Adapting to Climate Change: Mapping Connecticut's Coastal Responses to a Global Problem

Mark A. Boyer[1]

Abstract: Climate change is the signature global issue of our time. This is not just because of climate change itself, but also because of the host of socio-economic and physical impacts that are emerging from rising temperatures globally. But fundamentally for scholars of international relations, climate change confronts the policy limitations of sovereignty and its implications for global action directly. Because of the lack of effective global and even national climate change policy action, policy initiatives to confront climate change must focus on levels below the global, even though economic models suggest that global policy provision might be the most efficient way to target the implications of climate change. As part of a larger project on climate change policy in the northeastern United States, this study centers on how coastal municipalities in Connecticut have engaged with climate adaptation concerns and the degree of diversity that exists among those policy approaches.

"America must not ignore the threat gathering against us. Facing clear evidence of peril, we cannot wait for the final proof."
George W. Bush (October 7, 2002)[2]

I. Introduction

If we took away the date and the name of the speaker above, it would be easy to read this as an argument for governmental action to cope with climate change. But the irony is obvious. This quote was taken out of context from a 2002 speech that was part of the Bush administration's building

[1] Mark A. Boyer is Professor and Department Head in Political Science at the University of Connecticut and a Scholar-in-Residence at UConn's Center for Environmental Sciences and Engineering. He is also Co-Editor of *International Studies Review.* He wants to thank the College of Liberal Arts and Sciences and the Center for Environmental Science and Engineering (CESE) at the University of Connecticut for support of this project. Melanie Meinzer, Andy Bilich, Carolyn Bighanatti, and Jenny Artruc provided careful research assistance on the project. Lynn Stoddard from Connecticut's Department of Energy and Environmental Protection (DEEP) has provided invaluable contributions to this project by facilitating our data collection. Amy K. Donahue and Mark Robbins provided an important conceptual consult along the way on this project. Iver Nemann and Ole Sending were very helpful through an electronic exchange early in this project. This paper was originally prepared for presentation at the *Legal Solutions to Coastal Climate Change Adaptation in Connecticut* conference held at the University of Connecticut School of Law on February 10, 2012. Any questions or comments about this paper or the larger research project should be directed to mark.boyer@uconn.edu .

[2] George W. Bush, Speech (Oct. 7, 2002) (transcript available at http://articles.cnn.com/2002-10-07/politics/bush.transcript_1_weapons-terrorism-and-practices-terror-murderous-tyrant/5?_s=PM:ALLPOLITICS).

argument for military intervention in Iraq to eliminate that country's alleged weapons of mass destruction. Bush's quote is ironic in the climate change context, as threat perceptions are a primary motivating factor for municipal policy action on climate change adaptation, even if that motivation has spurred little action at the federal level to date. The Bush administration, as we know, was openly hostile to federal level policy action on climate change, whether focusing on mitigation or adaptation. As a result, climate change policy action in the United States has by default devolved to state and local governments. Thus, even though the threat is real, the federal government has been largely absent from policy action to cope with coastal impacts from climate change.

This paper seeks to accomplish several tasks that will hopefully lead to a better understanding of climate change policy and to more effective strategies for what is arguably the signature global issue of our time. First, this article discusses the global climate change policy dilemma from the standpoint of public goods theory and some related conceptual perspectives. Second, the article argues that traditional international relations perspectives provide little guidance for dealing with the climate change policy dilemma, when we recognize the limits of global policy action on this issue. Policy-makers must therefore examine the ways states, sub-state governmental units, and non-state actors engage climate change in the wake of ineffective, or largely non-existent, federal and global action. Adaptation responses in Connecticut's 24 coastal municipalities are the focus here, but this article is part of a larger project that is mapping climate change policy action for all 169 Connecticut municipalities. As Gore and Robinson argue, examining municipal level climate responses focuses attention on the governmental units that have become climate change policy leaders. By examining developments in the Northeast, more specifically, we are also looking at policy developments that are viewed as leading-edge programs nationally.[3]

It is also worth noting that this research project proceeds from the recognition that climate change policy action is both possible and necessary in the coming years. It is *possible* in the sense that "we created the problem, so we should solve it." And even those who harbor doubt as to the veracity of anthropogenic causes,[4] might want to apply technological fixes to adapt more effectively to the physical, social, and economic challenges caused by rising global temperatures. And it is *necessary* from a normative, transgenerational social responsibility perspective: should this problem really be left for those who follow? Certainly, authors like Hiskes[5] and Bryner[6] make strong cases that the current generation of policy-makers has a responsibility to protect the environmental rights – the rights to clean air, water and environmental quality, more generally – of our descendants. But beyond the normative argument, it is also necessary to engage climate change impacts from the perspective of grappling with the very real risks that climate change presents to almost any model of economic prosperity, physical security, and sustainability.

---

[3] Christopher Gore & Pamela Robinson, *Local Government Response to Climate Change: Out Last, Best Hope?*, *in* CHANGING CLIMATES IN NORTH AMERICAN POLITICS 138-158 (Henrik Selin & Stacy VanDeveer eds., 2009). The reader should also note that this paper's author proceeds intellectually from an international relations scholarly foundation, and thus frames the analysis broadly within the context of interactions between global and local socio-political forces.

[4] *See* Dessler & Parsons, Schneider, Archer, Hoggan, Bolin and others for an array of discussions of climate science and the politicized discourse that has surrounded the scientific debate for over two decades. ANDREW E. DESSLER & EDWARD A. PARSON, THE SCIENCE AND POLITICS OF GLOBAL CLIMATE CHANGE (2006); STEPHEN H. SCHNEIDER, SCIENCE AS A CONTACT SPORT (2009); DAVID ARCHER, GLOBAL WARMING: UNDERSTANDING THE FORECAST (2007); JAMES HOGGAN, CLIMATE COVER-UP (2009); BERT BOLIN, A HISTORY OF THE SCIENCE AND POLITICS OF CLIMATE CHANGE (2007).

[5] RICHARD P. HISKES, A HUMAN RIGHT TO A GREEN FUTURE (2009).

[6] GARY BRYNER, PROTECTING THE GLOBAL ENVIRONMENT (2011).

II. Climate Change in a Public Goods Context

Few issue areas in international relations research and policy-making fit better into a public goods theory framework than climate change, regardless of whether focusing on mitigation and adaptation concerns.[7] The GHG emissions produced by individual, commercial, and public sector action around the world create externalities that are often, if not always, global in character. Many of the vulnerabilities created by emissions (e.g., rising global temperatures, increasing extreme weather incidents, and changing weather patterns) are consumed by people around the world regardless of whether they contributed to the production of the emissions that cause these climatic changes. And although the demands for climate change adaptation to cope with vulnerabilities are most directly witnessed in local municipalities, their incidence is also widely dispersed around the globe. Thus, there is at least an argument that both mitigation and adaptation to climate change are global public goods in ways that few other public goods are global in character.[8]

Additionally, the pursuit of environmental quality (and climate change policy specifically) possesses a more transboundary, and often global, character than many other policy areas. The "shared fate," transboundary effects of global climate change force environmental policy into international and global policy arenas whether countries like it or not. But this statement ignores the degree to which improvements in environmental quality rest with individual action and also local initiative. These transboundary considerations push many environmental problems toward the purer public goods end of the conceptual continuum, even if the problems engendered in this policy area continue to exhibit impurities in significant ways.[9] They are rarely, however, purely private in character as the impacts created by climate change are widespread and the product of globally generated climatic processes (even if the on-the-ground impacts are local and unevenly distributed). As discussed below, even with this global character, climate change policy action is most often located at much lower governmental levels in many countries.[10]

III. Understanding the Climate Change Policy Environment

Regardless of where one resides on the spectrum of political preference about the appropriate role for governmental action generally, economists have long shown a high degree of consensus about the most efficient locus of governance for public goods provision. As Tullock puts it, "the governmental unit chosen to deal with any given activity should be large enough to 'internalize' all the externalities which

---

[7] For more in depth discussion of public goods theory as it applies to climate change, the reader might turn to Todd Sandler, GLOBAL CHALLENGES 99-106 (1997) or Mark A. Boyer, *Global Climate Change and Local Action: Understanding the Connecticut Policy Trajectory,* 13 INT'L STUD. PERSP. (forthcoming 2012).

[8] Drawing on the classic public goods literature of Samuelson, Olson, and others, pure public goods are defined as jointly produced and non-excludable. Jointness means that consumption of a public good by one individual does not diminish the amount of the commodity available for consumption by someone else. Non-excludability means that once a good is produced, non-contributors cannot be prevented from consuming the good. Paul Samuelson, *The Pure Theory of Public Expenditure*, 36 REV. ECON. AND STAT. 387-89 (1954); MANCUR OLSON, THE LOGIC OF COLLECTIVE ACTION (1965).

[9] Impurities can include congestion costs where goods exhibit some aspects of private consumption or where exclusion of potential consumers is possible (such goods are often referred to as club goods).

[10] For discussions of the impurities of environmental goods (both in terms of jointness and non-excludability), *see* Todd Sandler, *Intergenerational Public Goods: Strategies, Efficiency and Institutions*, *in* GLOBAL PUBLIC GOODS: INTERNATIONAL COOPERATION IN THE 21ST CENTURY 20-50 (Inge Kaul, Isabelle Grunberg, & Marc A. Stern eds., 1999); DAVIS B. BOBROW & MARK A. BOYER, DEFENSIVE INTERNATIONALISM: PROVIDING PUBLIC GOODS IN AN UNCERTAIN WORLD ch. 7 (2005).

that activity generates."[11] Building directly on this idea, Olson argues that "we can be reasonably certain that a broad array of governmental institutions is a necessary condition of Pareto optimal provision of collective goods, and that neither the extreme centralist nor the extreme decentralist position makes sense" all of the time.[12] In other words, economic efficiency would dictate that policy action be located at the level of government where a given externality most broadly exists. Government's role, then, is to figure out how best to regulate that externality and assess community members for its production (in the case of public goods) or reduction (in the case of public bads).

The global political impasse, witnessed in the inability of the UN Framework Convention on Climate Change (UNFCCC) process to develop binding mandates, also produces conditions where climate impacts exist and will continue to develop diffusely around the globe. Thus, some would argue that the industrialized powers that created climate change have exported their externalities to places unable to cope with them in effective ways. While the reduction of GHGs is indeed a rather pure public bad, climate impacts (although indeed spread around the world) are most often dealt with in more localized ways that raise equity (and significant financial) concerns for the localities confronting them.

Hence, this project focuses on a basic climate change governance dilemma*:* even though climate change policy might appropriately and efficiently be located at the global level, effective policy action is unlikely under the existing global policy architecture. Policy action, if it is to occur, will by default devolve to a complex array of individual countries, lower levels of government within countries, NGOs, and other policy actors including individuals.

One of the components for effectively understanding the emerging patterns of climate governance is considering how governmental (and nongovernmental) actors relate to one another. A lengthy discussion of intergovernmental relations is beyond the scope of this paper, but it is important to note the ways that diverse governmental units have engaged climate change. This includes some understanding of the fluid matrix of authority that exists across jurisdictions and governmental levels and also the degree to which we are indeed at a point in the development of climate policy where engagement with the issue and its challenges should best be considered as *policy experimentation,* as described by Vincent Ostrom,[13] Matthew Hoffman,[14] and others.

Putting a name to the empirical reality of diversified governance, Elinor Ostrom has further developed the concept of polycentricity, particularly as it applies to environmental issues and climate change. As she argues, "a polycentric system for coping with global climate change is emerging and is likely to expand in the future."[15] And until recently, the contributions made by multiple and diverse public and private actors in service of climate change action have been largely ignored by both the scholarly and policy-making communities. Put simply, "the efforts of many organizations at less-than-global scale can help reduce emissions to some extent, and they can also spur their own governments to take necessary national and international efforts."[16] Coping with climate impacts that require *adaptation* policies by localities is no different, as local jurisdictions will meet the demands for climate

---

[11] Gordon Tullock, *Federalism: Problems of Scale*, 6 PUB. CHOICE 19-29 (1969).

[12] Mancur Olson, *The Principles of "Fiscal Equivalence": The Division of Responsibilities among Different Levels of Government,* 59 AM. ECON. REV. 479-87 (1969).

[13] Vincent Ostrom, *Polycentricity (Part 2)*, *in* POLYCENTRICITY AND LOCAL PUBLIC ECONOMIES 119-38 (Michael D. McGinnis ed., 1999).

[14] MATTHEW J. HOFFMAN, CLIMATE GOVERNANCE AT THE CROSSROADS: EXPERIMENTING WITH A GLOBAL RESPONSE AFTER KYOTO (2011).

[15] Elinor Ostrom, *Polycentric Systems for Coping with Collective Action and Global Environmental Change*, 20 GLOBAL ENVTL. CHANGE 550-57 (2010).

[16] Elinor Ostrom, *Nested Externalities and Polycentric Institutions: Must We Wait for Global Solutions to Climate Change Before Taking Action at Other Scales?* 49 ECON. THEORY 353-69 (2010), *available at* http://www.springerlink.com/content/72345271408211 3q/fulltext.pdf, DOI 10.1007/s00199-010-0558-6.

adaptation in the short-term until policy, and the requisite funding, more fully emerges at higher governmental levels.

A polycentric perspective on the effective pursuit of climate governance, and its actual implementation in the policy realm, in the end encourages "experimental efforts at multiple levels, as well as the development of methods for assessing the benefits and costs of particular strategies."[17] Demonstrating the empirical veracity of Elinor Ostrom's arguments about the value and actual use of multi-scale approaches, Betsill and Bulkeley's work has examined the role played by Cities for Climate Protection (CCP) and how this NGO factors into our understanding of why cities around the world have developed independent climate action plans.[18] From their work, the impact of transnational networks for climate action and how the networks interact with localities to spur climate policy action is clear. Additionally, Hoffman's recent study of climate change "governance experiments" provides a quite extensive understanding of what policies are in place below the global and federal levels.[19] Hoffman's work ably demonstrates the shifting locus of climate change policy and the diversity of approaches being implemented below the national level.[20]

Further informing a polycentric view of the climate policy environment, the recent work of Neumann and Sending[21] and Sending and Neumann[22] helps conceptualize the "why" and "how" of climate change policy action. Starting from a perspective emphasizing collective welfare and recognizing the jurisdictional boundaries that exist down to the municipal level, Neumann and Sending provide the analyst with an understanding of why localities have stepped up on climate policy. Put simply, sub-national jurisdictions have stepped into the void of policy action at the global and federal level to service the welfare of localities and their citizenry. In essence, states and municipalities in many regions of the United States are developing quite effective climate change policies, because of a perception that such action is vital to the welfare of the citizenry that policy officials are charged to serve. In this way, then, Neumann and Sending may indeed be correct in arguing that such policy action is not about a transfer of power from the national level to other governmental units, but rather an exercise of the policy power resident in those sub-national jurisdictions all along.[23] As the data will show later in this article, the sense of climate threat that exists for coastal municipalities in Connecticut is

---

[17] Elinor Ostrom, *A Multi-Scale Approach to Coping with Climate Change and Other Collective Action Problems*, 1 SOLUTIONS 27-36 (2010), *available at* http://www.thesolutionsjournal.com/node/565 .

[18] Michelle M. Betsill & Harriet Bulkeley, *Transnational Networks and Global Environmental Governance: The Cities for Climate Protection Program*, 48 INT'L STUD. Q. 471-93 (2004); Michelle M. Betsill & Harriet Bulkeley, *Cities and the Multilevel Governance of Global Climate Change*, 12 GLOBAL GOVERNANCE, 141-59 (2006).

[19] HOFFMAN, *supra* note 14.

[20] The reader might be interested in reading Orr's (2011) recent review essay that compares the findings of Hoffman's project with two other recent works that come at the issues from quite different perspectives. *See* Shannon K. Orr, Book Review Essay, *Reimagning Global Climate Change: Alternatives to the UN Treaty Process*, 11 GLOBAL ENVTL. POL. 134-38 (2011).

[21] Iver B. Neumann, & Ole Jacob Sending, *"The International" as Governmentality*, 35 MILLENNIUM 677-701 (2007); IVER B. NEUMANN & OLE JACOB SENDING, GOVERNING THE GLOBAL POLITY (2010).

[22] Ole Jacob Sending & Iver B. Neumann, *Governance to Governmentality: Analyzing NGOs, States, and Power*, 50 INT'L STUD. Q. 651-72 (2006).

[23] To date, there is indeed a growing focus on American states as engines of climate change policy. Rabe has shown how states have taken the lead on climate change over the past decade and the implications of this action for intergovernmental interaction in the contemporary American federal system. Urpelainen, for instance, developed a game theoretic analysis of why US states have pursued independent climate policies, even in the face of what he argues is the relative ineffectiveness of such initiatives. BARRY G. RABE, STATEHOUSE AND GREENHOUSE (2004); Barry G. Rabe, *States on Steroids: The Intergovernmental Odyssey of American Climate Policy*, 25 REV. POL'Y RES. 105-28 (2008); Johaness Urpelainen, *Explaining the Schwarzenegger Phenomenon: Local Frontrunners in Climate Policy*, 9 GLOBAL ENVTL. POL. 82-105 (2009).

spurring them to exercise that power in demonstrative ways. Further expanding on the motivations for policy action, the next section briefly discusses some of the existing scholarship about policy drivers in local communities.

A. A Note about Local Policy Drivers

As Donahue argues:

> In a democracy, citizens' preferences about the outcomes of public policy are premier. Governments respond to these desires by determining what public services citizens want, levying taxes to pay for them, and ultimately providing them. As Teibout (1956) notes, though, a central problem of public finance theory is that "no market-type solution exists to determine the level of expenditures on public goods." The field of public finance thus faces an important question: what determines the level of public services?[24]

Specific to this analysis, what determines the level of municipal engagement with climate adaptation? Conventional arguments discussed briefly below provide only part of the picture of climate adaptation on Connecticut's coast.

Along these lines, Feiock and West identify a set of explanatory drivers of local policy adoption.[25] They are:

- ***Need/Response Policymaking Model****:* focuses on governments responding to an objective need for a policy.
- ***Diffusion of Innovation Model***: focuses on the degree to which some governments become policy leaders regarding the adoption of innovative approaches to policy problems and the degree to which others then follow and diffuse such innovation.
- ***Political Institutions Model:*** focuses on electoral competition and governmental structure as influential in understanding policy choice.
- ***Federalism Model***: focuses attention on the degree to which localities adopt and implement policy mandates from above (mostly state governments).
- ***Economic Model***: argues that more affluent communities with greater fiscal resources will be policy innovators.
- ***Interest Group Influence Model***: competing demands from constituencies produce demands for policy change.
- ***Administrative Capacity***: focuses attention on the expertise and personnel resources as drivers of innovation in adoption and implementation.

In addition, there is Teibout's model of policy as citizens "voting with their feet" where residents' demand for public goods yields competition at the local level for the provision of public services.[26] As towns seek to preserve tax base for revenue generation, they are compelled to compete with

[24] Amy K. Donahue, A Review of Conceptual Approaches to Estimating Citizen Demand for Local Public Services 416 (2010) (unpublished manuscript). *See* Charles M. Teibout, *A Pure Theory of Local Expenditure,* 64 J. OF POL. ECON. 416-24 (1956).

[25] Richard C. Feiock & Johnathan P. West, *Testing Competing Explanations for Policy Adoption: Municipal Solid Waste Recycling Programs*, 46 URB. AFF. REV. 399, 400-404 (1993).

[26] Teibout, *supra* note 24.

surrounding towns to keep their citizens happy with the level of services in their home communities. Obviously, Teibout's original argument underlies several of the models identified by Feiock and West.

So as these various explanatory models suggest, there exists a diversity of explanations for cross-jurisdictional differences in policy approaches. Some of those variations can be seen in the data discussed below regarding Connecticut's coastal towns.

B. Methodology

The following discussion and analysis is part of a larger project that examines the ways state and local governments in the northeastern United States are engaging with climate change in the vacuum of coherent and proactive global and federal policy. There are several facets of this project. One piece focuses on the evolution of Connecticut climate policy and what implications it has for other regions of the United States.[27] That portion of the project centers on interviews of policy-makers involved in the development of Connecticut climate policy.

A second portion of the project builds on earlier work done by Connecticut's Department of Energy and Environmental Protection (DEEP) to map climate change across the 169 municipalities in the state.[28] The current project seeks to update and further populate that mapping effort with policy data being shared between DEEP and the UConn research team.[29] The data analyzed in this paper are only for the 24 Connecticut coastal towns.

Data collection for the "169" project has taken three primary forms. First, the UConn research team was provided access to the data currently populating the ctclimatechange.com database and built its database around the existing policy data. The second step was examination of town documents, primarily available on town websites. Such documents included Plans of Conservation and Development (POCD), zoning documents, stormwater management and erosion plans, and other documents related to sustainability practices. The data collected from documentary sources were then augmented by phone calls to planning, zoning, and management officials in each town. As a result, the UConn research team feels confident that the data presented here for coastal municipalities is a comprehensive, if macro-level, body of information on adaptation policies on the Connecticut coastline. Data collection for the remaining 169 towns is ongoing, as is data collection on mitigation efforts for the coastal towns.

IV. Examining Connecticut Coastal Climate Adaptation

The first step in understanding what coastal towns are doing to cope with climate change is to examine the policy frame created at the state level in the early 2000s. Although too lengthy to recount here, Connecticut was an early entrant in the development of climate policy in the United States. Spurred partly by the Climate Action Plan adopted by the New England Governors/Eastern Canadian Premiers in 2001,[30] Connecticut's Republican governor in the early 2000s, John Rowland, signed onto

---

[27] Boyer, *supra* note 7. Please note that the interview data used for that publication was collected under an approved University of Connecticut IRB protocol. For details of that protocol, please contact the author.

[28] DEEP's work to date on that project is located at CT Climate Change, Initial Actions and Climate Action Map, http://ctclimatechange.com/index.php/towns/climate-action-map-testing/ (last visited July 2, 2012).

[29] The UConn research team is led by this paper's author and is comprised of several other graduate and undergraduate research assistants mentioned in the first footnote above.

[30] For more detail on the NEG/ECP process and programs, *see* The New England Governors' Conference, Inc., NEG/ECP Climate Change Program, http://www.negc.org/main/?do=page&id=39 (last visited July 3, 2012).

the plan and was then pushed from below to implement an aggressive set of state-level climate policies centering around a pro-jobs, pro-growth rationale for climate action.[31]

More specifically, two legislative acts provide the policy frame for a wide array of actions across the state. The first of these is the Connecticut Coastal Management Act (CCMA) enacted in 1980.[32] The second is Connecticut Public Act No. 08-98 (An Act Concerning Connecticut Global Warming Solutions) passed in 2008. While this second act focused mostly on approaches to GHG mitigation, it also set in place a policy review process for understanding climate impacts and existing policy actions around the state aimed at coping with climate impacts.[33] Coastal towns in Connecticut, then, have undertaken their adaptation programs in the context of these two policy frameworks. So while Connecticut is a home rule state where the primary sub-state governmental units are each of the 169 municipalities, the state (in this policy venue, mostly in the form of the DEEP) provides support for the towns through information sharing, the development of best practices, and, to some degree, policy coordination. But in the end, the primary locus of policy action is the town with these two acts as the primary legislative policy frame.

The next step in understanding the Connecticut coastal climate adaptation experience is to examine some summary data about the 24 coastal municipalities. Table 1 displays that data.

Table 1. Summary Connecticut Coastal Town Data.

Municipality	Pop. density (People/ sq. mile)	Income per capita ($)	% college or higher	Rep.	Dem.	Minority party	Unaffil.	Dominant party	Mun. Envt. Staff
Branford	1,274	41,744	43.7%	15.36%	33.58%	0.18%	50.87%	D	7
Bridgeport	9,014	19,802	15.2%	6.94%	63.16%	0.23%	29.66%	D	6
Clinton	829	37,186	37.2%	25.29%	28.07%	0.97%	45.67%	D	3
Darien	1,595	94,953	73.2%	48.67%	19.17%	0.12%	32.05%	R	4
East Haven	2,438	28,820	20.9%	15.60%	36.53%	0.17%	47.69%	D	3
East Lyme	564	34,733	34.5%	22.98%	30.29%	0.17%	46.56%	D	5
Fairfield	1,980	55,579	58.6%	29.41%	28.58%	0.30%	41.72%	R	11
Greenwich	1,274	92,014	62.2%	37.68%	25.57%	0.95%	35.80%	R	20
Groton	1,294	31,697	32.2%	19.49%	29.67%	0.25%	50.58%	D	5
Guilford	476	48,459	54.7%	22.71%	32.80%	0.23%	44.25%	D	5
Madison	507	48,623	62.8%	31.32%	26.72%	0.50%	41.45%	R	3
Milford	2,294	38,549	37.8%	21.59%	28.00%	0.41%	50.00%	D	8
New Haven	6,830	21,176	32.2%	4.11%	68.81%	0.56%	26.52%	D	10
New London	4,603	21,829	23.5%	17.27%	43.20%	1.16%	38.37%	D	3
Norwalk	3,722	41,419	38.4%	2.07%	34.24%	1.94%	43.87%	D	12
Old Lyme	331	50,249	52.9%	29.53%	28.31%	0.38%	41.78%	R	3
Old Saybrook	683	42,390	41.5%	32.11%	28.17%	0.40%	39.32%	R	4

[31] *See* Boyer, *supra* note 7, for much more detail about how Connecticut climate policy developed.

[32] *See* Conn. Dept. of Energy & Envtl. Protection, Overview of Connecticut's Coastal Management Program, http://www.ct.gov/dep/cwp/view.asp?A=2705&Q=323536 (last visited July 3, 2012), for more discussion of the CCMA.

[33] *See* An Act Concerning Connecticut Global Warming Solutions, 2008 Conn. Legis. Serv. P.A. 08-98 (H.B. 5600) (June 2, 2008).

Stamford	3,227	46,928	43.5%	22.15%	41.21%	1.31%	35.34%	D	4
Stonington	476	41,246	42.8%	21.62%	31.58%	0.23%	46.57%	D	5
Stratford	2,855	31,571	28.8%	18.83%	32.09%	0.25%	48.83%	D	5
Waterford	591	36,626	36.1%	19.92%	30.49%	0.26%	49.33%	D	5
West Haven	5,051	25,722	22.3%	18.22%	46.36%	0.37%	35.05%	D	4
Westbrook	434	41,667	35.3%	9.94%	57.37%	0.20%	32.49%	D	5
Westport	1,320	92,854	74.2%	27.91%	36.06%	0.12%	35.90%	D	16

From this data, a few patterns emerge that may inform our understanding of why some towns engage with climate change in significant ways and others somewhat less so.

- The population density data quickly reveal the points of urbanization: Bridgeport, New Haven, New London, West Haven. Clinton, East Lyme, Guilford, Madison, Old Lyme, Old Saybrook, Stonington, Waterford, and Westbrook show significantly lower population density.

- Somewhat surprisingly, given the "Gold Coast" nickname often heard for the coastal communities, there is a relatively normal distribution of per capita income across the towns. At the high end, Darien, Westport, and Greenwich show per capita incomes above $90,000. At the low end, Bridgeport, New Haven, New London, and West Haven all have per capita income levels below $30,000. These same four, as noted above, have the greatest population density. The remaining 17 municipalities range between those income extremes.

- Educationally, Darien, Fairfield, Greenwich, Guilford, Madison, Old Lyme, and Westbrook show the most educated populations; Bridgeport, East Haven, New London, and West Haven, the least educated.

- There is a high degree of dominance by the Democratic Party across these 24 towns. Seventeen towns are solidly Democratic, with one more (Clinton) marginally Democrat-dominant. Of the Republican-dominated towns, only two (Darien and Greenwich) can be described as clearly dominated by the GOP; while four (Fairfield, Madison, Old Lyme, and Old Saybrook) only lean that way. It is also worth noting two other issues regarding party affiliation: (1) in all 24 towns, there is a high percentage of registered voters listing themselves as unaffiliated. In many cases, the size of that group could sway even dominant towns in the opposite partisan direction; and (2) New England Republicans tend to be more centrist in their approach to governance than those found in the American South or West.[34] Thus, one might argue that it is easier to find centrist coalitions in New England politics than in other regions in the United States. Those tendencies may also mitigate general Republican resistance to climate change action in contrast to what is observed at the national level.

- Lastly, there is wide variation in the number of municipal staff assigned to environmental issues across the 24 towns. These numbers include staff with planning and zoning,

[34] Howard L. Reiter & Jeffrey M. Stonecash, COUNTER REALIGNMENT: POLITICAL CHANGE IN THE NORTHEASTERN UNITED STATES (2011).

conservation, inland wetlands, and sustainability duties for at least part of the employment responsibilities. Greenwich and Westport show the largest number of staff assigned to environmental tasks, suggesting that tax base may drive some of the variation here. Clinton, East Haven, Madison, New London, and Old Lyme show the lowest numbers of environmental staff. For Clinton, Madison, and Old Lyme, one might speculate that their low population density demands less staff to service citizen needs. But for New London and East Haven that argument does not follow and one might assume that the small number of environmental staff reflects the relatively small tax base and is also the result of decisions to focus on other pressing needs in each town. It is worth noting, though, that the more urbanized towns of Milford, New Haven, and Norwalk all register among the higher environmental staff numbers.

Table 2 moves us directly into the analysis of climate adaptation policy actions taken by the 24 towns. This table presents an aggregated quantitative view of policy action. Please note that the categories in the first five columns of data were adopted from the ctclimatechange.org map of town climate actions. The summed total of all five categories is reported in the "Total" column and thus provides a rough gauge of the level of attention paid to climate adaptation in a given town. Looking at Table 2, the first thing that stands out is the degree of engagement for climate adaptation that exists across all 24 towns. At the high end, Clinton, Groton, and Guilford have each taken at least 10 different policy actions, demonstrating a high degree of policy attention to adaptation concerns. At the low end, Norwalk and Old Lyme have only engaged in three initiatives each. But it is also worth noting that the higher end appears to be the more dominant pattern of behavior among the coastal towns with 13 towns engaging in eight or more actions and three others engaging in seven policy actions.

Table 2. Policy Action Inventory for 24 Coastal Towns (X = missing data)

Municipality	Town policy actions assessing vulnerability to climate change	Town policy actions on planning for impacts of climate change	Town policy actions for purchasing and capital improvement projects to meet future threats	Changes in zoning or building codes for future safety	Town map of vulnerable areas	Total	Municipal staff in P&Z, conservation, inland wetlands, and sustainability departments.
Branford	1	2	1	2	2	8	7
Bridgeport	1	2	2	2	1	8	6
Clinton	2	2	1	5	1	11	3
Darien	1	2	1	3	1	8	4
East Haven	1	1	2	2	2	8	3
East Lyme	1	2	2	2	1	8	5
Fairfield	2	2	1	2	1	8	11
Greenwich	1	1	1	1	1	5	20
Groton	2	2	3	2	1	10	5
Guilford	2	2	4	2	1	11	5
Madison	1	1	1	2	2	7	3
Milford	2	2	1	3	1	9	8
New Haven	1	3	1	1	2	8	10
New London	2	3	2	1	1	9	3
Norwalk	0	1	X	1	1	3	12
Old Lyme	X	1	X	1	1	3	3
Old Saybrook	2	2	0	2	1	7	4

Stamford	2	2	1	1	1	7	4
Stonington	0	1	0	2	1	4	5
Stratford	0	1	1	1	1	4	5
Waterford	1	2	1	2	2	8	5
West Haven	0	2	1	2	1	6	4
Westbrook	0	3	1	3	1	8	5
Westport	0	1	2	1	1	5	16

From a social science perspective, then, there is little macro-level variation across towns regarding their level of policy engagement with climate adaptation. At the most aggregated level, this would suggest that the threat presented by climate change to each town's way of life provides a rather uniform policy motivator for town officials. This might also be taken as evidence in support of the Need/Response model discussed above. Further, when comparing the total level of policy engagement with staff (the last two columns of Table 2), there does not appear to be a correlation between staff capacity and adaptation policy engagement. Thus, one can speculate that drivers other than staff expertise are at work. And going back to the data in Table 1, there also does not appear to be a correlation between party dominance and town engagement with climate adaptation. Further analysis of demographic descriptors with climate policy will be needed to flesh out these drivers in more detail at the aggregate level.

The Appendix provides us with much greater detail about the actual policy actions taken by the 24 towns. And Table 3 provides more detailed explanations for each of the categories shown in Table 2 and the Appendix. Clearly, the data displayed in the Appendix provides only a glimpse of the rich policy picture of climate adaptation in coastal Connecticut, but it does provide us with some further clues as to what the 24 towns are doing. It also fills in some detail to the aggregate results displayed in Table 2, as it follows that table's structure. Please note that the first four policy categories in the Appendix correspond to the first four in Table 2 and the policy counts are still located in the column next to the text portion for that policy category in the Appendix.

Table 3. Coastal Town Adaptation Tables Explanatory Notes

Town policy actions assessing vulnerability to climate change	Drawn primarily from town Plans of Conservation and Development (POCD), but also includes sustainability and coastal management plans, and info from town calls.
Town policy actions on planning for the future impacts of climate change	Both planned and implemented measures to combat future impacts of climate change were counted, which was largely anticipated to be in the form of increased flooding, erosion, damage to coastal property, stormwater pollution, and degradation of shellfish and wetland habitats. Resources used were POCDs and zoning documents. Membership in ICLEI counted as a planning action, since it indicated that towns recognized climate change as a problem, and wanted to use ICLEI as a resource.
Town policy actions for purchasing and capital improvement projects to meet future threats	Drawn from POCDs, zoning documents, and town calls. This category focused on physical improvements to town infrastructure that would help prepare for future threats.
Changes in zoning or building codes for future safety	Drawn from POCDs, zoning documents, stormwater management plans, erosion plans, and town calls. This category focused on changes in zoning regulations to account for increased flood risk, or restrict development in areas (such as coastal flood zones) with high risk of property damage during storms/flooding.
FEMA compliant or greater	*Basic compliance*: member of FEMA's National Flood Insurance Program, Regular Program (NFIP). This means that

	the town uses FEMA's Flood Insurance Rate Maps (FIRM). Towns that use the FIRM maps work with FEMA in a limited capacity. *Overcompliance*: member of FEMA's Community Rating System (CRS), part of the National Flood Insurance Program. Towns have to show they've made improvements in zoning to reduce flood risk, in order to participate in this selective program. CRS member towns get discounted flood insurance in regular and high flood risk zones. *Former member of FEMA's Community Rating System*: towns in this category recently belonged to the CRS, and are still listed on the FEMA website (though marked as "rescinded"). This means they are no longer fully compliant with FEMA's higher standards for the CRS program, and cannot receive flood insurance discounts. Still, it indicates initiative on the town's part to be proactive on flood risk reduction.
Town map of vulnerable areas	Gathered from POCDs, town GIS mapping online (where available), or from the town listing FEMA Flood Insurance Rate Maps on their website. There was a lot of variety in terms of mapping vulnerable areas. For some towns, this meant forecasting future sea level rise due to climate change, and for others, it meant including a map of vulnerable wetlands and standard 100- or 500-year flood zones (without reference to climate change).
Municipal staff in conservation, sustainability, planning departments	Drawn from town websites, and POCDs. Towns that had full staff directories were more comprehensive than those that only listed department heads on the websites. There is a possible undercount of those that only listed department heads, as larger towns likely also have support staff (especially in Planning & Zoning, the largest department).

A first point to note in the Appendix is that all 24 towns are at least FEMA compliant in their flood zone mapping and many aspire to do more, although they have not yet taken concrete action to move beyond the FEMA guidelines. Five towns (East Haven, East Lyme, Stamford, Stonington, and Westport), however, have done so and have engaged in such activities as joining FEMA's Community Rating System. This action allows residents to receive a 5% discount on federal flood insurance. These actions and the aspirations of many towns suggest that town officials are indeed responding to the flood vulnerability that they face on the coast, especially when one considers that these towns are located in a region that has a history of significant coastal storm impacts.

Almost all towns have integrated climate adaptation concerns into their town's Plans of Conservation and Development (POCD), showing a clear indication that coastal town officials are indeed paying close attention to adaptation issues as they work to serve their citizenry now and into the foreseeable future. Moreover, towns like Bridgeport (BGreen 2020), Fairfield (Fairfield Town Green), Groton (Groton Coastal Climate Change Project), Guilford (Municipal Coastal Plan), and Stamford (yearly climate change assessments) have undertaken policy packages that go beyond the baseline of thinking about threats. Those towns appear to be more actively engaging the problem.

In support of their efforts, other towns (like Branford, Bridgeport, Greenwich, New Haven, New London, Stamford, and Westbrook) belong to ICLEI (Local Governments for Sustainability (http://www.iclei.org/)). As stated on its website, ICLEI provides "technical consulting, training and information services to build capacity, share knowledge and support local government in the implementation of sustainability at the local level." Thus, joining ICLEI represents a conscious effort on

the part of town officials to work with others to pursue sustainable practices at the local level. Given that ICLEI requires subscription fees to join, membership also represents a demonstrative decision about the use of fiscal resources to support sustainability efforts.

Not surprisingly, there is also a high degree of engagement with adaptation policies across the towns regarding sewer systems and storm water management. Whether because of flash flooding concerns from localized rainfall, larger scale concerns resulting from significant storms or winter snow melt (issues hammered home during winter 2010-2011 and the "two-storm" challenge of fall 2011), or coastal erosion issues, almost all of the coastal towns are actively focused on coping with such vulnerabilities in operational ways.

Lastly regarding Table 2 and the Appendix, it is worth noting that some towns exhibit two policy actions regarding the mapping of vulnerable areas. In these cases, towns like Branford, East Haven, Madison, New Haven, and Waterford have performed vulnerable area mapping both as part of their POCD process and also as part of FEMA's flood insurance mapping. So while the same data might be used for both actions, the towns are putting forth "extra effort" to identify the most vulnerable areas in their towns. One might also expect that such remapping efforts have produced, and will continue to produce, some angst among town residents as the flood plains become larger under the new mapping processes. One coastal official recounted a town meeting in his community as follows:

> people who didn't think they needed flood insurance now all of the sudden have to have it. Now obviously it's a money thing, but it's also a risk management thing and that's a big focus now in the discussion. Much of the emphasis is about … risk management.[35]

As this quote suggests, although confronting the need for climate adaptation may be the result of proactive steps by town officials, it does not mean that residents will always be on-board with climate change policy directions. Thus, leadership from town officials and coalition-building within and among localities is and will continue to be important efforts in moving adaptation policies forward.

V. Concluding Analysis

When taking these data in aggregate, a pattern emerges of adaptation policies that are being adopted and implemented among Connecticut's coastal towns. Clearly, these 24 towns are well engaged with climate adaptation and are continuing to expand those efforts. What is less clear from the foregoing data, however, are the exact policy drivers prompting such actions. Some clues exist in the data, but more work is required to understand the idiosyncrasies of the experiences in particular towns. That work will entail further data collection both in terms of documentary work and interviews with a broad array of town policy officials. Nonetheless, some patterns of policy causality are beginning to emerge among Connecticut's coastal towns. These include:

- ***Threats and vulnerability*:** There is a high degree of engagement with adaptation policy among the coastal towns. A focus on adaptation is relatively consistent across those towns regardless of the demographic and political patterns shown in Table 1's summary data. Thus, it is safe to argue that the local threats engendered by climate change are driving a significant portion of the policy push in this area. In this way, the Realists in the international relations field are right:[36] threats drive action, and sometimes quite quickly;

[35] Interview with Michael Murphy, Director of Planning and Development, Town of Groton, CT (Dec. 12, 2010).
[36] In the international relations field, realists see action as largely generated by threats posed to policy actors.

- ***Policy entrepreneurs*:** The impact of individuals in the policy process cannot be underestimated.[37] The reader should not discount the impact of policy officials committed to climate change action in a variety of the coastal towns, including elected officials whose sights are set on higher state or national office. Policy officials with personal commitments to environmental concerns apply their expertise, energy, and problem-solving skills in ways that move the agenda forward. This may seem like an obvious conclusion, but it remains an important factor in understanding policy variation across jurisdictions and governmental levels;

- ***Framing and the policy environment*:** Policy entrepreneurs must recognize the policy environment within which they work and thus frame policy arguments to gain support. Framing climate policy as an economic development engine was crucial to moving Connecticut's state-level policy forward in the earlier 2000s. Framing will remain important for local officials, as residents confront rising insurance costs for example, and town officials must argue the necessity of those added expenses.

- ***Local political culture:*** Some communities may act because their political culture is more receptive to environmental action than others. More data is needed on this set of factors before conclusions can be more definitively drawn about its potency. As data collection moves away from coastal towns in the larger, 169 town research project, it will be interesting to see if the consistency of policy engagement that exists on the coast continues inland, where the demonstrative threat is lower. Local politics might then play a greater role than appears to be happening on the coast.

- ***Climate policy vacuum:*** The lack of action at both global and federal levels facilitates (or demands?) local policy initiatives. This causal variable can almost be left unsaid, but the ramifications are striking in at least two ways. First, as discussed early in this paper, local action is filling the void of federal action, but may be doing so in redundant and inefficient ways. Second, over the longer-term, as climate impacts become more significant and thus more costly, towns will be forced to fill yet another unfunded "mandate." But this mandate will not be coming from above, but rather from on-the-ground demands of servicing the welfare of their local citizens. The budget and programmatic impacts will be real and severe as climate impacts escalate.

In sum, Connecticut's coastal communities may indeed be leaders in climate adaptation, but they may soon begin to confront the limits of what they can do without intensive help from both state and federal authorities, both in terms of fiscal resources and expertise. Clearly, state authorities are cognizant of the issues and pressures at hand, but the climate policy gridlock at the federal level remains a major obstacle to coping effectively with climate change. An optimistic policy scenario suggests that as the threats become ever more real and demonstrative, policy-makers at all levels will respond appropriately. Unfortunately at least for the short-term, many officials at the federal level are still reluctant to apply George Bush's threat-action linkage to the climate change policy problem.

[37] For further discussion, see Barry G. Rabe, *States on Steroids: The Intergovernmental Odyssey of American Climate Policy,* 25 REV. POL'Y RES. 105-28 (2008).

VI. Appendix

Policy Action Inventory with Policy Details

		Town policy actions assessing vulnerability to climate change		Town policy actions on planning for the future impacts of climate change		Town policy actions for purchasing and capital improvement projects to meet future threats		Changes in zoning or building codes for future safety	FEMA compliant or greater	Town map of vulnerable areas	Town envir. staff
	#	*Policy Detail*	#	*Policy Detail*	#	*Policy Detail*	#	*Policy Detail*			
Branford	1	Plans of Conservation and Development (POCD) connect sea level rise with climate change and include flood zone maps	2	POCD calls for town to prepare for the sea level rise and flooding as an emerging conservation issue. Town participates in ICLEI's Clean Air & Climate Program to track and reduce GHG emissions.	1	Sewer system to be expanded and upgraded	2	New areas prone to flooding due to sea level rise identified. Zoning discourages development in floodplains. Zoning encourages gradual retreat from low-lying areas.	Basic compliance: member of FEMA's National Flood Insurance Program (NFIP), Regular Program	GIS town map online. Future land use map in POCD.	7
Bridgeport	1	Town's sustainability plan, "BGreen 2020," calls climate change Bridgeport's greatest environmental challenge. The sea level rise will result in greater flooding. Higher temperatures will have economic consequences, increase heat-related illness, and damage fish and shellfish habitats.	2	Town's sustainability plan, "BGreen 2020," makes recommendations to combat climate change, calling it a threat to economy, health, and national security. Town is a member of ICLEI.	2	Stormwater management system to be cleaned in order to prevent flooding. Old water fixtures in older housing will be changed out to conserve water and reduce the load on the town's water treatment facilities.	2	Zoning enacted to transform unused industrial sites into mixed-use development sites. Green landscaping measures (like street trees and green roofs) retain stormwater and reduce urban heat.	Basic compliance: member of NFIP, Regular Program. Town aspires to join the NFIP's Community Rating System (CRS).	FEMA flood zone map in POCD.	6

Clinton	2	POCD says town must prepare for future sea level rise. The town's Coastal Plan says town is threatened by flooding and sea level rise.	2	POCD and Coastal Plan set out plans for adaptation and mitigation of sea level rise and flooding.	1	Sewer minimization program should be established to discourage development in wetlands. Inadequate sewer systems should be upgraded. New construction and improvement projects should be required to provide as much stormwater infiltration as engineering practices allow.	5	Development discouraged in tidal wetlands (to protect and restore degraded shellfish habitats). Establishment of a sewer minimization program to prevent groundwater contamination. Public education program on maintaining septic systems. Upgrade of existing stormwater discharge structures by adding treatment structures and vegetative swales. Maintain coastal high hazard flood areas as open space to protect private property.	Basic compliance: member of NFIP, Regular Program.	FEMA flood zone map in Coastal Plan.	3

Darien	1	A 2007 slideshow on climate change ranks climate change induced flooding as the key threat to the town. Climate change is causing larger and more frequent floods, exacerbated by development, impervious surfaces, undersized culverts, and inadequate stormwater management systems.	2	POCD recommends town include storm drainage zoning as part of any new development or redevelopment plan. Town should consider large-scale flood control projects .	1	Town will consider large-scale flood control projects.	3	Prohibit development close to ponds and rivers. Zoning limits creation of impervious surfaces. Developers required to provide an erosion and stormwater drainage plan.	Basic compliance: member of NFIP, Regular Program	FEMA flood zone map in POCD.	4
East Haven	1	POCD says private development in coastal hazard areas is vulnerable, and further development should be discouraged. Tidal wetland areas and existing open space on the coast needs to be preserved, as developing it would increase chances of property damage.	1	POCD chapter on the shoreline sets out zoning recommendations for coastal development to reduce risk of flood damage.	2	Periodic flooding of some neighborhoods can be ameliorated by structural improvements in the drainage system. Town should also ask state and federal governments to purchase severely flood-damaged property.	2	Discourage development of coastal hazard and flood zones. Zoning to protect inland wetland areas from development that impairs floodwater management, increases erosion, and harms groundwater or wildlife.	Former member of FEMA's CRS (part of the NFIP from 2003-2010).	Future land use map in POCD. FEMA flood zone map.	3

East Lyme	1	POCD emphasizes need for green energy and to be responsive to flood hazards.	2	2010 POCD addresses flood risk and need for green energy. The town's Planning Commission expected to complete a "Climate Adaptation and Sustainability Plan" in 2011.	2	Zoning will control the alteration of natural flood plains. Town should regulate construction of flood barriers that unnaturally divert flood waters or increase flood hazard in other areas.	2	Zoning protects aquifers, groundwater, and prevents erosion. New development must result in no increase in stormwater runoff.	Member of FEMA's CRS. Residents receive a 5% discount on flood insurance.	GIS town map online.	5
Fairfield	2	Town zoning regulations account for flood vulnerability, both coastal and inland. The town's Shellfish Report covers conservation and restoration of threatened shellfish habitats.	2	Town zoning regulations detail flood area zoning for coastal and inland property, and call for stormwater erosion control. The Fairfield Town Green (an ad hoc committee addressing impacts of climate change) published the Fairfield Shelfish Report, which addresses environmental conservation of shellfish habitats to protect economic interests.	1	Zoning regulations require developers to supply new sewer and water supply systems to protect from flood contamination	2	New development and redevelopment projects must control for stormwater runoff to protect water quality. Zoning regulations protect against soil erosion.	Basic compliance: member of NFIP, Regular Program.	FEMA flood zone map.	11

Greenwich	1	POCD says town is vulnerable to increased flooding because of increased development, more impervious surfaces, and sea level rise.	1	POCD addresses global warming sea level rise. Town will consider joining ICLEI.	1	The Greenwich Flood and Erosion Control Board is authorized to plan, construct, repair, and maintain a flood or erosion control system, but will likely need to work with state and federal governments.	1	Regulations protect land and property in flood zones.	Basic compliance: member of NFIP, Regular Program. Town aspires to join the NFIP's CRS	FEMA flood zone map in POCD.	20
Groton	2	The Groton Coastal Climate Change Project assesses vulnerability and offers recommendations for the impact of climate change. The POCD addresses flooding risks.	2	The Groton Coastal Climate Change Project makes recommendations to combat the impact of climate change. POCD addresses flooding.	3	Existing buildings should be flood-proofed. Vulnerable land that can act as a flood buffer should be purchased by the town. Flood tide gates should be installed on the coast.	2	Zoning incentives to retreat from areas vulnerable to flooding. Redevelopment restrictions prevent building in areas vulnerable to flooding.	Basic compliance: member of NFIP, Regular Program.	Natural resource map of flood zones in POCD.	5
Guilford	2	The Municipal Coastal Plan assesses the town's vulnerability to sea level rise and provides policy recommendations. The POCD addresses flooding, erosion, and the safety of the water supply.	2	Municipal Coastal Plan includes policy recommendations in response to the climate change-induced sea level rise. POCD addresses flooding, erosion, and safety of water supply.	4	The Department of Public Works building should be relocated outside of the coastal flood zone. Town should acquire sensitive land. Town should improve storm damage systems. Town should dredge the harbors.	2	Zoning controls the growth rate of residential development, and reduces the amount of impervious surfaces allowed in commercial development, to avoid an increase in stormwater runoff. Zoning should minimize extensive changes in topography (steep slopes, wetlands, wetland buffers).	Basic compliance: member of NFIP, Regular Program. Town aspires to join the NFIP's CRS.	GIS town map online.	5

Madison	1	POCD notes coast's vulnerability to hurricanes, floods, and erosion	1	POCD recommends zoning restrictions to protect wetlands, floodplains, watercourses; prevent further coastal erosion; and prevent damage to coastal property during storms.	1	Town should discourage or prevent the use of flood or erosion control structures, except when necessary to protect property or water resources (structures such as sea walls actually deflect storm energy onto property).	2	Zoning prevents development on wetlands, floodplains, watercourses, and steep slopes. Zoning encourages coastal property owners to build as far from eroding shore areas as possible.	Basic compliance: member of NFIP, Regular Program.	Map of vulnerable coastal area in POCD FEMA flood zone map.	3
Milford	2	The 2002 POCD assesses vulnerability to flooding. The town's Health Department has assessed the public health impacts of global warming, and is a member of the CT DEEP's subcommittee on climate change adaptation.	2	POCD makes recommendations to improve zoning to minimize flood damage. The Health Department has been proactive in public education and preparedness about climate change induced public health risks.	1	Town will pursue state and federal funds to repair and restore damaged floodplains and drainage systems.	3	Zoning protects tidal wetlands. Town will create a Stormwater Management Ordinance. Zoning forbids multi-unit residential development in flood hazard areas	Basic compliance: member of NFIP, Regular Program.	GIS town map online.	8
New Haven	1	Town conducted vulnerability assessments for transportation and public health	3	Town acts to prevent and mitigate flooding. Town's Climate Action Plan seeks to reduce emissions in transportation and energy. Town is a member of ICLEI.	1	Salt marsh restoration will improve productivity of floodplains.	1	Zoning limits construction of new buildings within FEMA flood zones.	Basic compliance: member of NFIP, Regular Program. Town aspires to join the NFIP's CRS.	GIS town map in Hazard Mitigation Plan. FEMA flood zone map in POCD.	10

New London	2	Town has a Comprehensive Stormwater Management Plan to address flood threats. POCD makes policy recommendations to counteract flood and water pollution risks.	3	The Comprehensive Stormwater Management Plan outlines plans to repair flood basins and other stormwater systems as well as increase public awareness about the dangers of flooding. Town is a member of ICLEI.	2	Town should support installation of new sanitary pump facilities, using CT DEEP grants that provide 75% support. A systematic maintenance system for catch basins and street sweeping would reduce pollution from runoff.	1	Zoning regulates building in flood zones.	Basic compliance: member of NFIP, Regular Program.	Coastal flood zone map in POCD.	3
Norwalk	0		1	Town has prepared for some of the FEMA projected flooding.			1	Development restricted in FEMA flood zones.	Basic compliance: member of NFIP, Regular Program. Former member of FEMA's CRS (part of the NFIP from 1993-1998).	Env. and infra-structure map in POCD.	12

Old Lyme	0		1	The town has adopted the Connecticut River Estuary Regional Planning Agency's Hazard Mitigation Plan which specifically addresses flood zones and flood responses. In addition to flooding efforts, POCD plans to protect important coastal resources like tidal wetlands and other natural resources that can mitigate flooding effects.			1	Zoning regulated in FEMA flood zones. Buildings near tidal wetlands are required to have a coastal management plan. The town has planned to meet state zoning requirements outlined by the Coastal Management Act.	Basic compliance: member of NFIP, Regular Program.	FEMA flood zone map.	3
Old Saybrook	2	Town has a Natural Hazard Mitigation Plan to address the effects of the sea level rise on town property. POCD addresses flood hazards.	2	POCD says a policy should be developed to "preserve forestlands and bodies of water which naturally absorb significant amounts of carbon dioxide." It also calls for the protection of coastal wetlands and management of floodwater channels to reduce the effects of flooding.	0	Funding barrier will be hard to overcome. Specifically, the number of properties and people affected by the sea level rise predictions will be very difficult to handle.	2	New zoning and building permits prohibit the creation of new lots in flood areas unless the lot contains some upland area as well. Zoning complies with FEMA guidelines.	Basic compliance: member of NFIP, Regular Program.	Coastal resources and floodplains map online.	4

Stamford	2	The town planning department has completed a climate change vulnerability assessment. POCD's Sustainability Amendment addresses threat of climate change.	2	POCD describes adaptation and mitigation efforts that need to be undertaken, including storm warnings, storm drain systems, a climate budget, controlling development, yearly climate change assessments, tracking research in the field. Town is a member of ICLEI.	1	Too early to tell. Ms. McKenna thinks it is definitely possible once climate change becomes more on town-level agendas.	1	Minimum building height above sea level raised by one foot in 2002, as part of CRS.	Over-compliance: member of FEMA's CRS. Residents receive a 15% discount on flood insurance in high hazard areas.	Coastal flood zone map in town plan	4
Stonington	0		1	Town planning addresses flood prevention and drainage	0	At this point, the town is in preliminary discussions about climate change, and therefore it is hard to tell if purchasing capital and projects will be able to respond to climate change threats.	2	Building restricted in coastal high hazard flood zones. Zoning complies with FEMA flood maps.	Over-compliance: member of FEMA's CRS. Residents receive a 5% discount on flood insurance in high hazard areas.	Flood zone map in POCD.	5
Stratford	0		1	Town upgraded drainage infrastructure in 2011, which significantly reduced flood damage from Hurricane Irene.	1	Evacuation procedures, drainage projects, and floodplain management are all priorities.	1	Zoning complies with FEMA guidelines on floodplains to prevent and minimize flood damage	Basic compliance: member of NFIP, Regular Program.	Coastal flood zone map in POCD.	5

Waterford	1	Town will complete a vulnerability assessment as part of the hazard mitigation plan in 2012.	2	POCD calls for monitoring the sea level rise, and general policies to minimize flood damage and prepare for and respond to flooding. The town is also a member of a coastal resilience program through The Nature Conservancy.	1	Town will make improvements to react to identified threats.	2	Building and zoning codes comply with FEMA regulations. Minimum building height above sea level raised by one-foot in threatened areas.	Basic compliance: member of NFIP, Regular Program.	Flood zone map in POCD. Potential Category 3 storm flooding map in POCD.	5
West Haven	0		2	Most of town's efforts in response to climate change have to do with flooding. Specifically, the Inland Wetlands Conservation Project protects valuable flood barriers. A drainage project through the DOT will significantly increase the town's ability to cope with flooding.	1	Town is improving drainage systems through the DOT, and capital improvements to meet future threats will continue if funding for projects is granted at the state level.	2	Zoning and building codes prevent and mitigate flooding in accordance with FEMA policies. GIS identifies conservation areas that are threatened by development and flooding.	Basic compliance: member of NFIP, Regular Program.	FEMA flood zone map in POCD	4

Westbrook	0		3	POCD calls for adoption and implementation of a "Hazard Mitigation Plan" that would address flood risks related to sea level rise. Town should coordinate with federal guidelines like FEMA's CRS. The town is also going to be part of a study group for a Climate Policy Adaptation Study through NEMO and CLEAR.	1	Town plans to upgrade emergency shelters and emergency response.	3	Zoning complies with FEMA guidelines for floodplains to minimize flood damage. Town raised freeboard requirements for commercial buildings within floodzones. Flood certifications are required when building permits are issued.	Basic compliance: member of NFIP, Regular Program. Former member of FEMA's CRS (part of the NFIP from 2005-2011).	Flood zone map in POCD.	5

Westport			1	Town belongs to the Southwestern Regional Planning Agency's hazard mitigation plan, but has no other municipal level actions.	2	Town has upgraded the fire department in terms of both personnel and equipment. The town also was able to respond to the recent storms efficiently by opening and operating their shelters quickly and efficiently as well as monitoring safe evacuations from threatened areas. These actions coupled with the response and aid from FEMA inspired confidence in Westport's ability to respond to and address future threats.	1	Zoning encourages gradual retreat from coastal low-lying areas citing concern for climate change and sea level rise.	Over-compliance: Member of FEMA's CRS. Residents receive a 10% discount on flood insurance in high hazard areas.	Flood zone map online.	16