shtm> (cited on February 1, 2011) (“Currently over 20,100 communities voluntarily adopt and enforce local floodplain management ordinances that provide flood loss reduction building standards for new and existing development.”)

¹⁵¹ See, e.g., CCSP, *supra* note 3, at 209–210 (discussing two counties in Delaware that prohibit subdivisions and discourage new construction in the 100-year coastal floodplain).

¹⁵² TOWN OF CHATHAM WETLANDS PROTECTION REGULATIONS, §§ 202(3)(c), 203(3)(c), 206(3)(b) (prohibiting grading and construction within 50 feet of beaches, dunes, or salt marshes). *But cf. id.* § 205 (3)(a)(1) (allowing hard shore protection structures along banks above wetlands and beaches for homes built or approved before 1978).

¹⁵³ See, e.g., *infra* notes 165 and 286, and accompanying text.

¹⁵⁴ E.g. *Hope, Inc. v. County of DuPage, Ill.*, 717 F. 2d 1061, 1077 (7th Cir. 1983) (citing *Euclid v. Ambler Realty Co.*, 272 U.S. 365, 47 S.Ct. 114, 71 L.Ed. 303 (1926)). See also 83 AM. JUR. 2d Zoning and Planning § 9 (2005).

¹⁵⁵ See SLADE ET AL, *supra* note 34, at 44 n.58 (listing cases from all 23 tidewater state courts defining the landward boundary of the public trust). In Delaware, Maine, Massachusetts, Pennsylvania, and Virginia, private land extends down to mean low water. See *id.* at 69 n.22. But even there, the public has access rights for hunting, fishing, fowling, and navigation, and the state acts as trustee for these public property rights. *Id.* at 70 n.23

¹⁵⁶ See e.g., CCSP, *supra* note 3, at 226–227 (Maryland); *id.* at 206–209 (New Jersey); and CALIFORNIA COASTAL COMMISSION, CALIFORNIA COASTAL COMMISSION: WHY IT EXISTS AND WHAT IT DOES (2008).

¹⁵⁷ See *infra* notes 352 and 355.

¹⁵⁸ NJAC § 7.7E-7.11(e).

¹⁵⁹ CAL. PUB. RES. CODE § 30235. By “existing structures,” that statute means those built before the statute was passed in 1976. See generally Todd T. Cardiff, *Conflict in the California Coastal Act: Sand and Seawalls*, 38 CAL. W. L. REV. 255 (2001); and Meg Caldwell & Craig Holt Segall, *No Day at the Beach: Sea Level Rise, Ecosystem Loss, and Public Access along the California Coast*, 34 ECOLOGY L.Q. 533, 546 (2007). The California Coastal Commission has a wide range of possible tools for limiting the extent to which future development and redevelopment makes shore protection likely. *Id.* at 544–550.

¹⁶⁰ See *infra* note 355.

¹⁶¹ E.g., Rhode Island Coastal Resources Management Program §§ 210.3(B)(4) and 210.3(C)(3) (prohibiting structural shore protection to allow wetlands to migrate inland as sea level rises); and 06-096 ME. CODE R. §355 (5) (requiring all projects to be located and designed based on shore erosion and flooding from a 2-foot rise in sea level).

¹⁶² See, e.g., CCSP, *supra* note 3, at 227.

¹⁶³ See MARYLAND LAW REVIEW, *supra* note 7, at 1302–03 n. 87; 1309 n. 121; 1368 n. 367; 1376 n. 407; and 1377 n. 412. See also MD. CODE ANN. ENVIR. §16-201 (1998), substantially amended in 2007.

¹⁶⁴ Whether such a statute would pre-empt rolling easement zoning is unclear. The statute does not guarantee a right to elevate land surfaces or force localities to elevate roadways, so it seems possible that a locality could enact rolling easement zoning and enforce some restrictions while being unable to enforce other restrictions (unless the statute was amended).

¹⁶⁵ See *infra* note 286 and accompanying text (discussing Calvert County cliff retreat policy). The Calvert County Cliff retreat policy can be reconciled with the statutory right to shore protection in MD. CODE ANN. ENVIR. §16-201 (2009). The county requires landowners

to allow the cliff to retreat, while the state provides the right to protect the shore, which is below the base of a cliff. One could build a revetment to protect the base of a cliff while enabling the cliff itself to retreat. This is rarely done because owners are primarily concerned with the land and buildings at the top of the cliff. Moreover, these local regulations were designed to further the objectives of the Endangered Species Act which would preempt the state law. *But cf.* note 286 (discussing plans to relax rules prohibiting cliff armoring).

¹⁶⁶ HOUSE BILL 973-1978, *codified in* MD. CODE ANN. ENVIR. §16-201(c)(1)(i). See also MARYLAND DEPARTMENT OF THE ENVIRONMENT, PROPOSED LIVING SHORELINE REGULATIONS (2010). When this publication went to press, the state had not yet published the final regulations.

¹⁶⁷ TEX. NAT. RES. CODE ANN. § 61.013.

¹⁶⁸ *Id.* § 61.011(a)..

¹⁶⁹ 31 TEX. ADMIN. CODE § 501.26.

¹⁷⁰ *Id.* § 15.12(f).

¹⁷¹ Statutes that change littoral property rights sometimes require compensation; conversely efforts to avoid taking property sometimes prevent the goals of a statute from being achieved. *Compare* Stop the Beach Renourishment, Inc. v. Florida Department of Environmental Protection, 130 S. Ct. 2592, 2599, 560 U.S. ___, ___— 2010 (discussing a Florida statute that changed coastal property rights) *with* Severance v Patterson, No. 09-0387 (Tex. 2010) (citing statutory provision that explicitly disclaims any intent to “take rights from private owners” or affect land titles in any way). See *infra* § 4.1.3 for additional discussion of regulatory takings of property.

¹⁷² See, e.g., TEX. ADMIN. CODE 501.26(b); Shell Island Homeowners Ass'n v. Tomlinson, 517 S.E. 2d 401, 403 (NC 1999); and MARYLAND LAW REVIEW, *supra* note 7, at 1377 (discussing denial of a request for a permit to place geotextile containers along a beach in South Carolina).

¹⁷³ TEX. NAT. RES. CODE ANN. § 61.011(a).

¹⁷⁴ The statute’s explicit prohibition of hard structures, procedures for removal of homes seaward of the vegetation line, and explicit recognition of the inland migration of public access are all characteristics of a “rolling easement” as we use the term in this handbook. Texas courts have often used the term to narrowly refer to the inland migration of the public right to access along the privately owned dry beach. The extent to which the Open Beaches Act codified *that* aspect of a rolling easement has been litigated extensively, and was limited by the Texas Supreme Court in Severance

v Patterson, No. 09-0387 (Tex. 2010) (“[E]xisting public easements in the dry beach ... do not migrate or roll landward to encumber other parts of the parcel or new parcels....”).

¹⁷⁵ *Seaway Co. v. Att’y Gen.* 375 S.W.2d 923, 936–37 (Tex. Civ. App., writ ref’d n.r.e.).

¹⁷⁶ Mike Ratliff, *Public Access to Receding Beaches*, 13 HOUS. L. REV. 984, 993–94 (1976).

¹⁷⁷ *Luttes v. State*, 324 S.W.2d 167, 187 (Tex. 1958).

¹⁷⁸ For grants before Texas’ independence from Mexico, the high tide line refers to mean higher high water. *Luttes* 324 S.W.2d at 167, 191. For later grants, it is mean high water. *Id.* at 169. In most locations, every other high tide is higher than the previous tide. Mean higher high water is the average of all the higher high tides, while mean high water is the average of all the high tides.

¹⁷⁹ See § 2.2.1, *supra*, for an illustration and definition of the mean high water line, dry beach, and related terms.

¹⁸⁰ RATLIFF, *supra* note 176, at 993–94 .

¹⁸¹ TEX. NAT. RES. CODE ANN. § 61.011(a).

¹⁸² *Id.* § 61.013.

¹⁸³ See, e.g., *Seaway Co. v. Att’y Gen.*, 375 S.W.2d 923, 936–37 (Tex. Civ. App. 1964, writ ref’d n.r.e.); *Matcha v. Mattox*, 711 S.W.2d 95, 101 (Tex. Civ. App. 1986 writ denied); and *Feinman v. State*, 717 S.W.2d 106, 113 (Tex. App. 1986, writ ref’d n.r.e.).

¹⁸⁴ *Feinman*, 717 S.W. 2d at 110–11.

¹⁸⁵ *Id.*

¹⁸⁶ TEX. NAT. RES. CODE ANN. § 61.0183(a) and § 61.018(a).

¹⁸⁷ *Id.* § 61.013(b).

¹⁸⁸ *Brannan v. State*, No. 01-08-00179-CV (Tex. App.-Houston [1st Feb. 4, 2010, pet. filed).

¹⁸⁹ TEX. NAT. RES. CODE ANN. § 61.0185.

¹⁹⁰ *Id.* §§ 15.13(e)(13) and 15.13(g)(1). The fill may extend up to five feet seaward of the home. TEX. ADMIN. CODE. §§ 15.13(f)(3–4).

¹⁹¹ “The Galveston court described the area subject to public rights as a shifting and rolling easement.” P. Burka, *Shoreline Erosion: Implications for Public Rights and Private Ownership*, 1 COASTAL ZONE MANAGEMENT JOURNAL 175, 182–83 (1974) (citing *Galveston East Beach, Inc. v. State of Texas*, No. 97,893 (10th Dist. Ct. Galveston County, Texas 1964)).

¹⁹² *Feinman v. State*, 717 S.W.2d 106, 108–111 (Tex. App. 1986, writ ref’d n.r.e.).

¹⁹³ See e.g. *Matcha v. Mattox*, 711 S.W.2d 95, 101 (Tex. Civ. App. 1986, writ denied); *Feinman*, 717 S.W.2d at 113, and *Brannan v. State*, No. 01-08-00179-CV, (Tex. App.-Houston [1st Dist.] Feb. 4, 2010, pet. filed). See also *Severance v. Patterson*, 566 F. 3d 490, 493, 499 (5th Cir. 2009).

¹⁹⁴ “The State cannot declare a public right so expansive as to always adhere to the dry beach even when the land the easement originally attached to is eroded ... We have never held the dry beach to be encompassed in the public trust” *Severance v. Patterson*, No. 09-0387 (Tex. 2010) “A few states have declared that long-standing property principles give the state (and therefore, the public) the right to all beachfront property or the right to use even privately owned beachfront property ... [u]nlike the West Beach of Galveston ... [where] private owners who purchased beach properties obtained title without limitation on private rights of ownership and without encumbrances for public use.” *Id.* Texas common law applies to lands that became privately owned after Texas became independent from Mexico. This case did not address land granted before Texas Independence, where the Spanish civil law applies. *Id.* § 2.

¹⁹⁵ “Although existing public easements in the dry beach of Galveston’s West Beach are dynamic ... these easements do not migrate or roll landward to encumber other parts of the parcel or new parcels as a result of avulsive events.” *Id.*

¹⁹⁶ “Easements for public use of private dry beach property do change along with gradual and imperceptible changes to the coastal landscape.” *Id.*

¹⁹⁷ “New public easements on the adjoining private properties may be established if proven pursuant to the Open Beaches Act or the common law.” *Id.*

¹⁹⁸ The rolling easement would still apply to the boundary between public and private land (i.e., the high tide line). The case only concerned lands conveyed after Texas Independence (common law), *id.* leaving open whether the rolling easement still applies more generally to lands conveyed during Mexican rule (civil law).

¹⁹⁹ NEW JERSEY ADMINISTRATIVE CODE § 7:7E-8.11. See also CCSP, *supra* note 3, at 209.

²⁰⁰ TEX. NAT. RES. CODE ANN. § 61.017(c) (providing for public access inland of seawall on North Padre Island in the aftermath of *State of Texas v. Padre Island Development Corporation* (28th Judicial District, July 29, 1974); TEX. NAT. RES. CODE ANN. § 61.017(d) (providing for public access landward of a revetment constructed by the Corps of Engineers).

²⁰¹ See *supra* notes 90–92.

ROLLING EASEMENTS

²⁰² See *supra* note 93 and accompanying text.

²⁰³ R.E. BOYER, B.H. HOVENKAMP, & D.S.F. KURTZ, *THE LAW OF PROPERTY* (West Publishing Company, Hornbook Series 1991) [hereinafter *HORNBOOK ON PROPERTY*].

²⁰⁴ Transferring the property right to erect shore protection does not mean that there is a right to shore protection, only that the landowner is transferring whatever rights she may have to shore protection.

²⁰⁵ Covenants can also provide for access, but there is no advantage to using a covenant instead of an easement for such a purpose.

²⁰⁶ *HORNBOOK ON PROPERTY*, *supra* note 203, at 308. *BLACK'S LAW DICTIONARY*, 7th ed., 99 (1999).

²⁰⁷ E.g., *Seminole County v. Mertz*, 415 So.2d 1286 (Fla. App. 1982) (while the civil law provides owner of high ground an easement for the natural flow of water over lower ground and allows for reasonable enhancements, upland owner must purchase an easement from lower owner if the water is diverted from its natural path). See also W.B. Nathan, *Drainage Easements: Caught in the Mire of Alabama Common Law*, 33 *CUMB. L. REV.*, 659, 675 (2002–2003) (governments can obtain drainage easements by eminent domain).

²⁰⁸ *HORNBOOK ON PROPERTY*, *supra* note 203, at 310.

²⁰⁹ *Id.*

²¹⁰ *DANA & RAMSEY*, *supra* note 19, at 13.

²¹¹ Tara J. Foster, *Securing a Right to View: Broadening the Scope of Negative Easements*, 6 *PACE ENVTL. L. REV.*, 275–279 (1988).

²¹² Agreements to refrain from blocking the flow of water can be viewed as part of the downstream owner's duty under an affirmative drainage easement.

²¹³ Conservation easements are generally "easements in gross" (which give rights to a specific individual), rather than "easements appurtenant," (where rights go to any owner of a specific parcel). While easements appurtenant are permanent, courts have traditionally treated easements in gross as contracts with the owner that expire upon the owner's death. *DANA & RAMSEY*, *supra* note 19, at 14.

²¹⁴ William L. Prosser, *Nuisance without Fault*, 20 *TEX. L. REV.* 339, 410–420 (1942). Cf. *Pendergrast v. Aiken*, 236 S.E. 2d 787, 796–97 (N.C. 1977) (adopting the rule of reasonable use based on the law of nuisance in cases involving surface water drainage).

²¹⁵ Federico Cheever, *Public Good and Private Magic in the Law of Land Trusts and Conservation*

Easements: A Happy Present and a Troubled Future, 73 *DENV. U. L. REV.* 1077, 1080–82 (1996).

²¹⁶ *DANA & RAMSEY*, *supra* note 19, at 17–21.

²¹⁷ See, e.g., *UNIFORM CONSERVATION EASEMENT ACT*, National Conference of Commissioners on Uniform State Laws, 1982.

²¹⁸ To receive a tax deduction, however, the conservation easement must be permanent. 26 *C.F.R.* § 1.170A-14(a) (2010).

²¹⁹ Authors have used the term "rolling conservation easement" to mean different things. The Nature Conservancy has used it to refer to conservation easements that both have a traditional conservation purpose on the land to which they apply, and allow for those values to shift. We adopt TNC's usage in this report. Others have used the term "rolling conservation easement" to refer to conservation easements whose primary (or sole) objective is to enable shorelines to migrate inland. E.g., D. KREEGER, J. ADKINS, P. COLE, R. NAJJAR, D. VELINSKY, P. CONOLLY, & J. KRAEUTER, *PARTNERSHIP FOR THE DELAWARE ESTUARY, CLIMATE CHANGE AND THE DELAWARE ESTUARY: THREE CASE STUDIES IN VULNERABILITY ASSESSMENT AND ADAPTATION PLANNING 54* (PDE Report No. 10-01 2010). We use the term "shoreline migration conservation easement" instead.

²²⁰ The owners benefit from the continued existence of a beach in their neighborhood, while each loses some land in front of her home. The implications for a landowner are similar to the benefits from setbacks, where each owner loses the use of some land but benefits from neighbors refraining from use as well. Cf., Richard K. Green, *Land Use Regulation and the Price of Housing in a Suburban Wisconsin County*, 8 *J. HOUSING ECON.* 144, 156 (1999) (finding that increasing the setback from a street by 10 feet increased property values 6–8 percent).

²²¹ Robert C. Ellickson, *Alternatives to Zoning: Covenants, Nuisance Rules, and Fines as Land Use Controls*, 40 *U. CHI. L. REV.* 683, 713–719 (1973). Gerald Korngold, *The Emergence of Private Land Use Controls in Large-Scale Subdivisions: The Companion Story to Village of Euclid v. Ambler Realty Co.*, 51 *CASE W. RES. L. REV.* 617 (2001).

²²² An example of a navigation purpose would be prohibiting shore protection structures so that neighbors would have a beach for launching small boats or so that anyone would have a refuge to land a boat in an emergency.

²²³ See e.g., William H. Rehnquist, *The Prominence of the Delaware Court of Chancery in the State-Federal*

Joint Venture of Providing Justice, 48 Business Law 351 (1992).

²²⁴ HORNBOOK ON PROPERTY, *supra* note 203, at 373–385.

²²⁵ *Id.* at 385–98.

²²⁶ *Id.* at 322–324.

²²⁷ The two states are New Jersey and Delaware. See *Boro. of Avalon v. N.J. Dept. of Environmental Protection*, 959 A.2d 1215 (N.J. App. Div. 2008) (recounting that Borough filed complaint in chancery division on issue related to public beach access) and REHNQUIST, *supra* note 223, at 351–352.

²²⁸ HORNBOOK ON PROPERTY, *supra* note 203, at 323–325.

²²⁹ *Id.* at 326, 398.

²³⁰ Another challenge with legal covenants is that the plaintiff must present evidence that quantifies the damages.

²³¹ Horizontal privity of estate generally means that the covenant can be traced back to when the particular interest in land had a common owner. The privity of estate required for a legal covenant is met if the covenant accompanies the conveyance of the property interest to which it relates. HORNBOOK ON PROPERTY, *supra* note 203, at 310.

²³² See *id.* at 376 (discussing situation where privity of estate for covenant is created along with an easement).

²³³ *Id.* at 83–85.

²³⁴ Planning will be even easier if title changes on a date certain. It is possible that in the final decade or so, the parties will agree to revise the deed so that title changes on a date certain, based on a forecast of sea level rise. See *infra* note 595 and accompanying text.

²³⁵ HORNBOOK ON PROPERTY, *supra* note 203, at 83–85.

²³⁶ See, e.g., *National Wildlife Federation v. ICC*, 850 F.2d 694, 705 (D.C. Cir. 1988).

²³⁷ See, e.g., O. L. Browder, *Defeasible Fee Estates in Oklahoma—An Addendum*, 6 OKLA. L. REV. 482, 482–84 (1953).

²³⁸ The seller could be motivated by personal concern about the environment, environmental permit requirements, or the adverse impact of shore protection on adjacent parcels that she also owns.

²³⁹ In some estuaries, tidal gates may be erected to slow the rate at which mean high water rises. Although a single landowner is not likely to substantially slow the rate of global sea level rise, coastal landowners collectively could become a powerful force for reducing greenhouse gases.

²⁴⁰ Under the doctrine of waste, TLC has the option of monitoring the property to ensure that the owner does not do anything to harm its possibility of reverter. The doctrine of waste is an equitable doctrine of property law designed to prevent someone in temporary possession of a piece of property, such as a life tenant, from using the property in a way that unfairly harms the value of the estate that will eventually be transferred to a future interest holder. See RESTATEMENT OF PROPERTY: FUTURE INTERESTS 189, 193 (1936) (detailing the action that the owner of a future interest can take when the owner of the present estate engages in threatening conduct). The Restatement implies that if the contingent interest is likely to vest, the current estate holder's duty to the reversionary interest holder is (essentially) to manage the property as if she were the owner of the entire estate. See, e.g., RESTATEMENT OF PROPERTY: FUTURE INTERESTS 140, 193. The future interest holder has no duty to take action under the doctrine of waste; she simply risks losing whatever she might have saved by taking action.

²⁴¹ Storm erosion is less predictable than gradual submergence by rising sea level. Although the average annual mean tide level can also fluctuate, the 19.6-year running average that would be used to calculate sea level in a given year fluctuates less.

²⁴² The predictability of the property's longevity would be even greater if title were to change on a date certain. Converting a defeasible estate into an estate that transfers (for example) 10 years hence could be a final step in the management of such a rolling easement. See note 595 and accompanying text.

²⁴³ Daniel Alexandre Bloch, James Annan, & Justin Bowles, *Applying Climate Derivatives to Flood Risk Management* (June 20, 2010). Available at SSRN: <http://ssrn.com/abstract=1627644>.

²⁴⁴ The Uniform Conservation Easement Act allows easements to specify time limits. Federal tax laws, however, disallow deductions unless the easements are perpetual, which might include taking effect immediately, see *infra* note 473. Land trusts generally do not accept conservation easements that do not take effect until a remote date in the future. In this case, there is a possibility (albeit unlikely) that a home will be threatened before 75 years. A remote contingency that would destroy the conservation value does not disqualify the easement. 26 CFR §1.170A-14 (g)(3); but it is unclear whether an unlikely contingency that would postpone—but not destroy—the conservation value would be viewed more or less harshly. A conservation easement that prohibits shore protection but allows a home to remain for 75 years is less likely to lose its tax deductibility than a conservation easement that allows shore protection for 75 years.

²⁴⁵ See *infra* note 390 and accompanying text.

²⁴⁶ HORNBOOK ON PROPERTY, *supra* note 203, at 85–87.

²⁴⁷ Joseph Story, 2 COMMENTARIES ON EQUITY JURISPRUDENCE AS ADMINISTERED IN ENGLAND AND AMERICA 544–547 §§ 1314–1316 (1839) (“Where a penalty or forfeiture is designed merely as a security to enforce [an] obligation,” equity will ensure that the obligation is met, but will not assist with a forfeiture that causes one party to suffer a loss that is disproportionate to the loss of the other party). *Livingston v. Tompkins*, 4 Johns, Ch. 415, 8 Am. Dec. 604 (1820); *Jones v. Guaranty & Indemnity Co.*, 101 U.S. 622, 628 (1880) (“A court of equity abhors forfeitures, and will not lend its aid to enforce them.”); *Nielsen v. Woods*, 687 P.2d 486, 489 (Colorado Court of Appeals, 1984). (“[E]quity will not enforce a forfeiture [of land due to possibility of reverter] if the party insisting upon it may be made whole otherwise.”) *Cf.* RESTATEMENT (SECOND) OF CONTRACTS: LIQUIDATED DAMAGES AND PENALTIES § 355 (1981) (a contract clause with liquidated damages greater than the actual damages that were reasonably expected to result from a breach is unenforceable because it is a penalty). U.C.C. 2-718 (2001) (limiting liquidated damages to a reasonable expectation of actual damages).

²⁴⁸ See HORNBOOK ON PROPERTY, *supra* note 203, at 156 §§ 15–16. A fee simple determinable with a possibility of reverter is generally conveyed for a specific purpose whose duration is unknown, such as for the purposes of a school or railroad, e.g., *McDougall v. Palo Alto etc. School Dist.*, 212 Cal. App. 2d 422 (1963). Equity would have no reason to intervene to stop the reversion, because reversion is not punishment for closing the school or the railroad, but simply the natural termination of the estate which had been conveyed for a specific reason. By contrast, equity may intervene to stop a forfeiture resulting from the failure to comply with a condition, to ensure that neither party is subject to hardship. *Davis v. Gray*, 83 U.S. 203, 230–31 (1873). See also *supra* note 247.

²⁴⁹ The preference for conveyances of duration for a purpose over forfeitures has generally been accomplished by looking directly at the forfeiture issue regardless of how the interest is defined. Because (for example) the conveyance of land for a school can either be expressed as providing the land for the needed duration or as threatening a forfeiture as punishment for closing the school, some scholars have suggested that today there is little difference other than some of the rights flowing from each interest. See, e.g. *Frona Powell, Defeasible Fees and the Nature of Real Property*, 40 KANSAS LAW REVIEW 411, 415–410 (1992) (suggesting that the chief distinction is the mechanism

for how the estate terminates and not discussing the difference in purpose for the two estates). Allison Dunham, *Possibility of Reverter and Powers of Termination—Fraternal or Identical Twins?* 20 U. CHI. L. REV. 215, 225–229 (1953) (discussing the difference between the natural termination of an estate and a forfeiture, and how courts struggle when the intent of the parties diverges from the deed language as drafted).

The “power of termination/right of re-entry” cannot be sold in some jurisdictions. HORNBOOK ON PROPERTY, *supra* note 203, at 164, and can be viewed as waived if the owner fails to take legal action. *Id.* at 165. Contingent remainders and executory interests are vulnerable to the common law Rule Against Perpetuities. *Id.* at 168. See *infra* § 4.2.2.

²⁵⁰ HORNBOOK ON PROPERTY, *supra* note 203, at 184.

²⁵¹ See *infra* note 390–398 and accompanying text.

²⁵² CAL. CIV. CODE § 885.020 (“Every interest that would be at common law a possibility of reverter is deemed to be and is enforceable as a power of termination”).

²⁵³ E.g., Julia D. Mahoney, *Perpetual Restrictions on Land and the Problem of the Future*, 88 VA. L. REV. 740, 741 (2002) (citing LAND TRUST ALLIANCE, 1998 NATIONAL LAND TRUST CENSUS and Julie Ann Gustanski, *Protecting the Land: Conservation Easements, Voluntary Actions, and Private Lands*, in JULIE ANN GUSTANSKI AND RODERICK H. SQUIRES, EDs., PROTECTING THE LAND: CONSERVATION EASEMENTS PAST, PRESENT AND FUTURE (Washington DC, Island Press, 2000)).

²⁵⁴ One exception is that conservation easements sometimes include a clause that transfers the easement from one land to another if the first land trust fails to fulfill its responsibilities. See *infra* note 280 and accompanying text.

²⁵⁵ One who designs a rolling easement based on future interests must be prepared for possible skepticism of the arrangement, even though the traditional reasons for the skepticism do not apply to a rolling easement. Traditionally, reversions were usually based on how the landholder used the property, such as a railroad. See, e.g., *Preseault v. ICC*, 494 U.S. 1, 9–10 (1990). Although closing a railroad is a “natural termination,” it is still based on decisions by the owner. The rising sea is truly a natural termination that does not depend at all on what the owner does. Nevertheless, a conveyance that lasts “for so long as the grantee does not build and maintain a shore protection structure without the permission of the grantee” might seem to punish the grantee for the shore protection structure. A conveyance that lasts “for so

long as the grantee is able to use the property without erecting a shore protection structure” more clearly indicates that the reversion is based on duration of a specific land use rather than punishment for a single errant action. And “for so long as the sea level is less than 4 feet [above a benchmark]” is even more clearly an attempt to tailor the duration of the estate to natural factors.

²⁵⁶ See *supra* note 247. See also POWELL, *supra* note 249, at 425–26 (discussing cases where courts avoided a forfeiture by construing language that appeared to intend a power of termination or possibility of reverter as only being a covenant).

²⁵⁷ See HORNBOOK ON PROPERTY, *supra* note 203, at 176–79 (discussing how the same result can occur either by directly transferring an executory interest to X or by retaining a possibility of reverter and later conveying it to X).

²⁵⁸ See HORNBOOK ON PROPERTY, *supra* note 203, at 169–173. If the owner wants a tax deduction, a shoreline migration easement may be preferable because the IRS does not generally allow deductions for donations of a future interest in land, unless that is all the donor owns in the particular parcel.

²⁵⁹ In general, executory interests are subject to the common law Rule Against Perpetuities, which provides that the interest must be guaranteed to vest (if ever) within 21 years of the death of a party named in the deed, HORNBOOK ON PROPERTY, *supra* note 203, at 213–215. That period could often be too short for a rolling easement, especially if sea level rises more slowly than expected. Several states have repealed or reformed this rule. Although charities are sometimes exempt, the reform efforts have not considered environmental or historic preservation as specific purposes. See *infra* § 4.2.2.

²⁶⁰ *E.g.*, instead of donating a rolling easement as an executory interest, the owner could transfer a fee simple determinable to her son, and retain a possibility of reverter. She could then donate that possibility of reverter to The Land Conservancy and her son could later transfer the fee simple determinable back to her. Although this superficially seems to be an easy way to always defeat the Rule Against Perpetuities, that rule was meant to prevent complicated arrangements that keep land within a family indefinitely by allocating ownership interests based on various contingencies. See, *e.g.*, Angela M. Vallario, *Death by a Thousand Cuts: The Rule against Perpetuities*, 25 J. LEGIS. 141, 142–145 (1999). The rule was never intended to prevent environmental conservation or other transfers resulting from the natural termination of a particular use. If the son retains the fee simple determinable, the

donation of the possibility of reverter will be tax deductible. If he gives it back to his mother, then deductibility depends on how the IRS views the transaction. It will be deductible if the IRS looks narrowly at the donation as the entirety of her interest (possibly because of its conservation purpose) but it will not be deductible if the IRS looks broadly at the entire transaction.

²⁶¹ See *supra* § 2.2. *But c.f.* *Trepanier v. County of Volusia*, 965 So.2d 276, 292–293 (Fla. App. 2007) (holding that the doctrine of custom could support a rolling easement theory if there was evidence that the custom was for the easement to migrate inland).

²⁶² See *supra* notes 167–197 and accompanying text.

²⁶³ See *supra* note 97 (cases holding that roads did not have a rolling easement) and *Severance v. Patterson*, No. 09-0387 (Tex. 2010). See also *Trepanier*, 965 So.2d at 292–293 (whether public easement resulting from custom migrates inland would depend on whether the evidence showed that people had customarily shifted their use of the beach inland as the shore erodes).

²⁶⁴ See *infra* note 568 (citing a letter from the Texas Attorney General about new state requirement for waterfront owners to provide the state with rolling easements before beach nourishment can proceed).

²⁶⁵ 46 A.L.R. 1459. See, *e.g.*, *Collins v. Alabama Power Company*, 214 Ala. 643, 108 So. 868. (citing the rule that the owner of the servient estate must abstain from acts interfering with the proper enjoyment of the easement by the owner of the dominant estate); *Brown v. Alabama Power Company*, 156 So.2d 153 (Ala. 1963) (issuing injunction against building a house that would obstruct drainage easement owned by power company); and *Phillips v. Watuppa Reservoir Co.*, 184 Mass. 404, 68 N.E. 848 (1903) (holding that an easement to flood certain land precludes servient land owner from filling land if doing so prevents the flooding).

²⁶⁶ *E.g.* *U.S. v. Milner*, 583 F. 3d 1174, 1190 (9th Cir. 2009) (in a case where boundary between two private parties is mean high water, “[o]nce the shore has eroded so dramatically that the property owner’s shore defense structures fix the ambulatory boundary, the upland owner cannot expect to permanently maintain the boundary there without paying damages to the tideland owner or working out an agreement with the tideland owner.”)

²⁶⁷ *Cf. supra* § 3.1.2.3 (discussing policies that preserve public access inland of shoreline armoring that impairs or eliminates access seaward of the public trust boundary).

²⁶⁸ See “Background” section in *Brannan v. State*, No. 01-08-00179-CV, (Tex. App. Houston [1st Dist.] Feb. 4, 2010, pet. filed). That policy may be revised in the aftermath of *Severance v. Patterson*, No. 09-0387 (Tex. 2010).

²⁶⁹ See *Scureman v. Judge*, 747 A.2d 62, 68 (Del. Court of Chancery, Sussex 1999) (rejecting town’s theory that road along the shore had a rolling easement because roadway was on a specific dedicated parcel of land rather than on an easement across private land, and nothing in the conveyance suggested that the boundaries would roll); *Town of South Hero v. Wood*, 898 A.2d 756, 762 (Vermont) 2006 (rejecting town’s theory that road along shore had a rolling easement because an implied dedication of an easement does not shift without the consent of the servient owner).

²⁷⁰ Just as rolling easements along the beach often have some flexibility to allow people to continue occupying a home that encroaches onto the beach, an ambulatory boundary between two private landowners could include provisions for sharing the use of the land where feasible.

²⁷¹ *E.g.*, *Feinman v. State*, 717 S.W.2d 106, 113 (Tex. App. 1986) writ ref’d n.r.e.). Parts of this opinion were later overruled in *Severance v. Patterson*, No. 09-0387 (Tex. 2010) (“We disapprove of courts of appeals opinions to the extent they are inconsistent with our holding in this case”), but the rolling easement still applies under some circumstances. *Id.*

²⁷² See *BURKA*, *supra* note 191, at 182–83 (1974) (citing *Galveston East Beach, Inc. v. State of Texas*).

²⁷³ See *supra* note 85.

²⁷⁴ See *supra* note 266.

²⁷⁵ See, *e.g.*, *SLADE ET AL.*, *supra* note 34, at 177–180.

²⁷⁶ Some states have codified aspects of the public trust doctrine in statute (*e.g.* LA. CIV CODE ANN. ART. 451) or a state constitution (*e.g.* WASH. CONST. ART. 17 §1) The Texas Open Beaches Act specifies in great detail the migration of public access rights along the shore, see *supra* § 3.1.2.2, but it explicitly states that it does not alter property rights. See *supra* note 171, and accompanying text.

²⁷⁷ For example, in *Severance v. Patterson* the Texas Supreme Court held that the legislature had been careful to avoid altering property rights in passing a statute that codifies a rolling easement in some circumstances. “In 1969, the Legislature’s Interim Beach Study Committee, chaired by Senator A.R. Schwartz of Galveston County, confirmed the view that:

[The Open Beaches Act] does not, and can not, declare that the public has an easement on the

beach, a right of access over private property to and from the State-owned beaches bordering on the Gulf of Mexico. *An easement is a property interest; the State can no more impress private property with an easement without compensating the owner of the property than it can build a highway across such land without paying the owner.*

Severance v. Patterson, No. 09-0387 (Tex. 2010) (quoting LEGISLATIVE BEACH STUDY COMMISSION, 65TH LEGISLATIVE SESSION, FOOTPRINTS ON THE SANDS OF TIME 17 (1969), emphasis added by the court). See *infra* §§ 4.1.3 and 4.2.1 for a discussion of takings and just compensation.

²⁷⁸ See *supra* notes 390–396 and accompanying text.

²⁷⁹ See *Preseault v. ICC*, 494 U.S. 1 (1990).

²⁸⁰ *DANA & RAMSEY*, *supra* note 19, at 35. Although these clauses are sometimes called “reverter clauses,” they are actually executory interests, but exempt from the Rule Against Perpetuities, which does not apply to transfers between two charities.

²⁸¹ James T.B. Tripp and Daniel J Dudek, *Institutional Guidelines for Designing Successful Transferable Rights Programs*, 6 YALE J. ON REG. 369, 373 (1989) and *JUERGENSMEYER ET AL.*, *infra* note 312, at 451 (discussing Montgomery County, Maryland). *But see id.* at 447 (transferable development rights programs involve the recording of a covenant running with the land).

²⁸² Residents of the subdivisions often try to curtail some of the farming activities, which has led every state to pass “right to farm” legislation. Terence J. Centner, *Governments and Unconstitutional Takings: When Do Right-to-Farm Laws Go Too Far?* 33 B. C. ENVTL. AFF. L. REV. 87, 87–88 (2006).

²⁸³ See §4.2 and 8.1, *infra*.

²⁸⁴ This approach may also have a lower administrative burden than amending existing conservation easements that do not role. See *infra* notes 382–386 and accompanying text.

²⁸⁵ See *e.g.*, *infra* note 307

²⁸⁶ CALVERT COUNTY ZONING ORDINANCE (revised, June 10, 2008), Article 8, Environmental Requirements: Section 8-2.02, Shoreline and Cliff Areas on the Chesapeake Bay, Patuxent River, and their tributaries. Available at: <http://www.co.cal.md.us/residents/building/planning/documents/zoning/default.asp>. Cited February 1, 2011. See also CCSP, *supra* note 3, at 219. Officials have recently decided to relax these rules so that most of the threatened homes will not be lost. See, *e.g.*, Christy Goodman, *Homeowners near Cliffs May Get*

Some Relief, WASHINGTON POST, October 27, 2010, and to provide financial assistance to others whose homes will be lost. See, e.g., Meghan Russell, *Cliff Dwellers Sent Packing*, SOUTHERN MARYLAND NEWS, December 31, 2010

²⁸⁷ Without a rolling easement, the nontidal wetlands may be converted to dry land and remain dry through shore protection. Alternatively, they may be placed off limits to development, and remain as nontidal wetlands until the year X, when they will be submerged and become tidal wetlands. With a rolling easement and a permit to develop, the nontidal wetlands would become dry land, but still convert to tidal wetlands in the year X.

²⁸⁸ See, e.g., *supra* note 286.

²⁸⁹ See *supra* note 149 and accompanying text, (discussing prospects for shore protection of lands where development is restricted by Maryland's Critical Area Act). See also ENVIRONMENTAL RESEARCH LETTERS, *supra* note 14, Table S4.

²⁹⁰ For example, the owner and land trust could agree to remove the home on a specific date. See *infra* notes 595–596 and accompanying text.

²⁹¹ See *infra* note 443. Cf. also Alan F. Rothschild Jr., *Planning and Documenting Charitable Gifts*, 20 PROBATE AND PROPERTY (American Bar Association 2006), (discussing a case where donating a conservation easement first and then donating a fee simple interest with a restriction would have resulted in much greater tax savings than the taxpayer's donation of the land with the restriction).

²⁹² See ENVIRONMENTAL RESEARCH LETTERS, *supra* note 14, at 3 and Tables S2–S5.

²⁹³ See CCSP, *supra* note 3, at 236 (explaining that erosion-based setbacks in North Carolina 30–60 times annual erosion rate); MARYLAND LAW REVIEW, *supra* note 7, at 1334 (South Carolina, 40 time erosion rate); N.J. ADMIN. CODE §7:7E-3.19 (factor of 30 or 60). Cf. MAUI (HAWAII) PLANNING COMMISSION, SHORELINE RULES FOR THE MAUI PLANNING COMMISSION, §12-203-6 (i) (50 times erosion rate). KAUA'I COUNTY (HAWAII) CODE §8-27 (2008) (40 feet plus 70 or 100 years times erosion rate, depending on whether building footprint is less or greater than 5000 square feet).

²⁹⁴ Owners of homes that may be removed 30–40 years hence might require some compensation; but owners of the next row back are less likely to require compensation, because (a) loss of the property is more remote and (b) for a period of time the house would be oceanfront as a result of the rolling easement. The near-term benefit from becoming oceanfront would often exceed the cost of losing the home a few decades

later. See *infra* notes 303 and 446 and accompanying text.

²⁹⁵ MD. CODE REGS. § 27.01.02.05(C)(4).

²⁹⁶ MD. CODE ANN. NAT. RES. § 8-1808.10(b) (2009). The required setback is only 100 ft. for new construction on pre-existing lots.

²⁹⁷ MD. CODE REGS. § 27.01.00.01(C)(1–2). For further discussion, See CCSP, *supra* note 3, at 225–227.

²⁹⁸ See CCSP, *supra* note 3, at 96.

²⁹⁹ N.J. ADMIN. CODE § 7:7E-3.25 (d) (prohibiting development within 100 feet of a water body in areas within the 100-year flood plain); N.J. ADMIN. CODE § 7:7E-3.28 (prohibiting development within 300 feet of coastal wetlands unless development has no significant impact and is mitigated). Virginia generally requires a 100-foot setback along Chesapeake Bay, except for water-dependent activities and lots subdivided before 2002. See CCSP, *supra* note 3, at 227.

³⁰⁰ See, e.g., CCSP, *supra* note 3, at 226–227 (discussing setbacks that preserve water quality in Chesapeake Bay); *id.* at 214 (Delaware coastal bays); *id.* at 197 (New York); *id.* at 207 (New Jersey).

³⁰¹ See *infra* notes 473 and 503 and accompanying text (discussing rolling easements with a safety valve, in which, for example, no matter how rapidly the land is submerged, the rolling easement will not require abandonment of a home during the next 75 years).

³⁰² E.g., *Riggs v. Long Beach Township*, 538 A.2d 808 (N.J. 1988). Just compensation depends on how close the relationship is between the regulation and the acquisition. When governments condemn land, just compensation does not include the diminution of value resulting from unrelated regulations. For example, if land is downzoned from residential to agricultural to preserve an agricultural district, but later the land is condemned for an airport, the value of the downzoning need not be included in just compensation. Alan Romero, *Reducing Just Compensation for Anticipated Condemnations*, 21 JOURNAL OF LAND USE 153, 195 (2005). But if the downzoning was undertaken to secure a lower price for the land, then the downzoning is unconstitutional. See, e.g., *In re Elmwood Park Project Section 1, Group B*, 136 N.W.2d 896, 900 (Mich. 1965) (holding that city may not deliberately reduce the value of private property to deprive owner of just compensation). As a result it would require compensation. *Diego Gas & Elec. Co. v. City of San Diego*, 146 Cal. Rptr. 103,110 (Ct. App. 1978) (holding that downzoning land to decrease its value as a prelude to acquiring property makes the zoning part of the condemnation); and *Grand Trunk W. R. Co. v. City of*

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Detroit, 40 N.W.2d 195, 200 (Mich. 1949). Just compensation includes a decline in value resulting from activities in preparation for the condemnation, ROMERO at 190–93. Rolling easement regulation followed by purchasing rolling easements would be similar to a locality that downzones land to preserve open space, but years later decides to acquire the land for conservation or preservation purposes. The two actions are more closely related than preserving open space and later building an airport, though not part of the same project.

³⁰³ See, e.g., *Bauman v. Ross*, 167 U.S. 548, 575–84 (1897) (reviewing state procedures for calculating just compensation from partial takings and holding that it is within the authority of Congress to direct that calculations of just compensation deduct benefits resulting from the project that gives rise to the partial taking); *United States v. River Rouge Improvement Co.*, 269 U.S. 411, 415–416 (1926); and *Washington Metropolitan Area Transit Authority v. One Parcel of Land in Montgomery County, Md.*, 691 F.2d 702, 704 (4th Cir. 1982). See also Sydney Goldstein, *Economic Evidence in Right-of-Way Litigation*, 50 GEO. L. J. 205, 209–212 (1961) (discussing offsets for benefits to property in state just compensation rules).

³⁰⁴ “...Grantor may (2) place soil, rock, other earth materials, vegetative matter, and compost reasonably necessary for the purpose of combating erosion or flooding...” MARYLAND ENVIRONMENTAL TRUST/RURAL LEGACY MODEL EASEMENT (II)(E)(2) (2001). Cited on March 26, 2004 at http://www.dnr.state.md.us/rural_legacy/easement.pdf.

³⁰⁵ See *id.*, which clearly allows an earthen dike.

³⁰⁶ *Id.* § (II)(F). “Excavation of Materials. No excavation of materials is permitted...Notwithstanding the previous sentence, Grantor may excavate materials (1) for Agricultural use...(2) reasonably necessary for the purpose of combating erosion or flooding.”

³⁰⁷ During the first few years of the 21st century, the model easement for Maryland included the right to shore protection because officials from Maryland Environmental Trust believed that failing to protect the right to shore protection would discourage people from granting conservation easements. See *id.*

³⁰⁸ More generally, a rolling conservation easement is a conservation easement that can migrate as the environmental conditions giving rise to the easement migrate. The easements are sometimes used on timber lands. See, e.g., Robert Eshleman, *Letters to the Editor*, SIERRA COUNTY PROSPECT (August 8, 2010).

³⁰⁹ Virginia Department of Conservation and Recreation, Sample Conservation Easement Language, 2010. Available at:

http://www.dcr.virginia.gov/land_conservation/tools02e_shtml (allowing repair of existing shore protection structures but prohibiting new shore protection structures). For the Maryland model easement, the language quoted in *supra* note 306 remains but the language quoted in note 304 has been removed.

³¹⁰ Although conservation easements must be permanent for their donation to be tax deductible, restrictions can be added whenever the two sides agree to do so, since additional restrictions are essentially the same as adding a new easement to the old easement.

³¹¹ See *infra* § 4.2.2

³¹² Julian Conrad Juergensmeyer, James C. Nicholas, & Brian D. Leebrick, *Transferable Development Rights and Alternatives after Suitum*, 30 URB. LAW 441, 448–454 (1998).

³¹³ *Id.* at 446–448.

³¹⁴ *Id.* at 443–446.

³¹⁵ *Id.* at 446–448.

³¹⁶ Some TDR schemes have failed because there was no demand for development in the receiving area. *Id.* at 455.

³¹⁷ This appears to be the case for the Florida Keys. The growth management scheme for Monroe County Florida encourages growth to be transferred from Tier 1 keys to Tier 3 keys (with Big Pine Key in the middle). See, e.g., MONROE COUNTY (FLORIDA), A NEW ERA IN GROWTH MANAGEMENT: A LAYMAN’S GUIDE TO RESIDENTIAL ROGO (Rate of Growth Ordinance) (2009). ROGO is more complicated than an ordinary TDR scheme because it reduces overall growth through a point system. Points are awarded for retiring lots in Tier 1, and it takes far fewer points to obtain a permit to develop in Tier 3. *Id.*

³¹⁸ CCSP, *supra* note 3, at 168.

³¹⁹ The new parcels could have living shorelines instead of the bulkheads often found today on the bay sides of barrier islands. Wherever the existing bay side is wetlands or seagrass, such habitat may also need to be re-created inland.

³²⁰ If the mainland shore is protected, then barrier island migration will narrow and possibly eliminate the bay. But if the mainland is low-lying and not protected, then any loss of shallow water habitat on the bay side of the barrier island will be more than offset by the creation of new habitat along the retreating mainland shore.

²⁸⁷ See SAX, *supra* note 65, at 329 and 357 (quoting INSTITUTES OF JUSTINIAN, liber 2, title 1, at § 21).

³²² See *supra* notes 66 to 73. Some state laws that award the land to the public trust also preserve the

original bayfront owner's right to access. See *supra* note 73

³²³ See *supra* note 74.

³²⁴ Because most conservation areas on barrier islands extend from the ocean to the bay, this is usually not an issue. But in a few cases, the ocean side is developed while the bay side is a conservation area, such as the lands owned by the U.S. Fish and Wildlife Service in Nags Head and The Nature Conservancy in Kitty Hawk, both of which are in Dare County, North Carolina. To date, there has been no effort to find new home sites for lost homes in Nags Head, where development is only a few houses wide. There has been an effort, however, to ensure that the roadway along the entire length of the barrier island is maintained as the shore erodes.

³²⁵ Randall Arendt, *Basing Cluster Techniques on Development Densities Appropriate to the Area*, 63 JOURNAL OF THE AMERICAN PLANNING ASSOCIATION 137–145 (1997). See also *Williamson County Regional Planning Comm'n v. Hamilton Bank of Johnson City*, 473 U.S. 172, 176–177 (1985) (discussing cluster development).

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CHAPTER 4

CHOOSING THE APPROACH: IS THERE LEGAL AUTHORITY?

Rolling easements are government regulations or transfers of property rights that decrease or eliminate the continued use and enjoyment of coastal property as sea level rises. Designing a rolling easement policy requires deciding:

- The specific rights that will be altered, and
- The legal approach used to alter those rights.

Before specifying the rolling easement in detail, a threshold question is whether there is legal authority for the preferred legal approach. Or more generally: for which options is there currently legal authority? Such authority may be constrained for a number of reasons:

- The common law of property limits the ability of private parties to voluntarily transfer some property rights;
- State laws have abolished or limited options that the common law allowed;
- State law limits the power of local governments; and
- The federal constitution prevents property from being taken for a public purpose without just compensation; some state constitutions do so as well.³²⁶

In this chapter³²⁷ we summarize some of the issues that must be examined to determine whether there is legal authority for a particular approach. Because property law and the authority of regulatory agencies vary by state—and sometimes even within a state—all we can do here is summarize some of the issues that must be investigated before proceeding, with a few

examples for clarification. Although federal constitutional rights are uniform throughout the nation, whether a rolling easement *takes* property (requiring compensation) would depend on whether title to coastal property includes a right to hold back the sea, which is a matter of state law.

4.1 REGULATORY ROLLING EASEMENTS

The federal government regulates conversion of wetlands to water or dry land;³²⁸ but land use regulation is a matter for state and local governments.³²⁹ Local governments usually have the authority to regulate the use of dry land.³³⁰ State governments are trustees under the public trust doctrine for most intertidal lands and open water.³³¹ Rolling easements regulate land use to preserve the state's public trust resources; so rolling easement regulation could be the responsibility of either local or state governments.

4.1.1 Local Government

The power of local government to solve particular problems with particular solutions varies. Broadly speaking, in “home rule” states, the state constitution³³² or a statute³³³ has provided local governments with broad authority to act except where a specific statute limits local discretion. In non-home-rule states,³³⁴ a local government may only take action where it has a specific legislative grant of authority.³³⁵ Whether or not a state has home rule, in all but five coastal states,³³⁶ a 19th century holding known as the Dillon rule³³⁷

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requires courts to resolve ambiguities about local authority against the locality having the authority. The Dillon rule can sometimes lead a court to hold that a locality lacks the authority to solve new problems that were not specifically addressed in an enabling act. Virginia is unusually strict about applying the Dillon rule.³³⁸

All coastal states have granted the power to regulate land use through zoning to at least one level of local government (although no local government has zoning authority in parts of Texas).³³⁹ The type of locality with the zoning power varies. The southern agricultural states, with geographically dispersed populations, have had strong county governments since colonial times; and the western states later adopted strong county government as well.³⁴⁰ In New England states, by contrast, town governments regulate land use and county governments have no role.³⁴¹ In New York, New Jersey, and Pennsylvania, towns have strong regulatory powers, but counties are responsible for overall planning, coordination, and much of the infrastructure.³⁴²

4.1.1.1 Rolling Easement Zoning

Zoning is typically required to accomplish the purposes of a locality's comprehensive plan for land use. Therefore, two questions will typically be:

- Does sea level rise fit within the authorized purposes for comprehensive planning?
- Do the restrictions fit within the zoning authorization?

In Virginia, for example, the statute authorizes local comprehensive plans to indicate where existing lands may be abandoned, locate future waterways, and designate lands for conservation, recreation, drainage, and floodplains.³⁴³ The statute authorizes zoning ordinances “to provide for... safety from flood...for the preservation of agricultural and forest lands and other lands of significance for the protection of the natural environment.”³⁴⁴ Any locality can create zones and regulate “the use of land, buildings, structures,

and other premises for agricultural, business, industrial, residential, flood plain and other specific uses.”³⁴⁵ Zoning ordinances must include “adequate provisions for drainage and flood control.”³⁴⁶

These statutory provisions explicitly allow localities to regulate land use and structures to prevent flooding and conserve the environment. But they do not explicitly allow the localities to take specific measures to prevent environmental and flooding problems caused by sea level rise. Nor does the statute explicitly say that the locality can regulate efforts to change land elevations. Because Virginia strongly adheres to the Dillon Rule, a local government in Virginia may wish to ask counsel (or the State Attorney General) for an opinion on whether shore protection structures and adding fill to raise land elevations are among the activities that could be regulated under these provisions.

Even if grade elevation and shoreline armoring are the types of activities that a locality is authorized to regulate, one must evaluate whether a more specific statute takes away that power. Most states have wetland protection laws which sometimes have specific requirements for shore protection.³⁴⁷ In Virginia, the local wetlands board has the authority to issue permits for shore protection structures built within the wetlands; so the authority for rolling easement *zoning* stops at the water's edge. Seaward of that point, shore protection requires a case-by-case decision by a local wetlands board.³⁴⁸ Presumably, most wetlands boards will be reluctant to authorize the filling of wetlands for shore protection in places where zoning prohibits shore protection on dry land; but regulatory uncertainty is increased by the divided authority. That uncertainty is further compounded by federal regulations, which generally discourage shore protection within vegetated wetlands while allowing it along beaches.³⁴⁹ A Maryland statute specifically provides a right to control shoreline erosion; so rolling easement zoning by a locality to ensure that shores erode (for example, along Chesapeake Bay beaches)

would be generally preempted by state law.³⁵⁰ But the statute does not address gradual inundation of dry lands, so rolling easement zoning that prohibits grade elevation is not preempted. Along bodies of water with wetland shores, rolling easement zoning could ensure that the low dry lands gradually become wetland, while the statutory right to control shore erosion may permit the landowner to install sills, biologs, and other structures that prevent the seaward edge of the marsh from eroding.

4.1.1.2 Other Sources of Authority

In those cases where a local government lacks zoning authority to prohibit shore protection, it may have other authority to do so. In Texas, for example, the Legislature has provided all localities with broad authority to mitigate flood damages,³⁵¹ even though most county governments lack zoning authority.

4.1.2 State Agencies

State legislatures have plenary authority to regulate both land use and activities in the intertidal zone. Some legislatures have enacted statutes that prohibit or discourage new shore protection structures.³⁵² Most coastal states have a permit program for shore protection structures, as either part of their wetlands program (because many of these structures are in or adjacent to wetlands) or a separate program (because many of them are along mudflats or beaches).³⁵³

Administrative agencies have different degrees of legal authority to enact a regulatory rolling easement policy. By definition, administrative agencies (like localities) lack such authority if the state provides a statutory right to shore protection.³⁵⁴ On the other hand, administrative agencies in some states have been given broad latitude to issue regulations to preserve the coastal environment, and shore protection structures have been prohibited by state regulations in specified areas, mostly along ocean shores.³⁵⁵

4.1.3 Constitutional Takings Questions

Even if state law provides the local government or state agency with the authority to enact a rolling easement regulation, the regulation might require compensation under the “takings clause” of the 5th Amendment of the U.S. Constitution, which states: “...nor shall private property be taken for public use, without just compensation.”³⁵⁶ A complete review of the takings question for regulatory rolling easements is beyond the scope of this primer. Here we provide a few overview issues.

Under recent holdings by the U.S. Supreme Court, a court would consider three general categories in deciding whether a regulation that prohibits shore protection³⁵⁷ would be a taking:

- If owning land does not include a right to hold back the sea³⁵⁸ then a rolling easement regulation³⁵⁹ is not a taking.³⁶⁰
 - This question has only been addressed in a few states.³⁶¹
 - The Court has not specifically articulated how property rights evolve over time.³⁶²
- If there is a right to hold back the sea,³⁶³ then a taking will result under either of two situations:
 - If the regulation requires the owner to tolerate a permanent physical occupation, no matter how small, it is a taking.³⁶⁴
 - If the regulation completely destroys the property’s value, then it is a taking.³⁶⁵
 - The Supreme Court has held that there was not a complete destruction of value where a regulation prevented all use of most of a large parcel but still allowed a single home on part of the land.³⁶⁶ Thus, if a rolling easement regulation applies to part—but not all—of a parcel, a taking is unlikely under that test.
 - The Supreme Court has held that preventing all use for a time qualifies as a temporary taking—but it has not looked at the opposite case where a regulation prevents use after a distant time in the future.³⁶⁷

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- If there is a common law right to hold back the sea³⁶⁸ and the regulation does not completely destroy value, then the takings question is decided under a general balancing about whether the regulation goes too far, also known as the *Penn Central* test.³⁶⁹ The criteria for this test are malleable and evolving, but primarily based on the magnitude of the economic impact compared to the owner's reasonable investment-backed expectations.³⁷⁰

If a rolling easement regulation is a constitutional taking, it will not necessarily be invalid. A regulation may include a provision for paying just compensation, in which case the property owner must seek the compensation through that process before filing a takings claim.³⁷¹ Alternatively, a government may choose to provide a variance (rather than pay compensation) wherever the restriction would otherwise be a taking, and thereby preclude all takings claims.³⁷²

As a general rule, even if the taking of a rolling easement required just compensation, for a parcel that will not be threatened by sea level rise for a century, the just compensation would be a very small percentage of today's property value.³⁷³ Moreover, land that was not originally along the shore would receive the economic benefit of being along the shoreline for a period of time before being lost to the rising sea. That benefit would generally be subtracted from what the government owed,³⁷⁴ potentially reducing just compensation to zero for those parcels.³⁷⁵

4.2 INTERESTS IN LAND

4.2.1 Constitutional Takings Question

One of the primary reasons for obtaining a recorded rolling easement is that the legal uncertainty surrounding a possible regulatory takings claim can be avoided. If the landowner sells or donates a rolling easement, then the takings question is entirely avoided. Sometimes localities obtain easements as a condition for a

permit, a process known as an "exaction." Under existing holdings, an exaction of a rolling easement in return for a permit to develop vacant land is not a taking, provided that (a) the rolling easement mitigates a type of harm otherwise caused by the development,³⁷⁶ and (b) this mitigation is roughly proportional to the harm expected from the development.³⁷⁷ One paper has argued that exacting a rolling easement that prohibits shore protection meets this test because such a permit condition merely ensures a natural transformation that would occur if the development did not take place,³⁷⁸ but an exaction of another type of rolling easement could be a taking under other circumstances.³⁷⁹ Whatever the merits of a takings claim may be, they are litigated at the time of the exaction,³⁸⁰ and hence provide more legal certainty than a regulation, which need not be litigated until the property is threatened decades later.

4.2.2 Does State Property Law Allow Creation of the Rolling Easement Needed?

Just as government agencies must have legislative authority for their regulations to have the force of law, a property interest must be legally recognized for a court to enforce it. In this section we focus on conservation easements, future interests in land, ambulatory (moveable) boundaries, and rolling affirmative easements.

4.2.2.1 Conservation Easements

Traditionally, the common law did not recognize conservation easements as property. But statutes enacted during the 20th century now authorize conservation easements;³⁸¹ and land trusts can readily design shoreline migration conservation easements to fulfill the requirements of those statutes. Some issues will arise, however, if a land trust and the landowner want to amend an existing conservation easement that does not roll so that it becomes a rolling conservation easement.

Land trusts have developed a comprehensive framework for evaluating possible amendments to conservation easements.³⁸² Often amendments

occur because a landowner wants to do something that is prohibited by a conservation easement, but the proposed activity either has a negligible adverse impact on achieving the conservation purpose of the easement, or the owner is willing to amend the easement to prohibit an activity that would have a more severe impact on the conservation value. Land trusts are generally advised to ensure that amendments:

- Comply with applicable law;
- Serve the public interest consistent with the land trust's mission;
- Do not undermine the conservation purpose;
- Do not undermine the intent of the grantor, donor, or funding source;
- Do not diminish the actual conservation values from the easement; and
- Do not unreasonably enrich the landowner.³⁸³

To ensure compliance with applicable law, The Nature Conservancy seeks approval from a state's Attorney General before amending an easement (which can delay the process considerably).³⁸⁴

Converting an existing conservation easement into a rolling conservation easement would generally satisfy all those criteria. Adding the restrictions associated with preventing shore protection would either increase the conservation values of the easement by (for example) ensuring that farmlands become wetland, or have no impact (if the landowner was not going to hold back the sea anyway). The public interest is clearly served, and no one is enriched. The Nature Conservancy does not seek approval of the Attorney General for amendments that merely add restrictions.³⁸⁵

If the sole purpose of a conservation easement was to maintain the area of farmland in a given region, however, prohibiting shore protection might tend to undermine the intent. The parcel may remain farmland longer without the restriction (though there is no guarantee that the farm would be protected from the rising sea even without the

rolling easement). Thus the amendment could be viewed as having positive and negative impacts on conservation. If the resulting moderate legal risk³⁸⁶ was unacceptable, creating a new shoreline migration easement could accomplish the same result; but the holder of the conservation easement might be reluctant to accept the shoreline migration easement because of its duty to uphold existing easements. (Finding a second land trust to accept the new easement might be difficult). Nevertheless, in a state where the model easement discourages shore protection, the clear public policy in favor of allowing wetlands to migrate inland will make it difficult to challenge a rolling conservation easement created by amendment. One can reasonably assume that the original purpose of this conservation easement was to prevent development and thereby ensure that the land will be farmed for as long as the land exists, not to encourage the owner to eventually protect the land with a dike.

4.2.2.2 Defeasible Estates and Future Interests

Defeasible estates and future interests (e.g., property changing hands when sea level rises a given amount) have long been recognized by the common law of property. Nevertheless, how a court would treat a particular scheme depends on state property law. For example, the common law "Rule Against Perpetuities" would void TLC's interest in a deed that said "to buyer but if sea level rises one meter above the sea level of the 1980–2001 tidal epoch, then to TLC."³⁸⁷ But the rule would not void the interest in a deed that said "to buyer for so long as sea level is less than one meter above the 1980–2001 tidal epoch and then the property reverts back to the grantor,"³⁸⁸ and the seller can donate or sell that possibility of reverter to TLC. Anyone considering a rolling easement set up as a future interest in land should evaluate whether it would be subject to the Rule Against Perpetuities.

1. *Does the ambulatory boundary comply with local land use regulations?* Subdivision regulations that govern the shapes and sizes of parcels generally do not prohibit setting boundaries based on shorelines.⁴⁰³ But they often set a minimum width, and the migrating boundary would eventually leave the lot narrower than that minimum. Restrictions on the shape of parcels sometimes have exceptions for conservation purposes⁴⁰⁴ or necessity due to topography.⁴⁰⁵ Will the same reasoning apply to lots that become too narrow as the shore retreats?
2. *If the ambulatory boundary might eventually leave a parcel out of compliance, is the arrangement prohibited?* Does the mere possibility that a parcel might one day become too small invalidate the subdivision? Or does subdivision of land comply with the regulation if the landowner promises to either obtain a variance or transfer a parcel that becomes too small?
3. *Would the boundary comply with the state law of property?* Courts have sometimes been hostile to ambulatory boundaries, based on a long-standing maxim that the boundaries of land must be well-defined combined with the assumption that an ambulatory boundary is not as well defined as a fixed boundary.⁴⁰⁶ Those cases, however, have generally presented a court with a question about whether a boundary automatically migrates based on the law of property, not whether landowners are free to voluntarily create an ambulatory boundary.⁴⁰⁷ Some cases rejecting ambulatory boundaries have cited the fact that the land titles had not specifically stated that the boundary rolls,⁴⁰⁸ or they had implied that the boundary does not roll.⁴⁰⁹
4. *Can the same result be achieved by creating an affirmative easement that rolls rather than an ambulatory property line?* Some cases have suggested that a rolling affirmative easement has a stronger basis in property law than an ambulatory property line for a roadway.⁴¹⁰

4.2.2.4 Affirmative Easements that Roll.

It is likely that adjacent landowners are free to negotiate a rolling affirmative easement in at least some coastal states. After *Severance v. Patterson*, the Texas General Land Office announced that it had suspended a beach nourishment project along West Galveston Island until beachfront owners conveyed rolling easements for beach access,⁴¹¹ and the court implicitly recognized that a rolling easement can be a property interest under Texas Law.⁴¹² Other courts that declined to find that an easement rolls have indicated that if there were evidence of intent to roll, then the easements under consideration would roll.⁴¹³ The best possible evidence of intent would be specific language in a deed.

In states where the law has not squarely addressed whether affirmative easements can roll, the traditional rules of easement law generally support the ability to negotiate a rolling easement:

- The extent of ways granted may be defined by the express terms of the deed.⁴¹⁴
- When the easement does not specify the route but specifies the use, then the easement is for whatever width is reasonably necessary given the purpose.⁴¹⁵
- Some traditional rules tend to prevent an easement from rolling if it does not specify otherwise,⁴¹⁶ which implies that it *could* roll if it *does* specify otherwise.
- If a private way becomes impassable, the easement holder has no right to go on other lands unless the owner of the land is bound to make repairs.⁴¹⁷ That rule implies that the easement could be drafted to allow the easement holder to go on other lands.
- When an easement is conveyed by deed without specifying the route, the selection of the route is by the easement holder, as long as she is reasonable.⁴¹⁸

A few rules have discouraged courts from finding that there is a rolling easement:

ROLLING EASEMENTS

- Some cases have suggested that easements have a fixed location even though property lines themselves may be ambulatory, implying that a property line is more likely to roll than an access way.
- Once the route is fixed, the holder may not unilaterally change the route.⁴¹⁹

Those rules, however, were applied when courts faced questions about how to construe ambiguous easements, not about whether an easement could specifically be drafted to ensure that it rolls. A holder is not unilaterally changing the route, for example, if the terms of the easement provide for the route to migrate.

If an easement is needed for sole access to a home or business, a court will generally find an easement by necessity so that the owner can build a driveway.⁴²⁰ Parties are also able to negotiate the particular route for an easement by necessity.⁴²¹ It follows that if a particular way will be repeatedly washed out, then the parties can negotiate how the way of necessity will change. Honoring the terms of express language in a deed is more reasonable than ordering an alternative that no one contemplated.

4.2.3 Authority to Obtain a Rolling Easement

4.2.3.1 Private Entities

If a rolling easement is structured as a shoreline migration conservation easement, then the general restrictions for ownership of those instruments will apply. Qualified conservation organizations (as well as governments) have legal authority to hold conservation easements, while private citizens and for-profit corporations do not.⁴²² In most coastal states, anyone can hold a rolling easement structured as a defeasible estate, although statutes often provide charities with greater flexibility.⁴²³ Any person or corporation can hold covenants and ordinary common law easements.⁴²⁴

4.2.3.2 Local Government

A locality may come to possess a rolling easement through any of the following mechanisms:

- Purchasing the easement from a willing seller,
- Receiving a donated rolling easement from either the landowner or a qualified conservation organization,
- Acquisition through eminent domain,
- Exaction as a permit condition.

Local governments interested in obtaining a rolling easement would have to address two questions: (a) Is the interest sought recognized as property by state law, and (b) does the local government have authority to obtain such an interest in the manner chosen?

If the method of creating the rolling easement complies with a state's conservation easement enabling act, then the easement is property. The Uniform Conservation Easement Act⁴²⁵ allows conservation easements to be created using any means by which other easements can be created. Eleven coastal states⁴²⁶ have adopted the act, although some have altered that provision.⁴²⁷ Among the 13 coastal states with other conservation easement enabling statutes, some explicitly allow easement creation by any manner,⁴²⁸ some do not explicitly address how the easement is created,⁴²⁹ and others limit it.⁴³⁰ None of the statutes explicitly say whether a conservation easement can be created through exaction. Presumably an exaction would be a permissible mode of creation wherever the statute allows "any means." But an exaction might not be permissible where the statute excludes eminent domain⁴³¹ or requires the easement to be created voluntarily.⁴³²

As with regulatory authority, the power of local governments to create conservation easements varies. In some states, the power of eminent domain is sharply limited, while in other states it is much broader. Similarly, some states provide localities with the authority for transferable development rights, while others do not. Localities

may lack the power to exact an easement even if property law recognizes exacted conservation easements.

In states where the conservation enabling act does not allow conservation easements to be created involuntarily, it may be possible to obtain a rolling easement structured as a traditional future interest in land if eminent domain authority includes such interests. Moreover, in some cases a developer or other property owner may choose to sell or donate a rolling easement to obtain community support for a project. Some care may be necessary to ensure that the voluntary nature of the easement is well-established, lest it appear be an exaction in a state that does recognize exacted conservation easements as property.⁴³³

NOTES AND REFERENCES

³²⁶ Some states also have statutes that limit the economic burden of a regulation on private property. See, e.g., John D. Echeverria & Thekla Hansen-Young, *The Track Record on Takings Legislation: Lessons from Democracy's Laboratories*, 28 STAN. ENVTL. L. J. 439 (2009) (discussing property rights legislation in Florida and Oregon).

³²⁷ Conversations with Skip Styles (Virginia Wetlands Watch) and Jessica Grannis (Georgetown University Law Center) about a planned legal case study of Virginia, while the author was developing the outline for this primer, provided some key insights for this chapter, such as the need to evaluate the authority that states provide local governments, and the challenge of the Dillon Rule in Virginia. See ANDREW C. SILTON & JESSICA C. GRANNIS, *STEMMING THE TIDE: HOW LOCAL GOVERNMENTS CAN MANAGE RISING FLOOD RISKS*, GEORGETOWN CLIMATE CENTER (Review draft 2, 2010).

³²⁸ 33 U.S.C. § 1344.

³²⁹ See HORNBOOK ON PROPERTY, *supra* note 203, at 430.

³³⁰ E.g., *Hope, Inc. v. County of DuPage*, Ill., 717 F.2d 1061, 1077 (7th Cir. 1983) (citing *Euclid v. Ambler Realty Co.*, 272 U.S. 365, 47 S.Ct. 114, 71 L.Ed. 303 (1926)); and 83 AM. JUR. 2d, *Zoning and Planning* § 9 (2005).

³³¹ E.g., *Arnold v. Mundy*, 6 N.J.L. 1, 76–77 (Sup. Ct. 1821); *Martin v. Lessee of Waddell*, 41 U.S. (16 Pet.) 366, 410 (1842); and *Shively v. Bowlby*, 152 U.S. 1, 16 (1894). For further details, see *supra* § 2.2.1 and SLADE ET AL. et al., *supra* note 155.

³³² The state constitutions of Hawaii, Maine, Louisiana, Rhode Island, and Oregon provide home rule to all political subdivisions, while those of California and Washington provide home rule to cities. VERMONT LEAGUE OF CITIES AND TOWNS, *CANDIDATE BULLETIN 8/02, LOCAL GOVERNMENT AUTONOMY* (2002).

³³³ The state constitutions of Alaska, Connecticut, Maryland, Massachusetts, New York, Pennsylvania, South Carolina, and Texas provide home rule to at least some political subdivisions, once enabling legislation is passed. Delaware, Florida, Georgia, New Hampshire, New Jersey, and North Carolina have passed statutes providing political subdivisions with home rule. *Id.*

³³⁴ Alabama, Mississippi, and Virginia do not provide for municipal home rule. See *id.*

³³⁵ Jesse Richardson Jr., Meghan Zimmerman Gough, & Robert Puentes, *Is Home Rule The Answer? Clarifying the Influence of Dillon's Rule on Growth Management* 9–13 (Discussion Paper, The Brookings

Institution Center on Urban and Metropolitan Policy, Washington, DC, 2003).

³³⁶ Alaska, Massachusetts, New Jersey, Oregon, and South Carolina. Richardson et al., *supra* note 335, at 41–46.

³³⁷ “It is a general and undisputed proposition of law that a municipal corporation possesses and can exercise the following powers and no others: First, those granted in express words; second, those necessarily or fairly implied in or incident to the powers expressly granted; third, those essential to the declared objects and purposes of the corporation, not simply convenient, but indispensable. Any fair, reasonable doubt concerning the existence of the power is resolved by the courts against the corporation, and the power is denied.” 1 DILLON ON MUNICIPAL CORPORATIONS § 237 (5 ed. 1911). This holding was first adopted by the Iowa Supreme Court in an opinion written by Dillon in *Clark v. City of Des Moines*, 19 Iowa 199 (1865). Most other states soon adopted that holding, quoting the Dillon Rule verbatim.

³³⁸ RICHARDSON ET AL., *supra* note 335, at 45.

³³⁹ See *supra* notes 138 and 139.

³⁴⁰ J. Edwin Benton, *County Government*, in JACK RABIN (EDITOR), *ENCYCLOPEDIA OF PUBLIC ADMINISTRATION AND PUBLIC POLICY* 1, 261–262 (2003).

³⁴¹ *Id.*

³⁴² *Id.*

³⁴³ “The comprehensive plan shall be general in nature, in that it shall... indicate where existing lands or facilities are proposed to be extended, widened, removed, relocated, vacated, narrowed, abandoned, or changed in use as the case may be.... each locality shall develop a transportation plan that ...shall include ... waterways... The plan, with the accompanying maps... may include, but need not be limited to...the designation of areas ... conservation; active and passive recreation; public service; flood plain and drainage; and other areas.” VIRGINIA CODE § 15.2-2223

³⁴⁴ VIRGINIA CODE § 15.2-2283.

³⁴⁵ VIRGINIA CODE § 15.2-2280.

³⁴⁶ VIRGINIA CODE § 15.2-2241 (3).

³⁴⁷ See *infra* notes 352 and 353 and accompanying text.

³⁴⁸ See e.g. CCSP, *supra* note 3, at 227.

³⁴⁹ Reissuance of Nationwide Permits, 72 FED. REG. 11183 (March 12, 2007) (explaining that nationwide permit 13 allows for bank stabilization structures, provided that no material is placed in a special aquatic

site). Special aquatic sites include vegetated wetlands 40 CFR § 230.41.

³⁵⁰ Compare MD. CODE ANN., ENVIR. § 16-201 (2010) (shore protection is a permissible activity) with *supra* note 286 and accompanying text (Calvert County regulations prohibit cliff protection). See also *supra* note 165.

No court has examined whether (a) the rolling easement cliff retreat policy in Calvert County is preempted by the state law, (b) the state law would be preempted by the county's attempt to comply with the federal Endangered Species Act, or (c) the cliff armoring regulated by the county is inland of the jurisdiction of the state rule. Shore protection methods that do not slow cliff retreat would not be prevented by the county regulations. See also *supra* note 347.

³⁵¹ TEX. WATER CODE ANN. § 16.315. Localities are authorized to mitigate flooding by "... (13) adopting permanent land use and control measures with enforcement provisions that are not less stringent than the criteria for land management and use adopted by the director; (14) adopting more comprehensive floodplain management rules that the political subdivision determines are necessary for planning and appropriate to protect public health and safety...."

³⁵² E.g. S.C. CODE ANN. § 48-39-290 (B)(2) (prohibiting new seawalls along Atlantic Ocean). TEX. NAT. RES. CODE ANN. § 61.013 (discouraging all structures that interfere with coastal processes along the Gulf of Mexico).

³⁵³ See, e.g., the discussions of mid-Atlantic state regulatory programs in CCSP, *supra* note 3, at 194–238.

³⁵⁴ See, e.g., *supra* notes 159 (California) and 163 (Maryland), and accompanying text. Although a California statute guarantees a right to shoreline armoring to protect "pre-existing" structures in California, the state's Coastal Commission has the authority to regulate *how* shore protection is pursued, and the statute also directs the Commission to avoid armoring for new (post-1976) structures. See CARDIFF, *supra* note 159 and CALDWELL & SEGALL, *supra* note 159.

³⁵⁵ See, e.g., RHODE ISLAND COASTAL RESOURCE MANAGEMENT PROGRAM §210.3(B)(4) and §300.7(D) (2007) (prohibiting structural shore protection along barrier beaches and a single class of estuarine shores). Compare 310 MASS. CODE REGS. §10.28 (3) (prohibiting hard shore protection along dunes) with 310 MASS. CODE REGS. §10.30 (3) (allowing hard shore protection along banks to protect homes built before 1978). Compare 15A N.C. ADMIN. CODE § 7H.0308(a)(1)(B) (prohibiting structural shore protection on the ocean

beach) with 15A N.C. ADMIN. CODE § 07H.0208(b)(7) (allowing bulkheads and revetments along estuaries provided that they are inland of existing wetlands). See also 06-096 ME. CODE R. §355(E) (2010) (prohibiting shore protection along dunes) and 31 TEX. ADMIN. CODE § 501.26(b) (prohibiting seawalls that protect individual properties but allowing seawalls landward or the dune vegetation line provided that there is a funded beach nourishment project that will prevent the beach from narrowing). Compare OREGON'S STATEWIDE PLANNING GOALS & GUIDELINES, Goal 18: Beaches and Dunes OAR 660-015-0010(3) (allowing permits for oceanfront protection structures only where development or subdivision occurred before 1977) with *id.* Goal 17: Coastal Shorelands, OAR 660-015-0010(2) (requiring fill above the ordinary high water mark and erosion control structures to minimize adverse impacts on water currents, erosion, and accretion patterns).

³⁵⁶ U.S. CONSTITUTION, AMEND. V. Although the Bill of Rights originally applied to the federal government, the 14th amendment extended the requirement to pay just compensation to state and local governments. *Chicago, Burlington & Quincy Railroad Co. v. Chicago*, 166 U.S. 226, 235–41 (1897).

³⁵⁷ Or keep a pre-existing home on the beach.

³⁵⁸ Or keep a pre-existing home on the beach.

³⁵⁹ E.g., policies that prohibit shore protection as discussed in § 3.1.2.1, *supra*.

³⁶⁰ "Where the State seeks to sustain regulation that deprives land of all economically beneficial use, we think it may resist compensation only if the logically antecedent inquiry into the nature of the owner's estate shows that the proscribed use interests were not part of his title to begin with." *Lucas v. South Carolina Coastal Council*, 505 U.S. 1003, 1027 (1992).

³⁶¹ See e.g., *Stevens v. City of Cannon Beach*, 854 P.2d 449 (Or. 1993) (holding that prohibiting a seawall was not a taking in a case where other beneficial use was possible, because longstanding public right to access along the shore meant that building a seawall is not part of the property owner's title to begin with). See *infra* notes 266 & 361 and the text accompanying *infra* note 274 (discussing *U.S. v. Milner* in Washington State, where the tidal wetlands were owned by a private party and the right to shore protection was limited based on nuisance law). Cf. *Wilson v. Commonwealth*, 597 N.E. 2d 43 (Mass. App. 1992) (failing to rule on the underlying takings claim when homes in Chatham were lost due to government delays in decision on permit for revetment).

A few states explicitly say that property owners can hold back the sea, see, e.g., notes 159 & 163 and accompanying text, but that may be a revocable

statutory license rather than a compensable property right, see, e.g. MARYLAND LAW REVIEW, *supra* note 7, at 1376 n.407. See also Martin J. McMahon, “Annotation, Liability for Diversion of Surface Water by Raising Surface Level of Land,” 88 A.L.R. 4th 891, 897–98 (1991) (noting that some jurisdictions follow the “common-enemy doctrine,” under which every landowner “has an unqualified right to fend off surface waters as the landowner sees fit without being required to take into account the consequences to other landowners”). The right to shore protection is not necessarily absolute. The *Milner* court cited the common-enemy doctrine but held that the right to shore protection must be balanced against the tideland owner’s right to inland migration of tidelands. A regulation is probably not a taking if it goes no farther than the balancing a court would undertake in a nuisance case between private landowners. *Lucas v. South Carolina Coastal Council*, 505 U.S. 1002, 1029 (1992).

An intermediate appellate court opinion in North Carolina rejected a hotel’s takings claim based on land loss resulting from the denial of a shore protection permit. *Shell Island Homeowners Ass’n v. Tomlinson*, 517 S.E. 2d 406 (N.C.App. 1999). The permit denial was not a physical invasion because natural processes rather than actions by the state caused the land loss. *Id.* at 415. It was not a regulatory taking because the hotel continued to operate, *id.* at 415, and the plaintiff had ample notice of the no-armoring rule before the hotel was built, *id.* at 416. With the decline of the notice rule after *Palazzolo v. Rhode Island*, see *infra* note 362, it is unclear whether that court would find a taking in a case where all beneficial use of the property was lost.

³⁶² Before *Palazzolo v. Rhode Island*, 533 U.S. 606 (2001), courts and commentators generally accepted “the Notice Rule” under which a takings claim based on a regulation was—in effect—extinguished upon sale under the theory that activities prohibited by the regulation would not be among the property rights the owner has purchased, since she had notice that the property did not include those rights. Steven J Eagle, *The Regulatory Takings Notice Rule*, 24 U. HAW. L. REV. 533, 533–534 (2002). In *Palazzolo* the Court held that such a rule would be an unfair burden to owners who wished to sell (or died) before the claim was litigated, because the value of their claim would be lost. The court did not say, however, that regulations that alter the rights associated with land titles must always require compensation. 533 U.S. at 626–30.

³⁶³ Or keep a pre-existing home on the beach.

³⁶⁴ *Loretto v. Teleprompter Manhattan CATV Corp.*, 458 U.S. 419 (1982). Although a governmental flooding of land is a physical occupation, a court would have to

decide whether a rolling easement is more like a regulation requiring an owner to allow people to cross her property (which would be a physical invasion) or a regulation prohibiting an owner from building a fence to keep people out.

³⁶⁵ *Lucas v. South Carolina Coastal Council*, 505 U.S. 1003, 1027 (1992).

³⁶⁶ *Palazzolo v. Rhode Island*, 533 U.S. 606, 630–632 (2001).

³⁶⁷ *Cf. Esposito v. South Carolina Coastal Council*, 939 F.2d 165, 170 (4th Cir. 1991) (holding that a taking does not occur when a regulation today prospectively eliminates the right to rebuild a house should it ever be destroyed by a storm, because existing uses can continue and the impact on those uses is speculative). See also MARYLAND LAW REVIEW, *supra* note 7, at 1350 (arguing that the doctrine of nonconforming use supports the theory that rolling easement regulations are not a taking). In *Severance v. Patterson*, 566 F. 3d 490, 498–99 (5th Circuit 2009), the 5th circuit certified several questions about the authority of the rolling easement to the Texas Supreme Court, which held that neither the common law nor the statute provided authority for the rolling affirmative easement challenged in that case. See *supra* § 3.1.2.2. Had the Texas Supreme Court upheld the rolling easement as based on the Texas Open Beaches Act, then future takings cases in Texas would have to examine whether it is possible to bring a takings challenge of a rolling easement statute enacted long before a property is threatened, when the plaintiff waits until the property is actually threatened. Similar questions await any state that explicitly changes the doctrine of accretion or avulsion. If such a case involves a rolling easement for beach access, the statute of limitations may bar such a challenge the grounds that the physical invasion occurs when the property interest is taken; but the just compensation when the interest is taken would often be small. A continued refinement of the takings “notice rule” may be necessary for statutes that prohibit shore protection. See *supra* note 362.

³⁶⁸ Or keep a pre-existing home on the beach.

³⁶⁹ *Penn Central Transp. Co. v. New York City*, 438 U.S. 104 (1978).

³⁷⁰ *Lingle v. Chevron USA, Inc.*, 544 U.S. 528, 539–40 (2005).

³⁷¹ *Williamson County Regional Planning Comm’n v. Hamilton Bank of Johnson City*, 473 U.S. 172, 194–197 (1985).

³⁷² *Id.* at 186–194.

³⁷³ See *infra* §§ 5.2.1 and 5.2.2 (discussing the valuation of a rolling easement); MARYLAND LAW

REVIEW, *supra* note 7, at 1385–86 (discussing just compensation for a rolling easement), *and id.* at 1396–98 (roughly calculating just compensation for a nationwide rolling easement policy).

³⁷⁴ See *supra* note 303.

³⁷⁵ The State of Texas has argued that buyers of parcels near—but not yet along—the beach already consider the eventuality of owning waterfront property as a result of the rolling easement:

The majority’s opinion also destroys fixed expectations dating back over a century. As the majority itself explains, the public has used the beach since the 1830s. Slip op. 7. This practice has given rise to parties purchasing second- and third-row properties on the expectation that they would have access to the beach.

Severance v. Patterson, Joint Motion for Rehearing for Defendant-Appellees 11 (No. 09-0387. Supreme Court of Texas, December 10, 2010).

³⁷⁶ *Nollan v. California Coastal Comm’n*, 483 U.S. 825, 837 (1987) (unless an exaction “serves the same governmental purpose as [would a] development ban, the building restriction is not a valid regulation of land use but ‘an out-and-out plan of extortion.’” (quoting *J. E. D. Associates, Inc. v. Atkinson*, 121 N. H. 581, 584, 432 A.2d 12, 14–15 (1981))).

³⁷⁷ *Dolan v. City of Tigard*, 512 U.S. 374, 391 (1994) (“city must [ensure] that the required dedication is related both in nature and extent to the impact of the proposed development”)

³⁷⁸ See MARYLAND LAW REVIEW, *supra* note 7, at 1359–1361 (arguing that even a dedication may have a sufficient nexus and rough proportionality to satisfy the constitutional tests for exactions); *id.* at 1339–1347 (arguing that setting aside land to ensure that access migrates inland if a seawall is built has both nexus and rough proportionality); *and id.* at 1358 n.322 & 1360 (arguing that rolling easements have a substantial nexus and that neither rolling easements nor setbacks must meet the exactions test because there is no physical invasion).

³⁷⁹ Exacted conservation easements are rare. J. O. Lippman, *The Emergence of Exacted Conservation Easements*, 84 NEB. L. REV. 1043, 1102–1106 (2005). As a result, the Supreme Court has not had occasion to rule on whether they would be evaluated under the regulatory takings test (since there is no physical invasion) or the more stringent physical invasion test (since an interest in land is exacted). An affirmative beach-access rolling easement in return for a building permit would clearly be a physical invasion, and would bear some similarity to the facts in *Nollan* 483 U.S. at 838–842 (holding that requiring access along the dry

beach in return for a building permit is a taking). Nevertheless, requiring that existing access will roll inland rather than be blocked by a new home as the shore erodes, would have a much tighter nexus with the building permit, than requiring immediate access to the dry beach as in *Nollan*. See MARYLAND LAW REVIEW, *supra* note 7 at 1343–45, 1358.

³⁸⁰ Applicants generally challenge permit conditions before accepting a permit and proceeding with the development. See, e.g., *Nollan v. California Coastal Comm’n*, 483 U.S. 825, 828–829 (1987) (summarizing plaintiff’s challenge of exaction before filing the takings claim). If that challenge fails, then they may proceed with a takings claim. *Williamson County Regional Planning Comm’n v. Hamilton Bank of Johnson City*, 473 U.S. 172 (1985). The statute of limitations for bringing such a claim varies. The Tucker Act authorizing governmental payment for constitutional takings, 28 U.S.C. §1491, has a six-year statute of limitations. 28 U.S.C. § 2501. In states that lack a specific statute of limitations for takings claims, courts have held that the limitations period is the same as the period for similar injuries to real property. See, e.g., *Frustuck v. City of Fairfax*, 212 Cal. App. 2d 345, 374 (Court of Appeals, 1st Appellate Dist) (holding that the statute of limitations for constitutional takings is the 5-year statute of limitations for adverse possession rather than the 3-year period for trespass) and *Baker v. Burbank-Glendale-Pasadena Airport Authority*, 705 P.2d 866, 867–868 (Cal. 1985) (applying *Frustuck v. City of Fairfax*); *Webb v. Greenwood County* 229 S.C. 267, 273–74 (1956) (using the statute of limitations for damage or injury to real estate); *and Klumpp v. Borough of Avalon*, 202 N.J. 390, 397 (N.J. 2010) (adopting 6-year statute of limitations for injury to real estate because the 30-year period for adverse possession is too long to wait before bringing a takings case). See also 139 A.L.R. 1288 and 30 A.L.R. 1190 (citing cases with statutes of limitation for takings).

The statute of limitations period does not start until the claim arises. A regulatory takings claim generally cannot be considered until (1) all the administrative appeals have been exhausted to reach a final decision on the permit request, and (2) the plaintiff is unable to receive just compensation from the state government. *Williamson County Regional Planning Comm’n v. Hamilton Bank of Johnson City*, 473 U.S. 172 (1985).

³⁸¹ See *supra* § 3.2.1.

³⁸² LAND TRUST ALLIANCE, AMENDING CONSERVATION EASEMENTS (2007)

³⁸³ *Id.* at 32.

³⁸⁴ *Id.* at 48.

³⁸⁵ *Id.* at 48.

³⁸⁶ See *id.* at 55 (suggesting a moderate risk for amendments that affect conservation purposes both positively and negatively).

³⁸⁷ HORNBOOK ON PROPERTY, *supra* note 203, at 177–179. A commonly cited summary of the Rule Against Perpetuities is: “No interest is good unless it must vest, if at all, not later than twenty-one years after the death of some life in being at the creation of the interest.” JOHN CHIPMAN GRAY, RULE AGAINST PERPETUITIES, 4th ed. 199 (1942). The objective of the rule was primarily to prevent landowners (particularly in their wills) from creating situations in which land may change hands in unpredictable ways based on how people used the land, whether a remote descendant had children, or other unpredictable factors. The Rule does not apply to future interests in which the land reverts back to an original owner; that owner’s title is already vested. Reversion after a term of years is similarly viewed as vested because it is certain that the number of years will pass.

³⁸⁸ *Id.* at 179.

³⁸⁹ See *supra* notes 247–253 and accompanying text for a brief discussion of the law’s longstanding discomfort with future interests in land.

³⁹⁰ New Hampshire (H.B. 1270, Chapter 228 (2008)) completely eliminates the possibility of reverter except for charities and land trusts. California has converted all possibilities of reverter to the similar interest known as power of termination. CAL. CIV. CODE § 885.020. See *supra* notes 246–252 and accompanying text (discussing power of termination).

³⁹¹ *E.g.* N.Y. REAL PROP. § 345(4) (requiring an interest holder to re-register interest every 9 to 10 years or forfeit it); *and* CAL. CIV. CODE § 885.030 (every 30 years).

³⁹² *E.g.*, R.I. CODE § 34-4-19 (20 years); MD. CODE ANN., REAL PROP. § 6-101 (30 years); N.C. GEN. STAT. § 41-32 (60 years); Florida Real and Personal Property Code § 689.18 (21 years); *and* OREGON CODE § 105.770 (30 years). The statutes regulating possibility of reverter have no time limit for Massachusetts, New York, Virginia, and California. See VA. CODE ANN. § 8.01-255.1; MASS. CODE REGS., CH. 260 § 31A; N.Y. REAL PROP. § 345; *and* CAL. CIV. CODE § 885.030, respectively.

³⁹³ *E.g.*, VA. CODE ANN. § 8.01-255.1 (10 years).

³⁹⁴ See, *e.g.*, New Hampshire H.B. 1270 Chapter 228 (2008) (government and charities); R.I. CODE § 34-4-20 (to the state, a railroad or utility; or for public, charitable or religious purposes); N.Y. REAL PROP. § 345 (to governmental entity or for reversion on a lease of communication, transportation or transmission lines);

MD. CODE ANN. REAL PROP. § 6-105 (exception if government reserves possibility of reverter); N.C. GEN. STAT. § 41–32 (owned by government or charity); FLORIDA REAL AND PERSONAL PROPERTY CODE § 689.18 (governmental, educational, literary, scientific, religious, public utility, public transportation, charitable or nonprofit corporation); *and* CAL. CIV. CODE § 885.030 (oil, gas, mineral extraction).

³⁹⁵ N.Y. REAL PROP. § 345(9)(a) (2010); *and* FLORIDA REAL AND PERSONAL PROPERTY CODE § 689.18(7).

³⁹⁶ N.Y. REAL PROP. § 345(9)(b) (2010). OREGON CODE 105.770 does not specifically exempt events unrelated to the land’s use, but it only applies to “a special limitation or a condition subsequent, which restricts a fee simple estate in land,” which would not include a rise in sea level.

³⁹⁷ U.S. CONST. ART. VI § 2.

³⁹⁸ U.S. v. Albrecht, 364 F.Supp 1349 (D. N.D. 1973) *aff’d* 496 F.2d 908 (8th Cir. 1974) (federal government may obtain conservation easements not recognized by state property law).

³⁹⁹ See *supra* § 2.2.

⁴⁰⁰ U.S. v. Milner, 583 F. 3d 1174, 1190 (9th Cir. 2009) (holding that where boundary between two private parties is mean high water, “[o]nce the shore has eroded so dramatically that the property owner’s shore defense structures fix the ambulatory boundary, the upland owner cannot expect to permanently maintain the boundary there without paying damages to the tideland owner or working out an agreement with the tideland owner”).

⁴⁰¹ Linda Aurichio et al. v. Howard D. Menashe, A121073, (Court of Appeals of California, First Appellate District, Division Four, May 12, 2009) (not to be published in official reports) (adjusting boundary between private landowners to reflect migration of structures and landscaping on slowly sliding lands, based on the doctrine of relative hardship).

⁴⁰² See SAX, *supra* note 65, at 313–343.

⁴⁰³ The regulations sometimes prohibit flag lots (i.e., a lot with very little frontage on a public road other than a driveway) unless there is no practical alternative. See, *e.g.*, PRINCE GEORGE’S COUNTY [MARYLAND] ZONING CODE. § 24-138.01.

⁴⁰⁴ *E.g.*, PRINCE GEORGE’S COUNTY ZONING CODE § 27-441(b) (allowing flag lots in a conservation subdivision).

⁴⁰⁵ CHARLESTON SC SUBDIVISION REGULATIONS § 8.7.4 (2010) (allowing flag lots “when the buildable

area of a parcel is restricted due to the presence of a natural resource...”).

⁴⁰⁶ Dona R. Christie. *Of Beaches, Boundaries, and SOBS*. 25 JOURNAL OF LAND USE 35, 36 (2009).

⁴⁰⁷ See, e.g., *Scureman v. Judge*, 747 A.2d 62, 68 (Del. Court of Chancery, Sussex 1999), *People v. William Kent Estate Co.*, 242 Cal. App. 2d 156 (1966), and *Trs. of Internal Improvement Fund v. Ocean Hotels, Inc.*, 40 Fla. Supp. 26, 32 (1974).

⁴⁰⁸ See e.g. *Town of South Hero v. Wood*, 898 A.2d 756, 762–764 (Vermont) 2006 (distinguishing from case in Texas applying a statute that implicitly provided for a rolling easement).

⁴⁰⁹ See e.g. *Scureman v. Judge*, 747 A.2d 62, 68–69 (Del. Court of Chancery, Sussex 1999).

⁴¹⁰ See e.g. *id.* (declining to apply the rolling easement concept to a roadway because the road was on a dedicated parcel rather than an easement).

⁴¹¹ Ian White, *GLO says no to ‘static’ easements on West End*, GALVESTON COUNTY DAILY NEWS (November 26, 2010). “Because it is illegal for the state to spend taxpayers’ money on private land, [the holding in *Severance v. Patterson*] throws into doubt the land office’s legal position should it place any sand on an area of beach [that courts] eventually rules to belong to an individual homeowner.” *Id.* “Without a perpetual, rolling easement granted by the property owners, the project cannot move forward.” GENERAL LETTER FROM JERRY PATTERSON, COMMISSIONER, TEXAS GENERAL LAND OFFICE (December 2010) (sent to people who inquired about the suspension of planned beach nourishment in the aftermath of *Severance v. Patterson*).

⁴¹² In *Severance*, the court stated that the public beach easement along West Galveston Island rolls as long as shore erosion is gradual (at least within a given parcel) which implies that an easement that rolls with a gradually retreating shore would be a recognized property interest. Because it would be more practical to negotiate, inspect, and enforce an easement that rolls with the shore regardless of the cause of shore erosion, it follows that a rolling easement would be a recognized property interest in Texas.

⁴¹³ See *supra* notes 85 and 261

⁴¹⁴ EMORY WASHBURN, *A TREATISE ON THE AMERICAN LAW OF EASEMENTS AND SERVITUDES* 239 (Little Brown and Company, Boston 1873)

⁴¹⁵ *Id.* at 258.

⁴¹⁶ Easements may be extinguished by an Act of God. *Id.* at 656. Once established, an easement may not be relocated by dominant tenant. *Id.*

⁴¹⁷ *Id.* at 683.

⁴¹⁸ *Id.* at 238.

⁴¹⁹ *Id.*

⁴²⁰ *Id.* at 235–238.

⁴²¹ *Id.* at 237–238.

⁴²² See *supra* § 3.2.1 Easements, Conservation Easements, and Covenants

⁴²³ See *supra* note 395 and accompanying text.

⁴²⁴ The holder generally must own land nearby, however, for the easement to “run with the land” (i.e., bind subsequent owners of the land). See notes 209–213 and accompanying text (easements) and § 3.2.1.4 (covenants).

⁴²⁵ NATIONAL CONFERENCE OF COMMISSIONERS ON UNIFORM STATE LAWS (1982).

⁴²⁶ ALA. CODE § 35-18-1 *et seq.* (2010); ALASKA STAT. § 34.17.010 *et seq.* (2010); D.C. CODE § 42-201 *et seq.* (2010); GA. CODE ANN. § 44-10-3 (2009); LA. REV. STAT. ANN. § 9-1271 *et seq.* (2010); 33 ME. REV. STAT. § 476 *et seq.* (2010); MISS. CODE ANN. of 1972 § 89-19-1 *et seq.* (2009); OR. REV. STAT. ANN. § 217.715 *et seq.* (2010); S.C. CODE ANN. § 27-8-10 *et seq.* (2009); TEX. CODE ANN. § 183.002; and VA. CODE ANN. § 10.1-1009 *et seq.* (2010).

⁴²⁷ The Georgia Uniform Conservation Easement Act adds “except that a conservation easement may not be created or expanded by the exercise of the power of eminent domain.” GA. CODE ANN. § 44-10-3. The Virginia code adds: “A holder may acquire a conservation easement by gift, purchase, devise or bequest.” VA. CODE ANN. § 10.1-1010.

⁴²⁸ E.g., N.C. GEN. STAT. § 121-37 and DELAWARE CONSERVATION CODE § 6902. New Jersey mentions condemnation explicitly: “A conservation restriction [can]...be acquired in the same manner as other interest in land [and] may be acquired by gift, purchase or devise and, in the case of the State or local unit, by condemnation.” N.J. STAT. ANN. § 13:8B-1.

⁴²⁹ E.g., MD. CODE ANN., REAL PROP. § 2-118; FLORIDA REAL AND PERSONAL PROPERTY CODE § 704.06.

⁴³⁰ E.g., CAL. CIV. CODE § 815.2(a). “A conservation easement is an interest in real property voluntarily created and freely transferable in whole or in part for the purposes stated in Section 815.1 by any lawful method for the transfer of interests in real property in this state.” FLORIDA REAL AND PERSONAL PROPERTY CODE § 704.06 excludes acquisition by eminent domain.

⁴³¹ A court may have to investigate the legislative intent. If the intent of precluding eminent domain is to prevent involuntary creation of conservation easements,

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then exacted conservation easements are not permissible unless they are viewed as voluntary. If the intent is to control government expenditures, then the restriction does not prevent an exacted conservation easement.

⁴³² The Supreme Court cases on exactions have treated them as involuntary and hence, as potential takings. See, e.g., *Nollan v. California Coastal Comm'n*, 483 U.S. 825, 837 (1987) (the “permit condition ... is ‘an

out-and-out plan of extortion.” (quoting *J. E. D. Associates, Inc. v. Atkinson*, 121 N. H. 581, 584, 432 A.2d 12, 14–15 (1981))). Although that opinion is binding on whether an exaction is a taking under the U.S. Constitution, it does not control how a state court interprets the word “voluntary” in an easement enabling statute.

⁴³³ That concern can be avoided if the developer conveys the rolling easement to a land trust.

CHAPTER 5

ADVANTAGES AND DISADVANTAGES OF ROLLING EASEMENTS

The academic literature on responses to sea level rise has been relatively enthusiastic⁴³⁴ about rolling easements because they are likely to cost society less than other ways to ensure that wetlands and beaches migrate inland.⁴³⁵ Actual implementation of the concept, however, depends on the perceptions of property owners, developers, land trusts, and regulatory agencies. For voluntary measures, both sides of the transaction have to view it as beneficial—or at least not objectionable. For regulatory measures, if either the public or a class of property owners views the approach as harmful, it may be politically impractical. In this chapter we examine the advantages and disadvantages of rolling easements for the community at large (Section 5.1) and the owners of coastal lands that would eventually give way to the rising sea (Section 5.2).

5.1 TO THE COMMUNITY AT LARGE

The advantages to the environment and community of a rolling easement depend on whether the land would otherwise (Section 5.1.1) be protected or (Section 5.1.2) be given up to the rising sea, as well as the procedures for implementing such policies. In many cases, it is impossible to be sure today what would happen without a rolling easement. Given that we do not know what the future would otherwise hold, it may be useful to consider all of the possible outcomes,

and then evaluate whether the expected outcome from a rolling easement is preferable to the range of possibilities without a rolling easement.

5.1.1 If Shore Protection is Expected Otherwise

If the land would otherwise be protected, then rolling easements can help a community to:

- Enable shoreline habitats to adapt naturally to the rising sea, sustaining wetlands, beaches, and species that depend on them for survival (see Photos 25 to 27);
- Avoid increased taxes to pay for elevating infrastructure or dikes with pumping systems;
- Avoid loss of waterfront views caused by a dike or seawall (see Photo 28), or the loss of access for launching small boats from the shore;
- Mitigate eventual intra-community fights about whether to protect certain vulnerable areas, because a plan is negotiated when the consequences are far enough in the future for people to be reasonable;⁴³⁶
- Avoid hazardous habitation of lands below sea level;
- Reduce flood insurance rates if the National Flood Insurance Program community rating system gives community credit for planning for sea level rise;⁴³⁷ and
- Promote community awareness and dialogue about long-term sea level rise.

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Photos 25 to 27. Rolling easements can help sustain species that depend on wetlands for survival. Top: Mollie Beattie Coastal Habitat Community on Mustang Island, Texas. (March 2004). Middle: Marsh along the shores of Aransas Bay, Rockport Texas (March 2004). Bottom: Two men harvesting shellfish at low tide from mudflats in Murrell's Inlet, South Carolina (April 2004). Photo source: ©James G. Titus, used by permission.

The resulting disadvantages include:

- Initial costs of obtaining rolling easements and continuing costs of inspecting and managing them;
- Costs associated with relocating homes or abandoning them and finding new homes;
- Non-economic costs of relocation;⁴³⁸
- The need to resist political pressure to abandon the retreat policy; and
- Litigation costs when owners attempt to avoid the terms of the rolling easement.

5.1.2 If Retreat Will Occur with or without a Rolling Easement

If the land will otherwise be given up to the rising sea, the advantages and disadvantages depend on whether the area would be developed and later abandoned, or simply remain undeveloped.

If the land will otherwise be kept undeveloped solely because of future shoreline change,⁴³⁹ a rolling easement policy can help the community to:

- Avoid having to choose between
 - A large-scale purchase of expensive coastal lands or
 - Constitutional takings challenges (some of which may be successful) and continual efforts by landowners and their allies to repeal or obtain exceptions to the no-development policy;
- Avoid having to pick a particular elevation (or distance from the shore) for a setback line inland of which development will be allowed (creating problems if and when the shore retreats to that point);
- Maintain the property tax base until the land is submerged, by allowing the land to become developed; and
- Enable more people to live within walking distance of the shore rather than having to drive or enjoy the shore less often.

The possible disadvantages of rolling easements compared with preventing development include all



Photo 28. Dikes and Seawalls Can Block Views of the Beach and the Water. Sea Bright, New Jersey (August 2003). Photo source: ©James G. Titus, used by permission.

of the disadvantages listed in Section 5.1.1 (costs of managing the easement, relocation, moving, and lost buildings) as well as one other important disadvantage: Some governments may eventually decide to relax rolling easement regulations. And some landowners may challenge recorded rolling easements in court rather than acquiesce in the submergence of their homes. Although a well-drafted rolling easement would survive legal challenge, land trusts may have to spend considerable resources defending them (unless they are drafted to ensure that the landowner pays all of the costs of any unsuccessful legal challenges). By contrast, if development is prevented, shore protection will be very unlikely.

Another possible disadvantage is that the initial cost to a local government of obtaining rolling easements may be greater than the initial cost of preventing development. *In some cases* the only way to obtain rolling easements would be to purchase them, while regulations preventing development in the low-lying lands could be accomplished without a constitutional taking of land requiring compensation. In such cases, the total social cost to the community would still be

greater for preventing development than for a rolling easement, because the landowner who loses the benefits of the development is also part of the community. But if a locality's budget is constrained, it may prefer to achieve a given objective with the least expenditure of its own funds (and regulate) rather than spend more public funds to adopt a policy with a lower total social cost (purchase rolling easements).⁴⁴⁰

If the land will otherwise be developed but later abandoned to the rising sea, a rolling easement can:

- Diminish eventual intra-community fights about whether to protect certain vulnerable areas because a plan and legal requirements will already be in place;
- Reduce unexpected losses from economic and emotional investments in properties that are unexpectedly abandoned by owners who were planning to remain for a long time;
- Avoid the hazards associated with substandard shore protection that subsequently fails (see Photo 29), and the human toll from an unexpected community abandonment;⁴⁴¹



Photo 29. Living Below Sea Level Can Be Hazardous if Shore Protection Fails. Downtown New Orleans after the failure of dikes along the Industrial Canal. (Aerial view from a U.S. Navy helicopter. August 31, 2005.)

- Lower flood insurance rates if the National Flood Insurance Program community rating system gives the community credit for planning for sea level rise;⁴⁴²
- Promote community awareness and dialogue about long-term sea level rise; and
- Enable a community to avoid having to choose between
 - a large-scale buyout of land and structures or
 - the political and legal challenges associated with ordering people to abandon homes in which they wish to stay (which may require a buyout as well).

There are relatively few disadvantages to adopting a rolling easement policy for those areas which, in the absence of a rolling easement, would still be developed and abandoned—other than the short-term administrative cost of choosing the policy now instead of later. With or without rolling

easements, land will be developed, and later the structures will be removed. The only difference is that with rolling easements, people have decades of notice that the land will be abandoned. With this eventuality, rolling easements decrease (but do not eliminate) intra-community conflict about the retreat policy, costs associated with removing structures, and losses of community infrastructure.

5.2 TO LANDOWNERS

5.2.1 The Tax Advantages When Donated

The tax benefits from conservation easements are well established, and land trusts take considerable care both to inform potential donors about tax rules and to ensure that their own operations conform to the tax code so that tax deductions for their donors are not jeopardized. A tax-deductible donation of a possibility of reverter, by contrast,

would often not be practical;⁴⁴³ so this section focuses on shoreline migration conservation easements. (The tax implications of an affirmative rolling easement for beach access would be similar.⁴⁴⁴) We start with some background about the tax implications of conservation easements in general, and then look at how those concepts apply to rolling easements. This chapter does not provide tax advice, and its analysis of tax laws cannot be used to avoid tax penalties.

5.2.1.1 Conservation Easements

For standard conservation easements, both the land trust and the landowner generally assume that without the conservation easement, the land may eventually become developed and lose key environmental functions.⁴⁴⁵ With that assumption, the conservation easement benefits the public and the environment by maintaining the environmental functions of the property in its natural state. The property owner loses the opportunity to develop the land, which reduces its market value. But the tax code provides several tax advantages, which are generally worth a significant fraction (e.g. 50 percent) of the decline in market value. An investor-landowner who is planning to eventually sell or develop the land will be unwilling to provide a conservation easement unless the land trust will make up the difference (e.g. pay for the diminution in value minus the tax savings). But a landowner with no intention of selling or developing could view the tax savings as, in effect, a reward for a conservation ethic that he is already following; so he may gladly donate an easement. Owners concerned about both conservation and the value of the estate they pass on to their heirs may require some payment, but less than what an investor would require.⁴⁴⁶

There are two primary sources of tax savings for most property owners. First, the donation of an easement is a charitable contribution⁴⁴⁷ equal to its fair market value,⁴⁴⁸ which is generally the diminution in land value resulting from the restrictions.⁴⁴⁹ Although the deduction is limited to 30 percent of one's adjusted gross income, the deduction can be spread out over many years.⁴⁵⁰

Second, the diminution in value lowers the assessment for property taxes.⁴⁵¹ These two provisions can, in effect, refund about half the value of a donated easement to the property owner. In addition, property subject to a conservation easement may be partly excluded from the inheritance tax, for those with estates large enough to be subject to that tax;⁴⁵² and in some states conservation easements entitle the landowner to a lower property tax rate.

This chapter does not provide tax advice, and its analysis of tax laws cannot be used to avoid tax penalties.

The size of these tax incentives, in effect, can overcompensate some landowners given their objectives. If the land would not have been developed for decades anyway, the conservation easement has no impact during the next several decades. And yet the owner is compensated by the tax system based on market value, which assumes the owner could develop now. As a numerical illustration, consider the owner of a farm assessed at \$1,000,000 whose profits from farming only justify a property value of \$200,000.⁴⁵³ The diminution in value from a conservation easement (and hence the income tax deduction) would be \$800,000. If the landowner plans to not develop the property in his lifetime, which he assumes to be 30 more years, from his standpoint the conservation easement means that upon his death his heirs would inherit a farm worth \$200,000 instead of \$1 million. At a 5 percent rate of return, \$185,000 today would grow to \$800,000 by that time, so paying the owner \$185,000 today would compensate him for the expected decline in the value of his estate. In some cases, the income tax savings from the \$800,000 tax deduction alone would be worth more than \$185,000.⁴⁵⁴ In other cases, the decline in property taxes combined with the income tax deduction would be worth more than \$185,000. Table 3 provides the details for a hypothetical owner in the 33 percent income tax bracket (federal and state) and a property tax rate of 1 percent of market value. In this case, the tax

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Table 3. Numerical Illustration of the Tax Consequences of a Conservation Easement (assuming constant dollars and 5 percent rate of return unless otherwise stated)

	Owner's original plan: do not develop, and leave property to children upon death in 30 years	Place land under conservation easement, and leave property to children upon death in 30 years
Land Value	1,000,000 ¹	200,000 ¹
Annual Property Tax	10,000 ²	2,000 ²
Income Tax Deductions		
Property Tax	10,000	2,000
Charitable Contribution		
Years 1–16 ³	–	50,000 ³
Years 17–30	–	–
Annual Income Tax Benefit		
Years 1–16	3,300 ⁴	17,160 ⁵
Years 17–30	3,300 ⁴	660 ⁴
Present Values of Taxes Minus Tax Benefits ⁶		
Property Taxes Paid	153,725 ⁷	30,745 ⁷
Minus Savings From Income Tax Deduction for:		
Charitable Contribution	–	(185,976) ⁸
Property Tax	(50,729) ⁷	(10,146) ⁷
Total Taxes, 5% rate of return	102,995	(165,377)
Total Taxes, 3% rate of return	131,323	(189,284)
Value of Tax Savings from Conservation Easement Invested After 30 years		
Charitable Contributions ⁹		843,967
Property Tax Savings ¹⁰		350,752
Total Tax Savings, 5% rate of return		1,194,719
Total Tax Savings, 3% rate of return		788,533
Value of the Estate 30 Years Hence ¹¹		
Assuming 5% rate of return	1,000,000	1,394,719
Assuming 3% rate of return	1,000,000	988,553

NOTE: This table excludes reduced inheritance taxes, which may be substantial in some cases.

1. Hypothetical values.
2. Assumes that property tax is 1 percent of assessed value.
3. Assumes that owner's adjusted gross income is \$166,667/year and that owner donates easement on ¼ of the property every 4 years, with each deduction spread out over a 4-year period.
4. Value of deductions for property taxes, assuming 33 percent combined federal, state, and local marginal tax rate.
5. Value of deductions for charitable contribution and property taxes, assuming 33 percent marginal income tax rate.
6. Discount rate is 5 percent unless stated otherwise.
7. Calculated as the present value of a 30-year stream of property taxes or income tax deductions for property taxes, at a 5-percent discount rate.
8. Calculated as the present value of a 16-year stream of income tax savings from the charitable contribution.
9. Assumes that the 16-year stream of income tax savings is invested at a 5% rate of return.
10. Assumes that the property tax savings (net of any higher income taxes) is invested at a 5% rate of return.
11. Calculated as Land Value plus Total Tax Savings

savings (if invested) would grow to between \$800,000 and \$1,200,000 over the 30-year period (constant dollars), depending on the discount rate, which would be roughly comparable to (or slightly more) than the decline in market value from the conservation easement. If the tax savings alone are greater than the value of what the landowner gives up, economists might say that the tax system “overcompensates” the landowner.

The overcompensation occurs because there is a class of property owners who are, in effect, already giving something to society by not developing their land *now*. But they are not getting a tax deduction for that sacrifice. By agreeing to *never* develop their land, they are given a tax deduction for both the additional sacrifice and for the current sacrifice. As a result, the total tax savings can be greater than the value of the additional sacrifice, providing some compensation for the sacrifice the owner is already making. In the extreme case where the owner and his heirs would never develop or sell the land anyway, the tax savings are very attractive.

5.2.1.2 Rolling Easements

Unlike the typical conservation easement, a rolling easement is likely to have a small impact on the land’s market value and the resulting tax savings, except for very low-elevation or erosion-prone properties whose demise is relatively imminent. The present value of protecting an eroding farm that would otherwise be gradually consumed over a 300-year period would be about 7 percent of the farm’s value (assuming, for example, a 5 percent discount rate);⁴⁵⁵ the diminution in value from a rolling easement should be the present value of the lost property minus the cost of the shore protection. In areas where development is unlikely or precluded by existing policies, the cost of shore protection may be greater than the land value,⁴⁵⁶ which is why shore protection is rare in many rural areas.⁴⁵⁷ The rolling easement would not lower the market value of such land; so donating it should neither create a tax deduction nor lower the assessed valuation for purposes of the property tax.

For home lots, by contrast, the diminution in value from a rolling easement is likely to be unambiguous—albeit small. For example, at a 5 percent discount rate, the certain loss of a home fifty years hence reduces the property value by 9 percent if shore protection would otherwise be free.⁴⁵⁸ If the shore protection cost would be 1/6 of the property value⁴⁵⁹ fifty years hence, the rolling easement would reduce the property’s value by about 7.5 percent.⁴⁶⁰ On a \$500,000 home, this would be a deduction of \$37,500, worth about \$12,500 for someone in the 33 percent income tax bracket. One may also obtain property tax savings of a few hundred dollars per year (e.g., a 7.5 percent reduction on a property tax bill of a few thousand dollars). More typically, however, if the loss of the home will be one hundred years hence (with similar shore protection costs), then the rolling easement will reduce the property value by about \$3,000, below the \$5,000 threshold requiring an appraisal to document the value of the deduction.⁴⁶¹ These estimates of the market value of a rolling easement each assume that landowners would protect their property without the rolling easement. There is some chance, however, that shore protection is not a property right, and that a government agency would not allow shore protection.⁴⁶² These calculations also assume that buyers and sellers all have the same expectations about the risk of sea level rise to the property.

The actual impact of a rolling easement on market value could be *greater* if (for example) potential homebuyers fear a higher rate of sea level rise than commonly assumed, or if they simply resist purchasing lands subject to the easement.⁴⁶³ The impact could be *less* if the market tends to underestimate the expected loss from improbable events, which some studies imply.⁴⁶⁴ Those cases where the impact on market value is empirically greater than suggested by standard formulas would be particularly good candidates for donated rolling easements, because the donor’s tax deduction would be greater than the true impact of the rolling easement on the property.⁴⁶⁵ Cases where the market value is less than the intrinsic value would be better candidates for purchased

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rolling easements, because the price would be lower—or exacted rolling easements, because a trivial impact on property values would meet less resistance from developers, and be less likely to require substantial just compensation even if it were found to be a taking.

To the extent that tax incentives motivate donations of conservation easements, land trusts are likely to find donations of rolling easements more difficult to obtain than donations of standard conservation easements. For some owners, the fair market value of a conservation easement is many times what it would take to induce them not to develop their land because they do not want to develop anyway. So if the tax system provides an inducement equal to 30–50 percent of the decline in their property value, it is a good deal for them. For donations of rolling easements to be attractive based on tax savings alone, there would have to be a class of landowners who are already inclined to avoid shore protection, and would therefore view the tax benefits of a rolling easement as more than enough compensation to formally agree to avoid shore protection. But there is probably not a large class of homeowners or developers with a strong commitment to seeing their property submerged below a rising sea.⁴⁶⁶

Nevertheless, rolling easements could provide tax savings sufficient to induce owners to donate them if the guarantee of future shoreline migration persuades land trusts to accept conservation easements for land where they would otherwise not be willing to accept them. Consider, for example, the owner of a \$1 million lot with one home on one acre, which can be subdivided into five lots. If the owner subdivides and puts four of the lots under a conservation easement, the tax consequences will be similar to the case of the \$1 million farm we just discussed. (See Table 4.) Today, the owner would probably be unable to find a land trust willing to accept a conservation easement on this property, because the conservation value of keeping one acre of

moderate-density housing from becoming higher-density is minimal. A land trust (or government agency) attempting to ensure wetland migration, however, may be willing to accept a rolling easement on the parcel with a condition of no additional development—especially if the one-acre lot is adjacent to an area the trust is already preserving, and several owners are all interested in the same arrangement. In such a case, the tax benefits from an \$800,000 decline in market value would become available. In this example, the donation of rolling easements would partly compensate landowners on moderate-density residential property for resisting market forces that would otherwise lead to dense development where shore protection would be inevitable. This result could also be achieved with transferable development rights (as discussed in Section 3.4.2).

Moreover, if markets were to substantially overvalue rolling easements due to buyer resistance, the tax benefits could even justify donating a rolling easement that did not restrict development. For example, at a 5 percent rate of return, the present value of losing a \$200,000 parcel 150 years hence would be \$132. Yet real estate experts may advise people against buying homes with rolling easements, which might (for example) depress the market value by 5–10 percent. If such a market impact could be substantiated by a qualified appraisal,⁴⁶⁷ then the resulting tax deduction of \$10,000–\$20,000 could be viewed as overcompensation by someone who expected his family to keep the property until the end, especially if he was more doubtful than the conventional wisdom about either future sea level rise or the feasibility of shore protection. But until valuation studies are available, appraisers will have to account for uncertainty by using standard economic formulae (such as the Black-Scholes method for valuing options⁴⁶⁸) which do not assume irrational buyer resistance, using an estimate of the probability distribution of future sea level rise.

5.2.2 When Sold at Fair Market Value

By definition, a rolling easement sold for fair market value is not a charitable contribution. The tax consequences of a rolling easement are similar to the consequences whenever one sells part of his land: If the land has appreciated, then there may be a taxable capital gain; and the market value of the remaining property declines by the sale price, which in turn should reduce the assessed valuation and property taxes proportionately. Because rolling easements are new, however, some tax assessors may be reluctant to recognize the resulting decline in fair market.⁴⁶⁹ Nevertheless, a tax assessor would be more likely to rely on the results of an actual sales transaction than to rely on the estimate of an appraiser; so sales of easements are more likely to reduce property taxes than donations.

5.2.3 Exacted Rolling Easements

Easements exacted as a permit condition are unlikely to provide tax benefits, but the permit itself would be a substantial benefit to a developer who transfers a rolling easement. Exacted rolling easements would not be charitable contributions, because they would be transferred in exchange for something of value (the permit). Real estate taxes are unlikely to decline, because the permit enhances the property value. Nevertheless, an exacted rolling easement could still benefit a developer more than it costs. Just as a buyer of rolling easements can adjust the purchase price to the level necessary to induce a sale, a land use authority committed to ensuring landward migration of wetlands may be able to adjust what is awarded by the permit. A small increase in allowable density, for example, could be sufficient inducement for a developer to voluntarily transfer a rolling easement on the property.⁴⁷⁰

Other advantages to a developer are possible. Most lots in the typical coastal development would not be along the water, and some potential buyers of non-waterfront land may be more attracted to the idea of a community with a sustainable vision of its response to sea level rise than they are put off by the fact that in the very long run, their homes would be submerged—perhaps because other communities with no plan for rolling easements are not necessarily safer. Moreover, the eventual loss of their homes may⁴⁷¹ only occur after a period during which their land would be waterfront; in many cases, the value of owning waterfront land for a few decades would be greater than the cost of completely losing the land thereafter.⁴⁷² Those buyers who are not concerned about sea level rise, by contrast, may view the rolling easement as costing nothing because they do not expect the sea to rise much within their planning time horizon.

Risks to a developer are also possible. No one knows whether an extreme buyer resistance to rolling easements will arise, though fear of this being the case might deter some developers. There is little evidence of an irrational buyer resistance in Texas, where most—but not all—property along the Gulf of Mexico has been subject to a rolling easement which has been regularly enforced. Nevertheless, if buyer resistance unreasonably depressed the value of land subject to a rolling easement, it could be reasonable to add a safety valve. For example, in a neighborhood where land is unlikely to be submerged for 75 years, restrictions could provide that the home will not have to be abandoned during the next 75 years. Such a provision would have a minimal impact on the environmental result of the rolling easement, while assuring the buyer that the rolling easement will not disrupt his enjoyment of the land for at least the next 75 years. This safety valve might threaten the deductibility of a donated conservation easement,⁴⁷³ but exacted rolling easements would not be tax-deductible anyway.

NOTES AND REFERENCES

⁴³⁴ See, e.g., IPCC, *supra* note 110, at 368–369; U.S. GLOBAL CHANGE RESEARCH PROGRAM, *supra* note 110, at 87; CALDWELL & SEGALL, *supra* note 159; Donna McMahon, *The Republic of George's Island: One Man against the Elements*, 442 NATURE 222 (2006); Megan Higgins, *Sea Level Rise Impacts on Beaches and Coastal Property*, 1 SEA GRANT L. & POL'Y J. 43, 51 (2008); and Mark Stallworthy, *Sustainability, Coastal Erosion and Climate Change: An Environmental Justice Analysis*, 18 J. ENVIRONMENTAL LAW 357–373 (2006).

⁴³⁵ See generally MARYLAND LAW REVIEW, *supra* note 7.

⁴³⁶ Cf. generally, JOHN RAWLS, A THEORY OF JUSTICE (1971)

⁴³⁷ “The CRS has been developed to provide incentives for communities to go beyond the minimum floodplain management requirements to develop extra measures to provide protection from flooding.” NATIONAL FLOOD INSURANCE PROGRAM, FLOOD INSURANCE MANUAL CRS-1 (May 2005).

⁴³⁸ The human toll from relocation depends partly on whether it is well planned or occurs unexpectedly. Gradual abandonment can cause blight. “If homes are destroyed during a storm, communities can be severely disrupted by the sudden absence of neighbors who previously contributed to the local economy and sense of community. People forced to relocate after disasters are often at increased risk to both health problems and depression.” CCSP, *supra* note 3, at 100 (references omitted).

⁴³⁹ If the land is certain to remain undeveloped, the retreat pathway is likely with or without rolling easements along most parts of the U.S. coast. See ENVIRONMENTAL RESEARCH LETTERS, *supra* note 14.

⁴⁴⁰ Supreme Court holdings on the takings clause have generally been designed to discourage the government from pursuing social goals by singling out a few property owners to pay the cost of achieving public purposes that could more reasonably be achieved by spending government funds and sharing the burden among all taxpayers. *Dolan v. City of Tigard*, 512 U.S. 374, 396 (1994). Regulations that generally benefit most or all property owners provide a reciprocal advantage to all. See generally *Armstrong v. United States*, 364 U.S. 40, 48 (1960). Abraham Bell & Gideon Parchomovsky, *Takings Reassessed*, 87 VA. L. REV. 277, 278 (2001) (explaining that courts and scholars have struggled to draw a principled boundary between valid exercises of the police power and regulatory takings); *Nollan/Dolan?* Andrew W. Schwartz, *Reciprocity of Advantage: The Antidote to the Antidemocratic Trend in Regulatory Takings*, 22 UCLA

J. ENVTL. L. & POL'Y 1 (2003); and Joseph L. Sax, *Takings and the Police Power*, 74 Yale L.J. 36, 69 (1964). Basic nuisance law and a possible reading of *Penn Central* imply that a taking is less likely when the social benefit of a restriction is greater than the cost to the landowner. However, the regulatory takings cases do not currently require that a given objective be met at the least cost.

⁴⁴¹ See *supra* note 438

⁴⁴² See *supra* note 437.

⁴⁴³ I.R.C. § 170(f)(3) disallows deductions for a contribution of “less than the taxpayer’s entire interest,” with a few exceptions that do not apply. A developer who retains a possibility of reverter can take the deduction because the possibility of reverter is all that remains after selling the fee simple determinable to homebuyers; however, such “donations” may be business expenses anyway, especially if the possibility of reverter is exacted as a permit condition. Landowners who intend to retain a fee simple determinable while transferring a possibility of reverter to a land trust would generally own nothing but the possibility of reverter for a period of time during which it is donated to the land trust, *supra* note 260, and seemingly qualify for the deduction. But the IRS may look at the transaction as a whole, which is a donation of less than the entire interest.

⁴⁴⁴ See I.R.C. § 170(h)(4)(a)(i) (“For purposes of this subsection, the term “conservation purpose” means...(i) the preservation of land areas for outdoor recreation by, or the education of, the general public....”)

⁴⁴⁵ See, e.g., DEBRA WOLF GOLDSTEIN, THE HERITAGE CONSERVANCY, USING CONSERVATION EASEMENTS TO PRESERVE OPEN SPACE: A GUIDE FOR PENNSYLVANIA’S MUNICIPALITIES 27 (2002) [hereinafter HERITAGE CONSERVANCY].

⁴⁴⁶ For example, if the owner is provided a payment that, if invested along with the tax savings, will grow enough to equal the diminution in value by the time of the landowner’s expected death, the owner can leave his heirs an estate with the same value as if he simply refrains from development and does not attach a conservation easement to the property.

⁴⁴⁷ I.R.C. §§ 170(a), 170(f)(3)(B)(iii), & 170(h).

⁴⁴⁸ 26 C.F.R. § 1.170-1(e).

⁴⁴⁹ The value of the easement donated is calculated as the difference between the market value before and after the conservation easement is created. See, e.g., *Hilborn v. Commissioner*, 85 T.C. 677, 688 (1985).

⁴⁵⁰ I.R.C. § 170(b)(1)(B)(i). The deduction can be carried over for the next five years. I.R.C. § 170(b)(1)(B).

The total charitable deduction is limited to 1.8 times the taxpayer's adjusted gross income. *Id.* If the total value of a conservation easement is 3.6 times one's gross income, one may donate a conservation easement worth 1.8 times the adjusted gross income one year, and donate a conservation easement on the rest of the property 6 years later,

⁴⁵¹ See, e.g., Daniel C. Stockford, *Property Tax Assessment of Conservation Easements*, 17 B. C. ENVTL. AFF. L. REV. 823, 831 n.47 (1990) (listing statutes that specifically require a reduction in assessed valuation of land subject to a conservation easement for Connecticut, Florida, Georgia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, North Carolina, Pennsylvania, and Virginia). Nevertheless, land trusts often warn potential donors that their assessment for property taxes may not decline as much as the market value declines. *Id.* at 826.

⁴⁵² 26 U.S.C. § 2031 (a) and (c).

⁴⁵³ In *Stotler v. Commissioner*, for example, the tax court accepted a landowner's claim that a conservation easement reduced the value of a coastal property by 91 percent. 53 T.C. 973 (1987).

⁴⁵⁴ A taxpayer with adjusted gross income of \$2.5 million at the 40% marginal (federal and state) income tax rate could deduct the entire \$800,000 during the year of the donation, for an income tax savings of \$320,000. But a taxpayer with an adjusted gross income of \$100,000 could only deduct \$30,000 per year, and the marginal tax rate would be lower. See *supra* note 450.

⁴⁵⁵ At a discount rate of 5%, a farm with profits of \$50,000/year would be worth \$1,000,000. If the farm lost 1/300 of its land each year and hence profits declined by \$166.67 each year, then the present value of the income stream would be \$930,000 (7 percent decline). At a 3% discount rate, the present value would be \$890,000 (11 percent decline).

⁴⁵⁶ E.g., preventing an entire farm from being eroded or inundated would often cost more than \$70,000.

⁴⁵⁷ See, e.g., ENVIRONMENTAL RESEARCH LETTERS, *supra* note 14.

⁴⁵⁸ I.e., $1/(1.05^{50})=0.087$, which is approximately 9 percent. Although shore protection is not free, if it is subsidized with no cost to the landowner, then it does not lower the fair market price of a rolling easement.

⁴⁵⁹ A typical revetment costs about \$200/foot, so a 100-foot revetment would cost about \$20,000. See, e.g., Sorenson et al., 1986. Trucked-in sand often costs approximately 50 cents to one dollar per cubic foot. Therefore, elevating a 10,000-square-foot lot by one

foot would cost \$5,000–\$10,000. Elevating homes can cost tens of thousands of dollars.

⁴⁶⁰ If the cost of shore protection 50 years hence would be one-sixth the current property value, then the present value of the future shore protection cost avoided would be one-sixth of the present value of losing the property, calculated in note 458 (about 1.5 percent), and the net impact on today's property value would be the difference.

⁴⁶¹ 26 C.F.R. § 1.170A-13(c)(2)(i)(A).

⁴⁶² If one could assess the probability that a court would find that there is no right to shore protection (**A**) and that the government would not allow shore protection (**B**), then the value of a rolling easement should be further discounted by that likelihood (**A** times **B**), in the case of a donation to a land trust. If an easement is purchased by the very agency that could issue the permit for shore protection, the value need only be discounted by the likelihood that there is no right to shore protection (**A**).

⁴⁶³ Cf., Ben Lansink & Ward Lansink, APPRAISALS AND CONSULTING, DIMINUTION IN VALUE, INJURIOUS AFFECTION: NON-VISIBLE EASEMENTS (Toronto 2010) (buyer resistance to easement that did not affect use of existing property caused 14 percent reduction in property value); and P.J. Rohan, *The Model Condominium Code: A Blueprint for Modernizing Condominium Legislation*, 78 COLUM. L. REV. 587, 595 (1978) (warning of buyer resistance to poorly understood condominium restrictions).

⁴⁶⁴ E.g., H. Kunreuther & M. Pauly, *Neglecting Disaster: Why Don't People Insure against Large Losses?* 28 JOURNAL OF RISK AND UNCERTAINTY 5–21 (2004); and K. J. Arrow, *Risk Perception in Psychology and Economics*, 20 ECONOMIC INQUIRY 1–9 (1982).

⁴⁶⁵ This assertion assumes that the owner intends to retain the property until submergence, or will sell it to someone who correctly values the implication of the rolling easement. For additional discussion on how tax deductions for contributing conservation easements can be greater than the actual impact on the donor. See *supra* notes 446–451, Table 3, and accompanying text.

⁴⁶⁶ There may be a significant number of oceanfront landowners who would be willing to provide an affirmative rolling easement to allow access along the dry beach seaward of the dune, as long as such an easement did not have priority over their own use of the land, such as dune maintenance and keeping a home that encroaches seaward of the dune. Such easements might not significantly reduce property values and hence may have a negligible tax benefit. They might even benefit the property. See *supra* note 411 (discussing suspension of beach nourishment in West

Galveston until waterfront landowners conveyed rolling easements).

⁴⁶⁷ The IRS requires appraisals to be based on comparable sales information where it is available. 26 C.F.R. § 1.170A-14(h)(3)(i). There is generally not a resale market for conservation easements themselves because the primary value of a conservation easement does not accrue to the easement holder but to society and posterity. IRS rules require considering comparable sales of properties with and without the restriction. *Id.* But reliable information is often unavailable because the potential for development varies site by site. Even if a neighbor has sold an easement to a land trust, the sale might not be comparable. The future loss of a property, by contrast, would be a straightforward function of elevation and projected sea level rise—and shore protection costs are easily estimated. Appraisals often include adjustments for differences between the properties when those differences are readily quantified. See, e.g., *Stotler v. Commissioner*, 53 T.C. 973 (1987). Therefore, the market value of a rolling easement can probably be substantiated by a comparable sale for other properties with similar elevations, with differences in the market price of the property providing the basis for adjusting the market price of a rolling easement. For a discussion of the economics of qualified appraisals, see James Boyd, Kathryn Caballero, & R. David Simpson, *The Law and Economics of Habitat Conservation: Lessons from an Analysis of Easement Acquisitions* (Resources for the Future Working Paper No. 9932, 1999)

⁴⁶⁸ Fischer Black & Myron Scholes, *The Pricing of Options and Corporate Liabilities*, 81 THE JOURNAL OF POLITICAL ECONOMY 647–654 (1973). Because the value of a rolling easement declines exponentially with the year by which the land will be submerged, the high end of the uncertainty range for sea level rise dominates the value of a rolling easement.

⁴⁶⁹ *Cf. supra* note 451.

⁴⁷⁰ The increase in density required to offset the impact of the rolling easement depends on the profits per unit, and the impact of a rolling easement on property values. This type of inducement is the

temporal equivalent of transferable development rights. The period extending from now until whenever the property becomes threatened is the receiving epoch, while the more distant future is the sending epoch. Given the relative present values of a rolling easement and a development permit, a fairly small number of additional units should generally be sufficient inducement for a developer to place a rolling easement on all but the most low-lying (but easily protected) lands.

⁴⁷¹ This scenario would occur on an eroding shore or along estuaries with at least a small slope proceeding inland. In areas with ridges or natural levees along the shore and minimal erosion, the inland parcels could be submerged while waterfront parcels remain habitable.

⁴⁷² For example, at a 3 percent discount rate, the value of a 26-year estate is slightly greater than half the value of owning the land forever (i.e. fee simple absolute). Therefore, if the premium for being waterfront doubles the value of the land, one would be slightly better off with a waterfront lot that will be lost in 24 years than a nonwaterfront lot that will be retained forever. At a 5 percent discount rate, the break-even point would be 17 years. *But cf. supra* notes 463–465 and 467–468 and accompanying text (no research is available on whether markets would overvalue or undervalue rolling easements, and suggesting that donations are appropriate if markets overvalue while purchases or exactions are appropriate if markets undervalue the easements).

⁴⁷³ The requirement for the restrictions that apply *in perpetuity* may also imply that they must not be postponed significantly. *Cf.* 26 C.F.R. § 1.170A-14(g) (disallowing deduction for a remainder interest if the current tenants are allowed to undertake activities that reduce the conservation purpose of the donation in a subsection defining the general requirements of “in perpetuity”). Allowing a home to remain on site for 75 years, however, is not the same as allowing shore protection for 75 years; so allowing the home to remain for 75 years may be consistent with the conservation objective.

CHAPTER 6

DEFINING HOW IT WILL WORK

If rolling easements look promising and one has the legal authority, then the next step is to carefully plan the specifics about how it will work and where it should apply. This chapter addresses two key specifications of a rolling easement:

1. What is the boundary that rolls inland?
2. What restrictions should be imposed on the land inland and seaward of that boundary?

Chapter 7 considers where rolling easements might be most useful. Finally, chapters 8 and 9 examine the process for ensuring compliance, with a focus on recorded rolling easements.

6.1 THE ROLLING DESIGN BOUNDARY: WHICH RESOURCES AND RIGHTS ROLL INLAND?

A rolling easement can be based on whichever definition of shoreline is most appropriate for achieving the objectives of the policy. Rolling easements can use more than one rolling design boundary if, for example, it is important to prevent seawalls or new buildings on the beach, but the easement holder or government regulator can tolerate existing homes on the beach until they regularly stand under the runup of ocean waves (see Figure 2 on page 16). More generally, a rolling easement can be designed to ensure that wetlands and beaches have room to migrate inland and that either:

- *Existing public access (or a particular coastal ecosystem) along the shore migrates inland* (Section 6.1.1);
- *The area of public access (or habitat) initially shrinks before migrating inland.* The public's access along the shore currently includes some areas inland of the rolling boundary; so as the shore erodes, the area of public access will decline until the rolling boundary reaches the existing inland limit of public access, after which public access will migrate inland. Alternatively, conservation areas currently preserve areas inland of the rolling boundary; so the area of shoreline habitat will decline until the rolling boundary is inland of what is now a buffer, at which point habitat zones will migrate inland (Section 6.1.2); or
- *The rolling boundary is set landward of the current public access boundary,* so the public will have more access along the shore than it has today (Section 6.1.3).

How each of these goals is achieved will depend on the existing inland boundary of public access or regulatory authority, and whether that boundary or a more seaward boundary migrates under the public trust doctrine (see Table 4). We discuss each of these three possible objectives in turn. We also briefly consider property rights issues and look at a few rolling easement approaches based on elevation or the passage of time, rather than a rolling design boundary.

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Table 4

Example Options for the Rolling Design Boundary for Various Combinations of the Public Trust Boundary and Inland Extent of Public Access or Regulatory Jurisdiction

Existing boundaries		Options for Rolling Design Boundary				
Public Trust Boundary	Jurisdiction: access or regulation? Which? Extends to	Places where this combination applies	Rolling Boundary	Basis for Rolling Boundary	Issues (e.g. mechanism for rolling easement or notable aspect of the outcome)	
<i>The protected habitat or public access boundary will migrate inland as the shore retreats.</i>						
Mean high water	R	Spring high water	Estuaries in many states	Spring high water	Easement or wetland regulation	Rolling easement that prevents shore protection.
Dune Vegetation Line	A	Dune Vegetation Line	New Jersey, Louisiana, and Hawaii	Dune Vegetation Line	Common Law	Regulation or easement that prohibits shore protection.
Mean high water	A	Dune Vegetation Line	States other than NJ, LA, and HA.	Dune Vegetation Line	Example new statute	Possible taking in some cases
Mean high water	A	Dune Vegetation Line	Texas	Dune Vegetation Line	Easements for beach nourishment	New policy. Until 2010 state assumed property law was the same as in NJ, LA, HA.
Mean high water	A	Mean high water	Estuaries in many states	Mean high water	Common Law	Regulation or easement that prohibits shore protection.
<i>The protected habitat or area of public access will shrink at first and migrate inland thereafter.</i>						
Mean high water	A	Dune Vegetation Line	Developed beaches in many states	Mean high water	Common Law	Pedestrian access along ocean shore becomes impractical as access gradually narrows from dry beach to areas covered with waves
Mean high water	A	Dune Vegetation Line	Same as above	Actual observed average high water mark	Easements or example new law	Pedestrian access narrows but remains. Courts might find that public trust doctrine always provided access to actual water mark.
Mean high water	R	Spring high water	Estuaries in many states	Mean high water	Common Law	Rolling boundary from nuisance law.
<i>The protected habitat or area of public access is extended inland as part of the new policy</i>						
Mean high water	A	Mean high water	Several states in places with "private beaches"	Dune Vegetation Line	Easements for beach nourishment	Similar to existing federal policy which requires public easement before beach nourishment, except the easement would roll.

A = Public access is the focus of the design boundary.

R = Habitat protection (e.g. land use restriction) is the focus of the design boundary.

6.1.1 All Existing Resources and Boundaries Roll Inland

Preserving Beaches and Wetlands. The most commonly examined⁴⁷⁴ approach to rolling easements is to use one or more boundaries that are already established. The rolling easement just ensures that the boundaries roll inland, typically by preventing shore protection.⁴⁷⁵ Most existing regulatory rolling easement policies along ocean beaches prevent shore protection structures on or seaward of the dunes, but show flexibility on removal of buildings that are on the beach as a result of erosion,⁴⁷⁶ unless they encroach seaward of the boundary between public and private land (often the mean high tide line). Many of the same states have rolling setback policies that limit new construction within a given distance inland of the dune vegetation line.⁴⁷⁷

Rolling easement policies along marshes are rare. The design boundary is generally the upper edge of tidal wetlands,⁴⁷⁸ or a given distance inland of the marsh.⁴⁷⁹ Shore protection structures can block the inland migration of mudflats, vegetated wetlands, and estuarine beaches (see Photos 30 to 32). If preserving intertidal habitat is the goal, a policy can prohibit structures seaward of the inland edge of the particular habitat (e.g. below spring high water). If the goal is to preserve both tidal wetlands and a 50-foot buffer along the wetlands, structures can be prohibited within 50 feet of the landward boundary of the tidal wetlands. If the goal is to avoid flood damages or preserve floodplains, a rolling easement policy can prohibit new or rebuilt structures in the 10-year (or any other frequency) floodplain. In these three examples, a rolling easement could either require removal of all structures seaward of (or touching) the rolling design boundary, or allow nonconforming structures that were landward of the boundary when built to remain for a defined period or until repairs are necessary. Shore protection structures, however, will have to be removed regardless because they defeat the fundamental purpose of the rolling easement.



Photos 30 to 32. Shore protection structures can block the inland migration of mudflats, vegetated wetlands, and estuarine beaches. Top: a retaining wall along tidal flats in Westchester County, New York (March 2003). Middle: a bulkhead along a tidal marsh in Monmouth, New Jersey (September 2003). Bottom: a bulkhead along South Jamesport Beach in Riverhead, New York (September 2006). Photo source: ©James G. Titus, used by permission.

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Public Access. A rolling easement does not always have to explicitly address public access to ensure that it migrates inland. Along estuaries, public access is generally up to the mean high water line according to the public trust doctrine⁴⁸⁰; as long as human activities allow the intertidal zone to migrate inland, the public will continue to have pedestrian access, albeit inland. Public access extends to mean high water along many ocean beaches as well.⁴⁸¹ (See Figure 3 on page 19 and Section 2.2.2.) But along oceans, mean high water is out where small waves break during high tide, making pedestrian access impractical. This limited public access will automatically migrate inland, such as it is. In a few states, the public trust doctrine provides access up to the dune vegetation line.⁴⁸² As long as the dunes can migrate inland, the public access will follow in those states.⁴⁸³

Even in states where the public trust doctrine only provides access below mean high water, the public has access along some beaches up to the dune vegetation line, for reasons other than the public trust doctrine. In such places, a rolling easement must expressly articulate that access up to the vegetation line will migrate inland as the vegetation line migrates; otherwise, the line of public access will not migrate and the public access way will eventually narrow.⁴⁸⁴ In the case of a shoreline migration conservation easement, the landowners will often be most concerned about restrictions on shore protection and requirements to remove the buildings as the shore retreats. Owners may be willing to agree to provisions allowing the public access way to migrate inland, if they are satisfied with the restrictions on shore protection and maintaining their homes.

For government regulations, by contrast, migrating public access (beyond what would happen automatically from the public trust doctrine) can raise property rights issues. In Texas, there was some confusion from 1986 until 2010 about whether the boundary of the public's *legal* right to access along the beach migrates inland with the dune vegetation line, or if the boundary remains fixed where it was when public

access was established. The state's *policy* was that the access migrates inland, and the state assumed that it was simply implementing a longstanding public access right that had been explicitly codified.⁴⁸⁵ But in 2010, the Texas Supreme Court held that although the mean high water line (which defines land ownership) is a rolling boundary, the public access boundary does not roll.⁴⁸⁶ In effect, the court held that the state's policy to ensure that dry beach access is a rolling easement had reset the rolling design boundary inland from mean high water to the dune vegetation line, without a statutory basis for doing so.⁴⁸⁷ After the court ruling, the state suspended planned beach nourishment projects until beachfront landowners agreed to transfer rolling easements on their properties,⁴⁸⁸ which would have been unnecessary under the previous interpretation of Texas law.

Roads and other shorefront land uses. As with public access, a rolling easement meant to ensure that roads, utilities, parks, or waterfront businesses are able to migrate inland must explicitly say that the boundary migrates inland, and specify the shoreline with which they migrate. If a 50-foot roadway about 70 feet inland of the beach is the objective, for example, then the rolling easement could provide for a road easement to all dry land within 120 feet inland of the vegetation line. In this case, nonconforming structures may also have to be removed if they encroach more than (for example) 10 feet because they will become road hazards and otherwise defeat the purpose of the rolling roadway easement.

6.1.2 The Area of Habitat or Public Access Initially Shrinks before Migrating Inland.

Some landowners negotiating shoreline migration easements may agree to forgo shore protection, but not agree to the automatic inland migration of all existing legal and natural boundaries. State or local governments may conclude that the inland migration of some boundaries is essential to putting a community on a retreat pathway, but that requiring other boundaries to migrate inland

would unreasonably interfere with private property rights. In either case, the rolling easement that results will provide for an initial narrowing of the public resources along the shore, after which the remaining rolling boundaries will migrate inland with the retreating shore.

Public Access. Along beaches to which the public has access for reasons other than the public trust doctrine, the boundary of public access is generally a fixed line. Existing rolling easement regulations in such areas generally do not ensure that the boundary of public access migrates inland. As a result, the portion of the beach to which the public has access might narrow until the public trust boundary⁴⁸⁹ reaches the fixed line of public access. From that day on, public access will migrate inland; but it would only include the public trust lands. The public's ability to use the beach would be impaired—especially if homes remain seaward of the dune vegetation line (see Photos 33 to 35).

As a practical matter, public access up to the dune vegetation line has often been established based on the longstanding use of the beach, under various legal doctrines.⁴⁹⁰ If the public continues to use the beach up to the dune vegetation line, then public access along the shore could migrate inland, not as a matter of law, but through the repeated re-establishment of new public easements.⁴⁹¹ Landowners are entitled to prevent trespassing. Whether they do so depends on the energy of the wave environment, because posting signs or fences is impractical, hazardous, and often prohibited along shores with substantial waves (compare Photos 36 and 37 with Photos 33 to 35). Nevertheless, homes standing on the beach tend to discourage pedestrian access.

A conscious recognition that the public access line does not roll inland with the dune vegetation line would not necessarily mean that access along the shore must eventually be reduced to only those areas below mean high water. Some landowners may agree to allow the public to walk along the shore some distance seaward of the dune line, which could be set sufficiently inland of mean high water to provide a reasonable pedestrian way, but



Photos 33 to 35. Most states show flexibility on removal of buildings on the beach as a result of erosion. Top: Westerly, Rhode Island (March 2003). Middle: Kitty Hawk, North Carolina (June 2002). Bottom: Folly Beach, South Carolina (April 2004). Photo source: ©James G. Titus, used by permission.

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sufficiently seaward of the vegetation line to not interfere with the owners' use of their property. In many states, courts have not explicitly decided whether the public has access to the part of the beach between the average high water mark (or wet/dry line) and mean high water; so it is possible that in some states where private ownership extends down to mean high water (or even mean low water) the common law would allow access below the average high water mark.⁴⁹² Thus a regulation that sets the public access line as the average high water mark might not interfere with existing property rights, and a shoreline migration easement that sets public access accordingly may be viewed as a clarification rather than setting the access line seaward of where the law requires.⁴⁹³

Wetlands. The state as *property owner* can prohibit construction and other activities on public trust wetlands, typically low marsh. *Regulations* restrict the conversion of privately owned tidal wetlands to dry land.⁴⁹⁴ A state may be able to persuade a court to order removal of shore protection that blocks the inland migration of public trust tidal wetlands under the common law of nuisance.⁴⁹⁵ If so, a regulation that requires the same thing does not impair property rights. But

that argument does not apply to shore protection that prevents privately owned dry land from becoming privately owned high marsh. Although no court has decided the question, a state or local government might decide that it lacks the authority to ensure the migration of high marsh, and accordingly set the rolling design boundary at mean high water. As a result, the high marsh would be lost while the low marsh continued to migrate inland. Similarly, a landowner negotiating a shoreline migration easement might agree to forgo shore protection but not to remove the home until it is submerged at low tide. Such an arrangement would enable the public access line and wetlands to migrate inland, but the building line would—in effect—be reset to mean low water, before rolling inland.

*The accommodation pathway*⁴⁹⁶ can also narrow habitat or public access initially, before migrating inland. (Accommodation is a general response to sea level rise in which people continue to occupy an area but shore protection is precluded.⁴⁹⁷) For purposes of shore protection, the rolling design boundary along an estuary may be the upper edge of wetlands. But the boundary defining removal of homes may be well seaward of the upper edge of



Photos 36 and 37. Where the wave climate is reasonably light, landowners are better able to discourage trespassing on the dry beach. Left: fences along the dry beach of Long Island Sound (Knollwood Beach, Connecticut; March 2003). Right: a sign along the shore of Orient Harbor near the eastern end of Long Island. (Orient, New York; September 2006). Photo source: ©James G. Titus, used by permission.

tidal wetlands (e.g. mean low water)—or might not roll at all.

6.1.3 Inland Redefinitions of Public Access and Other Boundaries

As a general rule, a rolling easement policy need not be the occasion to reset the shoreline boundary defining where the public has access. The purpose of the rolling easement is to ensure that the inland boundary of shoreline habitat or public access migrates inland along with the retreating shore, *not* to push that limit farther inland relative to the shore. Nevertheless, a rolling easement policy can also be adopted as part of a government policy or private transaction that clarifies or modifies the public access boundary for other reasons. In many states, for example, the public has greater access along the ocean than along other bodies of water;⁴⁹⁸ eventually a uniform set of rules may be adopted in a given state. Shore protection policies and projects often re-define the private/public boundary from mean high water to the dune vegetation line, to ensure that publicly funded beach nourishment is only provided to beaches that are open to the public.⁴⁹⁹ Rolling easements can also be part of such transactions.⁵⁰⁰

Along estuarine shores, even though the public (usually) owns up to mean high water, a policy designed to allow wetlands to migrate inland may require structures to be removed once they encroach seaward of the tidal wetlands, which generally extend to spring high water (or farther).⁵⁰¹

6.1.4 Property Rights Issues

The question of what the design boundary should be for environmental and safety reasons is different from the question regarding payment to landowners. A rolling easement policy under which the existing public-trust boundary migrates inland might not require compensation under the U.S. Constitution or the common law (especially in an undeveloped area) because this boundary has

migrated inland for centuries, and landowners do not have an expectation of maintaining a home that stands in state-owned waters. A policy that provides for the inland migration of public access obtained by other means is more likely to alter property rights and require compensation. The Texas Supreme Court, for example, limited the situations in which the dry beach easement rolls inland, relying on the Legislature's intent to not alter property rights; but it also explicitly stated that the holding did not apply to the public/private boundary established by the public trust doctrine.⁵⁰²

Resetting the public/private boundary inland of where it is today would be even more likely to require compensation. Along estuarine shores, a rolling easement that requires removal of a home on *privately owned* wetlands above mean high water would interfere more with the reasonable expectations of a landowner than would a requirement to remove a structure standing in shallow water or the *publicly owned* wetlands below mean high water.

6.1.5 Alternatives to a Rolling Design Boundary

A rolling easement policy can also be based on time or migration of the shoreline. For example, instead of prohibiting shore protection without qualification—which existing rolling easement policies typically do—an easement or regulation could allow shore protection for a specific period (e.g., 75 years) to provide some assurance of property value.⁵⁰³ Such a qualification may be particularly appropriate if shore protection is unlikely to be needed before then anyway, because the environmental result is likely to be the same as if there were no qualification. But ensuring that the rolling easement will not take the property for two generations can help make a potential home buyer more willing to buy land subject to the easement, and hence make a developer more willing to place rolling easements on an entire development.

Structures can also be prohibited based on time alone. For example, the existing shoreline could be

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surveyed and a seaward limit line could be specified to move inland by five feet per year. Such a predetermined rate would only roughly correspond with the natural shore migration, but it would provide property owners with certainty regarding their land tenure. This approach may be useful for lands likely to be vulnerable within a few decades, during which time a community may be willing to temporarily provide beach nourishment or artificial wetland accretion if shorelines migrate faster than assumed.⁵⁰⁴ Existing setback policies already use a linear extrapolation of historic erosion rates to prevent construction on land likely to be eroded.

Finally, a rolling easement policy can be based on sea level. Restrictions could be based on the elevations of land relative to the rising sea. Alternatively, land could revert to another owner when the sea rises to a particular level.⁵⁰⁵ In this case, if entire parcels revert at once, one would have to pick a single elevation to represent vulnerability to sea level rise. Alternatives include the average elevation of the parcel and the elevation of the home site. If a survey shows the home site to be 4 feet above the upper edge of low marsh vegetation in an area where the boundary between low and high marsh is recognized as mean high water, then a 4-foot rise in sea level would submerge the home site in the absence of shore protection. In such a case, the deed might specify that the land reverts when sea level rises 4 feet above the current level.⁵⁰⁶

One could pick a nearby station where NOAA regularly measures sea level, and specify (for example) that when average annual sea level rises 4 feet above sea level for the current tidal epoch as measured by NOAA at that station (or the nearest station if NOAA later changes procedures), the land will revert. Alternatively, a deed might transfer title based on measured sea level relative to a benchmark elevation. If the home site is 7 feet above the North Atlantic Vertical Datum, then the deed might specify that when mean high water at that location reaches an elevation of 7 feet above the North Atlantic Vertical Datum, the land

reverts.⁵⁰⁷ In the former case, creation of the rolling easement requires agreement regarding the current land elevation relative to sea level, to establish a baseline; but over time it would be relatively easy for all of the parties to keep track of (or prove to a court) how much sea level had risen at the NOAA tide station.⁵⁰⁸ In the latter case, the deed could be drafted based on an elevation survey (or lidar elevation data), but it may be necessary to install a tide gauge and collect data for a suitably long period of time to determine sea level at that location.

6.2 RESTRICTIONS IMPOSED BY THE ROLLING EASEMENT

6.2.1 Seaward of the Rolling Design Boundary

Whether by regulation or interest in land, the most essential part of a rolling easement is the set of rights transferred from the coastal landowner to the local government or land trust. Seaward of the boundary, the rights potentially altered concern:

- Limits on shore protection;
 - Ban on shore protection structures,
 - Allow grade elevation?
 - Allow beach nourishment?
 - Material for grade elevation (if allowed);
- Ban on new structures of any type;
- Excavation;
- Removal of structures (stated period of time before structures must be removed)
 - Homes and other primary buildings,
 - Utility buildings,
 - Structures that alter shoreline processes whether or not originally intended as shore protection (e.g., retaining walls, driveways)
 - Other structures;
- Management of structures (before removal is due)
 - Repair rules,
 - Access rules,
 - Rules for relocation within parcel,

- Timing for removal,
- Rules on who can use them,
- Rent for the temporary continued use;
- Transfer of title (in the case of interests in land);
- Public access (in the case of rolling easements intended to ensure access);
- Permissible uses once the land becomes submerged (in areas where submergence does not transfer title to the state public trust);

This list highlights two key decisions: (1) whether to prevent all shore protection or just shoreline armoring; and (2) whether and when to require removal of buildings. Existing rolling easement policies generally allow ocean beach nourishment because adding sand to the system can offset erosion without impairing access along the beach. But placing soil onto wetlands can destroy them; and grade elevation inland of the wetlands prevents them from migrating inland. A rolling easement can be designed to remove buildings as soon as the building encroaches seaward of the rolling boundary or as late as never, with many possibilities in between. The timing of the required removal could depend on both the objective of the rolling easement and the logistics of removing

homes and businesses from developed areas.

Removal of homes need not be the goal of every rolling easement. A community’s plan might be to follow the accommodation pathway rather than retreat, in which case allowing homes to remain when an area becomes marsh or open water would be consistent with the plan (see Photos 38 and 39). Similarly, a key objective might be to ensure that low-lying waterfront owners do not elevate land or build dikes in ways that would slow drainage and increase flooding of adjacent lands that are slightly higher. Finally, even in an area where the ultimate goal is to retreat, a local government or land trust might assume that it lacks the resources or political ability to eject people from their homes, and prefer to let the state resolve this issue once the land is seaward of the public/private boundary; that eventuality would be ensured by the prohibition of shore protection. In all these cases, the rolling easement makes an eventual retreat more likely without actually forcing it to occur.

Even if the purpose of the rolling easement is to ensure that the entire footprint of human activities moves inland, some flexibility in the timing can reduce litigation costs, and help the landowner



Photos 38 and 39. Homes standing in tidal waters. A rolling easement would not necessarily require immediate removal of homes seaward of the rolling design boundary. Left: Gulf of Mexico, near Surfside, Texas (March 2006). Right: Forbes Bay, Elizabeth City (October 2002). Photo source: ©James G. Titus, used by permission.

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more than it harms the environment. Especially along a south-facing shore, marsh grasses can grow next to and even under a home elevated 10 to 12 feet above spring high water. Even if the home did impair marsh grasses, it might cover a very small part of the parcel. Yet to the landowner, continuing to have the home until his children (or grandchildren) are grown could make the required relocation far more palatable. If a storm destroys the house in the meantime, an owner is generally more willing to accept the need to move than if ejected by a court, and the economic damages attributable to the rolling easement are much less.⁵⁰⁹ These reasons for not immediately ejecting the owner when the property encroaches seaward of the rolling boundary do not necessarily mean that the flexibility should be in the original easement document. It may be more efficient for a rolling easement to have a specific requirement to remove the home once there is an encroachment, and then allow for renegotiation of the terms, if both parties agree, once submergence becomes imminent.⁵¹⁰

6.2.2 Landward of the Rolling Design Boundary

The objective of a rolling easement is to ensure that resources seaward of the rolling boundary can

migrate inland. But the uses of land that is inland of that boundary matter because that land will eventually be seaward of the boundary. Rights landward of the boundary that might be transferred include:

- Restrictions on grading;
 - No grading that increases land elevation,
 - Limited to a fraction of the property?
 - Allowed for driveway (Photos 40 and 41)?
 - Allowed for advanced septic system?
 - No foreign material brought in for grading,
 - No additional drainage ditches (which can allow saltwater into soils),
 - Excavation allowed to lower grade to create wetland habitat?
- Restrictions on construction;
 - No construction within a specified distance landward of the rolling easement boundary,
 - Design specifications for mobility, dismantling, or returning to nature without removal;
- Vegetation management;
 - No trees with large roots (whose degradation can cause subsidence),
 - No shade trees,
 - No fertilizer, and
- Limits on species of domestic animals allowed.



Photos 40 and 41. Restrictions on grade elevations might need an exception for driveways. Left: Swan Quarter, North Carolina (October 2002). Right: Middle Hooper's Island, Maryland (April 2005). Photo source: ©James G. Titus, used by permission.

Most important is prevention of activities that tend to nullify the rolling easement. If the goal is landward migration of wetlands, then increases in the elevation grades of the dry land would be, in effect, a form of shore protection. Some adjustments of grade may be needed for the temporary uses of land, such as leveling a roadway (see Photos 40 and 41) or installing an advanced septic system in an area with a high water table. Restricting foreign (off-site) material for grading would prevent the average grade from being elevated and would maintain the preexisting soil type.

The premise of a rolling easement is that the owner will continue to use the land in a way consistent with an eventual retreat. The owner is assumed to be in a better position than the government or land trust to judge whether an investment with a limited

useful life is worthwhile. Thus, the greater the restriction on construction landward of the boundary, the more the restriction resembles a setback rather than a rolling easement. Nevertheless, a rolling setback may be needed to preserve the integrity of the rolling easement. Buildings⁵¹¹ or septic systems,⁵¹² for example, are often set back from wetlands 50–150 feet; hence a rolling easement might require relocation of septic systems within 50–150 feet of the easement boundary or prohibit repairs to any system likely to be within 50–150 feet during the typical lifetime. Moreover, the drain fields from septic tanks generally must be at least 18 inches above the water table to perform properly,⁵¹³ so a rolling easement might require relocation or replacement with another type of system once the water table reaches a particular elevation (see Photo 42).⁵¹⁴



Photo 42. Mounds-based septic system next to house. Along the back side of Pickering Beach, Delaware (March 2009). Photo source: ©James G. Titus, used by permission.

NOTES AND REFERENCES

⁴⁷⁴ See, e.g., MARYLAND LAW REVIEW, *supra* note 7, at 1316 Fig 3 (showing all boundaries migrating inland).

⁴⁷⁵ See *supra* § 3.1.2.1.

⁴⁷⁶ See, e.g., TEX. NAT. RES. CODE ANN. § 61.0185 (providing for two-year delay in proceedings to remove from the beach a house that was previously landward of the vegetation, as long as it is not seaward of mean high tide); CCSP, *supra* note 3, at 173 (pictures of homes standing on the public beach at Kitty Hawk, North Carolina over a 1-year period); and *infra* Photo 35 (picture of homes standing on the dry beach at Folly Beach, South Carolina). See also *Hirtz v. State of Tex.*, 773 F. Supp. 6 (S.D. Texas 1991) (“The owners may lose their houses and their land entirely, and they have to allow public access over what used to be exclusively theirs, but they do not have to neglect the maintenance of what is actually there now.”) That opinion was later vacated on purely procedural grounds. *Hirtz v. State of Tex.*, 974 F. 2d 663 (5th Cir. 1992).

⁴⁷⁷ See *supra* note 293 and accompanying text.

⁴⁷⁸ Rhode Island’s rules prohibit shore protection along dunes, RHODE ISLAND COASTAL RESOURCES MANAGEMENT PROGRAM RULES § 210.7(D)(2); coastal barriers, *id.* § 210.2(D)(4); wetlands in Class 1 waters, *id.* § 210.3(C)(3); and beaches along Class 1 and 2 waters, *id.* § 210.1(C)(2). Construction along dune areas must be set back 30–60 times the annual erosion rate plus 25 feet inland of the crest of the primary dune, *id.* §§ 210.7 (C)(2) and 210.7(A)(2), but there is no similar setback for wetlands.

⁴⁷⁹ See, e.g., *supra* note 152 and accompanying text (discussing towns in Massachusetts that restrict grade elevation and shore protection within 50 feet inland of tidal wetlands)

⁴⁸⁰ See *supra* notes 43–54 and accompanying text.

⁴⁸¹ See, e.g., *State v. Ibbison*, 448 A.2d 728, 732 (RI, 1982). See also *supra* notes 46–47 and accompanying text.

⁴⁸² See *supra* note 51 (Louisiana), 52 (Hawaii and perhaps Washington), 58 (New Jersey and perhaps Oregon) and accompanying text.

⁴⁸³ See *supra* § 2.2.2.

⁴⁸⁴ See *supra* notes 83–88 and accompanying text.

⁴⁸⁵ See *supra* § 3.1.2

⁴⁸⁶ *Id.* The confusion resulted largely because the Open Beaches Act did not explicitly provide for the inland migration of the public easement along the dry beach as shores eroded, but instead directed the state to defend the public easement consistent with existing property rights. State officials and intermediate courts

assumed that the common law easement along the dry beach migrated inland, but in 2010 the Texas Supreme Court held that it did not (under most circumstances). And because the statute explicitly adopted the common law easement boundaries rather than explicitly providing for inland migration, and expressly said that it has no impact on land titles, the holding that the public dry beach easement did not roll under the common law implied that the statute had not created a rolling easement either. Had the statute explicitly redefined how the boundary migrated—at the risk of changing pre-existing property rights which were somewhat unclear—then by 2010, it would have been clear for 50 years that coastal property was subject to a rolling dry beach easement.

⁴⁸⁷ *Id.*

⁴⁸⁸ See, e.g., *supra* note 411 and accompanying text.

⁴⁸⁹ In many states, the inland extent of public trust access is unclear along beaches where the average high water mark is well inland of the mean high water line. What is clear, however, is that public trust access does not extend all the way to the vegetation line. See *supra* § 2.2.1.

⁴⁹⁰ See *supra* note 62–64 and accompanying text.

⁴⁹¹ See e.g. *Severance v Patterson*, No. 09-0387 (Tex. 2010) (“New public easements on the adjoining private properties may be established if proven pursuant to the Open Beaches Act or the common law”).

⁴⁹² The traditional public trust doctrine gave the public access up to the ordinary high water mark, and courts have generally held that the public has access to the entire wet beach. Court opinions defining “ordinary high water mark” as mean high water have focused on the difference between spring high water and mean high water, and not addressed the tendency for mean high water to be tens of feet seaward of the average high water mark. The cases have defined mean high water as the line that separates the wet beach from the dry beach, seemingly unaware that the wet/dry line is well inland of mean high water. See *generally, supra* § 2.2.1.

⁴⁹³ See *supra* notes 43–49 and 60, and accompanying text (citing court opinions that define the inland boundary of public ownership as mean high water but have left open the possibility that public access may extend farther inland).

⁴⁹⁴ See e.g. 33 U.S.C. § 1344.

⁴⁹⁵ See, e.g., MARYLAND LAW REVIEW, *supra* note 7, at 1371–1374 (arguing that a tideland owner could seek removal of a bulkhead as a nuisance) and *supra* notes

266–400 (discussing case where tribe owning tidelands sought removal of shore protection structure under nuisance law).

⁴⁹⁶ See *supra* § 1.1.

⁴⁹⁷ See *supra* § 1.1 for a brief discussion of the accommodation and other pathways

⁴⁹⁸ See *e.g.* TEX. NAT. RES. CODE § 61.01 (defining “public beach” as beaches along the Gulf of Mexico) and *McDonald v. Halvorson*, 780 P.2d 714, 724 (Or. 1989) (holding that the doctrine of custom which provides the public access along dry sand beaches on the Pacific Ocean does not apply to other beaches).

⁴⁹⁹ The U.S. Army Corps of Engineers requires that the public have access along and to any beaches that are nourished as part of a federal project. U.S. ARMY CORPS OF ENGINEERS, DIGEST OF WATER RESOURCES POLICIES AND AUTHORITIES 14-1: SHORE PROTECTION, EP-1165-2-1 (Washington, DC 1996). See also CCSP, *supra* note 3, at 121–122. Florida fixes the boundary at the mean high water line, and then claims all land created seaward of that line under the doctrine of avulsion. See, *e.g.*, *Walton County v. Stop the Beach Renourishment, Inc.*, 998 So.2d 1102, 1107–1109, 1115–1118 (Florida 2008).

⁵⁰⁰ See, *e.g.*, *supra* note 411 and accompanying text (citing a new policy in Texas which requires waterfront owners to convey a rolling easement on their lands before the state will place sand onto their privately owned beaches).

⁵⁰¹ See, *e.g.*, J.G. Titus & J. Wang, *Maps of Lands Close to Sea Level along the Middle Atlantic Coast of the United States: An Elevation Data Set to Use While Waiting for LIDAR*, in J.G. TITUS & E.M. STRANGE (EDITORS), BACKGROUND DOCUMENTS SUPPORTING CLIMATE CHANGE SCIENCE PROGRAM SYNTHESIS AND ASSESSMENT PRODUCT 4.1, EPA-430-R-07-004 9 & 27 (2008) (winds rather than tides determine the extent of tidal wetlands in nanotidal estuaries, and even in microtidal areas lands that are flooded irregularly by the winds can have tidal wetlands).

⁵⁰² *Severance v. Patterson*, No. 09-0387 (Tex. 2010).

⁵⁰³ Depending on how it is structured, such a safety valve may have tax consequences. See *supra* notes 244 and 473.

⁵⁰⁴ To avoid various uncertainties, a property owner and a land trust or local government may prefer to negotiate a specific abandonment date once submergence becomes imminent enough to predict with reasonable accuracy. See *infra* note 595.

⁵⁰⁵ See *supra* § 3.2.2.

⁵⁰⁶ In this situation, the entire parcel would transfer to the rolling easement holder at the same time as when the public trust doctrine would transfer ownership of the house site to the public (in most states). Regulations prohibiting grade elevation could enable wetlands to migrate inland before the reversion. In such a case, the easement holder would only own the portion of the parcel above the house site. Alternatively, a possibility of reverter could transfer ownership when spring high water submerges the home site; such a case would in effect, reset the rolling design boundary inland (or design plane upward).

⁵⁰⁷ For a discussion of reference elevations and their relationship to wetlands and sea level rise, see TITUS & WANG, *supra* note 501, at 6-24. That report includes a diagram similar to the figure in *supra* Box 2, but with the reference elevations also displayed. *Id.* at 7.

⁵⁰⁸ See *e.g.* CHRIS ZERVAS, SEA LEVEL VARIATIONS OF THE UNITED STATES: 1854–2006. (National Oceanic and Atmospheric Administration 2009). The [NOAA website](#) regularly updates sea level for stations around the United States.

⁵⁰⁹ The cost of post-storm relocation would only be the cost of vacant land, rather than the cost of land and structure.

⁵¹⁰ See *infra* notes 595–596 and accompanying text.

⁵¹¹ See, *e.g.*, CCSP *supra* note 3, at 214 (Delmarva Peninsula) and 226–227 (Chesapeake Bay).

⁵¹² TOWN OF DUXBURY, MASSACHUSETTS, SUPPLEMENTARY RULES & REGULATIONS TO THE STATE ENVIRONMENTAL CODE: TITLE 5, 310 CMR 15.000 (150 feet from wetlands).

⁵¹³ See, *e.g.*, CCSP *supra*, note 3, at 174–75.

⁵¹⁴ The most common alternative system involves building a small mound, so the parties would have to consider whether allowing the minor grading for such a system would be preferable to the alternatives. See, *e.g.*, CCSP, *supra* note 3, at 174–175.

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CHAPTER 7

DEFINING WHERE TO APPLY THE ROLLING EASEMENT

Where should wetlands, beaches, and public access along the shore move inland? This chapter examines some of the issues that localities and conservation organizations might consider. (The ultimate answer to the question depends on how all these factors are weighed, which is beyond the scope of this primer.)

7.1 DEFINING WHERE RETREAT IS PREFERABLE TO SHORE PROTECTION

There is both a private and public interest in whether a particular area is protected or given up to the rising sea. Most of the dry land along the shore is privately owned, while most shallow waters and intertidal lands are owned by the states (in trust for the public). Coastal hazards such as erosion and storms directly threaten the financial interests (and occasionally the safety) of private landowners, but public infrastructure is also threatened. Government programs often subsidize shore protection to prevent threats to private property⁵¹⁵ and cover the losses that do occur with flood insurance.⁵¹⁶ Severe storms often threaten public health, commerce, and the environment.

The private and public interests in shore protection may be aligned or they may diverge. They tend to be aligned in areas that are either very densely populated or very lightly populated. In densely developed coastal cities where land values are high, and private landowners and governments generally agree that shore protection is justified by both private investment and the

welfare of the community.⁵¹⁷ In rural areas, neither governments nor landowners tend to be interested in shore protection of land that is mostly farm and forest.⁵¹⁸ The cost of shore protection is often greater than the value of the land that could be saved, making it a bad investment for the landowner. The government often has little reason to fund shore protection, because the slow loss of undeveloped land in rural areas does not cause perceptible harm to the state or the nation, while shore protection could harm the environment by preventing the inland migration of wetlands and beaches.

The private and public interests may diverge, by contrast, along moderately developed ocean beaches and estuarine shores—for opposite reasons. Along some barrier islands and spits, the cost of shore protection is greater than the value of the property that would be protected.⁵¹⁹ As with undeveloped farmland, shore protection would be a bad investment for the landowner. But government agencies often decide that shore protection has a social value greater than its cost,⁵²⁰ and undertake publicly funded shore protection, with or without the support of adjacent landowners.⁵²¹ For example, in most states, erosion reduces the portion of the dry beach to which the public has access, while beach nourishment increases it. (See Section 2.2.)

Conversely, there are also cases where shore protection is a worthwhile investment to the landowner but counterproductive to society. For example, a group of homeowners would logically be willing to each spend \$200,000 to delay the

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loss of their \$600,000 homes by 20 years,⁵²² but doing so might not be a good investment for society overall. Perhaps the loss of those homes would otherwise increase the property values of the next row of homes by \$325,000 (i.e., from \$275,000 to \$600,000) because they would now be waterfront. In that case, the shore protection would only be deferring a social cost of \$275,000 (\$600,000 minus \$325,000), which would not be worth a current expenditure of \$200,000.⁵²³ Alternatively, perhaps shore protection would eliminate wetlands which serve an important ecological function, or would eliminate access along an important recreational beach. Or perhaps the least expensive measure of shore protection would be a dike which the community would gradually fortify as sea level rises, to the point where the entire community would eventually be below sea level and vulnerable to catastrophe during a severe storm.

Retreat policies have generally been implemented in two different types of situations:

- Shore protection has unacceptable impacts on public access and the environment.
- The cost of shore protection is high compared to the value of the assets likely to be lost as the shore retreats.

The decision to prohibit structures that harm beaches,⁵²⁴ access along beaches,⁵²⁵ or eroding-cliff habitat⁵²⁶ can be viewed as a policy judgment that the value of the natural shore is greater than the net value of the private property lost to the rolling easement.⁵²⁷ The merits of implementing a rolling easement will generally not depend on whether there is a right to hold back the sea (the *Coase theorem* makes this general point for other regulatory policies.⁵²⁸) If owning land does not inherently include a right to shore protection, retreat policies might be implemented without compensating landowners—but few governments will consciously give up taxable lands or anger property owners for the sake of a policy whose social benefits are less than the costs. Conversely, if there is a property right to shore protection, then logically a locality or conservancy should be willing

to purchase the rolling easement from the property owner to preserve a natural resource whose value is greater than the price of the rolling easement (which would be the property owners' expected loss from not holding back the sea). This does not mean that adoption of a retreat policy is equally likely whether or not there is a right to shore protection—especially if the costs are likely to be high. But if the policy is considered with sufficient lead time for the immediate costs to be low, then whether to actually adopt the policy should logically depend on whether the benefits are greater than the costs, but not on who would have to pay several decades later if this generation does not adopt a policy.

The case for a retreat policy is different for areas where shore protection would be unlikely even without a policy (see Section 5.1.2). At first glance, there seems to be no need for a retreat policy in areas where development is uneconomical (e.g., unbridged islands) or shore protection is not cost-effective. But an explicit retreat policy might be worthwhile, for several reasons:

- State and local governments may want to discourage unwise investments that put communities at risk. Property owners may undervalue the likelihood of property loss; or the community may wish to avoid hazards or nuisances that individual property owners are willing to take on.
- Where no lands seem certain to be protected, a local government may prefer to designate some lands for protection and others for retreat, both to improve prospects for environmental preservation in some areas and to define an area with improved economics for shore protection. (That approach is similar to smart-growth policies and other approaches to land use planning where some lands are designated for agriculture and open space while others are designated for extensive infrastructure and other services.⁵²⁹)
- A conservancy may prefer the certainty that a particular ecosystem will migrate inland over having to rely on property owners abandoning

lands that do not seem worth protecting today, but might be so in the future.

- The cost of implementing a retreat policy is low in an area where no one expects shore protection today. Changing economics could make development and shore protection more likely in the future, by which time the cost of adopting a retreat policy would be high.

Although the need for a retreat policy seems less in areas where retreat is likely anyway, benefits may eventually accrue; and the cost of complying with regulations or purchasing easements there would be relatively low.

For localities interested in preparing for sea level rise, one of the most urgent tasks is to define the lands likely to be armored, elevated, or yielded to the rising sea.⁵³⁰ In the context of a standard zoning ordinance, such a decision would involve designating shore protection, grade elevation, and retreat zones (see Figure 8 on page 43). In many coastal areas, planning and community processes have already weighed the need for development against the need for open space and conservation land. The same planning process could also decide between armoring, elevation, and retreat, although it might be reasonable to supplement that process with an environmental assessment of areas where the inland migration is most important.⁵³¹ Areas where wetland migration is a priority may include habitat for endangered species and places where potential migration of habitat is greatest. How state and federal policies should modify local choices is beyond the scope of this primer; but a possible precedent is existing land use policy, where localities make most of the initial site-specific decisions, while private, state, and federal acquisition programs often preserve lands that could be developed under local regulations.

7.2 DEFINING WHERE ROLLING EASEMENTS ARE PREFERABLE TO OTHER MEASURES FOR ENSURING A RETREAT

The three most commonly evaluated legal approaches for implementing retreat are (in decreasing degree of interference with private land use):

- Limit or prevent construction (setback);
- Rolling easements; and
- Curtail subsidies and rely on market forces (*laissez-faire*).

Figure 15 shows scenarios about how those options may play out over time, from the perspective of a single property owner. Figure 16 provides an aerial view that compares the initial restrictions associated with a setback policy to the later loss of homes resulting from a rolling easement policy.

The setback approach is usually preferable if it is feasible, because rolling easements are more administratively complex. Maryland limits development to one home in 20 acres along most shores that had not been developed by the 1980s⁵³² The low-density development makes shore protection relatively unlikely.⁵³³ In un-developed areas where land slopes are steep, it may be possible to ensure that all buildable lots created by new subdivisions have a house site at least 15–20 feet above the tidal wetlands. Even there, a rolling easement would provide additional assurance that wetlands will be able to migrate inland;⁵³⁴ but the policy that keeps the low land vacant makes retreat likely with or without the rolling easement. (The previous section considers whether vacant lands should be a high priority for retreat because rolling easements are more feasible, or a low priority because rolling easements might not be necessary.)

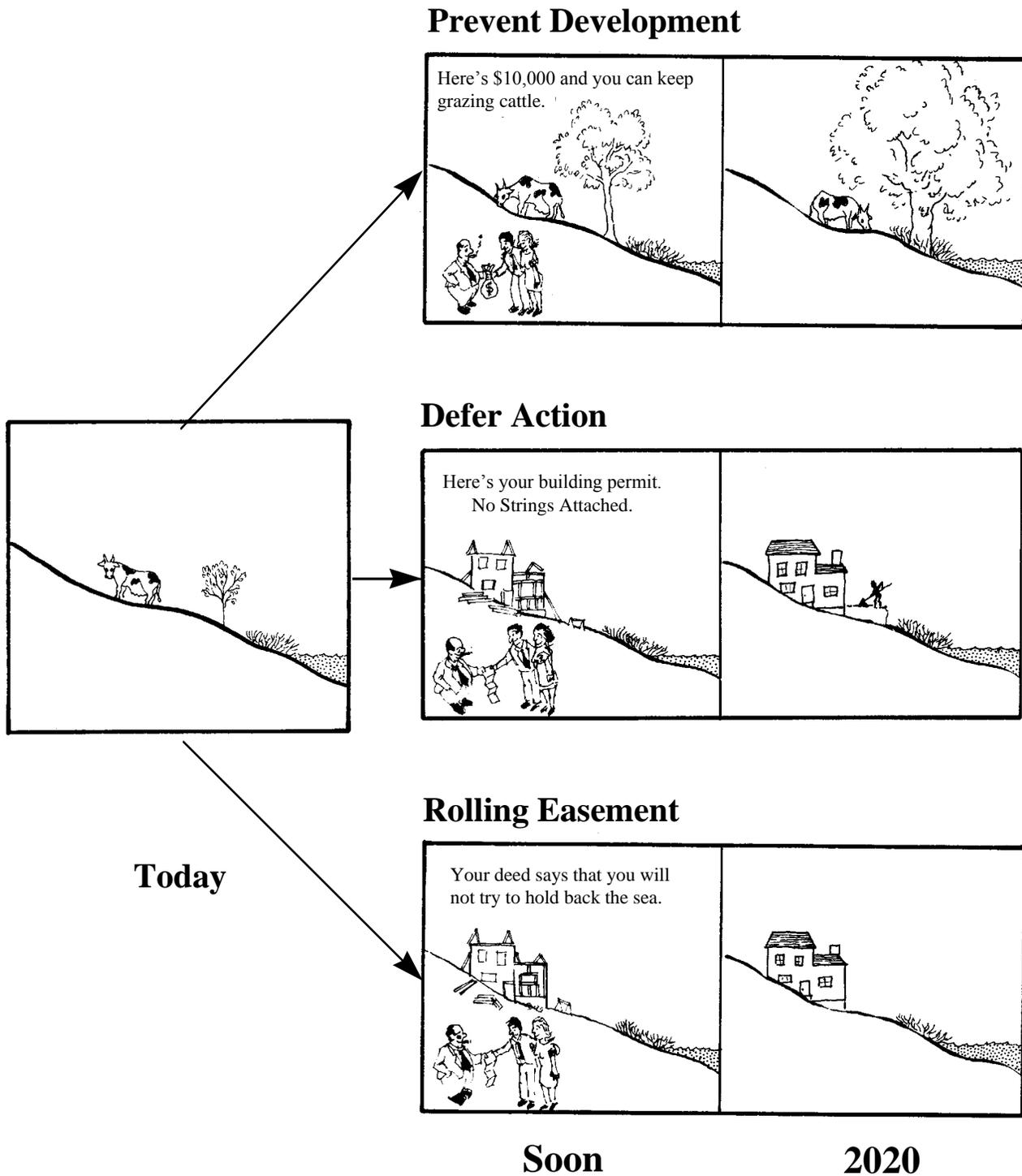
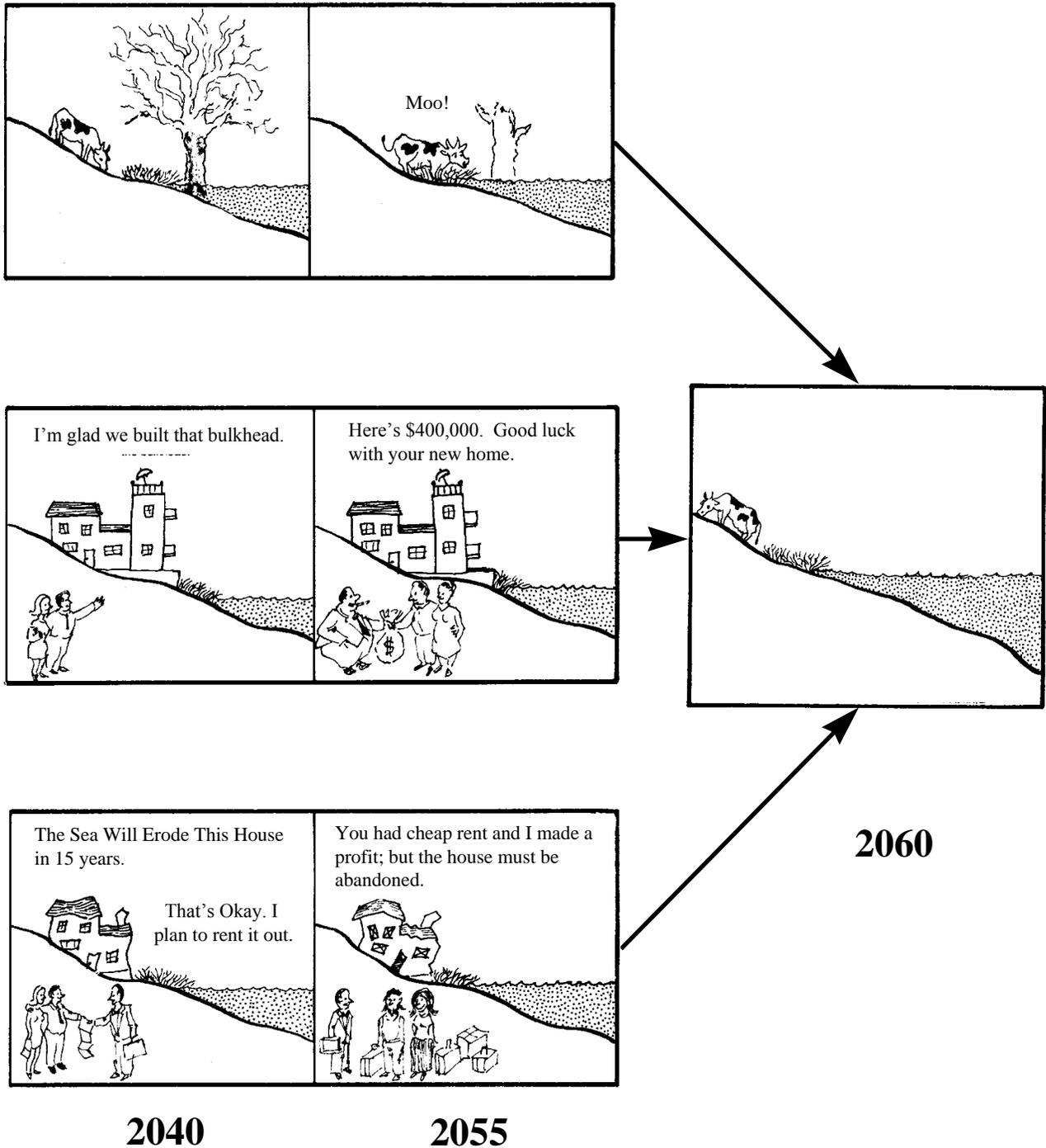


Figure 15. Three Approaches to Ensuring That Wetlands Can Migrate Inland. In each case, the land starts and ends as vacant farmland. This figure assumes that the public rather than the property owner bears the cost. Under the Prevent Development approach, the value of using the land for development is signified by the upfront cost of buying a non-development easement. Under the Defer Action approach, it is ultimately necessary to buy the entire land and structure (figure and caption continued on next page).



(Figure 15 continued). With rolling easements, a house must eventually be abandoned as well, but the eventuality has been incorporated into the expectations of the owner, who forgoes renovations. The cartoon does not include the cost of purchasing the easement, because its present cost would be trivial enough that it could easily be included as a permit condition for building or subdivision.

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Relying on market forces may be effective in some locations. But rolling easement policies would generally be more effective wherever property values are greater than the cost of shore protection. Even where shore protection costs are greater, a rolling easement may be an effective tool for warning owners not to expect government-funded shore protection.

In most coastal states, no one can confidently predict whether a takings claim will succeed if a government policy forces people with homes along estuarine shores to abandon homes to the rising sea. Rolling easements may be a useful way to avoid or mitigate such claims.

- A *purchased or donated rolling easement* eliminates the risk of a successful takings claim because the government or easement holder compensates (or receives through donation) the interest that might otherwise be taken. Depending on how it is acquired, a rolling easement may require a small payment today—but that payment provides legal certainty in what would otherwise be an uncertain legal environment.⁵³⁵ The fair market value of a rolling easement will be small, except possibly in cases where property loss is imminent.
- Obtaining a rolling easement as an *exaction* in a permitting process would usually—but not always—prevent a takings claim.⁵³⁶ Regardless, it would provide legal certainty⁵³⁷ because the takings claim would have to be litigated at the time of the exaction,⁵³⁸ rather than decades hence when a home is threatened.
- A *regulatory or legislative rolling easement* can also mitigate the eventual takings claims. Laws that initially change property rights or prohibit shore protection become part of the background principles of property law sooner⁵³⁹ or later,⁵⁴⁰ and become part of the expectations of people who buy land. Thus, the takings claims are unlikely to be viable for land that changes ownership at least a few times between the day the regulation is issued and the day the property becomes threatened decades later. Clarifying the “rules of the game” could also mitigate eventual takings claims by providing

landowners with increased certainty and thus reduce the possible harm from unpredictable regulatory requirements.

Finally, there may be several miscellaneous categories of land in a given jurisdiction where rolling easements are most practical. Land that will be created by accretion or avulsion in the future is water today, and hence it should be relatively uncontroversial to issue regulations today that prohibit private shore protection on these lands.⁵⁴¹ If such parcels ever become land, it will be because shores were allowed to migrate. So ensuring that such processes continue to operate would be analogous to the common law rule of accretion and reliction, whose justification for awarding accreted land to the waterfront landowner is that such an owner would also lose title to eroded lands.⁵⁴² Similarly, when a government agency issues a permit to fill privately owned wetlands for development, it could include a rolling easement as a permit condition.⁵⁴³ Another possibility is that whenever the government transfers land to private parties, a rolling easement could be retained on the lands.

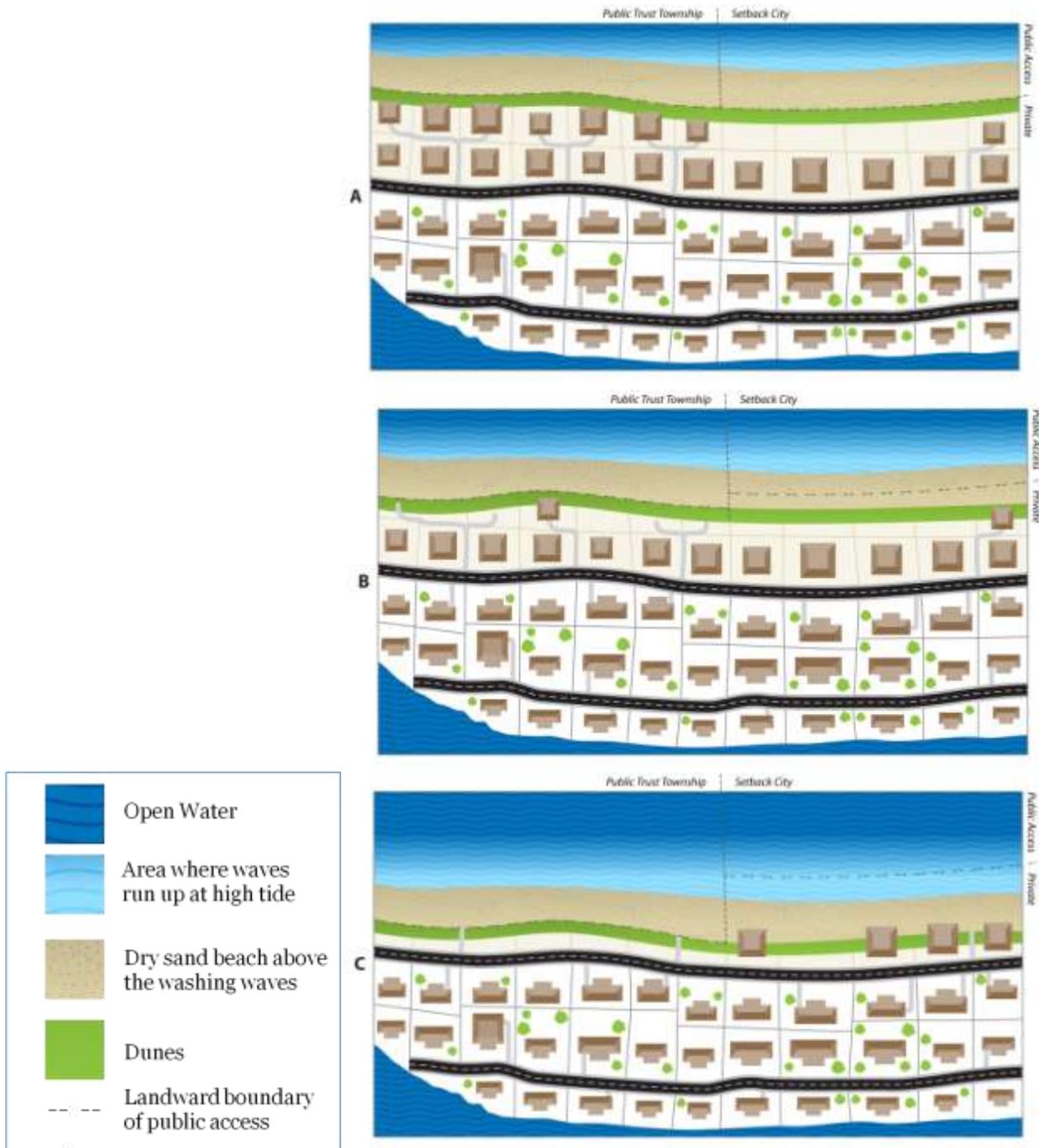


Figure 16. Comparison of Rolling Easement and Setback Policy. The hypothetical Public Trust Township has a rolling easement policy, while Setback City requires homes to be set back from the shore 40 times the annual erosion rate. (a) Initially, four lots in Setback City are seaward of the setback line and hence undevelopable. (b) After 40 years, the shore erodes as expected, requiring homes to be removed in Public Trust Township; but the most vulnerable lots in Setback City were never developed, so no homes need to be removed. (c) Another 40 years of shore erosion requires another row of homes to be removed in Public Trust Township. In Setback City, some of the homes remain standing on the beach because there is no policy for removing existing homes; those that have been destroyed are not rebuilt under the 40-year setback policy. The public easement along the dry beach gradually retreats inland in Public Trust Township, while in Setback City the public gradually loses beach access (assuming that Setback City is not in one of the few states where the public trust doctrine grants access along the entire dry beach) (see Section 2.2).

NOTES AND REFERENCES

⁵¹⁵ See, e.g., CCSP, *supra* note at 3, at 165–166 (discussing federal and state subsidies for beach nourishment).

⁵¹⁶ See, e.g. *id.* at 151–155 (discussing the implications of sea level rise for the federal flood insurance program) and HEINZ CENTER *infra* note 604 (quantifying the implications of shoreline erosion for the federal flood insurance program).

⁵¹⁷ See, e.g., CCSP, *supra* note 3, at 98, and ENVIRONMENTAL RESEARCH LETTERS, *supra* note 14, at 2, 5, and Tables S3–S5.

⁵¹⁸ See CCSP, *supra* note 3, at 98, and ENVIRONMENTAL RESEARCH LETTERS, *supra* note 14, at 2. But see Jim Titus, *Does Sea Level Rise Matter to Transportation Along the Atlantic Coast* in DEPARTMENT OF TRANSPORTATION, THE POTENTIAL IMPACTS OF CLIMATE CHANGE ON TRANSPORTATION 12–14 (2002) (showing photograph of a dike protecting a farming area in Tyrrell County, North Carolina, and map from a study of the likelihood of shore protection by Walter Clark et al., which depicts farming areas in North Carolina where dikes are expected or have been constructed) and CCSP *supra* note 3 at 88 (discussing farming areas along Delaware Bay and the Delaware River that were protected by dikes until the 20th century).

⁵¹⁹ For example, the beach nourishment along the northern New Jersey shore cost \$10 million per mile of beach. U.S. ARMY CORPS OF ENGINEERS. SANDY HOOK TO BARNEGAT INLET, BEACH EROSION CONTROL PROJECT, FACT SHEET (2009). Along part of this coast in (northern Sea Bright) there is only a single row of houses along the bay side of the barrier island. *Id.* But New Jersey Route 38 runs along the shore and protecting the road was important. Delaware has nourished beaches to preserve habitat for horseshoe crabs. CCSP, *supra* note 3, at 206.

⁵²⁰ See, e.g. NOAA, *supra* note 13 at section on “Benefit-Cost Analysis” and *id.* § “Recreational Value of Beaches.”

⁵²¹ See, e.g., Donna Weaver, *Harvey Cedars’ Dune Fight May Strain Finances*, ATLANTIC CITY PRESS (July 2, 2010) (homeowners who objected to dune reconstruction that would block view of the ocean awarded more than \$100,000 for grading easement). See also *Walton County v. Stop Beach Renourishment*, 998 So.2d 1102, 1104 (Fla. 2008), affirmed 130 S. Ct. 2592, 560 U.S. ___, (2010) (discussing shorefront landowners who unsuccessfully sought to challenge a permit for a beach nourishment project and also unsuccessfully claimed that the project would be a taking without compensation)

⁵²² The value of delaying the \$600,000 loss from today to 20 years hence would be \$268,000 to \$374,000 at a 3 to 5 percent discount rate.

⁵²³ The value of delaying the \$275,000 loss from today to 20 years hence would be \$122,000 to \$171,000 at a 3 to 5 percent discount rate.

⁵²⁴ See *supra* § 3.1.2.1.

⁵²⁵ See *supra* § 3.1.2.2.

⁵²⁶ See *supra* notes 165 and 286.

⁵²⁷ We assume here that the social value of the land is diminished by the expected cost of shore protection, even if the market value of the land is not. That is, the value of preserving a natural shoreline is greater than the value of the assets threatened by sea level rise minus the cost of shore protection. In a perfect market, the expected cost of shore protection is reflected in a lower property value.

⁵²⁸ Ronald Coase, *The Problem of Social Cost*, 3 J. L. & ECON. 1 (1960).

⁵²⁹ See, e.g., U.S. Environmental Protection Agency, WHAT IS SMART GROWTH? EPA-231-F-01-001A (2001).

⁵³⁰ CCSP, *supra* note 3, at 145, 171–176 and ENVIRONMENTAL RESEARCH LETTERS, *supra* note 14.

⁵³¹ The general restriction on filling tidal wetlands has obviated the need to set priorities on which wetlands should not be filled, so assessments of the relative importance of specific wetlands are usually unavailable. But the likelihood that wetlands will be allowed to migrate inland in some areas but not others may create a need for such evaluations.

⁵³² See *supra* notes 295–297 and accompanying text.

⁵³³ See *supra* note 289.

⁵³⁴ People may otherwise erect shore protection to keep their back yards..

⁵³⁵ Here we are referring only to the uncertainty about a successful takings claims. It still may be possible to challenge either the creation of the rolling easement itself, see *supra* § 4.2.2, or its continuing viability, see *supra* § 8.2.

⁵³⁶ See *supra* note 376. Davidson et al. point out that dedication of roadways and other conditions in return for subdivisions and rezoning has been upheld in several cases. Jonathan M. Davidson, Ronald Rosenberg, & Michael C. Spata, *Where’s Dolan: Exactions Law in 1998*, 30 URB. LAW 683, 684–85 (1998). Unlike those cases, the rolling easement has a common law nuisance basis as well. See *U.S. v. Milner*, 583 F. 3d

1174, 1190 (owner of tidelands below mean high water has legally recognized interest in shore protection).

⁵³⁷ See *supra* note 535

⁵³⁸ See *supra* note 380 and accompanying text.

⁵³⁹ A law that explicitly takes a property right may be a constitutional taking when enacted, entitling landowners to just compensation based on the current market value of what is taken. For a parcel not likely to be threatened for a century or more, the just compensation is likely to be trivial—especially in an undeveloped area where the economic feasibility of eventual shore protection is unclear. See *supra* § 4.1.3.

⁵⁴⁰ Before *Palazzolo v. Rhode Island*, 533 U.S. 606 (2001), courts and commentators generally accepted “the notice rule” under which a takings claim based on a regulation was—in effect—extinguished upon sale under the theory that activities prohibited by the regulation would not be among the property rights the owner has purchased, since he had noticed that the property did not include those rights; see *EAGLE*, *supra* note 362, at 533–534 (2002). After *Palazzolo*, the takings claim does not instantly vanish upon sale. But the issue of shore protection may not be a fundamental property right similar to development (which arose in *Palazzolo*) or keeping a home already built (which arose in *Severance v. Patterson*) for purposes of the notice rule, because the state has a competing property interest in the public trust tidelands otherwise eliminated by shore protection. Statutory rights to shore protection may create an investment backed expectation that relies on shore protection; while a regulatory rolling easement would remove that expectation for subsequent purchasers of the land. Legislation that protects the migrating boundary while protecting the upland owner against a forfeiture could be adopted by courts as a reasonable balancing of the interests and thus become part of the title to coastal property through ordinary applications of nuisance law.

⁵⁴¹ South Carolina’s setback rule generally prohibits development of land created by accretion or avulsion during the last 40 years. S.C. CODE ANN. § 48-39-280. If a variance is granted (e.g., because otherwise a taking result) then any construction is subject to a rolling easement rule. S.C. CODE ANN. §48-39-290 (D).

⁵⁴² See *supra* note 67 and *SAX*, *supra* note 65, at 308 (quoting Blackstone). The reasoning against the notice rule in *Palazzolo* (unjust enrichment of the government at the expense of the landowner who cannot sell his takings claim) would apply less (if at all) to land that did not exist when the rule was created.

⁵⁴³ Such a permit condition would meet the Supreme Court’s current standard for exactions. See *supra* § 4.2.1 for details on those standards. There is a

very clear nexus between allowing someone to convert wetlands to dry land and requiring that eventually they allow natural forces to convert the dry land back to wetlands. If the permit condition only applies to the land that is filled, there is a strict proportionality, which more than meets the standard for rough proportionality.

CHAPTER 8

MANAGING THE ROLLING EASEMENT

Like all restrictions of land use, a rolling easement requires a conscious effort by the property owner to comply, and by the regulatory agency or easement holder to monitor and enforce compliance. For most lands potentially submerged by a rising sea, the submerge date is at least several decades in the future—and often centuries. Therefore, management of a rolling easement involves two distinct phases:

- *From now until submergence becomes imminent.* During this period, the main purpose of the rolling easement is to manage expectations, ensuring that landowners and other stakeholders expect the eventual loss of the land to the sea. A rolling easement might also prevent or discourage certain activities, such as grade elevation.
- *The endgame.* The main purpose of the rolling easement is conversion of the property from dry to wet, by preventing shore protection. The endgame may also involve remediation of previous alterations to the land, such as removal of structures and lowering the grade if it has been elevated.

This chapter examines the first phase, which will account for most of the time during which a rolling easement governs. The final chapter looks at the endgame.

We focus on rolling easements implemented as conservation easements, though many of the considerations would apply to regulations,

interests in land, and ambulatory boundaries. Conservation easements require monitoring and enforcement, both to ensure that the expected conservation benefits occur and to create a record sufficient to prove that the owner has not abandoned the easement, in case the landowner attempts to invalidate it. The holder of a future interest (such as a possibility of reverter, or remainder interest in a life estate) generally has a legal right under the “doctrine of waste” to prevent the landowner from undertaking activities that would unreasonably diminish the value of his interest;⁵⁴⁴ but the holder has no legal obligation to do so.⁵⁴⁵ Although government regulations are not invalidated by an agency’s failure to inspect and enforce them, after a period of time, construction that takes place without a permit is often treated as if it has been granted a permit. Thus, the management requirements of a rolling easement depend on whether it is implemented by regulation, conservation easement, or future interest.⁵⁴⁶

“Submerge date” refers to the day the rolling design boundary migrates inland of the main building on a parcel of land subject to a rolling easement.

Anyone intending to create or manage a rolling easement should consider the extensive literature on managing conservation easements,⁵⁴⁷ but we make no attempt to summarize that body of

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knowledge here. Instead, we examine a few areas where managing a rolling easement is different from the typical conservation easement. We examine inspection and enforcement of shoreline migration conservation easements (Section 8.1) and possible attempts by landowners to have a court invalidate the easements (Section 8.2),⁵⁴⁸ with a few considerations about regulatory rolling easements (Section 8.3).

8.1 INSPECTION AND ENFORCEMENT OF CONSERVATION EASEMENTS

In general, conservation easements have short- and long-term costs for acquisition, management, and enforcement. In addition to the purchase price, the transaction costs of obtaining an easement can be thousands of dollars.⁵⁴⁹ For the typical conservation easement, a careful baseline environmental assessment is done at the beginning of the process,⁵⁵⁰ and once the easement has been legally executed and recorded in the local land records office, the easement holder will visit the property on a periodic basis, usually annually, to ensure that the landowner is complying with the terms of the easement.⁵⁵¹ If violations are discovered, the easement holder will attempt to negotiate a satisfactory solution, and if that fails, go to court.⁵⁵² Although managing and enforcing easements is one of the core activities of many land trusts, the expected costs of doing so often deter them from accepting easements from every potential donor.⁵⁵³

A key challenge is to design rolling easements so that their annual inspection and management costs are substantially less than the costs for the typical conservation easement, because rolling easements will often involve smaller parcels whose environmental benefits are decades or centuries in the future. How to best address that challenge will depend on whether one is attempting to allow a beach to migrate inland, or to ensure that a large low area is eventually submerged to become wetland. Shore protection structures are easily

noticed from the water or a walk along the shore, which could keep inspection costs low along eroding beaches. But grade elevation can be more difficult to detect unless someone sees the material brought in or surveys the land elevation.

Less frequent inspections may be a way to keep costs low.⁵⁵⁴ Table 5 provides an example list of provisions that could be included. In this case, the environmental benefits of the rolling easement are decades (or centuries) in the future, and each easement is likely to cover a relatively small area of land. Ordinarily a land trust would be very satisfied if the annual management cost was \$250 per easement because the lots tend to be fairly large. But in the case of a rolling easement, if the lot is originally hundreds of acres, it can generally be subdivided. In a typical coastal area with quarter-acre lots, a cost of \$250 per parcel would be \$1,000/year per acre. Although the environmental services from an acre of marsh *might* justify management costs of \$1,000/year,⁵⁵⁵ it would be virtually impossible to justify spending that much to ensure that an acre of wetlands could be created 100 years hence: At a 3 percent rate of return, for example, \$1,000/year would accumulate to \$625,000 per acre after a century—far greater than any estimate of the value or restoration cost of tidal wetlands. Therefore, the cost of managing rolling easements on land that is still decades away from being submerged must be far less than \$250 per parcel.

It should be possible to design rolling easements so that the annual cost is much lower than with standard conservation easements:

- Inspection would be easier: While conservation easements prohibit many land uses that interfere with the conservation value, the rolling easement merely restricts shore protection.⁵⁵⁶
- Inspection need not be as frequent for a rolling easement until submergence is imminent.

Why would a rolling easement require less frequent inspections? Primarily because violations need not be discovered immediately to achieve the conservation objective.⁵⁵⁷ The typical conservation

easement is transferred to ensure a *continuing* environmental contribution from the property; so it warrants a detailed annual inspection. Rolling easements, by contrast, are transferred to ensure that the land *eventually* becomes submerged.

If the rolling easement prohibits elevating the land so that wetlands can migrate inland, then when the submerge date arrives, the land elevation must not be higher than it is today. But if the owner *does* elevate the grade, it does not matter when the problem is discovered, as long as it is noticed several years before the submerge date so the land can be re-graded down to the original elevation. Occasional communication is advisable to discourage violations and explain the consequences; but that is less costly than on-site inspection. (An inspection upon sale of the property is advisable to avoid litigation over responsibility for undiscovered grade elevation.)

Once a property is finally threatened by the rising sea, the environmental benefits of the rolling easement will be more imminent and justify a greater management cost. By the time the low-lying land becomes submerged, the landowner is likely to be different from today, and the prospect of losing a home could provide a substantial incentive to cheat on the terms. Thus drafting an “endgame” is important for a rolling easement (see Chapter 9), unlike most conservation easements, where provisions for termination would threaten the tax deductibility.⁵⁵⁸

8.2 ATTEMPTS TO INVALIDATE THE ROLLING EASEMENT

The owners of land with conservation easements sometimes go to court seeking to have those easements weakened or invalidated so they can do things that the easement prohibits.⁵⁵⁹ In some cases, interpretations diverge regarding the intent of the easement, and the owner’s primary objective is to manage the land according to his own interpretation.⁵⁶⁰ But in other cases, the owner does not want to comply with the easement at all

Table 5. Partial List of Provisions for a Shoreline Migration Conservation Easement

1. Landowner (or easement holder) conducts an initial survey of ground elevations.
2. Owner promises to avoid increasing the grade elevation of any land before it becomes submerged, and to avoid erecting any shore protection structures that have the effect of preventing shore erosion, flooding, or inundation of the land on the parcel. No foreign materials for grading will be brought into the property other than gravel required for construction.
3. If grade increases are discovered by the holder or the landowner more than 30 years before the land is expected to be submerged, the other will be notified. The parties will negotiate in good faith a schedule for re-grading the land back to baseline elevation as soon as practicable, but in no case less than 10 years before that part of the land is expected to become submerged. If grade increases are discovered by the holder or the landowner less than 30 years before the land is expected to be submerged, a similar process applies, but the deadline for re-grading will be the midpoint between the discovery and the time when the property is expected to be submerged. The landowner will pay all costs associated with the violation.
4. Landowner will obtain a new elevation survey from a qualified surveyor before any subdivision, and immediately after construction of any buildings larger than 200 square feet, notify holder of the construction and provide a copy of the survey.
5. An elevation survey will take place before the land is sold, with buyer notified of any discrepancies between current and baseline elevation.^a
6. Landowner will notify holder if and when any part of the property is flooded by spring high tide or tidal wetland vegetation is found.
7. Holder will notify landowner if and when holder reasonably expects the land will become submerged within the next 20 years, and propose a date for inspection funded by holder within 1 year of such notice. Holder will also propose to landowner a schedule of future inspections no more frequent than once per year and no less frequent than once per decade until the property becomes submerged.

a. This requirement protects the buyer.

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and seeks to have it invalidated, arguing that circumstances have changed,⁵⁶¹ the easement holder has abandoned the easement,⁵⁶² or the easement was never valid under state law.⁵⁶³

Much of the literature on managing conservation easements focuses on enforcement and defending against attacks on an easement's validity.⁵⁶⁴ We briefly examine some of the reasons that standard conservation easements are sometimes challenged long after they are negotiated, and apply those general considerations to the specific challenges of a rolling easement. Many possible legal arguments for invalidating the standard conservation easement would not apply to a shoreline migration conservation easement—but the motivation for challenging a rolling easement would be the same if not greater.

1. *The land—and perhaps the conservation easement as well—has been purchased or inherited by people who did not participate in the original easement conveyance. New owners of the land may not even be sympathetic to the restrictions of the easement.*⁵⁶⁵

Given the very long-term nature of rolling easements, the people who own the land when it is finally submerged will rarely be the owners who negotiate the rolling easements. If there are comparable properties nearby that are not subject to a rolling easement, then as the submerge date approaches (e.g., appears to be 10–20 years away), economists would expect the property with the rolling easement to sell at a substantial discount compared with the other property. Such a discount should logically attract potential buyers who are willing to abide by the restriction, such as people who intend to rent the property and view it as a pure investment, or elderly people who do not expect to live past the submerge date and want an affordable coastal home. The greater the discount, the less likely a given owner will feel cheated by the restrictions in the rolling easement. Thus, the holder (and governmental entities that want to see an orderly retreat) have a substantial incentive to publicize the implications of the rolling easement.

This publicity encourages those who do not wish to give their home up to the sea to buy other land not subject to a rolling easement.

Yet the discount may tempt some investors to purchase the property and then try to remove the restriction and thereby make a profit. Some owners have sought to invalidate the restrictions from rolling easements even though the reason they had valuable waterfront property was that (formerly) seaward neighbors had yielded homes to the sea.⁵⁶⁶ Because some people will challenge the restrictions, those designing a rolling easement must consider measures to reduce the likelihood that a challenge will succeed.

2. *The new landowners and easement holders agree with the restrictions of the easement but interpret the words differently from the original parties, and thus no longer have a meeting of the minds.*

It should not be difficult to draft the easement conveyance so that it leaves no doubt that the rolling easement prohibits any activity that tends to slow the natural shoreline processes that erode or submerge the dry land. Nevertheless, rolling easements tailored to address only the problems of today could lead to a divergence of expectations later. For example, if the purpose is to allow marshes to migrate inland, and global warming allows mangroves to displace the marsh, a landowner may argue that circumstances have changed to the point of invalidating the easement. A showing that marsh is unlikely to “migrate” onto the property (either because marsh vegetation takes hold via processes other than migration, or because the land is likely to subside into open water before marsh vegetation takes over) may also be used to attack a rolling easement with the stated purpose of allowing marsh migration. Thus, the easement's statement of purpose should be written to broadly address the inland migration of some form of intertidal or shallow-water system, or emphasize preservation of the natural shoreline process. (Failure to do so, however, would not always be fatal due to the doctrine of *cy pres*.⁵⁶⁷)

Misunderstandings may also arise regarding the type of shore protection that is prohibited. The rolling easement in Texas was intended to ensure an open beach, not to ensure that the barrier islands migrate inland. Thus, as sea level rises, all dry land on a barrier island could be elevated with beach-quality sand without undermining the purpose of the Texas Open Beaches Act.⁵⁶⁸ But consider a sandy beach below a 5- to-10-foot bluff with a flat plateau along an estuarine shore. If a land trust accepts a rolling easement that prohibits shore protection structures but allows beach nourishment and/or living shoreline approaches to shore protection, the easement may preserve the existing habitat for many decades. Yet once sea level rises enough to submerge the entire bluff, landowners behind the bluff would usually want to prevent their lands from becoming tidal wetland, by elevating the grade of the land. Under the terms of the easement, they can do so unless the easement also includes a provision that prevents grade elevation of the land behind the bluff. Those drafting the rolling easement should thus decide at the outset whether the intention is to allow the bluff to eventually become submerged, or merely to retain a beach along the shore.

3. *The passage of time may change the context and function of the easement. Species migration or development may radically alter the benefits of preserving a given parcel. Is the new function covered by the easement?*

Traditionally, courts of equity have refused to enforce equitable servitudes (equitable covenants) when circumstances have changed to the point where enforcement is unreasonable or impracticable.⁵⁶⁹ Several scholars have objected to this “doctrine of changed circumstances” because it promotes uncertainty about the stability of agreements;⁵⁷⁰ but courts have continued to use the doctrine for equitable servitudes in general.⁵⁷¹ Under the doctrine of *cy pres*, however, if circumstances change when charities are the beneficiary, courts have long tried to reformulate the original terms to serve a similar purpose rather

than invalidate the agreement, and that approach is generally followed with conservation easements.⁵⁷² Nevertheless, changed circumstances may be a justification to void a conservation easement⁵⁷³ unless a statute says otherwise.⁵⁷⁴ Although habitat fragmentation can occur in the coastal zone, there is a general recognition that even relatively small areas of tidal wetlands, mudflats, beaches, or shallow water have ecological value. Similarly, although a changing climate can alter a habitat and the species that inhabit it, the general need for tidal habitat is recognized at all latitudes and for both pristine and polluted environments. Therefore, continued development or changing climate need not fundamentally undermine the validity of the rolling easement drafted to preserve the natural shore. But if the rolling easement is drafted to focus too narrowly on today’s environment, the landowner and easement holder may gradually develop different opinions about what is restricted.

4. *The owner may have stopped complying with the requirements without being challenged by the holder for such a long time that, for all practical purposes, the holder has abandoned the easement.*

Although the statutes that authorize conservation easements generally allow them to have whatever duration the parties choose,⁵⁷⁵ the Internal Revenue Code only allows tax deductions if the easements are *in perpetuity*.⁵⁷⁶ To preserve the tax status of easements, land trusts generally draft conservation easements so that a landowner and holder cannot terminate the easement by mutual consent without obtaining a court order.⁵⁷⁷ Nevertheless, the common law of property has long recognized that just as an easement can be obtained through prescription,⁵⁷⁸ it can be lost through abandonment. The test is generally a clear indication of intent to no longer use the easement, or conduct inconsistent with continuing the easement,⁵⁷⁹ such as tolerating construction by the landowner that blocks use, over a sufficiently long period.⁵⁸⁰ “Acts evincing an intention to abandon must be unequivocal.”⁵⁸¹ A statement that there is

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no intention to abandon the easement may be sufficient to defeat a claim of abandonment.⁵⁸²

For a standard conservation easement, the annual inspection provides very strong evidence that the easement has not been abandoned. Conversely, because the easement conveyance documents often provide for an annual inspection, the *failure* to inspect would be evidence that the easement *has* been abandoned. As discussed in the previous section, annual inspections are unnecessary for rolling easements on property not yet threatened by rising sea level; so failure to inspect would not be strong evidence of an intention to abandon. As long as the holder does what a reasonable holder of a rolling easement would do, it will be difficult to show that the rolling easement has been abandoned. As with all conservation easements, carefully drafting what is expected is important. A land trust might—at first glance—prefer to have the right to an annual on-site inspection in the decades before submergence becomes imminent. But including such a right in the conveyance could be risky if there is no plan to actually make those visits. Less costly means of reminding owners of their obligations under the rolling easement should be sufficient to show that the easement has not been abandoned.

5. Other Doctrines

The legal and planning literature addresses other ways that conservation easements can be attacked. The common law has long disfavored conveyances that restrict the use of land—especially long-term restrictions. The conservation easement enabling acts were designed to reverse those common law tendencies so that the free market can put land into permanent conservation status. But those statutes generally leave an opening for courts to intervene where necessary.⁵⁸³

8.3 ROLLING EASEMENT ZONING AND OTHER REGULATORY APPROACHES

Unlike property interests, failure of a government agency to inspect or otherwise enforce a regulation does not void the regulation. Yet enforcement includes many of the same considerations. In Texas, management of the rolling easement includes mandatory notifications about the rolling easement to purchasers of coastal property, warnings about technical encroachments, and litigation over serious encroachments. Landowner awareness helps to discourage long-term investments in property with short remaining lifetimes, and to induce voluntary compliance, though many owners still resist orders to abandon the premises.

NOTES AND REFERENCES

⁵⁴⁴ See *supra* note 240 and accompanying text.

⁵⁴⁵ Here we are assuming that the possibility of reverter transfers title upon a physical event such as a given rise in sea level. If it transfers upon an action of the landowner (such as building a shore protection structure) then the land trust must inspect the property and take it over if the owner takes the action, or risk losing the property due to the adverse possession by the owner.

⁵⁴⁶ For a future interest, the owner generally must file its claim within a reasonable time (usually the period specified in the statute of limitations for adverse possession). *But cf.* note 393 (statute requiring interest holders in Virginia to file within 10 years). In some states, the owners must re-file their interest in the property every 10–30 years. See *supra* note 394 and accompanying text.

⁵⁴⁷ Those considering regulatory rolling easements and future interests in land would have to address issues that do not arise with conservation easements, but all of the issues that arise with conservation easements would be relevant, even if the specific legal rules are different.

⁵⁴⁸ More states recognize perpetual conservation easements than allow future interests in land to extend *in perpetuity*. Moreover, the requirements for managing conservation easements are at least as great as for future interests.

⁵⁴⁹ See, e.g., HERITAGE CONSERVANCY, *supra* note 445, at 8.

⁵⁵⁰ See, e.g., *id.* at 14 and LESLIE RATLEY-BEACH, MANAGING CONSERVATION EASEMENTS IN PERPETUITY, LAND TRUST ALLIANCE 66 (Washington, DC 2009).

⁵⁵¹ HERITAGE CONSERVANCY at 30; and RATLEY-BEACH at 70.

⁵⁵² HERITAGE CONSERVANCY at 8 and 31; and RATLEY-BEACH at 255–314.

⁵⁵³ Land trusts typically solicit a donation from the landowner in order to offset some of the expected cost of monitoring and enforcement. See, e.g., Jessica E. Jay, *Land Trust Risk Management of Legal Defense and Enforcement of Conservation Easements: Potential Solutions* 6 ENVTL. LAW. 468 note 111 (2000) and Land Trust Alliance, *Practice 11A: Funding Easement Stewardship*, in LAND TRUST STANDARDS AND PRACTICES 5 (2004) (costs of managing an easement can be significant, a land trust can not accept a conservation easement whose environmental benefits are small compared to the cost of managing the easement).

⁵⁵⁴ Here we are referring primarily to shoreline migration conservation easements created to ensure that wetlands gradually migrate onto nearby low land. Shoreline migration easements that prohibit shoreline armoring along eroding beaches would be very easy to inspect.

⁵⁵⁵ E.g., R. Costanza, S.C. Farber, & J. Maxwell, *Valuation and Management of Wetland Ecosystems*, 1 ECOL. ECON. 335 (1989) (reporting that annual services from wetlands in Louisiana are about \$250–\$500/year). Frederick Bell, *The Economic Valuation of Saltwater Marsh Supporting Marine Recreational Fishing in the Southeastern United States*, 21 ECOLOGICAL ECONOMICS 243–254 (1997) (annual services of about \$125 and \$800/year from west and east coasts of Florida, respectively).

⁵⁵⁶ Although the purpose of a rolling easement is to prevent shore protection, Chapter 6 includes some possible restrictions landward of the rolling design boundary, or more precisely, landward of the primary design boundary but seaward of a rolling setback line. If such restrictions are included, inspections would have more to look for and hence require additional effort.

⁵⁵⁷ In addition, owners generally have little incentive to violate a rolling easement decades before the submerge date.

⁵⁵⁸ A conservation easement typically has unlimited duration, unless the instrument creating it says otherwise. See, e.g., Uniform Conservation Easement Act, National Conference of Commissioners on Uniform State Laws (1982). To be eligible for federal tax benefits, the restriction must be *in perpetuity*. I.R.C. §§ 170 (h)(2)(C), 170(f)(3)(B)(iii), & 170(h)(5)(A).

⁵⁵⁹ Melissa K. Thompson & Jessica E. Jay, *An Examination of Court Opinions on the Enforcement and Defense of Conservation Easements and Other Conservation and Preservation Tools: Themes and Approaches to Date*, 78 DENV. U. L. REV. 373 (2001).

⁵⁶⁰ THOMPSON & JAY at 389–408.

⁵⁶¹ See, e.g., UNIF. CONSERVATION EASEMENT ACT § 3, comment (1981) and N.Y. ENVTL. CONSERV. LAW § 49-0307(1).

⁵⁶² See, e.g., Meghan Ryan & Michelle Godfrey, *The Durability of Conservation Easements in Georgia*, 9 LAND USE CLINIC PAPER 2–4 (2008). Available at: <http://digitalcommons.law.uga.edu/landuse/9>. See also *infra* notes 579–582.

⁵⁶³ E.g., THOMPSON & JAY at 382–389 (examining three cases that challenged the existence of a valid conservation easement).

⁵⁶⁴ For example, in RATLEY-BEACH, *supra* note 550, approximately one-third of the book addresses record

keeping and policies that help prepare for litigation, and another third addresses correcting violations and defending easements against attempts to invalidate them.

⁵⁶⁵ A survey of 200 land trusts found that 64 percent of the legal challenges to conservation easements involved landowners who were not part of the original agreement. See, e.g., Adena R. Rissman, *Conservation Easement and Defense in the Land Trust Community*, 30 SAVING LAND, 24, 25 (Winter, 2011).

⁵⁶⁶ Cf., *Severance v. Patterson*, 566 F. 3d 490. (5th Circuit 2009). The plaintiff owned lots that are waterfront today but were not waterfront when the Texas Open Beaches Act was passed in 1959. *Id.* at 494 (“[I]n 1975, the State obtained a judgment ... that an easement existed on a strip of beach seaward of Severance’s land”). Thus, the plaintiff owned waterfront lots because the owners of seaward lots had given up their lots to the advancing Gulf of Mexico shore. The Texas Supreme Court did not directly hold that the plaintiff was not subject to the rolling easement, because it had been asked by the federal court to answer specific questions about Texas law; but it was clear from the opinion that the court was issuing a new rule under which the rolling easement would not apply to her situation. *Severance v. Patterson*, No. 09-0387 (Tex. 2010) “The dissent further dismisses Severance’s grievance as a gamble she took and lost by purchasing oceanfront property in Galveston.” *Id.*

⁵⁶⁷ See, e.g., UNIFORM CONSERVATION EASEMENT ACT § 3 at 63–64 (official comment) and DANA & RAMSEY, *supra* note 19, at 39–40.

⁵⁶⁸ Texas currently requires property owners to convey a rolling easement before the state will proceed with beach nourishment along privately owned beaches, *supra* note 411. Federal policy has led many states to require public easements to the beach before proceeding with a beach nourishment project, see *supra* note 64 and accompanying text, but only Texas requires a rolling easement.

⁵⁶⁹ See e.g. Carol M. Rose, *Servitudes, Security, and Assent: Some Comments on Professors French and Reichman*, 55 SO. CAL. LAW. REV. 1403, 1410–1413 (1982). The doctrine of changed circumstances rarely applied to easements at common law. Richard Epstein, *Notice and Freedom of Contract in the Law of Servitudes*, 55 SO. CAL. L. REV. 1353, 1364 (1982). Because conservation easements have characteristics of both equitable covenants and traditional easements, the law governing them draws from the traditional rules for both instruments.

⁵⁷⁰ John A. Lovett, *Property and Radically Changed Circumstances*, 74 TENN. L. REV. 463, 469 (2007) (citing articles by Robinson, Epstein, Rose, and Alexander). See also Glen O. Robinson, *Explaining Contingent Rights: The Puzzle of Obsolete Covenants*, 91 COLUM. L. REV. 546, 572–79 (1991); EPSTEIN, *supra* note 568, at 1364–68; and ROSE at 1412–13. But see Gregory S. Alexander, *Freedom, Coercion and the Law of Servitudes*, 73 CORNELL L. REV. 883, 898–900 (1998).

⁵⁷¹ According to the Restatement of Property:

§ 7.10 Modification and Termination of a Servitude Because of Changed Conditions

- (1) When a change has taken place since the creation of a servitude that makes it impossible as a practical matter to accomplish the purpose for which the servitude was created, a court may modify the servitude to permit the purpose to be accomplished. If modification is not practicable, or would not be effective, a court may terminate the servitude. Compensation for resulting harm to the beneficiaries may be awarded as a condition of modifying or terminating the servitude.
- (2) If the purpose of a servitude can be accomplished, but because of changed conditions the servient estate is no longer suitable for uses permitted by the servitude, a court may modify the servitude to permit other uses under conditions designed to preserve the benefits of the original servitude.
- (3) The rules stated in § 7.11 govern modification or termination of conservation servitudes held by public bodies and conservation organizations, which are not subject to this section.

RESTATEMENT (THIRD) OF PROPERTY: SERVITUDES. § 7.10 (2000).

⁵⁷² The Restatement has different rules for conservation easements (which it calls “conservation servitudes”) than for the general equitable servitude:

§ 7.11 Modification and Termination of a Conservation Servitude Because of Changed Conditions

- (1) If the particular purpose for which the servitude was created becomes impracticable, the servitude may be modified to permit its use for other purposes selected in accordance with the cy pres doctrine, except as otherwise provided by the document that created the servitude.
- (2) If the servitude can no longer be used to accomplish any conservation purpose, it may be terminated on payment of appropriate damages and restitution. Restitution may include expenditures made to acquire or improve the servitude and the value of tax and other government benefits received on account of the servitude.

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- (3) If the changed conditions are attributable to the holder of the servient estate, appropriate damages may include the amount necessary to replace the servitude, or the increase in value of the servient estate resulting from the modification or termination.
 - (4) Changes in the value of the servient estate for development purposes are not changed conditions that permit modification or termination of a conservation servitude.

Id. § 7.11.

⁵⁷³ *Id.*

⁵⁷⁴ For example, New York provides that “[a] conservation easement... may only be modified or extinguished” for [five reasons including] “the easement can no longer substantially accomplish its original purposes or any of the purposes set forth in section 49-0301 of this title” for easements owned by the state in Adirondack or Catskill park. But for easements held by conservation organizations in those parks, as well as all easements outside of those parks, the statute only lists the other four reasons. N.Y. ENVTL. CONSERV. LAW § 49-0307 (2010).

⁵⁷⁵ UNIFORM CONSERVATION EASEMENT ACT § 2.

⁵⁷⁶ 26 U.S.C. § 170(h)(2)(c) and § 170(h)(5)(A). See also 26 C.F.R. § 1.170A-14(a).

⁵⁷⁷ *Cf.* 26 C.F.R. § 1.170A-14(g)(6)(i). There is an exception for when the objectives are impossible to achieve, as long as any proceeds are devoted to accomplish the same objective. 26 C.F.R. § 1.170A-14(c)(2).

⁵⁷⁸ An easement by prescription is created in spite of the wishes of the landowner, if another party (or the public) openly uses the property without permission, continuously without interruption, for a period of time equal to the statute of limitations in a given state. HORNBOOK ON PROPERTY, *supra* note 203, at 312.

⁵⁷⁹ E.g., *Enos v. Casey Mountain, Inc.*, 532 So.2d 703, 705 (Fl. App. 1988).

⁵⁸⁰ E.g., *Mumaw v. Roberson*, 60 So.2d 741 (Fla. 1952) (rejecting a claim of an easement in a case where a fence and improvements had long blocked platted road to a lake).

⁵⁸¹ E.g., *Gerbig v. Zumpano*, 7 NY 2d 327, 331 (1960) (“Nonuser alone, no matter how long continued can never in and of itself extinguish an easement created by grant”).

⁵⁸² *Ma. & Pa. RR. Co. v. Mer.-Safe, Etc., Co.*, 166 A.2d 247 (Md. 1960) (citing *Canton Co. v. Baltimore & O.R. Co.*, 99 Md. 202, 57 Atl. 637 (1904)).

⁵⁸³ CHEEVER, *supra* note 215, at 1098–1100.

CHAPTER 9

THE ENDGAME: MANAGING THE TRANSITION

Given the uncertainties about how much the sea will rise, it is possible that a given parcel of land that seems vulnerable today will not be submerged—at least within the next few centuries. Perhaps global warming will be reversed and the sea will rise more slowly or even begin to fall. Perhaps the sea will simply rise more slowly than the rate that seems prudent to plan for today. If this is the case, then the owner of the parcel will be able to retain the land after all. The holder of the rolling easement will have accomplished nothing for having managed the rolling easement on that parcel; but this is a risk that land trusts and governments will often be willing to take.⁵⁸⁴ Like all precautionary measures, the rolling easement proves to be worthless only if there is some very good news: The sea rose so slowly that the adjacent coastal wetlands were not submerged and hence did not need this property for the habitat to survive.

Assuming that sea level continues to rise, however, most dry land within a few meters above the tidal wetlands today will eventually become submerged. Figure 6 (on page 29) depicts a possible scenario for a home along a wetland shore. Driveways and sidewalks are removed as the wetlands advance, but the preexisting home remains. Storms are less likely to destroy a home along a wetland shore than a home along the ocean, so the home continues to stand. Eventually, the home is standing seaward of mean high water and hence is on state-owned land. The fate of the building after that point is not necessarily part of the rolling

easement but instead depends on how the state regulates nonconforming structures standing in state-owned tidal wetlands or open water. Nevertheless, one option may be for the state to allow continued occupation for a limited time, in return for an escalating rent based on the fair market value of the location. The increasingly imminent abandonment and escalation of costs associated with a structure in the wetlands would tend to cause a gradual decline in the market value of the property.

That is just one of many scenarios. This chapter examines how they may play out, starting at the time when submergence appears to be sufficiently imminent to affect decisions by the landowner, continuing with measures that the rolling easement can require in preparation for the submergence, and finally looking at the actual submergence and conversion of the property from dry land to publicly owned wetlands and waters.



9.1 WHEN THE TERMS OF THE ROLLING EASEMENT START TO AFFECT DECISIONS BY THE OWNER

A key economic and policy justification for rolling easements is that they cost less than either preventing development or failing to plan.

For the typical coastal parcel, submergence by the rising sea is so uncertain and far in the future that it has no practical impact on how an owner uses the land, whether or not there is a rolling easement. If development is cost-effective, the owner may develop, and thereby derive more use from the land than leaving it undeveloped. Although a no-development easement would limit the owner's ability to profitably use his land, a rolling easement would not. The main impact of the rolling easement is likely to be the occasional reminders from the land trust or government entity that the land is subject to a rolling easement.

Twenty to forty years before submergence. As time passes and sea level rises, however, the submergence will eventually become close enough at hand to matter to an owner. Different owners (and potential owners) will have different time horizons, expectations, and preferences:

- The current owner of a given home may decide that a growing family requires a much larger house. He may decide to sell rather than enlarge the current home because he wants the house to last for many decades.
- A possible home buyer may consider purchasing this home with plans for a major upgrade to the house to meet his needs for the rest of his life, which he assumes to be about 50 more years. If the home is likely to be submerged in 30–40 years, he may be reluctant to buy it.
- If he does buy the house, he may be reluctant to spend the time and money on the upgrade, knowing he will have to find another home and possibly manage another renovation. If the renovation is likely to pay for itself in resale

value, he may still go ahead with the expansion and plan to move out 10–15 years later. But for most home addition projects, the costs are not recouped in higher resale values. So even if the property is likely to survive a few more decades, this particular owner is unlikely to pursue the renovation.

- People more likely to purchase this house may include (a) a homebuyer willing to consider a more modest renovation with a shorter payback period, (b) an investor-landlord only interested in short-term modifications that pay for themselves, or (c) a home buyer who is satisfied with the current house.

As time passes, fewer and fewer people will be inclined to add major additions that do not pay for themselves; those who find their homes insufficient will sell to investors or home buyers who are satisfied with the house as it is. The periodic reminders about rolling easements from the land trust or government agency to owners—as well as clear warnings to buyers from realtors⁵⁸⁵—could help ensure that people do not make investments inconsistent with the eventual abandonment of the property. This does not mean that no major renovations will take place—some people have the resources to build a new home likely to be destroyed 10 years hence. But most people with those resources still prefer a home likely to last longer unless they cannot obtain a similar parcel of land without the risk.

Ten to twenty years before submergence. Once submergence is only 10–20 years away, projects that would otherwise be economically justified will start becoming difficult to justify because of the reduced time for recouping an investment. Therefore, relatively few people are likely to buy homes with the intention of making major modifications. Most new purchasers are likely to be investors intending to rent the property or people satisfied with the home as it. Regular maintenance and repairs, including re-roofing, will still be worthwhile; so the neighborhood need not become blighted.

The final decade. The composition of homes is likely to shift from owner-occupied to rental property. As people die or sell their homes, most homebuyers will not want a home with such a limited lifetime. Investors may be more flexible if there is a profitable opportunity: In resort areas, rentals are generally weekly or seasonal. Few people base a decision to rent a particular house on whether they can return the following year. Even in non-resort areas, leases longer than one year are rare for homes. Therefore, the property value to a landlord-investor should only decline as the present value of future rents declines.

The possibility of blight could be serious if an entire neighborhood is expected to be submerged within a decade. Re-roofing may give way to spot repairs; new wiring, new plumbing, and new windows or doors are all less likely. Even painting may seem like a low priority. The increasing preponderance of rental property could further discourage upkeep. In beach resorts, however, where shore erosion rather than inundation threatens homes, the risk of blight will be less. If a row of homes is lost each decade, for example, there will be a mixture of homes whose loss is imminent next to homes that are about to become waterfront, next to homes that are not threatened for a few decades. The high premiums associated with oceanfront property provide an incentive for landowners to maintain their homes until the end.



9.2 ACTIONS REQUIRED OR ENCOURAGED BY THE ROLLING EASEMENT

Notice and inspection will be increasingly important as submergence becomes imminent.

As with all conservation easements, a key task for the rolling easement holder or local government will be to periodically remind landowners of the requirements. This is important both to prevent owners from violating the terms of the easement, and to discourage them from doing things that are inadvisable given those terms. A major renovation would increase the temptation to legally challenge (or cheat on) the requirement to refrain from shore protection; a decision to not renovate, by contrast, would help to settle the owner's expectations of the eventual abandonment. Clear warnings from realtors (particularly buyers' agents who discuss possible problems before the first visit) can discourage those unwilling to comply with the easement from even considering the property, making it more likely that the land will be bought by someone who is able to fit the eventual abandonment into his plans. No matter what the easement holder does, some people may take the chance of purchasing the land and then attempting to evade the terms of the easement. But most likely they would do so as a matter of economic speculation, which they would drop once there is no economic benefit from pursuing the matter. The purchaser who is never informed of the terms, by contrast, may come to oppose the rolling easement for more than economic reasons and thus be willing to take on legal costs (and impose legal costs on the holder) even when there is no economic benefit from doing so. Hence, ensuring that purchasers are truly aware of the terms of the easement will become increasingly important as the submerge date approaches.

In Section 8.1, we suggest that routine inspection might not be necessary for most of the duration of a rolling easement because shore protection is both unlikely and generally harmless several decades before submergence. Once submergence becomes

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imminent, however, inspection is important so that any violations can be cured before they matter. If a shoreline migration conservation easement⁵⁸⁶ is designed to ensure that wetlands migrate inland, then once submergence of part of the parcel is expected within about a decade, the holder should inspect the ground elevations to ensure that land grades have not been artificially elevated over the years. If grade elevation has taken place, the holder can require the owner to re-grade the land back to the original elevation so it will become submerged as originally agreed.⁵⁸⁷ Whether the parcel is along an eroding beach or a wetland shore, the inspection can also look for structures built for another purpose but likely to have an effect similar to a shore protection structure (e.g., retaining wall, paved elevated driveway).

The practical necessity of noticing violations before the submerge date is likely to create legal reasons for frequent inspections as well.⁵⁸⁸ Legal duties are often based on what a reasonable person should do. It is reasonable for a rolling easement holder to pay more attention to lands about to be submerged than to those that are on high ground and still some distance from the shore. Although periodic *reminders* should be sufficient to show that the easement holder has not abandoned the easement, more frequent *inspections* might help an easement holder to address a number of legal issues regarding specific violations:

- *Statute of Limitations.* The statute of limitations period to prove a specific violation is generally shorter than the prescriptive period necessary to prove abandonment, and is often based on the statute of limitations for breach of contract.⁵⁸⁹ In many states, an easement holder must go to court within three or four years⁵⁹⁰ of when the holder knows *or should know* about the violation.⁵⁹¹ A periodic inspection schedule could clarify when the holder should know about violations. Thus frequent inspections can reduce the risk that a court will decline to order a remedy on grounds that the holder should have known about it sooner.
- *Evidence to prove shore protection.* Over time memories fade and witnesses move or die. A witness who has seen dump trucks bringing topsoil to the property could provide compelling testimony that the grade has been elevated.⁵⁹² Yet a land trust will not generally look for such witnesses until a violation is noticed.⁵⁹³
- *Likelihood that a court orders a remedy.* Even if a violation is proven, the doctrines of estoppel, waiver, and laches are sometimes advanced as reasons for a court to not order a remedy.⁵⁹⁴ The rationale for these doctrines is that enforcement is unfair if the landowner made an investment while reasonably relying on the easement holder's apparent intent to not use the easement to block the project. Frequent notice should be sufficient to prove that it was unreasonable for an owner to assume that the land trust would not object if the land is elevated. Still, some types of notice are easy to overlook. An on-site inspection is strong evidence that the landowner had notice that the holder takes the restrictions seriously.

The decade before submergence may also be a good time to begin negotiations on the endgame for the easement, especially with a shoreline migration easement owned by a land trust. Although a rolling easement can outline the basic set of responsibilities, the actual transition may involve details that cannot all be anticipated when the instrument is originally negotiated. The parameters of any such negotiations would depend, most of all, on whether the rolling easement will terminate the landowner's use of any buildings on the property.

If the rolling easement terminates use of any building once it is seaward of the rolling design boundary, it may be advantageous to both parties to set a specific transfer date. If it is clear (for example) that the land will be submerged over a period starting in 6 years and ending in about 20 years, and that the home's location will be submerged in 10–12 years, both parties may benefit by replacing restrictions based on the rolling design boundary, with specific language that will transfer title to the land (for example)

12 years hence. The landowner's title could be converted to an "estate for years" with a duration of 12 years, with the rolling easement converted to a remainder interest that vests 12 years hence.⁵⁹⁵ Most landowners—particularly those residing on the property—would benefit from eliminating the uncertainty about their tenure; and both parties would be spared the time invested in annual inspections and protracted negotiations.⁵⁹⁶ If violations need to be cured, both parties may benefit by simply transferring the property on the date when it would have been submerged but for the violation, instead of re-grading the land down to the original elevation and then transferring it on that date anyway.⁵⁹⁷

If a rolling easement allows continued occupation after the home is seaward of spring high water, then property owners will have little reason to convert their land title into an estate for years. But in most cases, the landowner's right to occupy a home will end once the home is seaward of the public trust boundary—for example mean high water. At that point, the negotiations will be similar to the situation where a home must be abandoned as soon as it is within the wetlands, except that the negotiated transfer date (and possibly the negotiations) will be later.

Rolling easements are likely to allow continued occupation of homes in areas where the public trust boundary does not roll,⁵⁹⁸ and in areas where the comprehensive plan calls for an accommodation pathway. Negotiations would be very different. They might involve an inducement to abandon the home given the increasing costs of continued occupation, or they might simply focus on how the wetlands would be managed.

The likelihood of negotiating the details of the endgame depends on what happens to similar properties nearby. If adjacent properties have already been abandoned under similar arrangements, owners are likely to generally assume that the terms of the easement are binding, and negotiate the details in good faith. If other properties have been abandoned under different arrangements—or if this is the first parcel to be

submerged—then some owners are likely to resist the requirement to abandon the property, or at least resist the timing specified in the rolling easement.⁵⁹⁹

When the holder of a rolling easement is a government agency, then landowners can also make a political appeal against enforcing the easement. If the environmental, safety, and budgetary benefits of allowing the shore to retreat are generally accepted, then such appeals will generally fail. For example, Texas has generally declined to provide more than temporary relief in response to requests for exemptions from its rolling easement policy. A record of repeated reminders about the easement and efforts to negotiate in good faith may also help agencies resist such pressure. Nevertheless, to mitigate the perceived hardship, some sort of financial payment may be necessary.



9.3 FINANCIAL ASSISTANCE FOR RELOCATION

Termination payments could range anywhere from no compensation to something close to full compensation. Providing full compensation would largely defeat the purpose of the rolling easement: Even without the rolling easement, a local government could purchase the land at market value through eminent domain; providing full compensation would take away the incentive to

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avoid excess investment. Similarly, if one expects flood insurance to pay for the eventual loss of the home, much of the rolling easement's incentive to avoid unwise investments will be lost—unless the expected insurance payments are fully covered by insurance premiums (which is not the case today⁶⁰⁰).

Under the Texas rolling easement policy, the state generally offers landowners approximately \$50,000 for home relocation costs.⁶⁰¹ State law allows the Texas General Land Office to remove *some* homes encroaching seaward of the dune vegetation line, but the state usually allows continued occupation until either a storm destroys the house or the house is seaward of the mean high tide line, which is the boundary between public and private property.⁶⁰² If the home is occupied until it is destroyed by a storm, flood insurance may pay the entire value of the structure (though not the land). Thus, the state's enforcement flexibility substantially increases the likely financial compensation—and enables most owners to enjoy the property several more years.

Some researchers have taken this approach one step farther: Professor Joe Sax proposed creating a surety bond or “sinking fund” for compensating landowners by requiring annual payments well in advance of the submerge date. The proceeds could be invested and provided to the owner when the land is abandoned.⁶⁰³ With the blessing of the Federal Emergency Management Agency, The Heinz Center proposed a modification to the flood insurance program based on erosion-hazard mapping, in which higher flood insurance payments would accrue over 50 years sufficient to pay for the eventual loss of the structure.⁶⁰⁴ Under the Heinz Center approach, the government would continue to assume the *risk* of sea level rise; the owner would receive fair market value of the structure⁶⁰⁵ (though not the land) regardless of whether the higher premiums were sufficient to cover the payment. But assuming an accurate estimate of the submerge date,⁶⁰⁶ this approach would force owners of vulnerable property to pay for the *expected* cost of sea level rise. Under

FEMA's current procedures, rates on a given property neither anticipate nor respond to increasing vulnerability; so the premiums paid by other policy holders must cover those increased costs.⁶⁰⁷

If the Sax proposal is implemented as a bond, in which the property owner is provided the proceeds upon abandonment, then the landowner, not the government, will assume the risk of sea level rise. If the property lasts longer than expected, then the owner will get a payment worth more than the property. But if sea level rises more rapidly and/or the owner continues making upgrades as the submerge date approaches, then the bond will be less than the property value (though it still will tend to mitigate the apparently harsh effect of an owner having to give up property without a payment). The logic of such a fund is that, like insurance, it converts the risk or eventuality of the loss of one's home into a relatively modest annual payment. For example, if a rolling easement requires a payment equal to 1.3 percent of a home's value and the payment increases 3 percent per year, then it will be sufficient to cover the cost of the property in 40 years at a 3 percent rate of return. Given the various programs that benefit coastal landowners, a required annual payment into a buyout fund may be less politically difficult than uncompensated enforcement of the rolling easement.

If a land trust or landowner thinks that an eventual financial payment would help facilitate the endgame, provisions for such a fund can be included in the terms of the rolling easement. The landowner may be concerned that if his heirs still own the land when it is submerged, they might not have the money to buy a similar property inland. In such a case, he could ask that, instead of paying him for the rolling easement, the land trust invest the same amount in a trust fund, which can be transferred to the owner upon abandonment. Or the transferring owner could even provide those proceeds himself. If the easement holder (especially a government agency) is more concerned than the landowner about a bond being

available, the easement could specify that the owner must start to make annual payments some number of years before the estimated submergence, based on (for example) a percentage of the assessed market value.

A variant of this approach would be a payment from the landowner to the easement holder in lieu of having to remove the home when it first becomes seaward of the rolling design boundary. Such an option could be included either in the original easement conveyance⁶⁰⁸ or negotiated as the submerge date approaches. For example, a shoreline migration easement could prohibit shore protection and require immediate relocation of the house once it is seaward of the upper edge of tidal wetlands. The easement could also specify, or the parties may negotiate, an arrangement under which the owner can retain the home for a certain number of years after marsh takes over the land on which it stands, provided that the owner makes an annual payment into a fund, with some or all of those proceeds refunded when he abandons the parcel.

A final version of this approach is shown in Figure 6 (on page 29). In that case the rolling easement prohibits shore protection but does not require the home to be removed when it is in the wetlands. Eventually, however, the public/private boundary will move inland of the house. At that point, the state will own the land by operation of the public trust doctrine, and neither the landowner nor the easement holder will have any property interest in the portion of the parcel on which the home rests. The state will have both a property interest and an environmental interest in removing the structure, but also face political pressure to allow the home to stay. One option would be to for the state to charge an escalating rent for continued occupation⁶⁰⁹ possibly with the intention of refunding some or all of the proceeds upon abandonment.

Managing some sort of trust account would increase the administrative costs of the rolling easement. An account management fee similar to what custodians of retirement funds charge could

defray those costs. Sometimes the funds might have undesirable tax consequences.⁶¹⁰ Whether the additional administrative burden is worthwhile is a judgment that the land trust would have to make.

Instead of a cash payment, providing a new parcel of land may be feasible in some circumstances. In the case of an oceanside lot on a barrier island, a newly created lot on the bay side may sometimes be a reasonable solution.⁶¹¹ Some owners would willingly move a home to the safety of the bay side rather than insist on occupying a house seaward of the dune line, with both the ocean and the easement holder threatening to enforce the rolling easement.



9.4 AFTER THE LAND IS SUBMERGED

If the sea continues to rise, the shore retreats, and the rolling easement works as intended, eventually the entire parcel will be seaward of the rolling design boundary. In some cases, the rolling boundary will also be the boundary between the private dry land and the public trust tidelands. In other cases, the rolling boundary (e.g. spring high water or the dune vegetation line) will be inland of the public trust boundary. But eventually the public trust boundary (typically mean high water) will migrate inland of the entire parcel, and the land will no longer be privately owned.

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If the rolling easement does not require removal, the home might continue to stand on publicly owned wetlands. The owner will have no property right to keep the building there, and the state can require its removal. If the state does not do so, then either the former landowner or the land trust will own the home, depending on the type of rolling easement.⁶¹² If the land trust owns the house, it will be free to remove the structure. The situation in which people continue to inhabit homes standing in the water in areas preserved by rolling easements seems unlikely to become widespread.

Once the land becomes submerged and the buildings have been removed, the mission of the rolling easement will be accomplished in most cases. If the rolling easement is a possibility of reverter, the land will revert to the land trust or local government, which can manage it for conservation until it is transferred to the public trust. If state regulations or rolling easement zoning prevent shore protection, the government agency can then turn its attention to the next parcel inland, which may still be inhabited. Once the land reverts to the public trust, shoreline migration easements will be extinguished along with the owner's title to the land. In those relatively few cases where submerged lands have been conveyed to private parties, where the land does not necessarily revert to the public trust, the rolling easement will remain in force. At this point, it may have little practical significance aside from preventing the wetlands or shallow waters from being filled (which is generally discouraged by federal or state regulations anyway).

This is not to say that the parcel will remain under water forever. Migrating barrier islands, changing inlets, switching river deltas, earthquakes, or storms might create land once again at this location. But with few exceptions, title to any new land here would either go to the state (if the land was created by avulsion) or the owner of another parcel of land that gradually extended here through accretion.

When the rising sea finally reverses and begins to drop, the law may have to evolve to better allocate rights along a generally advancing shore, just as rolling easements are designed for a generally retreating shore. We do not address that possibility here. The mirror image of the rolling easement may confront communities along the Great Lakes⁶¹³ or other shorelines along falling lakes, long before it becomes an issue for the shores along tidal waters.



NOTES AND REFERENCES

⁵⁸⁴ Conservation easements are a form of risk management. They are often obtained in areas where there is no certainty that the land would otherwise be developed, because landowners who are certain that they want to develop the land do not to donate such easements. Either sea level rise or development could prove to be less than indicated by the best available projections.

⁵⁸⁵ See, e.g., TEX. NAT. RES. CODE ANN. § 61.025 (requiring a warning to all purchasers of coastal property that shore erosion may move the public beach to where the house is now, in which case the state of Texas may force the buyer to remove the house and pay for that removal); and S.C. CODE ANN. § 48-39-330 (requiring disclosure to purchasers of property seaward of the setback line that they may be affected by the setback line). Often warnings come at the end of the process of searching for a home, by which time a buyer may already feel committed to buying the home, and disregard the warning.

⁵⁸⁶ Under the doctrine of waste, the owner of a possibility of reverter may have the power to stop such grade elevation, if the title transfers upon a given rise in sea level. If title transfers upon shore protection, the holder will have to take precautions to find such violations or risk losing title to the land through adverse possession.

⁵⁸⁷ See, e.g., *supra* Table 5 (suggesting an initial elevation survey).

⁵⁸⁸ This paragraph draws upon a memo to EPA prepared by Leslie Ratley-Beach, Sylvia Bates, and Rush Shay of the Land Trust alliance concerning the importance of frequent inspections. See *generally* Ratley-Beach, Sylvia Bates & Rush Shay, RE: Review Request: Draft Primer on Rolling Easements (email from Leslie Ratley-Beach to Jeremy Martinich of EPA, November 1, 2010).

⁵⁸⁹ *Id.*

⁵⁹⁰ *Id.*

⁵⁹¹ See *generally* Lynn M LoPucki, *Statute of Limitations in Warranty*, 21 U. of Fla. L. Rev. 336 (1968). *But cf.* CHEEVER, *supra* note 215, at 1098 n.109 (noting that the statute of limitations in at least one state does not directly articulate the discovery rule, which tolls the statute of limitations from the time of a violation until the time when the injured party knows or should have known about it).

⁵⁹² Comparing the original survey with the existing elevation of the land may still be the most reliable way to measure how much the elevation has changed. But a witness to the grade elevation would help to prove

that the survey evidence is correct and that the grade elevation did not result from winds or flood waters depositing material.

⁵⁹³ The admissibility of evidence is often a consideration that prompts land trusts to undertake regular inspections. RATLEY-BEACH ET AL, *supra* note 588. If written records rather than memories are the primary evidence that grade elevation has taken place, the records could be challenged as hearsay. See e.g. Fed. R. Evid. 801 and 802. But records maintained in the course of business, such as regular inspections, would generally be admissible under the business-records exception to the hearsay rule. *Id. Cf.* Fed. R. Evid. 803(6). The most important written record for a rolling easement would be the original survey which would be part of the original conveyance and hence not hearsay. If a survey takes place each time the land is sold, the subsequent surveys should also be admissible either because they are not hearsay either (e.g. they have been accepted by the owner and are signed by the buyer and hence an admission about the condition of the land) or they are a business record. Nevertheless, if a land trust wants to introduce as evidence photos or records of its visual observations about whether the grade had been elevated, the hearsay exception for business records may allow evidence from regular annual surveys that would not be allowed for one-time surveys. Whether decadal inspections would be treated as business records is less clear.

⁵⁹⁴ *Id.*

⁵⁹⁵ Converting a possibility of reverter into an estate for years would be relatively straightforward because the land trust would be trading one type of future interest for another. If the land trust holds a conservation easement, it will generally be necessary to persuade a court that this change serves the conservation interest. A court's willingness to accept such a change may depend on how the court views uncertainty and measures designed to reduce litigation costs. If the costs of obtaining such court orders were too high, another option would be to exchange forbearance by the conservancy from then until the projected submerge date in return for the remainder on an estate for years. During most (or all) of that period, the forbearance would have no environmental significance because the submerge date would not yet have arrived.

⁵⁹⁶ IRS regulations appear to allow modifications of the instrument consistent with the objectives, and even allow for judicially approved sale as long as the proceeds are used for the same purpose. 26 C.F.R. § 1.170A-14(g)(6)(i).

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⁵⁹⁷ For example, there may be value in having low-lying habitat just above wetland elevation.

⁵⁹⁸ *E.g.*, areas where the submerged land has already been sold to private landowners.

⁵⁹⁹ For example, in *Severance v. Patterson*, the parcels were in the second row back from the beach when the Open Beaches Act was adopted, but along the Gulf when the case was filed. The owner challenged the application of the law to her home on the grounds that the public easement did not necessarily roll onto her property, and the court agreed. *See supra* note 566.

⁶⁰⁰ *See* CCSP, *supra* note 3, at 151–154 (showing that under grandfathering policy, flood insurance rates do not increase when sea level rise makes a given property more hazardous).

⁶⁰¹ TEXAS DEPARTMENT OF PUBLIC SAFETY. STATE OF TEXAS HAZARD MITIGATION PLAN 2010–2013, 194 (2010) (discussing relocation under the Coastal Erosion Planning and Response Act). *See also* *Severance v. Patterson*, 566 F. 3d 490, 494 (2009) (plaintiff was offered relocation assistance of \$40,000 for two structures in 2006).

⁶⁰² *See* § 3.1.2 (discussing the Texas Open Beaches Act). As this report went to press, the state had not yet made any changes in its relocation assistance policy in light of the Texas Supreme Court's opinion in *Severance v Patterson*, No. 09-0387 (Tex. 2010).

⁶⁰³ Joseph L. Sax, *The Fate of Wetlands in the Face of Rising Sea Levels: A Strategic Proposal*, 9 UCLA J. ENVTL. L. & POL'Y 143, 148 (1991).

⁶⁰⁴ THE HEINZ CENTER, *EVALUATION OF EROSION HAZARDS* with forward by James Lee Witt, Director, Federal Emergency Management Agency (2000), 156–172, 178.

⁶⁰⁵ Here we are assuming that the value of the structure is less than the maximum coverage per structure. The maximum coverage is \$250,000, 44 CFR § 61.1, but there have been several proposals to raise it.

⁶⁰⁶ The Heinz Center proposal did not explicitly address accelerated sea level rise, but revising the basic approach to do so would be relatively straightforward. With or without accelerated sea level rise, however, shoreline retreat over a 50-year period is uncertain. Transferring a 50-year risk from property owners to the flood insurance program based on a forecast is not necessarily the most efficient way to discourage unwise investments, but it would incorporate risks into decisions more than the current approach. *See* CCSP, *supra* note 3, at 151–154.

⁶⁰⁷ *See supra* note 600.

⁶⁰⁸ Such a provision is essentially an option for continued habitation in return for a payment. If included as part of the original easement, such a provision could be attacked as a violation of the Rule Against Perpetuities. But a land trust that wanted to stay on good terms with the property owner may be reluctant to attack a provision that it originally negotiated with the property owner. *Cf. supra* notes 259, 260, and 387.

⁶⁰⁹ Several states rent public trust tidelands for a variety of water-related purposes. New Jersey requires those wanting to build a dock to lease the wetlands and shallow waters over which the dock will be built. *See, e.g.*, NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION, *PUBLIC ACCESS IN NEW JERSEY: THE PUBLIC TRUST DOCTRINE AND PRACTICAL STEPS TO ENHANCE PUBLIC ACCESS* 23–25, 41 (undated). Several states lease tidelands for aquaculture or mineral extraction. SLADE ET AL, *supra* note 34, at 249–255. In Mississippi, the Secretary of State has the discretion to award or deny a tidelands lease for a gaming casino. *Columbia Land Dev., LLC v. Secretary of State*, 868 So.2d 1006, 1011–1016 (Miss.2004).

⁶¹⁰ For example, if a cash refund is expected eventually, then a “donation” of a rolling easement would really be a “bargain sale.”

⁶¹¹ *See supra* § 2.5.

⁶¹² Under a shoreline migration easement, the landowner would be likely to own the building; with a future interest, the land trust would own it.

⁶¹³ *See, e.g.*, James R. Angel & Kenneth E. Kunkel, *The Response of Great Lakes Water Levels to Future Climate Scenarios with an Emphasis on Lake Michigan-Huron*, 36 JOURNAL OF GREAT LAKES RESEARCH 51–58 (2010) (75 percent of all simulations showing drop in lake levels through the year 2080, with 25 percent chance that the drop could be 50–70 centimeters).

GLOSSARY

Access, Lateral

Right to walk or otherwise move *along* a shore, once someone has reached the shore.

Access, Perpendicular

Legally permissible means of reaching the shore from dry land.

Access Point

Place where anyone may legally gain access to the shore; usually a park, the end of a public street, or a public path. A place where perpendicular access is provided.

Accommodation

One of three general pathways by which society can respond to rising sea level or shoreline erosion, in which no effort is made at shore protection while human activities continue to occupy an increasingly wet environment. This approach is most common for a small rise in sea level that does not warrant the major investments or relocations necessitated by the *retreat* and *shore protection* pathways.

Accretion

1. Gradual and imperceptible advance of a shoreline into the sea. 2. Legal doctrine under which property lines that follow the shoreline move with the changing shore when that change is gradual and imperceptible, whether the shore erodes or accretes. 3. *Wetland Accretion*.

Affirmative Easement

See *easement*.

Armoring

See *shoreline armoring*.

Astronomical Tides

Tides that result from gravitational forces of the moon and sun on ocean waters.

Average High Water Mark

1. In this report, the average upper reach of the waves during all the high tides over the course of the year. 2. The average position of the wet/dry line along a sandy beach. 3. The upper reach of the waves during a day with average seas and the average high tide.

Avulsion

1. Loss or gain of lands bordering on the seashore by sudden or violent action of the elements, perceptible while in progress, or caused by human activities. Often refers to the sudden and rapid change in the course and channel of a boundary river. 2. Legal doctrine under which property lines that follow the shoreline do not move with the changing shore, when that change is sudden and perceptible.

Barrier Island

Long, narrow coastal landform composed of sand that is essentially parallel to the shore and usually separated by wetlands; protects inland areas from ocean waves and storms.

Barrier Island Migration

Whole-scale movement of a barrier island or barrier spit in response to sea level rise, changes in sediment supply, storm surges or waves, or some combination of these factors.

Barrier Island Raising

Combination of beachfill and grade elevation in the area landward of the beach. The landward portion is rarely elevated as a large-scale operation. Individual lot owners sometimes import fill to raise their lots, especially if the lots are prone to flooding.

Beach

Unconsolidated material that covers a gently sloping zone, typically with a concave profile, extending landward from the low water line to the place where there is a definite change in material or physiographic form (such as a cliff), or to the line of permanent vegetation (usually the effective limit of the highest storm waves); a shore of a body

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of water, formed and washed by waves or tides, usually covered by sand or gravel and lacking a bare rocky surface.

Beach Nourishment

Addition of sand, usually dredged from offshore, to an eroding shoreline to enlarge or create a beach area, offering both temporary shore protection and recreational opportunities. Putting sand where there is none necessarily raises the elevation, but engineered beaches can be designed to have a volume and height that a natural beach would never attain. Also known as “beachfill” and “sand replenishment.”

Bluff

Elevated landform, such as a cliff, composed of partially consolidated and unconsolidated sediments, typically sands, gravel, and/or clays.

Breakwater

Offshore structure (such as a wall or jetty) that, by breaking the force of the waves, protects a harbor, anchorage, beach, or shore area.

Bulkhead

Vertical wall along the shore designed either to create a vertical shore for navigation purposes, or to prevent erosion in areas with minor wave action.

Buyer Resistance

Reluctance of a potential purchaser to pay what a product is worth for reasons that appear to be based on intuition or emotion rather than a rational assessment of the product’s value. The requirement that the price be discounted because of a feature by an amount far in excess of any reasonable expectation of the cost of that feature, e.g., requiring a price discount of \$1,000 because of a clause that may require a payment of \$500.

Civil Law

A system of law derived from Roman Law as codified by the Institutes of Justinian. The civil law governs most of Europe, and South America, other than former British Colonies, as well as parts

of Asia and Africa. Unlike common law, judges do not make law under the civil system. In the United States, Louisiana is the only state that (partially) follows the civil law today. But some land grants conform to the civil law rather than the common law, in states that were once ruled by France or Spain. In particular, the public trust extended farther inland under the civil law than the common law.

Coastal Zone

Area extending from the ocean inland across the region directly influenced by marine processes.

Common Law

The system of law developed by English judges and adopted by most states, based on precedent and case law, in which judges make decisions on specific cases, generally on matters where no statute clearly applies, and each judge attempts to rule in a manner consistent with how previous courts have addressed similar facts.

Conservation Easement.

A negative easement in gross whose restrictions promote conservation. Ownership is generally limited to government agencies and qualified nonprofit land trusts.

Contour Interval

Difference in elevations of adjacent contours on a topographic map. The smaller the contour interval, the more precise the map.

Covenant Running with the Land

Agreement concerning use of a parcel of land between an owner of the parcel and an owner of a nearby parcel, which binds and benefits successive owners of both parcels as if each had made the agreement. Unless otherwise specified, *covenant running with the land* means *legal* covenant running with the land for which the remedy for a violation would be an award of damages. Often a given agreement is also an *equitable covenant running with the land*, also known as an *equitable servitude*.

Defeasible Estate

Complete ownership of land that is capable of terminating upon the occurrence of an event.

Design Sea Level

The sea level at which a rolling easement based on sea level changes ownership.

Dike

Wall generally of earthen materials designed to prevent permanent inundation of lands below sea level, tidal flooding of lands between sea level and spring high water, or storm-surge flooding of the coastal floodplain.

Dominant Estate

Land whose owner benefits from an easement.

Dredge and Fill

Process used extensively before the 1970s to elevate estuarine shorelines to a height that allows construction of homes. Commonly known as lagoon development, channels are dredged through tidal wetlands to allow small boat navigation, and dredge spoil is placed on the remaining marsh to raise the marsh high enough to allow development. Also known as “canal estates.”

Dry Beach

1. In legal writing, the portion of a beach landward of mean high water 2. In geological writing, the portion of a beach landward of the wet/dry line or upper limit of wave runup.

Dune

Landform characterized by accumulation of wind-blown sand, often vegetated, along the coast.

Easement

Right to enter land possessed by someone else and make limited use of that land (such as walk, fish, change the grade elevation, or drain water). Also known as *affirmative easement*.

Encroach

1. In this primer, to lie a short distance seaward beyond the boundary line, either by advancing beyond the boundary, or by remaining in place while the boundary line moved inland. 2. To advance a short distance beyond the normal boundary line.

Easement Holder

Party who owns the rights in an easement, such as a conservation easement. Typically the landowner conveys a conservation easement to a holder. In this report, however, the term usually means *rolling easement holder*, which has a broader meaning. See *rolling easement holder* and *dominant estate*.

Easement in Gross

Easement (usually an affirmative easement) that allows someone (called either the dominant tenant or the easement holder) to make use of land owned by another (the servient estate) unrelated to any land the dominant tenant may own.

Equitable Covenant Running with the Land

See *equitable servitude*.

Equitable Servitude

Agreement concerning use of a parcel of land between an owner of the parcel and an owner of a nearby parcel, which binds and benefits successive owners of both parcels as if each had made the agreement. An equitable servitude is similar to a legal covenant, except that it entitles the benefited land to an equitable remedy, such as an injunction to honor the terms of the covenant. A negative equitable servitude (which limits one owner's use of this land) is similar to negative easement, except that courts recognize only a few types of negative easements, whereas they allow parties to restrict almost any type of land use in an equitable servitude.

Erosion

Loss of sediment, sometimes indicated by the landward retreat of a shoreline indicator such as the water line, berm crest, or vegetation line. The

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loss occurs when sediments are entrained into the water column and transported from the source.

Erosion-Based Setback

Setback equal to an estimated annual erosion rate multiplied by a number of years set by statute or regulation (e.g., 30 years).

Estate for Years

Ownership of land that terminates after a given period of time. When a grantor conveys an estate for years, the interest he retains is known as a reversion.

Eustatic Sea-Level Rise

Changes in global sea level relative to a vertical datum. Eustatic changes represent global sea level. The causes include ice sheet melting, increasing temperature of surface waters, and increasing volume of seafloor due to tectonic processes.

Exaction

Interest in land, usually an easement or a parcel of land in fee simple absolute, that a government agency requires a private landowner to convey to the government as a condition for a permit.

Executory Interest

Future interest in land that entitles owner to possession for the first time, when an event occurs that ends the *possibility of reverter* or *fee simple subject to condition subsequent* owned by someone else. For example, a deed that says “O grants Blueacre to A and his heirs for so long as sea level is less than one meter above the NAVD, and then to B” would give a fee simple determinable to A and an executory interest in Blueacre to B. The legal difference between a possibility of reverter (or power of termination) and an executory interest is that neither the owner of an executory interest nor his heirs ever owned Blueacre, whereas the owner a possibility of reverter (or a power of termination) or his heirs owned Blueacre at one time.

Fee Simple Absolute

Ownership of the entire set of rights in land forever. A deed that says “O grants Blueacre to A and his heirs” conveys to A fee simple absolute in Blueacre.

Fee Simple Determinable

Ownership of the entire set of rights in land with the potential to last forever but which is subject to a limitation, which would cause the estate to end. The limitation is generally the end of the circumstances that motivated the owner to obtain this interest in land (e.g. the railroad closes or the sea rises enough to threaten the property). A deed that says “O grants Blueacre to A and his heirs for so long as sea level is less than one meter above the NAVD” conveys a fee simple determinable to A unless and until sea level rises one meter above NAVD, after which point Blueacre reverts to O or his heirs. O retains a *possibility of reverter*.

Fee Simple Subject to Condition Subsequent

Ownership of the entire set of rights in land with the potential to last forever but which ends if a particular condition occurs, provided the original grantor exercises his power of termination. A deed that says “O grants Blueacre to A and his heirs, but if a seawall is built on Blueacre, O has a power of termination” conveys a fee simple subject to a condition subsequent. If a seawall is built on the property, O has the power to terminate the estate by going to court. The condition is generally an action by the owner contrary to the original agreement under which the land was transferred. Courts have often viewed the resulting transfer of possession as unreasonably punitive.

Flag Lot

Parcel with no true front yard, whose only frontage along the street is for the driveway. A flag lot often has a shape that looks like a flag (the site for the home and most of the yard) on a pole (the driveway).

Future Interest in Land

Future and possibly contingent right to a fee simple absolute that entitles one to take possession at some date in the future or upon the occurrence of an event (e.g. when the sea rises to a specified level).

Global Sea Level Rise

Worldwide average rise in mean sea level.

Grade Elevation

Adding sand, gravel, or soil to elevate a land surface.

Groin

Engineering structure perpendicular to the coast, used to accumulate littoral sand by interrupting alongshore transport processes. A groin is often constructed of concrete, timbers, steel, or rock.

In Gross

See *easement in gross*.

Inholding

Privately owned land within a publicly owned park, wildlife refuge, or other natural area.

Inundation

Permanent flooding of dry lands when the sea level rises.

Landowner

In this report, someone whose property interest in a particular parcel entitles her to current possession. The landowner may be the holder of a *defeasible estate*, an *estate for years*, or *fee simple absolute* subject to a *conservation easement*.

Land Trust

Private charitable organization that works to conserve land by acquiring and managing conservation lands or conservation easements.

Levee

Wall generally of earthen materials designed to prevent riverine flooding after periods of great rainfall.

Life Estate

Ownership of land that terminates when someone dies. When a grantor conveys a life estate, the interest he retains is known as a “reversion”. Generally, the person whose death triggers the reversion owns the life estate. If he sells the life estate to someone else, it is known as a “life estate *par autre vie*.”

Littoral

Relating to a tidal shoreline.

Living Shoreline

Type of *shore protection* that retains some or all of the environmental characteristics of a natural shoreline.

Marsh

Low-lying vegetated wetlands that generally are found between mean sea level and spring high water, or areas that are flooded at least a few times each month. Salt marshes occur in protected environments, such as behind barriers. Salt-tolerant plants colonize salt marshes.

Mean High Tide Line

General term that refers to whichever measure of mean high water applies. This term is used in Texas, where land conveyances before 1840 extended to *mean higher high water*, but land grants thereafter extended down to *mean high water*. In Texas, this line refers to the elevation contour along the beach whose elevation is the same as mean high tide, which is considerably seaward of where the waves wash at high tide.

Mean High Water

Tidal datum. The average height of all high water heights observed over a 19-year period.

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Mean Higher High Water

Tidal datum. The average height of the higher of two daily high tides observed over a 19-year period. This measure is often used along the Gulf of Mexico, where one of the high tides each day is much higher than the other high tide. Along most of the U.S. Atlantic coast, by contrast, the two daily high tides reach similar heights.

Mean Low Water

Tidal datum. The average height of all low water heights observed over a 19-year period.

Mean Sea Level

Average water level position measured over a 19-year period that takes into account natural tidal oscillations. Often computed by the arithmetic mean of observed hourly heights over a 19-year period. Local mean sea level is determined relative to the local land at a tide station. Global mean sea level is the average level of the global ocean.

Mudflat

Level area of fine silt and clay along a shore alternately covered or uncovered by the tide or covered by shallow water.

Negative Easement

Right to prevent the owner of land from doing something on her land that she would otherwise have the right to do.

Nanotidal Wetlands

Wetlands that are irregularly flooded by wind-generated tides in estuaries with little or no astronomical tides. These wetlands are often classified as nontidal wetlands, but like tidal wetlands, their frequency of inundation is controlled directly by sea level.

Nontidal Wetlands

Wetlands that are not flooded by tides.

Ocean

In this report, the Atlantic, Pacific, and Arctic Oceans; the Gulf of Mexico, and other bodies of water with large waves.

Ordinary High Water Mark

Demarcation between the publicly owned land along the water and privately owned land. Generally based on mean high water, the definition varies by state. Along beaches with significant waves, it may be based on the line of vegetation, the water mark caused by wave runup, surveys of the elevation of mean high water, or other procedures. Along flat waters, it is the same as the *average high water mark*.

Possibility of Reverter

Future interest in land that entitles the owner to re-possess the land if and when a specific event occurs. That event is also the limitation that ends the preceding fee simple determinable occurs. A possibility of reverter is automatically created when the owner of a fee simple absolute conveys a *fee simple determinable*.

Power of Termination

Future interest in land that entitles the owner to go to court to re-possess the land if and when a particular condition occurs, which is specified in the conveyance of a *fee simple subject to condition subsequent*. A power of termination is automatically created when the owner of a fee simple absolute conveys a *fee simple determinable subject to condition subsequent*.

Privity of Estate, Horizontal

Situation in which the original parties of a covenant shared some interest in the land that is the subject of the covenant, or the covenant is created as part of the subdivision process when both owners can trace their titles back to a common owner of a larger parcel that included their respective parcels.

Privity of Estate, Vertical

Situation in which the present owner of a parcel that is benefited or burdened by a covenant owns the entire estate that was owned by the original party that made the agreement, to whom the owner traces his title.

Public Trust Doctrine

Legal principle derived from English common law. The essence is that the waters of the state are a public resource owned by and available to all citizens equally for the purposes of navigation, hunting, fowling, and fishing, and that this trust is not invalidated by private ownership of the underlying land.

Relative Sea Level Rise

Rate of sea level change measured with respect to a specified vertical datum relative to the land, which may also be changing elevation over time.

Recorded Rolling Easement

1. A *rolling easement* recorded in the local land records office. 2. Any property interest designed to prevent shore protection or ensure that a property boundary or right of access migrates inland. 3. A *conservation easement, affirmative easement, covenant, future interest in land, or ambulatory boundary* designed to ensure that a property boundary or right of access migrates inland.

Reliction

Slow and imperceptible advance of the shoreline resulting from falling sea level, as distinct from the deposit of sediment, which is known as *accretion*.

Retreat

One of three general pathways by which society can respond to rising sea level or shoreline erosion, in which human activities move inland to make way for the landward migration of wetlands, beaches, open water, and public rights associated with the shore and tidal waters.

Revetment

Sloped facing of stone, concrete, etc., built to protect a scarp, embankment, or shore structure against erosion by waves or currents.

Rolling Conservation Easement

1. Conservation easement that both restricts construction and other land use with the purpose of maintaining existing conservation value of land, and prohibits shore protection, i.e., a standard *conservation easement* combined with a *shoreline migration conservation easement*. 2. Conservation easement with boundaries that migrate as a result of changing environmental conditions or forest practices. 3. A *shoreline migration conservation easement*. This report uses the first definition.

Rolling Design Boundary

Shoreline (or a line that generally follows the shore) that defines the landward boundary of certain rights or restrictions in a rolling easement. The most common examples are the *dune vegetation line, spring high water* (upper edge of tidal wetlands) *mean high water, mean low water*, and a given distance inland (e.g., 100 feet) from any of those boundaries.

Rolling Easement

1. Regulation or an interest in land in which a property owner's interest in preventing real estate from eroding or being submerged yields to the public or environmental interest in allowing wetlands, beaches, or access along the shore to migrate inland. 2. An interest in land along the shore whose inland boundary migrates inland as the shore erodes. 3. In Texas, an easement along the shore whose inland boundary migrates inland or seaward as the shore erodes or accretes.

There is generally a *rolling design boundary* seaward of which the restrictions apply, such as the dune vegetation line. At a minimum, a rolling easement prohibits hard shore protection and other structures that prevent the landward edge of

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wetlands or beaches from migrating inland or block public access along the shore. A rolling easement may also require removal of preexisting buildings as they become nonconforming structures seaward of the rolling design boundary. Along estuaries, a rolling easement may also prohibit grade elevation of dry land, which would tend to squeeze wetlands.

Rolling Easement Holder

Person, land trust, or government agency that owns the property rights from a *rolling easement* or has the legal power to enforce it. The rolling easement holder could be a local planning department or land use regulatory agency (in the case of *rolling easement zoning*), a state regulatory agency (in the case of state regulations prohibiting shore protection), the state agency responsible for managing public trust lands (in the case of a rolling easement that derives from the *public trust doctrine* of common law), a government agency that acquires *conservation easements* (in the case of a *recorded rolling easement* that had been conveyed to a government agency), a qualified land trust (in the case of a rolling easement that had been acquired by a land trust), or a nearby landowner (in the case of a *covenant, equitable servitude, or affirmative easement* with a rolling boundary).

Rolling Easement Zoning

Land use zoning that prohibits shore protection in some zones.

Running with the Land

See *covenant running with the land*.

Sand Dunes

Mounds or ridges of sand. They are formed from sand that is transported and deposited by the wind.

Sand Replenishment

See *beach nourishment*.

Safety Valve

1. A provision in a regulation or recorded property interest that limits the potential harm to the property owner. 2. In this report, a provision that the *rolling easement* will not require the removal of the home before a specified date, even the land is submerged more rapidly than expected.

Sea Level Rise

In this report, relative sea level rise. In other contexts, the term may refer to global sea level rise.

Seawall

Structure separating land and water areas, primarily designed to prevent erosion and other damage from wave action.

Servient Estate

Land that is burdened by an easement.

Setback

Requirement that construction be located a minimum distance inland from tidal wetlands, tidal water, the primary dune line, or some other definition of the shore.

Shore

Narrow strip of land in immediate contact with the sea, including the zone between high and low water lines. A shore of unconsolidated material is usually called a beach. (In common parlance, “shore” may refer to an entire coastal community; but that meaning is not used in this report.)

Shoreline migration conservation easement

Conservation easement whose sole restriction is to make a property subject to a rolling easement.

Shoreline migration easement

See *shoreline migration conservation easement*.

Shore Retreat

1. Migration of a shoreline toward higher ground away from deeper water, whether through direct inundation from higher relative sea level or shoreline erosion. 2. One of three general pathways by which society can respond to rising sea level and other processes that cause the shoreline to migrate inland. See *retreat*.

Shoreline

Intersection of a specified plane of water with the shore or beach. The line delineating the shoreline on National Ocean Service nautical charts and surveys approximates the mean high water line.

Shoreline Armoring

Placement of fixed engineering structures, typically rock or concrete, on or along the shoreline to mitigate the effects of coastal erosion and protect structures. These structures include seawalls, revetments, bulkheads, and rip-rap (loose boulders).

Shore Protection

1. Activity that protects land from inundation, erosion, or storm-induced flooding, generally either through shoreline armoring or soft shore protection. 2. One of three general pathways by which society can respond to rising sea level and other processes that increase the risk for flooding and coastal erosion through use of shore protection measures, such as shoreline armoring, beach nourishment, or grade elevation.

Soft Shore Protection

Method of shore protection that prevents erosion through use of materials similar to those already found in a given location, e.g., adding sand to an eroding beach, planting vegetation whose roots will retain soils along the shore, and elevating the surface grade of dry land.

Special Exception

Land use permitted within a given zone, provided that an administrative fact finder is satisfied that specific conditions are met.

Spring High Water

Average height of the high water during semi-monthly times of spring tides (full and new moons).

Submerge Date

1. The day the rolling design boundary migrates inland of a given building or parcel of land subject to a rolling easement. 2. In the case of a rolling easement structured as a future interest in land, the day that the property reverts from the landowner to the owner of the future interest.

Submerged Land

1. Land that is below the water all of the time or on a regular basis. 2. In this report, tidelands plus the bottoms of bays and other estuaries, as well as the ocean floor along the coast.

Submergence

1. In this report, the conversion of dry land to wetland or open water through either shoreline erosion or inundation. 2. In the case of a rolling easement, the occurrence of the *submerge date*. 3. A rise in sea level or sinking of the land surface so that areas that were formerly dry land become intertidal or open water. 4. Inundation.

Taking

An action by a government that diminishes an owner's property rights enough to require compensation under the 5th Amendment of the U.S. Constitution.

Tidal Inlet

Opening in the shoreline through which water penetrates the land, thereby providing a connection between the ocean and bays, lagoons, marsh, and tidal creek systems. The main channel of a tidal inlet is maintained by tidal currents.

Tidal Range

Vertical difference between normal high and low tides often computed as the elevation difference between mean high water and mean low water.

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Spring tide range is the elevation difference between spring high water and spring low water.

Tidal Wetlands

Wetlands that are flooded by high tides and exposed at low tides. In some contexts, this term refers to vegetated wetlands (e.g., marshes and swamps) but not non-vegetated wetlands such as tidal mudflats and beaches. In other contexts, it may refer to both vegetated and non-vegetated wetlands.

Title

The sum of all property rights to a particular parcel owned by a particular owner.

Tidelands

Lands that are flooded during ordinary high water and hence available to the public under the public trust doctrine. They include beaches, vegetated wetlands, mudflats, salt flats, and rocky intertidal areas.

TLC (The Land Conservancy)

An example land trust that accepts conservation easements in coastal communities.

Transfer Title

To convey all of one's property rights in a particular parcel to someone else. A title transfer conveys only what the transferor owns, which may be less than *fee simple absolute*.

Variance

An exemption to a local land use rule granted to an applicant because of hardship or because the enforcement of the rule might violate a statute or constitutional provision.

Wetland Accretion

Process by which tidal wetlands keep pace with rising sea level through peat formation and the accumulation of sediment, so that the land level rises at approximately the same rate as the sea rises. Also known as "vertical accretion".

Wetland Migration

Process by which tidal wetlands adjust to rising sea level by advancing inland into areas previously above the ebb and flow of the tides.

Zoning

A system of regulating the use of land based on dividing a jurisdiction into several zones, each of which has different allowed land uses.

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