

# Dynamic Property Rights: The Public Trust Doctrine and Takings in a Changing Climate

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I. INTRODUCTION .....	53
A. The Public Trust Doctrine and Rolling Easements .....	57
B. Regulatory Takings Defined .....	62
II. CAN COMMON LAW PRINCIPLES PROVIDE THE AUTHORITY TO RESTRICT DEVELOPMENT IN THE COASTAL ZONE? .....	63
A. Common Law Background Principles of Dynamic Coastlines .....	67
B. The Potential for Lucas Liability .....	69
C. Investment-Backed Expectations Under Penn Central.....	76
D. Expansion of the Doctrine of Waste .....	83
E. The Government’s Property Interest as a Contingent Future Interest .....	86
III. COMMON LAW DOCTRINES IN PRACTICE: AN ANALYSIS OF STATE DOCTRINES.....	91
A. Geographic Scope of the Public Trust .....	91
B. Source of the Public’s Right to Access the Beach.....	92
C. Rights Protected Under the Public Trust .....	95
D. Rights Afforded to the Littoral Owner .....	96
IV. LEGISLATIVE INTERVENTIONS: RULES FOR BEACH NOURISHMENT AND ARMORING .....	98

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A. The Texas Open Beaches Act.....	99
B. Other State Statutory Provisions.....	102
V. CONCLUSIONS .....	106
VI. APPENDIX A.....	109

Adaptation to the impacts of climate change will present a number of complex legal problems. Most pressing among these is how society will respond to rising sea levels and increasing strength and frequency of coastal storms. The coastal zone constitutes a dynamic interface between public and private property that has long been recognized in the common law. In the last century, coastal populations increased rapidly, and they continue to grow today.<sup>1</sup> These growing populations come to a coastline that is increasingly stressed and dynamically changing, requiring comprehensive planning to protect environmental benefits, public health, and safety. Recent cases from Texas and Florida have demonstrated tensions between private property and the public trust, a trend that will likely only increase in the coming years.<sup>2</sup> These cases highlight the legal uncertainty that states face in determining how to protect rapidly eroding shorelines—a problem that will only become more acute as sea levels rise in the future.<sup>3</sup>

As a matter of basic public policy, states have an interest in carefully managing coastal development in the face of projected climate change impacts in order to protect public safety and minimize future disaster recovery expenditures.

This paper explores how the states—as sovereigns and holders of the public trust—possess the ability to limit coastal development while avoiding regulatory takings liability. We provide both a theoretical explanation of how common law doctrines can expand the regulatory authority of the public trust onto dry land, and a comprehensive overview of how these doctrines differ in scope and interpretation across coastal states. We then explore how variations

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1. PEW OCEANS COMMISSION, AMERICA'S LIVING OCEANS: CHARTING A COURSE FOR SEA CHANGE 6 (2003), *available at* [http://www.pewtrusts.org/uploadedFiles/wwwpewtrustsorg/Reports/Protecting\\_ocean\\_life/env\\_pew\\_oceans\\_final\\_report.pdf](http://www.pewtrusts.org/uploadedFiles/wwwpewtrustsorg/Reports/Protecting_ocean_life/env_pew_oceans_final_report.pdf) (finding that more than half of Americans currently live in coastal counties and another 25 million people will move into these counties by 2015).

2. *Stop the Beach Renourishment v. Fla. Dep't Env'tl. Prot.*, 130 S.Ct. 2592 (2010); *Severance v. Patterson*, 2010 WL 4371438 (Tex. Nov. 5, 2010).

3. Sea levels are expected to rise up to 1.9 meters by 2100. Martin Vermeer & Stefan Rahmstorf, *Global Sea Level Linked to Global Temperature*, 106 PROC. NAT'L ACAD. SCI. 21527, 21527 (2009).

in state common law result in differential abilities to wield public trust authority to regulate coastal development.

### I. INTRODUCTION

Coastal areas will be increasingly threatened by the effects of climate change. Two of the most significant projected impacts of climate change in the coastal zone are rising sea levels, resulting in gradual inundation,<sup>4</sup> and increased severity and frequency of coastal storms,<sup>5</sup> which together can result in significant landform erosion as well as the gradual drowning of the coastal zone.

The combined effects of ice melt and thermal expansion will continue to affect sea levels for the foreseeable future. In fact, even if atmospheric emissions had been stabilized in 2000, residual warming would still lead to an additional 12-13 cm of sea level rise, which would result in significant coastal inundation.<sup>6</sup> In addition, mounting evidence indicates both that the rate of global sea level rise is increasing and that the absolute amount of sea level rise by the end of the century is likely to be more than initially projected.<sup>7</sup> In 2007, the Intergovernmental Panel on Climate Change projected that there would be between .18 and 0.6 meters of sea

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4. For an explanation of the forces contributing to climate-driven sea level rise see *id.*; Catia M. Domingues et al., *Improved Estimates of Upper-Ocean Warming and Multi-Decadal Sea Level Rise*, 453 NATURE 1090, 1092 (2008) (estimating that thermal expansion of the ocean contributes 1.6mm/yr to sea level rise); E. Rignot, D. Braaten, S.P. Gogineni, W.B. Krabill, & J.R. McConnell, *Rapid Ice Discharge from Southeast Greenland Glaciers*, 31 GEOPHYSICAL RESEARCH LETTERS L10401 (2004) (estimating the contribution to sea level rise from the melt of the Greenland ice sheet to be 0.04mm/yr).

5. There is a fierce scientific “debate” about the impacts of climate change on hurricanes. Due to the differences in the dynamics of ocean basins, climate change will have different impacts on hurricanes in the Atlantic and Pacific Oceans. In the smaller Atlantic Ocean, climate change is likely to lead to more frequent hurricanes. Mark A. Saunders & Adam S. Lea, *Large Contribution of Sea Surface Warming to Recent Increase in Atlantic Hurricane Activity*, 451 NATURE 557 (2008); P.J. Webster & G.J. Holland, et. al, *Changes in Tropical Cyclone Number, Duration, and Intensity in a Warming Environment*, 309 SCIENCE 1844, 1844 (2005). In contrast, in the larger Pacific Ocean where storm tracks are longer, warming oceans are likely to lead to stronger storms. James B. Elsner, James P. Kossin & Thomas H. Jagger, *The Increasing Intensity of the Strongest Tropical Cyclones*, 455 NATURE 92, 93 (2008); Kerry Emanuel, *Increasing Destructiveness of Tropical Cyclones Over the Past 30 Years*, 436 NATURE 686 (2005). Further complicating the picture, the potential effects of wind shear, which can break apart storms, may offset the increase in storm frequency that one might expect in the Atlantic as a result of rising sea surface temperatures. Thomas R. Knutson et al., *Simulated Reduction in Atlantic Hurricane Frequency Under Twenty-First Century Warming Conditions*, 1 NATURE GEOSCIENCE 359 (2008).

6. Gerald A. Meehl, et al., *How Much More Global Warming and Sea Level Rise?*, 307 SCIENCE 1769, 1771 (2005).

7. See Vermeer & Rahmstorf, *supra* note 3, at 21,527.

level rise by 2100.<sup>8</sup> However, more recent projections indicate that we will experience between .75 and 1.9 meters of sea level rise during this period.<sup>9</sup>

Inundation due to sea level rise and natural land subsidence will combine to accelerate the rate of coastal erosion.<sup>10</sup> Loss of land due to inundation will be particularly severe in low-lying coastal areas or where community infrastructure is co-located with an eroding shoreline. In areas with long, sloping continental shelves, 1 centimeter of sea level rise will cause the high tide line to move inland between 20 and 100 meters.<sup>11</sup> The Environmental Protection Agency estimates that one meter of sea level rise will lead to the loss of up to 10,000 square miles of coastal lands in the United States.<sup>12</sup> Furthermore, this land loss is likely quite conservative, as it is based on IPCC projections of sea level rise, whose calculations underestimate the future contributions of ice melt to rising sea levels.<sup>13</sup> Consequently, coastal states will increasingly face significant losses of littoral property as they are gradually flooded by rising seas.

As a result of rising sea levels and the increasing strength and frequency of storms, coastal properties—both developed and undeveloped—will face substantial risks from climate change impacts in the coming years. Damages from climate change could significantly impact the federal budget because most coastal properties in the United States are covered under the National Flood Insurance Program (“NFIP”).<sup>14</sup> While NFIP is supposed to

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8. INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, SUMMARY FOR POLICYMAKERS: A REPORT OF WORKING GROUP I 13-14 (2007).

9. Vermeer & Rahmstorf, *supra* note 3, at 21527; Stefan Rahmstorf, Professor of Physics of the Oceans, Potsdam University, Plenary Lecture at the UN Conference on Climate Change: Climate Change: Global Risks, Challenges, & Decisions (Mar. 10, 2009); *See also* W.T. Pfeffer, J.T. Harper & S. O’Neel, *Kinematic Constraints on Glacier Contributions to 21<sup>st</sup> Century Sea-Level Rise*, 321 SCIENCE 1340, 1342 (2008).

10. Rusty A. Feagin, Douglas J. Sherman, & William A. Grant, *Coastal Erosion, Global Sea Level Rise, and Loss of Sand Dune Plant Habitats*, 3 FRONTIERS IN ECOLOGY & ENV’T 359, 359 (2005).

11. Orrin H. Pilkey & J. Andrew G. Cooper, *Society and Sea Level Rise*, 303 SCIENCE 1781, 1782 (2004).

12. James G. Titus, *Chapter 7: Sea Level Rise*, in REPORT TO CONGRESS: THE POTENTIAL EFFECTS OF GLOBAL CLIMATE CHANGE IN THE UNITED STATES 118, 118 (Environmental Protection Agency ed. 1989).

13. Vermeer & Rahmstorf, *supra* note 3, at 21531.

14. JUSTIN R. PIDOT, COASTAL DISASTER INSURANCE IN THE ERA OF GLOBAL WARMING: THE CASE FOR RELYING ON THE PRIVATE MARKET 13 (2007) (as of 2005, 75% of all eligible communities participated in the National Flood Insurance Program). *But see* Coastal

be a self-sustaining program, Hurricane Katrina demonstrated that catastrophic losses will overwhelm the capacity of the program and require it to borrow funds from the federal treasury.<sup>15</sup> As large disasters, such as category five hurricanes, increase in frequency, NFIP will be increasingly financially stressed. This is particularly true given the Program's near-exclusive reliance on historical data, which will systematically underestimate the risk of coastal flooding in the context of climate change.<sup>16</sup> This underestimation of risk will create actuarially unsound premiums, leaving NFIP chronically under-funded, and increasing demands from federal tax revenues to pay covered claims.

In contrast, states' financial incentives to engage in climate change adaptation are likely to cut both ways. States derive large spillover benefits from coastal development and tourism, including local economic growth and expansion of the property tax base.<sup>17</sup> However, at the same time, states permitting extensive coastal development are increasingly financially stressed by their involvement in both primary and secondary insurance markets to protect coastal assets.<sup>18</sup> As coastal development has intensified,

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Barrier Resources Act, 16 U.S.C. § 3505 (2010) (explicitly excluding some high-risk areas from the National Flood Insurance Program).

15. See Erwann Michael-Kerjan & Frederic Morlyae, *Extreme Events, Global Warming, & Insurance-Linked Securities How to Trigger the "Tipping Point"*, 33 THE GENEVA PAPERS 153, 155 (2008) ("In 2005, insured losses from Hurricanes Katrina, Rita and Wilma alone are estimated at over \$85 billion (including the \$23 billion for flood claims paid by the government-run and -founded National Flood Insurance Program). The U.S. federal government provided over \$120 billion in federal relief...").

16. Kenneth J. Bagstad, Kevin Stapleton & John R. D'Agostino, *Taxes, Subsidies, and Insurance as Drivers of United States Coastal Development*, 63 ECOLOGICAL ECON. 285 (2007).

17. See generally Yehuda L. Klein, Jeffery P. Osleeb & Mariano R. Viola, *Tourism-Generated Earnings in the Coastal Zone: A Regional Analysis*, 20 J. COASTAL RESEARCH 1080 (2004) (detailing the economic benefits that coastal regions derive from tourism).

18. For examples of state involvement in reinsurance markets for natural hazards, particularly hurricane and wind damage, see Florida Office of Program and Policy Analysis and Government Accountability, State Board of Administration of Florida: Florida Hurricane Catastrophe Fund, <http://www.oppaga.state.fl.us/profiles/4042/>; Alabama Insurance Underwriting Association, Alabama Beach Pool, <http://www.alabamabeachpool.org>; Mississippi Wind Underwriting Association, <http://www.msplans.com/mwua/>; Texas Windstorm Insurance Association, About TWIA, <http://www.twia.org/AboutTWIA/tabid/56/Default.aspx>; Georgia Underwriting Association, Georgia FAIR Plan, <http://www.georgiaunderwriting.com/info%20bulletin%20070705.pdf>; South Carolina Wind & Hail Underwriting Association, About Us, <http://www.scwind.com/about.html>; North Carolina Insurance Underwriting Association, About NCIUA-Beach Plan, <http://www.ncjua-nciua.org/html/about-nciua.htm>.

hurricane damages have increased significantly,<sup>19</sup> and states confront a growing number of insurers who do not want to assume the risk of underwriting coastal development. As a result, states have increasingly become involved in underwriting reinsurance policies to bear some of the risk of loss that the private sector will not assume.<sup>20</sup> Such state involvement in reinsurance exposes a state's entire budget to increasingly frequent and strong storms and also forces taxpayers living inland to pay for the risk that coastal residents have assumed.<sup>21</sup> Stronger, more frequent storms will further stress federal and state budgets, as citizens will need broader programs of federal and state disaster relief, which already rely primarily on general revenues. As a result, in addition to keeping people out of harm's way and protecting coastal resources, as well as the ecosystem services they provide,<sup>22</sup> state and federal governments may have a financial interest in limiting vulnerable coastal development to reduce future stress on their respective disaster relief programs.

Proceeding from the premise that states have a variety of health, safety, budgetary, and environmental rationales motivating them to limit coastal development, this paper examines tools that states can use to impose such restrictions without running afoul of the takings doctrine. Specifically, we turn to the public trust doctrine and how a state's potential future ownership of coastal properties may expand its regulatory authority. That is, we

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19. Arthur Charpentier, *Insurability of Climate Risks*, 33 THE GENEVA PAPERS 91, 103 (2008) (Noting the value at risk in the United States' coastal zone increased 69% between 1993 and 1998). Cf. Roger A. Pielke Jr., *Are There Trends in Hurricane Destruction?*, 438 NATURE E11 (2005) (finding that once societal factors, including increased coastal development, are controlled for, there is no increase in the level of hurricane damages).

20. Florida is perhaps the most striking example of this phenomenon. After Hurricane Andrew in 1992, the state was forced to become involved in the provision of reinsurance because no major insurer wanted to continue offering policies in the state. STATE BOARD OF ADMINISTRATION OF FLORIDA, FLORIDA HURRICANE CATASTROPHE FUND FISCAL YEAR 2008-2009 ANNUAL REPORT I (2009). For a sample of other states' involvement in reinsurance see Elisabeth K. Ondera, Comment, *Testing the Waters: The South Carolina Coastal Captive Insurance Act as Part of a Multifaceted Approach to the Coastal Insurance Conundrum*, 59 S.C. L. REV. 599 (2008); Mississippi Insurance Department, Governor Signs Wind Pool Bill (March 2007), available at <http://www.mid.state.ms.us/newsletters/february07news.pdf>; see also *supra* note 18.

21. Jay Fishman, Op-Ed., Update on the Coastal Hurricane Zone Concept, WALL ST. J., Aug. 27, 2007, available at [http://agents.travelers.com/AgentHQPublic/AgentHQMainPage.aspx?TemplatePageId=7&ContentPageId=templatedata/AgentHQPublic/Content/data/home\\_page/costal](http://agents.travelers.com/AgentHQPublic/AgentHQMainPage.aspx?TemplatePageId=7&ContentPageId=templatedata/AgentHQPublic/Content/data/home_page/costal).

22. ISLAND PRESS, MILLENNIUM ECOSYSTEM ASSESSMENT (2005), available at [http://islandpress.org/assets/library/27\\_matoolkit.pdf](http://islandpress.org/assets/library/27_matoolkit.pdf).

conceptualize the public trust as a tool that not only protects the public's rights in the manner explored in traditional environmental law scholarship, but also as a tool to prevent high risk coastal development in the face of rising sea levels.<sup>23</sup>

#### A. *The Public Trust Doctrine and Rolling Easements*

The public trust doctrine is a common law doctrine, inherited from England and dating back to Roman law, dictating that all submerged lands are the property of the state and held in trust for the people.<sup>24</sup> In the United States, the public trust consists of both the federal navigational servitude and state-level doctrines.<sup>25</sup> States vary in both the geographic scope of the public trust and the specific public trust rights that they recognize.<sup>26</sup> However, the federal public trust doctrine, establishes that at minimum, the public trust protects navigation, commerce, and fishing.<sup>27</sup>

With respect to the boundary between public and private property, states can be divided into three categories. In nearly all cases, the relevant lines for defining the limits of private title and public access are the mean high water and mean low water marks, which are the averages of high and low tides over 18.6 years.<sup>28</sup> The first and largest category of states are those states that recognize that private title ends and state title begins at the mean high water mark.<sup>29</sup> Second, are those states that recognize private title to the

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23. For the classic view of the public trust doctrine in natural resources law see generally Joseph L. Sax, *The Public Trust Doctrine in Natural Resource Law: Effective Judicial Intervention*, 68 MICH. L. REV. 471 (1970). For an explanation of the public trust doctrine as an "avoidance of excess" see Barton H. Thompson, Jr., *The Public Trust Doctrine: A Conservative Reconstruction and Defense*, 15 SOUTHEASTERN ENVTL. L.J. 47, 49 (2006).

24. *Shively v. Bowlby*, 152 U.S. 1 (1894).

25. *United States v. Rio Grande Dam & Irrigation Co.*, 174 U.S. 690, 703 (1899) (holding that the commerce power of the federal government vests it with the authority to take all measures, even against the state, to preserve the federal navigation servitude); *Shively*, 152 U.S. at 26 (noting that there is significant variation in state public trust doctrine and finding that "[g]reat caution, therefore, is necessary in applying precedents in one state to cases arising in another").

26. See *infra* Appendix A.

27. *Martin v. Waddell*, 41 U.S. 367, 383 (1842).

28. *Borax Consol. Ltd. v. Los Angeles*, 296 U.S. 10, 26-27 (1935).

29. See, e.g., *Marks v. Whitney*, 491 P.2d 374 (Cal. 1971); *State v. Knowles-Lombard Co.*, 188 A. 275 (Conn. 1936); *State v. Ashmore*, 224 S.E.2d 334 (Ga. 1976); *Cinque Bambini P'ship v. State*, 491 So. 2d 508 (Miss. 1986); *Carolina Beach Fishing Pier, Inc. v. Carolina Beach*, 177 S.E.2d 513 (N.C. 1970); *Purdie v. Attorney General*, 732 A.2d 442 (N.H. 1999); *People v. Steeplechase Park Co.*, 113 N.E. 521 (N.Y. 1916); *State ex rel. Thornton v. Hay*, 462 P.2d 671 (Or. 1969).

mean low water mark but find a public trust easement over the foreshore.<sup>30</sup> Finally, Texas and New Jersey have recognized that the public trust extends all the way to the first line of vegetation, covering the whole dry sand beach.<sup>31</sup>

The Supreme Court has recognized the public trust as a special kind of title that may not be freely given away.<sup>32</sup> In general, the state may only grant public trust lands to private individuals when doing so will serve a higher public purpose and such transfers remain subject to the public's right of use for navigation and fishing.<sup>33</sup> Further, the state may not abdicate interest in the public trust.<sup>34</sup> In the context of sea level rise, if property owners are not permitted to build coastal defense structures, then the mean high tide line will advance and the dynamic property line will move landward. Such landward movement of the mean high tide line necessarily expands the amount of land subjected to the public trust. Thus, in the face of rising sea levels, which stand to greatly expand the scope of public trust lands, state actions that permit property owners to hold back the advance of the dynamic property line may unlawfully abdicate the state's duty as trustee, as defined under *Illinois Central*.

It should be noted that the massive expansion of the public trust due to inundation by rising sea levels is unlike anything that we have seen under the common law. Therefore, understanding the application of common law doctrines in this unprecedented context requires that we look for natural expansions of this doctrine that provide a legal rationale for the state to follow in executing its public trust duty. This analysis is made even more complicated by the fact that the public trust interest we consider is a wholly future interest involving land over which the state does not yet hold title. In *Illinois Central*, the Supreme Court objected to

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30. See, e.g., *Michaelson v. Silver Beach Improvement Ass'n*, 173 N.E.2d 273 (Mass. 1961).

31. Texas Open Beaches Act, TEX. NAT. RES. CODE ANN. § 61 (2010); *Matthews v. Bay Head Improvement Ass'n*, 471 A.2d 355 (N.J. 1984) (holding that the public trust right to bathe is meaningless without the accompanying right to be on the dry sand beach).

32. *Ill. Cent. R.R. v. Illinois*, 146 U.S. 387, 452 (1892).

33. *Id.* at 453; James L. Huffman, *A Fish out of Water: The Public Trust Doctrine in a Constitutional Democracy*, 19 ENVTL. LAW 527 (1989).

34. *Ill. Cent. R.R. v. Illinois*, 146 U.S. at 452. ("The state can no more abdicate its trust over property in which the whole people are interested, like navigable waters and soils under them . . . than it can abdicate its police powers in the administration of government and preservation of the peace.").



the abdication of general control over state lands and waters held in the public trust.<sup>35</sup> The Court, however, found that grants of small portions of the public trust space to private parties could be permitted if those transfers advance the public interest and do not interfere with public use of the rest of the public trust.<sup>36</sup>

When viewed on an individual level, it may seem that permitting a single property owner to build a seawall falls into this latter category of approved grants of public trust lands. However, because of the large scale of land for which coastal armoring requests can be anticipated, the general permitting of coastal fortification would, in total, amount to an abdication of the state's public trust responsibilities to protect the coastal zone. Furthermore, although the state's public trust interest in lands that will be subject to future inundation has yet to be realized, simply failing to pursue the public rights over tens of thousands of acres of land that may become submerged is arguably a failure to assert the public interest on the scale with which the *Illinois Central* Court was concerned. Therefore it follows from the Supreme Court's logic in *Illinois Central* that the full scope of a state's public trust duty under the radically different environmental circumstances of significant sea level rise may require not only that the state proactively assert the advance of the public trust title with rising seas, but also that the state deny permits to hold back the natural advance of mean high tide.<sup>37</sup>

Some may argue that *Illinois Central* has no application in this context because the facts of the case are readily distinguishable. *Illinois Central* involved a state grant of submerged lands that were already subject to the public trust.<sup>38</sup> As we have outlined above, while *Illinois Central* is not directly controlling, it provides important precedent that can be naturally extended to help define the state's duties toward public trust lands that will be submerged in the future. In addition, where seawalls are already being used to hold back the advance of rising sea level, the land that would

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35. *Id.*

36. *Id.* at 452-53.

37. Note that the state may be able to permit seawalls consistent with *Illinois Central* if it charges the property owner rent for occupying land that would otherwise be subject to the public trust. However, this approach only works if the only public trust value the state is charged with protecting is access. To the extent that a state's public trust doctrine encompasses resource conservation, seawall fees may not be adequate to mitigate against the loss of ecosystem services in the public trust.

38. *Ill. Cent. R.R. v. Illinois*, 146 U.S. at 448-50.

otherwise be submerged is arguably already subject to the public trust, and this situation may be directly controlled by *Illinois Central* when the seawall is on a large enough scale to constitute a substantial interference with the public trust.

Therefore, the rationale applied by the Court in *Illinois Central* can be extended to the littoral zone and access to the public beach, particularly in light of the large swaths of future public land that will be created by inundation due to sea level rise. The Court noted that submerged lands have a “necessarily public character” and are held “by the whole of the people for purposes in which the whole people are interested.”<sup>39</sup> As recognized in the public trust doctrine of nearly every state, paramount among these public interests is the ability to access the water for a variety of purposes. Because access to the foreshore is typically the aspect of the public trust that is most significant to the public as a whole, the armoring of the coast, and drowning of the foreshore is a loss of the character *Illinois Central* intended to protect. Even if there is access over a sea wall, it is unlikely that it is meaningful public access to the shore. As discussed above, seawalls cause passive erosion, leading to loss of the dry sand beach and fundamentally altering the character of the shore. For many members of the public, if the state does not maintain a sand beach in front of the seawall, the public will have no way to access the water for swimming and recreation. Furthermore, access may not be sufficient to protect the navigation interest, particularly if small boats cannot be launched over the seawall. Finally, it should be noted as a practical issue, that most littoral owners assert a private property right to exclude the public from lateral access along the top of the seawall. This means that even if there is a vertical access point to the water, it may not be practically accessible to the general public.

While this argument may present some difficulties when the public trust interest has not yet been realized (that is, when the state attempts to prevent armoring because of the *future* location of the public trust), it certainly applies with great force in areas where seawalls are effectively below the natural mean high water mark. In these cases, not only do seawalls directly occupy public trust property, but they also seriously impair public access to the shore and the public’s coincident ability to exercise the rights protected under the public trust. A state’s choice to permit seawalls to

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39. *Id.* at 456.

remain and impair the public trust is at least as serious an abdication as the granting of submerged lands for which the everyday Chicagoan likely had little direct use in *Illinois Central*. Moreover, because *Illinois Central* stands for the proposition that a state must retain the right to rescind large-scale, private-purpose transfers, the state's granting a privilege to construct a seawall should be subject to the state's retained right to rescind the "transfer" once the seawall occupies land that, in the absence of the seawall would be public tidelands. Otherwise, seawalls occupying a substantial portion of a coastal region could result in a "substantial impairment of the public's interest in state tidelands as a whole."<sup>40</sup>

The concept of a public trust that moves with rising sea levels was first thoroughly discussed by James G. Titus, who borrowed the term "rolling easements" from the Texas Open Beaches Act to explain this phenomenon.<sup>41</sup> The rolling easements concept assumes that as sea levels rise and the mean high tide line moves inland, public trust title will follow this line. Titus argues that rolling easements are an efficient means of adapting to rising sea levels because they impose no costs until sea levels actually rise, they have plenty of time to be incorporated into reasonable investment-backed expectations, and they may foster consensus on coastal development policies because developers will be forced to admit the existence of sea level rise before they can argue that they should not be subjected to rolling easements.<sup>42</sup>

One of the attractive aspects of rolling easements is that they allow states to reclaim title to property without incurring liability for a regulatory taking under *Lucas*.<sup>43</sup> Caldwell & Segall argue that the public trust and other common law principles that underlie rolling easements are background principles under *Lucas*,<sup>44</sup> and therefore, rolling easements should not pose takings problems.<sup>45</sup> Kleinsasser concurs, finding that the public trust doctrine

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40. CWC Fisheries Inc. v. Bunker, 755 P.2d 1115, 1118-20 (Alaska 1988).

41. James G. Titus, *Rising Seas, Coastal Erosion, and the Takings Clause: How to Save Wetlands and Beaches Without Hurting Coastal Property Owners*, 57 MD. L. REV. 1279, 1313 (1998).

42. *Id.* at 1327, 1331, 1355.

43. *Lucas v. South Carolina Coastal Council*, 105 U.S. 1003 (1992).

44. 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, 551-58 (2007).

45. *Id.*

“underlies modern takings analysis.”<sup>46</sup> Thus, the public trust doctrine provides a strong basis for states to claim title to newly submerged lands as the mean high tide moves inland.

For rolling easements to effectively avoid excess coastal development, the state must be able to use its future interest in submerged public trust lands to prevent development of them today. Without this extension, rolling easements cannot efficiently prevent the creation and eventual submersion and abandonment of coastal development. Thus, the legal question remaining is, to what extent may the state use the concept of rolling easements to limit coastal development on private lands that will become inundated, while avoiding liability for regulatory takings?<sup>47</sup>

### B. *Regulatory Takings Defined*

The Supreme Court recognizes two classes of takings: physical invasions of property, which always demand compensation, and regulations that are “so onerous that [their] effect is tantamount to . . . ouster.”<sup>48</sup> Regulatory takings are further divided into two classes of cases: *per se* regulatory takings, which deprive the owner of all economically beneficial use of his land, and all other regulatory takings.<sup>49</sup>

In *Lucas v. South Carolina Coastal Council*, the Court found that regulations depriving an owner of all economically beneficial use of his property are *per se* takings that require compensation.<sup>50</sup>

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46. Zachary C. Kleinsasser, *Public and Private Property Rights: Regulatory and Physical Takings and the Public Trust Doctrine*, 32 B.C. ENVTL. AFF. L. REV. 421, 456 (2005).

47. For an argument that coastal development restrictions should not be regulatory takings because they merely allow legislatures to make rational choices to control coastal development see Marc R. Poirier, *Takings and Natural Hazards Policy: Public Choice on the Beachfront*, 46 RUTGERS L. REV. 243 (1993).

48. *Lingle v. Chevron U.S.A. Inc.*, 544 U.S. 528, 537 (2005) (citing *Penn. Coal Co. v. Mahon*, 260 U.S. 393 (1922) (regulatory takings)); see also *Loretto v. Teleprompter Manhattan CATV Corp.*, 458 U.S. 419 (1982) (physical takings).

49. *Lucas v. South Carolina Coastal Council*, 505 U.S. 1003 (1992) (establishing the doctrine of *per se* regulatory takings); *Penn. Cent. Transp. Co. v. New York*, 438 U.S. 104 (1978) (establishing the factors a court should consider in determining whether a regulation goes too far and becomes a taking). The Supreme Court recently considered whether a third type of taking, the judicial takings should be recognized in a 4-2-2 split. The plurality (Scalia, Roberts, Thomas, and Alito) found that a judicial takings doctrine exists. Justices Kennedy and Sotomayor found that there is not a judicial takings doctrine, while Justices Breyer and Ginsberg found that it was unnecessary to determine whether there is a judicial takings doctrine to resolve the case before them. *Stop the Beach Renourishment v. Fla. Dept. Envtl. Prot.*, 130 S. Ct. 2592 (2010).

50. *Lucas*, 505 U.S. at 1027.

However, the state will not be liable for a per se taking if the regulation proscribes an activity that the property owner already could not undertake under the state's common law in property and nuisance.<sup>51</sup> As a threshold matter, *Lucas* does not apply at all unless the property owner has been deprived of the *entire* value of his property. In fact, in *Palazzolo v. Rhode Island*, the Court found that a regulation that reduced the value of the property by 95% was not a per se taking.<sup>52</sup>

All regulatory takings that are not per se takings are evaluated under the factors enumerated in *Penn Central*.<sup>53</sup> Under *Penn Central* analysis the court must weigh the economic impact of the regulation, the character of the governmental action, and the property owner's reasonable investment backed expectations.<sup>54</sup>

It would appear that development restrictions on coastal property would fall squarely under *Lucas*, a case which itself dealt with the enforcement of South Carolina's Beachfront Management Act so as to prevent Mr. Lucas from building on his property. There, the court found that the statute, which was enacted after Lucas took title to the property, was a per se taking.<sup>55</sup> However, in so holding, the court also established the concept of "background principles." Under *Lucas*, common law principles that were in existence at the time a property owner took title can serve as valid limitations on property rights, and regulations that merely operationalize those principles do not qualify as per se regulatory takings.<sup>56</sup> Therefore, development limitations that are rooted in the public trust or other common law doctrines should not be regulatory takings. In the following section, we introduce a set of hypothetical permit applications and examine how various common law authorities may permit the state to restrict development while steering clear of takings liability.

## II. CAN COMMON LAW PRINCIPLES PROVIDE THE AUTHORITY TO RESTRICT DEVELOPMENT IN THE COASTAL ZONE?

To examine the use of common law background principles and the application of *Lucas* in the context of sea level rise, consider

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51. *Id.* at 1029-30.

52. 533 U.S. 606 (2001).

53. 438 U.S. 104.

54. *Id.* at 124, 130-31.

55. *Lucas*, 505 U.S. at 1028.

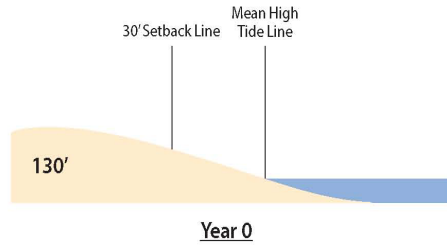
56. *Id.* at 1027.

the hypothetical scenarios presented in Figures 1 and 2 below. For the purposes of this example, we will assume that the state permitting agency has data establishing with a 95% probability that the mean high tide will move twenty feet landward within 50 years and 130 feet landward within 100 years. However, the state agency is unable to establish the rate at which this sea level rise will occur, so it is equally probable that sea level rise occurs at a constant rate over each period or that it happens in a series of sudden events. In year zero of the hypothetical, the state has a thirty-foot construction setback that applies to all structures.

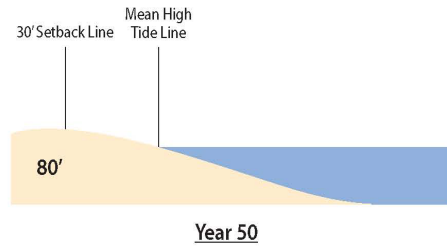
In this hypothetical, we consider two permit applications pending before the state. The first is for an undeveloped parcel where the owner proposes to build a house (Figure 1). We will assume that the owner is indifferent about the precise location of the house on the property but he requires at least seventy feet from the back of the property to build his house. The second application concerns an identical property that has a house on it that sits forty feet from the mean high tide line in year zero (Figure 2). The homeowner is concerned about a future threat to his property from erosion and seeks to install a seawall behind the thirty-foot set back line. Assume that the house was built prior to the enactment of the coastal permitting statute under which the agency now acts. The hypothetical state agency in this case is deeply concerned about rising sea levels and increasingly frequent and strong storms that it is beginning to experience. In crafting its response to these climate change impacts, the state agency's paramount concerns are ensuring public access to the coast and reducing total coastal vulnerability to sea level rise and increased storminess. The state agency is of the opinion that the most effective way to address coastal vulnerability is to reduce the amount of vulnerable development in the coastal zone. The state believes that it can accomplish this goal by limiting new development and limiting the building of erosion control structures, which reinforce littoral owners' expectations that they can keep their homes safe from the impacts of sea level rise and permanently occupy their littoral property. To this end, the state agency wants to build upon its thirty-foot setback requirement and limit vulnerable coastal development without incurring liability for takings.

**Figure 1: Hypothetical Sea Level Rise for an Undeveloped Parcel**

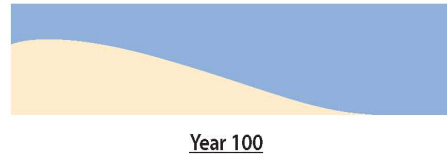
**Figure 1**



At year 0, property owner purchases the property to the left. It is 130' from the back edge of the property to the mean high tide line. The state enforces a 30' set back line on all new construction and improvements to protect them from erosion and rising sea levels. The property owner considers the minimum distance from the back of the property that he needs to build to be 70'.

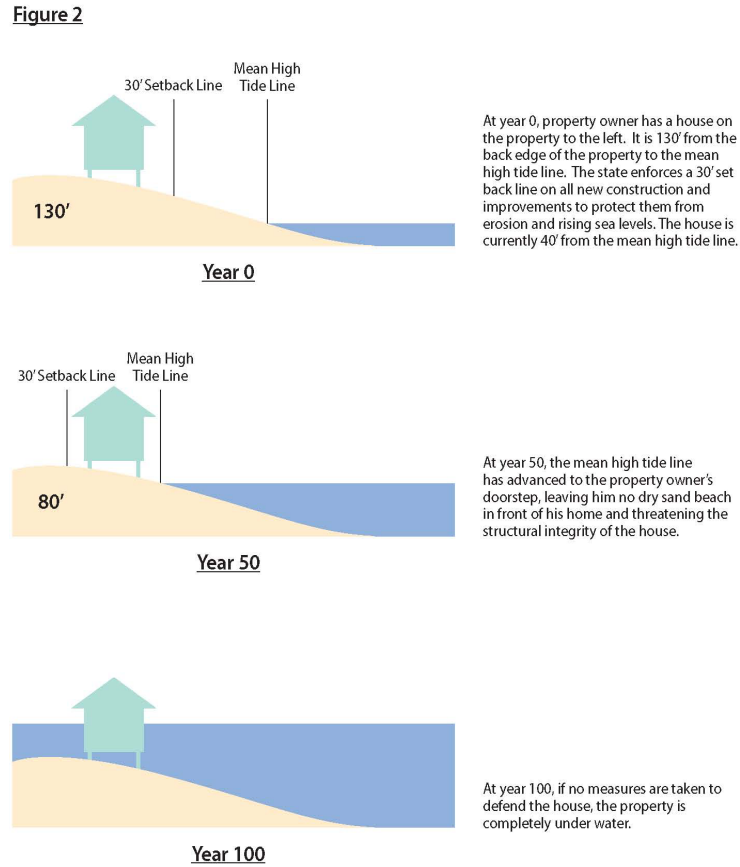


At year 50, the property owner still has not built. Sea level rise has caused the front 50' of his land to become submerged, leaving 80' of developable land. He still wishes to build a house that requires at least 70' from the back of the property.



At year 100, the undeveloped property is completely submerged.

**Figure 2: Hypothetical Sea Level Rise for a Developed Parcel**



There are three possible ways that the state agency may be able to hold back coastal development without incurring takings liability. First, the state agency can demonstrate that the public trust and associated doctrines establishing the dynamic nature of property rights at the coast constitute *Lucas* background principles and that exercising the public's rights (and the state's responsibilities) under these doctrines would not extinguish any of the property owner's rights. Second, if the state can establish that there is not a



total taking of the property, it can challenge the reasonableness of the investor's expectations under *Penn Central*. Finally, the state may deny the permit drawing upon an extension of the common law property doctrine of waste, alleging that the state has a contingent future interest in the land currently held in fee by the property owner.<sup>57</sup> These options are explored in more detail in the sections that follow.

A. *Common Law Background Principles of Dynamic Coastlines*

The common law has long recognized the dynamic nature of coastlines and the ability of littoral property lines to shift as the result of natural forces. In addition to the public trust, which follows shifts in the mean high tide, the major doctrines recognizing the dynamism of the coast are the doctrines of accretion, erosion, and avulsion.<sup>58</sup> While all three doctrines deal with dynamic coastlines, they reflect different social values about shifting property rights and lead to different results.

The doctrines of accretion and erosion recognize that the coastline is always experiencing imperceptible but ultimately significant gains and losses of sediment. Over time, the mean high tide line will shift as a result of the gain or loss of land through movement of alluvion.<sup>59</sup> Because these changes are recognized to be the result of the work of natural forces, common law doctrines recognize that property boundaries will shift to follow accretion and erosion. That is, when erosion causes once dry land to become submerged, the littoral owner is divested of his title and the land becomes a part of the public trust.<sup>60</sup> Conversely, because he is subjected to the risks of erosion, the littoral owner is usually

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57. While the concept of a contingent future interest in a property in fee may seem unusual, it is consistent with literature on the public trust that suggests that the use of the public trust doctrine as a background principle may keep littoral owners from claiming full title. See Kliensasser, *supra* note 46, at 456-58.

58. See generally *id.* (discussing the extent to which the public trust doctrine is a *Lucas* background principle).

59. *Shively v. Bowlby*, 152 U.S. 1, 35 (1894). Alluvion is a term used to refer to sediment particles that are transported and deposited by water to create accretions and erosive loss of property. *Id.*

60. See, e.g., *id.* at 35-36; *City of St. Paul v. State*, 137 P.3d 261, 265 (Alaska 2006) (Noting that mean high tide is an ambulatory property boundary that is changed by accretion and erosion); *Dep't of Natural Res. v. Ocean City*, 332 A.2d 630 (Md. 1975).

understood to have the right to any accretions that cause previously submerged property to become dry land.<sup>61</sup>

The doctrine of avulsion, on the other hand, maintains that property lines are unchanged when the gain or loss of land is sudden.<sup>62</sup> For example, if a littoral owner loses his dry sand beach in a hurricane event, the common law recognizes his right to rebuild the beach.<sup>63</sup> For those who understand the mechanisms by which this sand is lost, this seems an odd result: an avulsive event is truly just erosion over a very rapid time scale, but the outcome with respect to property rights is completely different. While the doctrine of avulsion penalizes states seeking to implement rolling easements by giving the property owner the right to rebuild his beach, it is a valuable tool for states undertaking beach nourishment projects. When a state or the U.S. Army Corps of Engineers pumps sand onto the beach, this is undoubtedly an avulsive event. Thus, states can greatly expand public access to beaches by creating dry sand beach below the original mean water line, as this dry sand beach will remain in the public trust.<sup>64</sup>

There are two other common law doctrines that have helped secure public access to the beach: prescription and custom. Prescription recognizes that a continuous, open, and hostile use of dry sand beach by the general public can be sufficient to establish a public easement over dry sand beaches held by private littoral owners.<sup>65</sup> Custom, in contrast, recognizes the public right to access simply because it has always existed.<sup>66</sup> As we will explore below, the

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61. See, e.g., *Brannon v. Boldt*, 958 So.2d 367 (Fla. 2007); *State ex. rel. State Lands Comm'n v. Superior Court*, 900 P.2d 648, 664 (Cal. 1995) (finding that the general common law rule of accretion grants accreted lands to the littoral owner); *State v. Knowles-Lombard Co.*, 188 A. 275 (Conn. 1936). *But see* CAL. CIVIL CODE § 1014 (2010) (establishing that artificial accretions do not belong to the littoral owner).

62. For a comprehensive discussion of the evolution of the doctrine of avulsion see Joseph Sax, *Some Unorthodox Thoughts About Rising Sea Levels, Beach Erosion, and Property Rights*, 11 VT. J. ENVTL. L. 641 (2010).

63. See, e.g., *Walton Cnty. v. Stop the Beach Renourishment, Inc.*, 998 So. 2d 1102 (Fla. 2008) (holding that under the doctrine of avulsion property owners have the right to reclaim land lost in a storm event); *State v. Wisenberg*, 633 So. 2d 983 (Miss. 1994); *Dep't of Natural Resources v. Ocean City*, 332 A.2d 630 (Md. 1975).

64. The Supreme Court has recently upheld the state's superior right to fill submerged lands to create a public beach in *Stop the Beach Renourishment v. Fla. Dep't Envtl. Prot.*, 130 S. Ct. 2592, 2611-12 (2010).

65. *Eaton v. Town of Wells*, 760 A.2d 232, 248 (Me. 2000); *Daytona Beach v. Tona-Rama, Inc.*, 294 So. 2d 73, 80 (Fla. 1974).

66. *State ex rel. Thornton v. Hay*, 462 P.2d 671, 676 (Or. 1969).

difference in the origins of these rights may have significant implications for continued public beach access under a system of rolling easements.

B. *The Potential for Lucas Liability*

Employing the background common law principles described above, this section examines the possibility of *Lucas* liability in the event that the hypothetical permit applications in Figures 1 and 2 are denied. Analyzing the permit application described in Figure 1, a permit denial would likely result in a per se takings claim under *Lucas*. As described here, the situation in year zero is actually more favorable to the property owner than that of *Lucas* and the *Lucas* facts would be most closely represented by an application in year 50. Thus, the ability of the state to deny a permit application in this case would hinge solely upon its ability to show that the applicant had no right to build on his property at the time of purchase under common law principles.<sup>67</sup> In New Jersey, where the public trust extends to all dry sand beach incident to the public's right to recreation in the water,<sup>68</sup> the state's is probably an easier argument to make. Therefore under New Jersey's version of the public trust, as long as the state could show that there is no way that the property owner can build on his property without infringing on public trust property, the property owner never had the right to build in the first place.

However, in states where there is not a public trust right in dry sand beaches, the state's position is less secure. In this case, the state may have to wait until the public trust is activated, meaning, when the mean high tide line, comes to cover the property (the 100 year scenario). The one exception will be in states that have undertaken beach nourishment and follow the doctrine of avulsion.<sup>69</sup> In these cases, if the state can show that the historic mean high tide line runs over petitioner's property and the dry sand he claims was created through nourishment activities, it can reduce the size of the property owned in fee that it considers for

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

68. *Matthews v. Bay Head Improvement Ass'n*, 471 A.2d 355, 363 (N.J. 1984)./

69. Most states that undertake extensive beach nourishment have codified the doctrine of avulsion as a set of statutory rules. See *infra* nn. 127, 141-43 and accompanying text.

permitting purposes. In this case, if the redrawing of the private property line results in the property being unbuildable under local zoning requirements, then the state may deny the permit with no fear of takings liability.

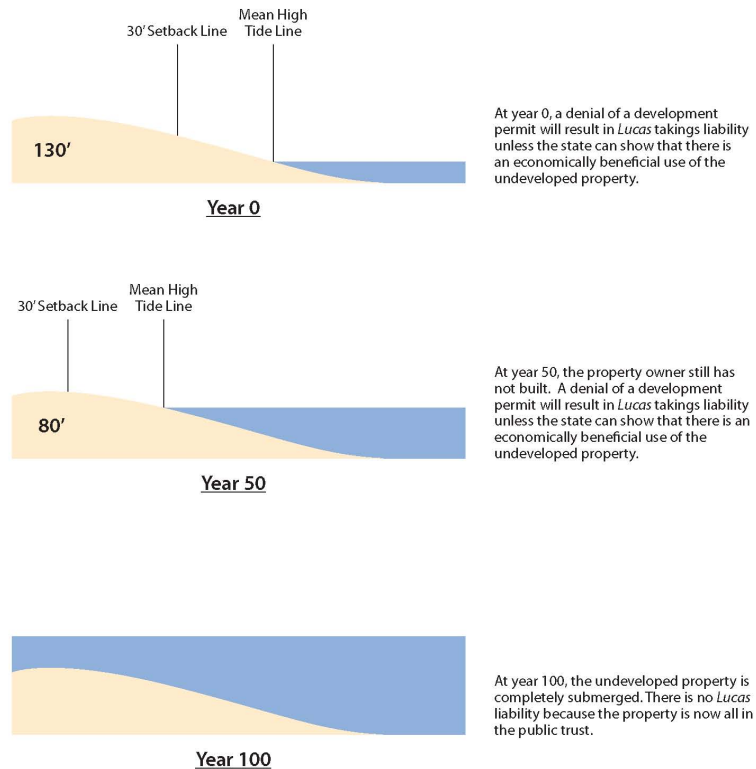
The best claims that the state has regarding the application in Figure 1 are based on the ideas that the petitioner has no reasonable investment-backed expectation to build on property and that the state's future interest in the portion of the property that will be inundated by sea level rise results in a vested or contingent future public trust interest in the property. Both of these arguments are examined in more detail below.

If the state is not comfortable with the uncertainty associated with assuming a protected vested or contingent future interest, it always has the option of issuing a building permit requiring the owner to acknowledge the risks of owning and developing on coastal property. The state could require the coastal property owner to confirm that he is aware of the impacts of the doctrine of erosion on his future property rights, that he has no right to defend his property from rising sea levels, and that when his property comes to be part of the public trust, he is responsible for the removal of a previously permitted structure that now is located on public trust property.<sup>70</sup> Such a permit would certainly avoid *Lucas* liability, however, it lacks the economic efficiency of avoiding development altogether, discussed under the expansion of the doctrine of waste below. As the case studies of coastal adaptation in the states reveal, once building is initially allowed, it is politically difficult to force property owners to surrender to the rolling easement.<sup>71</sup>

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70. See TEX. NAT. RES. CODE ANN. § 61 (2010).

71. See Margaret E. Peloso, *Adapting to Rising Sea Levels* (April 2, 2010) (unpublished Ph.D dissertation, Duke University) (on file with author).

**Figure 3: Lucas Analysis of Permit Application 1****Figure 3**

In the case of the applicant in Figure 2, there is no risk of a *Lucas* taking because there is already a house on the property, so when evaluating the parcel as a whole, the property owner will have no claim that he is denied all beneficial use of his property.<sup>72</sup> Based on the common law doctrines described above, we would actually expect the state to risk potential liability for breach of the

72. See, e.g., *Palazzolo v. Rhode Island*, 533 U.S. 606, 651 (2001); *Whalers Vill. Club v. Cal. Coastal Comm'n*, 220 Cal. Rptr. 2, 14 (1985) (holding that denial for permits to defend coastal property is not a taking).

public trust if it were to issue a seawall permit in year 50. In this case, the state would be permitting the property owner to hold off the expected advance of the public trust for his private gain. Such a permit amounts to granting public trust property to a private individual for his private benefit, violating *Illinois Central*.<sup>73</sup> In the same vein, it is important to note that *any* seawall granted in either hypothetical that comes to lie on submerged lands presents the problems under *Illinois Central* discussed above. In these cases, the state's two options to fulfill its public trust duty would be to either require the removal of the seawall or charge the littoral owner rent for occupying public trust lands.<sup>74</sup>

Where the state has granted littoral owners a statutory right to defend their property, the analysis is more complicated. However, even this case is defensible from a takings perspective because when evaluating the property as a whole, the right to defend the home is only a small piece of the entire value of the property. While an inability to defend the home from rising sea levels may ultimately lead to the loss of the home, this is only a piece of the property's value—the inability to build a seawall does not deny the homeowner all economically beneficial use of the property. At a minimum, the property owner has enjoyed and will enjoy the beneficial use of the home up until year 50.<sup>75</sup> Therefore, the value of the property can be divided into two discrete segments: the right to currently own and occupy the home and the right to attempt to defend it from the impacts of sea level rise in the future. This situation presents no problem if the permit denial is in year zero because we know that the property has value and the loss of the right to defend it does not immediately strip the property of all value.

The more difficult question arises in year 50, where denial of a seawall permit will result in the imminent prospect of losing the house. If the right to defend littoral property were a right that the

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73. Ill. Cent. R.R. v. Illinois, 146 U.S. 387, 453 (1892).

74. There are, in fact, numerous examples of cases in which state agencies have attempted to order the removal of seawalls and other coastal armoring structures that interfere with the public trust. See, e.g., Brannan v. State, No. 01-08-00179-CV, 2010 WL 375921 (Tex. App. Feb. 4, 2010); Sams v. State, Dep't of Env'tl. Prot., 2009 WL 1057064 1 (Conn. Super. Ct. Mar. 26, 2009).

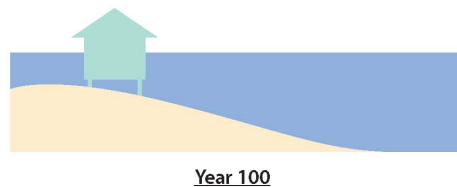
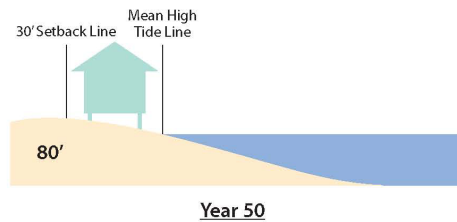
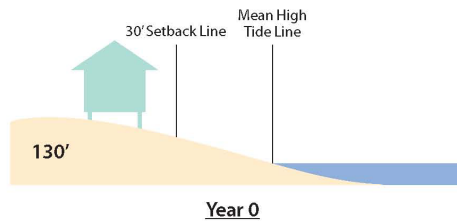
75. Cf. Penn. Cent. Transp. Co. v. New York, 147 U.S. 104, 136 (1978) (finding that there was no taking because the permit denial did not prevent petitioners from operating and making a profit from the railroad station).

property owner actually had, it is possible that such a denial could give rise to takings liability. However, the statutory right in this case begins to resemble the invalidated statutory grant to the Illinois Central Railroad and could be an invalid abdication of the public trust.<sup>76</sup> The ultimate outcome of such an analysis would depend on the scope of the public trust space occupied and the court's assessment of whether the occupation of public trust space by a seawall protecting private property serves a purpose that is consistent with the public trust interest. In *Illinois Central*, the Supreme Court found that the state of Illinois' grant of submerged lands to the railroad was not in the interest of the public trust, and therefore was an impermissible abdication of the state's public trust responsibility.<sup>77</sup> In year 50, issuance of a development permit to the homeowner may over time become a grant of the right to occupy submerged lands. This is so, because if the property owner is not permitted to build the seawall in year 50, the lands in question will become submerged and revert to the public trust between years 50 and 100. Furthermore, we argue that any occupation of public trust space by a seawall is not consistent with the use of the remainder of the public trust space, as it cuts off public access to the shore. In these cases, it seems that the outcome that avoids takings liability is to permit the initial construction of the seawall and then either (1) implement a sliding rent scheme under which the littoral owner must pay the state for the right to occupy lands that would otherwise be submerged as the sea rises or (2) order the removal of the seawall when it comes to lie seaward of the mean high tide line.

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76. Ill. Cent. R.R. v. Illinois, 146 U.S. 387, 453 (1892).

77. *Id.*

**Figure 4: Lucas Analysis of Permit Application 2****Figure 4**

The foregoing analysis is premised on the assumption that sea level rise results in the loss of land through gradual inundation, looking more like an erosive loss. If, instead, the loss is the result of sudden storm event, the result is the same in both cases. For example, assume that the beach remains as pictured in year 0 until year 49. In year 49, a large storm causes an avulsive event that results in the scenario shown in year 50. In this case, both property owners would have the right to reclaim (e.g. renourish) their dry sand beach in a reasonable amount of time. Therefore, either owner would be permitted to build in year 50 if the loss had occurred as



the result of an avulsive event, because he will be able to replenish his beach and therefore will have enough dry sand to meet the state's set-back requirements.

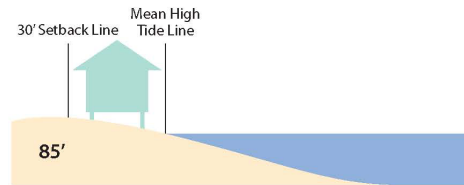
The owner's ability to build is limited if more than a reasonable amount of time has passed since the avulsive event. A reasonable amount of time is a matter of judicial determination,<sup>78</sup> but in cases where many years have passed without the owner reclaiming the property he lost to avulsion, his attempt to reclaim lost property is likely to be found unreasonable. For example if the hurricane happened in year 25, and the year 50 permit applicant has done nothing since that time to reclaim his title, the court may find that he no longer has the right to reclaim it.<sup>79</sup> This result is significant because it underscores the importance of the mechanism of shoreline change to the state's ability to promote coastal retreat. Because the pace of inundation due to sea level rise is likely to be gradual in the short term, restrictions on rebuilding after episodic events, such as storms, could provide states their first real opportunities to limit vulnerability-increasing development in the coastal zone due to the landward advancement of the public trust. However, because the doctrine of avulsion freezes the boundary between littoral and public lands and the pre-storm mean high tide line, shoreline change due to storm events cannot be used to promote coastal retreat in states adhering to the doctrine of avulsion unless the state engages in extensive buyouts or property owners wait more than a reasonable amount of time to reclaim their property. This distinction, combined with the fact that the state of the doctrine of avulsion is not clear in many states,<sup>80</sup> only serves to complicate state adaptation planning, as states may not know what their rights and responsibilities are in the wake of storm-caused shoreline loss.

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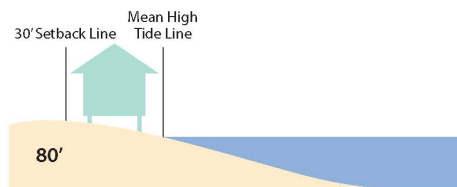
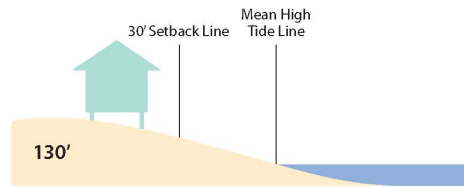
78. *See* *Bohn v. Albertson*, 238 P.2d 128, 136 (Cal. 1951).

79. *See* *Walton Cnty. v. Stop the Beach Renourishment, Inc.*, 998 So. 2d 1102 (Fla. 2008).

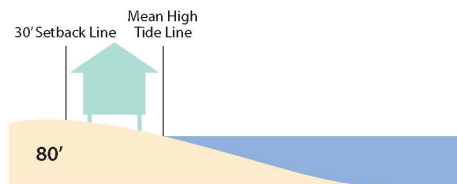
80. *See* Appendix A, *infra*.

**Figure 5: Comparison of Erosive and Avulsive Property Loss****Figure 5****Year 49**

In the figures shown, the property owner has lost his dry sand beach through gradual erosion. In this situation the littoral owner will not have a right to defend his property or restore his dry sand beach. If the state issues a permit to the property owner in this situation, it may be subjected to public trust liability under *Illinois Central* because a permit would effectively allow the littoral owner to prevent the advance of the sea and reversion of his land to the public trust.

**Year 50****Year 49**

When property is lost due to avulsion, the dry sand beach disappears in a sudden event, such as a hurricane. In most states, a property owner suffering from an avulsive loss of dry sand beach will have the right to rebuild his dry sand beach in a reasonable amount of time. Here, the littoral owner in year 50 may replenish dry sand in front on his property out to the point where the mean high tide line was in year 49. In this case, the restoration of dry sand will be sufficient to provide short-term protection to the house.

**Year 50**

### C. Investment-Backed Expectations Under *Penn Central*

In the standard takings analysis the state must first demonstrate that the taking was for a valid public purpose.<sup>81</sup> If this requirement is not met, then the state may not enforce the regulation at all, even if it pays compensation. Here, the state agency is acting to

81. *Kelo v. City of New London*, 545 U.S. 469, 480 (2005).

protect public health and safety and its rights in the public trust. All of these uses would be recognized as a valid exercise of state police power and therefore the threshold requirement for the state to regulate uses of coastal property is satisfied.

The next question the permitting agency must ask is whether enforcing the regulation against a property owner will result in a taking. Those alleged regulatory takings that do not result in a complete diminution of property value are analyzed under *Penn Central's* multi-factor test rather than as per se takings under *Lucas*.<sup>82</sup> Under *Penn Central* analysis, a court reviewing a permit denial by the state agency would consider the character of the government action, the economic impact of the regulation, and the extent to which the regulation interferes with the reasonable investment-backed expectations of the petitioner.<sup>83</sup>

In our hypothetical scenarios, the first step for any state agency concerned with avoiding takings liability is establishing that even if the permit is denied, there will still be an economically beneficial use of the property. In the case of the seawall permit application originally described in Figure 2, there is no doubt that the property retains an economically beneficial use without the sea wall permit: there is already a house on the property and the property owner may continue to live in it up until it becomes submerged. The closer question, of what happens to the homeowner when he applies for a seawall permit to protect an existing home in year 50 (Figure 2), is addressed using common law background principles. As we described above, the seawall permit granted in year 50 likely gives the littoral owner the right to occupy public trust space, and depending on the grant's geographic scope and purpose, may be invalid under the public trust. In year 100, neither the property owner in Figure 2 nor the property owner in Figure 1 retains any rights to the original parcel.

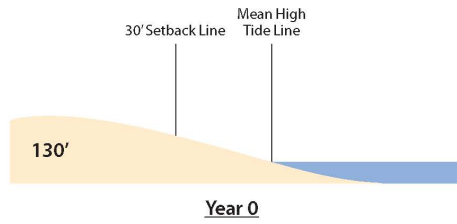
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82. *Palazzolo v. Rhode Island*, 533 U.S. 606, 651 (2001).

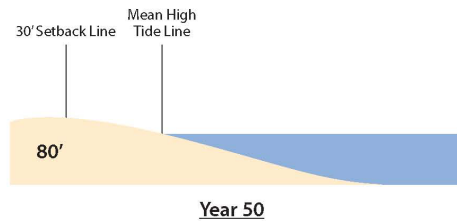
83. *Penn. Cent. Transp. Co. v. New York*, 438 U.S. 104, 130-31 (1978).

**Figure 6: When Does Penn Central Analysis Apply to a Permit Denial? (undeveloped parcel)**

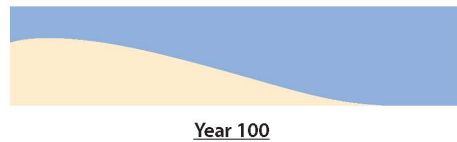
**Figure 6**



At year 0, *Penn Central* analysis will apply if the state can show that there is an economically beneficial use of the property other than development. For example, if the property owner could run a beach club and charge access fees, *Penn Central* analysis could be applied.



At year 50, *Penn Central* analysis may apply under the same conditions as in year 0. However, this situation is more analogous to *Lucas* and is likely to be analyzed as a *per se* taking.



At year 100, the undeveloped property is completely submerged. No takings analysis applies because there is no remaining property right to be taken.

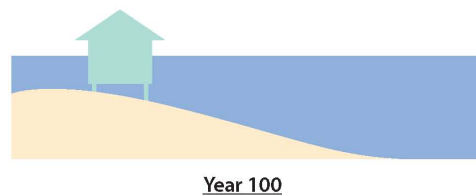
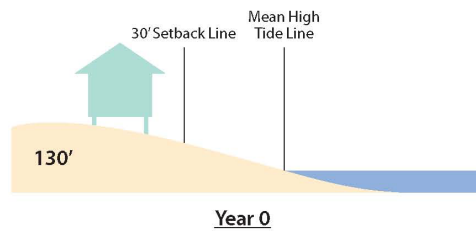
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DYNAMIC PROPERTY RIGHTS

79

**Figure 7: When Does Penn Central Analysis Apply to a Permit Denial?  
(developed parcel)**

Figure 7



The case of the permit applicant who wishes to build on an undeveloped property, shown in Figure 6 presents a more complicated scenario. In the initial period, denial of the permit may appear to be a *Lucas* taking. As a threshold matter, to even get to the analysis described below, the state will have to establish that there is still value to the private property owner in holding the

undeveloped dry sand beach.<sup>84</sup> This value will be highly jurisdiction-specific: in states that recognize the right to exclude the general public from the dry sand beach the owner may still have value in operating a private beach club and selling passes to members.<sup>85</sup> However, in states where the public cannot be excluded from the dry sand beach, the state will have to use the public trust principles described above or the theory of waste discussed below to establish that the denial of the development permit merely reinforces the state's common law rights and does not take away a right that the property owner has.<sup>86</sup> If the property owner cannot derive any economically beneficial use from the dry sand beach, this case has the facts of *Lucas*, and *Penn Central* analysis would not apply.

Assuming that there is residual value in the property, an evaluation of a takings claim against the state would fall under *Penn Central* analysis. Here, the character of the government action is to protect public safety and the public's rights in the public trust. This is certainly a significant purpose given the courts' recognition that the public's trust rights are paramount.<sup>87</sup> This government action will be weighed against the economic impacts of the regulation, which here are also significant because they ultimately result in the total loss of the property. The final significant factor if a court were to uphold a state's permit denial would be a finding that the property owner's investment-backed expectations were unreasonable.<sup>88</sup> Such a finding will be essential to establishing that there is no taking because takings analysis applies only to rights

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84. *Palazzolo*, 533 U.S. at 651.

85. While a court has never ruled precisely on this issue, New Jersey courts have found that the state may require public access across private beach clubs and found that the clubs can retain their profitability by charging use fees to those taking advantage of club services. See *Raleigh Ave. Beach Ass'n v. Atlantis Beach Club*, 879 A.2d 112 (N.J. 2005).

86. See *id.*

87. See, e.g., *Ill. Cent. R.R. v. Illinois*, 146 U.S. 387 (1892); *Aptos Seascapes Corp. v. Santa Cruz*, 188 Cal. Rptr. 191 (Cal. 1982); *Krieter v. Chiles*, 595 So. 2d 111 (Fla. 1992); *Glass v. Goeckel*, 703 N.W.2d 58 (Mich. 2005); *Opinion of the Justices (Public Use of Coastal Beaches)*, 649 A.2d 604 (N.H. 1994).

88. See *Palazzolo v. State*, 2005 No. WM 88-0297, 2005 WL 1645974, at \*7 (R.I. Super. July 6, 2005) ("Although the Public Trust doctrine cannot be a total bar to recovery as to this takings claim [because parts of the parcel are not tidally influenced], it substantially impacts Plaintiff's title to the parcel and has a direct relationship to Plaintiff's reasonable investment-backed expectations").

that the property owner had at the moment of purchase. Therefore, if a court finds that the property owner's expectations were unreasonably based on rights that he did not have, then there can be no taking.

In order to find that the investment-backed expectations of the property owner are unreasonable, it is necessary to establish that the property owner has constructive notice of the limited tenure of his title and then show that he cannot recover the value of his investment in this time frame. The first step is far easier than the second. Under the common law, we accept as background principles the doctrines of the public trust, accretion, and erosion. Therefore, we can assume that the property owner has at least constructive notice that the seaward limit of his title is dynamic.<sup>89</sup> Next, we must establish that climate change and its impacts are sufficiently established in the public consciousness such that the property owner should have been aware of the potential that his property would be inundated. In our hypothetical, we assume that the state has data to show the likelihood of long-term inundation of the property. From this assumption, we conclude that courts would agree that the expectation of a perpetual title in fee to the current extent of the dry sand on a parcel is unreasonable. Such an expectation is increasingly likely to be deemed unreasonable as more states engage in sea level rise planning and produce maps of areas at risk of inundation.<sup>90</sup>

The remaining questions to establish unreasonableness are how long the property must remain useable for an investment to be reasonable, and how certain one must be that the inundation will occur on the time scale specified at the outset of this hypothetical analysis. That is, if we know the probability of inundation is 95% within 100 years, is the state justified in saying that even the risk-tolerant developer is unreasonable in wanting to bank on the 5% chance that the property will not flood?

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89. Note that many states go one step further, and require property owners to sign documentation upon purchase stating that they understand that their property has a dynamic boundary and/or that they are purchasing property in a coastal flood zone.

90. *See, e.g.*, *Brannan v. State*, No. 01-08-00179-CV, 2010 WL 375921 (Tex. App. Feb. 4, 2010) (holding that because of the rolling easement under the Texas Open Beaches Act littoral owners do not have a right to defend their property from erosion and sea level rise).

In terms of the length of usability, it could be reasonable to rely on a generally established lifetime for the type of construction in question. However, this figure may be inaccurate because many coastal developments outlive their “useful” lifetimes through remodeling and retrofits. The truly difficult question arises when the developer acknowledges that sea level rise will render the property useless in 50 or 100 years but alleges that he will have derived all possible beneficial use from it before that point so that when the land reverts to the public trust it will have no value to him. In this case, the property owner’s expectations of the value he will derive from the property may account for the limited duration of his title in fee and still be totally reasonable.

This does not mean, however, that the *Penn Central* analysis in the case of the short-term profit taker, who will sell the property right after development and does not care if it is submerged many years because his investment-backed expectations have been fulfilled, must go against the state, as the court could always find that the long-term policy interest that defines the character of the government action is significant enough to outweigh the other factors. According to *Penn Central*, the touchstone of this analysis would be average reciprocity of advantage,<sup>91</sup> meaning that as long as the property owner is benefitted by the regulation that limits his development right there is no taking. That is, when the character of the government action is to promote a public benefit in which the property owner will share, the government action is not a taking. Therefore, to the extent that restrictions on the short-term profit maximizer’s intent to develop benefit him as a member of the public at large, the character factor of *Penn Central* analysis may be able to override the subjective profit-making expectations of the individual property owner. In the context of sea level rise, the state’s permit denial and policy of rolling easements benefit the public as a whole both by preserving public access and by preserving ecosystem values that would otherwise be lost as the beach is “squeezed” against a seawall.<sup>92</sup> The public will also benefit

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91. *Penn Central*, 438 U.S. at 134-35 (“Unless we are to reject the judgment of the New York City Council that the preservation of landmarks benefits all New York citizens . . . –which we are unwilling to do—we cannot conclude that the owners of the Terminal have in no sense been benefitted by the Landmarks Law.”)

92. Robert J. Nicholls et al., *Chapter 6: Coastal Systems and Low-Lying Areas*, in CLIMATE CHANGE 2007: IMPACTS, ADAPTATION AND VULNERABILITY. CONTRIBUTION OF WORKING



from the averted costs of disaster relief that a state would ultimately incur if the homes were permitted and then threatened by natural hazards. These benefits to the public trust are benefits in which all citizens, including the property owner share, and therefore may be sufficient to sustain denial of a development permit under *Penn Central* analysis.

D. *Expansion of the Doctrine of Waste*

The final defense of state actions to prevent building along areas of the coast that will be subject to inundation is an expansion of the doctrine of waste. Under the public trust doctrine, the state will take title to all lands that become submerged due to sea level rise. With statistically robust projections of sea level rise, the state has what amounts to a vested future interest in lands that will become submerged. In the context of sea level rise, the state functions like a remainderman in a life estate. Although the state's interest is not a "grant" in the classical sense of a remainder, the inevitability of sea level rise renders the future interest of the state in lands that will become submerged more similar to a remainder than a contingent future interest. As explained below, this fundamental shift in the understanding of the state's interest in future "erosions" caused by sea level rise is warranted because, like the holder of the life estate, there is nothing that the littoral owner can do to stop sea level rise. The contingent future interest is fundamentally an institution of property that is designed to control the current titleholder's behavior, because the interest will not ripen into an ownership interest unless some event that the current owner can control occurs (e.g. the serving of alcohol on a premises). Therefore, a core premise underlying the contingent future interest is that the present owner may modify his behavior to prevent the ripening event from occurring and thus retain title in perpetuity. In contrast, there is nothing that the littoral owner can do to prevent the natural end of his estate in littoral property as sea level rises (he could, of course, build a seawall, but as we argue below that does not give him title to the land) and there is nothing an individual littoral owner can do to halt sea level rise and prevent the gradual transfer of his title to the state as his land

becomes submerged. Because the public trust doctrine and the doctrine of erosion will combine to eliminate the property holder's title over time, the property owner's title is equivalent to a life estate where the relevant "life" is the amount of time that it will take for sea level rise to inundate the property. The state functions as the remainderman and will take title when the "life" of the dry land is extinguished.<sup>93</sup>

Under common law property doctrines, any person with a vested future interest in a piece of property has the ability to prevent the life tenant from engaging in behavior that prevents the holder of the future interest from enjoying the full value of the property.<sup>94</sup> An action in waste is available to any remainderman to prevent the life estate holder from devaluing the property.<sup>95</sup> In general, waste actions are available for the remainderman to protect any future intended use that he has for the property.<sup>96</sup>

Here, the state has a vested future interest in littoral property in its role as the guardian of the public trust. As protector of the public trust, the state has an obligation to protect public rights recognized under the state's public trust doctrine. At minimum, these rights include navigation, commerce, and fishing.<sup>97</sup> Thus, in its role as remainderman, the state has a paramount interest in protecting the future public interest in navigation, commerce, and fishing.

To this end, the state would be able to maintain an action in waste against anyone who takes actions today that would impair the public's future interest. Consider the following illustration in the case of navigation: if a property owner builds a house today that is submerged in 50 to 100 years, the house will present an obstacle to navigation unless it is removed and will also significantly impair the public's right to use the new public trust lands for a variety of activities, such as fishing, recreation and commerce.<sup>98</sup> Perhaps the clearest example is the right of the public under the public trust to

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93. *See, e.g.*, *Brant v. Virginia Coal & Iron Co.* 93 U.S. 326, 333-34 (1876); JOSEPH W. SINGER, *PROPERTY LAW: RULES, POLICIES, AND PRACTICES* 553-57 (2006).

94. *See, e.g.*, *Elliff v. Texon Drilling Co.*, 210 S.W.2d 558 (Tex. 1948).

95. *See Moore v. Phillips*, 627 P.2d 831 (Kan. Ct. App. 1981).

96. *See id.*

97. *Martin v. Waddell*, 41 U.S. 367, 383 (1842); *see also* Appendix A.

98. A number of states have expanded the scope of their public trust doctrines to expressly recognize a public interest in recreation. *See* Appendix A, *infra*.

walk along the foreshore:<sup>99</sup> if the foreshore is littered with seawalls and houses, public access may be cut off altogether or the safety of walking along the foreshore may be significantly impacted. Because development of the coastal property will interfere with the state's contingent future interest in the public trust, the construction of the house falls within the classical definition of waste.

From this analysis it appears the state could maintain an action in waste, and the logical extension is that the state may also use the prevention of waste as a justification to deny development. Waste is a common law property doctrine and as such qualifies as a *Lucas* background principle.<sup>100</sup> If the state can deny permits today to prevent current owners from devaluing (wasting) the state's future public trust interests, then, under *Lucas*, the state is also immunized from regulatory takings claims.<sup>101</sup>

This interpretation of waste demonstrates that the state permitting agency considering the application for the undeveloped lot in Figure 1 may be able to avoid per se takings claims for permit denials at either year 0 or year 50 because any development on the parcel constitutes wasteful interference with the state's future interest in the parcel as a piece of the public trust.

The justification of a future action in waste may also be helpful in the *Penn Central* analysis, to the extent that it underscores the limited duration of the fee interest held by the littoral owner. The justification of avoiding wasteful development that harms future public interest in submerged lands shapes the character of the governmental action, and provides a strong public policy justification to allow the regulation to proceed.<sup>102</sup> This

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99. Readers will recall that the foreshore is legally defined as the area between mean high tide and mean low tide (the wet sand beach). In any mean high water mark state, the public will have the right to walk along the foreshore, because it is part of the public trust title.

100. *Lucas v. South Carolina Coastal Council*, 505 U.S. 1003, 1027, 1029 (1992).

101. Note that this then raises the interesting question of whether the problem in *Lucas* itself is really just a statutory drafting issue. If the South Carolina Legislature had drafted the Beachfront Management Act so as to specifically codify the public trust doctrine, and stated a legislative intent to prevent waste, would it have been sufficiently anchored in background principles to avoid being a regulatory taking?

102. *Penn Cent. Trasp. Co. v. New York*, 438 U.S. 104, 127 (1978) (citing *Goldblatt v. Town of Hempstead*, 369 U.S. 590 (1962)) (concluding that use restrictions are not takings when they are necessary to achieve a substantial government purpose). *But see*

justification, putting a strong thumb on the scales for the “character” factor may be the only potential mechanism for the court to rule in favor of the state in the case of the potential developer who plans to derive all value from his property prior to its submergence.<sup>103</sup>

In the case where there is already a house on the property, the waste argument appears less helpful, because the “wasteful” development has already occurred. If events proceed as shown in Figure 7, the house will fall completely within the public trust by year 100 and will certainly pose a threat to navigation. The state may be able to draw upon waste in this context to defend against a seawall permit, but the argument is considerably weaker than that for the undeveloped parcel. Here, the state’s best argument is that allowing the property owner to build the seawall would give him a false sense of security in his tenure, which may lead him to overinvest in the property through actions like remodeling. This argument then begins to look like the argument for the undeveloped parcel to the extent that over-investment in an existing property presents the same waste problems that developing an open parcel does. In this case, it is likely that the state would need to show that there is additional waste associated with the construction of the seawall—for example, the state may need to show that the seawall would be a greater impediment to navigation than the house falling into the water would be.

The state could also argue that the seawall itself is wasteful. If the state requires the removal of seawalls when they come to interfere with the public trust, then even a seawall permitted in year 0 will have only a 50-year lifespan. To make this showing, the state must argue that the seawall is wasteful because in year 50 the seawall will artificially hold back the public trust and physically interfere with the state’s use of the land for public trust purposes. While waste arguments may be useful in this context, they do not have nearly the same persuasive power as when applied to undeveloped parcels.

#### E. *The Government’s Property Interest as a Contingent Future Interest*

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Lingle v. Chevron U.S.A., 544 U.S. 528, 540 (2005) (finding “the *Penn Central* inquiry turns in large part, albeit not exclusively, upon the magnitude of a regulation’s economic impact and the degree to which it interferes with *legitimate* property interests) (emphasis added).

103. See *supra* nn. 89-91 and accompanying text.

The above analysis of the doctrine of waste is premised on the assumption that the state's future public trust interest can be treated as a vested future interest. However, courts have historically treated some aspects of the dynamic property rights doctrines as contingent future interests.<sup>104</sup> If the transfer of title at the dynamic property boundary of the shore is a contingent future interest, then the littoral owner could be seen as holding a fee simple defeasible subject to the future condition of sea level rise. A fee simple defeasible is a type of property interest in which the fee holder's title is subject to the performance (or non-performance) of a condition specified by the grantor.<sup>105</sup> Once that condition occurs, however, the fee owner immediately loses title to the property and it passes to the third party who held the contingent future interest.

In this contingent future interest paradigm, the state would not have the ability to prevent wasteful development as we have described above because the state would not have an actionable interest in the littoral owner's property. Here, we explore the policy justifications for vested and contingent future interests. We conclude that sea level rise presents a unique case in which the state's future public trust interest is in fact vested and should give rise to the possibility of an action in waste.

Traditionally, courts have treated the property interests at the dynamic littoral boundary as contingent future interests.<sup>106</sup> In the absence of rising sea levels, some beaches will move between phases of erosion and accretion.<sup>107</sup> From a property owner's perspective, the switch between erosion and accretion can be relatively unpredictable, and courts have treated these changes as lacking a clear physical direction over time.<sup>108</sup> The rather

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104. *See* Walton Cnty. v. Stop the Beach Renourishment, 998 So.2d 1102, 1112 (2008).

105. SINGER, *supra* note 93, at 506.

106. *Id.*

107. G. BENASSAI, INTRODUCTION TO COASTAL DYNAMICS AND SHORELINE PROTECTION 7 (2004).

108. *See, e.g.*, Walton Cnty. v. Stop the Beach Renourishment Inc., 998 So.2d 1102, 1112 (Fla. 2008). ("The right to accretion and reliction is a contingent future interest that only becomes a possessory interest if and when land is added to the upland by accretion or reliction."). Note that in reality sea levels have been gradually rising and shorelines have consequently been eroding throughout the entire era in which this common law has developed.

uncertain nature of accretions and erosions renders them comparable to contingent future interests, as discussed below. Climate change and resultant sea level rise, however, present a completely different scenario. Sea level rise is a unidirectional change that will result in the continuous encroachment of the sea on to littoral property. Unlike the conventional paradigm of shoreline dynamics in the common law, coastal landform loss due to climate change is neither unpredictable nor uncertain in direction. To the contrary, the combination of climate modeling and coastal landform mapping allows us to know with reasonable certainty which coastal areas will ultimately be inundated over stated timeframes.<sup>109</sup> Because of this unidirectional progression towards an end state for which relevant experts should be able to attach a discrete probability, the advancement of public trust title due to rising seas is not well represented by the model of a contingent future interest where the littoral owner holds a defeasible fee.

In our case, the contingent future interest holder is the state, and the state automatically takes title when the mean high tide line shifts landward. The important distinction is that a defeasible fee interest is cut short upon the occurrence of a particular event, whereas a life estate only ends at the end of the measuring life. In our case, while the property owner may make certain modifications to his littoral property that increase erosion and therefore hasten the impacts of sea level rise—for example, building a seawall that leads to passive erosion—there is nothing that a property owner can do as an individual to accelerate sea level rise on a large scale. That is, while there may be slight temporal differences in the rate of beach loss when a seawall is built when compared to leaving a property in its natural state, neither action works in the classical sense to immediately cut off the property owner's interest. Therefore, his interest is not cut short in the same manner that it would be under a classic defeasible fee. Rather, the property owner's interest ends at the natural point when the mean high tide line overtakes his property.

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109. See, e.g., SAN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION, LIVING WITH A RISING BAY (2008) (containing numerous inundation maps focusing on different regions of the San Francisco Bay). See generally Nicholls et al., *supra* note 92 (explaining the projection of impacts of sea level rise in low-lying coastal areas).

Further, a grantor creates a fee simple defeasible because he wants to control the behavior of the grantee with respect to the land. Central to this conception of property is that the subsequent fee owner may exercise his free will: he simply does so at the risk of losing his property.<sup>110</sup> An owner of a fee simple defeasible thus has a choice to make. So long as he conforms his behavior to the wishes of the grantor he retains title in fee to the property. This is entirely unlike the littoral owner whose property is subject to inundation due to sea level rise. That is, there is no way that an individual landowner can modify his own behavior so as to prevent the inundation of his property by rising seas over the long run.<sup>111</sup> Even if an individual property owner were to attempt to armor his property, he will encounter two difficulties if acting alone. First, given the magnitude of expected sea level rise, it will be extraordinarily difficult to design a seawall that protects only his property. Second, even if such a design were feasible, it would still be subject to edge effects that undercut and ultimately destroy the seawall. This is simply not like the classic example of a fee-simple defeasible where a property owner can make an active choice about the use to which he puts his property—for example, serving alcohol on the premises that will result in a change of his fee owner status. The inevitability of sea level rise thus makes this case more like a life estate subject to the state's vested future interest.

Finally, it is important to address the potential counterargument that without a direct grantor there can be no vested future interest in property. While it is the case that there is not a grantor in the traditional sense, in many cases, the United States acted as an intermediate holder of public trust lands between the moment the lands were acquired and the admission of a state to the Union.<sup>112</sup> Through this temporary holding, the United States functioned like a grantor giving the state the rights and responsibilities to control the public trust. While in a strict

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110. *Id.*

111. Even if an individual littoral owner were to halt all of his carbon emissions, sea level rise would still ultimately inundate his property. In fact, even if *all* greenhouse gas emissions were halted today, the “climate commitment” will result in additional sea level rise and inundation of coastal property. Gerald A. Meehl, Warren M. Washington, William D. Collins, Julie M. Arblaster, Aixue Hu, Lawrence E. Buja, Warren G. Strand, & Hiyan Teng, *How Much More Global Warming and Sea Level Rise?*, 307 *SCIENCE* 1769, 1769 (2005).

112. *See* *Pollard v. Hagan*, 44 U.S. 212, 221 (1845).

sense the public trust lands of the original colonies were technically reserved by the states,<sup>113</sup> this seems to be a difference without distinction as the federal government was, in some sense, the temporary holder of all public trust lands prior to statehood.<sup>114</sup> In virtually every coastal state in the United States, the doctrine of erosion has been followed since the establishment of statehood because it has been adopted from the English common law. As a result, the state has always had the right to take title to land that is submerged. Because of the background principles of common law that govern littoral property boundaries, it is implicit in every grant of littoral property that the state reserves the vested right to act as guardian of the public trust. The state's interest in lands that will become submerged as a result of sea level rise can therefore be understood as a vested interest dating back to the original grant of title to a private landholder. This interpretation is entirely consistent with the body of case law considering rights to submerged lands. That case law explicitly finds that in the absence of an express grant of submerged lands, the state, as the holder of the public trust, will retain title to all submerged lands, even if the doctrine of erosion operates to reduce the size of the granted parcel.<sup>115</sup>

Most important to this discussion is the policy that drives recognition of a life estate as opposed to a defeasible fee. The defeasible fee exists to give someone a potential fee interest where the grantor can exercise limited control over the fee holder's behavior. In contrast, the life estate exists to give the holder a time-limited right to the property and grant the future interest to a third party. Because rising sea levels are a certain and unavoidable occurrence, they are more analogous to an event ending a life estate than to an event cutting short a defeasible fee.

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113. *See id.* at 230 ("The shores of navigable waters, and the soils under them, were not granted by the Constitution of the United States, but were reserved to the states respectively.")

114. *See id.* at 225, 227.

115. *Appleby v. New York*, 271 U.S. 364, 399, 403 (1926).



### III. COMMON LAW DOCTRINES IN PRACTICE: AN ANALYSIS OF STATE DOCTRINES

As the above analysis suggests, the variation in state level common law doctrines may have significant impacts on the ability of a particular state-permitting agency to control coastal development in the face of increasing sea levels and stronger, more frequent storms. In this section, we explore significant variations in state common law doctrines and how they impact the ability of state regulatory agencies to limit coastal development. Appendix A summarizes the prevailing doctrines in all coastal and Great Lakes states with respect to the recognized rights of the public and littoral owners. Understanding the scope of these respective rights is essential to figuring out how dynamic property regimes in the context of climate change will play out in the states. Those states that recognize a larger range of rights for littoral owners will likely have difficulty preventing wasteful coastal development. Those with geographically expansive public trust doctrines, however, will be best positioned to implement rolling easements and proactively discourage or prevent risky coastal development.

#### A. *Geographic Scope of the Public Trust*

In most coastal states, the public trust extends up to the mean high water mark.<sup>116</sup> This definition derives from the English public trust doctrine, which recognizes that the public trust extends to all waters that are tidally influenced.<sup>117</sup> However, for particular historical reasons, some states limit the public trust to only those lands below mean low water.<sup>118</sup> For example, Massachusetts changed its common law to extend private title to the low water mark in order to encourage the development of wharfs and other coastal infrastructure essential to the promotion of commerce in the colonies.<sup>119</sup>

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116. See Appendix A.

117. *Martin v. Waddell*, 41 U.S. 367 (1842).

118. Massachusetts, Maine, Delaware, and Virginia extend private title to mean low water. Generally, this is a result of colonial ordinances to encourage wharf development. See *Shively v. Bowlby*, 152 U.S. 1, 18-26 (1984) (reviewing the extent of private title and public trust in the colonies).

119. See *Boston Waterfront Dev. Corp. v. Commonwealth*, 393 N.E.2d 356 (Mass.

New Jersey has the most geographically expansive reading of the public trust doctrine. It is the only state that recognizes that the public trust encompasses the dry sand beach up to the first line of vegetation.<sup>120</sup> The *Matthews* court recognized that the public trust included the public's right to bathe and elaborated that this right is not meaningful unless the swimming members of the public can also rest upon the dry sand beach.<sup>121</sup> The court found that the full enjoyment of the public's right to bathe requires that they also have the ability to rest on the dry sand beach.<sup>122</sup>

The variation in the geographic scope of the public trust will affect the ability of states to limit coastal development on the theory that the development will come to interfere with the public trust. Most significantly, low water marks will move onshore later than high water marks, so more time will elapse before low water states take title to submerged lands. Further, low water states' limited geographic reach may make it more difficult to use the justification of the public trust to reach even the foreshore, let alone dry sand and the developments that lie beyond it.<sup>123</sup> This may ultimately frustrate a policy of rolling easements because low water states will have difficulty preventing the construction of armoring structures beyond the foreshore. On the other hand, New Jersey's broad reading of the public trust may well make it easier for that state to prevent coastal armoring and other reckless coastal development. In fact, under the *Illinois Central* logic described above, the state may well have a public trust duty to prevent coastal armoring that is intended to hold back the advance of the public trust beach. At the opposite end of this spectrum is Texas, whose legislation to define the scope of and protect public beaches is discussed below.

#### B. *Source of the Public's Right to Access the Beach*

New Jersey is the only state that directly applies the public trust to public beach access. Other states rely on other approaches to

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1979).

120. *Matthews v. Bay Head Improvement Ass'n*, 471 A.2d 355 (N.J. 1984).

121. *Id.* at 363.

122. *Id.*

123. *See, e.g., Groves v. Sec'y. Natural Res.*, 1994 WL 89804 at \*5 (Del. Super. Feb. 8, 1994) (refusing to follow *Matthews* on the grounds that private title covers the foreshore).

protect public access to dry sand beaches. Their chosen methods may ultimately determine the extent to which public beach access can be protected in the future.

The majority of states establish public access to the beach through easements by prescription or dedication.<sup>124</sup> In these cases, courts typically find that as long as the use of the beach has been continuous and open during beach season for a number of years, the use requirement will be satisfied. Where state courts differ significantly is in whether they require that the use be hostile. Some will only grant easements by prescription, whereas others are also willing to find easements by dedication where the use is not hostile.<sup>125</sup>

Oregon has taken a unique approach to protecting public access to the beach. In *Thornton v. Hay*, the Supreme Court of Oregon adopted the English doctrine of custom to protect the public's right to access the beach.<sup>126</sup> According to the court, the public in Oregon has openly used the beach since the time of first settlement, and this continued customary use enables the public to acquire a right to access the dry sand.<sup>127</sup> Florida also follows the doctrine of custom but only applies it to public beaches when the right of access and reasonable use can be established over "historical time."<sup>128</sup> For private beaches, public access is generally found through other forms of easements.<sup>129</sup>

A few states also protect the public's right to access the beach through statute. The Texas Open Beach Act, discussed below, has been understood to be the most important statutory protection of the public's right to access the beach. In California, the Coastal Act has an express policy of expanding public access to the beach to the greatest extent feasible.<sup>130</sup> To achieve this goal, the California Coastal Commission may require the dedication of easements or payment of mitigation fees as a condition of building permits.<sup>131</sup>

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124. See, e.g., *Eaton v. Town of Wells*, 760 A.2d 232, 248 (Me. 2000); *Daytona Beach v. Tona-Rama, Inc.*, 294 So. 2d 73, 80 (Fla. 1974).

125. SINGER, *supra* note 93, at 207-15.

126. State *ex rel.* *Thornton v. Hay*, 462 P.2d 671, 676 (Or. 1969).

127. *Id.* at 673.

128. *Daytona Beach*, 294 So. 2d at 80.

129. *Id.*

130. CAL. PUB. RES. CODE § 30210 (2010).

131. See *Grupe v. Cal. Coastal Comm'n*, 166 Cal. App. 3d 148 (1985) (upholding

The ability to require easements gives the Commission significant powers to expand public beach access as long as the required dedications meet the Supreme Court's essential nexus test from *Nollan*.<sup>132</sup>

Finally, states that recognize the doctrine of avulsion and conduct significant beach nourishment secure substantial beach access through the creation of dry sand beach below the original mean high tide line. Typically, these programs are implemented pursuant to statute, and they will be discussed in more detail below.<sup>133</sup>

The variety of ways in which the states protect the public's right to access the dry sand beach may have significant impacts on the ability of the state to protect that access in the future. In general, prescriptive and dedicated easements are understood to apply to a particular place on a platted map.<sup>134</sup> As a result, it may be challenging for states and members of the public to argue that these easements move with the relative changes in the beach. This raises the possibility that as sea levels rise and the public trust comes to occupy the formerly dry sand over which the public had an easement, the easement may be lost. On the other hand, access secured through the public trust, custom, or statute defines the beach itself, not its current location, as the relevant area to which the public has a right.<sup>135</sup> Under these access regimes, it is clear that the right of access is not sensitive to the current or potential future location of the beach: the public's right of access will attach to the beach no matter how far inland it moves with the rising of seas.

Note that this movement is intertwined with the geographic scope of the public trust, described above, with respect to its

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required dedication of an easement to preserve public beach access); *Ocean Harbor House Homeowners Ass'n v. Cal. Coastal Comm'n*, 163 Cal. App. 4th 215 (2008) (upholding a permit condition requiring payment of a fee so that state may purchase lands to mitigate loss of beach caused by seawall). 166 Cal. App. 3d 148

132. *Nollan v. Cal. Coastal Comm'n*, 483 U.S. 825, 837 (1987) (holding that in order for the state to require dedication without takings liability it must demonstrate that there is an "essential nexus" between the dedication and the public policy it furthers).

133. *See, e.g.*, N.C. GEN. STAT. § 146-6(g) (2010) (establishing that title to all land created through nourishment vests in the state; FLA. STAT. § 161.053 (2010) (requiring the establishment of an erosion control line as the boundary between public and private property prior to the commencement of beach nourishment activities).

134. SINGER, *supra* note 93.

135. *Matthews v. Bay Head Improvement Ass'n*, 471 A.2d 355 (N.J. 1984); *State ex rel. Thornton v. Hay*, 462 P.2d 671, 676 (Or. 1969); TEX. NAT. RES. CODE § 61 (2010).

impact on rolling easements. States that have public trust easements or easements by custom to the entire dry sand beach expect that these easements will roll landward with rising seas. As a result, the state may be able use this right over the dry sand to prevent new private construction on the beach to the extent that it would interfere with the public's ability to safely use their easement over the dry sand beach.

### C. *Rights Protected Under the Public Trust*

As inherited from England, the public trust in all states protects, at minimum, the rights to commerce, fishing, and navigation.<sup>136</sup> Both the New Jersey court's holding in *Matthews* and the waste argument we advance above make clear that the scope of public rights recognized under the public trust may ultimately influence both the geographic extent of the public trust and the ability of the state to prevent reckless coastal development. It is interesting to note that while the Supreme Court in *Shively* cautioned against applying the public trust precedents of one state to another, a review of the common law reveals that state courts routinely import the common law protections of other jurisdictions.<sup>137</sup>

California greatly expanded its public trust doctrine in *Marks v. Whitney*, recognizing that the public trust encompasses bathing, swimming, boating, general recreation, scientific study, and conservation.<sup>138</sup> Mississippi has subsequently adopted *Marks*' expansive reading of the rights protected under the public trust.<sup>139</sup>

In *Avon-by-the-Sea* and *Matthews*, the New Jersey courts established the important proposition that the uses protected by the public trust can change over time as the public's use of the shoreline evolves.<sup>140</sup> Illinois courts have subsequently relied upon *Avon* to explain that the rights protected by the public trust doctrine may change over time.<sup>141</sup>

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136. *Martin v. Waddell*, 41 U.S. 367, 383 (1842).

137. *Shively*, 152 U.S. at 26.

138. *Marks v. Whitney*, 491 P.2d 374, 380 (Cal. 1971).

139. *Cinque Bambini P'ship v. State*, 491 So.2d 508, 512 (Miss. 1986).

140. *Neptune City v. Avon-by-the-Sea*, 294 A.2d 47 (N.J. 1972); *Matthews v. Bay Head Improvement Ass'n*, 471 A.2d 355 (N.J. 1984).

141. *People ex rel. Scott v. Chicago Park Dist.*, 360 N.E.2d 773, 780 (Ill. 1976).

Alaska's public trust doctrine, as established in its constitution, may be the most expansive in terms of resource coverage.<sup>142</sup> The Alaska constitution recognizes that all of the state's natural resources are property of the state in trust for the people, including all waters and wildlife.<sup>143</sup> However, beachfront property litigation in Alaska is extremely rare,<sup>144</sup> and therefore, the applicability of this broad public trust doctrine to coastal development remains an open question.

Apart from the states described above, most other states do not have an extensive enumeration of the public trust rights protected under their case law.<sup>145</sup> Thus, it is safe to say that they protect the rights of navigation, fishing, and commerce, and that other rights may be added over time.

#### D. *Rights Afforded to the Littoral Owner*

The rights that a state affords to its littoral owners have the potential to significantly limit the ability of a state to control coastal development and implement rolling easements. This potential is discussed above with respect to the right of the littoral owner to defend his property. Underlying all littoral rights are the common law doctrines of public trust and erosion, which will ultimately force the littoral owner to yield to the sea. However, the shape of coastal development in the short run will be influenced by the rights of the littoral owner. If these short run decisions lead to extensive coastal armoring, they may ultimately come to have a long-term impact by making it politically difficult for states to implement retreat policies.

All littoral owners have rights to access the water, which often include the right to wharf out to the point of navigability, and the right of accretion.<sup>146</sup> California has codified an interesting exception to the doctrine of accretion: accretions that are the result of artificial events do not inhere to the owner.<sup>147</sup> However,

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142. ALASKA CONST. art. VIII § 3.

143. *CWC Fisheries, Inc. v. Bunker*, 755 P.2d 1115, 1120 (Alaska 1988).

144. *See* Appendix A. The comprehensive survey of cases conducted to create Appendix A did not find a single public trust case in Alaska that addresses the property rights of a littoral owner.

145. *Id.*

146. *Martin v. Waddell*, 41 U.S. 367 (1834).

147. CAL. CIV. CODE § 1014 (2010).

the California courts have held that if the alluvion is from an artificial source, such as mining, but the accretion is caused by natural forces, then the title does belong to the littoral owner.<sup>148</sup> In contrast, Rhode Island recognizes that the littoral owner has the right to quiet title to any lands that are filled with the state's acquiescence,<sup>149</sup> meaning that if the state fails to either object to a quiet title action or assert title to filled lands itself, those lands will belong to the littoral owner.

In a broad reading of what aspects of littoral property add value to the property, Florida has recognized that the littoral owner has the right to unobstructed views.<sup>150</sup> This is potentially significant when considering possible mechanisms to protect coastal property. The right to unobstructed views means that the state may not build sand dunes to protect littoral property if the dunes will be so high that they will block views of the ocean from the first floor of littoral properties.<sup>151</sup> This means that the state may face more pressure to install coastal armoring structures rather than engaging in soft coastal protection techniques. Views are also protected to some extent in California. In California, the right to views is not a specific littoral right, but loss of view is a loss for which property owners may seek compensation in partial takings cases.<sup>152</sup> Massachusetts has also recognized that littoral views are a major component of property values and suggests that there may be a right to views.<sup>153</sup>

Alabama and New Jersey both recognize the right of the littoral owner to construct improvements on his beach and charge for access to them.<sup>154</sup> In Alabama, the right to improvements centers upon navigation and even allows the littoral owner to dredge the area in front of his property to improve access to a wharf that he constructs.<sup>155</sup> New Jersey has a long history of private beach clubs that provide services, including recreational facilities and

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148. State of Cal. *ex rel.* State Lands Comm'n v. Super. Ct., 900 P.2d 648 (1995).

149. Greater Providence Chamber of Commerce v. State, 657 A.2d 1038 (R.I. 1995).

150. Brannon v. Boldt, 958 So.2d 367, 373 (Fla. Dist. Ct. App. 2007).

151. *Id.*

152. See Appendix A, *infra*.

153. *Id.*

154. Raleigh Ave. Beach Ass'n v. Atlantis Beach Club, 879 A.2d 112, 125 (N.J. 2005); City of Orange Beach v. Benjamin, 821 So.2d 193, 195 (Ala. 2001).

155. *Benjamin*, 821 So.2d 193 at 195.

lifeguards, to their members. After the *Matthews* court expanded the public trust to include all dry sand beaches, the future of these beach clubs was in question. Today, the beach clubs are allowed to charge individuals who spend time on their dry sand beaches or use club-provided services like private life guarding.<sup>156</sup> However, these fees are controlled by the state department of environmental protection and are maintained at the level of fees charged for the use of municipal beaches.<sup>157</sup>

Massachusetts, which has the most restrictive public trust doctrine on the coast, recognizes that littoral owners have the right to completely exclude the public from all lands above mean high water so long as the exclusion does not interfere with the public's right to unimpeded navigation.<sup>158</sup>

As suggested above, the most significant right that a littoral owner would potentially have is the right to defend his property. No state recognizes such a right through the common law because it would be directly at odds with the doctrine of erosion. However, as explained above, states following the doctrine of avulsion do recognize the limited right of littoral owners to protect their homes by rebuilding beaches lost in storm events. Maryland goes one step further, recognizing that littoral owners have a statutory right to hold back the sea and reclaim land lost to erosion.<sup>159</sup> Finally, the California Coastal Act includes a provision that suggests that coastal property owners have a qualified right to defend existing structures on their properties.<sup>160</sup> California courts have found that this provision does not in fact accord an unqualified statutory right to defend a littoral property that overrides the Coastal Commission's general permitting authority and ability to deny armoring permits.<sup>161</sup>

#### IV. LEGISLATIVE INTERVENTIONS: RULES FOR BEACH NOURISHMENT AND ARMORING

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156. *Raleigh Ave. Beach Ass'n*, 879 A.2d at 125.

157. *Id.*

158. *Michaelson v. Silver Beach Improvement Ass'n*, 173 N.E.2d 273, 276-77 (Mass. 1961).

159. MD. CODE ANN., [ENVIR.] § 16-201 (Westlaw 2010).

160. CAL. PUB. RES. CODE § 30235 (2010).

161. *Whalers Vill. Club v. Cal. Coastal Comm'n*, 173 Cal. App. 3d 240 (1985).



While the common law appears to provide means for the state to take title to nourished beaches and prevent armoring through the doctrines of avulsion and public trust, many states have elected to pass legislation to address these issues. Some states have comprehensive beach bills that address a variety of conservation and access issues, while others have more targeted statutory provisions focused on armoring and nourishment.<sup>162</sup> This section explores various state statutory provisions to address armoring and nourishment and assesses how they will perform in the implementation of rolling easements.

#### A. *The Texas Open Beaches Act*

The Open Beaches Act has traditionally been understood to be one of the most significant public beach access provisions in place and certainly the strongest when it comes to adaptation to sea level rise. However, a recent holding by the Texas Supreme Court has cast serious doubts over the reach of the Open Beaches Act.<sup>163</sup> Here, we provide the reader with an overview of the structure of the Open Beaches Act and attempt to explain how *Severance v. Patterson* has modified the scope and applicability of the Act.

Texas is the only state that has enacted a policy of rolling easements. The Act defines the public beach as:

[A]ny beach area, whether publicly or privately owned, extending from the line of mean low tide to the line of vegetation bordering on the Gulf of Mexico to which the public has acquired a right of use or easement to or over the area by prescription, dedication, presumption, or has retained a right by virtue of continuous right of the public since time immemorial, as recognized in law and custom.<sup>164</sup>

The Act goes on to give the public unrestricted access to the entire public beach.<sup>165</sup> The Commissioner of the Texas General Land Office is then charged with enforcing the Open Beaches Act by preventing any structures from encroaching upon the public beach.<sup>166</sup> The Commissioner's authority includes not only the ability to prevent new construction but also the power to order the

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162. See Appendix A, *infra*.

163. *Severance v. Patterson*, 2010 WL 4371438 (Tex. Nov. 5, 2010).

164. TEX. NAT. RES. CODE § 61.001(8) (2010).

165. NAT. RES. § 61.011.

166. NAT. RES. § 61.018.

removal of existing structures that interfere with the public beach.<sup>167</sup>

In order to ensure that all property owners are aware of the risks of purchasing coastal property, the Open Beaches Act contains a disclosure provision.<sup>168</sup> The disclosure provision requires that sales of property along the coast include specific statutory language regarding the risks of owning coastal property in the contract. This language requires the littoral purchaser to take notice of the fact that if erosion or storm events cause the property to lie on the public beach then the owner may be forced to remove it at his own cost.<sup>169</sup> The act also forbids the placement of erosion control structures to prevent the shoreward movement of the public beach.<sup>170</sup>

The Act seeks to avoid takings liability by putting property owners on notice that they run the risk of losing title as a result of natural events. The Open Beaches Act was challenged as a taking and was upheld in *Matcha v. Mattox*.<sup>171</sup> However, recent destruction as a result of Hurricane Ike has once again raised the Open Beaches Act in the public consciousness.<sup>172</sup> With many coastal properties completely destroyed in the aftermath of the hurricane, the General Land Office has stated that it may take up to a year to determine which properties will be condemned under the Open Beaches Act and which may be rebuilt.<sup>173</sup> Furthermore, the General Land Office, realizing that it could not require the removal of such a large number of houses at once, modified the Beach and Dune Rules—the regulations which implement the Open Beaches Act—to permit extensive rebuilding of homes that came to lie on the public beach as the result of the storm.<sup>174</sup>

The General Land Office's ability to condemn properties situated on the public beach as a result of a storm event was

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167. *Id.*

168. NAT. RES. § 61.025.

169. *Id.*

170. NAT. RES. § 61.011.

171. *Matcha v. Mattox*, 711 S.W.2d 95 (Tex. 1986).

172. See Michael Graczyk & Cain Burdeau, *Some Ike Victims May Not be Allowed to Rebuild*, ASSOCIATED PRESS, Sept. 18, 2008.

173. *Texas May Seize Beach Homes Due to Hurricane Ike Erosion*, ASSOCIATED PRESS, Sept. 19, 2008.

174. See 31 TEX. ADMIN. CODE § 15.13.

severely curtailed by the Texas Supreme Court's recent holding in *Severance v. Patterson*. In *Severance*, the Court, for the first time, recognized a form of the doctrine of avulsion in Texas.<sup>175</sup> The Court held that avulsion would operate to preserve the pre-storm vegetation line as the landward extent of the public's easement over the dry sand beach.<sup>176</sup> However, the Court also concluded that *Luttet*, which established the seaward limit of littoral property to be the current location of the mean high tide line, would still control with regard to determining the boundary between private littoral property and public trust lands.<sup>177</sup> As a result of this significant shift in the application of the doctrine of avulsion, it will no longer be possible for private structures to interfere with the public beach as the result of storm events. Instead, the state's condemnation power can only be exercised when (1) a littoral structure comes to occupy submerged public trust lands or (2) erosion causes the vegetation line to migrate landward of the littoral structure.

*Severance* provides an important opportunity to examine the potential impact of the doctrine of avulsion on rebuilding and invites the question of whether the doctrine of avulsion must be eliminated in states subject to strong coastal storms, including hurricanes, in order for rolling easements to be successfully implemented. Now that avulsion will no longer serve to move the vegetation line shoreward, littoral owners in Texas, in theory, have a right to fill and reclaim lost littoral property after storm events. Therefore, comparing post-storm rebuilding in past storm events to what happens after future storms, where the doctrine of avulsion undoubtedly applies, will provide an important measure of the impact of the doctrine of avulsion on the extent of post-storm rebuilding.

Traditionally, Texas courts have read the definition of public beach expansively, finding that the definition covers most of the Texas Gulf Coast. Because the Open Beaches Act defines the public beach by the vegetation line, regardless of where that line moves as the result of natural events, Texas courts have found that the public beach easement under the Open Beaches Act will roll

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175. *Severance v. Patterson*, 2010 WL 4371438 (Tex. Nov. 5, 2010).

176. *Id.* at \*10.

177. *Id.* at \*11.

landward with the vegetation line.<sup>178</sup> As a result of this interpretation of the Open Beaches Act, Texas was widely understood to be the only state that had enacted a policy of rolling easements.

However, the *Severance* court upset this settled understanding of Texas property law, by holding that there is no rolling easement.<sup>179</sup> According to the *Severance* court, public beach only exists where an easement can be proven over a specific property. Furthermore, unless public beach access was expressly reserved by the state in the initial land grant, the state may not rely upon custom to secure public access.<sup>180</sup> Because much of the Texas coast experiences very high erosion rates—often upwards of ten feet a year—many of the properties over which Open Beaches Act easements had been proven are now submerged and part of the public trust. Post *Severance*, property that becomes littoral by virtue of erosion and loss of the original oceanfront lot will not be encumbered by the public beach easement. Although the precise extent of original littoral properties is unknown, it is likely that under *Severance*, many current littoral properties are not subject to the Open Beaches Act, and public access to the dry sand beach along large sections of the Texas coast has effectively been eliminated.

#### B. Other State Statutory Provisions

A number of states have specific statutory provisions to affirmatively establish that all beach created by nourishment activities belongs to the state. For example, Florida's Beach and Shore Preservation Act requires that an erosion control line be established prior to nourishment activities and designates this line as the boundary between public and private property.<sup>181</sup> Similarly, in North Carolina, all nourishment activities undertaken with public funding inhere title in the newly created beach to the state.<sup>182</sup> Texas and California also have statutes that recognize that

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178. *Id.* at 100.

179. *Severance* at \*11.

180. *Id.* at \*5, \*11.

181. FLA. STAT. § 161.053 (2010).

182. N.C. GEN. STAT. § 146-6(f) (2010). *But see* Dep't of Natural Res. v. Mayor of Ocean City, 332 A.2d 630 (Md. 1975) (holding that land created through beach

accretions from artificial sources do not change the line between public and private property.<sup>183</sup>

It is clear that under these provisions, the state can protect public access and existing coastal property by creating new beach. What is less clear is what the impact of fixing a pre-nourishment property line will be in the future. That is, does an erosion control line set a new, fixed boundary between public and private property? Or is the boundary only in force so long as it does not come under the public trust as a result of sea level rise? If pre-nourishment boundaries become fixed, they may prevent states from implementing rolling easements in the future. Note that this does not appear to be the case in Florida, where the Florida Supreme Court recently held that the erosion control line is only fixed so long as the state maintains a dry public beach seaward of the line.<sup>184</sup>

Perhaps of even more concern is the expectation created by continued nourishment activities. Over time, property owners who are continually protected by the expenditure of public funds for beach nourishment will come to expect this costly service and may feel entitled to it. As sea levels continue to rise and storms become more frequent, the extent of required nourishment and its associated costs will increase significantly. Therefore, states that engage in extensive nourishment today may be doing themselves a great disservice when it comes to future climate change adaptation. This is particularly true in places where nourishment activities make new development safe in areas that are inherently geologically unstable and at risk from sea level rise and storm activities.<sup>185</sup>

Consider again the permit applicant in Figure 1. Assume that all conditions of this parcel are true and that the dry sand beach constituting the first forty feet of the parcel was created by nourishment. If the property is in a state where nourished beach belongs to the state, the property owner clearly cannot build on

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nourishment belongs to littoral owners).

183. CAL. CIV. CODE § 1014 (2010); TEX. NAT. RES. CODE § 61 (2010).

184. *Walton Cnty. v. Stop the Beach Renourishment Inc.*, 998 So.2d 1102 (Fla. 2008).

185. See Raymond J. Burby, *Hurricane Katrina and the Paradoxes of Government Disaster Policy: Bringing About Wise Governmental Decisions for Hazardous Areas*, 604 ANNALS AM. ACAD. POL. & SOC. SCI. 171, 172 (2006).

this land. However, the property owner may be able to use the land to satisfy the thirty-foot setback requirement. In this situation, could the state deny the permit on the grounds that the parcel, if left in its natural state, would not be buildable? That is, should property owners be allowed to develop on properties that will require the state to continue nourishment activities in the future? If their permits are denied, can property owners maintain takings claims? It would seem that the state, seeking to prevent wasteful development as a matter of public policy, should deny these property owners permits.

That argument, however, is seriously undercut if the state has an established and ongoing policy of beach nourishment. In some ways, we might say that the property owner in this situation has more reasonable investment-backed expectations because historical experience tells him that the state will protect his property. This is a classic manifestation of the safe-development paradox, or the idea that people willingly move into hazardous areas because of consistent government policies to make any area in which people choose to live safe for building.<sup>186</sup> This discussion underscores the point that even those states that exercise their legal authority to implement rolling easements are likely to face political challenges in doing so. Further, a state's ability to implement rolling easements will be constrained by the extent to which the state's own actions, such as beach nourishment, contribute to the reasonableness of a property owner's investment-backed expectations.

Perhaps the most politically challenging situation for states arises from problems surrounding coastal armoring. Building upon the safe development paradox, littoral owners are likely to expect that the government will either protect their property or permit the owners themselves to protect their property.<sup>187</sup> We make the case that permitting the construction of coastal defense structures, however, prevents the movement of the public trust landward, and therefore amounts to impermissible abdication of the public trust under *Illinois Central*.<sup>188</sup> While state agencies do not currently embrace this rationale, they are certainly aware of the

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186. *Id.*

187. *Id.*

188. *Illinois Central R.R. v. Illinois*, 146 U.S. 387, 453 (1892).

many significant impacts of seawalls, including increasing rates of passive beach erosion, reduction in biodiversity of the beach, and prevention of the natural landward movement of coastal habitats.<sup>189</sup> With these conservation and beach quality considerations in mind, many states have adopted rules to limit coastal armoring.

As explained above, the Texas Open Beaches Act forbids coastal armoring as part of its implementation of rolling easements.<sup>190</sup> The California Coastal Act places strict limitations upon the construction of seawalls. The California Coastal Commission only grants seawall permits when the seawall will protect existing structures and public beaches by mitigating the adverse impacts of limited sand supply.<sup>191</sup> Delaware and Georgia require permits for seawalls that are to be built seaward of the statutorily defined building line.<sup>192</sup> Similarly, Florida's Beach and Shore Preservation Act requires permits for coastal armoring below mean high water and forbids the construction of seawalls within fifty feet of mean high water without a permit.<sup>193</sup> Both Hawaii and North Carolina require permits for construction in special management areas and have a strong preference for non-structural shoreline stabilization (e.g., beach nourishment).<sup>194</sup> Oregon forbids all seawalls in the beach and dune area.<sup>195</sup> In addition, Maryland's Living Shoreline Protection Act of 2008 requires the use of non-structural shoreline stabilization unless a

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189. For a summary of these impacts see Caldwell & Segall, *supra* note 44, at 536-54. See also Jennifer E Dugan, David M. Hubbard, Iván F. Rodil, David L. Revell, & Steven Schroeter, *Ecological Effects of Coastal Armoring on Sandy Beaches*, 29 MARINE ECOLOGY 160, 164 (2008) and M.G. Chapman, *Paucity of Mobile Species on Constructed Seawalls: Effects of Urbanization on Biodiversity*, 264 MARINE ECOLOGY PROGRESS SERIES 21, 28 (2003) (finding that seawalls lead to significant reductions in biodiversity).

190. TEX. NAT. RES. CODE § 61 (2010).

191. CAL. PUB. RES. CODE § 30235 (2010).

192. DEL. ADMIN. CODE § 5102.4 (2010); GA. CODE ANN. § 12-5-230 (2010).

193. FLA. STAT. § 161.052(1) (2010).

194. HAW. REV. STAT. § 205A (2010); 15A N.C. ADMIN. CODE § 7M.0202 (2010). In one well known example, a condominium built near a highly dynamic inlet has had temporary erosion control structures in place for nearly twenty-five years. See Kevin Maurer, *North Carolina to Start Enforcing Sandbag Ban*, INSURANCE J., May 2, 2008, available at <http://www.insurancejournal.com/news/southeast/2008/05/02/89643.htm>.

195. OR. REV. STAT. § 390.605 (2010).

property owner can demonstrate that non-structural measures are not a feasible means of protecting their property.<sup>196</sup>

While all of these states have authority to prevent the building of seawalls, most if not all of these laws also have variance provisions that are designed to avoid takings claims. These variances may take a number of forms ranging from a true zoning variance to the North Carolina Coastal Resources Commission's ability to authorize the placement of temporary erosion control structures.<sup>197</sup> Even in North Carolina, where temporary erosion control structures are supposed to remain in place for no more than two years, political factors, possibly including the fear of takings claims, result in far more coastal armoring being permitted and allowed to remain in place than the relevant statutory provisions would suggest.<sup>198</sup>

## V. CONCLUSIONS

Climate change poses a serious threat to the coastal zone. Over time, rising seas and increasingly strong and frequent storms together will inundate properties and increase coastal flooding. These conditions will increasingly challenge states in their efforts to protect growing coastal populations. Protecting these populations will involve a combination of measures for both near-term protection of public health and safety and longer-term plans to move people out of harm's way. Rolling easement policies provide an important tool for states to achieve their longer-term goal to limit development in increasingly hazardous coastal areas.

However, the efficacy of rolling easement policies will depend on the ability of coastal states to reach beyond the present-day geographic contours of the public trust to prevent risky coastal development in the future. As demonstrated through several permit application scenarios above, states may be able to limit risky coastal development by drawing on a combination of situation-specific arguments related to background principles of common law. Such arguments may reflect the dynamic nature of the coast,

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196. See HB 973, Fiscal & Pol. Note, Gen. Assemb., 2008 Sess. (Md. 2008), [http://mlis.state.md.us/2008rs/fnotes/bil\\_0003/hb0973.pdf](http://mlis.state.md.us/2008rs/fnotes/bil_0003/hb0973.pdf).

197. See 15A N.C. ADMIN. CODE 7M.0202(e) (2010).

198. See Willard H. Kilough III, *Federal Grant Awarded to Save Condos from Beach Erosion*, ISLAND GAZETTE, Jul. 29, 2004.



the unreasonableness of many investment-backed expectations for new coastal development, and the state's contingent future interest in land that will become submerged in order to prevent wasteful development. These arguments may have enough force for the state to deny most future coastal development, but questions remain as to the ability of the public trust and waste doctrines to prevent excessive spending on development where the owner claims that he will derive all value from the development prior to its inundation.

Further, the ability of states to use rolling easement policies will be influenced by a multitude of state-level doctrinal variations. States that read the public trust expansively are best positioned to implement rolling easements in terms of both the geographic scope of the doctrine and the public rights it protects. As long as the littoral owner does not have a statutory right to defend his property, variation in littoral rights will likely not affect the states' ability to implement rolling easements.

In fact, it appears the true obstacle to implementing rolling easements and limiting wasteful coastal development is not legal, but, rather, political. As this article has demonstrated, states have numerous legal arguments upon which they can base a public policy of limiting coastal development to keep the public out of harm's way and prevent damage to property that will fall within the public trust in the future. States can justify such a policy based not only on future legal interests in lands that will be submerged but also on other police power grounds, such as public safety.<sup>199</sup>

The real challenge, then, is to align public expectations with the state's understanding of coastal hazards, as the authors of the Open Beaches Act attempted to do. This is no small feat. Empirical data shows that members of the general public tend to be very poor at understanding hazard probabilities and will grossly underestimate their own exposure to risk.<sup>200</sup> Further, while most Americans now believe that climate change is real, they also believe that its impacts are both spatially and temporally distant.<sup>201</sup>

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199. States may also justify the policy based on the fact that otherwise, they will be unable to adequately protect or provide emergency services to growing populations in increasingly vulnerable coastal areas.

200. WHARTON RISK MANAGEMENT & DECISION PROCESS CENTER, MANAGING LARGE-SCALE RISKS IN A NEW ERA OF CATASTROPHES 133 (2008).

201. Anthony Leiserowitz, *Communicating the Risks of Global Warming: American Risk*

As a result, people are likely to have unrealistic expectations about the value of their coastal property and the value of developing or remaining on it. This means that states adopting legally justified and defensible policies to limit risky coastal development may face substantial public backlash, including numerous takings claims over denied permits. Thus, while it appears that states do in fact have the legal authority to reach beyond rolling easements to limit future coastal development, they may be unlikely to do so until the public's understanding of climate change more fully encompasses the risks posed by rising sea levels and increasing storms.

2011]

*DYNAMIC PROPERTY RIGHTS*

109

APPENDIX A: STATE LEGAL DOCTRINES RELATED TO PUBLIC TRUST  
AND LITTORAL RIGHTS\*

State	Lower Limit of Private Title	Upper Reach of Public Trust	Source of Law	Specific Public Trust Rights Recognized	Public Access to Dry Sand? (source of right)
Alabama	High Water Mark	High Water Mark	Common Law	navigation, commerce, fishing	no
Alaska	High Water Mark	High Water Mark	AK Const.	Fish, wildlife, and waters in their natural state	no
California	High Water Mark	High Water Mark	Cal Civil Code 830; Cal Civil Code 670, Common Law; Cal Pub Res Code 3011-12; Cal Const Art. X Sec. 4	Navigation, commerce, fishing, hunting, bathing, swimming, boating, general recreation, conservation, scientific study	Coastal Act has an express purpose to maximize public access to the beach. Coastal Commission may require dedication of easements as a condition for Coastal Development Permits.
Connecticut	High Water Mark	High Water Mark	Common Law	fishing, hunting, bathing, boating, taking shellfish, passage	
Delaware	Low Water Mark	High Water Mark	Common Law	Navigation, fishing, and exercise of Police Power	No

\* This Table is provided to assist the reader in applying the environmental statutory and regulatory provisions of various states to coastal permitting problems. It is necessarily a simplification and not a comprehensive statement of the law.

Florida	High Water Mark	High Water Mark	Codified in Fla. Const. art. X, sec. 11	navigation, bathing, fishing	Custom in places where the right of access and reasonable use over historical time can be established.
Georgia	High Water Mark	High Water Mark	Ga. Const., common law	commerce, navigation, fishing, bathing	May have rights through easement
Hawaii	High Water Mark	High Water Mark	Common Law		
Maine	Low Water Mark	High Water Mark	Common Law from MA	Fishing, navigation, fowling	No
Maryland	High Water Mark	High Water Mark	Common Law		No
Massachusetts	Low Water Mark	High Water Mark	Common Law	Fishing, navigation, fowling	No
Michigan	Low Water Mark	High Water Mark	Common Law	Navigation, fishing, right to walk along shores	No
Minnesota	Low Water Mark	Low Water Mark	Common Law	Navigation, recreation and other water-connected uses	
Mississippi	High Water Mark	High Water Mark	Common Law, Public Trust, Tidelands Act	Transportation, recreation, navigation, swimming, bathing, recreational activities, development of mineral resources, environmental protection	

2011]

## DYNAMIC PROPERTY RIGHTS

111

New Hampshire	High Water Mark	High Water Mark	Common Law, State Statute	Fishing, navigation, "other public purposes"	No under PTD- by statute, court also rejects writ-large use of easements b/c it says they must be determined on a case-by-case basis
New Jersey	High Water Mark	High Water Mark	Common Law	Fishing, navigation, bathing, swimming, and "other recreational uses"	Yes (PTD-umbrella right). Public must be allowed "reasonable enjoyment of private dry sand beach as determined by the <i>Matthews</i> factors.
New York	High Water Mark	High Water Mark	Common Law		
Oregon	High Water Mark	High Water Mark	Oregon Beach Bill		Yes, custom
Pennsylvania	Low Water Mark	Low Water Mark	Common Law		
Rhode Island	High Water Mark	High Water Mark	RI Const. art. I, sec. 7, PTD from English Common Law	Unrestricted access to the shore. Fishery, commerce, and navigation.	No
South Carolina	High Water Mark	High Water Mark	Common Law		

Texas	High Water Mark	Vegetation line where Open Beaches Act Jurisdiction is proven	TX Open Beaches Act, common law	Fishing, navigation, recreation	Yes, Open Beaches Act as incorporated into state constitution by referendum . Open Beaches Act applies only where state can prove public beach exists.
Virginia	Low Water Mark	Low Water Mark	Common Law		
Washington	High Water Mark	High Water Mark	Common Law**		

\*\* Sources used in constructing the above Table:

*Alaska:* ALASKA CONST. art. VIII § 3

*California:* CAL. CIV. CODE § 830 (2010); CAL. PUB. RES. CODE § 30001.5(c) (2010); Cnty. of Lake v. Smith, 278 Cal. Rptr. 809 (1991); City of L.A. v. Venice Peninsula Properties, 253 Cal. Rptr. 331 (1988); Marks v. Whitney, 491 P.2d 374 (Cal. 1971); Miramar Co. v. Santa Barbara, 143 P.2d 1 (Cal. 1943).

*Connecticut:* Shively v. Bowlby, 152 U.S. 1, 21 (1894); State v. Knowles-Lombard Co., 188 A. 275 (Conn. 1936).

*Delaware:* Groves v. Sec'y. Natural Res., 1994 WL 89804 at \*5 (Del. Super. Feb. 8, 1994) (citing State ex rel. Buckson v. Penn. Railroad Co., Del. Supr., 267 A.2d 455, 458 (1969)).

*Florida:* FLA. CONST. art. X, § 11; Daytona Beach v. Tona-Rama, Inc., 294 So. 2d 73, 78 (Fla. 1974).

*Georgia:* Shively v. Bowlby, 152 U.S. 1, 25 (1894).

*Hawaii:* Cnty. of Hawaii v. Sotomura, 517 P.2d 57, 58 (Haw. 1973).

*Maine:* ; Conservation Law Found. v. Dep't of Env'tl. Prot., 823 A.2d 551, 563 (Me. 2003); Bell v. Town of Wells, 557 A.2d 168, 183 (Me. 1989).

*Maryland:* Shively, 152 U.S. at 23-24; Dep't of Natural Res. v. Mayor of Ocean City, 332 A.2d 630 (Md. 1975).

*Massachusetts:* Shively, 152 U.S. at 18-19; Boston Waterfront Dev. Corp. v. Commonwealth, 393 N.E.2d 356 (Mass. 1979); Michaelson v. Silver Beach Improvement Ass'n, 173 N.E.2d 273 (Mass. 1961).

*Mississippi:* MISS. CODE ANN. § 29-15 (2010); Phillips Petroleum Co. v. Mississippi, 484 U.S. 469 (1988); Bayview Land v. State, 950 So. 2d 966 (Miss. 2006); Cinque Bambini P'ship v. State, 991 So. 2d 508, 516 (Miss. 1986).

*New Hampshire:* Shively, 152 U.S. at 20; Opinion of the Justices (Public Use of Coastal Beaches), 649 A.2d 604 (N.H. 1994).

*New Jersey:* Shively, 152 U.S. at 21-22; Martin v. Waddell, 41 U.S. 367, 421 (1842); Matthews v. Bay Head Improvement Ass'n, 471 A.2d 355, 357 (N.J. 1984).

*New York:* Shively, 152 U.S. at 21.

*North Carolina:* Id. at 25.

*Oregon:* State ex rel. Thornton v. Hay, 462 P.2d 671 (Or. 1969).

*Pennsylvania:* Shively, 152 U.S. at 23.

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*Rhode Island*: R.I. CONST. art. 1, § 17; *Shively*, 152 U.S. at 20.

*South Carolina*: *Shively*, 152 U.S. at 25; *McQueen v. South Carolina Coastal Council*, 580 S.E.2d 116 (S.C. 2003).

*Texas*: TEX. CONST. art. I, § 33; TEX. NAT. RES. CODE ANN. § 61 (2010); *Severance v. Patterson*, No. 09-0387, 2010 WL 4371438 at \*11 (Tex. Nov. 5, 2010); *Luttes v. State*, 324 S.W.2d 167, 187 (Tex. 1958).

*Virginia*: *Shively*, 152 U.S. at 24-25.

*Washington*: *United States v. Milner*, 583 F.3d 1174, 1181 (9th Cir. 2009); *Van Buskirk v. ConocoPhillips, Inc.*, No. C06-1220-JCC, 2009 WL 3784334, at \*1 (W.D. Wash. Nov. 10, 2009).

State	Rights of Littoral Owner	Extent of Coastal Zone	Doctrine of Accretion?
Alabama	Right to construct improvements, including wharfing and dredging, and collect reasonable fees for the use of these improvements	Ten foot elevation contour in coastal counties	Yes, but depends on how accretion happened. Littoral owner may claim title to all natural accretions and artificial accretions unless he caused them.
Alaska		Three sub zones (1) zone of direct interaction, (2) zone of direct influence, (3) zone of indirect influence. Local planning authorities may define their own extents	Yes
California	Right to uninterrupted natural flow of sand (not enforceable against the state), right to views (not specific to littoral areas, but views are compensable in partial takings cases), right to access	1000 Yards from MHT unless there is significant estuarine habitat or recreational areas then first major ridgeline or 5 miles from MHT	Yes
Connecticut	Wharf out, access to water, accretion and reclamation	1000 feet from MHW or regulated inland boundary of coastal wetlands	Yes
Delaware	Unrestricted use of the foreshore	Whole State	Yes
Florida	Right of unrestricted access to water, Right to land added by accretion and reliction, right unobstructed views.	Whole State	Yes
Georgia	Rights for cultivation of oyster claims, right	Coastal Counties	Yes



2011]

## DYNAMIC PROPERTY RIGHTS

115

	of access		
Hawaii		Whole State	No. Under statute, accreted lands belong to the state unless the accreted lands restore a littoral owner's previously eroded property
Louisiana		Varies from 16 to 32 miles inland from the Gulf Coast following the intracoastal	
Maine	Ingress and Egress, wharf out	Inland line of coastal towns and all islands	Yes, <i>Michaelson</i>
Maryland	Flow of water, reasonable use of water, access to water, accretion, and reliction.	Inland boundary of littoral counties	Yes
Massachusetts	May exclude public from all uses, except that he may not impair navigation. Court suggests there may be a right to views (notes that it is a major component of property values)	100 feet inland of first major public right of way that is within 1/2 mile of the coast. Includes all islands, intertidal areas, dunes, and beaches	Yes
Michigan		1000 feet from MHW	
Minnesota	Wharf out	Depends on the area of the state	
Mississippi	Reasonable use of waterfront property subject to state's interest in land	Coastal Counties	Yes
New Hampshire	Access	Coastal Municipalities	
New Jersey	May charge fees for access to beach when providing lifeguarding and other services under a fee structure approved by State Department of Environmental Protection. Ingress, Egress, and unobstructed views.	1/2 mile to 24 miles inland depending on the region	Yes- includes accumulation of lands behind artificial structures

New York	Reasonable access to water, accretions	Varies by region, generally 1000 feet and 500 feet in developed areas	Yes
North Carolina		Coastal Counties	Yes
Oregon		Crest of the coastal range	Yes
Pennsylvania		900 feet in urban areas, up to 3 miles in rural areas on lake Erie. 660 feet in urban areas, up to 3.5 miles in rural areas on Delaware Bay	
Rhode Island	Right to quiet title to land that is filled with the state's acquiescence as long as the fill does not interfere with public trust rights, right to wharf out.	Whole State	
South Carolina	Access to water (but NOT right to wharf out)	Coastal Counties	Yes, but artificial accretions created by the littoral owner's activities belong to the state
Texas		Area seaward of Coastal Facility designation line	Yes, but accretions caused by littoral owner's intentional filling of tidelands belong to the state
Virginia		Coastal counties and cities	

2011]

## DYNAMIC PROPERTY RIGHTS

117

Washington		Coastal counties	Yes***
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## \*\*\* Sources used in constructing the above Table:

- Alabama:* ALA. CODE § 33-7-50 (2010); State v. Gill, 66 So.2d 141, 145 (Ala. 1953).  
*Alaska:* City of St. Paul v. Alaska, 137 P.3d 261, 265 (Alaska 2006); Schafer v. Schnabel, 494 P.2d 802, 807 (Alaska 1972).  
*California:* CAL. CIV. CODE § 1014 (2010); Miramar Co. v. Santa Barbara, 143 P.2d 1 (Cal. 1943). Note that California draws a distinction between “natural” accretions, to which a littoral owner will take title, and “artificial” accretions, which belong to the state. See State ex rel. State Lands Comm’n v. Super. Ct., 900 P.2d 648 (Cal. 1995).  
*Connecticut:* State v. Knowles-Lombard Co., 188 A. 275 (Conn. 1936).  
*Delaware:* State ex rel. Buckson v. Penn. R.R. Co., 267 A.2d 455 (Del. 1969).  
*Florida:* Walton Cnty. v. Stop the Beach Renourishment, Inc., 988 So.2d 1102 (Fla. 2008); Brannon v. Boldt, 958 So.2d 367 (Fla. 2007); Trepanier v. Cnty. of Volusia, 965 So. 2d 276, 292 (Fla. 2007).  
*Hawaii:* HAW. REV. STAT. § 501-33 (2010).  
*Maryland:* People’s Counsel for Balt. Cnty. v. Md. Marine Manufacturing Co., 560 A.2d 32 (Md. 1989).  
*Massachusetts:* Michaelson v. Silver Beach Improvement Ass’n, 173 N.E.2d 273, 275 (Mass. 1961).  
*Mississippi:* Bayview Land, Ltd. v. State ex rel. Clark, 950 So. 2d 966, 988 (Miss. 2006).  
*New Jersey:* City of Ocean City v. Maffucci, 740 A.2d 630 (N.J. 1999).  
*North Carolina:* Carolina Beach Fishing Pier, Inc. v. Town of Carolina Beach, 177 S.E.2d 513, 517 (N.C. 1970).  
*Rhode Island:* Nugent v. Vallone, 161 A.2d 802, 805 (R.I. 1960).  
*South Carolina:* Hilton Head Plantation Property Owners Ass’n v. Donald, 651 S.E. 2d 614, 617 (S.C. App. 2007).  
*Texas:* 31 TEX. ADMIN CODE § 19.2 (2010); Natland Corp. v. Baker’s Port, Inc., 865 S.W.2d 52 (Tex. 1993); Lorino v. Crawford Packing Co., 175 S.W. 2d 410, 414 (Tex. 1943).  
*Washington:* United States v. Milner, 583 F.3d 1174, 1187 (9th Cir. 2009).

State	Special Rules for Beach Nourishment?	Special Rules for Armoring?
Alaska	Follows avulsion	
California	Yes. Accretion only extends to "natural" events, but analysis is complicated (natural movement of artificially placed spoil is "natural").	Coastal Act 30235 allows the construction of seawalls only to protect existing structures and public beaches when the seawall will mitigate the adverse impacts of limited sand supply.
Connecticut		Shoreline erosion control structures require approval from local zoning authority under the State Coastal Management Act. State DEP can issue removal orders if seawalls are found to be below high tide line.
Delaware		Construction of beach protection structures requires permit from the state if the structure is seaward of the statutorily defined building line. Beach Protection Act Regulations 4.03
Florida	Yes. Under Beach and Shore Preservation Act, state sets an erosion control line at the start of nourishment projects and this is the new property line.	Requires permit under Beach and Shore preservation act for armoring below MHW. Seawalls may not be constructed within 50' of MHW
Georgia		Permits are required for all building and shoreline engineering GA Code 12-5-239.
Hawaii		Statute prohibits construction of retaining walls or any other use of accreted lands that may interfere with the future natural course of the beach. Permits required for construction in Special Management Areas under the state Coastal Zone Management Act.
Maryland	No. Follow rules of avulsion for all sudden shoreline changes. State does not gain title in nourishment, particularly when it ensures nourishment doesn't change property rights	State Living Shoreline Act requires that non-structural stabilization measures be used unless property owner can demonstrate that only a seawall will protect property.
Massachusetts	Dry land created by the state belongs to the state.	
Mississippi	Miss. Code. Ann. § 29-15 recognizes avulsion if lands are brought under tidal influence by avulsion still belong to the fee holder.	Boards of Supervisors have statutory authority and duty to issue bonds and erect seawalls or other protection structures when public roads are threatened.
New Jersey	Land lost by avulsion still vests in the original fee holder, but land gained by avulsion belongs to the state. Nourished beaches belong to the state. State has a	Seawalls can only be built if essential to protect existing structures or public recreation areas, must not cause adverse environmental impacts, and must be consistent with the

	Shore Protection Master Plan, and statute establishes a Shore Protection Fund for protection, stabilization, restoration, and maintenance of the shore.	Shore Protection Master Plan. State regulations express a presence for non-structural shoreline protection.
North Carolina	By statute all land created through nourishment activities passes in fee to the town. A landowner may have the benefit of title from nourishment activities when he does the filling himself under state approved procedures and it is to regain land previously lost.	
Oregon	Recognizes avulsion	Oregon Beach Bill 390.605 requires a permit for any development on lands covered by the beach and dune overlay zone. Seawalls are not permitted in this area.
South Carolina	Artificial additions of sand that fill tidelands belong to the public trust, not the littoral owner.	
Texas	Beach nourishment activities governed by state statute under CEPR. Title to nourished beach is unclear because of recent <i>Severance</i> holding, which adopts avulsion only for vegetation line. Appears that under <i>Severance</i> title to nourished beaches likely belongs to littoral owner.	Armoring is forbidden under the Open Beaches Act. There is no right to armor to protect property.
Washington		State Shoreline Management Act requires that local plans contain measures that permit the protection of single-family residences. However, local plans may require a showing that the bulkhead or revetment is the only way to protect the property before permitting it. Ninth Circuit has held that U.S can maintain a trespass action for seawalls that come to intersect MHW.****

\*\*\*\* Sources used in constructing the above Table:

*California*: CAL. PUB. RES. CODE §§ 30235, 30253 (2010); State Lands Comm'n v. Super. Ct., 900 P.2d 648 (Cal. 1995).

*Connecticut*: CONN. GEN. STAT. § 22a-109 (2010).

*Hawaii*: HAW. REV. STAT. § 183-45 (2010).

*Maryland*: H.B. 973, Gen. Assemb., 2008 Sess. (Md. 2008).

*Mississippi*: MISS. CODE ANN. § 65-33-1 (2010); Sec'y of State v. Wiesenberg, 633 So.2d 983 (Miss. 1994).

*New Jersey*: N.J. STAT. ANN. § 13:19-16.1(b) (2010); N.J. ADMIN. CODE § 7:7E-7.11 (2010); City of Long Branch v. Liu, 833 A.2d 106 (N.J. 2003).

*North Carolina*: N.C. GEN. STAT. § 146-6 (2010).

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*South Carolina:* Hilton Head Plantation Prop. Owners v. Donald, 651 S.E.2d 614 (S.C. 2007).

*Texas:* TEX. NAT. RES. CODE §§ 33.601-33.613 and 61 (2009); Severance v. Patterson, No. 09-0387 at 22-25 (Tex. 2010); Brannan v. State, No. 01-08-00179-CV, 2010 WL 375921 (Tex. App. Feb. 4, 2010).

*Washington:* WASH. REV. CODE § 90.58.100(6); United States v. Milner, 583 F.3d 1174, 1191 (9th Cir. 2009); Luhrs v. Whatcom County, 152 Wash. App. 1023, 2009 WL 29925856 at \*3 (2009).