Coastal Management in the Face of Rising Seas: Legal Strategies for Connecticut

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Abstract: Adapting to sea level rise impacts will require governments to change how they regulate coastal development. This will require policymakers, at both the state and local level, to integrate adaptation into a complex web of overlapping and "siloed" regulatory frameworks that all assume static climate conditions, including floodplain regulations, coastal regulations, and wetlands regulations. This article examines two adaptation approaches that could be applied in Connecticut: a local-level approach using zoning and floodplain regulations, and state-level approach modeled after cutting-edge sea level rise regulations adopted by neighboring Rhode Island. For each method, the authors examine what measures can be implemented now given existing legal authorities delegated to state agencies and municipalities; what measures will require additional delegations or amendments to existing statutes or regulations; and what level of government is best suited to implement different measures (state or local).

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I. Introduction

A. Problem: The Physical and Governance Challenges Posed by Climate Change

In 2009, Connecticut released *Facing Our Future*, the state's plan for adapting to climate change.[2] In 2011, as Tropical Storm Irene ripped across the state, Connecticut saw a glimpse of its future with a changing climate. Whole towns had to be evacuated, homes were torn from their foundations and turned into battering rams, and thousands lost power. Heavy inland rain and coastal storm surges caused entire communities to flood with waist-deep waters.[3]

Although Irene was a severe storm event, these types of impacts may become a normal occurrence along Connecticut's shorelines as sea levels rise. Based upon conservative estimates, Connecticut projects between four inches and 2.9 feet of sea level rise (SLR) over the next century.[4] A more recent assessment, factoring in rapid ice sheet melt, estimates 9 to 29 inches by mid-century.[5]

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[2] CONN. DEP'T OF ENVTL. PROT., FACING OUR FUTURE: ADAPTING TO CONNECTICUT'S CHANGING CLIMATE (Mar. 2009), *available at* http://www.ct.gov/dep/lib/dep/air/climatechange/adaptation/090320facingourfuture.pdf [hereinafter *Facing Our Future*].

[3] Linda Conner Lambeck & Tom Cleary, *Chaos in Connecticut: Irene Causes House Collapses, Extreme Flooding*, GREENWICH CITIZEN, Aug. 28, 2011, http://www.greenwichcitizen.com/local/article/Chaos-in-Connecticut-Irene-causes-house-2145228.php [hereinafter *Chaos in Connecticut*].

[4] ADAPTATION SUBCOMMITTEE TO THE GOVERNOR'S STEERING COMMITTEE ON CLIMATE CHANGE, THE IMPACTS OF CLIMATE CHANGE ON CONNECTICUT AGRICULTURE, INFRASTRUCTURE, NATURAL RESOURCES AND PUBLIC HEALTH 9 (2010), *available at* http://ctclimatechange.com/wp-content/uploads/2010/05/Impacts-of-Climate-Change-on-CT-Ag-Infr-Nat-Res-and-Pub-Health-April-2010.pdf.

[5] SLR projections vary, but the Intergovernmental Panel on Climate Change's 2001 report predicts that global warming of between 2.5°F and 10.4°F could lead to SLR of between four inches and 2.9 feet by 2100. *Natural Coastal Shoreline Environment*, *in Facing Our Future*, *supra* note 2. Although often cited, IPCC estimates do not account for continental ice sheet melt, which could cause sea levels to rise several feet higher. *See* Martin Vermeer & Stefan Rahmstorf, *Global Sea Level Linked to Global Temperature*, 106 PROC. NATL. ACAD. SCI. U.S.A. 21527-21532 (2009); *see also* Stefan Rahmstorf, *Semi-Empirical Approach to Projecting Future Sea Level Rise*, 315 SCI. 368, 369 (Jan. 19, 2007).

SLR will cause extensive physical impacts along Connecticut shorelines. It will drive storm surges further inland and increase flood elevations. Some coastal lands will become permanently inundated, shorelines will erode, important coastal resources such as tidal wetlands will be destroyed, and storms such as Irene may become more intense.[6]

Adapting to these impacts in Connecticut will be particularly important, but also difficult. Connecticut's shorelines feature both extensive coastal development[7] and critical natural resources. Tidal wetlands and beaches provide recreational opportunities, serve as natural flood buffers, filter polluted runoff, and serve as breeding grounds for Connecticut's valuable fishing and aquaculture industry. In deciding how to adapt to continued accelerated SLR, state agencies and local governments will need to balance the competing demands of economic development and environmental conservation placed on coastal lands. Both bring important benefits: coastal development increases the government tax base and provides valuable economic growth to the state, while coastal resources provide important ecological services that are difficult, if not impossible, to restore once lost. Coastal resources, however, are already being squeezed out by a combination of rapid coastal development,[8] sea level rise, and erosion; impacts that will be exacerbated by climate change and associated human responses. For example, as flooding and erosion increasingly threaten structures, private landowners will seek to build hard shoreline armoring, such as sea walls, which prevent the inland migration of wetlands, beaches, and dunes, leading to their permanent inundation and eventual loss.

Because of these trade-offs, Connecticut may need to employ different adaptation strategies for different areas depending on what is at risk (i.e., critical facilities, non-critical development, or sensitive natural resources). There are three primary strategies to adapt to SLR: protection, accommodation, and retreat. Governments may want to *protect* areas with intense development or critical facilities with hard shoreline armoring. In some less-intensely developed areas, governments may want to *accommodate* development by requiring that structures be designed to be more resilient to impacts. In areas with sensitive natural resources and limited development, governments may want to employ a *retreat* strategy by preventing armoring, requiring that structures be gradually relocated inland as impacts occur, and preserving and enhancing coastal resources.

Implementing any type of adaptation strategy, however, poses substantial governance challenges. Regulation in the coastal zone is typically implemented through a complex maze of overlapping, misaligned, and out-of-date statutes that assume static climate conditions. For example, although flooding will be one of the primary impacts of SLR, current practices for regulating development in floodplains only consider *historic* conditions; and similar approaches to mitigating flood impacts are applied in all areas of the floodplain regardless of what is at risk.[9] Regulations also tend to be "siloed" to address one specific problem; for example, regulations designed to lessen the ecological impacts of coastal development are often separate and unrelated to floodplain regulations or wetlands

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[6] *Natural Coastal Shoreline Environment* 1-2, *in Facing Our Future, supra* note 2.

[7] Connecticut has over $405 billion of insured shoreline development, consisting of mainly low-density, high land value, single-family homes along low-lying shorelines. CONN. DEP' OF ENVTL. PROT., NATURAL HAZARDS MITIGATION PLAN 2007-2010 iv (2007), *available at* http://www.ct.gov/dep/lib/dep/water_inland/hazard_mitigation/plan/hazardmitigationplan.pdf [hereinafter *CT 2007 Natural Hazards Mitigation Plan*].

[8] Coastal development, especially when located just above the extreme high tide line (EHTL), limits or eliminates the opportunities for wetlands to migrate inland with shoreline change. This phenomenon has been dubbed "coastal squeeze." R.R. Twilley, *Mangrove Wetlands*, *in* SOUTHERN FORESTED WETLANDS: ECOLOGY AND MANAGEMENT 445-73 (M. Messina and W. Connor eds., 1997).

[9] Floodplain regulations typically employ an accommodation approach, allowing continued development as long as structures are floodproofed or elevated.

regulations.[10] Thus, policymakers are put in the difficult position of having to figure out how to both integrate adaptive measures into separate and sometimes competing regulatory frameworks, while also updating regulatory methods to consider changing climate conditions.

B. Solution: Adapting to Impacts Through Land use Regulations

This article examines legal strategies to help state and local governments reconcile these governance challenges when adapting to SLR. In the context of Connecticut state law, this article examines how land use regulations can be used to ensure that coastal development is more resilient to SLR impacts and less harmful to coastal ecosystems. The article provides case studies of two different approaches to SLR adaptation developed in two nearby states, a local approach developed for Maryland, and a state-level approach implemented in Rhode Island. Each approach is then tested against Connecticut law to determine (1) what measures are legally feasible in Connecticut, (2) what measures can be implemented immediately given existing authorities and what measures will require additional delegations or amendments to existing statutes or regulations, and (3) what level of government is best suited to implement the different measures (state or local).

Part two of this article starts by providing background on the existing legal frameworks that govern development in Connecticut's coastal floodplains. A complex patchwork of overlapping laws governs development in tidal wetlands and watercourses, coastal areas, and floodplains. These laws divide permitting authority between different local entities (Zoning Commissions and Inland Wetlands Agencies), and between local entities and the state Department of Energy and Environmental Protection (DEEP). Because of these overlaps, an effective adaptation strategy will require coordination among these different regulatory entities and integration of adaptation measures into multiple regulatory and planning frameworks. Although this article focuses on *regulatory* frameworks, we recognize that a successful adaptation strategy will require state and local governments to use all the "tools" in their "tool kit"—regulations, incentives, public investments, and education and outreach.

Part three of this article examines a *local* approach. Connecticut is a "home rule" state, which, in the land use context, means that local governments are delegated broad and sometimes exclusive powers to regulate development within their communities.[11] This article analyzes the legal feasibility of implementing a model SLR ordinance that was developed for Maryland (hereinafter "model ordinance") in Connecticut. The model ordinance is designed to help local governments (1) augment land use regulations in their floodplains to address the risks posed by SLR, and (2) build in regulatory flexibility to allow municipalities to tailor regulations to meet their adaptation goals and implement different adaptation measures based upon the different types of development or resources that are at

[10] *See, e.g.*, Maryland Critical Areas Act, MD. CODE ANN., NAT. RES. §§ 8-1801 to 8-1817; NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION & U.S. GEOLOGICAL SURVEY, PROCEEDINGS FROM THE SEA LEVEL RISE AND INUNDATION COMMUNITY WORKSHOP, LANSDOWNE, MD, DEC 3-5, 2009, 23 (Mary Culver et al., eds. 2010) ("The current environmental and coastal hazard laws focus on single-issue management, and the laws provide inadequate tools for multi-sector and multi-purpose management.").

[11] Home Rule Amendment, CONN. GEN. STAT. §§7-187 to -201; CONN. CONST. Art. 10, § 1.

risk.[12] It allows local governments to divide their floodplain into three different zones: a Protection Zone (designed to allow hard shoreline armoring), an Accommodation Zone (designed to enhance existing flood mitigation techniques to address SLR (such as freeboard requirements)), and a Conservation Zone (designed to facilitate retreat by limiting new development and redevelopment in order to preserve coastal ecosystems).[13] Each zone employs different land use tools, or development standards, to achieve the stated goals. For example, in the Conservation Zone the tools employed include downzoning to low-density uses such as open space or recreational uses; restrictions on rebuilding after storm damage; and maximum practicable setbacks. In order to implement such an approach several legal issues must be addressed: local governments need adequate authority delegated from their state legislatures to implement each tool; the tools employed must be consistent with state law; and the tool must be consistent with constitutional requirements. This article analyzes whether the model ordinance can be implemented under both Connecticut's existing municipal delegations to zone and plan, and in a manner that is consistent with a variety of state laws governing development in coastal areas, wetlands, and floodplains.

Part four examines a state-level approach as adopted by Rhode Island. Rhode Island regulates development along the coast through a "rolling" coastal management statute. Under such a statute, "regulators impose land use restrictions by reference to dynamic feature, such as the tideline, a dune crest, or a vegetative line."[14] These coastal features are considered to "roll" because they fluctuate with natural processes and move inland as sea levels rise. Rhode Island added section 145 to its Coastal Resources Management Program to specifically require consideration of 3- to 5-feet of sea level rise in "the siting, design, and implementation of public and private coastal activities." Rhode Island also has a flexible framework that employs different regulations based upon considerations of coastal features (wetlands, beaches, dunes, barrier islands, bluffs, rocky shores) and adjacent coastal uses (conservation, low-intensity, commercial, or water-dependent uses). This model is germane to

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[12] The model ordinance and further discussion of some of the state and federal legal issues can be found in a report being prepared for the Maryland Department of Natural Resources. *See generally* Jessica Grannis, Eric Swanson, Christine Wyman, Jena Shoaf, & Meagan Singer, *A Model Sea Level Rise Overlay Zone for Maryland Local Governments* (forthcoming; currently on file with the Georgetown Climate Center) [hereinafter Grannis, *MD Model SLR Overlay Zone*]. The model ordinance was designed to test tools identified in the Georgetown Climate Center's Adaptation Tool Kit. For a further discussion of each tool used in the model ordinance and a discussion of the some of the legal and policy barriers see JESSICA GRANNIS, GEORGETOWN CLIMATE CENTER, ADAPTATION TOOL KIT: SEA-LEVEL RISE AND COASTAL LAND USE at 1 (August 2011), *available at* http://www.georgetownclimate.org/resources/adaptation-tool-kit-sea-level-rise-and-coastal-land-use [hereinafter Grannis, *Adaptation Tool Kit*].

[13] This concept of incorporating adaptation goals into the design of zoning districts was initially proposed by Tom Ankersen, Director of the Conservation Clinic at the University of Florida Levin College of Law. *See* Thomas T. Ankersen, et al., presentation to the Charlotte Harbor National Estuary Program, *Comprehensive Plan Policies, Land Development Regulations, and a Parcel-Specific Implementation Strategy to Address Sea Level Rise Impacts in Florida* (May 27, 2010), *available at* http://www.flseagrant.org/coastalplanning/wp-content/uploads/2012/03/sea_level_rise_Cons.Clinic_2010_v.2.pdf.

[14] J. Peter Byrne & Jessica Grannis, *Coastal Retreat Measures*, *in* THE LAW OF ADAPTATION TO CLIMATE CHANGE 23 (Michael B. Gerrard & Katrina F. Kuh eds., forthcoming 2012) [hereinafter Byrne, *Coastal Retreat Measures*]. The term "rolling easement" has been championed by Jim Titus of EPA to describe the collection of land use policies that function to ensure that coastlines can migrate naturally inland as the seas rise, and was adopted from a Texas Supreme Court decision describing the public access easement created by the Texas Open Beaches Act. James G. Titus, *Rising Seas, Coastal Erosion, and the Takings Clause: How to Save Wetlands and Beaches without Hurting Property Owners*, 57 MD. L. REV. 1279, 1313, 1364-68 [hereinafter, Titus, *Rising Seas*]. *See also* Feinman v. State, 717 S.W. 2d 106 (Tex. App. 1986).

Connecticut because, like Rhode Island, Connecticut must balance economic development along intensely developed shorelines while preserving sensitive coastal resources.

Finally, in Part five, recommendations are provided on regulatory options for Connecticut's municipalities and state agencies. This article examines what Connecticut can do now to adapt given existing state law; where state agencies or municipalities will need additional authority; and what long-term strategies Connecticut can work towards.

II. Legal Background: Connecticut Coastal Laws

A. Connecticut Jurisdictional Boundaries

In order to implement regulatory measures to adapt to SLR, regulating entities must have sufficient legal authority, and adaptive measures must be consistent with state law and the constitution. In this section, background is provided o the existing regulatory frameworks that govern development in Connecticut's coastal floodplains, and the divisions of authority between different local entities and the state Department of Energy and Environmental Protection (DEEP) is also explained.

In Connecticut, municipal governments are the primary entities charged with regulating land use, through the Zoning Enabling Act (ZEA).[15] However, when regulating development in areas vulnerable to SLR, Connecticut municipalities will have to comply with two special laws: the Connecticut Coastal Management Act (CCMA),[16] which governs development in coastal areas and the Inland Wetlands and Watercourses Act (IWWA),[17] which requires local governments to create special Inland Wetlands Agencies (IWAs).[18] IWAs are charged with regulating development adjacent to inland wetlands and tidal watercourses. Additionally, local authority over state tidelands (i.e., the wet sand beach) is preempted; DEEP has primary authority to regulate in tidelands pursuant to the Tidal Wetlands Act[19] and the Structures, Dredging and Fill Act.[20]

These statutes divide land use authority between a mix of local and state entities and create areas of overlapping jurisdiction. As the graphic below illustrates (Figure 1), the division of authority between local and state entities is based upon the following geographical markers (on the graphic moving from right to left):

[15] CONN. GEN. STAT. § 8-2.
[16] Connecticut Coastal Management Act, CONN. GEN. STAT. § 22a-90 to -111.
[17] Inland Wetlands and Watercourses Act, CONN. GEN. STAT. § 22a-36 to -45.
[18] *Id*. § 22a-42(c); *See also* HARBOR MANAGEMENT ACT (HMA), CONN. GEN. STAT. §§ 22a-113k to -113t, which allows local governments to create special Harbor Management Commissions (HMCs) to guide development in designated harbor areas to promote the "most desirable use of [local harbors] for recreational, commercial, industrial and other purposes." CONN. GEN STAT. § 22a-113m. HMCs do not have regulatory authority; however, HMCs can influence development in harbor areas because both Zoning Commission and DEEP permitting decisions must be consistent with the Harbor Management Plan, and HMCs can object to a project, requiring the Zoning Commission to approve the project by a two-thirds majority to allow the project to proceed.
[19] Tidal Wetlands Act, CONN. GEN. STAT §§ 22a-28 to -35.
[20] Structures, Dredging & Fill Act, CONN. GEN. STAT. § 22a-359 to -363.

- Waterward of the Mean High Water Line (MHWL) (depicted in blue): DEEP has exclusive authority over all land-disturbing activities conducted waterward of the MHWL (essentially areas of the wet beach).[21]
- Extreme High Tide Line (EHTL) to the MHWL (depicted in green): Local entities share regulatory authority with DEEP over lands between the EHTL and the MHWL.[22] The EHTL is defined as the maximum height reached by a rising tide.[23] In these areas of overlapping jurisdiction, permit applications must be filed with and meet the standards and criteria of both state and local regulating entities.[24]
- EHTL to Coastal Boundary (depicted in yellow): Local governments have exclusive authority to regulate development in areas stretching landward of the EHTL. Within the coastal boundary (defined as all lands 1,000 feet inland of the MHWL),[25] the CCMA (described in more detail below) requires municipalities to impose special coastal development regulations.[26]

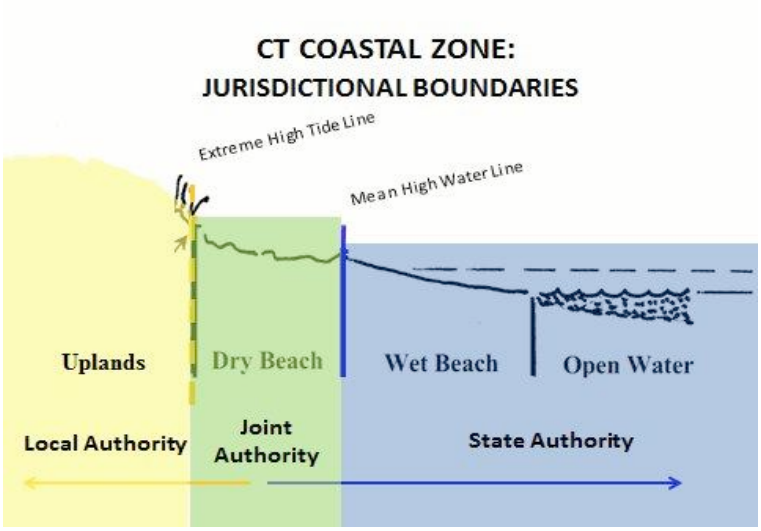

Fig. 1. Depiction of jurisdictional boundaries between Connecticut municipalities and the state Department of Energy and Environmental Protection.

In implementing SLR regulations it will be important for policymakers to understand these overlapping authorities in order to ensure that adaptive measures are coordinated between the

[21] Office of Long Island Sound Programs, Fact Sheet for State and Municipal Regulatory Jurisdictions, *in* CONN. DEP'T OF ENVTL. PROT., CONNECTICUT COASTAL MANAGEMENT MANUAL (2000) *available at* http://www.ct.gov/dep/lib/dep/long_island_sound/coastal_management_manual/manual_08.pdf. [hereinafter *CT Coastal Management Manual*].

[22] *Id.* In general, and especially on gently sloping shorelines, the EHTL lies inland of the MHTL.

[23] Extreme high tides include "spring high tides and other high tides that occur with periodic frequency but does not include storm surges … such as those accompanying a hurricane or other intense storm." CONN. GEN. STAT. § 22a-359(c).

[24] *CT Coastal Management Manual supra* note 21.

[25] Connecticut's "coastal boundary" is defined as the furthest inland of (1) the 100-year flood zone; (2) 1,000 feet from the mean high water mark; or (3) 1,000 feet from the inland boundary of tidal wetlands. CONN. GEN. STAT. § 22a-94(b).

[26] *Id.* 22a-92(d).

different regulatory bodies and integrated into all relevant regulations and planning documents that govern development in coastal floodplains.

B. Local Authority

1. Zoning Enabling Act

Under existing laws, Connecticut municipalities will play an integral role in regulating for SLR because they are granted almost exclusive authority to regulate land use. The ZEA grants Connecticut municipalities broad powers to enact land use regulations for "public health, safety, convenience and property values"[27] This authority is exclusive landward of the EHTL, and grants municipalities sufficient authority to use zoning to regulate for SLR impacts. First, the Connecticut General Statutes specifically authorize local governments to enact zoning regulations to protect their communities from dangers such as fires, panic, and *floods*.[28] SLR will increase risks of flooding and erosion, which will imperil lives, property, and the state's natural resources.[29] Regulations that attempt to mitigate these impacts serve to protect the health, safety, convenience, and property values of the community. Additionally, local governments are authorized to consider future conditions when enacting land use regulations, so long as the regulations are supported by sufficient evidence showing the threats posed by the projected conditions.[30] Finally, the statute explicitly authorizes local governments to use many of the specific tools used in the model ordinance (described above), including size and height limitations; density, footprint, and use restrictions; and overlay zones.[31] Connecticut courts have construed this delegation broadly to include additional tools not listed in the statutory language.[32] While Connecticut municipalities are delegated broad powers to regulate land use, these powers are constrained by the requirements of the other state laws discussed below, and any local implementation of SLR adaptations must also be consistent with these laws.

2. Connecticut Coastal Management Act

When executing their zoning powers, coastal municipalities must comply with special requirements imposed by the Connecticut Coastal Management Act.[33] The CCMA governs development occurring between Connecticut's coastal boundary and the MHWL. When considering applications for activities that are located fully or partly within the coastal boundary, local permitting authorities must comply with both the municipal zoning ordinance and the statutory goals and policies of the CCMA to consider "the potential impact of coastal flooding and erosion patterns on coastal

[27] *Id.* 8-2(a).

[28] *Id.* Additionally, Sec. 8-2(b) requires that all municipalities contiguous to Long Island Sound consider the environmental impact of any proposed development on the Sound. *Id.* 8-2(b).

[29] *See CT* 2007 *Natural Hazards Mitigation Plan supra* note 7; *see also Chaos in Connecticut supra* note 3.

[30] *See* discussion of substantive due process requirements *infra* note 70.

[31] CONN. GEN. STAT. § 8-2(a).

[32] *See* Gideon Associates v. Coventry Planning & Zoning Com'n, No. CV010077060S2003, 2003 WL 21805742, at *7 (Conn. Super. Ct. July 24, 2003) (finding that the zoning delegation in § 8-2 authorized a municipal zoning commission to enact zone change/downzone); Nicholas v. Zoning Com'n of Town of Ledyard, No. 522997, 1995 WL 27500, at *2 (Conn. Super. Ct. Jan 18, 1995) (finding that the zoning delegation in § 8-2 authorizes a municipal zoning commission to enact a reasonable development moratorium).

[33] CONN. GEN. STAT. §§ 22a-90 to -111. The CCMA is the central law guiding the state's comprehensive Coastal Management Program and was adopted pursuant to the requirements placed on coastal states by the federal Coastal Zone Management Act.

development so as to minimize damage to and destruction of life and property and reduce the necessity of public expenditure to protect future development from such hazards."[34]

The CCMA employs several tools to ensure that development projects consider impacts to coastal resources. First, the teeth of the CCMA are in the site plan review requirements. Municipalities must require permit applicants to submit a coastal site plan.[35] Regulators must review site plans to ensure that the proposed project is consistent with the CCMA and is designed to avoid or minimize "adverse impacts to coastal resources." Listed adverse impacts relevant to SLR adaptations include

> degrading natural erosion patterns; ... degrading natural or existing drainage patterns; ... increasing the hazard of coastal flooding through significant alteration of shoreline configurations; ... degrading or destroying essential wildlife, finfish or shellfish habitat; ... and degrading tidal wetlands, beaches and dunes, rocky shorefronts, and bluffs and escarpments through significant alteration of their natural characteristics or function.[36]

Second, the CCMA grants municipalities explicit power to utilize specific tools to regulate development in coastal areas, which were not previously delegated in the ZEA, including downzoning, setbacks and special-use zones.[37] These tools could play an important role in allowing municipalities to implement special regulations to protect vulnerable coastal areas and resources from SLR impacts within their jurisdiction.

The state has little regulatory authority landward of the EHTL. The CCMA only authorizes DEEP to review and comment on coastal site plan decisions and contemplated changes to municipal coastal plans; local governments, however, are not legally required to heed any comments or suggestions and DEEP can only appeal municipal decisions in court by arguing that they are arbitrary and capricious.[38] Under the current CCMA framework, state supervision is unlikely to be an effective tool for requiring adaptation within the coastal boundary; these tools may only be effective for promoting adaptation within willing local jurisdictions. While the state can use its oversight powers to review and comment on the vulnerability of projects to SLR and to help municipalities consider SLR in their coastal planning documents, there is no requirement that municipalities adopt DEEP recommendations.

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[34] *Id.* at 22a-92(a)(5).

[35] Coastal site plan review applications require significant detail, including a detailed description of the proposed activity and its location, identification of all coastal resources on and adjacent to the site, an assessment of how the proposed activity is consistent with the CCMA, methods of proposed stormwater management, an evaluation of the potential beneficial and adverse impacts of the proposed project and a description of proposed methods to mitigate or lessen, any unavoidable adverse impacts. CONN. GEN. STAT. § 22a-105(c). For further guidance *see* Office of Long Island Sound Programs, *Coastal Site Plan Review Application Checklist*, in *CT Coastal Management Manual, supra* note 21.

[36] CONN. GEN. STAT. § 22a-93(15); *see also* Office of Long Island Sound Programs, Fact Sheet for Adverse Impacts, in *CT Coastal Management Manual, supra* note 21.

[37] *Id.* 22a-103(c).

[38] *See* CONN. GEN. STAT. §§ 22a-102(d), 103(b), 104(e). DEEP has general supervisory authority to assure continuing, effective, coordinated and consistent administration of the requirements and purposes of the CCMA. *Id.* 22a-97(b).

3. Inland Wetlands and Watercourses Act

Connecticut local governments are also required to regulate all land-disturbing activity within the state's inland wetlands and watercourses pursuant to the Inland Wetlands and Watercourses Act.[39] Although SLR will not directly affect inland wetlands unless inundated, the statute also covers all rivers, streams, and other tidally influenced waterways, which will be affected by rising seas. The IWWA requires each municipal government to create an Inland Wetlands Agency (IWA)[40] charged with protecting and maintaining inland wetlands and watercourses "for their conservation, economic, aesthetic, recreational, and other public and private uses and values."[41] Activities affecting designated wetland areas must comply with separate inland wetland permitting requirements.[42] IWAs cannot issue a permit for activities that may have a significant impact on wetlands or watercourses unless there is "no feasible or prudent alternative."[43] Thus, before issuing a permit, IWAs "must determine that the alternative presented by the applicant is not only sound from an engineering standpoint but is also economically reasonable in light of the social benefits derived from the activity."[44] Although "cost may be considered in deciding what is prudent a mere showing of expense will not necessarily mean an alternative is imprudent."[45] When permitting a project, IWAs can also impose limitations, conditions, and modifications to mitigate potential environmental impacts.[46]

IWAs could play an integral role in adapting tidal watercourses. IWAs have an explicit regulatory mandate to protect the environmental values provided by wetlands and watercourses, some of which may be vulnerable to SLR impacts. Thus, an effective adaptation strategy should consider how to integrate SLR adaptation into municipal wetlands ordinances as well as zoning ordinances and floodplain ordinances.

C. State Permitting Authority: Tidal Wetlands Act and the Structures, Dredging and Fill Act

Adaptation activities adjacent to intertidal areas will likely have to be implemented at a state level or will require coordination with DEEP under existing state law. DEEP is given exclusive authority to

[39] CONN. GEN. STAT. §§ 22a-36 to 22a-45. The IWWA defines "wetland" as "land, including submerged land, not regulated pursuant to [the TWA]," and designates wetlands by soil type. *Id.* § 22a-38(15). The IWWA defines "watercourses" as "rivers, streams … and all other bodies of water … which are contained within, flow through or border upon this state or any portion thereof, not regulated pursuant to [the TWA]." *Id.* § 22a-38(16). IWA's jurisdiction may extend to non-wetlands areas that are *likely to impact* or affect wetlands and watercourses. 1995 CONN. PUB. ACTS No. 95-383; 1996 CONN. PUB. ACTS No. 96-157; Queach Corp. v. Inland Wetlands Comm'n of Town of Branford, 779 A.2d 134, 138-39 (Conn. 2001) (citing section 2.1jj(2) of Branford's IWWA regulations).

[40] CONN. GEN. STAT. § 22a-42(c). IWAs share regulatory and permitting authority with municipal zoning and planning agencies and generally require separate permit applications. Municipalities may authorize existing planning or zoning commissions to assume the regulatory authority of an IWA, thereby allowing for a combined permit process. In practice, however, IWAs are almost always separate commissions.

[41] *Id.* § 22a-36.

[42] IWAs are authorized to promulgate regulations for activities within the boundaries of inland wetlands and watercourses. *Id.* 22a-42(c).

[43] The statute requires IWAs to consider the environmental impact of the proposed activity, including injury or interference with safety, health, or reasonable use of property, and any impacts reasonably related to the proposed activity on wetlands and watercourses, among other factors. *Id.* § 22a-41. The IWWA defines "feasible" as that which is "able to be constructed or implemented consistent with sound engineering principles." *Id.* § 22a-38(17); *see also* definition of "prudent." *Id.* 22a-38(18).

[44] Samperi v. Inland Wetlands Agency of City of West Haven, 628 A.2d 1286, 1296 (Conn. 1993).

[45] CONN. GEN. STAT. 22a-38(18).

[46] *Id.* 22a-42a(d)(1).

permit activities in tidal wetlands pursuant to the Tidal Wetlands Act (TWA),[47] and coastal or navigable waters under the Structures, Dredging and Fill Act (SDFA).[48]

The TWA gives DEEP regulatory jurisdiction over all land-disturbing activities, including dredging, filling, and construction to one foot above the EHTL of a tidal wetland.[49] To carry out state policy objectives for tidal wetland protection, the statute creates criteria for granting, denying, or conditioning permits that specifically take into account the impacts of any proposed activity upon tidal resources, erosion, flooding, and other natural disasters.[50] These criteria have been further outlined in DEEP regulations on tidal wetlands.[51] The SDFA gives the state regulatory jurisdiction over all land-disturbing activities waterward of the EHTL.[52] Such regulated activities may only be conducted within this zone after the applicant has secured a permit from DEEP.[53]

In making permitting decisions under both acts, DEEP must consider: the potential effect on the area's natural resources; effects on and prevention of shore erosion and coastal flooding; use and development of adjoining lands; coastal and inland navigation for all vessels; pollution control; water quality; recreational use; management of coastal resources; and, the rights and interests of all persons concerned with the proposed activity.[54]

D. Connecticut Constitutional Takings Law

Finally, land use regulations designed to mitigate impacts from SLR have the potential to significantly impact property values; and, thus, must be evaluated in light of constitutional prohibitions against regulations that "take" private property. Both the Connecticut and federal Constitutions prohibit regulations that effectively expropriate private property without just

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[47] *Id.* §§ 22a-28 to 22a-35. Under the TWA, "wetland" is defined as "areas which border on or lie beneath tidal waters" and which support certain wetland vegetation. *Id.* 22a-29(2).

[48] *Id.* § 22a-359 to 22a-363.

[49] The TWA defines "regulated activity" as any of the following: "draining, dredging, excavation, or removal of … aggregate of any kind … from any wetland or the dumping, filling or depositing thereon of any … aggregate of any kind … either directly or otherwise, and the erection of structures, driving of pilings, or placing of obstructions, whether or not changing the tidal ebb and flow." *Id.* § 22a-29(3). Certain listed activities, such as emergency response activities, are exempted from regulation.

[50] *Id.* 22a-30(c).

[51] DEEP has outlined specific criteria for regulated activities, including wetland preservation, recreational and navigational uses, erosion and sedimentation, marine fisheries, shellfisheries, and wildlife, and protection of life and property from natural disasters. CONN. AGENCIES REGS. 22a-30-10(g).

[52] CONN. GEN. STAT. § 22a-359(a). Regulated activities include dredging, erecting structures, placing fill, obstructing or encroaching or carrying out of any maintenance work incidental thereto. *Id.* § 22a-361(a)(1). Section 22a-363b(a) lists exempt activities.

[53] *Id.* 22a-361(a)(1).

[54] *Id.* §§ 22a-359(a), 22a-30(c). *See also* CONN. AGENCIES REGS. § 22a-30-10. In addition to issuing individual permits on a site-specific basis, DEEP has also developed three expedited area-wide permit processes: general permits, Certificates of Permission (COP), and emergency authorizations. Expedited permits provide an avenue by which DEEP can implement adaptations, such as protection measures, on an area-wide basis; however, they could also be used to frustrate local adaptation initiatives. For example, a landowner may be able to build hard shoreline armoring under a DEEP expedited permit, even in areas where the locality wanted to limit or prohibit armoring. CONN. GEN. STAT. § 22a-363; *see also* Conn. Dep't of Energy & Envtl. Prot., *General Permits: An Environmental Permitting Fact Sheet*, http://www.ct.gov/dep/cwp/view.asp?a=2709&q=324154&depNav_GID=1643 (last visited June 19, 2012).

compensation.[55] Many state courts adhere to the U.S. Supreme Court's takings jurisprudence; however state courts *may* interpret their state constitutions more restrictively than the U.S. Constitution. Historically, Connecticut courts have been more protective of private property rights; however, these old state law cases pre-date and may be superseded by more recent U.S. Supreme Court cases that have clarified federal takings analysis.[56] Thus, it is necessary to understand both the Connecticut and federal tests for regulatory takings to determine how Connecticut courts may analyze new SLR regulations.

Federal courts, interpreting the Fifth Amendment's Takings Clause, apply two relevant tests: the *per se* "total takings" test, and the *Penn Central* balancing test. In *Lucas v. South Carolina Coastal Council*, the U.S. Supreme Court articulated the total takings rule: where a regulation deprives a property owner of "*all* economically beneficial use" it is a takings *per se* and the government must pay the landowner just compensation.[57] The regulation must essentially render the property valueless. There is, however, an exception to this rule: a regulation will not be a taking where the limitation on use "inheres in the title itself in the background principles of property and common law" (such as public trust and nuisance).[58] Where a regulation does not amount to a total taking, the court applies a balancing test (articulated in the case *Penn Central Transportation Co. v. New York City)*, in which the court weighs three factors: (1) the economic impact of the regulation, (2) the character of the government action, and (3) the "reasonable investment-backed expectations" of the landowner.[59]

Connecticut courts apply a similar analysis in reviewing regulatory actions for violations of the state's constitution, applying two relevant tests: a practical confiscation test,[60] and a three-factor balancing test.[61] Under the practical confiscation test, Connecticut courts find takings where a regulation deprives a property owner of "any worthwhile rights or benefits" in their land.[62] For regulations that do not amount to confiscatory taking, Connecticut courts apply a balancing test similar to that articulated in *Penn Central*. Connecticut courts consider (1) the degree of diminution of the value of the land, (2) the nature and degree of public harm to be prevented, and (3) alternatives available to the landowner.[63]

While the court's analysis under a balancing approach is substantially the same in both state and federal courts, Connecticut courts have in the past applied a more restrictive confiscatory (or total) takings test than federal courts. In *Lucas,* the U.S. Supreme Court was clear—application of the *per se* test should be limited to regulations that cause a 100% diminution in value; anything less than a

[55] The Fifth Amendment to the U.S. Constitution provides that no "private property be taken for public use, without just compensation." U.S. CONST. amend. V; *see also* U.S. CONST. amend. XIV, § 1 (applying the Fifth Amendment's protection of property to state actions). Similarly, the Connecticut Constitution provides that "[t]he property of no person shall be taken for public use, without just compensation therefore." CT. CONST. art. I § 11. *See also* Vartelas v. Water Resources Commission, 146 Conn. 650, 654 (Conn. 1959).

[56] Connecticut courts also divide their analysis of whether a regulation amounts to a taking based upon the state constitution or the federal constitution, which seems to suggest that different standards apply. *See* Rural Water Co., Inc. v. Zoning Bd. of Appeals of Town of Ridgefield, 947 A.2d 944 (Conn. 2008).

[57] 50 U.S. 1003, 1019 (1992).

[58] *Id* at 1027.

[59] Penn Central Transportation Co. v. New York City, 438 U.S. 124 (1978).

[60] *Lucas,* 50 U.S. at 1018-20 (defining federal "per se" taking as a total diminution in value).

[61] *Penn Central,* 438 U.S. at 124.

[62] Brecciaroli v. Conn. Comm'r of Env. Prot., 362 A.2d 948, 951 (Conn. 1975).

[63] Chevron Oil Co. v. Zoning Board of Appeals of Town of Shelton, 365 A.2d 387, 391 (Conn. 1976).

complete elimination in value requires application of the *Penn Central* balancing test.[64] Pre-*Lucas* state court cases, however, have applied the confiscatory takings analysis in cases where the regulation caused less than a 100% diminution in value. For example, in *Dooley v. Town Planning and Zoning Commission of Town of Fairfield*, a 1964 case, the Connecticut Supreme Court found that a floodplain ordinance worked a taking even though the regulation at issue only resulted in a 75% diminution in the property's value. The court found that town's designation of a floodplain district was a taking because it "froze the area into a practically unusable state."[65] Similarly in *Bartlett v. Zoning Commission of Town of Old Lyme* a 1971 case, the Connecticut Supreme Court struck down a wetlands protection ordinance that resulted in the diminution in the property's value from $32,000 to $1,000.[66] Furthermore, unlike federal courts, early Connecticut court opinions have not recognized a nuisance exception to takings. They have struck down regulations even where they were designed to prevent significant injuries to the community.[67]

It is unclear how *Lucas* will affect Connecticut's constitutional takings jurisprudence. Since *Lucas*, Connecticut courts have not significantly analyzed a regulation that worked a total taking. More recent cases do, however, seem to reinterpret the holdings of *Bartlett* and *Dooley,* while not explicitly overturning these cases. For example, in *Bauer v. Waste Management of Connecticut, Inc.*, a 1995 case, the court cites to *Dooley* and *Bartlett*, but restates the confiscatory takings rule as "involv[ing] situations that require a landowner to leave his property in *essentially its natural state*."[68] In *Bauer*, the court seems to require a complete wipe out of economic use, not merely a substantial diminution in value. Because the courts have not clearly rejected *Bartlett* and *Dooley,* it is difficult to predict what standard a state court will apply in analyzing SLR regulations, especially regulations that substantially diminish land values. With SLR regulations, retreat policies have the highest likelihood of triggering a

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[64] *See* Tahoe-Sierra Pres. Council, Inc. v. Tahoe Reg'l Planning Agency, 535 U.S. 302, 330 (2002). In an explanatory footnote in *Lucas*, the Supreme Court stated that the *per se* rule would not apply if the diminution in value were *95%* instead of 100%. *Lucas* 50 U.S. at 1019, n.8.

[65] Dooley v. Town Planning and Zoning Comm'n of Town of Fairfield, 191 A.2d 770, 773 (Conn. 1964).

[66] 282 A.2d 907 (Conn. 1971). While the Court recognized the public importance of wetlands (as "vital economic resources," that provided recreational benefits, wildlife shelters, and helped to maintain property values), it nonetheless found that the ordinance caused a confiscatory taking because it prohibited all use of the property "other than wooden walkways, wharves, duck blinds, public boat landings and public ditches." *Id.* at 910. *But cf.* Breccaroli v. Conn. Commissioner of Envtl Prot., 362 A.2d 948 (Conn. 1975) (upholding DEEP's denial of a permit to fill the wetlands portion of a lot under the TWA, where denial did not result in a confiscatory taking because the landowner could still seek to build on the non-wetlands portion of the lot).

[67] In *Dooley*, even though the court recognized the "laudable" purpose of flood control, the court found that the private property owner could not be made to sacrifice for the community welfare and that eminent domain would be a more appropriate mechanism to achieve this community benefit. 191 A.2d at 773-74.

[68] Bauer v. Waste Mgmt. of Connecticut, Inc., 662 A.2d 1179, 1197 (1995) (*citing Bartlett,* 282 A.2d 907; and *Dooley*, 191 A.2d 770). Although these more recent cases may be factually distinguishable (because they did not involve an important public purpose, such as threats to the health, safety, and welfare, and often involved landowner fault), they show that the Connecticut courts may be tracking more closely with the U.S. Supreme Court's analysis articulated in *Lucas*. In *Norwood v. Zoning Bd. of Appeals of the Town Of Branford,* the court found that the denial of a variance to a zoning ordinance that rendered a lot unbuildable did not amount to a takings because it only represented a financial loss. 772 A.2d 624, 628-29 (Conn. 2001). The ordinance did not render the lot worthless, and the lot "could have value as an addition to an abutting lot[.]" *Id. See also* City of Bristol v. Tilcon Minerals, Inc., 931 A.2d 237, 257 (Conn. 2007) (finding there cannot be a confiscatory taking without "total destruction of a property's economic value or substantial destruction of an owner's ability to use or enjoy the property"*); but cf* Pike v. Zoning Bd. of Appeals of Town of Hampton, 624 A.2d 909 (1993) (finding a taking where use as a side yard and twelve other possible uses were not possible, constituting severe reduction in value if not destruction of value).

confiscatory takings analysis. The implication of Connecticut takings law with respect to these particular policies is discussed below, in Section III(B)(2).

III. A Local Approach to SLR Adaptation for Connecticut

A. Design of the Model SLR Zoning Ordinance

As the primary regulators of land use in Connecticut, local governments will play a critical role in adapting to climate change. This part of the article examines whether Connecticut municipalities can implement policies proposed in a model SLR ordinance developed for Maryland by the Georgetown Climate Center.[69] The model was designed to help local governments integrate adaptive land use measures into existing frameworks for regulating coastal floodplains. The model enhances regulations in two ways. First, it extends the boundaries of the regulated floodplain to cover areas that have historic risk of flooding and that will become increasingly at-risk as sea levels rise. Second, the model gives regulators more flexibility to tailor regulations to their adaptation goals by dividing the floodplain into three different SLR zones. Each of these zones implements regulatory tools designed to effectuate one of three adaptation goals: protect, accommodate, and retreat.

The first challenge that local governments will face in implementing this approach is determining where to draw the boundaries for each zone. In the near term, local governments should use existing floodplain boundaries. Connecticut has yet to develop SLR maps that are scientifically rigorous enough to be used for regulatory purposes.[70] Additionally, using existing designations will ensure that local communities maintain compliance with the National Flood Insurance Program (NFIP). Under the NFIP, the Federal Emergency Management Agency (FEMA) develops Flood Insurance Rate Maps (FIRMs) that divide the floodplain into three different zones that govern what regulations apply: A-zones, V-zones, and X-zones. To participate in the NFIP local governments must impose special regulations in A-zones (which include inland areas of the 100-year floodplain), and V-zones (which

[69] *See generally* Grannis, *MD Model SLR Overlay Zone supra* note 12.

[70] Governments face challenges in generating SLR maps for regulatory purposes. Technical challenges stem from the scientific uncertainty about the rate of SLR, the geographical extent and timing of SLR impacts, and how SLR will affect storm surges. In using maps for regulatory purposes, municipalities also face legal challenges because they must comply with constitutional substantive due process requirements. Although the legal hurdle is low, substantive due process requires that regulations be "rationally related to a legitimate public interest." *See* Village of Euclid v. Ambler Realty, Co., 272 U.S. 395 (1926). Connecticut courts are deferential to local policy decisions to amend their zoning regulations; however, courts have required local governments to provide *sufficient evidence* documenting the probability of the threat when imposing new regulations to address future conditions. *Compare* Nicholas v. Zoning Comm'n of Town of Ledyard, No. 522997, 1995 WL 27500, at *2 (Conn. Super. Ct. Jan. 18, 1995), *and* Corsino v. Grover, 170 A.2d 267, 310 (Conn. 1961) (holding that the commission was under duty to reasonably anticipate future conditions which could affect the public welfare adversely), *with* Toll Bros., Inc. v. Bethel Planning & Zoning Comm'n, No. HHBCV030523881S, 2006 WL 3114387, at *3 (Conn. Super. Ct. Oct. 19, 2006) (finding that the zoning commission had insufficient evidence that future traffic would cause a threat to public health). Thus, in the short term, local governments will be on the strongest legal footing where they rely on existing maps to regulate in areas with clearly documented historic risk of flooding, such as FIRMs supported by a Flood Insurance Study. Governments can then use less rigorous SLR studies and vulnerability assessments to prove how SLR will increase risks in flood-prone areas, thereby justifying increased regulations in areas at historic risk of flooding. As SLR mapping improves, the state or local governments may be able to adopt maps for regulatory purposes that could withstand a substantive due process challenge.

include areas of the 100-year floodplain that are subject to wave action).[71] Although X-zones (encompassing the 500-year floodplain) are mapped, FEMA does not require that these areas be regulated for flood risks.[72]

Because the NFIP only considers *historic* flood risks, FIRMs will be insufficient to ensure protection against rising sea levels. However, NFIP maps can be used as a starting point for enhancing regulations. The model SLR ordinance proposes that local governments extend the boundaries of the regulated floodplain to include the 500-year floodplain[73] and divide the 100-year floodplain into three different zones: a "Protection Zone," an "Accommodation Zone," and a "Conservation Zone." Each zone augments regulations by employing specific development standards designed to effectuate each adaptation goal.

In dividing the floodplain in this manner, local governments will have to weigh competing policy considerations and determine what their adaptation goals are for different parts of their communities. Local governments should consider: existing floodplain designations (V-zones, coastal A-zones, A-zones); the extent of existing development; the quality of natural resources in the area and the ecosystem services provided; the area's vulnerability to SLR and other climate change impacts; and, the extent of existing armoring and the feasibility and likelihood of future armoring. The Protection Zone could include intensely developed areas, like city centers, which may have limited adaptation options due to the location of critical facilities, historic properties, and large areas of public and private development. These may be areas with extensive existing armoring or degraded ecosystems. The Accommodation Zone could include moderate to intensely developed areas with non-critical public and private development that are less vulnerable to impacts than the Conservation Zone, but are unsuitable for armoring. The Conservation Zone could include less developed, highly vulnerable areas that have sensitive natural resources. These areas are also likely to be unsuitable for hard-shoreline protections, due to both economic and environmental costs.

Second, governments will need to determine what tools or development standards to employ in each zone. In the Protection Zone municipalities may want to allow additional armoring by:

- Designating areas as appropriate for armoring in advance of impacts, and permitting armoring by right or creating streamline permitting process for armoring in these areas.
- Requiring that armoring be designed to protect against elevated flood heights due to increased sea levels.
- Requiring that projects mitigate impacts to natural resources and public access.

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[71] The 100-year floodplain covers areas with a 1% or greater chance of flooding in any given year based upon historic data. In A-zones, local governments must impose minimum floodplain regulations (e.g., elevating or flood-proofing structures and eliminating basements). In V-zones, local governments must impose slightly more rigorous regulations to mitigate impacts from wave action (e.g., elevation on pilings and anchoring). Federal Emergency Management Agency, Map Service Center, *Definitions of FEMA Flood Zone Designations,* https://msc.fema.gov/webapp/wcs/stores/servlet/info?storeId=10001&catalogId=10001&langId=-1&content=floodZones&title=FEMA%20Flood%20Zone%20Designations (last visited June 19, 2012).

[72] The X-zone, or the so-called the 500-year floodplain, includes areas that have a 0.2% to 1% chance of flooding in any given year based upon historic flood data. *Id.*

[73] *See generally* Grannis, *MD Model SLR Overlay Zone, supra* note 12, at § IV(2). Although the X-zone is not a perfect proxy for how SLR may impact a community, these are areas that FEMA's Flood Insurance Studies demonstrate are at risk from a statistical suite of storms that are characteristic for Connecticut. Cedar Falls, IA recently extended floodplain regulations to their 500-year floodplain to address impacts from repeated riverine flooding. CEDAR FALLS ZONING ORD. § 29-156, *available at* http://library.municode.com/index.aspx?clientId=10264. To implement these new requirements the City had to work with FEMA to update their FIRMs to show elevations for the 500-year flood.

This will allow the community to identify areas it wants to protect in advance, ensure areas are protected against heightened flood elevations, budget to build and maintain public armoring projects, and provide developers with certainty that armoring will be allowed when they are making investment decisions. To do so, however, municipalities will have to coordinate with DEEP because the ability to armor is limited by state law.

The Conservation Zone is designed to gradually relocate existing development away from highly vulnerable areas while protecting the surrounding environment. T do so, local governments could:

- Downzone to only allow low-density and low-intensity uses, such as low-density residential, agricultural, recreational, open space, or water-dependent uses.
- Require maximum practicable setbacks that require shoreline structures to be placed as far landward or upland on the site as feasible to maximize protection from flooding, erosion, and surges.
- Restrict rebuilding of storm-damaged structures.
- Restrict hard-shoreline armoring.

The Accommodation Zone is designed to allow for continued development, while requiring that the siting and construction of new and redeveloped structures consider future SLR impacts. Here, local governments could:

- Downzone to lower density and intensity uses, such as residential and commercial development.
- Require maximum practicable or erosion-based setbacks for waterfront properties.
- Increase freeboard requirements consistent with estimates for projected SLR. Local governments should also consider varying elevation requirements based upon the type of structure or use (critical or non-critical).[74]
- Establish size and height maximums to only allow smaller structures that are more easily moveable and pose less threat of collateral damage in the event the structure is destroyed in a storm.

Local governments may have difficulty completely revamping their land use ordinances in the manner proposed. Therefore, the model ordinance was designed to be as "plug and play" as possible. The hope is the model will help communities begin to think about different ways to regulate flood-prone areas in the face of rising seas. And, that it will help them incorporate those provisions of the model that are feasible for their community and that will be effective at helping them address their particularized vulnerabilities.

[74] Structures must typically be elevated one-foot above the base flood elevation (computed elevation which floodwater as anticipated to rise during the 100-year storm event). Federal Emergency Management Agency, *Base Flood Elevation*, http://www.fema.gov/plan/prevent/floodplain/nfipkeywords/base_flood_elevation.shtm (last visited June 19, 2012). This elevation is called "freeboard." But see note 98, *infra*, regarding potential policy challenges to implementing increased freeboard requirements.

B. Potential State Law Barriers to Implementation of Tools Included in Model SLR Ordinance

In Connecticut, implementation of many of these tools at a local level will present two major challenges. First, because Connecticut law divides permitting authority between the state and a variety of municipal commissions, implementation will require significant coordination between a variety of regulatory entities. To be effective, measures may need to be integrated into multiple ordinances and plans, and regulatory approaches will need to be coordinated among different local commissions and the state.

Second, state laws may prohibit or restrict implementation of certain tools, such as downzoning, rebuilding restrictions, and limitations on hard shoreline armoring. The inability of local governments to implement specific tools may limit the ability of localities to regulate in a more flexible manner. Policymakers may need to consider how to amend existing laws to give both state and local regulators more options to respond to SLR threats.

1. Protection Zone

Any viable adaptation strategy will require consideration of armoring policies. In areas with intense development and critical facilities it may not be cost effective or desirable to try to move or raise development. Thus state and local governments will need to consider where they want to allow hard armoring, what development standards to require when permitting hard armoring, and how they want to mitigate the associated environmental impacts of armoring. Governments may also need to consider what level of government is best suited to regulate armoring. Because the state has exclusive permitting authority seaward of the MHWL, armoring decisions may best be addressed at a state level.

Under existing frameworks in Connecticut, local control over armoring is limited and state law may prohibit local designation of areas where they want to allow hard shoreline armoring. First, armoring projects often get built in intertidal areas and thus invoke state permitting requirements. Local authority to regulate armoring in tidally influenced waters below the MHWL is preempted by both the SDFA and the TWA, and local authority is shared with DEEP waterward of the EHTL.[75] Therefore, consistent application would require local governments to coordinate with DEEP in order to ensure that state armoring decisions match local designations.

Second, the laws regulating shoreline flood and erosion control structures[76] may prohibit any permitting entity from allowing armoring on an area-wide basis. Under the CCMA, local governments may only grant permits where the applicant can show that the armoring is "necessary and unavoidable," and the statute favors non-structural approaches to flood and erosion control.[77] IWAs are also limited in the means by which they can permit armoring within inland wetlands and watercourses. The IWWA prohibits any activities that may have a significant effect on inland wetlands and watercourses. Shoreline flood and erosion control structures may only be permitted where there is no "feasible or prudent alternative."[78] Likewise, in lands below the MHWL, DEEP is granted exclusive permitting authority, and state policy encourages natural protection of tidal habitats.[79] While the

[75] CONN. GEN. STAT. § 22a-359(a), 22a-32.
[76] *Id.* 22a-109(c).
[77] *Id.* 22a-92(b)(2)(J).
[78] *Id.* § 22a-41(b)(1).
[79] The SDFA states that the coast should be protected to promote the "prevention or alleviation of shore erosion and coastal flooding." *Id.* § 22a-359(a). The TWA similarly states that loss of natural tidal habitats is found to

policies articulated by all of these acts do not prohibit hard armoring outright, they seem to require that permitting decisions be made at a site-specific, rather than area-wide basis,[80] and may prohibit any permitting entity (whether state or local) from designating whole zones as appropriate for armoring without site-specific review. For these reasons, creation of Protection Zones at a local level may be infeasible given existing law in Connecticut.

2. Conservation Zone

In the face of competing demands to develop in areas with sensitive natural resources, policymakers will also have to consider how to adapt areas of their shoreline that provide important ecological services. It may not be environmentally sustainable or cost-effective over the long term to protect or build ever-higher structures in certain portions of the coast that are less developed and more vulnerable to impacts. In these areas, policymakers may want to reduce their community's vulnerabilities by limiting new development and redevelopment and preserving the flood buffers provided b natural shorelines.

To do so, the Conservation Zone includes tools designed to protect ecosystems and to gradually reduce development in highly vulnerable areas. In this zone, armoring will need to be limited or prohibited. As sea levels rise and lands become inundated, hard armoring prevents the ability of ecosystems to naturally adapt by cutting off their ability to migrate inland. Additionally, local governments will need to reduce the number of people and structures in harm's way. They can do this by downzoning to allow only low-density development, such as low-density residential (e.g., one unit per 20 acres), open space, recreational, or other water-dependent uses; and by restricting rebuilding. The model SLR ordinance proposes that localities prohibit the reconstruction of structures that are damaged twice in storm events.

Aside from the political constraints localities face in implementing these tools, existing state laws also pose a barrier. First, prohibitions on armoring on an area-wide level may be problematic for reasons similar to those presented for the Protection Zone. To ensure that the Conservation Zone remains armor-free, local governments would have to coordinate with DEEP to ensure that state policies seaward of the EHTL mirror local prohibitions. Additionally, the CCMA, IWWA, TWA and SDFA seem to forbid bare prohibitions on armoring on an area-wide basis. Although the CCMA encourages the use of non-structural mitigation measures,[81] the Act requires authorities to grant permits where the applicant can show that the armoring is "necessary and unavoidable."[82] This statutory language may prohibit local governments from restricting armoring in an entire zone—undermining the concept of area-wide designations as contemplated in the model ordinance.

Second, Connecticut state law may prohibit both downzoning and rebuilding restrictions. The ZEA limits the ability of local governments to phase out "nonconforming uses." Downzoning creates nonconformities because after the ordinance is amended some existing uses no longer comply with the new zoning requirements.[83] In many jurisdictions, nonconforming uses are allowed to continue, but local governments can phase these uses out over time using rebuilding restrictions that require properties to come into compliance with new zoning restrictions when the use is abandoned or

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"disturb the natural ability … to reduce flood damage and adversely affect the public health and welfare." *Id.* § 22a-28.

[80] *Id.* 22a-106(b(1).

[81] *Id.* 22a-92(b)(2)(J).

[82] *Id.*

[83] BARLOW BURKE, THE LAW OF ZONING AND LAND USE CONTROLS 93 (2d ed. 2009).

destroyed.[84] However, Connecticut law is more limited. The ZEA states that municipal zoning ordinances "shall not provide for the termination of any nonconforming use solely as a result of nonuse for a specified period of time without regard to the intent of the property owner to maintain that use."[85] Connecticut courts have found that "[o]nce a nonconforming use is established, the only way it can be lost is through abandonment."[86] The mere discontinuance of a use where there is no intent to abandon is not enough—it must be found that the owner clearly intended to "relinquish permanently the nonconforming use."[87] Because a property owner whose land is destroyed does not intend to abandon his or her use, Connecticut law may require that municipalities allow legally nonconforming uses to be reestablished.[88] Connecticut courts may read this precedent to find that rebuilding restrictions violate the ZEA. However, none of the cases on nonconforming uses address the situation where a use is destroyed by a natural hazard. Regulators have a much stronger justification for discontinuing a use that has a susceptibility to recurring damage from natural hazards.

The CCMA and IWWA may also prohibit rebuilding restrictions. The CCMA explicitly prohibits the use of the coastal site plan review process to restrict rebuilding.[89] Similarly, the IWWA allows certain uses "by right" (meaning the permitting authority must issue a permit where an applicant can show that their project conforms to the applicable regulations for the specific zone where their property is located), including existing residential homes.[90] Downzoning to prohibit these uses or to prevent their reestablishment after storm damage may violate these provisions.

Finally, whether warranted or not, Connecticut takings law may also pose a barrier to rebuilding restrictions and downzonings. These types of policies have the potential to completely wipe out all economic value. *Historically,* Connecticut courts have interpreted the state's Takings Clause strictly and found regulations to work an unconstitutional taking on the basis of a substantial diminution in property value. Even where some economic value remains, Connecticut courts have applied a *confiscatory takings* analysis to strike down regulations designed to protect wetlands and floodplains.[91] This precedent may have a chilling effect o municipalities fearful of being challenged in court.

Despite some adverse case law, however, these fears may be unwarranted—plaintiffs face a high hurdle in succeeding in a takings claim. First, regulations that do not substantially diminish the value of regulated lands will be analyzed under a balancing approach. The public benefits of the regulation will be weighed against the economic impact to the landowner. Municipalities will be on strong ground where they can show that development in highly vulnerable areas of the coast constitutes a threat to the public health, safety, and welfare; and where they can demonstrate the important public benefits provided b natural resources in these areas.

Second, even where a regulation causes a substantial diminution in the value of some lands, municipalities can craft regulations to avoid takings liability. Connecticut municipalities could argue that the confiscatory takings test should only apply to regulations that result in a 100% diminution in the economic use of the property, per the Supreme Court's holding in *Lucas* and more recent

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[84] *Id.*

[85] CONN. GEN. STAT. 8-2(a).

[86] Taylor v. Zoning Bd. of Appeals of Town of Wallingford, 783 A.2d 526, 532 (Conn. App. Ct. 2001).

[87] Cummings v. Tripp, 527 A.2d 230, 243 (Conn. 1987).

[88] *See* 112 Merwin Avenue, LLC v. Planning and Zoning Bd. of City of Milford, No. CV064006676S, 2007 WL 2570444, at *6-8 (Conn. Super. 2007)

[89] CONN. GEN. STAT. 22a-105(e).

[90] *Id.* § 22a-40; Knapp v. Inland Wetlands Comm'n of Town of Prospect, 508 A.2d 804, 805-06 (Conn. App. Ct, 1986).

[91] *See* discussion above at Section II(D). Connecticut courts have also struck down setback regulations where enforcement of the setback provisions would prohibit development for any reasonable purpose. Chevron Oil Co. v. Zoning Bd. of Appeals of Town of Shelton, 365 A.2d 387 (Conn. 1976).

Connecticut cases.[92] Connecticut municipalities could also craft regulations that leave some residual economic use. After enactment, municipalities can also avoid the harsh results of application of the zoning ordinance through the variance process. Using variances, municipalities can allow some development where a strict application of the zoning ordinance will result in unusual hardship to the landowner.

Although untested, jurisdictions may also defend rebuilding restrictions on public nuisance grounds.[93] The science justifying the public benefits of land use and environmental controls has dramatically evolved since the early state law cases of *Dooley* and *Bartlett* were decided in the 1970's. Floodplain and wetlands regulations are more legally defensible today because regulators have a clearer understanding of both the environmental impacts of development to sensitive ecosystems and the costs of maintaining development in high-risk areas. Certain uses in particularly vulnerable areas of the coast may become a nuisance as flooding, erosion, and storm damages increase, and structures come to pose a threat to adjacent structures and emergency response personnel.[94] Municipalities should have some means to phase out uses that pose increasing dangers and costs to the community.

Finally, rebuilding restrictions could also be defended from takings claims on the grounds that they are not triggered until a home is twice damaged. A landowner can still make economic use of their property until such time as their property is damaged. Where feasible, the landowner can relocate the property out of the high-hazard area and thus avoid the rebuilding prohibitions. Once a structure is damaged twice, there is a clear evidence of the threat to the property from natural hazards. Additionally, municipalities could argue that it is not the regulation that has caused the confiscation, but the physical forces of erosion and sea level rise.[95]

3. Accommodation Zone

The tools outlined in the Accommodation Zone may be the best option for Connecticut local governments in the short term given existing state law. The Accommodation Zone employs traditional tools that are already used to increase the resilience of development to flood impacts, such as downzoning, increasing setbacks, increasing building elevation requirements (i.e., increasing

[92] *See* discussion of more recent Connecticut case law examining the practical confiscation test, *supra* note 68.

[93] Esposito v. S.C. Coastal Council, 939 F.2d 165 (4th Cir. 1991) (holding that a taking does not occur when a regulation today removes from the bundle of property rights the right to rebuild a house should it ever be destroyed by a storm, because existing uses can continue and the impact on those uses is speculative). *See also* Oswalt v. County of Ramsey, 371 N.W.2d 241, 246 & n.3 (Minn. Ct. App. 1985) (holding that municipalities can phase out a nonconforming use without paying compensation and that limiting repairs of partially destroyed structures is an acceptable method to phase out nonconforming uses, but declining to decide whether a regulation prohibiting the reconstruction of houses in a floodplain is a taking).

[94] For example, Massachusetts courts review regulatory takings more liberally and have upheld very restrictive land use regulations in the 100-year floodplain. In *Gove v. Zoning Bd. of Appeals of Chatham*, the County survived a takings challenge to a regulation that prohibited development in the 100-year floodplain on the grounds that development posed risks to adjacent parcels during storm events and posed dangers to rescue personnel during evacuations. The court upheld the regulation because it did not prevent all economic use but allowed some residual uses such as recreational, agricultural, and commercial fishing. 831 N.E.2d 865, 871-75 (Mass. 2005).

[95] *See e.g.,* Bauer v. Waste Mgmt. of Connecticut, Inc., 662 A.2d 1179 (1995) (In *Bauer,* the Connecticut Supreme Court rejected the plaintiffs argument that the town's refusal to allow a landfill operator to exceed its height limits when the landfill had reached capacity constituted taking. The court held that "it [was] not the regulation that deprived Waste Management of all beneficial use of its land, but rather it was Waste Management's prior use of its land, namely, the deposit of ninety feet of refuse on that land." *Id.* at 1197.)

freeboard), and limiting the size and height of structures.[96] The model ordinance proposes that local governments downzone the Accommodation Zone to only allow lower density residential and commercial development, thereby limiting the extent of development in harm's way. Under the model SLR ordinance, setbacks are established through the site plan review process and structures are required to be setback as far upland as practicable on the lot to maximize protection from flooding. Alternatively, where historic erosion rates are available, local governments can establish erosion-based setbacks where the setback is calculated by multiplying the erosion rate for the area by the life of the structure (e.g., 60 years).[97] The model also requires additional freeboard to account for SLR.[98] Localities can vary freeboard requirements based upon the type of structure—requiring lesser elevations for residential and commercial structures and greater elevations for critical facilities (e.g., hospitals, fire and police stations) and public infrastructure (e.g., bridges, roads).[99] Finally, the model ordinance proposes that local governments limit the footprint and height of structures allowed in the Accommodation Zone to lessen the potential collateral damage that structures can cause if damaged in storm events. Several Connecticut local governments already employ these tools, albeit without consideration of SLR, and homeowners in participating communities that adopt these measures can be eligible to receive insurance premium discounts under the Community Rating System (a subprogram of the NFIP).[100]

There do not appear to be many barriers to implementation of these tools under existing Connecticut law. The ZEA explicitly allows local governments to regulate setbacks, structure design, density, footprint, and use restrictions as well as overlay zones.[101] The tool that could be problematic is downzoning. The ZEA's provision requiring preservation of nonconforming uses may limit a municipality's ability to downzone.[102] While municipalities may have to allow for the reestablishment of nonconforming uses, downzoning can still be used to ensure that structures are rebuilt to a smaller, less vulnerable footprint. Additionally, where structures are destroyed beyond 50%, they will be required to conform to more restrictive development standards, such as freeboard and size and height limits.[103]

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[96] This finding is similar to our analysis of Maryland state law. *See generally* Grannis, *MD Model SLR Overlay Zone, supra* note 12, at VII.

[97] *See e.g.,* Kaua'i County, Hawaii, County Code, Ordinance 863 Establishing a New Article 27, Chapter 8, § 1 (1987), *available at* http://collaborate.csc.noaa.gov/climateadaptation/Lists/Resources/Attachments/12/Kauai_Shoreline_Setback_Bill_Final.pdf.

[98] It is important to note that increasing freeboard can have the unintended consequence of making properties ineligible for FEMA mitigation grants. FEMA offers grants to elevate at-risk structures; each project, however, must be justified using a cost-effectiveness analysis. The extra cost of elevating a structure to higher freeboard standards (e.g., 2 feet instead of 1 foot) can exceed the benefits allowed under FEMA's formula and make the project ineligible for funding. Dave Carlson, Delaware's *Hazard Mitigation Plan*, presentation to Delaware's Sea Level Rise Advisory Committee (Jan. 19, 2012).

[99] Janet Freedman, *Rhode Island Efforts Towards Mitigation and Adaptation to Climate Change,* presentation to Groton Coastal Climate Adaptation Workshop (Jan. 27, 2010), *available at* http://www.icleiusa.org/action-center/planning/Janet_ICLEI%20RI%20climate%20change%20planning.pdf.

[100] *See generally*, Federal Emergency Management Agency (FEMA), *Community Rating System*, http://www.fema.gov/business/nfip/crs.shtm (last visited June 19, 2012).

[101] CONN. GEN. STAT. 8-2(a), (m).

[102] *Id.* 8-2(a).

[103] When permitting repairs to "substantially damaged" structures (i.e., structures where the cost to repair the structure exceeds 50% of the structure's fair market value), the structure must be brought into compliance with NFIP minimum requirements. FRENCH & ASSOCIATES, LTD, MANAGING FLOODPLAIN DEVELOPMENT THROUGH THE NATIONAL FLOOD INSURANCE PROGRAM 8-18 – 8-22 (1998), *available at*

The Accommodation Zone is also unlikely to run afoul of Connecticut takings law. The zone's provisions allow some economic use of property and can be justified with compelling public health, safety, and welfare justifications. Setbacks established through site plans can allow some development. Elevation requirements may increase the costs of development or redevelopment, but can be shown to provide important flood protections.

Additionally, local governments can use the CCMA's site plan review process to require consideration of potential SLR impacts when permitting development in coastal areas. Under the CCMA, municipalities must require site plans for all development projects within the coastal boundary.[104] In reviewing site plans, Section 22a-92(a)(5) requires the permitting authority to consider "the *potential* impact of coastal flooding and erosion patterns on coastal development so as to minimize damage to and destruction of life and property and reduce the necessity of public expenditure to protect future development from such hazards."[105] When approving any activity proposed in a coastal site plan, the CCMA requires that the municipality find that the activity's "potential adverse impacts" on coastal resources are acceptable.[106] The statute's reference to "*potential* impact of coastal flooding," should allow for consideration of the increased risks posed by SLR.[107] Site plans can be used as a mechanism to encourage developers to consider the risks to projects from different SLR scenarios. Additionally, using site plans, municipalities can impose conditions to require that development projects incorporate measures to mitigate SLR risks. These policies present the best options for Connecticut local governments to require adaptation through regulatory approaches given existing state law.

IV. State Level Approach to Climate Change: Rhode Island Case Study

State agencies also have an important role to play in adapting to SLR. Rhode Island serves as an interesting comparison for Connecticut in considering potential state-level regulatory responses. As Rhode Island is a limited home rule state, many of the climate change approaches adopted in Rhode Island are administered on the state level. Like Connecticut, Rhode Island's coastline is highly developed, densely populated, and rich in history. To accommodate the needs of a productive coastline, while also ensuring preservation of the coast, Rhode Island has created a flexible framework that employs different regulations based upon considerations of coastal features (wetlands, beaches, dunes, barrier islands, bluffs, rocky shores) and adjacent coastal uses (conservation, low-intensity, commercial, or water-dependent uses).

Rhode Island, like other states such as Texas, Maine, Massachusetts, North and South Carolina, and Oregon, has adopted a variation of the "rolling easement"[108] (referred to here as "rolling coastal

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http://www.fema.gov/pdf/floodplain/is_9_complete.pdf.

[104] *See* discussion of site plan review *supra* note 35.

[105] CONN. GEN. STAT. 22a-92(a)(5).

[106] *Id.* § 22a-106(a). In making this decision, the municipality is required to take into account the criteria listed in § 22a-106(b)(1)-(3).

[107] This approach has been adopted in Maine and by Hull, Massachusetts. For a further discussion of using site plan review to account for SLR, *see* Grannis, *MD Model SLR Overlay Zone supra* note 12, at 48.

[108] The concept of the rolling easement was initially developed in Texas in the 1950s; it was conceived not as an environmental measure, but rather was designed to protect the public's access to the beach. Richard J. McLaughlin, *Rolling Easements as a Response to Sea Level Rise in Coastal Texas: Current Status of the Law after* Severance v. Patterson, 26 J. LAND USE & ENVTL. LAW 365, 369-70 (2011). The Texas Open Beaches Act (OBA) was a response to a ruling by the Texas Supreme Court which held that private land owner property rights extended down to the low water mark. There was a public outcry and the legislature responded the next year by ensuring public access to the dry sand beach b enacting the OBA. *Id.* at 370. The legislature, relying on principles of public

management statutes").[109] Coastal managers recognized that beaches and coastal wetlands were being lost at dramatic rates because natural migration processes were being disrupted by engineered structures, such as revetments, jetties, and bulkheads.[110] To respond to such threats these states implemented rolling coastal management statutes, which are designed to balance public and private rights in tidelands. These statutes allow landowners to develop lands adjacent to the coast, but impose regulations on development to ensure that it does not detrimentally impact coastal resources, such as b building protective structures that prevent natural shoreline processes.

A. Rolling Coastal Management Statutes: A Brief History

Rolling coastal management statutes can provide a useful adaptation strategy because they address the temporal uncertainty of SLR. They accommodate continued development but preserve the right of the state to enforce a retreat policy as climate impacts occur and intensify.[111] As a legal concept, rolling coastal management statutes are closely related to the Public Trust Doctrine (PTD). The PTD has a long legal lineage and can be traced back through the Magna Carta to the Roman Empire.[112] The PTD reflects the principle that each state has a responsibility to preserve and hold in trust state-owned tidelands, waters, and natural resources.[113] The PTD establishes a rolling border

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trust and historic public use, created a process for establishing public access rights across private dry sand beaches up to the vegetative line. TEX. NAT. RES. CODE ANN. §§ 61.012, 60.016. In several decisions, the Texas Court of Civil Appeals found that, once established, the OBA easement "rolled" inland and encumbered formerly unencumbered land as a result of the natural process of erosion and, thus, found that the law did not cause a taking of private property. *See* Arrington v. Tex. Gen. Land Office, 38 S.W.3d 764 (Tex.Ct. App.2001); Matcha v. Mattox, 711 S.W.2d 95 (Tex.Ct. App. 1986); Feinman v. State, 717 S.W.2d 106 (Tex.Ct. App. 1986). The rolling public access easement created by the OBA has recently been called into question by the Texas Supreme Court in *Severance v. Patterson*, 345 S.W.3d 18 (Tex. 2010). The court in *Severance* found that the boundaries of the easement do not "roll" in dramatic avulsive storm events, as opposed to gradual accretion, due to common law distinctions between avulsion and accretion. The Texas Supreme Court reheard arguments in this case after popular outcry, but the Court largely affirmed its prior decision. Severance v. Patterson, No. 09-0387, 2012 WL 1059341 (Tex. Sup. Ct. Mar. 30, 2012).

[109] It is important to note that a "rolling coastal management *statute*" may not face the same challenges as the "rolling public access easement" created by OBA. "These statutes have been called 'rolling easement statutes' because of their similarities to the Texas Open Beaches Act. Texas courts interpreted the Open Beach Act as creating a rolling public access easement over dry sand beaches. Other states have enacted similar laws that employ a rolling boundary that triggers land use restrictions. However, these land use statutes do not create a true easement, in the legal meaning of the term, because they create no right in the public to use private property. Instead, they manage coastal land uses based upon project's proximity to the shoreline and recognize the dynamic migrating nature of the shoreline." Byrne, *Coastal Retreat Measures*, *supra* note 14, at n. 67. Where such a statute does not try to assert public access rights upland of public tidelands, it will not constitute a permanent physical invasion of lands and may be upheld under common law doctrines of public trust and nuisance. *See also* Meg Caldwell and Craig Holt Segall, *No Day at the Beach: Sea Level Rise, Ecosystem Loss, and Public Access Along the California Coast*, 34 ECOLOGY L.Q. 533 (2007) and JIM TITUS, U.S. EPA, CLIMATE READY ESTUARIES, ROLLING EASEMENTS PRIMER (2011), *available at* http://www.epa.gov/cre/downloads/rollingeasementsprimer.pdf [hereinafter Titus, *Rolling Easement Primer*].

[110] Megan Higgins, *Legal and Policy Impacts of Sea Level Rise to Beaches and Coastal Property*, 1 SEA GRANT L. & POL' J. 43 (2008), *available at* http://nsglc.olemiss.edu/SGLPJ/Vol1No1/3Higgins.pdf.

[111] *See generally* TITUS, ROLLING EASEMENT PRIMER, *supra* note 109. For nearly 30 years, James Titus has been investigating the issue of rising sea levels for the U.S. Environmental Protection Agency; he is one of the leading experts on the impacts of rising sea levels.

[112] COASTAL STATES ORGANIZATION, PUTTING THE PUBLIC TRUST DOCTRINE TO WORK 4 (2d ed. 1997).

[113] *Id.* at 5.

between state tidelands and privately held uplands that fluctuates with a natural coastal feature. While this border varies from state to state, the majority view is that the lands below the mean high water mark (i.e., the wet sand beach) belong to the state and are held in trust by the government for public use (for fishing, navigation, and sometimes recreational use). Lands above the mean high water mark (i.e., the dry sand beach) are typically held privately.[114] States outside the majority have adopted a myriad of rules: some set a public/private border at the mean lower water mark, others allow private ownership of tidal flats, and others do not allow private ownership of beaches. Even in those states, however, the public retains limited rights to submerged lands and the state retains its traditional duties.[115]

Rising sea levels threaten this balanced division between public and private interests in coastal lands. If sea levels are allowed to rise unchecked, they will permanently inundate some areas and convert private lands to public lands. However, if landowners choose to hold back the sea by building hard protective structures, public lands will gradually erode, which could have far-reaching economic and environmental consequences. Rolling coastal management statutes attempt to balance these extremes by applying a deferred-retreat strategy. The essence of a rolling coastal management statute is that it codifies the rights between a coastal landowner and the public in tidelands based upon common law boundaries that fluctuate with natural coastal processes. Typically, rolling coastal management statutes use this boundary to establish various land use regulations, such as setbacks, and landowners are prevented from taking any measures to prevent tidelands from migrating inland (such as by building sea walls).[116] With a rolling coastal management scheme in place, both the property owner and the government are "winners": the property owner is able to continue economic use of his or her property within certain legal parameters until impacts occur (which may b decades in the future), and the government is able to preserve the public's present and future interest in tidelands, to ensure access to the shore and provide important ecological services.

B. How Rolling Coastal Managements Statutes have been Implemented in Rhode Island

1. History of the Coastal Resources Management Council

Rhode Island has adopted a "rolling" approach to coastal management. In 1971, the Rhode Island legislature created the Coastal Resources Management Council (the "Council") and delegated authority to it to manage and protect the state's coastal resources.[117] In creating the Council, the legislature recognized that certain actions, such as the unregulated development of shore-side properties, was having an irreversible impact on the resources the legislature was constitutionally mandated to protect – public trust lands. The legislation granted the Council broad discretion to ensure the preservation of all of Rhode Island's coastal resources.[118] To implement this authority, the

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[114] Titus, *Rising Seas, supra* note 14, at 1365-66.

[115] *Id.* at 1366.

[116] TITUS ROLLING EASEMENT PRIMER *supra* note 109, at 7.

[117] The Council is tasked with the responsibility "to preserve, protect, develop and where possible restore the coastal resources of the state for this and succeeding generations through comprehensive and coordinated long-range planning and management designed to produce the maximum benefit for society from such coastal resources." R.I. GEN. LAWS § 46-23-1(a)(2). The Council has "exclusive jurisdiction below mean high water for all development, operations, and dredging, consistent with [legislative findings] and except as necessary for the department of environmental management to exercise its powers and duties." *Id.* 46-23-6(2)(ii)(A).

[118] R.I. GEN. LAWS § 46-23-6(1)(i). The strategies, methodologies and regulations that the Council employs in its management are outlined in *The State of Rhode Island Coastal Resources Management Program*, commonly known as the "Redbook." Rhode Island courts have consistently upheld the authority of the Council against legal

Council adopted the state's coastal zone management program, known as the Coastal Resources Management Program (CRMP).

2. The "Rolling" Provisions of the CRMP

The Coastal Resources Management Program has a complex regulatory structure that manages specific development activities in various coastal settings. While complex, this administrative setup gives the Council flexibility to regulate in a manner that balances public interests with economic uses of the coast. The CRMP identifies six different water "types": conservation areas, low-intensity use, high-intensity boating, multipurpose waters, commercial and recreational harbors, and industrial waterfronts.[119] The state has also designated ten categories of coastal "features": tidal waters; beaches and dunes; undeveloped barriers; moderately-developed barriers; developed barriers; coastal wetlands; headlands, bluffs and cliffs; rocky shores; manmade shores; and areas of historic/archaeological significance.[120] The CRMP then places limitations on or requirements for different activities based on the water "type" and coastal "features" where the activity is proposed. These include the construction of residential structures, docks and piers; beach nourishment; and construction of commercial or industrial buildings. This type of "zoning" of coastal lands could be helpful in implementing a SLR adaptation strategy by helping communities establish adaptation goals for different types of lands and different states of development.

The CRMP also employs different development standards based upon the type of waters and the types of coastal features. Most of the rolling land use restrictions apply to construction in conservation areas, low-intensity use waters, and multipurpose waters. For example, residential structures are prohibited within conservation areas except for already-developed barriers and areas of historic/archaeological significance. In coastal beaches,[121] the CRMP prohibits construction of most structures.[122]

The Council has implemented a three-fold approach to preserving and restoring coastal areas damaged by erosion and upland development. First, the Council has established a policy to restore damaged wetlands and, when possible, build new ones.[123] By creating and restoring wetland areas, the state encourages the growth of a natural buffer zone to protect coastal areas from the effects of sea level rise. Second, the Council prohibits new armoring and the repair of armoring in certain water

challenge. In *Milardo v. Coastal Resources Management Council*, the court recognized that a quasi-legislative power was granted to the Council when it was established and upheld the Council's denial of a permit to construct an individual sewer on his property. 434 A.2d 266, 271 (R.I. 1981). The court extended this holding in *Santini v. Lyons,* recognizing the Council's broad authority to protect precious coastal resources, even when those who own coastal properties face a heavier burden then those outside the jurisdiction of the Council. 448 A.2d 124 (R.I. 1982).

[119] 16-2 R.I. CODE R. §§ 200.1—200.5.

[120] *Id.* 210.

[121] "Coastal beaches include expanses of unconsolidated, usually unvegetated sediment commonly subject to wave action, but may also include a vegetative beach berm." *Id.* §210.1(A).

[122] *Id.* § 210.1(D)(1) ("The construction of new structures other than accessways, walkover structures, and beach facilities, are prohibited in setback areas.").

[123] *Id.* § 210.3(C)(2) ("To offset past losses in coastal wetlands and unavoidable alterations to surviving coastal wetlands: (a) disturbed wetlands should be restored as directed by the Council or enhanced when possible; and (b) in areas selected on the basis of competent ecological study, the Council will encourage the building of new wetlands.").

"types."[124] The CRMP prohibits the use of armoring to recoup property lost through gradual erosion.[125] The CRMP also requires the removal of armoring that is severely damaged or abandoned, and the Council may seek the owner's cooperation or require that the armoring be removed.[126] Third, the CRMC requires a "rolling" setback for shoreline properties. Structures must be setback a "minimum distance from the inland boundary of a coastal feature" calculated based on long-term shoreline change rates.[127] These policies will ensure that the shoreline is allowed to migrate landward unimpeded even as sea levels rise; however, they still allow landowners to continue to use and maintain their lands until impacts occur.

3. The CRMP Addresses Climate Change and Sea Level Rise

Rhode Island was one of the first states to explicitly address sea level rise in its coastal management program. In 2008, the Council amended the CRMP to include Section 145, entitled "Climate Change and Sea Level Rise."[128] Through Section 145, the Council made many important acknowledgements: They recognized the strong scientific evidence of climate change and the long-term threats posed to the state by a changing climate.[129] They recognized the immense threats that climate change and rising seas pose to terrestrial and marine environments and acknowledged the challenge that coastal managers face in "cop[ing with] and adapt[ing] to the new regime."[130] And, they acknowledged that sea level rise will displace coastal populations, threaten infrastructure including roads and bridges, and cause intensified coastal flooding threatening recreation areas, public space, and the natural environment, such as coastal wetlands.[131] This state-level acknowledgement provided a critical foundation for building stronger climate change management tools, on both the state and local level. Connecticut faces similar threats and even if Connecticut does not adopt a statewide policy, like that articulated by Section 145, an acknowledgement by the state of the challenges faced by coastal managers in the wake of climate change could provide municipalities with a stronger footing to enact local regulations.

Section 145 also provides a model for "mainstreaming" climate adaptation. The regulations require the Council to consider SLR in planning and management. The Council must "accommodate a base rate of expected 3- to 5-foot rise in sea level by 2100 in the siting, design, and implementation of public and private coastal activities and to insure proactive stewardship of coastal ecosystems under …

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[124] *Id.* § 300.7(D)(1) ("The Council shall prohibit new structural shoreline protection methods on barriers classified as undeveloped, moderately developed, and developed and in Type waters.").

[125] *Id.* § 300.7(D)(4) ("Structural shoreline protection facilities are prohibited when proposed to be used to regain property lost through historical erosion or storm events.").

[126] *Id.* § 210.6(C)(3) ("The Council shall endeavor to determine the ownership of abandoned or deteriorating shoreline protection structures and shall encourage the owners of such structures to restore or remove them. The Council may order restoration or removal where it finds that the structure poses a hazard to navigation, interferes with the public's right of access to and along the shore, causes flooding or wave damage to abutting properties, or degrades the scenic qualities of the area.").

[127] *Id.* § 140(A) In Rhode Island, the requisite setback requirements for sites along the coast are based on calculated long-term shoreline change rates. This allows for the dune to roll back with sea level rise and storm forces, and also allows a structure to maintain a 30-year life expectancy. *See* Puchalski v. Coastal Resources Management Council 2001 WL 1006699 (R.I. Super. Aug. 8, 2001).

[128] CRMP, Section 145: Climate Change and Sea Level Rise, adopted on January 15, 2008, effective on February 17, 2008.

[129] 16.2 R.I CODE r. § 145(B).

[130] *Id.* at § 145(B)(10).

[131] *Id.* at § 145(B)(12)-(14).

changing conditions."[132] In the regulations, the Council acknowledged that SLR projections were a low estimate. Section 145 directs the Council to periodically reevaluate the rate based upon new scientific evidence. The regulations also allow the Council to "take into account different risk tolerances for differing types of public and private coastal activities"[133] When considering regulation options in Connecticut, the state and municipalities should consider policies that are robust and can incorporate changes in emerging science.

In response to the adoption of Section 145, the state's Building Code Standards Committee also adopted new regulations incorporating freeboard calculations (a height above the anticipated flood level) within V-zones (i.e., coastal high hazard zones).[134] Specifically, this allows the state building codes and standards committee to consult with the building code commissioner "to adopt, maintain, amend, and repeal code provisions for storm and flood resistance. Such code provisions shall, to the extent reasonable and feasible, take into account climactic changes and potential climactic changes and sea level rise."[135]

4. Other State Policy and Initiatives that Address Climate Change and Sea Level Rise

The Council has been active in other non-regulatory climate change efforts. The Council has worked with the University of Rhode Island Environmental Data Center and others to obtain LiDAR (Light Detection And Ranging) mapping of the state.[136] LiDAR data will assist the state in establishing accurate elevations for mapping SLR scenarios and projecting the landward migration of flood hazard zones along the coast.[137] The Council also worked with the University of Rhode Island Graduate School of Oceanography and Rhode Island Sea Grant to create the first Ocean Special Area Management Plan (OSAMP), which included a chapter on Global Climate Change.[138] These collaborative state efforts have allowed Rhode Island to begin to develop the science and data needed to prepare for a future with a changing climate.

Lastly, in 2010, the Rhode Island legislature passed a bill that created a statewide climate change commission.[139] Now in effect, the Climate Change Commission consists of 28 members including representatives of the legislature, state agencies, business organizations, environmental organizations, and community groups. The Climate Change Commission is tasked with studying the projected impacts of climate change within the state, identifying and reporting on methods of possible adaptations that will increase economic and ecosystem sustainability to identified threats, and

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[132] *Id.* at § 145(C)(3).
[133] *Id.*
[134] R.I. GEN. LAWS 23-27.3-100.1.5.5.
[135] *Id.*
[136] Rachel M. Gregg, *Planning for Sea Level Rise in Rhode Island's Coastal Management Program* (July 1, 2010), case study available on the Climate Adaptation Knowledge Network, http://www.cakex.org/case-studies/1546 (last visited June 20, 2012).
[137] *Id.*
[138] *Id.* Special Area Management Plans (SAMPs) are broadly defined in the Coastal Zone Management Act as "plans which provide for increased specificity in protecting significant natural resources, reasonable coastal-dependent economic growth, improved protection of life and property in hazardous areas, including those areas likely to be affected by land subsidence, sea level rise, or fluctuating water levels of the Great Lakes, and improved predictability in governmental decision making."
[139] The Rhode Island Climate Risk Reduction Act of 2010, R.I. GEN LAWS §§ 23-84-1–23-84-3, *available at* http://www.rilin.state.ri.us/billtext10/housetext10/h7719aaa.htm.

identifying potential mechanisms to mainstream climate adaptation into existing state and municipal programs, including policy plans and infrastructure development and maintenance.[140]

V. Conclusion: Charting a Path Forward

From this analysis it is clear that Connecticut has a broad range of existing tools that they could use *now* to take incremental steps to begin to build resilience within its communities. Innovative tools for regulating floodplains and coastal areas are being developed in jurisdictions across the country that can be used as models for best practices.

To conclude, this section provides some recommendations for charting a path forward at both a state and local level. First, actions that Connecticut municipalities can take now using existing authorities are examined. Second, this section discusses actions that policymakers can consider in the medium term that would require amendments to existing laws and policies. Third, recommendations are provided for charting a long-term vision for regulating coastal development in the face of rising seas. Finally, lessons learned are shared for other jurisdictions struggling with similar challenges in adapting to climate change.

A. What Connecticut can do now with Existing Authority

Rhode Island provides a useful example for how Connecticut municipalities could begin to mainstream adaptation by encouraging consideration of SLR through the CCMA's site plan review process.[141] Under the CCMA, permitting authorities must "minimize adverse impacts on coastal resources" and consider "the potential impact of coastal flooding and erosion patterns on coastal development."[142] The authority could be interpreted broadly to allow local governments to use the site plan review process to protect their communities from potential SLR impacts. Like Rhode Island, Connecticut municipalities could require that all development proposals consider a range of anticipated SLR scenarios. This could be used to ensure that development proposals consider a range of adaptation options, and allow regulators to condition development based upon landowner agreements to use resilient design techniques, not armor, or remove structures that come to encroach o public lands as the seas rise.

Municipalities could increase their communities resilience by amending floodplain ordinances to require that development incorporate more protective flood mitigation measures, such as additional freeboard, smaller footprints, greater setbacks, and only allowing lower-intensity uses (as suggested in the Accommodation Zone). These approaches would have the added benefit of qualifying the community for the Community Rating System, which provides insurance premium discounts for homeowners in participating communities.

At the state level, agencies could undertake many non-regulatory initiatives to support municipal efforts. While Connecticut may not be in as strong a position as Rhode Island to adopt statewide policies, state agencies can offer guidance for municipalities and incentives to encourage them to begin to adapt. DEEP could develop necessary data, mapping and other tools to support local decision-making. State agencies could also adjust property acquisition policies to provide added incentives to encourage landowners to sell vulnerable properties and retreat from the shoreline; this may relieve municipalities from having to enact politically and legally challenging downzonings.

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[140] R.I. GEN. LAWS 23-84-3.

[141] *See* Grannis *MD Model SLR Overlay Zone supra* note 12.

[142] CONN. GEN. STAT. 22a-92(4)-(5).

B. What Connecticut could do with Amendments to Existing Laws or Regulations

With minor amendments to the CCMA, TWA and SDFA, the state could develop more streamlined processes for regulating shoreline armoring and encouraging soft-armoring alternatives. The state could employ an approach similar to that adopted in Maryland—the Living Shorelines Protection Act.[143] Under this approach the state could delegate authority to DEEP to streamline permitting for hard armoring, make permitting decisions on a regional scale, and encourage soft-armoring alternatives where feasible.[144] At a minimum, municipalities and DEEP could coordinate to identify areas appropriate for hard protection due to the location of critical facilities and infrastructure and encourage and fund soft projects in other areas of the coast with sensitive natural resources.

C. Connecticut Should Develop Long-Term Strategies to Encourage Retreat

While Connecticut has options to regulate armoring and to require more resilient construction, implementation of retreat policies may be more politically and legally challenging. As a result, policymakers may need to think about a long-term strategy to develop flexible legal frameworks to promote retreat. To allow municipalities to downzone and limit rebuilding, the state legislature should amend provisions that restrict local governments' ability to phase out nonconforming uses, or explicitly allow them to phase out nonconforming uses which come to constitute a nuisance due to threats to public health, safety, and welfare. Additionally, due to the political challenges, Connecticut may want to consider coupling regulatory approaches with incentive-based approaches to encourage relocation of development inland. For example, policymakers may want to reevaluate how they allocate hazard-mitigation funding after storm events: they could target funds to buy out storm-damaged structures and limit rebuilding in highly vulnerable areas. Connecticut could also consider transferrable development rights (TDR) programs. Downzoning may be more politically palatable and more legally defensible where municipalities allow affected landowners to recoup some of their investment by selling TDRs.[145] A TDR program could be created that would allow affected landowners to sever their development rights and sell those rights to upland developers to increase densities in less vulnerable areas of the community or region.[146]

D. Lessons for Other Jurisdictions

This case study demonstrates that local governments especially have broad existing powers that they can use now to adapt their communities to the threats posed by climate change. Communities across the nation are grappling with the increasing threats posed by natural hazards, and best practices from these communities can serve as models for others seeking to adapt their floodplains and coastal regulations.

However, the path to creating a more resilient community may not be easy or clear—legal obstacles may unnecessarily deter government action. To determine what options are feasible for a

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[143] Since the writing of this article, Connecticut enacted legislation amending its state's Coastal Management Act requiring that local governments consider impacts from SLR and authorizing the use of "living shorelines." *See* An Act Concerning the Coastal Management and Shoreline Flood and Erosion Control Structures, 2012 Conn. Legis. Serv. P.A. 12-101 (June 8, 2012).

[144] *See* Maryland Living Shorelines Protection Act, MD. CODE ANN. ENVIR. § 16-201; *see also* discussion of how Living Shoreline Act can be used to promote adaptation in Grannis, *MD Model SLR Overlay Zone, supra* note 12, at 19-20.

[145] CONN. GEN. STAT. 8-2e.

[146] *See* Grannis, *Adaptation Tool Kit, supra* note 12, at 57-59.

given state or community, policymakers will need to navigate a complex maze of overlapping laws to answer many legal questions: what level of governments is best suited to implement particular adaptation tools; what level of coordination will be required between levels of government; what legal barriers exist; and what implementation challenges require changes to existing laws and regulations. One of the lessons learned from Connecticut is that although municipalities have a broad range of powers that they can use to adapt, they may need additional authority to allow them to regulate with more flexibility to address the impacts that are already being felt along their shorelines.