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Combatting Sea Level Rise in Southern California: How Local Governments can Seize Adaptation Opportunities while Minimizing Legal Risk

Megan M. Herzog and Sean B. Hecht***

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I. Introduction

The world-famous shoreline that has long defined the culture of Southern California is changing. Research projects sea levels on the Southern California coast will rise five to twenty-four inches above 2000 levels by 2050.¹ Rising sea levels threaten thousands of coastal residents and billions of dollars of coastal property with increased risk of flooding, storm damage, shoreline erosion, saltwater intrusion, and wetland loss.² The impacts of sea level rise will be acute along the densely developed Southern California Bight, which spans from Point Conception to the Mexico border. The Southern California coastal zone includes portions of five counties (Santa Barbara, Ventura, Los Angeles, Orange, and San Diego) and thirty-nine municipalities.³ The region boasts two of the largest

1. NAT'L RESEARCH COUNCIL COMM. ON SEA LEVEL RISE IN CAL., ORE., & WASH., SEA LEVEL RISE FOR THE COASTS OF CALIFORNIA, OREGON, AND WASHINGTON: PAST, PRESENT, AND FUTURE 108 (2012), *available at* http://www.nap.edu/catalog.php?record_id=13389 [hereinafter NAT'L RESEARCH COUNCIL].

2. *See* INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2007: SYNTHESIS REPORT, CONTRIBUTION OF WORKING GROUPS I, II AND III TO THE FOURTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE 48-53 (2007), *available at* http://www.ipcc.ch/publications_and_data/publications_ipcc_fourth_assessment_report_synthesis_report.htm.

3. Although the four counties of Kern, San Bernardino, Riverside, and Imperial are also commonly understood to be located within Southern California, these counties are not in the coastal zone and therefore are outside the scope of this article. Southern California's thirty-nine coastal zone municipalities include (from north to south): Guadalupe, Goleta, Santa Barbara, Carpinteria, San Buenaventura (City of Ventura), Oxnard, Port Hueneme, Malibu, Los Angeles, Santa Monica, El Segundo, Manhattan Beach, Hermosa Beach, Redondo Beach, Torrance, Palos Verdes Estates, Rancho Palos Verdes, Long Beach, Avalon (on Catalina Island), Seal Beach, Huntington Beach, Costa Mesa, Newport Beach, Irvine City, Laguna Beach, Aliso Viejo, Laguna Niguel, Dana Point, San Clemente, Oceanside, Carlsbad, Encinitas, Solana Beach, Del Mar, San Diego, Coronado, National City, Chula Vista,

metropolitan areas in the United States, Los Angeles and San Diego,⁴ and the country's two busiest seaports at Los Angeles and Long Beach.⁵ The coastline also supports thousands of private homes, vast amounts of public infrastructure, coastal power plants, iconic sandy beaches, piers, harbors, and wetlands. Historically, public debates over coastal access, conservation, and development in this region have been fierce,⁶ but preparing its urbanized coast for sea level rise undoubtedly will be Southern California's greatest land use challenge. Adaptation choices inevitably will result in tradeoffs between the preservation of coastal ecosystems, which must migrate landward to survive inundation, and the protection of coastal development.

As the primary coastal land use decisionmakers, Southern California's local governments will make choices that will shape the region's resilience to sea level rise. Southern California's history of tense coastal land use battles suggests that sea level rise planning in the region will be politicized and litigious. To implement adaptation plans effectively, local governments must be aware of how the current legal landscape interacts with sea level rise adaptation strategies. First, local governments must understand the ways law enhances their adaptive capacity by providing them with the necessary legal authority to take certain actions to adapt to changing sea level conditions. Second, local governments must appreciate legal risks—that is, potential legal limitations on tools for building adaptive capacity, as well as potential liability to private parties for harms related to the adverse effects both of adaptation actions and sea level rise itself.

This article identifies how local governments can harness legal doctrines to support aggressive, innovative strategies to achieve successful sea level rise adaptation outcomes for Southern California while minimizing

and Imperial Beach. See CAL. COASTAL COMM'N, SUMMARY OF LCP PROGRAM ACTIVITY IN FY 11-12 (2012), available at http://www.coastal.ca.gov/la/docs/lcp/FY11_12_LCPStatusSummaryChart_FINAL.pdf. The coastal counties have jurisdiction over unincorporated lands in the coastal zone.

4. *Largest Urbanized Areas with Selected Cities and Metro Areas*, U.S. CENSUS BUREAU, <http://www.census.gov/dataviz/visualizations/026/> (last visited Mar. 19, 2013) (reporting that Los Angeles and San Diego are the second and fifteenth largest urban areas in the nation, respectively).

5. *About the Port*, PORT OF LOS ANGELES, <http://www.portoflosangeles.org/about/profile.asp> (last visited Mar. 19, 2013); *Facts at a Glance*, PORT OF LONG BEACH, <http://www.polb.com/about/facts.asp> (last visited Mar. 15, 2013).

6. See, e.g., *City of Malibu v. Cal. Coastal Comm'n*, 206 Cal. App. 4th 549 (2012); Tony Perry, *In La Jolla People-Versus-Seals Battle, Tide Has Yet to Turn*, L.A. TIMES, Jan. 8, 2012, available at <http://articles.latimes.com/2012/jan/08/local/la-me-seals-20120109>; Kenneth R. Weiss and Amanda Covarrubias, *Battle Over Broad Beach Takes New Turn, With Earthmoving Equipment*, L.A. TIMES, June 9, 2005, available at <http://articles.latimes.com/2005/jun/09/local/me-beach9>.

legal risk. We focus primarily on the following four categories of legal issues that may be implicated as Southern California localities plan for the impacts of sea level rise:

- 1) the **California Coastal Act**, which includes a variety of legal authorities that allow local governments to incorporate consideration of sea level rise into coastal planning, development, regulation, and permitting;
- 2) the **public trust doctrine**, which places a duty upon the local trustees to manage coastal resources, including tidelands and surface waters, for the benefit of the state's citizens;
- 3) the **constitutional takings doctrine**, under which certain adaptation strategies that impair private property rights may be vulnerable to an adverse judicial ruling; and
- 4) the **California Environmental Quality Act (CEQA)**, which outlines extensive requirements for conducting environmental impact analyses for general plan updates and new development, including private development that requires discretionary governmental approval.

We divide our analysis of these legal doctrines into their potential interactions with two general categories of coastal land uses: 1) private development, including both existing land uses and future development that will be subjected to adverse impacts; and 2) critical municipal infrastructure like roads, power plants, and ports. In preparing for sea level rise, local planners must evaluate the suitability of different adaptation strategies to local land use planning objectives. Sea level rise adaptation tools generally fall into the categories of protection, accommodation, and retreat. Local governments might seek to *protect* densely developed areas or critical infrastructure with coastal armoring structures. In less-developed areas, government may focus on enhancing the resilience of structures to *accommodate* projected sea level rise impacts. Where the need to preserve sensitive coastal resources is paramount, local governments may opt to *retreat* from rising tides.⁷ In addition, it will be important for local governments to consider that some adaptation tools could be more legally risky than others. We broadly outline likely sea level rise impacts in Southern California, and evaluate the risks and opportunities of potential

⁷ See generally J. Peter Byrne, *The Cathedral Engulfed: Sea level Rise, Property Rights, and Time*, 73 LA. L. REV. 69, 85 (2012); Jessica Grannis et al., *Coastal Management in the Face of Rising Seas: Legal Strategies for Connecticut*, 5 SEA GRANT L. & POL'Y J. 59, 61 (2012).

adaptation strategies that local governments could deploy. Overall, we demonstrate how Southern California local governments can harness their existing regulatory authority to support aggressive sea level rise adaptation strategies and, through proactive planning and smart decisionmaking, mitigate potential legal liabilities.

We do not claim to provide a comprehensive or detailed picture of all law and policy issues related to sea level rise in Southern California. Additionally, we recognize that decisions about adaptation actions reflect economic, scientific, and other policy judgments that go beyond the scope of this piece. At this early stage in California's sea level rise planning efforts, we hope to advance the dialogue about potential adaptation strategies beyond generalities by focusing on a discrete set of policy issues in one geographical region. Because Southern California is the site of a spectrum of coastal development types and adaptation challenges, the region can serve as a valuable microcosm for examining the interaction between laws and sea level rise adaptation tools. Thus, many of the topics discussed here may have statewide and even national application.

II. Background: Sea Level Rise and the California Coast

Sea level rise is a consequence of a warming planet. Anthropogenic greenhouse gas emissions from sources like power plants, motor vehicles, and manufacturing processes accumulate in the earth's atmosphere and trap heat, contributing to a rise in the mean global temperature. The increased temperature causes ocean water to expand thermally and land ice to melt into the ocean, resulting in the phenomenon of sea level rise.⁸ In its 2007 Synthesis Report, the Intergovernmental Panel on Climate Change projected the pace of sea level rise to increase over the coming decades, and cautioned that even if anthropogenic greenhouse gas emissions are stabilized, thermal expansion of the ocean would cause sea levels to continue to rise for centuries into the future.⁹ Thus, a changing coast is unavoidable. Global sea level rise will increase the risk of coastal flooding, tidal inundation, storm damage, shoreline erosion, saltwater intrusion, and wetland loss, among other impacts.¹⁰

In 2008, in recognition of the threats posed by sea level rise, former California Governor Arnold Schwarzenegger signed Executive Order S-13-2008, which called for the development of a statewide Climate Adaptation Strategy and ordered state agencies to plan for sea level rise impacts.¹¹

8. NAT'L RESEARCH COUNCIL, *supra* note 1, at 9.

9. INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *supra* note 2, at 46.

10. *Id.* at 48-53. See also NAT'L RESEARCH COUNCIL, *supra* note 1, at 9.

11. Exec. Order No. S-13-2008 (Cal. 2008), available at <http://gov.ca.gov/news.php?id=11036> (directing state agencies *inter alia* to "consider a range of sea level rise scenarios for the years 2050 and 2100 in order to assess project

California completed its Climate Adaptation Strategy in 2009 and is currently undertaking an update, expected for public release in early 2013.¹² In addition to the Climate Adaptation Strategy, several California agencies partnered with Oregon, Washington, and federal agencies through the West Coast Governors' Alliance for Ocean Health to sponsor a 2012 National Research Council study of sea level rise along the U.S. Pacific Coast.¹³ Together, the projections of the Climate Adaptation Strategy and National Research Council study present a sobering picture of potential sea level rise impacts in California.

The Climate Adaptation Strategy notes that sea levels have already risen as much as seven inches along the California Coast over the past century, and estimates that almost half a million Californians living in coastal and bay areas will be impacted by future sea level rise.¹⁴ The National Research Council study reports that sea levels south of California's Cape Mendocino are expected to rise 4.7 to 24 inches (12 to 61 centimeters) above 2000 levels by 2050 and 16.5 to 65.7 inches (42 to 167 centimeters) by 2100.¹⁵ Sea level rise in California will exacerbate coastal flooding and storm surges in low-lying areas, causing tidal damages to reach inland areas that previously have not been exposed to tidal floods. Some potential impacts of flooding include property damage, physical injury, emotional trauma, higher insurance costs, damage to public infrastructure, and pollution events.¹⁶ Few physical, economic, or social vulnerability assessments of sea level rise have been conducted to date in the Southern California region.¹⁷ As local governments begin to conduct such assessments, the likely regional impacts of sea level rise—and thus, the potential legal ramifications of

vulnerability and, to the extent feasible, reduce expected risks and increase resiliency to sea level rise . . .”).

12. CAL. NATURAL RESOURCES AGENCY, 2009 CALIFORNIA CLIMATE ADAPTATION STRATEGY (2009), *available at* http://resources.ca.gov/climate_adaptation/docs/Statewide_Adaptation_Strategy.pdf; Cal. Natural Resources Agency, *California Climate Adaptation Strategy*, CALIFORNIA CLIMATE CHANGE PORTAL, <http://www.climatechange.ca.gov/adaptation/strategy/index.html> (last visited Mar. 19, 2013).

13. NAT'L RESEARCH COUNCIL, *supra* note 1.

14. CAL. NATURAL RESOURCES AGENCY, *supra* note 12, at 3.

15. NAT'L RESEARCH COUNCIL, *supra* note 1, at 108. Specifically, the National Research Council study projects sea levels off the coast of the City of Los Angeles to rise 5 to 24 inches (12.7 to 60.8 centimeters) above 2000 levels by 2050 and 17.4 to 65.6 inches (44.2 to 166.5 centimeters) by 2100. *Id.* at 96, tbl.5.3. Cf. CAL. NATURAL RESOURCES AGENCY, *supra* note 12, at 65 (incorporating a projection of twenty to fifty-five inches of sea level rise into the statewide Climate Adaptation Strategy, “as it was the best available science at the time of the 2009 impacts assessment”).

16. CAL. NATURAL RESOURCES AGENCY, *supra* note 12, at 36, 68-69.

17. *See infra* text accompanying notes 28-34.

those impacts—will become clearer. It should also be noted that sea level rise projections are characterized by substantial uncertainty.¹⁸ Moreover, while sea level rise is likely to exacerbate the severity and frequency of avulsive events, such as inundation from storm surges, these events and their impacts are difficult to predict.¹⁹ The uncertainty and unpredictability of sea level rise impacts compound public entities' adaptation planning challenges.

To address the issue of uncertainty, in 2010, the Sea level Rise Task Force of the Coastal and Ocean Working Group of the California Climate Action Team (CO-CAT)²⁰ developed the State of California Sea Level Rise Interim Guidance Document, which guides state entities on how to incorporate sea level rise projections into planning and decisionmaking.²¹ The Group also has issued adaptation recommendations. In general, the Coastal and Ocean Working Group encourages all levels of government to incentivize property owners in high-risk areas to relocate and limit future development; cluster new development in low-risk areas; and create additional buffers and setbacks to minimize future risks.²² The Coastal and Ocean Working Group specifically encourages local governments to consider: setbacks, buffer areas, clustered development, rebuilding restrictions, building code amendments, relocation incentives, rolling development restrictions, engineering solutions, and General Plan amendments as potential adaptation strategies.²³ In March 2011, the California Ocean Protection Council adopted a nonbinding resolution encouraging all state agencies to adhere to the Sea Level Rise Interim Guidance Document and to incorporate sea level rise considerations into

18. NAT'L RESEARCH COUNCIL, *supra* note 1, at 101. See also CAL. COASTAL COMM'N, OVERVIEW OF SEA LEVEL RISE AND SOME IMPLICATIONS FOR CALIFORNIA 3 (2001), available at <http://www.coastal.ca.gov/climate/SeaLevelRise2001.pdf> (acknowledging the uncertainty arising from the fact that the effects of sea level rise in California have been counterbalanced to some extent by uplift of land and tectonic forces).

19. NAT'L RESEARCH COUNCIL, *supra* note 1, at 59-64.

20. The Coastal and Ocean Working Group is a collaboration of state agencies responsible for coastal resources, including, among others, the Ocean Protection Council, California Coastal Conservancy, Coastal Commission, State Lands Commission, Department of Fish and Wildlife, State Parks, and Bay Conservation and Development Commission. CAL. NATURAL RESOURCES AGENCY, *supra* note 12, at 72.

21. SEA LEVEL RISE TASK FORCE, COASTAL & OCEAN WORKING GROUP, CAL. CLIMATE ACTION TEAM, CALIFORNIA SEA LEVEL RISE INTERIM GUIDANCE DOCUMENT (2010), available at http://www.slc.ca.gov/Sea_Level_Rise/SLR_Guidance_Document_SAT_Responses.pdf

22. CAL. NATURAL RESOURCES AGENCY, *supra* note 12, at 73.

23. *Id.* at 77.

decisionmaking.²⁴ Although the State of California currently does not require local governments to plan for sea level rise, the State has encouraged all local governments to incorporate sea level rise projections into planning and decisionmaking, and to consider potential adaptation strategies.²⁵ Additionally, the State incentivizes local planning activity through some state funding programs.²⁶ To support local adaptation planning processes, the California Emergency Management Agency and California Natural Resources Agency recently published a California Climate Adaptation Policy Guide targeted to local governments.²⁷

III. Planning for Sea Level Rise in Southern California

With encouragement from the state, some local governments in Southern California have initiated local sea level rise vulnerability assessment and adaptation planning processes. Southern California's largest city, Los Angeles, is coordinating a science-based, participatory process to respond to climate change called AdaptLA: Climate Change Adaptation Planning for a Coastal, Urban Metropolis. The City Adaptation Leadership team, in partnership with University of Southern California Sea Grant, the Los Angeles Regional Collaborative on Climate Action and Sustainability, ICLEI-Local Governments for Sustainability, and the Clinton Climate Initiative, is currently in the process of assessing the city's sea level rise vulnerability.²⁸ Southern California's second largest city, San Diego, has partnered with staff from surrounding local governments, public entities, academia, and nongovernmental organizations to develop a regional San Diego Bay Sea Level Rise Strategy.²⁹ The regional strategy, which San Diego

24. JULIETTE A. FINZI HART ET AL., RISING TO THE CHALLENGE: RESULTS OF THE 2011 CALIFORNIA COASTAL ADAPTATION NEEDS ASSESSMENT I (2012), *available at* http://www.usc.edu/org/seagrant/research/climateadaptsurvey/SurveyReport_FINAL_OnlinePDF.pdf.

25. CAL. EMERGENCY MGMT. AGENCY & CAL. NATURAL RESOURCES AGENCY, CALIFORNIA CLIMATE ADAPTATION POLICY GUIDE (2012), *available at* http://resources.ca.gov/climate_adaptation/docs/IAPG_Planning_for_Adaptive_Communities.pdf.

26. The State Coastal Conservancy, Strategic Growth Council, and Department of Water Resources require all entities applying for funds, including local governments, to conduct sea level rise vulnerability assessments. HART ET AL., *supra* note 24, at 1.

27. CAL. EMERGENCY MGMT. AGENCY & CAL. NATURAL RESOURCES AGENCY, *supra* note 25.

28. *AdaptLA: Climate Change Adaptation Planning for a Coastal, Urban Metropolis*, UNIVERSITY OF SOUTHERN CALIFORNIA SEA GRANT, <http://www.usc.edu/org/seagrant/research/adaptla.html> (last visited Mar. 15, 2013).

29. The Adaptation Strategy Steering Committee included staff from the cities of Chula Vista, Coronado, Imperial Beach, National City, and San Diego. DANIELLA

released in February 2012, includes a physical vulnerability assessment and adaptation recommendations.³⁰ The strategy complements adaptation planning efforts already underway at the City of San Diego and Port of San Diego, each of which is in the process of developing a Climate Mitigation and Adaptation Plan.³¹ Some smaller Southern California cities also are engaged in preparing for sea level rise. For instance, Santa Barbara³² and Newport Beach³³ have commissioned sea level rise vulnerability assessments, and Ventura has implemented an adaptation project at a popular surfing beach.³⁴ Many of Southern California's forty-four coastal county and municipal governments have not yet begun to think about sea level rise in a coordinated and targeted manner, however.

The first step in the sea level rise planning process is for Southern California local governments to conduct a vulnerability assessment to understand the magnitude of risks and the sensitivity of the planning area.³⁵ A thorough vulnerability assessment involves examining historical erosion and storm data, and modeling projected sea level rise impacts. Following the vulnerability assessment, a locality can conduct a risk assessment, which evaluates how expected sea level rise impacts will affect the people, development, infrastructure, and natural resources within the planning area.

HIRSCHFELD & BRIAN HOLLAND, ICLEI-LOCAL GOVERNMENTS FOR SUSTAINABILITY, SEA LEVEL RISE ADAPTATION STRATEGY FOR SAN DIEGO BAY (2012), *available at* <http://www.icleiusa.org/action-center/planning/san-diego-bay-sea-level-rise-adaptation-strategy>.

30. *Id.*

31. *Climate Mitigation and Adaptation Plan*, PORT OF SAN DIEGO, <http://www.portofsandiego.org/climate-mitigation-and-adaptation-plan.html> (last visited Mar. 15, 2013); *Climate Change Mitigation and Adaptation Plan*, ENVIRONMENTAL SERVICES DEPARTMENT, CITY OF SAN DIEGO, <http://www.sandiego.gov/environmental-services/sustainable/eestf.shtml> (last visited Mar. 15, 2013).

32. The Santa Barbara City Council adopted a City Climate Action Plan, including a sea level rise vulnerability study, in September 2012. GARY GRIGGS & NICOLE RUSSELL, CITY OF SANTA BARBARA SEA LEVEL RISE VULNERABILITY STUDY (2012), *available at* http://www.santabarbaraca.gov/Resident/Major_Planning_Efforts/Climate_Action_Plan/.

33. In 2010, Newport Beach commissioned a Harbor Area Management Plan that included a sea level rise vulnerability assessment. HARBOR AREA MANAGEMENT PLAN 56-61 (2010), *available at* <http://www.newportbeachca.gov/Modules/ShowDocument.aspx?documentid=9186>.

34. Nat'l Oceanic & Atmospheric Admin., *Managed Retreat*, OCEAN AND COASTAL RESOURCE MANAGEMENT, http://coastalmanagement.noaa.gov/initiatives/shoreline_ppr_retreat.html (last visited Mar. 15, 2013).

35. NICOLE RUSSELL & GARY GRIGGS, ADAPTING TO SEA LEVEL RISE: A GUIDE FOR CALIFORNIA'S COASTAL COMMUNITIES 10-11 (2012), *available at* <http://www.opc.ca.gov/2012/06/new-sea-level-rise-adaptation-guide-available/>.

The risk assessment should identify priority areas for adaptation actions, such as communities vulnerable to flooding or erosion.³⁶ Based upon the vulnerability and risk assessments, a local government can then develop an adaptation plan.³⁷ Adaptation planning will require Southern California local governments to articulate adaptation objectives for the planning area and evaluate the suitability of various sea level rise adaptation strategies to achieving local objectives in priority areas. For the purposes of adaptation planning, sea level rise adaptation strategies can be divided into three types: protection, accommodation, and retreat. These three types of strategies can be complementary, and governments can deploy them contemporaneously in different zones.³⁸

Protection strategies defend the location of development even as sea levels rise. Commonly, protection involves armoring the coast with hard-engineered shoreline stabilization structures like seawalls,³⁹ riprap,⁴⁰ or revetments.⁴¹ Protection can also involve “soft armoring,” which describes the use of natural stabilization structures, like sand or vegetation, to

36. *Id.* at 29

37. *Id.* at 32.

38. Byrne, *supra* note 7; JAMES G. TITUS, ROLLING EASEMENTS 1 (2011), *available at* <http://water.epa.gov/type/oceb/cre/upload/rollingeasementsprimer.pdf>.

39. A seawall (also called a bulkhead) is a vertical coastal stabilization structure that sits parallel to the shoreline. Seawalls are sometimes constructed flush against a cliff or bluff. They have vertical, stepped, or concave faces, and are made of a rigid material like concrete, steel, and/or wood. Most seawalls are approximately six feet thick. They are costly to construct but can last for decades. Rebecca Stamski, *The Impacts of Coastal Protection Structures in California's Monterey Bay National Marine Sanctuary* 3, 6-7, 14-15 (Marine Sanctuaries Conservation Series MSD-05-3, 2005), *available at* <http://aquaticcommons.org/2325/1/stamski.pdf>; GARY B. GRIGGS, KIKI PATSCH, & LAURET E. SAVOY, *LIVING WITH THE CHANGING CALIFORNIA COAST* 117 (2005).

40. Riprap describes large (one- to six-ton) rocks or pieces of concrete rubble that are deposited directly on a beach or cliff slope for coastal protection. In comparison to seawalls, riprap is less expensive but requires greater beach area. Riprap installations typically have a width to height ratio of 1.5:1 or 2:1; thus, riprap that is 20 feet high would stretch 40 feet across a beach. Stamski, *supra* note 39, at 3, 6-7, 13. Riprap is the most common type of coastal armoring in California because it does not require complicated engineering efforts and can be installed quickly in an emergency situation. GRIGGS, PATSCH, & SAVOY, *supra* note 39, at 112-13. Riprap may be placed in front of a seawall to enhance protection. *Id.* at 124.

41. A revetment is a more deliberately engineered version of riprap involving carefully stacked layers of rocks of different sizes. Typically, a revetment is deposited on a permeable cloth to minimize scour. GRIGGS, PATSCH, & SAVOY, *supra* note 39, at 114-15.

strengthen coastlines. It may be appropriate for local governments to establish protection zones in densely developed coastal areas where armoring is already present and ecosystems are in a degraded state. Protection also may be the appropriate strategy for areas with large pieces of critical municipal infrastructure, like power plants.⁴² Within protection zones, local governments can use regulatory tools to mitigate the adverse impacts of hard armoring.⁴³

Historically, property owners have most commonly turned to protection strategies to address the problems of coastal flooding and storm surges.⁴⁴ Approximately thirty-three percent of the coastline in Ventura, Los Angeles, Orange, and San Diego counties is already protected with hard armoring structures.⁴⁵ Most hard armoring in California was installed from 1978 to 2000, during a period of Pacific climate variability that was characterized by strong winter storm surges.⁴⁶ Although hard armoring can be effective at preventing flooding from damaging critical infrastructure and densely developed areas, hard structures have high economic, environmental, and social costs.⁴⁷ By preventing the natural landward migration of beaches and deflecting wave energy, hard armoring contributes to beach and wetland erosion. Erosion negatively impacts both ecosystem functions and the public's ability to access the coast.⁴⁸ Over time, the inundation and erosion related to sea level rise could cause dune, beach, and wetland ecosystems backed by hard armoring to disappear.⁴⁹ Hard armoring also interferes with the ability of coastal ecosystems to filter water, buffer coastal communities from storms, support fisheries, and provide

42. Grannis et al., *supra* note 7, at 74.

43. *Id.*

44. J. Peter Byrne & Jessica Grannis, *Coastal Retreat Measures*, in *THE LAW OF ADAPTATION TO CLIMATE CHANGE*, 267, 269 (Michael B. Gerrard & Katrina Fischer Kuh, eds. 2012).

45. RUSSELL & GRIGGS, *ADAPTING TO SEA LEVEL RISE: A GUIDE FOR CALIFORNIA'S COASTAL COMMUNITIES*, *supra* note 35, at 35.

46. Gary B. Griggs, *The Effects of Armoring Shorelines—The California Experience*, in *PUGET SOUND SHORELINES AND THE IMPACTS OF ARMORING—PROCEEDINGS OF A STATE OF THE SCIENCE WORKSHOP, MAY 2009* at 77 (Dethier H. Shipman et al. eds., 2010), *available at* <http://pubs.usgs.gov/sir/2010/5254/>.

47. JESSICA GRANNIS, *ADAPTATION TOOL KIT: SEA LEVEL RISE AND COASTAL LAND USE* 36, 38 (2011), *available at* http://www.georgetownclimate.org/sites/default/files/Adaptation_Tool_Kit_SLR.pdf.

48. *Id.* at 38; 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.* 534, 534 (2007).

49. Byrne & Grannis, *supra* note 44, at 269.

other valuable ecosystem services that would be costly for coastal communities to replace.⁵⁰ In addition to the environmental impacts, the visual impacts of a concrete coast are stark and may be offensive to local residents and beachgoers.⁵¹ As successive property owners armor the coast, hard armoring may lower property values in the larger community.⁵² Consequently, many governments are moving away from hard armoring as a primary sea level rise adaptation strategy.⁵³ Shoreline armoring is banned or severely restricted in Maine, Massachusetts, North Carolina, Oregon, Rhode Island, South Carolina, and Texas.⁵⁴ Instead, innovative governments are increasingly turning to soft armoring to protect development.

The term “soft armoring” covers a variety of techniques that use natural infrastructure, such as sand, gravel, dune grass, or wetlands, to strengthen coastlines. Soft armoring not only is more aesthetically pleasing than hard-engineered structures but also it can enhance coastal ecosystem services and protect recreational resources.⁵⁵ The primary drawback of soft armoring is that projects can be quite expensive.⁵⁶ The term “living shoreline” is popular in the Mid-Atlantic region to describe a variety of projects that incorporate natural habitat restoration or conservation, such as restoring a band of marsh habitat, into shoreline stabilization.⁵⁷ Projects incorporating living shoreline principles may be a superior alternative to hard armoring in

50. *Id.*

51. Griggs, *supra* note 46, at 78.

52. Warren Kriesel & Robert Friedman, *Coping With Coastal Erosion: Evidence for Community-Wide Impacts*, 71 *SHORE & BEACH* 19 (2003).

53. GRANNIS, *supra* note 47, at 37.

54. James F. O’Connell, *Shoreline Armoring Impacts and Management Along the Shores of Massachusetts and Kauai, Hawaii*, in *PUGET SOUND SHORELINES AND THE IMPACTS OF ARMORING—PROCEEDINGS OF A STATE OF THE SCIENCE WORKSHOP, MAY 2009*, *supra* note 46, at 65, 66.

55. Robert R.M. Verchick & Joel D. Scheraga, *Protecting the Coast*, in *THE LAW OF ADAPTATION TO CLIMATE CHANGE*, *supra* note 44, at 235, 250. Local governments should be aware that soft armoring is not wholly without negative environmental impacts, however; beach nourishment, for example, can disrupt sand habitats or introduce foreign species to beach environments. *See id.* at 251.

56. Byrne, *supra* note 7, at 93.

57. C.A. Currin, W.S. Chappell, & A. Deaton, *Developing Alternative Shoreline Armoring Strategies: The Living Shoreline Approach in North Carolina*, in *PUGET SOUND SHORELINES AND THE IMPACTS OF ARMORING—PROCEEDINGS OF A STATE OF THE SCIENCE WORKSHOP, MAY 2009*, *supra* note 46, at 91, 93, 95.

some circumstances, particularly in estuarine environments that are not subject to high-energy wave action.⁵⁸

Another form of soft armoring is beach nourishment (also called beach or sand replenishment), which involves the introduction of new sediment to an eroded beach.⁵⁹ The new sediment (typically sand) may be placed in a dune system above the shoreline, on the dry or wet sand area of the beach, or offshore as a sandbar. Over time, ocean waves and currents will redistribute the new sediment into a stable configuration along the shoreline—although this process may take several months or years.⁶⁰ Nourishment increases storm protection while concurrently increasing beach area for coastal access and recreation.⁶¹ In contrast to hard armoring, nourishment has been shown to increase property values for both beachfront and non-beachfront properties in a locality.⁶² Beach nourishment has been a common practice in Southern California dating back to the early twentieth century.⁶³ The region's beaches have been the recipients of hundreds of beach nourishment projects.⁶⁴ The California Coastal Sediment Management Workgroup estimates that, because of nourishment projects, there is little undiluted, "native" sand left on many Southern California beaches.⁶⁵

Accommodation strategies harness traditional zoning, building code, and flood protection code tools to increase development's resilience to sea level rise.⁶⁶ Accommodation strategies include rebuilding restrictions, impact fees, structure removal requirements, density restrictions, setback buffers, and freeboard requirements to protect coastal ecosystems and gradually

58. ELLEN HANAK & GEORGINA MORENO, CALIFORNIA COASTAL MANAGEMENT WITH A CHANGING CLIMATE 11 (2008), available at <http://www.ppic.org/main/publication.asp?i=853>.

59. CAL. DEP'T OF BOATING & WATERWAYS & STATE COASTAL CONSERVANCY, CALIFORNIA BEACH RESTORATION STUDY 4-1 (2002), available at <http://www.dbw.ca.gov/Environmental/BeachReport.aspx>.

60. *Id.* at 4-3, 4-4.

61. *Id.* at 4-1.

62. Kriesel & Friedman, *supra* note 52.

63. CAL. COASTAL SEDIMENT MGMT. WORKGROUP, BEACH NOURISHMENT PROJECT PERFORMANCE & SEDIMENT CHARACTERISTICS, RESULTS FROM CSMW TASK 3, 2 available at http://dbw.ca.gov/csmw/beach_nourishment.aspx.

64. *Id.* For a list of beach nourishment projects in California, see TABLE 2 - *Beach Nourishment Projects in California* (modified from Coyne, 2000), CAL. COASTAL SEDIMENT MGMT. WORKGROUP, <http://dbw.ca.gov/csmw/PDF/TABLE2TASK3CSMW.pdf> (last visited Mar. 19, 2013).

65. CAL. COASTAL SEDIMENT MGMT. WORKGROUP, *supra* note 63, at 4.

66. Byrne, *supra* note 7, at 85.

reduce development.⁶⁷ An accommodation strategy is most appropriate for residential and commercial areas that can sustain additional development as long as that development is designed for resilience.⁶⁸ Within an accommodation zone, a local government may seek to shape development into structures that are smaller, more easily relocated, and designed to mitigate collateral damage in the event of a destructive storm.⁶⁹ Accommodation strategies are typically the easiest and quickest adaptation strategies for local governments to deploy because they harness familiar land use tools.⁷⁰

Retreat strategies channel new development out of vulnerable areas while allowing existing development to be relocated, demolished, or inundated by the rising sea.⁷¹ A retreat strategy is appropriate where a local government seeks to preserve the recreational benefits and ecosystem services provided by beaches, dunes, and wetlands.⁷² Because hard armoring structures prevent the natural inland migration of coastal ecosystems, restricting hard armoring is a crucial retreat zone strategy.⁷³ The City of Ventura has implemented a retreat strategy at Surfer's Point, where erosion threatened a popular California State Park bike path. The City of Ventura could have installed a seawall to protect the bike path, but the seawall would have destroyed a famous surf break. Instead, the Ventura City Council developed a managed retreat plan to relocate the bike path sixty feet inland and restore the natural beach habitat seaward of the path.⁷⁴

Inland relocation need not occur immediately in all retreat zones, however. Retreat-based tools include rolling development restrictions (often called "rolling easements").⁷⁵ The term "rolling development restriction" refers to a collection of land use policies, easements, and permit conditions that shape or modify development to prevent it from interfering with the natural landward migration of the shoreline as sea levels rise.⁷⁶ Put simply, rolling development restrictions are traditional land use restrictions

67. Byrne & Grannis, *supra* note 44, 274; GRANNIS, *supra* note 47, at 3, tbl.1 & 30; Grannis et al., *supra* note 7, at 74.

68. Grannis et al., *supra* note 7, at 74.

69. *Id.* at 75.

70. *Id.* at 79.

71. Byrne & Grannis, *supra* note 44, at 268-69.

72. Grannis et al., *supra* note 7, at 76.

73. *See* Grannis et al., *supra* note 7, at 74.

74. Nat'l Oceanic & Atmospheric Admin., *Managed Retreat*, OCEAN AND COASTAL RESOURCE MANAGEMENT, http://coastalmanagement.noaa.gov/initiatives/shoreline_ppr_retreat.html (last visited Mar. 15, 2013).

75. Byrne, *supra* note 7, at 109; *see generally* TITUS, *supra* note 38.

76. Byrne, *supra* note 7, at 109; GRANNIS, *supra* note 47, at 41.

tied to the position of the mean high tideline (or other dynamic coastal feature). As the mean high tideline migrates inland, the development restriction “rolls” inland with it. Thus, rolling development restrictions will not restrict a property owner’s use of her property until sea levels rise to a point where the property is threatened.⁷⁷ Notably, the California Climate Adaptation Strategy explicitly encourages local governments to consider rolling development restrictions as a climate adaptation strategy.⁷⁸

Throughout the adaptation planning process, it will be important for local governments to remain aware of how legal principles such as the public trust doctrine, the constitutional takings doctrine, coastal zoning, and environmental impact assessment processes interact with potential adaptation choices. We introduce these concepts in the following subsections.

A. Public Trust Doctrine

Rolling development restrictions and other retreat-based adaptation strategies are rooted in the public trust doctrine, which developed from ancient common law principles and Roman law notions of public property.⁷⁹ Under English common law, the public trust doctrine provided that all navigable waterways and submerged tidelands were held in trust by the sovereign for the people to use for commerce, navigation, and fishing.⁸⁰ Following the American Revolution, each original U.S. state assumed the British sovereign’s trusteeship over traditional public trust resources, including tidelands. Each state subsequently admitted to the United States, including California upon admission to the union in 1850, assumed equivalent public trust rights and responsibilities under the equal-footing doctrine.⁸¹ In California, the public trust doctrine places a duty upon the state to manage coastal resources, including tidelands and surface waters,

77. Byrne, *supra* note 7, at 109.

78. CAL. NATURAL RESOURCES AGENCY, *supra* note 12, at 77.

79. CAL. STATE LANDS COMM’N, THE PUBLIC TRUST DOCTRINE 1 (2001), *available at* http://www.slc.ca.gov/Policy_Statements/Public_Trust/Public_Trust_Doctrine.pdf.

80. See *Illinois Central R.R. Co. v. Illinois*, 146 U.S. 387, 452 (1892) (holding “[t]hat the state holds title to soils under tidewater by the common law. . . . in trust for the people of the state, that they may enjoy the navigation of the waters, carry on commerce over them, and have liberty of fishing therein, freed from the obstruction or interference of private parties.”). See also CAL. STATE LANDS COMM’N, THE PUBLIC TRUST DOCTRINE, *supra* note 79, at 1-2 (citing *Colberg, Inc. v. State of California ex rel. Dep’t Pub. Works*, 67 Cal. 2d 408, 416 (1967)).

81. CAL. STATE LANDS COMM’N, THE PUBLIC TRUST DOCTRINE, *supra* note 79, at 2 (citing *Pollard’s Lessee v. Hagen*, 44 U.S. 212, 228-29 (1845)). See also *Martin v. Waddell*, 41 U.S. 367 (1842).

up to the mean high tideline⁸² for the benefit of the state's citizens.⁸³ Over time, courts have interpreted and expanded the public trust doctrine. In its modern application in California, citizens' protected uses of trust lands and waters have expanded beyond fishing, navigation, and commerce to include water-oriented recreation, scientific study, open space, and environmental protection.⁸⁴

The California Constitution and the California Coastal Act of 1976⁸⁵ (Coastal Act) supplement and reinforce the public trust doctrine, both with respect to particular trust values and uses, and more generally. The California Constitution's Declaration of Rights states, "The people shall have the right to fish upon and from the public lands of the State and in the waters thereof, . . . and no land owned by the State shall ever be sold or transferred without reserving in the people the absolute right to fish thereupon"⁸⁶ Additionally, Article X of the California Constitution prohibits the state from selling or granting certain tidelands to private parties,⁸⁷ and prohibits private parties from excluding the public from waterways, "so that access to the navigable waters of this State shall be always attainable for the people thereof."⁸⁸ The Coastal Act references and expands upon Article X. Section 30210 of the Coastal Act guarantees that "maximum access . . . and recreational opportunities shall be provided for all the people consistent with public safety needs and the need to protect public rights, rights of private property owners, and natural resource areas from overuse." Section 30211 provides that "[d]evelopment shall not interfere with the public's right of access to the sea . . . including, but not limited to, the use of dry sand and rocky coastal beaches"

Together, the common law, caselaw, the California Constitution, and the Coastal Act have developed a robust public trust doctrine in California. These sources have clarified that trustees' public trust responsibilities follow

82. CAL. CIV. CODE § 670 (asserting that the state's jurisdiction over tidelands extends landward to the ordinary high water mark). *See also* *Borax Consol., Ltd. v. Los Angeles* 296 U.S. 10, 26-27 (1935) (finding that the mean high tideline is the average height of high waters).

83. *State of California ex rel. State Lands Comm'n v. Superior Court*, 11 Cal. 4th 50, 63 (1995) ("[T]idelands . . . are owned by the state in trust for the public.").

84. *Marks v. Whitney*, 6 Cal. 3d 251 (1971). *See also* CAL. STATE LANDS COMM'N, PUBLIC TRUST POLICY 1-2 (2001), available at http://www.slc.ca.gov/Policy_Statements/Public_Trust/Public_Trust_Policy.pdf.

85. CAL. PUB. RES. CODE §§ 3000-30900 (West 2012).

86. CAL. CONST. art. I, § 25.

87. *Id.* art. X, § 3.

88. *Id.* art. X, § 4.

the ambulatory mean high tideline as it ebbs and flows.⁸⁹ On a relatively flat beach, each centimeter of sea level rise will result in the mean high tideline migrating 40 centimeters inland.⁹⁰ In the context of a rising sea, the public trust doctrine should be applied to recognize the public's reversionary trust interest in privately owned land that becomes inundated as sea levels rise.⁹¹

B. Takings Doctrine

In addition to evaluating the suitability of a particular adaptation strategy to the local area and local adaptation goals, Southern California local governments should be aware of the possibility that a property owner may challenge an adaptation strategy as an unconstitutional "taking" of property without just compensation (otherwise known as inverse condemnation). Under the Takings Clause of the Fifth Amendment to the U.S. Constitution, the federal or a state government may not "take," or seize, private property for public use without providing the property owner with just compensation.⁹² Article I, section 19 of the California Constitution contains an analogous requirement.⁹³

A classically cited example of eminent domain is condemning a private lot in order to construct a highway. Government-caused damage to private property also may amount to a taking. The takings prohibition not only covers "'direct appropriation' of property,"⁹⁴ however, but also extends to land use regulation that "goes too far."⁹⁵ According to the U.S. Supreme

89. See *Lechuza Villas West v. Cal. Coastal Comm'n*, 60 Cal. App. 4th 218, 235 (1997), *cert. denied*, 525 U.S. 868 (1998) (holding that the mean high tideline is ambulatory and moves as the coast erodes).

90. CAL. COASTAL COMM'N, STAFF RPT. W23B (App. No. 4-11-026) at 13 (Apr. 23, 2012), available at <http://documents.coastal.ca.gov/reports/2012/5/W23b-5-2012.pdf>.

91. Caldwell & Segall, *supra* note 48, at 552-55. Accord WILL TRAVIS & TIM EICHENBERG, USING THE PUBLIC TRUST DOCTRINE TO ADAPT TO CLIMATE CHANGE IN SAN FRANCISCO BAY 13 (S.F. Bay Conservation & Development Comm'n Staff Rpt., Feb. 27, 2009) (declaring that "[s]ea level rise will increase state ownership rights."); A REPORT ON SEA LEVEL RISE PREPAREDNESS 25 (Cal. State Lands Comm'n Staff Rpt., Dec. 17, 2009) ("[C]oastal boundaries and the State's sovereign ownership should continue to move with ever shifting sands and seas.").

92. CONST. amend. 5 ("No person shall . . . be deprived of life, liberty, or property, without due process of law; nor shall private property be taken for public use, without just compensation.").

93. CAL. CONST. art. I, § 19(a) ("Private property may be taken or damaged for a public use and only when just compensation . . . has first been paid . . .").

94. *Lucas v. S.C. Coastal Council*, 505 U.S. 1003, 1014 (1992) (quoting *Legal Tender Cases*, 12 Wall. 457, 551 (1871)).

95. *Id.* (quoting *Pennsylvania Coal Co. v. Mahon*, 43 S. Ct. 158, 160 (1922)).

Court, prohibiting overly burdensome regulations as regulatory takings “bar[s] Government from forcing some people alone to bear public burdens which, in all fairness and justice, should be borne by the public as a whole.”⁹⁶ The California Constitution has delegated local governments broad police powers to regulate on behalf of the public health, safety, and welfare.⁹⁷ Although private land use clearly is subject to local governments’ police powers,⁹⁸ under the regulatory takings doctrine, a land use regulation may extend beyond the proper boundaries of police powers to the point of becoming an unconstitutional taking. The U.S. Supreme Court has provided no bright-line rule establishing when exactly a regulation “goes too far,” but five key cases have helped to elucidate the contours of the regulatory takings principle.

The clearest case of a regulatory taking is a physical occupation of private property. Under *Loretto v. Teleprompter Manhattan*,⁹⁹ any regulation that results in an involuntary, permanent, and physical occupation of private property amounts to a “per se” taking that must be compensated. In *Loretto*, a property owner challenged a state law that authorized a cable company to install cable television wires on her property and prohibited her from receiving payment from the cable company. The U.S. Supreme Court held that the wires, no matter how small, and assuming that their installation furthered a public purpose, amounted to a permanent, physical invasion, and thus a taking.¹⁰⁰

*Lucas v. South Carolina Coastal Council*¹⁰¹ confirmed that any regulation depriving a property owner of all economically beneficial use of her property is functionally equivalent to a per se taking and must be compensated, unless the regulation merely codifies a preexisting limitation on the owner’s use of her property. In *Lucas*, a property owner purchased coastal property with the intent of constructing a home. Subsequent to his purchase, the state passed a coastal protection law that denied him the right to construct a home on his property. The U.S. Supreme Court held that a restriction totally prohibiting economically beneficial use of a property automatically constitutes a taking, unless the restriction regulation codifies “background principles” of law that would have imposed the same restriction even in the absence of the regulation.¹⁰² Note that a regulation can amount to a total

96. *Armstrong v. United States*, 364 U.S. 40, 49 (1960).

97. CAL. CONST. art. XI, § 7.

98. BILL HIGGINS, INST. FOR LOCAL GOVT., REGULATORY TAKINGS AND LAND USE REGULATION: A PRIMER FOR PUBLIC AGENCY STAFF 6 (2006).

99. *Loretto v. Teleprompter Manhattan CATV Corp.*, 458 U.S. 419 (1982).

100. *Id.*

101. *Lucas v. S.C. Coastal Council*, 505 U.S. 1003 (1992).

102. *Id.* at 1022-23.

taking only where an owner is deprived of the entire property value (i.e., 100 percent).¹⁰³

In the case of a regulation that results in only a partial diminution in property value, the legal analysis to determine whether a taking has occurred is less clear. Pursuant to *Penn Central Transportation v. City of New York*,¹⁰⁴ courts will analyze a regulation that results in a partial diminution in property value under a loose three-factor balancing test. In *Penn Central*, Penn Central Transportation Company challenged New York City's historic preservation law as effecting a regulatory taking because it prohibited Penn Central from constructing a skyscraper office building over the historic Grand Central Terminal. The U.S. Supreme Court used a balancing test to weigh the economic impact of the regulation on the parcel against the reasonable investment-backed expectations of the property owner, considering also the "character" of the regulation (i.e., whether the regulation serves a public good or targets specific property owners). The Court was persuaded that Penn Central obtained a reasonable return on its investment because it could continue to operate Grand Central Terminal.¹⁰⁵

In some cases, permit exactions (e.g., mitigating conditions) may be so burdensome as to amount to a taking of private property. A court hearing a property owner's challenge to a permit exaction would apply the so-called *Nollan-Dolan* test to determine whether a mitigation condition is so overly burdensome as to amount to a constitutional violation. Under *Nollan v. California Coastal Commission*¹⁰⁶ and *Dolan v. City of Tigard*,¹⁰⁷ conditions imposed by a permitting agency on a land use permit constitute a taking unless they have a "nexus," or a logical relationship, and rough proportionality to the impact of the permitted project. In *Nollan*, the U.S. Supreme Court struck down a permit exaction requiring a lateral public easement across a beach as a regulatory taking. The Court found that the lateral easement condition had no essential nexus to the reason why the permitting agency could have denied the permit: the fact that the permitted development blocked the public's view of the beach.¹⁰⁸ In *Dolan*, a property owner challenged a condition to a permit for a structural addition that required her to dedicate a portion of her property to be used as a public bike path. The permitting

103. See, e.g., *Palazallo v. Rhode Island*, 533 U.S. 606, 630 (2001) (holding that a regulation depriving an owner of 95 percent of a property's value did not amount to a per se taking).

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

105. *Id.* See also *Kaiser Aetna v. United States*, 444 U.S. 164, 175 (1979) (adding "reasonable" to clarify the meaning of the *Penn Central* phrase "investment-backed expectations").

106. *Nollan v. Cal. Coastal Comm'n*, 483 U.S. 825 (1987).

107. *Dolan v. City of Tigard*, 512 U.S. 374 (1994).

108. *Nollan*, 483 U.S. 825.

agency justified the exaction on the grounds that it would mitigate the flooding and traffic impacts of the expanded development. The Court found that, although there was a nexus between the expanded development and flooding and traffic mitigation, the burden of the bike path on the property owner was disproportionate to the development's flooding and traffic impacts.¹⁰⁹ *Dolan* requires a permitting agency to make an individualized, quantifiable finding that a required exaction is reasonably related to the impact of the permitted activity.¹¹⁰

There is uncertainty involved in any litigation. Uncertainty is a particularly salient feature of regulatory takings cases, where courts do not employ a "set formula" to determine when a land use regulation constitutes a taking, instead preferring to engage in "essentially ad hoc, factual inquiries."¹¹¹ Nonetheless, successful regulatory takings challenges are rare. In general, local governments have latitude to exercise their land use decisionmaking powers broadly in response to impending sea level rise impacts.¹¹² Regardless of the outcome, though, a takings challenge can be expensive, time-consuming, and politically damaging. In the case of sea level rise adaptation, lawsuits could delay implementation of a local government's adaptation program. For these reasons, Southern California local governments should evaluate the legal risk of a takings challenge when comparing potential adaptation strategies.

C. Coastal Zoning and Permitting

Ultimately, Southern California local governments should develop a comprehensive, forward-looking plan that outlines sea level rise adaptation strategies. The adaptation plan should identify protection, accommodation, and retreat zones, and serve as a guide for local land use decisionmaking. Local Coastal Programs (LCPs) provide a good vehicle for proactive adaptation planning and coastal management.¹¹³ The Coastal Act sets forth a framework for local planning and regulation of the coast through LCPs.

The Coastal Act protects, conserves, and enhances public access to the state's coast through planning, regulation, and development permitting in the coastal zone, which extends roughly 1000 feet inland from the shore.¹¹⁴ The Coastal Act outlines the state's goals for its coastal zone:

109. *Dolan*, 512 U.S. 374.

110. *Ocean Harbor House Homeowners Assoc. v. Cal. Coastal Comm'n*, 163 Cal. App. 4th 215, 237 (2008) (citing *Dolan*, 512 U.S. at 395).

111. *Penn Cent. Transp. Co. v. City of New York*, 438 U.S. 104, 124 (1978).

112. *See* *Byrne & Grannis*, *supra* note 44, at 268.

113. *Accord* RUSSELL & GRIGGS, ADAPTING TO SEA LEVEL RISE: A GUIDE FOR CALIFORNIA'S COASTAL COMMUNITIES, *supra* note 35, at 32.

114. CAL. PUB. RES. CODE § 30103.

- (a) Protect, maintain, and, where feasible, enhance and restore the overall quality of the coastal zone environment and its natural and artificial resources.
- (b) Assure orderly, balanced utilization and conservation of coastal zone resources taking into account the social and economic needs of the people of the state.
- (c) Maximize public access to and along the coast and maximize public recreational opportunities in the coastal zone consistent with sound resources conservation principles and constitutionally protected rights of private property owners.
- (d) Assure priority for coastal-dependent and coastal-related development over other development on the coast.
- (e) Encourage state and local initiatives and cooperation in preparing procedures to implement coordinated planning and development for mutually beneficial uses, including educational uses, in the coastal zone.¹¹⁵

The California Coastal Commission (Commission), a fifteen-member representative body, has primary responsibility for enforcing the Coastal Act,¹¹⁶ but in practice, it is mainly local governments that implement the Act through LCPs.¹¹⁷ An LCP is a zoning document that consists of two parts: first, a Land Use Plan that details the types and locations of land uses in the coastal zone; and second, a Local Implementation Plan containing the zoning ordinances and permitting procedures necessary to execute the Land Use Plan.¹¹⁸ Under the Coastal Act, all coastal jurisdictions are required to prepare an LCP for certification by the Commission—although not all jurisdictions have done so yet.¹¹⁹

Completing and obtaining certification of an LCP allows a local government to assume authority for most coastal zone development planning and permitting along its coast.¹²⁰ Almost all development in the

115. *Id.* § 30001.5.

116. *Id.* § 30330.

117. *Id.* § 30500.

118. *Id.* ch. 6, art. 2. *See also* CAL. COASTAL COMM'N, LCP UPDATE GUIDE: INTRODUCTION TO UPDATING LCP IMPLEMENTATION PLAN (IP) PROCEDURES 4 (2011), *available at* http://www.coastal.ca.gov/la/lcpguide/lcp_ip_guide.pdf.

119. CAL. PUB. RES. CODE § 30500 (“Each local government lying, in whole or in part, within the coastal zone shall prepare a local coastal program for that portion of the coastal zone within its jurisdiction.”); *id.* ch. 6, art. 2 (outlining the procedures for preparation, approval, and certification of LCPs).

120. *Id.* § 30600.1. Prior to certification of an LCP, any development located in the “dual permit jurisdiction,” which includes the area within 300 feet of the coast,

coastal zone requires a Coastal Development Permit (CDP) from either the Commission or a certified local government.¹²¹ Notably, the Coastal Act's definition of "development" covers a broad range of coastal activity:

"Development" means, on land, in or under water, the placement or erection of any solid material or structure; discharge or disposal of any dredged material or of any gaseous, liquid, solid, or thermal waste; grading, removing, dredging, mining, or extraction of any materials; change in the density or intensity of use of land . . . ; change in the intensity of use of water, or of access thereto; construction, reconstruction, demolition, or alteration of the size of any structure . . . ; and the removal or harvesting of major vegetation¹²²

The Commission delegates the authority to review and approve CDP applications to local governments with Commission-certified LCPs.¹²³ Local governments with permitting authority may attach to CDPs "reasonable terms and conditions" necessary to ensure that development will be in conformance with the Chapter 3 policies of the Coastal Act.¹²⁴ Chapter 3 of the Coastal Act includes policies to enhance public access to the coast,¹²⁵ protect recreational uses,¹²⁶ preserve and restore marine resources,¹²⁷ protect

the area between the coast and the first public roadway, and areas within 100 feet of any wetland, estuary, or stream, requires permits from both the local government and the Commission. *Id.* §§ 30600(b), 30601; CAL. CODE REGS. tit. 14 § 13307. Development located within the coastal zone but 300 feet or more inland from the coast may only require a CDP from the local government, if the local government has established permitting procedures. Local government permit decisions are appealable to the Commission. CAL. PUB. RES. CODE § 30601. After certification of an LCP, the Commission's permitting jurisdiction is limited to development on submerged lands, tidelands, or other public trust lands; amendments to any CDPs issued prior to certification; and appeals. *Id.* § 30519.

121. CAL. PUB. RES. CODE § 30600.

122. *Id.* § 30106. Additionally, the Coastal Act exerts certain authority over Port Master Plans and large public works projects. *See, e.g., id.* §§ 30321, 30711, 30600(a). *But see id.* § 306010 (authorizing certain development without a permit).

123. *Id.* § 30600.

124. *Id.* § 30607 ("Any permit . . . shall be subject to reasonable terms and conditions in order to ensure that such development or action will be in accordance with the provisions of this division.").

125. *Id.* §§ 30210-14.

126. *Id.* §§ 30220-24.

127. *Id.* §§ 30230-37.

agricultural land and environmentally sensitive habitat areas (ESHA),¹²⁸ and minimize visual and scenic impacts.¹²⁹

A certified LCP grants a locality substantial powers to control and shape coastal development to respond to sea level rise. LCPs broadly can incorporate sea level rise adaptation strategies by identifying areas where natural shoreline preservation or hard armoring is critical, increasing development resilience, restricting further coastal armoring, channeling future development away from sea level rise exposure zones, and contemplating the siting of new or relocated municipal infrastructure.¹³⁰ Southern California local governments should explore LCPs as a planning tool to identify protection, accommodation, and retreat zones, and clarify adaptation goals and implementation measures specific to those zones.

D. The Role of Environmental Impact Assessment

The California Environmental Quality Act (CEQA) may provide an opportunity for local governments to evaluate, on a project-by-project basis or at the planning stage, the relationship between future sea level rise scenarios and planned development on or near the coastline.¹³¹ CEQA may also enable or require local governments to minimize impacts on the environment or public health that may result from placing development in areas at risk from sea level rise. CEQA requires local agencies to evaluate whether their decisions have a significant effect on the environment. While a recent court decision called into question the application of CEQA to at least some sea level rise-related impacts, we believe that the law nonetheless requires local governments to take these impacts into account in most circumstances.

CEQA requires state and local government agencies to conduct environmental review of projects before they make discretionary decisions to approve those projects. The projects covered by CEQA include both those undertaken directly by the agency, and those that involve issuing a permit or other approval to allow a private party to take action. CEQA requires that agencies determine whether each such project (with the exception of some projects that are exempt based on statutory or regulatory provisions) may have a significant effect on the environment. If a project may have such a significant effect, the agency must prepare an environmental impact report (EIR).¹³² An EIR helps decisionmakers take account of environmental impacts of a project and demonstrates to the public that an agency has analyzed and considered environmental

128. *Id.* §§ 30240-44.

129. *Id.* § 30251.

130. Caldwell & Segall, *supra* note 48, at 549.

131. CAL. PUB. RES. CODE § 21151; CAL. CODE REGS., tit. 14, §15002(f)(1).

132. *Id.*

consequences before making a decision.¹³³ An EIR must analyze the significant effects of a proposed project on the environment, and identify and analyze how the impacts can be mitigated or avoided through project modifications or alternatives.¹³⁴ A “significant effect on the environment” means any “substantial, or potentially substantial, adverse change”¹³⁵ in the physical area affected by a proposed project.¹³⁶

CEQA applies to private development that requires discretionary governmental approval,¹³⁷ as well as general plan updates and new development conducted by local agencies.¹³⁸ Public projects under CEQA include public works construction and related activities, the adoption and amendment of local General Plans, and the enactment and amendment of zoning ordinances.¹³⁹ Importantly, CEQA also requires that state and local government agencies refrain from approving projects with significant environmental impacts if there are “feasible alternatives or mitigation measures” that can substantially lessen or avoid those impacts.¹⁴⁰ An agency may not approve or carry out a project that would have significant environmental effects unless it finds for each significant effect that either: (1) changes or alterations have been incorporated into the project that will mitigate or avoid the significant environmental effects, (2) the responsibility for those changes and operations is within another agency’s jurisdiction, or (3) there are economic, legal, social, or other considerations that make the mitigation measures and alternatives infeasible.¹⁴¹ As a result, EIRs must include a robust analysis of alternatives to the proposed project. In approving a project, a government agency must require the implementation of any feasible mitigation measures identified in the EIR.

The first step in the environmental review process, if a project is not exempt, is to complete an initial study to determine the level of environmental review needed.¹⁴² If the initial review reveals no substantial evidence that a project may have significant environmental impacts, the

133. *Id.*

134. CAL. PUB. RES. CODE §§ 21100(b), 21151; CAL. CODE REGS., tit. 14, §§ 15124, 15125, 15126.6, 15362.

135. CAL. PUB. RES. CODE § 21068; CAL. CODE REGS., tit. 14, § 15002(g).

136. CAL. PUB. RES. CODE § 21060.5.

137. *Id.* § 21080(a).

138. *Id.*; CAL. CODE REGS., tit. 14, § 15378(a)(1).

139. *Id.*

140. CAL. PUB. RES. CODE § 21002; CAL. CODE REGS., tit. 14, §§ 15002(a)(3), 15021(a)(2).

141. CAL. PUB. RES. CODE § 21081(a); CAL. CODE REGS., tit. 14, § 15091(a).

142. CAL. CODE REGS., tit. 14, § 15063.

agency may adopt a negative declaration.¹⁴³ If the initial study produces substantial evidence that significant adverse impacts may occur, the project applicant can make project modifications to eliminate the impacts. The agency then can adopt a mitigated negative declaration.¹⁴⁴ If it is not possible to adopt a negative declaration, the agency must prepare an EIR for the project. An EIR must identify and analyze a reasonable range of project or location alternatives that would feasibly attain most of the basic objectives of the project yet avoid or substantially lessen any significant effects of the project.¹⁴⁵

In the context of sea level rise, CEQA can help local governments to determine whether planned future development will reduce opportunities to preserve threatened ecosystems or put people in harm's way. For example, hard armoring projects or structures constructed in areas where they ultimately will impede the ability of wetlands or other coastal ecosystems to migrate inland as the sea encroaches can cause these types of impacts. If significant environmental impacts are likely to occur, CEQA will require the lead agency to propose and implement feasible mitigation measures. CEQA also will require the lead agency to consider alternatives to the proposed project that may reduce or eliminate the impacts. These features of CEQA generally are thought to require agencies to propose, and to demand of their permit applicants, project modifications such as alternative site configurations and alternatives to hard armoring that would reduce or eliminate impacts where a project's relationship to sea level rise or related storm surges will adversely affect residents or ecosystems.

Nonetheless, California law is currently unsettled on whether and to what extent the likely consequences of siting a project in an area where coastal resources are likely to be affected by the impacts of sea level rise constitute a "significant effect on the environment" that must be analyzed and mitigated under CEQA.¹⁴⁶ The answer, as interpreted by California courts, appears to depend on how the impacts of sea level rise are framed. While the foreseeable environmental consequences of siting a project in a vulnerable area require CEQA analysis, some courts may decline to require environmental review of impacts that appear instead to be "the significant effects of the environment on the project" rather than "the significant effects of the project on the environment."

Section 15126.2(a) of CEQA's implementing regulations (known as the CEQA Guidelines)¹⁴⁷ states in part:

143. See CAL. PUB. RES. CODE § 21080(c); CAL. CODE REGS., tit. 14, §§ 15064(f)(3), 15070.

144. CAL. PUB. RES. CODE §§ 21064.5, 21080(c)(2); CAL. CODE REGS., tit. 14, §§ 15006(h), 15064(f)(2).

145. CAL. CODE REGS., tit. 14, § 15126.6(a), (f).

146. See CAL. PUB. RES. CODE § 21060.5 (defining a "significant effect on the environment" as any "substantial, or potentially substantial, adverse change").

147. The CEQA Guidelines are codified at CAL. CODE REGS., tit. 14, div. 6, ch. 3.

The EIR shall also analyze any significant environmental effects the project might cause by bringing development and people into the area affected. *For example, an EIR on a subdivision astride an active fault line should identify as a significant effect the seismic hazard to future occupants of the subdivision. The subdivision would have the effect of attracting people to the location and exposing them to the hazards found there.* Similarly, the EIR should evaluate any potentially significant impacts of locating development in other areas susceptible to hazardous conditions (e.g., floodplains, coastlines, wildfire risk areas) as identified in authoritative hazard maps, risk assessments or in land use plans addressing such hazard areas.¹⁴⁸

While the Guidelines require an EIR to discuss the effects of bringing development into a hazardous area as well as the effects of local hazards on the future project, California courts have applied this principle inconsistently. In the 2011 case *Ballona Wetlands Land Trust v. City of Los Angeles*,¹⁴⁹ the California Court of Appeal for the Second District held that the above-italicized portion of CEQA Guidelines section 15126.2 is inaccurate and reflects an incorrect application of the law. In that case, the plaintiffs challenged an EIR for a mixed-use real estate development on the grounds that the EIR failed to address both the impact of sea level rise on the project and the extent to which the project would worsen the impacts of sea level rise on nearby areas.¹⁵⁰ The court held that an EIR is not required to consider the impact of sea level rise on the project, reasoning that the purpose of an EIR is to identify the “significant effects of a project on the environment,” not “the significant effects of the environment on the project.”¹⁵¹ The court thus held Guidelines section 15126.2(a) invalid to the extent that it requires consideration of an environmental effect on a project.¹⁵²

The decision in *Ballona Wetlands* is in tension with other appellate decisions and with other principles embodied in CEQA. For example, another California appellate court has required discussion of the impacts of the environment on a project. The California Court of Appeal for the First

148. CAL. CODE REGS., tit. 14, § 15126.2(a) (emphasis added).

149. *Ballona Wetlands Land Trust v. City of Los Angeles*, 201 Cal. App. 4th 455 (2011).

150. *Id.* at 472.

151. *Id.* at 473.

152. *Id.* (invalidating the part of Guidelines (CAL. CODE REGS., tit. 14, § 15126.2(a)) that requires an EIR to analyze the impacts of locating development in hazardous areas like floodplains and coastlines).

District, in *Oakland Heritage Alliance v. City of Oakland*,¹⁵³ held that the EIR at issue adequately discussed the seismic impacts on proposed structures of locating development near earthquake fault lines. This court held the EIR up to the very same CEQA standards rejected by the *Ballona Wetlands* court.

We believe that the *Ballona Wetlands* decision departs from the purpose and past usage of CEQA in suggesting that decisionmakers and the public need not be informed that rising sea levels may adversely affect a proposed project. In the past, courts have confirmed that CEQA requires agencies to consider seismic impacts¹⁵⁴ and the effect of hazardous materials.¹⁵⁵ Both earthquakes and hazardous materials can be understood as impacts of the environment on the project, since development has no effect on earthquake activity or the presence of hazardous materials. Like these impacts, sea level rise threatens both the integrity of built structures and the safety of their occupants. Moreover, in many situations, locating a project in an area vulnerable to sea level rise may lead to foreseeable environmental impacts that would not occur but for the project.

A recent decision by the Ventura County Superior Court, *Sierra Club v. City of Oxnard*,¹⁵⁶ explains why local governments should still undertake CEQA review of sea level rise-related impacts in a wide variety of contexts, despite the holding of the *Ballona Wetlands* court. *Sierra Club* overturned a local government decision not to evaluate the sea level rise impacts of a project. First, the Superior Court explained that “land use compatibility” is an integral part of CEQA analysis, and that the “environmental setting,” including vulnerability to sea level rise, is important to evaluating the compatibility of land uses with a proposed project. As the court noted, “[i]t is inconceivable that the *Ballona Wetlands* Land Trust court is suggesting that the public has no right to know if a CEQA project is being placed directly upon a known seismic fault; or in the path of a projected tsunami; or in the middle of an abandoned toxic waste dump.”¹⁵⁷ Second, the court went on to note that even under the legal analysis in *Ballona Wetlands*, many projects may have a “significant impact on the environment” when foreseeable sea level rise is considered.¹⁵⁸ In *Sierra Club*, the proposed project threatened the future viability of particular coastal wetlands and

153. *Oakland Heritage Alliance v. City of Oakland*, 195 Cal. App. 4th 884, 898-900 (2010).

154. *Id.*

155. *City of Long Beach v. Los Angeles Unified School District*, 176 Cal. App. 4th 889, 905 (2009).

156. *Sierra Club v. City of Oxnard*, Case No. 56-2011-00401161, Order on Petition for Writ of Mandate and Peremptory Writ of Mandate (Ventura County Superior Court, Oct. 15, 2012).

157. *Id.* at 49.

158. *Id.* at 49-50.

associated plants and animals. Given the project's proposed location and local sea level rise projections, there was substantial evidence that the project would impede migration of the wetlands, impair the wetlands' ecological function, and possibly ultimately destroy the wetlands entirely.¹⁵⁹ While *Sierra Club* cannot be cited as legal authority because it is a state trial court opinion, it demonstrates that there are two distinct, strong arguments for continuing to include sea level rise in CEQA analyses for appropriate projects, notwithstanding *Ballona Wetlands*. We believe that future courts ought to find this reasoning persuasive.

Local governments would be wise to address sea level rise impacts in their environmental impact analysis under CEQA in a robust way. CEQA provides an opportunity to compile, analyze, and provide mitigation opportunities for projected impacts of sea level rise. Moreover, as demonstrated in *Sierra Club*, there is legal risk to local governments that fail to do so.

IV. Private Development

If sea levels rise as predicted, over 156,000 Southern Californians will be living in areas vulnerable to a 100-year coastal flood by 2100.¹⁶⁰ Low-income populations, the elderly, minority communities, and other vulnerable populations in Southern California may be disproportionately exposed to adverse impacts.¹⁶¹ The increased storm-related flooding, inundation, and erosion associated with sea level rise have the potential to damage health care facilities, businesses, homes, and other privately owned structures in vulnerable coastal areas.¹⁶² The estimated replacement value of Southern California building stocks that will be impacted by coastal flooding is 26.1 billion dollars.¹⁶³ A study by San Francisco State University and the California Department of Boating and Waterways estimates that by 2050, a 100-year storm combined with a fifty-five-inch rise in sea level would result in over 15 million dollars in structural damage in Los Angeles' Venice Beach

159. *Id.*

160. MATTHEW HEBERGER ET AL., THE IMPACTS OF SEA LEVEL RISE ON THE CALIFORNIA COAST, CEC-500-2009-024-F 42, tbl.8 (Cal. Climate Change Ctr. 2009), available at http://www.pacinst.org/reports/sea_level_rise/report.pdf.

161. *Id.* at 21-22, 49-51. See also HIRSCHFELD & HOLLAND, *supra* note 29, at vi (projecting that low-income residents, the homeless, elderly, and minorities in San Diego Bay disproportionately will suffer sea level rise impacts).

162. See NAT'L RESEARCH COUNCIL, *supra* note 1, at 9; CAL. NATURAL RESOURCES AGENCY, *supra* note 12, at 68-69, 127.

163. CAL. NATURAL RESOURCES AGENCY, *supra* note 12, at 3, fig.2.

alone.¹⁶⁴ Building stocks may be particularly exposed in densely developed areas like Venice, Malibu, Newport Beach, Balboa Island, and Ventura.¹⁶⁵ Buildings constructed prior to 1968, when the Federal Emergency Management Agency began requiring local governments to adopt minimum building standards for flood protection as part of the National Flood Insurance Program, may be especially vulnerable.¹⁶⁶

Southern California local governments will have to consider the costs and benefits of various strategies when evaluating adaptation options for densely developed coastal communities. For some areas, local governments will determine that protection with hard armoring is desirable. In others, however, either because of the economic costs of armoring or to protect the long-term survival of coastal ecosystems, local governments may elect to pursue strategies of accommodation, retreat, or a combination of the two. The following subsections outline the interaction between the law and protection, accommodation, and retreat strategies for private properties. In cases where hard armoring is desirable or unavoidable, we discuss the ability of local governments to condition armoring permits to maximize public access and protection of ecological functions. Where accommodation or retreat is a more appropriate adaptation strategy, we discuss how a local government can use its regulatory authority to enact regulations that require private property owners to shift, modify, or abandon development in the erosion zone, to justify decisions to deny applications for armoring, and to challenge armoring permits. In addition, we discuss the extent of local governments' powers to use retreat- and accommodation-based regulatory tools in the context of existing development. We evaluate the potential for litigation and the likelihood of an adverse judicial ruling, where possible. We also offer recommendations for local governments seeking to mitigate liability to private property owners for adaptation policies.

A. Protection

A protection-oriented strategy is appropriate, in the medium to long term, for a limited but important set of coastal properties. In cases of private structures like medical or education facilities that serve an important

164. P.G. KING ET AL., THE ECONOMIC COSTS OF SEA LEVEL RISE TO CALIFORNIA BEACH COMMUNITIES 66 (2011), available at <http://www.dbw.ca.gov/PDF/Reports/CalifSeaLevelRise.pdf>.

165. See HANAK & MORENO, *supra* note 58, at 5, fig.1 (representing the population density of census block groups bordering the coastline); CAL. NATURAL RESOURCES AGENCY, *supra* note 12, at 68 (describing how many of California's population centers are located in low-lying coastal floodplains vulnerable to inundation and storm surges).

166. HIRSCHFELD & HOLLAND, *supra* note 29, at 47.

public function, or because it is the most economical adaptation choice to protect a densely developed coastal area, a local government may deem armoring private property desirable.¹⁶⁷ The following subsections discuss the potential use of hard and soft armoring tools in Southern California, and legal avenues available to limit the adverse environmental impacts associated with armoring.

1. Hard Armoring

The Coastal Act governs the ability of California private property owners to install hard armoring. Private property owners whose homes or businesses are endangered by sea level rise may apply for a CDP to construct coastal armoring.¹⁶⁸ Local governments with certified LCPs have the power to review CDP applications for armoring.¹⁶⁹ Section 30235 of the Coastal Act provides that armoring “shall be permitted when required to serve coastal-dependent uses or to protect existing structures or public beaches in danger from erosion”¹⁷⁰ The Commission historically has interpreted “danger” to mean that a structure will be unsafe to occupy in the next one to three storm cycles absent any action.¹⁷¹ While broad application of section 30235 may be in tension with other goals of the Coastal Act, this section nonetheless provides significant authority for local governments to allow hard armoring to protect property in appropriate circumstances. Local governments should, at the same time, be mindful of the need to limit and mitigate the impacts of hard armoring to the extent feasible, and the tools available for doing so.

In protection zones, where a local government decides to permit hard armoring, a local government can impose exactions upon a private property owner’s armoring permit to maximize public access, mitigate the visual impacts of armoring, and protect ecological functions. As described above, the Coastal Act allows permitting entities to attach to CDPs “reasonable terms and conditions” necessary to ensure that development will be in conformance with the Chapter 3 policies of the Act, which maximize public access, protect recreational uses, preserve and restore marine resources, protect ESHA, and minimize visual impacts.¹⁷² Additionally, section 30235 of the Coastal Act provides that armoring devices shall be permitted only “when designed to eliminate or mitigate adverse impacts on local shoreline sand supply.”

167. See O’Connell, *supra* note 54, at 74.

168. See CAL. PUB. RES. CODE §§ 30519, 30600-01.

169. *Id.* § 30600.

170. CAL. PUB. RES. CODE § 30235.

171. Caldwell & Segall, *supra* note 48, at 561; GRIGGS & RUSSELL, CITY OF SANTA BARBARA SEA LEVEL RISE VULNERABILITY STUDY, *supra* note 32, at 60.

172. *Id.* § 30607. See *supra* notes 125-129 and accompanying text.

For instance, the Commission or local government may require a permittee to pay an in-lieu sand mitigation fee sufficient to replace the amount of beach area and sand that the armoring project will destroy over the project's design life.¹⁷³ Sand mitigation proceeds go towards the Commission's Beach Sand In-lieu Mitigation Program, which aids regional and local efforts to implement beach nourishment projects.¹⁷⁴ Additionally, to mitigate the adverse visual impacts of armoring structures, the permitting entity typically will require the structure to match the color and texture of the surrounding environment. For example, a seawall flush against a bluff should be colored and textured to match the natural bluff.¹⁷⁵ It is also fairly common practice for armoring CDPs to include a condition requiring the permittee to implement a monitoring program and report any change in sea level and other coastal conditions to the Commission.¹⁷⁶

The typical hard armoring permit specifies that any future improvements, repairs, and/or maintenance activities relating to the armoring structure will require a separate permit.¹⁷⁷ CDPs also typically will include a condition specifying that the permittee waives all rights under section 30235 to install further armoring that extends seaward beyond the footprint of the permitted armoring structure,¹⁷⁸ or at least to waive such rights unless all alternatives are infeasible.¹⁷⁹ Such a condition could be important should future sea level rise necessitate reinforcement of the structure.¹⁸⁰ Armoring permits also may include a condition specifying that the permittee assumes risk of property damage and acknowledges potential hazards like sea level rise, flooding, high waves, and erosion. This condition

173. *Ocean Harbor House Homeowners Assoc. v. Cal. Coastal Comm'n*, 163 Cal. App. 4th 215 (2008).

174. CAL. COASTAL COMM'N, STAFF RPT. FR 6B (App. No. 6-04-156) at 5, 15-16 (June 29, 2005), available at <http://www.coastal.ca.gov/sd/7-2005-F6b.pdf>.

175. See, e.g., CAL. COASTAL COMM'N, STAFF RPT. F 14A (App. No. 5-10-045) at 26 (June 16, 2010), available at <http://documents.coastal.ca.gov/reports/2010/7/F14a-7-2010.pdf>.

176. See, e.g., *id.* at 5-6; CAL. COASTAL COMM'N, STAFF RPT. W 11D (App. No. 5-11-106) at 3 (July 21, 2011), available at <http://documents.coastal.ca.gov/reports/2011/8/W11d-8-2011.pdf>.

177. See, e.g., CAL. COASTAL COMM'N, STAFF RPT. FR 6B (App. No. 6-04-156), *supra* note 174, at 9.

178. See, e.g., *id.* at 4-5.

179. *Id.* at 8.

180. See *id.* at 12.

indemnifies the Commission or local government in case a third party sues over the failure of the armoring structure.¹⁸¹

Local governments may include maximum armoring permit term limits in an LCP.¹⁸² Otherwise, armoring permits are term-limited based on the design life of the armoring structure. Consequently, certified local governments will have the ability to review an armoring project again down the road to evaluate the project against changed coastal conditions. As an example, in the case of one 120-foot-long seawall installed to protect a condominium development in Solana Beach, the Commission approved a CDP with a term of twenty-two years, which matched the design life of the seawall.¹⁸³ As a permit condition, the Commission specified that the permittee homeowners' association must apply for a CDP amendment within twenty-one years to authorize either removal of the seawall or additional mitigation requirements.¹⁸⁴

Armoring permits also may explicitly preserve public rights by including special condition language stating that "approval of this permit shall not constitute a waiver of any public rights that exist or may exist on the property."¹⁸⁵ Significantly, this condition contemplates that future sea level rise and the public trust doctrine could affect private property boundaries. Finally, it is standard for CDPs to include a condition confirming that all conditions are perpetual and run with the land to bind all future owners.¹⁸⁶ Prior to issuance of the CDP, the permittee is required to execute and record a deed restriction notifying all future owners of the permit and its conditions.¹⁸⁷

181. See, e.g., CAL. COASTAL COMM'N, STAFF RPT. F 14A (App. No. 5-10-045), *supra* note 175, at 4, 11; CAL. COASTAL COMM'N, STAFF RPT. W23B (App. No. 4-11-026), *supra* note 90, at 8.

182. See CAL. COASTAL COMM'N, REVISED FINDINGS ON CITY OF SOLANA BEACH LCP LAND USE PLAN at policies 4.20, 4.53, 4.55, 4.56 (May 24, 2012) available at <http://documents.coastal.ca.gov/reports/2012/6/Th24a-6-2012.pdf> (suggesting modifications to Solana Beach's LCP to require that the City may only approve armoring permits for a term of twenty years).

183. See, e.g., CAL. COASTAL COMM'N, STAFF RPT. FR 6B (App. No. 6-04-156), *supra* note 174, at 5.

184. *Id.*

185. See, e.g., *id.* at 9; CAL. COASTAL COMM'N, STAFF RPT. W 11D (App. No. 5-11-106), *supra* note 176, at 6.

186. See, e.g., CAL. COASTAL COMM'N, STAFF RPT. F 14A (App. No. 5-10-045), *supra* note 175, at 3.

187. See, e.g., CAL. COASTAL COMM'N, STAFF RPT. F 14A (App. No. 5-10-045), *supra* note 175, at 7; CAL. COASTAL COMM'N, STAFF RPT. W 11D (App. No. 5-11-106), *supra* note 176, at 3.

A property owner may challenge required armoring mitigation measures as unconstitutional takings under the *Nollan-Dolan* analysis.¹⁸⁸ In the case of mitigation conditions required of an armoring project, however, the legal risk of a challenge or adverse ruling is fairly low. First, the Commission historically has required mitigation measures for hard armoring projects as a matter of course, and courts have protected such conditions against challenges from property owners. In one case, the California Court of Appeal for the Sixth District even upheld a 5.3 million-dollar mitigation fee condition to a CDP for a seawall to protect a condominium complex. Under the *Nollan-Dolan* analysis, the Court of Appeal found a nexus and rough proportionality between the mitigation fee and the seawall's negative impacts on public access and coastal recreation.¹⁸⁹

Second, local governments typically will be able to demonstrate successfully to a court that mitigation measures are logically related and roughly proportional to the impacts of the armoring on coastal ecosystems and public access. The Coastal Act explicitly allows entities issuing CDPs to impose mitigation conditions on private coastal armoring projects to further the Act's Chapter 3 policies, and the existence of a nexus under *Nolan* is clear from Chapter 3. Specifically, section 30210 guarantees that "maximum access . . . and recreational opportunities shall be provided for all . . . ;" and section 30211 declares that "[d]evelopment shall not interfere with the public's right of access to the sea . . . including, but not limited to, the use of dry sand and rocky coastal beaches . . ." ¹⁹⁰ The use of sea level rise and erosion rate projections will bolster a local government's claims here. A local government can also use sea level rise projections to demonstrate to a court that hard armoring ultimately will interfere with public trust lands as sea levels rise. To satisfy the requirements of *Dolan*, localities should be sure to explicitly reference empirical studies from the accompanying EIR to demonstrate hard armoring contributes to beach erosion and encumbers public access to trust lands.¹⁹¹ The strength of the public trust interests at stake combined with the well-documented adverse impacts of hard armoring likely will persuade a court that mitigation measures to preserve public access and protect coastal ecosystems are linked to and proportional to the impact of the development.

Despite the fact that the legal risk of a regulatory taking ruling is low, local governments should take note that the U.S. Supreme Court in *Nollan* expressed particular concern about lateral conservation easements as

188. In addition, third parties could challenge a local government's decision to allow hard armoring. See *infra* subsection V.A (outlining how claimants can use the public trust doctrine to challenge a locality's decision to allow armoring).

189. *Ocean Harbor House Homeowners Assoc. v. Cal. Coastal Comm'n*, 163 Cal. App. 4th 215 (2008).

190. CAL. PUB. RES. CODE §§ 30210-11.

191. See *Dolan v. City of Tigard*, 512 U.S. 374 (1994).

conditions to development permits.¹⁹² As a consequence of *Nollan*, a court may look for a local government to demonstrate an especially clear nexus where a condition requires a property owner to dedicate a portion of her private property interests, in fee simple or in the form of a conservation easement, to the public to mitigate the impacts of armoring.¹⁹³ Even a lateral conservation easement is unlikely to trigger a takings claim or liability, though, as long as the permitting entity has not imposed a separate, burdensome, and arguably duplicative condition to address an armoring structure's public access and recreation impacts, such as a sand mitigation fee. The Commission has a long history of imposing exactions that require an offer of dedication of lateral public access to mitigate hard armoring's burdens on public resources.¹⁹⁴

CEQA provides another valuable tool for ensuring that property owners develop and implement appropriate mitigation measures. Notably, section 13096(a) of the Commission's regulations requires a finding that any Commission-approved CDP, as conditioned, is consistent with CEQA. While CEQA requires that there be independent authority (such as section 30235 of the Coastal Act) for requiring a particular measure as mitigation for project impacts, CEQA does provide a further vehicle through which local governments may impose exactions to mitigate significant environmental impacts of development. If feasible mitigation to lessen significant impacts of a project is otherwise authorized by law, CEQA requires mitigation to be incorporated into a project approval. Authority to impose mitigation under CEQA is also subject to Constitutional takings restraints.

It should be noted, however, that hard armoring is exempt from CEQA in emergency situations. CEQA provides a statutory exemption for "[s]pecific actions necessary to prevent or mitigate an emergency."¹⁹⁵ In one case, *CalBeach Advocates v. City of Solana Beach*, the project engineer for a proposed bluff-face seawall testified that if construction of the seawall was deferred until after an EIR was certified, the coastal bluff would collapse and place the bluff-top residents' home in immediate peril.¹⁹⁶ The court held that anticipation of the collapse of a coastal bluff was an emergency that exempted the project from CEQA.¹⁹⁷ The court noted that a project to prevent an emergency requires the designer to anticipate the emergency, and in this case, there was substantial evidence that immediate action was

192. See *Nollan v. Cal. Coastal Comm'n*, 483 U.S. 825 (1987).

193. *Byrne & Grannis*, *supra* note 44, at 273.

194. See CAL. COASTAL COMM'N, STAFF RPT. FR 6B (App. No. 6-04-156), *supra* note 174, at 28.

195. CAL. PUB. RES. CODE § 21080(b)(4).

196. *CalBeach Advocates v. City of Solana Beach*, 103 Cal. App. 4th 529 (4th Dist. 2002).

197. *Id.* at 537.

needed to prevent the collapse of the coastal bluff.¹⁹⁸ Emergency CDPs include conditions requiring the permittee to apply for a permanent CDP within ninety days, at which point CEQA would apply.¹⁹⁹

2. Soft Armoring

As an alternative to hard armoring, local governments may consider soft armoring to protect development and enhance the resilience of coastal ecosystems.²⁰⁰ In San Diego County, which already experiences a significant annual sand deficit,²⁰¹ beach nourishment is likely to play a key role in local governments' suite of sea level rise adaptation strategies.²⁰² The San Diego Association of Governments has declared that it "is committed to maintaining beaches as an approach to counter sea level rise" and that "[r]estoring beaches (with sediment management devices) is the most effective method of protecting against the detrimental effects of sea level rise."²⁰³

If a beach nourishment project involves development on lands within the Commission's sole or dual permitting jurisdiction (e.g., state tidelands), the project proponent must submit a CDP application to the Commission.²⁰⁴ The Coastal Act explicitly requires applicants for CDPs for sand replenishment projects to provide a plan for "onsite monitoring and supervision during the implementation of the permit."²⁰⁵ In addition to a CDP, soft armoring projects may require a variety of other state and federal authorizations. Local governments seeking to implement soft armoring may have to seek prior authorization from the following agencies, among others: the appropriate Regional Water Quality Control Board or U.S. Army Corps of Engineers under section 404(e) of the Clean Water Act;²⁰⁶ the California State

198. *Id.* at 537-38.

199. See CAL. COASTAL COMM'N, SAMPLE EMERGENCY CDP ORDINANCE, available at http://www.coastal.ca.gov/la/docs/emerg_ord2.pdf.

200. See GRANNIS, *supra* note 47, at 40.

201. SAN DIEGO REGION COASTAL REGIONAL SEDIMENT MANAGEMENT PLAN: DESCRIPTION OF PROPOSED ACTIONS AND ALTERNATIVES 2, 6 (2010), available at http://dbw.ca.gov/csmw/pdf/RSM_FINAL_DOPAA05_12_2010.pdf.

202. See *id.* at 5, 6 (reporting that multiple beach nourishment projects are already planned and currently underway in the San Diego region in part to combat sea level rise).

203. *Id.* at 6.

204. See *supra* note 120 and accompanying text.

205. CAL. PUB. RES. CODE § 30607.7.

206. 33 U.S.C. § 1344 (West 2013); CAL. WATER CODE § 13377 (West 2012) ("[T]he state board or the regional boards shall, as required or authorized by the Federal

Lands Commission for lease of state lands for the placement of sand below the mean high tideline;²⁰⁷ and the California Department of Fish and Wildlife (Fish and Wildlife) for an incidental take permit under the California Endangered Species Act.²⁰⁸

Local governments also should be aware of the possibility that beach and wetland adaptation projects may adversely affect a marine managed area or marine protected area (MPA). Human activities are restricted in marine managed areas to protect, conserve, and manage “living marine resources and their habitats, scenic views, water quality, recreational values, and cultural or geological resources.”²⁰⁹ MPAs are a subset of marine managed areas designated by law specifically “to protect or conserve marine life and habitat.”²¹⁰ California’s MPAs include state marine reserves, state marine parks, and state marine conservation areas.²¹¹ Southern California is home to twenty-seven mainland MPAs and twenty-five island MPAs.²¹² Soft armoring projects could stress or disturb MPAs, impairing the resilience of those ecosystems.²¹³ According to Fish and Wildlife’s regulations, “it is unlawful to injure, damage, take, or possess any living, geological, or cultural marine resource” in an MPA.²¹⁴ To avoid potential liability for an unlawful take of MPA resources, local governments seeking to implement soft armoring projects near an MPA should consult with the California Department of Fish and Wildlife early in the project planning process.

In addition to substantive state and federal environmental laws, soft armoring projects typically will be subject to CEQA. If soft armoring projects impose significant adverse impacts on the environment, they will require an EIR, consideration of alternatives, and mitigation of impacts. However, if an

Water Pollution Control Act, as amended, issue waste discharge requirements and dredged or fill material permits . . .”).

207. See CAL. STATE LANDS COMM’N, APPLICATION FOR LEASE OF STATE LANDS, http://www.slc.ca.gov/Online_Forms/LMDApplication/Lease_App_Form_2011.pdf.

208. CAL. FISH & GAME CODE § 2081(b)-(c) (West 2012).

209. CAL. PUB. RES. CODE § 36602(d).

210. CAL. FISH & GAME CODE § 2852(c).

211. *Introduction to the MLPA*, CALIFORNIA DEPARTMENT OF FISH & WILDLIFE, <http://www.dfg.ca.gov/mlpa/intro.asp> (last visited Mar. 15, 2013).

212. *South Coast Marine Protected Areas*, CALIFORNIA DEPARTMENT OF FISH & WILDLIFE, http://www.dfg.ca.gov/mlpa/scmpas_list.asp (last visited Mar. 15, 2013).

213. See SCIENTIFIC & TECH. SUBCOMM., MARINE PROTECTED AREAS FED. ADVISORY COMM., CLIMATE CHANGE IMPACTS ON COASTAL AND MARINE ECOSYSTEMS AND THE POTENTIAL ROLE OF THE NATIONAL SYSTEM OF MPAS 2-3 (draft Apr. 2010), available at http://www.mpa.gov/pdf/helpful-resources/climatechange_impacts4_10.pdf (describing the negative impacts of human-causes stressors on marine ecosystems and MPAs).

214. CAL. CODE REGS., tit. 14, § 632(a)(1).

initial study provides no substantial evidence that a particular project would have significant adverse environmental impacts, the Commission may adopt a negative declaration to comply with CEQA.²¹⁵

Before pursuing a soft armoring project, a locality should consider the possibility that the project may carry a risk of an adverse takings ruling, under either a *Loretto* analysis for a physical occupation of private property or a *Lucas* analysis for a deprivation of the economically beneficial use of private property.²¹⁶ Recent case law suggests, however, that the risk of a court ruling that a soft armoring project constitutes a taking is low. In the recent U.S. Supreme Court case *Stop the Beach Renourishment v. Florida Department of Environmental Protection*, Florida homeowners challenged a beach nourishment project that would have added seventy-five feet of dry sand seaward of the mean high tideline.²¹⁷ The homeowners argued that the project deprived them of their right to have their properties touch the water and their right to benefit from future sand accretions. When the Florida Supreme Court ruled against the homeowners, the homeowners appealed to the U.S. Supreme Court, claiming a “judicial taking” had occurred. The U.S. Supreme Court found in favor of the state, relying significantly on state law. Interestingly, the Court ruled 8-0 that no judicial taking had occurred because Florida Supreme Court’s decision was consistent with the background principles of state law, but split 4-4 on whether a judicial taking is possible.²¹⁸

Stop the Beach Renourishment’s heavy reliance on state law suggests that a court hearing a similar challenge to a Southern California local government’s beach nourishment program would take background principles of California law into careful consideration. Because soft armoring projects are likely to occur on and impact public trust lands, and based on the strength of the public trust doctrine in California, a locality should be able to use its authority over tidelands and its responsibility to preserve and protect the coast for the public as justifications for combating beach erosion with a soft armoring project. On the whole, based on Southern California’s long history of beach nourishment projects, a court should not be sympathetic to a takings challenge. *Stop the Beach Renourishment* suggests that the risk of a successful takings challenge to soft armoring projects is low; however, local governments can take as a lesson from this case that disgruntled property owners may still “bring protracted

215. See CAL. PUB. RES. CODE, § 21080(c); CAL. CODE REGS., tit. 14, §§ 15064(f)(3), 15070.

216. Verchick & Scheraga, *supra* note 55, at 251.

217. *Stop the Beach Renourishment v. Fl. Dep’t of Env’tl. Prot.*, 130 S. Ct. 2592 (2010).

218. Verchick & Scheraga, *supra* note 55, at 253 (citing *Stop the Beach Renourishment*, 130 S. Ct. 2592).

and questionable takings claims in response to public action that affects their property in even the most intangible way.²¹⁹

B. Accommodation

In less-developed residential and commercial areas, or in tandem with protection- and retreat-based strategies, Southern California local governments may adopt accommodation strategies to enhance coastal resilience. An accommodation strategy allows additional development so long as that development is designed to be resilient to the anticipated impacts of sea level rise.²²⁰ Accommodation strategies include the use of tools like rebuilding restrictions, impact fees, structure removal requirements, density restrictions, and freeboard requirements to protect coastal ecosystems and gradually reduce development.²²¹ For example, within an accommodation zone, a local government could use its LCP, building codes, and flood protection codes to mandate that development be designed to mitigate collateral damage in the event of a destructive storm; to require additional freeboard to account for sea level rise-related flooding; and to ensure that development is small and easily relocated by limiting the footprint and height of structures.²²² Generally, accommodation-based adaptation tools are unlikely to trigger a regulatory takings challenge because they involve the traditional exercise of local government police powers to regulate for the public health, safety, and welfare.²²³

Strengthening and broadening the application of traditional land use restrictions can facilitate adaptation planning. Even a small amount of sea level rise can expose previously protected inland development to flooding, storm surges, large waves, and other destructive impacts. Unless local governments update existing land use regulatory regimes to incorporate considerations of sea level rise and future storm conditions, development may be damaged or destroyed.²²⁴ In particular, Southern California local governments may be interested in incorporating accommodation-based strategies into their coastal zoning programs and permit conditions. We discuss these two tools below. We also briefly outline the potential

219. David M. Carboni, *Rising Tides: Reaching the High-Water Mark of New Jersey's Public Trust Doctrine*, 43 RUTGERS L.J. 95, 112-13 (2011).

220. Grannis et al., *supra* note 7, at 74.

221. Byrne & Grannis, at 274; GRANNIS, *supra* note 47, at 3, tbl.1 & 30. *See also* Grannis et al., *supra* note 7, at 74.

222. Grannis et al., *supra* note 7, at 75, 79.

223. *See id.* at 80.

224. *See* CAL. COASTAL COMM'N, STAFF RPT. W23B (App. No. 4-11-026), *supra* note 90, at 13.

interactions between accommodation strategies and the reconstruction of structures destroyed by storms.

1. Local Coastal Programs

LCPs are a useful tool to further accommodation. As discussed above, an LCP is a zoning program that details the types, scales, and locations of land uses in the coastal zone. An LCP comprises of zoning ordinances, zoning district maps, and permitting procedures.²²⁵ As one example, the City of Carlsbad LCP broadly segregates the City's coastal zone area into segments. For each segment, the LCP defines standards like the maximum development density, required buffers and setbacks, drainage and erosion control measures, measures to protect sensitive habitats, and site design principles.²²⁶ The City of Carlsbad LCP includes a wetland mitigation requirement and a policy of "no net loss" of sensitive habitat.²²⁷ Additionally, the LCP severely restricts development in the 100-year floodplain: "No permanent structures or filling shall be permitted in the floodplain and only uses compatible with periodic flooding shall be allowed."²²⁸ Santa Barbara County's LCP outlines traditional zoning districts and overlay districts, including a Flood Hazard Area Overlay and ESHA Overlay.²²⁹ The LCP's permitting procedures include a requirement that the County not approve any proposed use that is "inconsistent with the intent of [a] zone district."²³⁰ Other features of Santa Barbara County's LCP include building height limitations²³¹ and allowing variances in extraordinary situations.²³²

A local government can incorporate accommodation-based adaptation strategies into the ordinances and procedures that comprise its LCP. For instance, an LCP could promote accommodation with ordinances that specify setback requirements for new development and require the removal

225. CAL. PUB. RES. CODE ch. 6, art. 2.

226. CITY OF CARLSBAD LOCAL COASTAL PROGRAM (1996), *available at* <http://www.carlsbadca.gov/services/departments/planning/Documents/LCPA.pdf>.

227. *Id.* at 21.

228. *Id.* at 87.

229. SANTA BARBARA COUNTY ARTICLE II COASTAL ZONING ORDINANCE (2012), *available at* <http://www.sbcountyplanning.org/PDF/A/Article%20II.pdf>.

230. SANTA BARBARA CNTY. MUNI. CODE § 35-172.8 (2013), http://www.santabarbaraca.gov/Government/City_Hall/Municode/.

231. *Id.* § 35-127.

232. *Id.* § 35-173.

of threatened structures.²³³ Furthermore, an LCP can specify under which conditions a local government will approve permits for additional coastal development. Despite the adaptation opportunities provided by an LCP, and even despite the Coastal Act's mandate that all coastal zone localities prepare LCPs,²³⁴ one-third of Southern California coastal jurisdictions are not covered by a certified LCP.²³⁵ Twenty-five Southern California coastal segments subject to the Coastal Act's LCP requirements remain to have permit authority transferred, including San Diego County and the Cities of Los Angeles, Santa Monica, Newport Beach, San Clemente, and Solana Beach.²³⁶

If a local government or segment of local government without a certified LCP elects to develop one, it will be critical for the locality to keep in mind that the Commission has the authority to deny a proposed LCP if the locality does not accept the Commission's recommended modifications. Depending on the substance of the Commission's recommendations, the Commission's authority could either facilitate or hamper the locality's ability to implement aggressive adaptation strategies through planning and permitting, or could pressure the locality to adopt particular sea level rise adaptation strategies favored by the Commission.²³⁷ Similarly, should a local government amend an existing LCP to incorporate sea level rise planning, any proposed amendment would be subject to the Commission's

233. See CAL. COASTAL COMM'N, STAFF RPT. FR 6B (App. No. 6-04-156), *supra* note 174, at 31 (describing the City of Encinita's proposed comprehensive shoreline erosion management plan).

234. CAL. PUB. RES. CODE § 30500.

235. Note that some cities and counties have been officially segmented into smaller geographic units, termed "LCP segments," for the purposes of LCP preparation and certification. CAL. COASTAL COMM'N, SUMMARY OF LCP PROGRAM ACTIVITY IN FY 11-12 (2012), *available at* http://www.coastal.ca.gov/la/docs/lcp/fy11_12_LCPStatusSummaryChart_FINAL.pdf (evidencing that 25 out of 76 total LCP segments in Southern California have not been transferred permit authority).

236. The 25 LCP segments that have not yet been transferred permit authority are: the City of Goleta; Santa Monica Mountains segment of Los Angeles County; Playa Vista A segment of Los Angeles County; the following segments of the City of Los Angeles: Pacific Palisades, Venice, Playa Vista, Del Rey Lagoon, Airport/Dunes, and San Pedro; City of Santa Monica; City of Hermosa Beach; City of Torrance; the following segments of Orange County: Bolsa Chica, Santa Ana River, and Santa Ana Heights; City of Seal Beach; City of Costa Mesa; City of Newport Beach; City of Aliso Viejo; City of San Clemente; San Diego County; Agua Hedionda segment of the City of Carlsbad; City of Solana Beach; Mission Bay segment of the City of San Diego; and South Bay Island segment of the City of Chula Vista. *Id.*

237. Caldwell & Segall, *supra* note 48, at 549.

certification that the project conforms to the Coastal Act and meets minimum public participation requirements.²³⁸

The Commission exercises other authority that could affect a local government's ability to plan for sea level rise through LCPs. The Coastal Act requires the Commission to review certified LCPs at least every five years to evaluate their effectiveness in implementing the policies of the Coastal Act. Some advocates have called upon the Commission to undertake a review of existing LCPs to examine whether they effectively address sea level rise and coastal armoring.²³⁹ Upon review, the Commission may suggest LCP amendments. If the Commission were to review a stand-alone Land Use Plan and suggest modifications, a locality could risk LCP certification if it were to decline the Commission's recommendations.

Additionally, the Commission is authorized to recommend LCP amendments to a local government "to accommodate uses of greater than local importance," such as large public works projects and energy facilities, when such uses are not permitted by the local government's LCP.²⁴⁰ If a local government declines to amend its LCP to accommodate such a project, the Commission may unilaterally amend the LCP under Coastal Act section 30515. After a public hearing, the Commission may certify an LCP amendment to accommodate a project serving greater regional need if it finds, "after a careful balancing of social, economic, and environmental effects," that the project is in furtherance of the public welfare, there are no less environmentally damaging feasible alternatives, and the amendment otherwise conforms to the policies of the Coastal Act.²⁴¹ As the Coastal Commission's guidance emphasizes, the Commission may only exercise its amendment override authority in very limited circumstances.²⁴² However rare such circumstances may be, we nevertheless raise this issue because the unprecedented impacts of sea level rise undoubtedly will stress the limits of statutes like the Coastal Act that were not designed with climate change in mind. Indeed, sea level rise may present just the type of rare critical infrastructure siting challenges and conflicts that necessitate section 30515.

A local government's adoption of an LCP is exempt from the requirements of CEQA, but the Commission is subject to a limited version

238. CAL. PUB. RES. CODE § 30514; CAL. COASTAL COMM'N, LOCAL COASTAL PROGRAM POST-CERTIFICATION GUIDE FOR COASTAL CITIES AND COUNTIES 30-33, 73 (2002), available at <http://www.coastal.ca.gov/la/docs/post-cert-lcp-guide.pdf>.

239. See, e.g., Caldwell & Segall, *supra* note 48, at 534.

240. CAL. PUB. RES. CODE § 30519(c).

241. *Id.* § 30515.

242. CAL. COASTAL COMM'N, LOCAL COASTAL PROGRAM POST-CERTIFICATION GUIDE FOR COASTAL CITIES AND COUNTIES, *supra* note 238, at 34.

of CEQA when it certifies an LCP.²⁴³ The Commission's certification process is the "functional equivalent" of CEQA, where the commission does not need to prepare formal negative declarations or EIRs before considering proposed projects, but still needs to meet the basic CEQA requirements of environmental analysis, disclosure of significant environmental impacts, and mitigation.²⁴⁴ If a local government does not accept the Commission's modifications to an LCP, the Commission may use CEQA review to support its decision to deny a proposed LCP and guide a local government toward its preferred sea level rise adaptation strategies.

2. Permit Exactions

In accommodation zones, Southern California local governments with certified LCPs may seek to use their coastal zone permitting authority to enhance the resilience of development. Permit conditions that address the impacts of sea level rise can include, for example, rebuilding restrictions, setback buffers, conditions requiring the dedication of lateral conservation easements, impact fees, flood protection requirements, land use restrictions, "no further armoring" conditions, and structure removal requirements.²⁴⁵ As stated above, most development activities in the coastal zone require a CDP, including "the placement or erection of [most] solid material[s] or structure[s] . . ."²⁴⁶ The CDP requirement plainly extends to most new development activities on undeveloped parcels, granting a certified local government broad authority to control future development within its jurisdiction.

As described earlier, where a local government has authority to issue CDPs, the Coastal Act and CEQA provide the permitting agency with the power to mitigate development through "reasonable terms and conditions" necessary to ensure that development will be in conformance with the Chapter 3 policies of the Coastal Act.²⁴⁷ Affected property owners could potentially challenge permit conditions as a regulatory taking under *Nollan-Dolan*. In general, the legal risk exactions pose is relatively low under the *Nollan-Dolan* analysis.²⁴⁸ In the case of new development, a court hearing a property owner's challenge to an exaction likely would find that exactions are logically related and roughly proportional to the impacts of the development because sea level rise ultimately will cause the coastal property to interfere with public rights to trust lands.

243. CAL. PUB. RES. CODE § 21080.9; CAL. CODE REGS., tit. 14, § 15265(a).

244. See CAL. CODE REGS., tit. 14, § 15265.

245. Byrne & Grannis, *supra* note 44, at 274; GRANNIS, *supra* note 47, at 3, tbl.1 & 30.

246. CAL. PUB. RES. CODE § 30600. But see *id.* §§ 30610-13.

247. *Id.* § 30607.

248. *Nollan v. Cal. Coastal Comm'n*, 483 U.S. 825 (1987); *Dolan v. City of Tigard*, 512 U.S. 374 (1994).

A local government also may be able to use its permitting authority to modify existing land uses. Although the Coastal Act explicitly exempts the improvement, repair, and maintenance of most existing private structures from the CDP requirement,²⁴⁹ the Act allows the Commission to specify by regulation that certain types of statutorily exempted activities “involve a risk of adverse environmental effect” and therefore still require a CDP.²⁵⁰ The Commission has drafted regulations that require owners of existing structures to obtain CDPs for a variety of development activities, thus allowing certified local governments to regulate some existing property owners and land uses through permit exactions.

The Commission has specified by regulation that a CDP is required for improvements to single-family residences that are “located: on a beach, in a wetland, seaward of the mean high tide line, in an environmentally sensitive habitat area, in an area designated as highly scenic in a certified land use plan, or within 50 feet of the edge of a coastal bluff.”²⁵¹ This category of locations incorporates a broad array of sensitive properties that may be especially vulnerable to flooding and erosion. Notably, the Commission’s interpretation of ESHA broadly includes all wetlands, estuaries, streams, rivers, lakes, coastal waters, and riparian habitats,²⁵² as well as large, contiguous areas of native Mediterranean habitats in the Santa Monica Mountains.²⁵³ In addition, the Commission has specified that a CDP is required for “[a]ny significant alteration of land forms including removal or placement of vegetation, on a beach, wetland, or sand dune, or within 50 feet of the edge of a coastal bluff, or in environmentally sensitive habitat areas.”²⁵⁴ As removal of vegetation can include an action as simple as raking

249. CAL. PUB. RES. CODE § 30610.

250. *Id.* § 30610(a)-(c).

251. CAL. CODE REGS. tit. 14, div. 5.5, § 13250.

252. CAL. COASTAL COMM’N, STATEWIDE INTERPRETIVE GUIDELINES FOR WETLANDS AND OTHER WET ENVIRONMENTAL SENSITIVE HABITAT AREAS (1981).

253. Memorandum from John Dixon, Cal. Coastal Comm’n Ecologies/Wetland Coordinator, to Ventura Staff, Cal. Coastal Comm’n, re Designation of ESHA in the Santa Monica Mountains (Mar. 25, 2003), *available at* <http://www.coastal.ca.gov/ventura/smm-asha-memo.pdf>. *See generally* CAL. PUB. RES. CODE § 30107.5 (“‘Environmentally sensitive habitat area’ means any area in which plant or animal life or their habitats are either rare or especially vulnerable because of their special nature or role in an ecosystem and which could be easily disturbed or degraded by human activities and developments.”).

254. CAL. CODE REGS. tit. 14, div. 5.5, § 13250. In the case of an existing private structure that is not a single-family residence, a CDP is still required for “(1) Improvement . . . if the structure or the improvement is located: on a beach; in a wetland, stream, or lake; seaward of the mean high tide line; in an area designated as highly scenic in a certified land use plan; or within 50 feet of the edge of a coastal

piles of beach seaweed, this regulation requires existing property owners to obtain a CDP for a broad range of land uses.

The Commission has also determined that repair, maintenance, or replacement of existing hard armoring structures requires a CDP. Accordingly, within a protection or accommodation zone, a local government can opt to approve a hard armoring permit for the design life of a structure while retaining authority to review whether armoring remains appropriate as the extent of sea level rise threats become clearer. In addition, a CDP is still required for the repair or maintenance of other structures located in “any sand area, within 50 feet of the edge of a coastal bluff or environmentally sensitive habitat area, or within 20 feet of coastal waters or streams” where the repair or maintenance requires the placement of solid materials or the presence of mechanized equipment or construction materials.²⁵⁵ The regulation’s inclusion of the “placement of solid materials” means that many repairs to and maintenance activities on existing structures require a CDP.

In the case of a property owner seeking a permit for improvement or repair of an existing property, a court likely will find that conditions furthering accommodation meet the *Nollan-Dolan* test. There is a clear nexus between the remodeling activity and conditions furthering accommodation because remodeling will extend the life of the development, thereby subjecting it to future interference with public trust lands and increasing its exposure to the impacts of sea level rise. Additionally, a court likely will find that conditions furthering accommodation are proportional to the impacts of the remodeling activity. Based on the strength of the public trust doctrine in California, a local government likely will be able to demonstrate to a court that any future interference with tidelands constitutes a significant impact to public rights that far outweighs the burden of the required conditions on a private landowner. A local government can support its conditions with projections evidencing that the property is vulnerable to the impacts of sea level rise.

3. Rebuilding After a Disaster

Accommodation-based strategies are key in advance of situations where property owners seek to rebuild structures destroyed by storms. Importantly, rebuilding a structure destroyed by a disaster falls largely outside of the regulatory reach of the Coastal Act. According to section 30610(g) of the Coastal Act, a statutory exemption from the CDP requirement extends to:

bluff; [and] (2) Any significant alteration of land forms including removal or placement of vegetation, on a beach or sand dune; in a wetland or stream; within 100 feet of the edge of a coastal bluff, in a highly scenic area, or in an environmentally sensitive habitat area” *Id.* § 13253.

255. *Id.* § 13252.

The replacement of any structure, other than a public works facility, destroyed by a disaster. The replacement structure shall conform to applicable existing zoning requirements, shall be for the same use as the destroyed structure, shall not exceed either the floor area, height, or bulk of the destroyed structure by more than 10 percent, and shall be sited in the same location on the affected property as the destroyed structure.

.....
(A) "Disaster" means any situation in which the force or forces which destroyed the structure to be replaced were beyond the control of its owner.

Where erosion is the disaster that destroys a property—regardless of whether the erosion is associated primarily with a storm event or the result of slowly rising sea levels—the section 30610(g) exemption likely will be irrelevant because the structure could not be re-sited in the same location. Rebuilding the structure on another portion of the parcel would require a CDP and thus be subject to the Commission and/or local government's approval. The exemption likely also will be irrelevant if the former location of the structure is inundated by the landward migration of the sea, both because of the impracticability of rebuilding the structure in a wet area and because the public trust rights will have followed the mean high tideline as it migrated onto what was previously private property, thus converting that property into a public trust resource.²⁵⁶

There may be situations, however, where a property owner could rebuild a destroyed coastal structure in the same location. For instance, a storm event may destroy a structure without eroding or inundating the land supporting the structure. The ability of property owners to repeatedly rebuild storm-destroyed structures in the same threatened location not only is uneconomical and inefficient but also could significantly interfere with a local government's accommodation- or retreat-based adaptation strategy. Consequently, the California Coastal and Ocean Working Group specifically encourages local governments to consider rebuilding restrictions as a potential adaptation strategy.²⁵⁷ Southern California local governments should proactively include rebuilding restrictions as conditions to CDPs for armoring, repair, improvement, and other development activities occurring in a retreat zone. Additionally, although we do not discuss the National Flood Insurance Program (NFIP) in detail in this article, local governments

256. *But see* CAL. CIV. CODE §§ 1014, 1015 (dictating that property boundaries to not change as a result of a sudden avulsion event on a river or stream bank); *Severance v. Patterson et al.*, 682 F.3d 360 (5th Cir. 2012) (holding that Texas law does not recognize a rolling easement in response to the avulsive effects of Hurricane Rita, versus accretive effects).

257. CAL. NATURAL RESOURCES AGENCY, *supra* note 12, at 77.

also should explore whether they can amend their NFIP-implementing regulations to restrict rebuilding and otherwise promote accommodation-based adaptation strategies.²⁵⁸

The section 30610(g) rebuilding exemption underscores the importance of a strong LCP complete with accommodation-based building codes and floodplain regulations. Note that section 30610(g) requires the rebuilt structure to “conform to applicable existing zoning requirements.” Thus, where a local government cannot exercise its permitting authority to prevent rebuilding in vulnerable zones, it may still exercise its floodplain zoning authority and building code authority to ensure that the reconstructed development is more resilient to sea level rise.

C. Retreat

Retreat strategies use regulatory tools to channel new development out of the vulnerable zone, while ultimately obliging existing development to be relocated, demolished, or inundated by the rising sea.²⁵⁹ Retreat strategies may be appropriate where Southern California beaches and other sensitive coastal resources are backed by private development. Relocating or abandoning the coastal armoring and other development that backs many California beaches would allow beaches to migrate inland. Otherwise, erosion and accretion related to sea level rise is predicted to reduce the total area of beaches in California, leading to a reduction in tourism revenues and beach-related expenditures.²⁶⁰ The California Coastal Commission reports that, as a rule-of-thumb, one foot of sea level rise corresponds to 50 to 100 feet of beach loss.²⁶¹ Within the City of Santa Barbara alone, sea level rise could result in the loss of more than three miles of beaches.²⁶² Because some of Southern California’s recreational assets are globally popular tourist destinations, impairment would have significant economic consequences.²⁶³

258. See Byrne, *supra* note 7, at 85.

259. Byrne & Grannis, *supra* note 44, at 268-69.

260. CAL. NATURAL RESOURCES AGENCY, *supra* note 12, at 65, 70. See also HIRSCHFELD & HOLLAND, *supra* note 29, at 50-51 (“Shorelines parks and recreational facilities [in San Diego Bay] are highly vulnerable to flooding and inundation, due to their extensive exposure and high sensitivity. These uses will be more exposed to flooding and inundation than any other land use . . .”).

261. See *id.* at fig.5.

262. GRIGGS & RUSSELL, CITY OF SANTA BARBARA SEA LEVEL RISE VULNERABILITY STUDY, *supra* note 32, at 28.

263. See generally Linwood Pendleton et al., *Estimating the Potential Economic Impacts of Climate Change on Southern California Beaches*, 109 CLIMATIC CHANGE 277 (2011).

In addition to beaches, other sensitive coastal habitats such as dunes and wetlands may be eroded or flooded by rising sea levels, or by storm surges exacerbated by rising sea levels, and irreversibly lost.²⁶⁴ Only 33.9 square miles of coastal wetlands remain in Southern California, and almost half of that area is located in San Diego County.²⁶⁵ As wetlands provide a variety of important ecosystem services to surrounding communities, such as flood protection and water purification, the environmental consequences of local flooding or inundation could be significant.²⁶⁶ Thus, wetland protection is sure to play an important role in sea level rise planning. Furthermore, San Diego's subtidal marshes comprise almost 20 percent of all eelgrass habitat in California, providing critical support for a variety of endangered and threatened species.²⁶⁷ In densely developed Los Angeles County, only two major wetland areas are left: the Ballona and Bolsa Chica Wetlands. The Ballona Wetlands are a biodiversity hotspot, and provide important habitat for plants and wildlife.²⁶⁸ The Bolsa Chica Wetlands provide critical habitat for raptors, herons, and other shorebirds, including threatened and migratory bird species.²⁶⁹ Conservation of these two wetlands is especially critical because Los Angeles County has the second lowest wetlands acreage of any coastal county in the state.²⁷⁰ The California Climate Change Center estimates that wetlands require roughly 150 square miles of additional land to accommodate a fifty-five-inch rise in sea levels.²⁷¹ In Los Angeles and Orange Counties, the majority of potential coastal

264. CAL. NATURAL RESOURCES AGENCY, *supra* note 12, at 69-70. See also CAL. COASTAL COMM'N, OVERVIEW OF SEA LEVEL RISE AND SOME IMPLICATIONS FOR CALIFORNIA, *supra* note 18, at 15 (projecting that sea level rise in California will inundate coastal wetlands).

265. HEBERGER ET AL., *supra* note 160, at 66, fig.26.

266. *Id.* at 28.

267. HIRSCHFELD & HOLLAND, *supra* note 29, at 28-29.

268. *Ballona Wetlands Education Program*, LOS ANGELES AUDUBON, <http://www.losangelesaudubon.org/education-mainmenu-194/ballona-wetlands-program-mainmenu-203> (last visited Mar. 19, 2013).

269. *Bolsa Chica Campaign Fact Sheet*, ANGELES CHAPTER SIERRA CLUB (Jan. 30, 2004), http://angeles.sierraclub.org/pressroom/FS_BolsaChica.asp; *Experience Bolsa Chica*, BOLSA CHICA LAND TRUST (2009), <http://www.bolsachicalandtrust.org/experience.html>.

270. See HEBERGER ET AL., *supra* note 160, at 67, tbl.18 (reporting that, with only 2.8 square miles of wetland area, Los Angeles County contains less wetlands area than every other county except San Francisco).

271. HEBERGER ET AL., *supra* note 160, at 68.

wetland migration area is not viable wetland habitat because it is already developed, adding to wetland conservation challenges.²⁷²

Ultimately, the freedom of beaches, dunes, and wetlands to migrate inland will be essential to their survival.²⁷³ Through buyout programs, local governments could use public funds to purchase the developed or undeveloped private property necessary to protect migration corridors for ecosystems that must migrate landward to avoid inundation. A locality could purchase complete parcels or easements in fee simple.²⁷⁴ Local governments potentially could seek funds from the Commission or through various federal government sources to support land acquisition programs. Regardless, purchasing large amounts of privately held coastal property is likely to be prohibitively expensive for local governments and to result in a loss of an important tax base.²⁷⁵ Thus, a local government interested in implementing a retreat strategy must turn to regulatory tools. Fortunately, Southern California local governments already exercise a variety of land use decisionmaking powers that can help them orchestrate a retreat from sea level rise in appropriate areas.²⁷⁶

Legal and political complications may arise from the fact that private property owners control much of the coastline and may prefer to install hard armoring rather than accept significant regulatory restrictions on the use of their property, let alone abandon their developed property to the rising tide. To accomplish retreat in areas where private property owners control a significant portion of the coastal zone, Southern California local governments must confront the issue of hard armoring, which prevents the inland migration of coastal ecosystems. A local government could use the public trust doctrine and the Coastal Act in combination with its zoning or permitting authority to prevent hard armoring.²⁷⁷ We present several strategies to prevent hard armoring, along with their attendant legal risks, below. We also outline opportunities for innovative local governments to further retreat by enacting regulatory setbacks that “roll” with the rising tide, imposing permit exactions, and implementing a transfer of development rights (TDR) program.²⁷⁸

272. *Id.* at 73, fig.30; HANAK & MORENO, *supra* note 58, at 3.

273. CAL. COASTAL COMM’N, OVERVIEW OF SEA LEVEL RISE AND SOME IMPLICATIONS FOR CALIFORNIA, *supra* note 18, at 15.

274. GRANNIS, *supra* note 47, at 47.

275. *See* Byrne & Grannis, *supra* note 44, at 269, 270.

276. *Id.* at 268.

277. Caldwell & Segall, *supra* note 48, at 544-67.

278. Transfer of development rights (TDR) programs also are sometimes referred to as “transfer of development credits” or “TDC” programs.

1. Preventing Hard Armoring

In contrast to protection strategies, which employ armoring to fix the coastline in its current location, retreat strategies enable coastal ecosystems to migrate landward. Temporary armoring to protect development from erosion, high waves, and storm surges may not be incompatible with long-term retreat goals; however, at some point, the mean high tideline may rise to a level that necessitates either abandonment of a parcel, or construction of a permanent seawall to hold back the sea from encroaching upon private property. At this point, because hard armoring protections have long been the default coastal adaptation strategy in California, a local government pursuing a strategy of retreat will need tools to prevent private property owners from installing or expanding the use of hard armoring.

As discussed above, section 30235 of the Coastal Act provides that armoring “shall be permitted when required to . . . protect existing structures or public beaches in danger from erosion” Notably, the term “existing structures” has unsettled meaning. The Commission historically has interpreted the term to refer to structures existing as of the time of application for a CDP to construct coastal armoring, although the term could be read to limit armoring to structures pre-dating the 1976 passage of the Coastal Act.²⁷⁹ Under the Commission’s current interpretation of the term “existing,” section 30235 of the Coastal Act appears to guarantee current property owners a broad right to install armoring at the point at which sea level rise endangers their property. However, since the late 1990s, the Commission has included “no further armoring” conditions in all CDPs (e.g., for new structures, additions, remodeling, etc.) as a general policy, along with a waiver of liability and a permanent deed restriction noticing all future owners of the armoring restriction should imminent danger arise.²⁸⁰ A “no further armoring” condition prohibits new armoring as well as expansions of existing armoring. Consequently, it is principally owners of structures that: (1) were constructed prior to the late 1990s, and (2) have not been modified since the late 1990s, which would have triggered CDP requirements, who may present a challenge to a local retreat strategy.²⁸¹

Where section 30235 of the Coastal Act appears to allow a property owner to armor, other sources of California law can provide grounds to challenge coastal armoring as an illegal interference with public lands. The most important of these is the public trust doctrine. A local government pursuing a retreat strategy to combat sea level rise could use the public

279. Caldwell & Segall, *supra* note 48, at 558-59.

280. Caldwell & Segall, *supra* note 48, at 564-65; HANAK & MORENO, *supra* note 58, at 17.

281. HANAK & MORENO, *supra* note 58, at 17. Although note that the Commission could exercise its discretion to change its policy of including “no further armoring” conditions in all CDPs. *Id.*

trust doctrine in tandem with the Coastal Act to support a zoning ordinance prohibiting armoring, deny CDP applications for armoring, challenge individual hard armoring structures, or challenge CDPs granted by the Commission for armoring.²⁸² We discuss each of these three tools, along with its attendant legal risks, in turn.

a. Regulatory Prohibitions on Armoring

To facilitate retreat in developed communities, a local government might seek to impose a local zoning ordinance that restricts any additional hard armoring. We refer to such an ordinance here as a “no further armoring” ordinance. The most aggressive version of a “no further armoring” ordinance would prevent owners of currently unprotected property from installing hard armoring in the future, and would require owners of protected property to remove their hard armoring structures after the permit term for the armoring structure expires. By prohibiting the renewal of permits for current armoring structures and eventually requiring the removal of current structures, the ordinance effectively would define an abandonment date for some coastal structures. A “no further armoring” ordinance that applies to developed and undeveloped properties and current and future owners alike is almost certain to engender political controversy.²⁸³ In situations where people’s homes are perceived to be at stake, emotions run high.²⁸⁴ As stated above, about one-third of the Southern California coastline is already armored.²⁸⁵ Coastal landowners that have not yet armored their property may feel a “no further armoring” ordinance is unfair if neighbors with existing seawalls would not have to abandon their property as quickly. Public opposition to such an ordinance may gain momentum as storm surges begin to actively destroy coastal buildings, and homes sited on eroding bluffs begin to crumble into the sea. Because affluent landowners own much of the coastal private property in Southern California,²⁸⁶ the likelihood of legal action and coordinated

282. Caldwell & Segall, *supra* note 48, at 544-67.

283. *Id.* at 567.

284. See, e.g., Jonathan Friedman, *Road Issue Major Hurdle in Conservancy Plan Resolution*, MALIBU TIMES, Nov. 28, 2007, http://www.malibutimes.com/news/article_898c7253-1f28-5f4a-9ab5-6fe2b60cf02c.html (describing Malibu residents’ heated opposition to a Santa Monica Mountains Conservancy proposal to allow overnight camping in Ramirez Canyon in part because of the perceived fire risks to homes).

285. See *supra* text accompanying note 45.

286. In California, median- and high-income persons make up 73 percent of the coastal residents vulnerable to sea level rise-related flooding. HEBERGER ET AL., *supra* note 160, at 46. As an example from Southern California, the median household income in the coastal City of Malibu is 132,926 dollars, compared to a statewide median household income of 61,632 dollars, and the median housing unit

political opposition is significant. Southern California coastal property owners are not likely to surrender their real estate investments without a fight.

Political conflict can increase the likelihood of legal challenges, which, regardless of their outcome, could delay full implementation of a retreat-based strategy. For these reasons, local governments should carefully consider whether and how to incorporate ordinances that restrict armoring into their broader sea level rise adaptation strategies. Before publicly pursuing a “no further armoring” ordinance, a local government should confirm its solid commitment to the policy. Governments also should follow sound principles of public participation during all stages of the policymaking process. As the Coastal Act itself declares, “the achievement of sound coastal conservation and development is dependent upon public understanding and support; and . . . planning and implementation of programs for coastal conservation and development should include the widest opportunity for public participation.”²⁸⁷ Broad-scale stakeholder engagement, public meetings, solicitation of public comment, public education programs, and other purposeful public participation efforts could be valuable ways to broaden commitment to a “no further armoring” policy and thereby mitigate legal risk.²⁸⁸ Key to the process will be developing and communicating information about future physical risks and uncertainties, as well as the likely economic, social, and environmental costs of protecting communities through hard armoring.

A local government that enacts a “no further armoring” ordinance should be prepared for a battle over the ordinance’s constitutionality. Depending on when property owners likely will be forced to abandon their property, such an ordinance could negatively affect property and resale values.²⁸⁹ Thus, discontented private property owners who are denied the opportunity to armor their property would challenge the ordinance as a regulatory taking that unconstitutionally diminishes their property value.²⁹⁰

value in Malibu is 1,000,001 dollars, compared to a statewide median housing unit value of 421,600 dollars. U.S. Census Bureau, State & County Quickfacts—Malibu (city), California, <http://quickfacts.census.gov/qfd/states/06/0645246.html>.

287. CAL. PUB. RES. CODE § 30006.

288. See generally Nancy Perkins Spyke, *Public Participation in Environmental Decisionmaking at the New Millenium: Structuring New Spheres of Public Influence*, 26 B.C. ENVTL. AFF. L. REV. 277 (1999).

289. Kriesel & Friedman, *supra* note 52 (finding that shoreline stabilization can positively impact property values for the armoring property owner, while erosion risk negatively affects the value of properties that take no stabilization action).

290. See Caldwell & Segall, *supra* note 48, at 568 (arguing that a regulation restricting armoring would not result in the total loss of economically beneficial use necessary to trigger an analysis under *Lucas* because the future loss of property will

A court hearing a challenge to the ordinance should weigh the public and private interests at stake under the *Penn Central* balancing test.²⁹¹ The public trust doctrine would provide the most persuasive support for the ordinance. Under the prong of the *Penn Central* balancing test where the court must evaluate the character of the regulation, a local government defending a “no further armoring” ordinance should argue that the zoning ordinance merely codifies the public trust doctrine’s background limits on private development in tidelands.²⁹²

There is no exact definition of which legal doctrines constitute background principles, and no California case has addressed the concept.²⁹³ Background principles of state law are underlying restrictions that define the contours of private property interests. As the U.S. Supreme Court has stated, background principles “inhere in the title itself.”²⁹⁴ The Court has described background principles as “common, shared understandings of permissible limitations . . . derived from a state’s legal tradition.”²⁹⁵ They are understood to include the principles of, *inter alia*, nuisance law, public safety, custom, and the public trust doctrine.²⁹⁶ A property owner may not use her property in a way that violates background principles. Using traditional property law terms, we could say that background principles describe land uses that never were a part of an owner’s “bundle of sticks.”²⁹⁷ The government cannot seize a property interest that an owner never had.²⁹⁸ As an illustration, the common law nuisance doctrine prevents a property owner from creating a public nuisance on her property; therefore, a regulation that prevents property owners from using their property in a harmful or offensive way cannot constitute a regulatory taking, even if the regulation significantly restricts land use.²⁹⁹

As the public trust doctrine is a source of background principles, regulations that codify public trust principles cannot constitute a regulatory

not occur for decades, and the discounted present value of the easement’s impact on property values is minimal for all but imminently threatened property).

291. *Penn Cent. Transp. Co. v. City of New York*, 438 U.S. 104 (1978).

292. *Byrne & Grannis*, *supra* note 44, at 275-77.

293. *See HIGGINS*, *supra* note 98, at 14.

294. *Lucas v. S.C. Coastal Council*, 505 U.S. 1003, 1029 (1992).

295. *HIGGINS*, *supra* note 98, at 14 (quoting *Palazzolo v. Rhode Island*, 533 U.S. 606, 630 (2001)).

296. *Id.* at 12.

297. *Id.*

298. *Id.*

299. *See id.* at 13 (citing CAL. CIV. CODE §§ 3479, 3480; *Mugler v. Kansas*, 123 U.S. 623, 675 (1887)).

taking.³⁰⁰ A local government may be able to demonstrate to a court that a “no further armoring” ordinance merely codifies the preexisting legal principles that prohibit owners from using private property in a way that interferes with public trust resources and that require trustees to protect public trust resources for the benefit of the state’s citizens. The local government should reference empirical studies showing that hard armoring structures negatively impact coastal ecosystems by deflecting wave energy and contributing to coastal erosion. Additionally, the government should argue that armoring prevents the natural inland migration of the mean high tideline, thus prohibiting the state’s citizens from rightfully enjoying their tidelands.

Nonetheless, no matter how compelling the public trust doctrine, a court may be reluctant to enforce a “no further armoring” ordinance against owners who purchased their property prior to enactment of the ordinance and with the expectation that hard armoring would be available. In such cases, a court is more likely to find the ordinance to be “forcing some people alone to bear public burdens which . . . should be borne by the public as a whole.”³⁰¹ Specific facts could be important here. For instance, a court may feel more secure enforcing the ordinance against a property owner where the impacts of sea level rise on the property will not manifest for many years into the future and the impact of the regulation on the property’s value is low.³⁰² Local governments should emphasize, as Peloso and Caldwell suggest, that “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.”³⁰³ Under the prong of the balancing test that considers the economic impact of the regulation, a local government will have the strongest case where it can demonstrate using sea level rise projections that future abandonment of the property will not occur for many years.

300. *Accord id.* at 14 (citing Nat’l Audubon Soc’y v. Superior Court, 33 Cal. 3d 419, 440 (1983), *cert. denied*, 464 U.S. 977 (1983)). *Cf.* Esplanade Properties, LLC v. City of Seattle, 307 F.3d 978, 985 (9th Cir. 2002) (holding that the public trust doctrine constitutes a background principle of Washington State law for the purpose of a takings analysis); *Stevens v. City of Cannon Beach*, 317 Or. 131 (1993), *cert denied*, 114 S. Ct. 1332 (1994) (holding that the common law doctrine of custom constitutes a background principle of Oregon State law for the purpose of a takings analysis and restricts private ownership of the dry sand beach); *McQueen v. S.C. Coastal Council*, 354 S.C. 142 (2003), *cert denied* 124 S. Ct. 466 (2003) (holding that the public trust doctrine constitutes a background principle of South Carolina State law for the purpose of a takings analysis).

301. *Armstrong v. United States*, 364 U.S. 40, 49 (1960).

302. *See Caldwell & Segall, supra* note 48, at 568.

303. Margaret E. Peloso & Margaret R. Caldwell, *Dynamic Property Rights: The Public Trust Doctrine and Takings in a Changing Climate*, 30 STAN. ENVTL. L.J. 51, 72 (2011).

Under the prong of the balancing test that considers the investment-backed expectations of the property owner, a local government should stress to the court that the owner will already have enjoyed the reasonable lifespan of the structures by the time of abandonment—particularly so in the cases of structures that are many decades old. A local government may wish to appeal to a predetermined economic lifespan of structures set out in its zoning code³⁰⁴ or in a CDP related to the property, or reference the Commission's routine presumption of a 75-year economic lifespan for new structures.³⁰⁵ In the hypothetical case of property abandonment in 2050, property owners in all pre-1975 structures would have enjoyed a 75-year beneficial lifespan, and property owners in all pre-2020 structures would have satisfied a 30-year mortgage term. Notably, the median construction date of Santa Barbara County homes is 1974,³⁰⁶ Los Angeles County—1973,³⁰⁷ Orange County—1983,³⁰⁸ and San Diego—1985.³⁰⁹ Additionally, a local government should emphasize to the court that a property owner can never reasonably expect to use her property in a way that interferes with public trust lands. Certainly, this argument will have the strongest force against owners who purchased their property after the 1976 passage of the Coastal Act and after sea level rise became a matter of local public acknowledgement.³¹⁰ (For a more detailed exploration of the relationship between the public trust doctrine and reasonable investment-backed expectations, see the discussion of regulatory setbacks *infra*.) It is notoriously difficult to predict how any court will apply a subjective balancing test. Still, the public trust doctrine has a particularly strong

304. See, e.g., MENDOCINO CNTY. COASTAL ZONING CODE § 20.500.020, available at <http://www.co.mendocino.ca.us/planning/zoning/> (setting the economic life span of new structures at 75 years for the calculation of a mandatory setback distance from the edges of bluffs).

305. See, e.g., CAL. COASTAL COMM'N, STAFF REPORT W10A-11-2012 at 12 (Oct. 26, 2012), available at <http://documents.coastal.ca.gov/reports/2012/11/W10a-11-2012.pdf>; CAL. COASTAL COMM'N, STAFF REPORT W8C-4-2010 at 10 (Mar. 30, 2010), available at <http://documents.coastal.ca.gov/reports/2010/4/W8c-4-2010.pdf>.

306. Santa Barbara, CA Real Estate, COLDWELL BANKER, http://www.coldwellbanker.com/real_estate/home_search/ca/Santa%20Barbara (last updated Feb. 4, 2013).

307. Los Angeles, CA Real Estate, COLDWELL BANKER, http://www.coldwellbanker.com/real_estate/home_search/ca/Los%20Angeles (last updated Feb. 4, 2013).

308. Orange, CA Real Estate, COLDWELL BANKER, http://www.coldwellbanker.com/real_estate/home_search/ca/Orange (last updated Feb. 4, 2013).

309. San Diego, CA Real Estate, COLDWELL BANKER, http://www.coldwellbanker.com/real_estate/home_search/ca/San%20Diego (last updated Feb. 4, 2013).

310. See Peloso & Caldwell, *supra* note 303, at 81.

legacy and expansive application in California,³¹¹ and the negative impacts of hard armoring on public trust resources is well-documented.³¹² In many cases, particularly where the impacts of sea level rise will not manifest for many years and the impact of the ordinance on the property's value is low, a local government should be able to demonstrate to a court that the public's interest in preserving the coast outweighs private property owners' interests in hard armoring.

b. Challenging an Armoring Structure under the Public Trust Doctrine

If the public trust doctrine restricts private property owners' ability to construct armoring as a background principle of state law, it follows that a local government could use the public trust doctrine to oppose individual armoring structures even absent a "no further armoring" ordinance or permit restriction. That is, a local government should be able to assert its sovereign authority as a public trustee to prevent armoring, rather than enact an ordinance through exercise of its police powers. Here, the local government would initiate a legal action to restrain a property owner from installing armoring or to require an owner whose property is protected to remove existing armoring. The local government would argue that the challenged armoring structure interferes unlawfully with public resources. The disadvantage of this litigation strategy is that the case will be very fact-specific. The local government must be able to prepare and present empirical studies specific to the challenged armoring structure for the purposes of demonstrating to the court why the challenged structure, in particular, impedes public trust resources. Local governments should be advised that legal uncertainty is high in complex, fact-based cases. Fact-intensive cases typically also require significant resources and time. Yet at the conclusion of the case, a favorable ruling would prevent only one armoring structure. To effect any meaningful change, a local government may have to challenge large numbers of property owners in a piecemeal fashion. Nonetheless, it is possible that favorable rulings in a small number of cases will provide enough guidance to property owners and courts to effect a significant change in property owners' motivation to armor.

Alternatively, the local government could argue that *all* armoring structures (or all armoring structures of a particular type) impede the public trust. A local government pursuing this strategy would argue that section 30235 of the Coastal Act, which provides that armoring "shall be permitted when required . . . to protect existing structures . . . in danger . . .,"³¹³ is facially unconstitutional because it conflicts with the public trust doctrine and

311. See *Marks v. Whitney*, 6 Cal. 3d 251 (1971); *Nat'l Audubon Soc'y v. Superior Court*, 33 Cal. 3d 419 (1983), *cert. denied*, 464 U.S. 977 (1983).

312. See *supra* notes 47-53 and accompanying text.

313. CAL. PUB. RES. CODE § 30235.

Article X of the California Constitution. There are advantages and disadvantages to this strategy. On one hand, a favorable ruling could result in the court striking down or severely restricting section 30235, thereby affecting all coastal properties. Depending on the nature of the opinion, however, a “favorable” ruling could prohibit local governments from taking sensible and economical measures to defend protection zones and critical municipal infrastructure. On the other hand, an unfavorable ruling could have devastating impacts on governments’ ability to use rolling development restrictions and other innovative sea level rise adaptation strategies rooted in the public trust doctrine. Consequently, other public entities and adaptation advocates would not likely support a “rogue actor” local government challenging section 30235. Furthermore, a large-scale challenge to the legality of armoring is unprecedented, so high levels of legal uncertainty and political controversy would characterize the case. Because of the high stakes of the litigation, both parties would be motivated to appeal the case to the highest judicial authority. Litigation could stretch on for years, straining limited local government resources.

On balance, the costs and risks appear to outweigh the potential benefits of directly challenging an armoring structure or Coastal Act section 30235 under the public trust doctrine. Fortunately, local governments can exercise less risky regulatory tools to limit hard armoring and mitigate its impacts.

c. Denying Permit Applications for Hard Armoring

As an alternative to a “no further armoring” ordinance that applies to all properties, local governments with permitting authority can deny permit applications for hard armoring on a case-by-case basis based on the Coastal Act, CEQA, and the public trust doctrine. The Chapter 3 policies of the Coastal Act provide a variety of grounds upon which a permitting entity could deny a CDP for hard armoring. The strongest of these grounds is public access and recreation. The State Legislature gave maintaining and enhancing public access special emphasis in the Coastal Act. One of the Legislature’s stated goals in passing the Coastal Act was “[m]aximiz[ing] public access to and along the coast and maximiz[ing] public recreational opportunities”³¹⁴ In furtherance of this goal, as well as the public access provisions in Article X, section 4 of the California Constitution, large chunks of the Coastal Act are devoted to preserving and enhancing coastal access.³¹⁵ Additionally, the Coastal Act specifically requires that every CDP issued for development between the coastline and the first public roadway “shall include a specific finding that the development is in conformity with the public access and public recreation policies of Chapter 3.”³¹⁶ A permit denial

314. CAL. PUB. RES. CODE § 30001.5.

315. *Id.* ch. 3, art. 2; *id.* ch. 6, art. 3.

316. *Id.* § 30604.

should reference the wide range of empirical studies that demonstrate the adverse impacts of hard armoring on public access and recreation.

The existence of strong LCP policies restricting armoring would strengthen a local government's decision to deny a hard armoring CDP. Section 30604(b) of the Coastal Act allows a permitting agency to deny CDPs that violate a certified LCP. Therefore, an LCP policy disfavoring armoring could provide grounds for a local government to deny a permit. As an example, Policy 6.3 of the City of Santa Barbara LCP explicitly preferences retreat strategies over protection with hard armoring:

Seawalls, revetments and bulkheads shall not be permitted unless the City has determined that they are necessary to, and will accomplish the intent of protecting existing principal structures, and that there are not less environmentally or aesthetically damaging alternatives such as relocation of structures, sand augmentation, groins, drainage improvements, etc.³¹⁷

Other potentially useful LCP policies could include ordinances that restrict hard armoring in particular zones or evidence a general local policy of limiting hard armoring within the jurisdiction to the maximum extent feasible.

Where the property seeking a permit is in imminent danger, the local government will have to acknowledge Coastal Act section 30235, which provides that hard armoring "shall be permitted when required to . . . protect existing structures . . . in danger from erosion" Despite the seemingly mandatory "shall" language in section 30235, permitting entities still have latitude to deny a CDP for hard armoring based on another section of the Act, section 30007.5, which "recognizes that conflicts may occur between one or more policies" of the Act, and declares that "such conflicts be resolved in a manner which on balance is the most protective of significant coastal resources." The denial decision should reference the inherent conflict between the hard armoring right and the public access and environmental policies in Chapter 3 of the Coastal Act, and determine that denying the hard armoring permit at issue is the most environmentally protective outcome. Note, however, that denying a CDP for hard armoring where a structure is in imminent danger may trigger takings liability.³¹⁸ (For further discussion of potential takings liability, see the analysis of "no further armoring" ordinances in subsection a *supra*.)

317. CITY OF SANTA BARBARA, LOCAL COASTAL PLAN (1981), as amended Nov. 2004, available at <http://www.santabarbaraca.gov/NR/rdonlyres/339FC495-3AA7-4EB8-A398-01811BA23A08/0/LocalCoastalPlanCompleteDocumentPDF.pdf>.

318. Peloso & Caldwell, *supra* note 303, at 73.

The public trust doctrine, which places a duty upon a local government trustee to protect coastal resources for public fishing, recreation, and open space, environmental protection, underlies the Coastal Act's public access protections and reinforces a decision to deny a CDP for hard armoring.³¹⁹ Peloso and Caldwell argue,

[I]t follows from the Supreme Court's logic in *Illinois Central* that the full scope of a [trustee]'s public trust duty under the radically different environmental circumstances of significant sea level rise may require not only that the [trustee] proactively assert the advance of the public trust title with rising seas, but also that the [trustee] deny permits to hold back the natural advance of mean high tide.³²⁰

Peloso and Caldwell acknowledge, on one hand, the inherent difficulties of asserting this argument before the rising mean high tideline has converted the property at issue into public trust lands.³²¹ On the other hand, they acknowledge that waiting to deny a hard armoring permit until the point where the structure is in imminent danger may trigger takings liability.³²² Although a local government should be able to demonstrate to a court that there is an apparent conflict, in either scenario, between the public trust doctrine and the Coastal Act's armoring provision, a prudent local government may prefer to avoid the controversy and ensuing litigation altogether. Instead of denying the hard armoring permit, the local government can simply grant the armoring permit and wait until the mean high tideline reaches the hard armoring structure before ordering its removal.³²³

CEQA could provide another potential tool for local agencies to require implementation of alternatives to hard armoring. CEQA's substantive mandate is that agencies refrain from approving projects with significant environmental impacts if there are "feasible alternatives" that can substantially lessen or avoid those impacts.³²⁴ Thus, under CEQA, an agency may propose alternatives to hard armoring that would achieve the same objective of protecting an existing structure, but with fewer significant effects. Where it is feasible to implement those alternatives, the agency should require their implementation. Those alternatives can be required only if there is independent authority to support them, such as zoning

319. See *Marks v. Whitney*, 6 Cal. 3d 251 (1971).

320. Peloso & Caldwell, *supra* note 303, at 59.

321. *Id.* at 60.

322. *Id.* at 72-73.

323. *Id.* at 73.

324. CAL. PUB. RES. CODE § 21002; CAL. CODE REGS., tit. 14, §§ 15002(a)(3), 15021(a)(2).

ordinances or Coastal Act-authorized provisions. Nonetheless, the Commission and local governments have granted many armoring permits over the years based upon findings that there are no other feasible less-environmentally-damaging alternatives to hard armoring projects. The Commission routinely has found removal or relocation of threatened structures to be infeasible because of the expense and/or lack of available area on the parcel.³²⁵ A local government likely would need to support any significant change in this historical policy with substantial justification, including empirical studies and other evidence demonstrating a change in physical conditions. Under the authority of section 30801 of the Coastal Act, an aggrieved permit applicant could appeal the local government's permit denial to the Commission and possibly a court, either of which would focus intently on the administrative record prepared by the local government.

d. Challenging Commission-Granted Permits for Armoring

There may be cases where the Commission has sole or dual permitting authority over a property within the local government's boundaries—either because of the nature of the property or development, or because the local government lacks a certified LCP—and the Commission approves a property owner's CDP for coastal armoring.³²⁶ In such a case, the local government may consider the armoring project to be in conflict with its broader sea level rise adaptation goals, perhaps because the local government is exercising a general policy of managed retreat or no-armor accommodation, or because the armoring project will impair the ability of a beach, wetland, or other sensitive coastal ecosystem to migrate inland. In such circumstances, a local government could challenge a CDP issued by the Commission for coastal armoring.

Section 30801 of the Coastal Act allows any "aggrieved person" (i.e., a person who appeared at a Commission hearing regarding the action or who, "by other appropriate means prior to a hearing, informed the commission . . . of the nature of his concerns . . .") a right to judicial review of any Commission decision or action by seeking a writ of mandate within sixty days of the decision becoming final. Section 30803 also allows "[a]ny person" to seek declaratory and equitable relief in response to any violation of the Coastal Act. Additionally, any person may bring an action to enforce the Commission's nondiscretionary duties.³²⁷ A local government could challenge a CDP for hard armoring on the grounds that hard armoring violates Chapter 3 of the Coastal Act, as outlined above. Additionally, section 30604(a) of the Coastal Act, which prohibits the Commission from approving a CDP if the permitted development "would prejudice the ability

325. See, e.g., CAL. COASTAL COMM'N, STAFF RPT. FR 6B (App. No. 6-04-156), *supra* note 174, at 15.

326. See *supra* text accompanying note 168.

327. CAL. PUB. RES. CODE § 30804.

of [a] local government to prepare a local coastal program that is in conformity with Chapter 3 . . .,” may be relevant. Under this authority, a local government may be able to demonstrate to a court that it is preparing to adopt an LCP and its future local LCP plans will restrict hard armoring in the area at issue. The local government could even argue that approving the armoring permit amounts to the Commission’s abdication of its public trust responsibilities.

Challenging a Commission-granted armoring permit would require a significant investment of a local government’s time and resources to, in the best-case scenario, prevent one armoring project. Hence, this strategy is best reserved to address particularly egregious armoring projects. For example, a local government may wish to fight a large armoring project behind a sensitive wetland or popular beach. Challenging permits on a case-by-case basis should not serve as a substitute for a broad-scale local adaptation planning strategy, however.

2. Regulatory Setbacks

Another valuable retreat-based adaptation tool is the mandatory setback (also called buffer). In the context of sea level rise adaptation, setbacks establish a minimum distance from the coast beyond which property owners are allowed to erect or maintain structures. Notably, both the Coastal and Ocean Working Group and the California Climate Adaptation Strategy encourage local governments to impose mandatory setbacks.³²⁸ A setback distance can be fixed (e.g., 100 feet from the position of the mean high tideline at the time of construction); based on a projected erosion rate calculated over the expected life of the structure (e.g., landward from the mean high tideline a distance of at least seventy-five times the annual rate of erosion); and/or “tiered” such that smaller structures are subject to a smaller setback distance while larger structures that will be more challenging to abandon or relocate are subject to a greater setback distance.³²⁹

To incorporate sea level rise projections into the construction of new structures, a local government could establish setback distances for each new structure based on erosion rates and the expected lifespan of the development.³³⁰ Setbacks have the added advantage of facilitating both accommodation and retreat. As Titus has described, erosion-based setbacks

328. CAL. NATURAL RESOURCES AGENCY, *supra* note 12, at 77; GRANNIS, *supra* note 47, at 27.

329. GRANNIS, *supra* note 47, at 26.

330. *Id.* See, e.g., Byrne & Grannis, *supra* note 44, at 273 (citing Maine’s Sand Dune Rule, ME. CODE R. 06-096 ch. 355, § 5, which calculates setbacks for structures over 2,500 square feet based on a rate of two feet of sea level rise over the next 100 years).

“clearly contemplate that shores will erode for the next few decades, but they leave open the question of whether homes will be removed or shores protected once the erosion buffer is consumed.”³³¹ In combination with an erosion-based setback requirement, a mandatory setback distance from sensitive coastal resources like beaches or wetlands could allow a local government to preserve migration corridors for those ecosystems.³³² Although fixed setbacks do not create the same expectation of eventual abandonment as erosion-based setbacks do, they are a useful tool for local governments to further sea level rise accommodation goals while delaying the inevitable choice between protection and retreat.³³³ It would be fairly easy for a local government to commit to retreat down the road by purchasing or condemning an easement that is designed to roll with sea level rise on the setback area.³³⁴ One significant drawback of setbacks as an adaptation strategy, however, is that they have the potential to lower property values.³³⁵ If a court finds that a local government issued a setback ordinance in order to reduce the purchase cost of an easement, it may invalidate the ordinance as an improper exercise of police power. Alternatively, a court could find that the ordinance is part of a larger condemnation effort and order the government to pay compensation. To be safe, local governments should wait a period of years between establishing a setback ordinance and seeking easements.³³⁶

In the context of the Coastal Act, setbacks historically have been “a contentious issue.”³³⁷ There is no explicit authorization for setbacks in the Act, although general policy language could be read to express approval of buffer areas to protect coastal waters, wetlands, and other sensitive resources.³³⁸ The Commission has a stated practice of requiring a 100-foot buffer from wetlands when reviewing proposals for development in Southern

331. TITUS, *supra* note 38, at 65-66.

332. GRANNIS, *supra* note 47, at 26.

333. TITUS, *supra* note 38, at 66.

334. *Id.*

335. GRANNIS, *supra* note 47, at 28.

336. TITUS, *supra* note 38, at 66.

337. CAL. COASTAL COMM’N, RECAP PILOT PROJECT FINDINGS AND RECOMMENDATIONS: MONTEREY BAY REGION ch. 5 (1995), available at <http://www.coastal.ca.gov/recap/content2.html>.

338. *Id.* See CAL. PUB. RES. CODE §§ 30231, 30240(b). See also *Bolsa Chica Land Trust v. Superior Ct.*, 71 Cal. App. 4th 493, 507 (1999) (holding that mitigation of impacts to environmentally sensitive habitat areas is not sufficient to satisfy Coastal Act section 30240, which requires the literal area to be protected from development that threatens habitat values).

California.³³⁹ Certified LCPs and Land Use Plans, however, historically have varied widely in their attention to buffers and the degree to which they allow exceptions from setback requirements.³⁴⁰ The Commission encourages local governments to incorporate new scientific data into setback requirements as they update LCPs.³⁴¹

A potential limitation on setback ordinances is that an ordinance mandating an aggressive setback—one that might challenge the ability of some property owners to develop their property at all—could be construed as a regulatory taking. A court hearing a legal challenge to a setback ordinance from an aggrieved property owner may find that the program constitutes a regulatory taking in the unlikely event that the erosion rate or distance employed does not leave a property owner sufficient space to develop the property. In such a case, a court may find that the regulation denies the property owner any economically beneficial use of her property under *Lucas*.³⁴² Local governments could reduce their legal risk by adopting a policy that allows granting of variances in extreme situations like this.

If a locality's erosion-based setback leaves a property owner with sufficient development space on her property, a court will analyze the ordinance as a regulation that results in a partial diminution in property value under the three-factor *Penn Central* balancing test.³⁴³ A court hearing a challenge to a regulatory setback might determine, based on background public trust principles, that the property owner acquired the property with knowledge of the setback regulation (or the potential for increased regulation) as well as sea level rise projections, and thus had no reasonable investment-backed expectation to interfere with public tidelands. Local governments can use *Tahoe-Sierra Preservation Council v. Tahoe Regional Planning Agency*³⁴⁴ to support their argument. In *Tahoe-Sierra Preservation Council*, the U.S. Supreme Court upheld a challenged development moratorium based on a *Penn Central* analysis. In reaching its holding, the Court relied in part on an analysis of the reasonable investment-backed expectations of the property

339. CAL. COASTAL COMM'N, PROCEDURAL GUIDANCE FOR THE REVIEW OF WETLAND PROJECTS IN CALIFORNIA'S COASTAL ZONE ch. 1, n.13 (1994), available at <http://www.coastal.ca.gov/wetrev/wettc.html>.

340. CAL. COASTAL COMM'N, RECAP PILOT PROJECT FINDINGS AND RECOMMENDATIONS: MONTEREY BAY REGION, *supra* note 337, at ch. 5.

341. CAL. COASTAL COMM'N, PROTECTING SENSITIVE HABITATS AND OTHER NATURAL RESOURCES 1, 2 (2007), available at <http://www.coastal.ca.gov/la/lcpguide/lcpguide.pdf>.

342. See *Lucas v. S.C. Coastal Council*, 505 U.S. 1003, 1022-23 (1992).

343. *Penn Cent. Transportation Co. v. City of New York*, 438 U.S. 104 (1978). See also *Kaiser Aetna v. United States*, 444 U.S. 164, 175 (1979) (adding "reasonable" to the *Penn Central* phrase "investment-backed expectations").

344. *Tahoe-Sierra Preservation Council, Inc. v. Tahoe Reg'l Planning Agency*, 535 U.S. 302 (2002).

owners.³⁴⁵ The Court noted the district court's finding that "almost everyone in the Tahoe Basin knew . . . that a crackdown on development was in the works."³⁴⁶ According to the Court, all property owners who purchased land after the implementation of the existing regulatory scheme were aware that they had purchased their property "amidst a heavily regulated zoning scheme."³⁴⁷ *Tahoe-Sierra Preservation Council* confirms that the existence of a comprehensive land use regulatory regime, such as an LCP or comprehensive sea level rise adaptation plan, is one factor courts should consider in an analysis of reasonable investment-backed expectations.³⁴⁸ A local government facing a challenge should seek to demonstrate to the court that purchasers of coastal zone property have received constructive notice—based on the Coastal Act, floodplain regulations, the California Constitution, and the public trust doctrine—that coastal property is environmentally sensitive and subject to significant land use restrictions.³⁴⁹ Furthermore, the local government should emphasize to the court that the owner will have enjoyed the reasonable lifespan of the structures on the property and recouped her real estate investment by the time the setback requires total abandonment.

Given the importance of reasonable investment-backed expectations to the *Penn Central* analysis, a proactive local government should support its setback ordinance with a notice ordinance that requires disclosures in all sales contracts for coastal zone properties. The disclosure should notify all purchasers of sea level rise, shoreline erosion, the existing coastal land use regulatory regime, and the potential for future regulation to address changing coastal conditions.³⁵⁰ Even in the absence of a disclosure requirement, a local government may be able to prove notice by referencing the terms and conditions of a CDP previously recorded against the property. As mentioned above, CDPs typically include a condition requiring the permittee and all future owners of the property to acknowledge the potential hazards of sea level rise, flooding, high waves, and erosion.³⁵¹

345. *Id.* at 312-15, 335-43.

346. *Id.* at 315, n.11.

347. *Id.* at 313, n.5. See Thomas Ruppert, *Reasonable Investment-Backed Expectations: Should Notice of Rising Seas Lead to Falling Expectations for Coastal Property Purchasers?*, 26 J. LAND USE & ENVTL. L. 239, 252-53 (2011) (analyzing *Tahoe-Sierra Preservation Council*).

348. *Id.* at 252.

349. See *id.* at 254, 256, 258.

350. *Id.* at 265-66 (citing CAL. CIV. CODE § 1102.6a).

351. See, e.g., CAL. COASTAL COMM'N, STAFF RPT. F 14A (App. No. 5-10-045), *supra* note 175, at 4.

3. Permit Exactions

As described in greater detail in subsections C and B above, section 30607 of the Coastal Act and CEQA provide certified local governments with the authority to impose “reasonable terms and conditions” on coastal development permits as necessary to ensure that development will be in conformance with the Chapter 3 policies of the Coastal Act. Permit exactions can be an effective vehicle for retreat-based strategies like mandatory setbacks and prohibitions on future coastal armoring. In comparison to regulatory setbacks and “no further armoring” ordinances, setback conditions are relatively safe from an adverse takings ruling. A court hearing a challenge to a setback condition to a permit for a coastal structure is relatively likely to find under *Nollan-Dolan* that the condition is logically related and roughly proportional to the impact of the development. In the case of an improvement or repair to an existing structure, remodeling would extend the life of the structure, thereby inevitably subjecting it to future sea level rise. A local government would have a particularly strong defense if the setback condition at issue applies to a property owner eligible to install armoring protection, as armoring would increase the likelihood that the development ultimately will interfere with public trust uses of tidelands. A court hearing a challenge to a setback condition to a CDP for an undeveloped property also is relatively likely to find under *Nollan-Dolan* that the condition is logically related and roughly proportional to the impact of the development. Sea level rise inevitably would cause the new structure to interfere with public tidelands. A local government can support its position here through reference to empirical data contained in the associated EIR.

A “no further armoring” condition also is a relatively low-risk exaction. A court hearing a challenge to a “no further armoring” condition included in a CDP for improvement or repair of existing property likely would be persuaded by the fact that the Commission’s practice of including “no further armoring” conditions in CDPs is widespread, and furthers the policies of the Coastal Act, which prevent the Commission from approving development that: contributes to erosion,³⁵² requires armoring devices,³⁵³ or interferes with the public’s right to access the coast.³⁵⁴ Likewise, a court may find that a “no further armoring” condition is logically related and roughly proportional to the impact of the new development because, given sea level rise projections, the new development ultimately would interfere with public trust lands.

352. CAL. PUB. RES. CODE § 30253(b).

353. *Id.*

354. *Id.* §§ 30211, 30252.

4. Transfer of Development Rights

As a general rule, a combination of “carrots” (incentives) and “sticks” (enforced standards) likely will comprise the most effective and least controversial sea level rise adaptation strategy.³⁵⁵ Transfer of Development Rights (TDRs), which are part-market mechanism, part-zoning regulation, fit this adage well. In the context of sea level rise in Southern California, an effective TDR program would involve a zoning ordinance that allows a property owner in a sea level rise exposure zone to sell her right to develop her property to another property owner in a preferred development zone. The receiving property owner may use the credits she purchases to exceed density, building height, or other land use restrictions. To ensure the sending property remains undeveloped, the sending property owner must execute a permanent conservation easement at the time she sells her development rights.³⁵⁶

The Santa Monica Mountains/Malibu TDR program, which the Commission designed in 1978 to divert development away from certain steep, erosive areas within the Santa Monica Mountains, can serve as a useful model for Southern California local governments considering a TDR strategy.³⁵⁷ The Santa Monica Mountains/Malibu TDR program operates by requiring participants to retire their right to develop a lot in the sending area via recordation against the title to the property of an offer-to-dedicate an open space easement to the people of the State of California.³⁵⁸ Then, for each lot retired, a new subdivision is created in an approved receiving area.³⁵⁹ Lots are valued for TDR credit based on factors such as acreage and ecosystem services.³⁶⁰ The Commission reports that the TDR program successfully “has directed development in the Santa Monica Mountains region to locations which, when developed, lead to less significant impacts on coastal resources.”³⁶¹

TDR programs that prohibit all development on a particular property may, however, be vulnerable to takings challenges if there is not a robust market for TDR credits. If development is completely prohibited on the sending property and compensation is unpredictable or not readily available in the TDR market, a court hearing a challenge might find that a regulatory

355. Byrne & Grannis, *supra* note 44, at 271.

356. GRANNIS, *supra* note 47, at 57.

357. See Byrne & Grannis, *supra* note 44, at 288.

358. CAL. COASTAL COMM’N, FINDINGS AND RECOMMENDATIONS FOR THE SANTA MONICA MOUNTAINS/MALIBU REGIONAL CUMULATIVE ASSESSMENT PROJECT (RECAP) 30, 31 (1999), available at <http://www.coastal.ca.gov/recap2/recap2.html>.

359. *Id.* at 14.

360. *Id.* at 26.

361. *Id.* at 22.

taking has occurred under *Lucas*.³⁶² If the TDR program is well designed, however, a court might find that the TDRs amount to just compensation. Should a local government consider implementing a TDR program with complete development prohibitions, it could reduce its legal risk by guaranteeing a fair, stable market for TDRs.³⁶³ Because many Southern California localities are geographically large and house a variety of land uses, a TDR program could successfully channel new development out of sea level rise exposure areas.

If a TDR program does not completely prohibit development on the sending property, a court hearing a takings challenge would apply the *Penn Central* balancing test.³⁶⁴ In this case, a court is likely to find the economic impact of the regulation is offset by the value of the TDRs. In its balancing analysis, a court likely will consider the background principles of the state's public trust doctrine and the overall goal of the regulation to protect public resources from the impacts of sea level rise. Thus, the legal risk of a TDR program that does not entirely limit development on the sending property is low.

V. Critical Municipal Infrastructure

Sea level rise threatens the critical municipal infrastructure that supports coastal communities.³⁶⁵ By 2100, 106 miles of highways, 862 miles of roads, and 47.4 miles of railways in Southern California will be vulnerable to a 100-year coastal flood.³⁶⁶ Impairment of roadways could result in serious economic and social consequences.³⁶⁷ For example, disabled roadways could isolate coastal communities, prevent residents and emergency services from accessing homes, and impair the transport of goods to and from ports.³⁶⁸ If impaired, coastal wastewater treatment plants

362. See *Suitum v. Tahoe Reg'l Planning Agency*, 520 U.S. 725, 747-50 (1997) (Scalia, J., concurring).

363. See *Suitum*, 520 U.S. 725.

364. *Penn Cent. Transportation Co. v. City of New York*, 438 U.S. 104 (1978).

365. See, e.g., *HIRSCHFELD & HOLLAND*, *supra* note 29, at 20 (describing the primary vulnerabilities of stormwater management, wastewater, potable water, and energy infrastructure in the San Diego Bay).

366. *HEBERGER ET AL.*, *supra* note 160, at 54, tbl.15.

367. *CAL. NATURAL RESOURCES AGENCY*, *supra* note 12, at 69, 127. See also *HIRSCHFELD & HOLLAND*, *supra* note 29, at v, 21 (describing the vulnerability of transportation facilities in San Diego Bay to sea level rise-related flooding and inundation).

368. *CAL. NATURAL RESOURCES AGENCY*, *supra* note 12, at 69. See also *LOS ANGELES DEP'T OF CITY PLANNING, SAN PEDRO COMMUNITY PLAN 78* (draft Aug. 2012), available at http://cityplanning.lacity.org/cpu/SanPedro/Environmental_txt/SanPedroDraftComm

like Los Angeles' Hyperion Wastewater Treatment Plant and the Orange County Sanitation District facilities could discharge untreated or partially untreated sewage into coastal waters, severely impacting ecosystems, public health, fishing communities, and recreational opportunities.³⁶⁹ Impairment of stormwater pumping plants could lead to flooding of local streets and homes, and the transport of urban pollutants to the ocean.³⁷⁰ Numerous sewage pumping plants along the coast also could be exposed to damage from sea level rise.³⁷¹ Impaired pumps could cause waste to back up into homes, resulting in displacement.³⁷² Storm-related flooding and tidal inundation could cause electrical equipment to fail or lead to a sewage spill with economic and environmental consequences.

Utility infrastructure is vulnerable as well. Water utilities manage potable water infrastructure along the coast, including water pipes, water main connections, meters, and fire hydrants. Impairment of this infrastructure could lead to the flooding of low-lying areas or the contamination of the public water system with saltwater, groundwater, or other substances.³⁷³ Southern California's fifteen coastal power plants, including the massive El Segundo Generating Station, Alamitos Generating Station (Long Beach), and Haynes Generating Station (Long Beach), could be compromised by coastal flooding, impacting over 8000 megawatts of electric generating capacity.³⁷⁴ Substations and transmission lines might suffer erosion, flooding, or inundation, affecting regional electricity

nityPlan.pdf ("A principal mobility concern in San Pedro relates to the limited access out of the area, should a major disaster occur. Surrounded by the Pacific Ocean on two sides, access in and out of the area is primarily through the north and west.").

369. See HEBERGER ET AL., *supra* note 160, at 62; CAL. NATURAL RESOURCES AGENCY, *supra* note 12, at 69.

370. See CAL. NATURAL RESOURCES AGENCY, *supra* note 12, at 127; HIRSCHFELD & HOLLAND, *supra* note 29, at 36-37 (describing the vulnerability of the San Diego Bay stormwater management system to flooding and inundation).

371. See, e.g., L.A. Dep't of Pub. Works, *About the City's Sewer System*, LA SEWERS, <http://www.lasewers.org/sewers/about/index.htm> (last visited Mar. 19, 2013).

372. CAL. NATURAL RESOURCES AGENCY, *supra* note 12, at 69.

373. See Tamara Keith, *California Delta at Risk*, NPR.ORG (Jan. 8, 2008, 1:00 PM), <http://www.npr.org/templates/story/story.php?storyId=17929496> (describing how sea level rise contributes to the saltwater intrusion in California's Sacramento-San Joaquin Delta).

374. HEBERGER ET AL., *supra* note 160, at 59, fig.21; 61, fig.23. See also CAL. NATURAL RESOURCES AGENCY, *supra* note 12, at 69 (noting that coastal power plants are vulnerable to sea level rise-related flood events, potentially impacting service delivery).

reliability.³⁷⁵ As a secondary impact, impairment of coastal electricity generation and receiving stations could disrupt the power supply to wastewater treatment plants and consequently result in sewage spills.³⁷⁶

The public trust doctrine underscores the necessity for local governments to plan for critical public infrastructure well in advance of adverse sea level rise impacts. The public trust doctrine places a duty on local governments to protect public trust uses, including environmental protection and public recreation, whenever feasible.³⁷⁷ If a locality declines to prepare for sea level rise, government-owned and -managed infrastructure could be subject to impairments, losses of functionality, and pollution events that negatively affect the coastal environment and public recreational resources in violation of the public trust doctrine and state and federal environmental laws. Such events could subject the local government to civil suits. For instance, should a local government fail to prepare adequately for the impacts of sea level rise, one of the most readily predictable potential liabilities is spills. A local government, as the owner or operator of a facility involved in a spill, may be responsible under, *inter alia*, the Comprehensive Environmental Response, Compensation and Liability Act,³⁷⁸ Clean Water Act,³⁷⁹ federal Endangered Species Act,³⁸⁰ or California Endangered Species Act³⁸¹ for a civil fine, the cost of responding to the spill, and/or the cost of repairing any damages to natural resources.

Where sea level rise impacts result in contamination of the potable water supply, private property damage, or the failure of essential services such as electricity, a local government potentially could be liable to private parties under common law doctrines of tort or contract. For example, should a government fail to maintain a roadway, it could be subject to tort

375. See CAL. NATURAL RESOURCES AGENCY, *supra* note 12, at 126 (noting that flooding and storm activity may damage coastal transmission lines and other grid infrastructure, causing power outages); HIRSCHFELD & HOLLAND, *supra* note 29, at 42 (describing the vulnerability of energy facilities in San Diego Bay).

376. See *Energy Impacts & Adaptation – Climate Change*, U.S. ENVTL. PROT. AGENCY, <http://www.epa.gov/climatechange/impacts-adaptation/energy.html#Water> (last visited Mar. 15, 2013) (describing how sea level rise can disrupt electricity generation and coastal energy infrastructure).

377. *Nat'l Audubon Soc'y v. Superior Court*, 33 Cal. 3d 419, 446 (1983).

378. 42 U.S.C. §§ 9601-9675. *But see id.* § 9607(b) (creating an exception to liability for a person “who can establish by a preponderance of the evidence that the release or threat of release of a hazardous substance and the damages resulting therefrom were caused solely by—(1) an act of God . . .”).

379. 33 U.S.C. §§ 1251-1387.

380. 16 U.S.C. §§ 1531-1544.

381. CAL. FISH & GAME CODE §§ 2050-2115.5.

liability.³⁸² Additionally, a roadway divestiture that deprives abutting landowners of access to the broader network of public roadways could constitute an inverse condemnation requiring compensation.³⁸³ Local governments also often are obliged to maintain infrastructure as a condition of receiving federal funds.³⁸⁴ The degree to which a local government may be held liable by a court for failure to prepare for sea level rise is case-specific, and by no means does this canvass the entire spectrum of potential legal vulnerability; but the examples described here should be sufficient to convey the broad potential risks of delaying or ignoring sea level rise adaptation planning.

In some situations where sea level rise threatens costly infrastructure, local governments may determine that hard armoring is a necessary adaptation option. In such cases, private citizens could challenge public armoring projects on the grounds that they conflict with public trust principles. Also, where hard armoring projects are connected to private property damage, local governments may be liable to property owners for inverse condemnation. In other situations, such as where a coastal community is generally implementing a policy of retreat, it may be appropriate to relocate coastal infrastructure. Local governments may need to turn to eminent domain to relocate vulnerable municipal infrastructure in a densely developed community. We discuss these potential adaptation options and their legal implications below.

A. Protection

Despite the many adverse impacts of hard armoring discussed above, even the most forward-thinking local government likely will determine that some degree of armoring is a necessary adaptation measure where critical coastal infrastructure is costly to replace, challenging to relocate, or essential to the community. Because any development in public trust lands requires a permit from the Commission regardless of whether a certified LCP is in place, a local government must ensure that it minimizes adverse impacts from any proposed armoring. The Commission will evaluate a local government's CDP application for armoring in public trust lands according to the Chapter 3 policies of the Coastal Act and may authorize permit conditions to mitigate any adverse impacts of the development.³⁸⁵ If a local government were to receive an unfavorable decision from the Commission

382. Byrne & Grannis, *supra* note 44, at 282.

383. *Id.*

384. *Id.*

385. CAL. PUB. RES. CODE § 30607. See, e.g., CAL. COASTAL COMM'N, STAFF RPT. W23B (App. No. 4-11-026), *supra* note 90 (recommending approval of the California Department of Transportation's plan to demolish and reconstruct an existing seawall protecting the Pacific Coast Highway in Ventura County).

on its permit application for armoring, it would have the option of appealing the decision to a court.³⁸⁶

CEQA also applies to a local government's decision to install coastal armoring. As with armoring of individual residential properties, local governments need to consider less damaging alternatives, and mitigate any significant environmental impacts caused by the armoring. Any armoring of public property must be designed to protect vulnerable properties and infrastructure, while minimizing impacts on the environment. Such a project would armor more land than an individual residential armoring project, and should, to the extent feasible, be structured to avoid worsening sea level rise impacts on other areas.

The conflict between coastal armoring and the public trust doctrine and Coastal Act could limit local governments' ability to plan for sea level rise with hard-engineered structures. Members of the public could challenge a CDP allowing armoring on public property as a violation of the Coastal Act by using the same Chapter 3 policies presented above as grounds for local governments to deny private property owners' hard armoring permit applications. Affected members of the public could also challenge infrastructure armoring as an illegal cessation of public trust rights. Generally, the tidelands trust serves purposes that are water-dependent or water-related, and accordingly limits uses of trust lands. Public trust uses often conflict with one another; for example, a port's terminal areas may not be suitable for recreation, and use of public beaches may be in tension with conservation of natural habitat.³⁸⁷ The State Lands Commission has emphasized government's discretion to balance trust uses: "The public uses to which tidelands are subject are sufficiently flexible to encompass changing public needs. In administering the trust the state [or a successor trustee, such as a local government] is not burdened with an outmoded classification favoring one mode of utilization over another."³⁸⁸ A trustee has authority to choose among competing trust uses, subject to the Legislature's authority to administer the trust (which itself is subject to judicial review).³⁸⁹ The California Supreme Court has noted that "[t]he administration of the trust by the state is committed to the Legislature, and a determination of that branch of government made within the scope of its powers is conclusive in the absence of clear evidence that its effect will be to impair the power of succeeding legislatures to administer the trust in a manner consistent with its broad purposes."³⁹⁰

386. *Id.* § 30801.

387. CAL. STATE LANDS COMM'N, THE PUBLIC TRUST DOCTRINE, *supra* note 79, at 4.

388. *Marks v. Whitney*, 6 Cal. 3d 251 (1971); *Colberg, Inc. v. State ex rel. Dep't Pub. Works*, 67 Cal. 2d 408, 421-22 (1967).

389. CAL. STATE LANDS COMM'N, THE PUBLIC TRUST DOCTRINE, *supra* note 79, at 4-5, 13.

390. *City of Long Beach v. Mansell*, 3 Cal. 3d 462, 482, fn.17 (1970).

The California Legislature may make statutory grants of tidelands to state and local government trustees, who are also bound to act in accordance with the public trust responsibilities and may not subsequently lease trust lands to promote private rather than public purposes.³⁹¹ In 1938, the California Legislature granted responsibility over its tidelands trust lands to the State Lands Commission.³⁹² Legislative tidelands trust grants to local trustee agencies typically specify authorized trust purposes and uses, which may be more limited than the purposes and uses that otherwise would be available under the doctrine.³⁹³ Although the public trust may be terminated only in rare cases, private entities may carry out proper trust uses with permission from the state or local trustee, and trustees may exclude the public from the trust lands if necessary to accomplish a trust use.³⁹⁴ The State Lands Commission has determined that permanent developments on public tidelands trust land must meet one of the following criteria:

- 1) the structure must directly promote uses authorized by the statutory trust grant and trust law generally (e.g., wharves, warehouses),
- 2) the structure must be incidental to the promotion of such uses (e.g., a convention center that promotes a port and port trade), or
- 3) the structure must accommodate or enhance the public's enjoyment of the trust lands (e.g., hotels, restaurants).³⁹⁵

Moreover, leases of tidelands must comply with the terms of any statutory trust grant that conveyed those tidelands to a local government trustee.³⁹⁶ Citizens or the State Lands Commission may sue a local

391. CAL. STATE LANDS COMM'N, THE PUBLIC TRUST DOCTRINE, *supra* note 79, at 3; CAL. STATE LANDS COMM'N, PUBLIC TRUST POLICY, *supra* note 84, at 3.

392. CAL. PUB. RES. CODE § 6301 (The State Lands Commission has "exclusive jurisdiction over all ungranted tidelands and submerged lands owned by the State," and "exclusively administer[s] and control[s] all such lands, and may lease or otherwise dispose of such lands . . ."). *See also* CAL. STATE LANDS COMM'N, PUBLIC TRUST POLICY *supra* note 84, at 1.

393. *See* CAL. STATE LANDS COMM'N, THE PUBLIC TRUST DOCTRINE, *supra* note 79, at 4.

394. CAL. STATE LANDS COMM'N, PUBLIC TRUST POLICY, *supra* note 84, at 1, 2.

395. CAL. STATE LANDS COMM'N, THE PUBLIC TRUST DOCTRINE, *supra* note 79, at 6.

396. *Id.* at 10. *See also* *City of Long Beach v. Morse*, 31 Cal. 2d 254 (1947) (holding that the local government may only use granted lands and proceeds from

government trustee to enforce public trust duties. Alternatively, the State Lands Commission can report a potential trust violation to the Legislature, which may revoke or modify the operative land grant.³⁹⁷

The California Supreme Court has emphasized that local governments, as tidelands trustees, “ha[ve] an affirmative duty to take the public trust into account in the planning and allocation of water resources, and to protect the public trust uses whenever feasible.”³⁹⁸ Local governments may have to balance—and in some cases, decide among—competing public trust values, and must ensure that their decisions are well-documented and scientifically defensible. Overall, in developing and implementing policies and adaptation procedures, localities should consider existing and emerging information on sea level rise and carefully consider the trade-offs of various strategies in order to live up to their public trust responsibilities.

1. Impacts to Private Property

The takings doctrine may apply should a local government seek to install hard armoring on properties it does not own in order to protect vulnerable communities or adjacent municipal infrastructure. A challenge to a land use ordinance that required a property owner to permit hard armoring on her property would trigger *Loretto*.³⁹⁹ A court hearing these facts likely would conclude that the regulation effects a per se taking, as the hard armoring is directly analogous to the involuntary, physical invasion at issue in *Loretto*.⁴⁰⁰ Although local governments are unlikely to avoid having to compensate landowners for the armoring, governments should be assured that they have wide authority to act in this area. Flood protection and armoring are recognized “public uses” for the purposes of eminent domain.⁴⁰¹ Again, however, a local government may prefer to purchase an easement or right-of-way rather than resort to an exercise of eminent domain.

The takings doctrine also could apply should local government action in designing, constructing, or maintaining coastal armoring result in permanent flooding or other “sustained and substantial” flooding damage to nearby private property.⁴⁰² For instance, a local government may construct a flood control or shore stabilization structure that is designed to withstand likely sea level rise impacts, but fails because sea levels rise more quickly

oil and gas development on those lands for the purposes specified in the trust grant under which the city claims title to the lands).

397. CAL. STATE LANDS COMM’N, PUBLIC TRUST POLICY, *supra* note 84, at 3.

398. Nat’l Audubon Soc’y v. Superior Court, 33 Cal. 3d 419, 446 (1983).

399. *Loretto v. Teleprompter Manhattan CATV Corp.*, 458 U.S. 419 (1982).

400. Verchick & Scheraga, *supra* note 55, at 248-49 (citing *Loretto*, 458 U.S. 419).

401. *Id.* at 248.

402. *Nicholson v. United States*, 77 Fed. Cl. 605, 616 (2007); Verchick & Scheraga, *supra* note 55, at 249.

than anticipated or storm surges are more powerful than expected. As stated earlier, a situation where a government causes damage to private property without paying just compensation may amount to an inverse condemnation. To constitute inverse condemnation, flooding need not be intentional so long as it is the “direct, natural, or probable result of an authorized activity and not the incidental or consequential injury inflicted by the action.”⁴⁰³ “Inverse condemnation lies where damages are caused by the deliberate design or construction of the public work; but the cause of action is distinguished from, and cannot be predicated on, general tort liability or a claim of negligence”⁴⁰⁴

In one illustrative post-Hurricane Katrina case, *Nicholson v. United States*,⁴⁰⁵ New Orleans homeowners raised an inverse condemnation claim, alleging that the U.S. Government’s failure to properly design, construct, and maintain levees resulted in the destruction of their homes. Plaintiffs alleged that the U.S. Government “not only built an ineffective system but also knew or should have known of the system’s defects and of the probable disaster in the event of a hurricane.”⁴⁰⁶ The Court of Federal Claims ruled in favor of the government, failing to find a direct connection between the flooding and the government’s actions. According to the *Nicholson* Court, “the construction of the floodwalls did not cause the flooding; the flooding was caused by the storm surge.”⁴⁰⁷ Thus, the court did not need to reach the question of whether Hurricane Katrina was foreseeable.⁴⁰⁸ The court noted that “Plaintiffs’ case would be stronger if the floodwalls *as designed*, channeled the flood waters toward their property or had a net effect of increasing the level of flooding.”⁴⁰⁹ Additionally, the *Nicholson* Court was persuaded by the fact that plaintiffs suffered only one severe flooding event and did not claim continuous flooding.⁴¹⁰

In comparison to *Nicholson*, California courts historically have taken a less literal view of causation when reviewing inverse condemnation claims, holding government entities liable for foreseeable harm as well as harm

403. *Nicholson*, 77 Fed. Cl. at 616 (quoting *Ridge Line, Inc. v. United States*, 346 F.3d 1346, 1355-56 (Fed. Cir. 2003) (citations omitted)).

404. *Cal. State Auto. Ass’n Inter-Insurance Bureau v. City of Palo Alto*, 138 Cal. App. 4th 474, 479 (6th Dist. 2006).

405. *Nicholson*, 77 Fed. Cl. 605.

406. *Id.* at 612.

407. *Id.* at 617.

408. *Id.* at 618.

409. *Id.* at 622 (emphasis in original).

410. *Id.* at 619.

directly caused by flood control structures.⁴¹¹ A state court hearing an inverse condemnation challenge to a flood control project will apply a “rule of reasonableness” to determine whether a taking has occurred.⁴¹² In essence, “public agencies must act reasonably in the development of construction and operational plans so as to avoid unnecessary damage to private property. Reasonableness, in this context, . . . represents a balancing of public need against the gravity of private harm.”⁴¹³ The balancing test is quite fact-specific. Courts must consider:

(1) [t]he overall public purpose being served by the improvement project; (2) the degree to which the plaintiff’s loss is offset by reciprocal benefits; (3) the availability to the public entity of feasible alternatives with lower risks; (4) the severity of the plaintiff’s damage in relation to risk-bearing capabilities; (5) the extent to which damage of the kind the plaintiff sustained is generally considered as a normal risk of land ownership; and (6) the degree to which similar damage is distributed at large over other beneficiaries of the project or is peculiar only to the plaintiff.⁴¹⁴

In one California case applying the rule of reasonableness, *Arreloa v. County of Monterey*, the California Court of Appeal found county entities liable for a taking when a levee failed during a heavy storm and multiple private properties flooded. The *Arreloa* court found that the county entities “made explicit and deliberate decisions” that permitted the flood control channel to deteriorate over many years, even though the county entities knew that failing to properly maintain the channel diminished the project’s ability to provide flood protection.⁴¹⁵ The court stated, “[i]t is sufficient that Counties were aware of the risk of failing to adequately clear the channel and chose to tolerate that risk.”⁴¹⁶

411. *Pacific Bell v. City of San Diego*, 81 Cal. App. 4th 596, 607 (2000) (holding that inverse condemnation occurs where “a public improvement that as designed and constructed presents inherent risks of damage to private property, and the inherent risks materialize and cause damage”).

412. *Bunch v. Coachella Valley Water Dist.*, 15 Cal. 4th 432, 447 (1997); *Locklin v. City of Lafayette*, 7 Cal. 4th 327 (1994); *Belair v. Riverside County Flood Control Dist.*, 47 Cal. 3d 550 (1988).

413. *Bunch*, 15 Cal. 4th at 443 (quoting Van Alstyne, *Inverse Condemnation: Unintended Physical Damage*, 20 HASTINGS L.J. 431, 489–490 (1969)).

414. *Arreloa v. County of Monterey*, 99 Cal. App. 4th 722, 739 (2002) (quoting *Locklin*, 7 Cal. 4th at 368-69).

415. *Id.* at 747.

416. *Id.* at 746.

Nicholson and the California rule of reasonableness cases suggest that local government actions in the context of sea level rise could create risk of a successful takings claim if courts are influenced by facts regarding the foreseeability of sea level rise impacts in the aggregate—even if individual storm events are relatively unpredictable.⁴¹⁷ In *Nicholson*, the court seemed reluctant to hold the federal government liable for a one-time storm event. The *Nicholson* court suggested, however, that in cases of continuous flooding or where structures increase flooding risk, a finding of inverse condemnation might be more appropriate. Sea level rise might present such a case, since the increased likelihood of flooding and storm damage associated with climate change is effectively permanent and continuous. Additionally, coastal armoring can “ha[ve] a net effect of increasing . . . flooding”⁴¹⁸ because it can decrease the natural flood-control capacity of coastal ecosystems over the long-term and worsen sea level rise impacts on surrounding properties.⁴¹⁹ *Arreloa* further suggests that a state court may be persuaded by a local government’s knowledge of sea level rise risks and the adverse impacts of armoring, and its failure to mitigate those impacts. A court applying the rule of reasonableness factors might focus in particular on the third factor of analysis and note that sea level rise adaptation alternatives to hard armoring are available to local governments. In general, local governments should take into account their potential legal liability for private property damage when evaluating the relative risks of retreat versus protection as potential adaptation options. Additionally, per *Arreloa*, local governments should be sure to incorporate sound design, proper maintenance plans, maintenance funding, and oversight into the development process for any engineered structure.

Recent Takings Clause jurisprudence has the potential to further expand takings-related liability. A recent U.S. Supreme Court case, *Arkansas Game and Fish Commission v. United States*,⁴²⁰ suggests that a government may in some cases have to pay just compensation under the Takings Clause for temporary government-induced flooding. In *Arkansas Game and Fish Commission*, an Arkansas agency challenged the U.S. Army Corps of Engineers’ flood-control actions in a wildlife management area. The Arkansas agency claimed that the cumulative impact of flood events during the wildlife management area’s peak timber-growing season resulted in millions of dollars in damage.⁴²¹ Prior to this case, federal courts had generally understood Takings Clause liability to be limited to permanent or

417. See Verchick & Scheraga, *supra* note 55, at 249 (citing *Nicholson v. United States*, 77 Fed. Cl. 605 (2007)).

418. *Nicholson*, 77 Fed. Cl. at 622 (emphasis in original).

419. See Byrne & Grannis, *supra* note 44, at 269; Kriesel & Friedman, *supra* note 52.

420. *Ark. Game & Fish Comm’n v. United States*, 133 S. Ct. 511 (2012).

421. *Id.*

inevitably recurring government-induced flood events.⁴²² The U.S. Supreme Court expanded the scope of the Takings Doctrine in holding that “recurrent floodings, even if of finite duration, are not categorically exempt from Takings Clause liability.”⁴²³ *Arkansas Game and Fish Commission* stands for the proposition that temporary government-induced flooding *can* constitute a taking; it remains to be seen how lower courts will apply this holding to delineate which kinds of temporary flooding events *do* constitute a taking. Finally, local government planners should keep in mind Article I, section 25 of the California Constitution, which guarantees the public an absolute right to fish on public lands. Section 25 could come into play if a local government allows public fishing piers to be inundated or destroyed by sea level rise as part of a retreat strategy, or installs armoring that prevents the public from accessing popular fishing spots.

2. Port Master Plans

Sea level rise threatens commerce as well as public and private development. Southern California houses the two busiest seaports in the country, the Port of Los Angeles and Port of Long Beach,⁴²⁴ as well as the state’s fourth largest port, the Port of San Diego.⁴²⁵ The ports are vulnerable to flooding and inundation, which could disrupt cargo shipments and have major economic consequences.⁴²⁶ Storm damage to wharves, deepened channels, and changes in the relative height of ships to the docks also may disrupt trade.⁴²⁷ Storm impacts could result in port breakwaters damaging port facilities or adjacent ecosystems in the harbor.⁴²⁸ Breakwater damage could potentially implicate state and federal environmental statutes like the

422. See *Ark. Game & Fish Comm’n v. United States*, 637 F.3d 1366 (Fed. Cl. 2011), *reversed by* 133 S. Ct. 511 (2012).

423. *Arkansas Game & Fish Commission*, 133 S. Ct. at 515.

424. *About the Port*, PORT OF LOS ANGELES, <http://www.portoflosangeles.org/about/profile.asp> (last visited Mar. 15, 2013); *Facts at a Glance*, PORT OF LONG BEACH, <http://www.polb.com/about/facts.asp> (last visited Mar. 15, 2013).

425. *Port of San Diego Overview*, PORT OF SAN DIEGO, <http://www.portofsan-diego.org/about-us.html> (last visited Mar. 15, 2013).

426. CAL. COASTAL COMM’N, OVERVIEW OF SEA LEVEL RISE AND SOME IMPLICATIONS FOR CALIFORNIA, *supra* note 18, at fig.5; HEBERGER ET AL., *supra* note 160, at 62; CAL. NATURAL RESOURCES AGENCY, *supra* note 12, at 126.

427. CAL. COASTAL COMM’N, OVERVIEW OF SEA LEVEL RISE AND SOME IMPLICATIONS FOR CALIFORNIA, *supra* note 18, at fig.5; HEBERGER ET AL., *supra* note 160, at 62.

428. See GRIGGS, PATSCH, & SAVOY, *supra* note 39, at 124 (describing how the San Pedro Breakwater was destroyed in 1983 by a combination of sea level rise, high tide, and large waves, “displacing 10- to 20-ton granite rocks and causing 7.3 million dollars (in 2005 dollars) in damage.”).

federal Endangered Species Act,⁴²⁹ California Endangered Species Act,⁴³⁰ Migratory Bird Treaty Act,⁴³¹ or Clean Water Act.⁴³² Any resulting private property damage could lead to tort or contract claims.⁴³³ Furthermore, port marinas could be impaired by erosion or inundation, with negative consequences for recreation and marina residents.⁴³⁴

In contrast to other local government entities, the ports have a high level of adaptive capacity due to their significant economic resources.⁴³⁵ The Ports of Los Angeles and San Diego already have begun to study their adaptation options.⁴³⁶ As port authorities and local governments explore sea level rise adaptation actions for Southern California ports, they should keep in mind that they may need to amend a Port Master Plan in order to implement an adaptation strategy. In particular, a port may need to amend its Plan to incorporate protection-based tools. Coastal Act section 30705(a) declares water areas at a port may only be “diked, filled, or dredged” in conformance with a certified Port Master Plan. Port Master Plan amendments follow the same certification process as applied to the original Plan: first, the Commission must certify that the proposed amendment conforms to the Coastal Act; second, the entity that controls the trust lands beneath a port (such as the port’s board of commissioners⁴³⁷) must adopt a resolution implementing the certified Plan amendment; and third, the

429. 16 U.S.C. §§ 1531-1544.

430. CAL. FISH & GAME CODE §§ 2050-2115.5.

431. 16 U.S.C. §§ 703-712.

432. 33 U.S.C. §§ 1251-1387.

433. See CAL. COASTAL COMM’N, OVERVIEW OF SEA LEVEL RISE AND SOME IMPLICATIONS FOR CALIFORNIA, *supra* note 18, at 12.

434. See *e.g.*, *Facilities – Marinas*, PORT OF LOS ANGELES, <http://www.portoflosangeles.org/facilities/marinas.asp> (last visited Mar. 15, 2013).

435. See *e.g.*, PORT OF LOS ANGELES, ANNUAL BUDGET FISCAL YEAR 2012/2013 4 (2012), *available at* http://www.portoflosangeles.org/Publications/Budget_FY2012-2013.pdf (listing total projected operating revenues for fiscal year 2012-13 of 398.6 million dollars).

436. See Carter Atkins, Port of Los Angeles, *Assessing the Need for Adaptation: The Port of Los Angeles/RAND Corporation Study*, presentation, Am. Assoc. of Port Auth. 2011 Climate Change Workshop (Jan. 27, 2011), *available at* http://aapa.files.cms-plus.com/SeminarPresentations/2011Seminars/11ClimateChange/11ClimateChange_Atkins_Carter.pdf; CAL. STATE LANDS COMM’N, A REPORT ON SEA LEVEL RISE PREPAREDNESS 5 (2009), *available at* http://www.slc.ca.gov/reports/sea_level_report.pdf.

437. See, *e.g.*, CITY OF LOS ANGELES CHARTER, vol. 1, art. VI, §§ 601, 650-52 (granting the Port of Los Angeles’ Board of Harbor Commissioners control over the tidelands beneath the Port).

Commission must accept the resolution and final EIR as consistent with its certification.⁴³⁸

The Coastal Act requires the Commission to consider the public trust doctrine and adverse environmental impacts when reviewing proposed Port Master Plan amendments. Section 30708 declares that: “All port-related developments shall be located, designed, and constructed so as to: (a) Minimize substantial adverse environmental impacts. . . . [and] (d) Provide for other beneficial uses consistent with the public trust, including, but not limited to, recreation and wildlife habitat uses, to the extent feasible.” Pursuant to the public trust doctrine, the port-controlling entity must manage its trust lands according to both general public trust principles and the terms of the statutory tidelands grant giving the local government control over the tidelands.⁴³⁹

Any sea level rise planning action taken by a port’s governing board could amount to a choice between competing trust uses. For example, the Port of Los Angeles supports a marina, Cabrillo Beach Recreational Complex, athletic fields, and the Los Angeles Maritime Museum. Should the Port fail to take adaptation actions to protect its recreational facilities, sea level rise impacts could disable these facilities and restrict recreational uses. A port also could elect to implement protection strategies that protect the port’s vital commerce-related functions but restrict public access and recreation. Given the requirements of Coastal Act section 30708, the Commission likely would examine closely how any proposed Plan

438. CAL. PUB. RES. CODE § 30716(a); CAL. CODE REGS. tit. 14, § 13632(e).

439. Grants as amended over time can provide a local government broad flexibility to manage the port tidelands for any trust uses that provide statewide benefits, including recreation. For example, in the California Tidelands Trust Act of 1911, the state granted the City of Los Angeles control over the San Pedro-Wilmington tidelands in the San Pedro-Wilmington region “solely for the establishment, improvement, and conduct of a harbor . . . for all purposes of commerce and navigation.” 1911 Cal. Stat. 1256. *See also Overview of Public Trust Doctrine*, PORT OF LOS ANGELES, <http://www.portoflosangeles.org/about/publictrust.asp> (last visited Mar. 19, 2013). In 1929, the Legislature revised the tidelands grant to include the purpose of a fishery. 1929 Cal. Stat. ch. 651, § 1. Effective 2003, Assembly Bill 2769 further expanded the tidelands grant to incorporate broadly any uses that comply with the public trust doctrine and provide statewide benefits, including a variety of enumerated uses. 2002 Cal. Stat. ch. 1130. *See also Overview of Public Trust Doctrine*, PORT OF LOS ANGELES, <http://www.portoflosangeles.org/about/publictrust.asp> (last visited Mar. 19, 2013) (listing tidelands purposes added by Assembly Bill 2769, including: highways, streets, bridges, belt line railroads, parking facilities, transportation and utility facilities, public buildings, convention centers, public parks, public recreation facilities, small boat harbors and marinas, snack bars, cafes, cocktail lounges, restaurants, motels, hotels, protection of wildlife habitats, open space areas, and areas for public recreational use).

amendment for sea level adaptation affects port-related recreation, public access, and ecosystems. Because enhancing public access to the coast is an important goal of the Coastal Act, it seems likely that the Commission would look more favorably upon sea level rise adaptation alternatives that preserve public access and recreation at a port to the greatest extent feasible. Additionally, port-governing bodies should keep in mind that the Legislature could modify port tidelands grants to constrain or even widen a port's adaptation choices. Legislative action seems unlikely, however, given that port tidelands grants have been amended so infrequently to date.⁴⁴⁰

The Coastal Act contains additional policies specific to port fill activities that may be triggered by hard or soft armoring adaptation proposals. Port waters may be "diked, filled, or dredged" only for the following enumerated uses: maintenance and improvement of ship channels, new or expanded commercial or recreational facilities, incidental public services (e.g., burying pipes), "[m]ineral extraction, including sand for restoring beaches, except in biologically sensitive areas," "[r]estoration purposes or creation of new habitat areas," nature study, or "[m]inor fill for improving shoreline appearance or public access to the water."⁴⁴¹ The Commission may find that sea level rise adaptation strategies are acceptable fill uses under the Act's provisions for channel maintenance, incidental public services, habitat restoration, and/or public access. In considering an amendment to authorize port fill activities, the Commission must "balance and consider socioeconomic and environmental factors,"⁴⁴² and evaluate whether any proposed new or expanded port development "minimize[s] disruption to fish and bird breeding and migrations, marine habitats, and water circulation."⁴⁴³ Additionally, the Commission must find that the proposed fill area is the "minimum necessary to achieve the purpose of the fill," and that "[t]he nature, location, and extent of any fill . . . minimize[s] harmful effects to coastal resources, such as water quality, fish or wildlife resources, recreational resources, or sand transport systems . . ."⁴⁴⁴ Again, as in section 30708, the Coastal Act explicitly mentions public recreation and environmental protection among its enumerated fill uses. In general, the Commission is more likely to approve proposed fill projects that are conservative in size and carefully designed to minimize and mitigate adverse environmental impacts.

CEQA may apply to hard and soft armoring strategies, as discussed above. A port can also use CEQA as a tool to facilitate adaptation to sea

440. See, e.g., *supra* note 439 (evidencing that the California Legislature has only amended the San Pedro-Wilmington tidelands grant for the lands beneath the Port of Los Angeles twice in the past century).

441. CAL. PUB. RES. CODE § 30705(a)(1)-(8).

442. *Id.* § 30705(d).

443. *Id.* § 30705(c).

444. *Id.* § 30706.

level rise when it pursues any amendments to its Port Master Plan or construction projects. As discussed in subsection D, local governments should address sea level rise-related impacts in their environmental review documents under CEQA. Ports can use this opportunity to assess the vulnerability of a proposal and to develop alternatives or mitigation measures.

B. Retreat

Few areas of undeveloped land remain along the Southern California coast. Eminent domain may be a useful tool should a local government need to relocate vulnerable municipal infrastructure in a densely developed community. Even where a government provides just compensation in exchange for private land under the justification of eminent domain, it may face constitutional challenges from the property owner alleging that the intended use of the seized property does not constitute a proper public use.⁴⁴⁵ When a government entity invokes eminent domain, it must take private property for a “public use,” meaning a use that “concerns the whole community or promotes the general interest in its relation to any legitimate object of government.”⁴⁴⁶ Re-siting infrastructure in response to sea level rise almost certainly would constitute a proper public use for exercise of eminent domain.⁴⁴⁷ Nonetheless, local governments may prefer (at least as a first option) to avoid political conflict and potential legal challenge by engaging in voluntary land acquisition negotiations.

445. *People ex rel. Dep’t Pub. Works v. Chevalier*, 52 Cal. 2d 299, 304 (1959) (confirming that the question of whether a taking is for a proper public use under the eminent domain provisions of the U.S. Constitution and California Constitution is a justiciable issue).

446. *Cal. State Auto. Ass’n Inter-Insurance Bureau v. City of Palo Alto*, 138 Cal. App. 4th 474, 479-80 (6th Dist. 2006) (quoting *Frustuck v. City of Fairfax*, 212 Cal. App. 2d 345, 358 (1st Dist. 1963)).

447. *See, e.g., Chevalier*, 52 Cal. 2d at 304 (confirming that a public street or highway constitutes a proper public use for the purposes of eminent domain); *City of Pasadena v. Stimson*, 91 Cal. 238, 253 (1891) (confirming that sewers constitute a proper public use for the purposes of eminent domain); *Patel v. S. Cal. Water Co.*, 97 Cal. App. 4th 841, 844 (4th Dist. 2002) (confirming that “a variety of water-related activities, such as servicing water tanks and maintaining water pipes” constitutes a proper public use for the purposes of eminent domain); *Barham v. S. Cal. Edison Co.*, 88 Cal. Rptr. 2d 424, 430 (App. Ct. 4th Dist. 1999) (confirming that transmission of electrical power constitutes a proper public use for the purposes of eminent domain); *Frustuck*, 212 Cal. App. 2d 345 (confirming that construction of storm drainage systems constitutes a proper public use for the purposes of eminent domain).

VI. Conclusion

Sea level rise in Southern California will impact private and public land uses significantly. This article demonstrates that Southern California local governments already exercise a robust suite of police powers and other regulatory powers that can be harnessed to achieve successful adaptation outcomes. Yet, we also show that there is neither a single adaptation path, nor a set of regulatory tools that is free from legal risk or uncertainty. Preparing for sea level rise will require local governments to make difficult decisions about the future of their coastal communities. Overall, proactive planning and careful decisionmaking grounded in an awareness of the how the Coastal Act, CEQA, the takings doctrine, and the public trust doctrine interact with sea level rise adaption will allow local governments to seize adaptation opportunities while minimizing legal risks. To conclude, we offer five broad recommendations based on our analysis for Southern California local governments interested in building resilience to sea level rise's coastal impacts.

1. Conduct an Assessment of Legal Vulnerability to Sea level Rise Impacts

First, we emphasize the importance of including a legal risk assessment within the suite of physical, economic, and social impact assessments that local governments should conduct in preparing for sea level rise. Just as an assessment of local physical vulnerability enables localities to develop technical adaptation plans, so does a legal vulnerability assessment enable localities to make smart policy choices. The legal risk assessment should: 1) discuss the extent to which a local government may be liable for failure to take adaptation actions, and 2) evaluate the relative legal risk of potential adaptation options. This article touches upon some of the potential sources of liability that a legal risk assessment should consider and lays out the broad contours of what might be contained in a comparative legal analysis of adaptation strategies, but it is no substitute for an assessment that is specific to local contexts. As stated earlier, successful regulatory takings challenges are rare, and decisions about adaptation actions ultimately must incorporate economic, scientific, social, and other policy judgments in addition to legal risk. Nonetheless, a thorough understanding of the current legal landscape will enhance the ability of local planners and advocates to prioritize and swiftly implement effective adaptation strategies in the context of uncertainty.

2. Initiate a Participatory Adaptation Planning Process as Soon as Practicable

We emphasize the value of initiating a participatory adaptation planning process—particularly for critical municipal infrastructure—in advance of significant sea level rise impacts. As we described in this article,

if a locality delays sea level rise adaptation planning, government-owned and -managed infrastructure could be subject to impairments that negatively affect the environment, recreation, or public health and welfare in violation of state or federal law. Additionally, we highlight here the need for local governments to devote time and resources to careful consideration of the tradeoffs of various adaptation strategies in order to live up to their responsibilities as public trustees. For these reasons, it would behoove Southern California local governments to initiate a robust adaptation planning process as soon as practicable.

An effective sea level rise adaptation planning process will incorporate sound public participation procedures into all stages of the process. Stakeholder engagement, public meetings, solicitation of public comments, public education programs, and other community outreach efforts can help local governments ascertain coastal communities' adaptation priorities. At the same time, public engagement efforts can help community members better understand the justifications for coastal adaptation policies like armoring restrictions that may, at first, seem overly burdensome. As we discussed in this article, robust public participation procedures can mitigate legal risk by averting the feelings of alienation and resentment that so often induce residents to file inverse condemnation lawsuits.

3. Utilize Local Coastal Programs as a Vehicle for Sea level Rise Adaptation Strategies

Southern California local governments should utilize LCPs to classify protection, accommodation, and retreat zones; specify attendant goals for each zone; and assign adaptation implementation measures to each zone. All jurisdictions that lack certified LCPs should complete, adopt, and seek Commission certification of an LCP as part of sea level rise adaptation planning. Local governments with certified LCPs should consider amendments to incorporate sea level rise adaptation. As we have discussed at length in this article, certified LCPs provide local governments with valuable regulatory tools for proactive adaptation planning and coastal management.

4. Address Sea level Rise Impacts in Environmental Impact Reports for Appropriate Projects

We underscore the importance of thoroughly addressing sea level rise impacts in EIRs under CEQA notwithstanding *Ballona Wetlands*. Not only does CEQA provide a valuable opportunity for local governments to compile data on sea level rise, make reasoned plans for future development, and analyze adaptation alternatives but also, as we demonstrated in this article, the information contained in a robust EIR can support a local government's chosen adaptation strategy should litigation arise down the road. Moreover, as *Sierra Club* demonstrates, there is potential legal risk for local

governments that do not include consideration of sea level rise in EIRs for appropriate projects.

5. Explore Alternatives to Hard Armoring as a Long-Term Adaptation Strategy

Lastly, because of its significant economic, environmental, and social impacts, we recommend that local governments explore alternatives to hard armoring such as soft armoring, accommodation, and retreat in appropriate circumstances. Furthermore, as we demonstrate in this article, approving or installing hard armoring can expose local governments to risk of legal challenge under the Coastal Act or public trust doctrine. We have presented several strategies for local governments to prevent private property owners from installing hard armoring. Our analysis suggests that although a “no further armoring” ordinance is likely to be politically controversial, it may survive legal challenge under the Takings Clause. Additionally, we have offered grounds for certified local governments to deny permit applications for hard armoring structures under CEQA, the Coastal Act, and the public trust doctrine; and we have discussed ways a local government could challenge Commission-granted permits for armoring in particularly egregious cases. We also have demonstrated that “no further armoring” conditions to CDPs are a low-risk exaction. We acknowledge, however, that a local government may wish to postpone the legal and political controversies surrounding hard armoring restrictions in some cases by permitting armoring in the short or medium term. In such cases, local governments should mitigate the adverse impacts of the armoring project to the greatest extent feasible. We have described how a local government with a certified LCP could condition permits for hard armoring structures to maximize public access and protect ecological functions with relatively low risk of an adverse takings ruling.

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