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By Stealth or by Spotlight: Matching Barriers to Adaptation Approaches

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By Stealth or by Spotlight: Matching Barriers to Adaptation Approaches
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Abstract

The goal of this research is testing existing frameworks that theorize the barriers to uptake of climate change adaptation (CCA) in municipal governments, and then connecting those barriers to alternative approaches to achieving adaptation within municipal organizations. The alternative approaches are argued to include full-on adaptation planning, a more technically-oriented mainstreaming approach, and a ‘stealth’ approach wherein policies with co-benefits are highlighted without much discussion of climate *per se*.

We interviewed planners in 15 coastal communities in Massachusetts, U.S.A., to inquire into local efforts toward CCA and what they viewed as required to move forward locally. The case studies are suburban and small towns, because these tend to be under-researched and, we argue, if CCA is to influence the majority of U.S. population, it will need to move beyond global cities and into typical suburban and smaller cities and town situations. We use qualitative analysis to characterize the findings on barriers. The most commonly listed are lack of resources, challenges from public support, limitations in the planners’ knowledge and climate information, lack of support from elected officials or state mandates, and opposition from property interests. These largely match what would be expected given previous research, including characterizations of endogenous and external economic and institutional contexts for the communities and the staff – with one major addition. In these municipalities coastal property is largely the province of the very wealthy. Overcoming landowners opposition to changing regulatory regimes is a very significant barrier to implementing, or even discussing, change. The results suggest that the existing frameworks, while quite helpful, need to better address the *real politic* of coastal land use planning.

Given this, it is perhaps not surprising that most communities are using the ‘stealth’ no-regrets/co-benefits approach. Some are undertaking a planning approach framed within hazards planning. Mainstreaming, while popular among researchers and perhaps in larger cities, proves to be more difficult for these smaller cities and towns to do, in part because they have no officially-sanctioned climate projections to use in developing regulations. While the interviews do not demonstrate direct this barrier-this approach outcomes, it nevertheless appears helpful to characterize CCA responses as by plan, by mainstreaming, or by stealth.

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By Stealth or by Spotlight: Matching Barriers to Adaptation Approaches

By Elisabeth Hamin, with research assistance from Sally Miller and Ana Mesquita
University of Massachusetts, Amherst

Global cities – the Londons, Amsterdams, Hamburgs – may be making progress in climate change adaptation (CCA) planning. But in the US, most of the population is now suburban, and while suburbs vary widely in their resources levels, many are served by small, fairly isolated, and generalist staff. In 2011 I interviewed municipal planners in fifteen coastal Massachusetts cities and towns distributed north (n=5) and south of Boston (n=5) and on Cape Cod south of Boston (n=5) (see Map 1). Taken as a whole this set of cities and towns is fairly representative of the population size and income characteristics of the cities and towns outside of Boston. The largest planning staff was perhaps five, and the normal staff was two. In Massachusetts the regional planning agencies have advisory-only roles, and serve as consultants to towns that request their services; they have no ability to require action by their constituent cities and towns. And, the state has not mandated any adaptation action by cities or towns. In fact the state's 2011 Adaptation Plan uses data developed some years ago to identify threats to the area, and then recommends that real planning occur. The US federal government, as most will know, provides no mandates to state or local bodies on climate change and in fact prefers in general not to even talk about climate change. The upshot of this is that a significant percent of US population is served by generalist planners with no mandate and little experience of or directions regarding how to prepare for climate change. To say that there are barriers to adaptation outside the major cities seems an understatement. In particular, in this paper I focus on the needs of smaller cities and towns working without a mandate for action, testing to see whether key existing adaptation theory works for these less sophisticated governmental bodies. I also seek to connect specific barriers to ways to get around, over, or past them, because a diagnosis of barriers is only helpful if that diagnosis also provides suggestions on how to move forward.

In general the literature and discussions at conferences seem to assume there are two basic ways to approach adaptation: first is full-on adaptation planning (1), in which the city or town prepares a comprehensive strategic framework based on climate forecasts and vulnerability analyses. The advantages here include the comprehensive nature of the method, which should assist in preventing maladaptation, the ability to include the public through regular participatory processes, and having as one product of the process an agreed-upon climate projection or set of scenarios (2). The second approach is often termed 'mainstreaming', and implies moving directly from climate forecast to changing technical specifications and regulations without going through a full planning process (3, 4). The advantages here include speed, as climate becomes a normal part of the municipal processes quite directly, and implementation, as the goal is to bypass a long planning process and go directly to changing policy. There is, I argue, a third potential approach, which I call 'Stealth,' but might be more explicitly described as the 'no regrets + co-benefits, no discussion' approach (5). The idea here is to achieve some climate adaptation goals without even discussing it the actions as adaptation. Indeed, research

suggests that at the national level at least, climate change is rarely the primary or stated motivation for adaptive action (6). An example here may help.

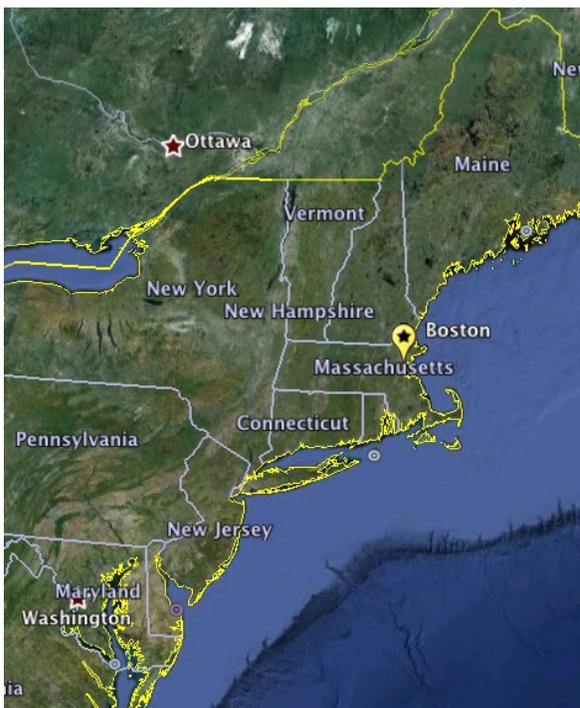
The only city planner that chose not to meet with me when I requested an interview is an older, industrial town on the South Shore that is experiencing high rates of diabetes, asthma, crime, teenage pregnancy, and all the other social ills that tend to co-locate with poverty and unemployment. To increase the challenge level, in recent years municipal budgets have been cut, so that the planning staff in this moderately sized city is now 3. When I called the planner to ask for the interview and told him what we were interested in, he just laughed. Climate change, with its long time horizon, is not even on the political horizon there, and for good reason – they have pressing problems now. But when I mentioned issues of stormwater management and excess heat days, the planner spoke with pride about implementing bicycle paths, urban greening and on-site stormwater programs, but his reason for doing these is public health. As an adaptation expert, I know that these actions will likely also help the city be more resilient to changed climate—they are adaptation actions, whether he specifically calls them that or not. In this case, he did not undertake these with any thought for adaptation, but it is not hard to imagine that a planner might propose no-regrets actions for her/his city knowing that they will increase resilience, without giving climate much public discussion as the reason for the actions, since there are other very good reasons that might be easier to explain—the stealth approach to adaptation.

The Interviews

As noted above, in the spring and summer of 2011 my research assistant, Ana Mesquita and I visited conducted open-ended interviews in 15 cities and towns. Interview sites were limited to one state, Massachusetts, to minimize variation from state-level policy frameworks (see Map 1, regional locator, and Map 2, interview sites, below). We focused on coastal areas, as these seemed the most likely to have begun considering climate change due to publicity about sea level rise. We excluded towns that did not have planning staff, as land use responsibilities in these cases tend to be circumstantially distributed across different departments and persons. The state was then divided into three coastal regions to represent regional place identity – north shore (north of Boston); south shore (south of Boston but not on Cape Cod) and Cape Cod. We randomly selected five communities in each region for interviews. We contacted the person listed on the municipal website as responsible for land use or planning, and all but one community (as explained above) agreed to be interviewed. Interviews tended to be fairly brief, about 30 minutes, and had between 1 and 3 persons attending. Interview results were fully transcribed and then coded into the web-based Dedoose program. Codes were initially selected based on literature review, and then coding categories were added as needed to respond to the content of the interviews themselves, so that all discussion in the interviews has an appropriate code. Dual-coding was conducted on three interviews to assure intercoder reliability. The focus of the interviews was on impacts the planner expects from climate change, what steps the municipality had taken for climate adaptation, and the challenges (barriers) to moving forward. Excerpts presented below are selected to be the most elegant explanations of issues that were mentioned by multiple persons, as further explained for each quote in the text below.

One issue to note here is that the interview respondents in general tend to wish to ‘please’ the interviewer (i.e., this author) and thereby support my and their own conception of themselves as competent and moral persons (7). As a result, the interviewees may have been motivated to claim knowledge of CCA and CCA actions whether or not the policy change was really undertaken as a CCA response. It is difficult to disambiguate this, so for the purposes of this article I will assume that their claims that actions were taken specifically for CCA are on their face correct.

In general, the cities and towns where we conducted interviews have fairly comfortable income levels overall, and demonstrate high levels of social capacity, both anticipatory and in response to crises, as defined by the IPCC (2007) (8). Power and income are very unevenly divided in the region, with a very steep property value slope as land moves away from the beach. There is no federal or state mandate, or even approved scenarios, to address climate change, although the state was working on an Adaptation Plan at the time of our interviews. Land use in general is controlled locally in Massachusetts, with no regulatory power for regional bodies (except limited development reviews on the Cape). With anticipated increases in sea level, floods and stormwater intrusion (9), most planners know there is pressing need for policy, but remain largely unable to publically frame the problem as one of climate change (10).



Map 1: Regional Locator



Map 2: Interview Sites

Research Literature Framework

Barriers can cover a wide range of issues, but, following Adger (11), we note that they are socially constructed and thus not insurmountable. Burch (12) argued that in relatively high-capacity cities and towns such as those within which we are working, addressing barriers tends to be more an issue of facilitating effective use of resources rather than a need to create capacity per se. For this research, we sought to test two contrasting diagnostic frameworks. The first was developed by Moser and Ekstrom (13), and builds from the wide range of research identifying barriers to adaptation planning (14–19). The authors provide a highly specific stage-by-stage listing of potential barriers, and suggest these cross-stage categories :

- *Leadership*, whether in the government or grass-roots level activism. Leadership is particularly essential when there is no regulatory mandate or local public demand for action.
- *Resources*, including technical information such as regional climate forecasts as well as staff time and expertise.
- *Communication* and information, which is particularly understood to be public participation and the flow of communication among those responsible for action; there is a sense in the article that this is a top-down flow of information from agencies to the public as well as cross-flow among members engaged in a CCA planning process. Note that in this formation, technical information needs are included in the resources category above.
- *Values and Beliefs*, especially regarding risk and how it should be managed and what concerns have standing. Although not explicit in the original framework, for our purposes, belief (or lack thereof) in the anthropogenic causes of climate change would be categorized here.

An alternative approach focusing on an action-model of adaptation (20) is provided by Arnell and Delaney (21) (see also 22, 23), who characterize barriers as:

- *Missing operators*, e.g, lack of awareness by leadership of the need for adaptation
- *Missing means*, limited institutional capacity, budgetary constraints, lack of regulatory authority
- *Unemployed means*, because of mis-allocation of costs and benefits, actions are not taken. A relevant example would be homeowners not moving because low-priced nationally-subsidized flood insurance will reimburse their losses.

Not surprisingly, there are similarities between these two: both begin by noting the need for leadership and resources, but after that have different foci: the Moser and Ekstrom focus on the social processes of planning and implementing, while Arnell and Delaney's investigation includes reference to public goods theories (see also 24). Burch (12), for example, found that in her three case study cities, conflicting cultures between different municipal departments and lack of political leadership were the two most commonly cited barriers. As a result, rather than attempting to increase capacity, the need is to re-work path dependent institutional structures. These answers generally assume that the

respondent has some knowledge of CCA. In a bit of reality testing, Measham and Preston (17) found when investigating adaptation status in three Sydney suburbs that: “When asked about how they might apply their policies regarding climate adaptation, the most common response was that participants simply didn’t know how to go about it. (p. 902).”

Beyond the barriers, there is a question of what steps a city or town will take for CCA. Typically, the literature and guides suggest a fairly normal planning process. Moser and Ekstrom (2011) suggest three iterative stages: understanding, planning, and managing. The U.S. National Research Council (25), for another instance, holds out this model:

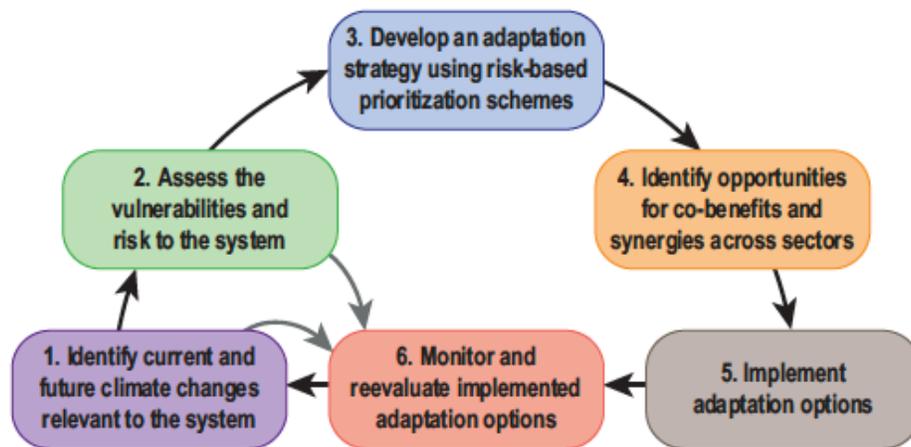


FIGURE S.1 The planning process is envisioned to incorporate the following steps: (1) identify current and future climate changes relevant to the system, (2) assess the vulnerabilities and risk to the system, (3) develop an adaptation strategy using risk-based prioritization schemes, (4) identify opportunities for co-benefits and synergies across sectors, (5) implement adaptation options, and (6) monitor and reevaluate implemented adaptation options.

Figure 1: Adaptation Planning Process, from US National Research Council

This of course aligns quite well with traditional comprehensive planning processes, adjusted to address vulnerability and climate analyses. But planning is only part of the path communities need to take. In a previous paper, Nicole Gurrán, Barbara Norman and I proposed that there is a recognizable ‘ladder of adaptation,’ a fairly regular order of actions that cities tend to follow in their efforts to prepare for climate change (26), based on interviews, focus groups, and surveys among second-tier cities in coastal Australia (27). In this model, the CCA planning process is just one step of many that need to be taken.

In the discussion below, we first summarize trends in responses, and then present detailed discussion exploring what the planners meant for each barrier and planning approach category. The final sections explore the connections between the barriers each municipality experiences, and the CCA choices they are making.

Findings: Barriers

There are two ways (at least) to analyze the planners' discussions of barriers. The first is to focus on the issue they described as the most important, which was typically the one they mentioned first, when asked about barriers. Using this criteria, the responses can be summarized as shown in Figure 2 below.

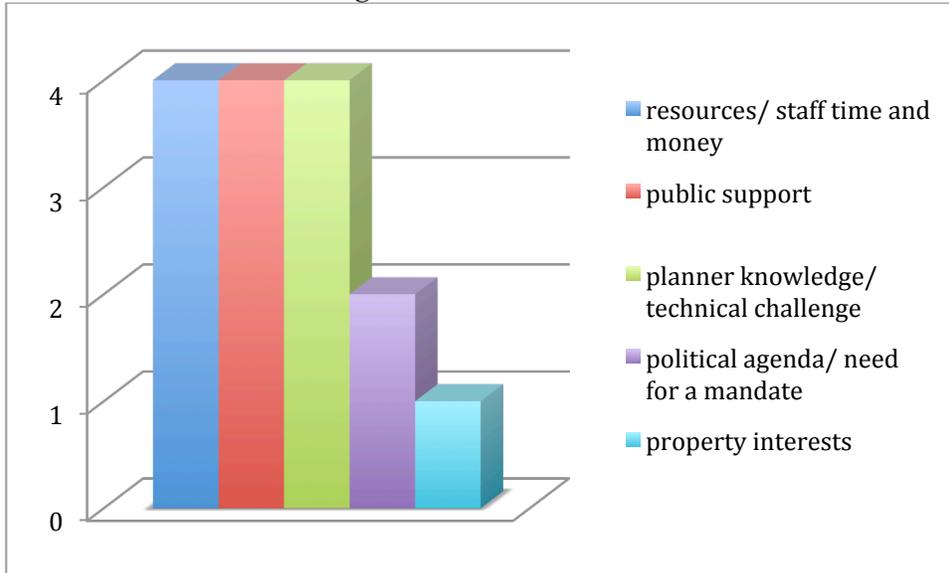


Figure 2: Primary barriers

Most interviewees discussed more than one barrier, and the discussion then becomes more nuanced. When including counts for all barriers mentioned, the two most common barriers to taking action that the planners reported were resources (staff and money) (n=13), and their sense that climate projections or science remain uncertain (n=13). Closely following these is concern over politics or lack of leadership (n=12). One of the more interesting issues discussed is the difficulty of taking action that might impact private property values (n=7). After this, a range of barriers get mentioned: challenges from existing land use patterns, lack of public support or contrary local values, and the distant time frame of adaptive need (n= 4 or 5 each). A cluster of institutional reasons get some mentions: the lack of regional planning in the state, the lack of federal or state mandates for action, difficulty in finding a legal basis for including adaptation in regulations. Perhaps surprisingly, even though there have not been significant floods in the region in the past few years, the lack of recent problems was not mentioned as a barrier. Graphically, the barrier responses are as follows:

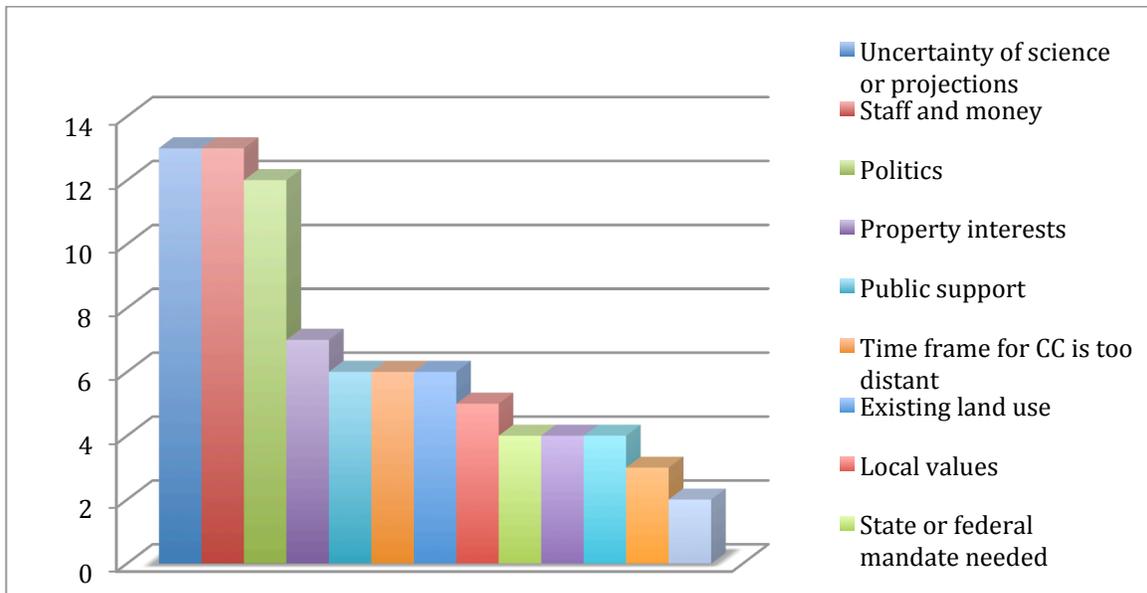


Figure 3: All Barriers Mentioned

Climate Projection Uncertainty

At the time of our interviews, there were no state-approved climate change projections of any sort. The result is that if a town or city wants to address CCA, they have to decide on their own what numbers to use. Note that we coded responses here that had to do with the planners' concern over climate uncertainties; local beliefs are discussed in the section on local values.

NS3: We just constructed a harbor walk. Should we have built it higher, because the sea level's going to rise? But, if that's true, how much higher should we have built it? What's the information on which to base that? We don't have any of those facts. So we built it based on current conditions, figuring if it's sometimes underwater, people wouldn't use it that day! The same way if it's got two feet of snow on it, it wouldn't be used. So I think it's outside our normal arena, it's lack of knowledge, and I think the idea about some guidance, in terms of, you know, planners always like models, or examples, would be really helpful.

Since then, the Commonwealth of Massachusetts has released an adaptation plan. One of our interviewees was part of the group writing that plan, and describes his experience here:

NS5: I was in a group [writing the state plan] that was talking about, you know, the coastal zone and potential impacts ...and i think we probably had about 8 sessions and they were completely dominated by trying to pick the number of what we should plan to. And I think that's probably one of the biggest impediments right now. There's a lot of information

about, a lot of data collected, a lot of projections of where things may go but that range is pretty broad, you know anywhere from a foot to 2 meters, i hate to mix units, but... I think that's probably where things get really problematic, of how you're going to convince one community that this is the right target to use when there's a lot of disagreement on what it might be... So I think that's kind of the, call it the line in the sand that we need to plan and use as the basis for regulation or standard that we're going to hold things to, is the biggest challenge.

Staff and Resources

Money and time were often cited both for undertaking adaptation planning, and for doing the actual actions themselves. Typical quotes:

SS4: Well, the short answer we just covered, money. And staffing, money, and resources. At our level of (SS4's) population of 25,000 our planning department is me and a full time secretary. She is off today and if the phone rings, no one will answer it. And under state law, when someone brings in a subdivision plan, submits it here for the planning board to review and approve, there are mandatory, statutory deadlines and if the planning board doesn't act on that within one hundred forty-five days, it gets approved by default and so, I have little control in managing my time ... And with whatever little time is left over, we can do planning. So we don't do much planning here at the local level and I can say that's [true] for most of the communities in the Commonwealth.

NS5: I think that's the challenge, one of the challenges here, is there's a lot of infrastructure, and if these things [climate impacts] are realized, there's going to be pretty big price tags on trying to come up with solutions for them. So I think with [CCA planning] has to come some form of ... assistance in implementing it. ... You'll probably get a lot of people that agree with it [CCA planning] just on principle that it's a smart thing to do, again, you're trying to tease out those benefits that you can see from implementing it, [regardless of] whether it's more sustainable -- again trying to drive it at some sort of savings to the community on the whole. And then a way to help with implementing it.

Politics

While the literature, as noted above, tends to view 'leadership' as the problem, in our towns this was never cited per se. Perhaps this is because the planners job is leadership, thus the question of lack of leadership becomes framed as lack of their time to actually undertake that role, as discussed above.

SS3: We've got to convince the town manager that it's a good idea, he's got to convince the board of selectmen that it's worthwhile having his staff

spending time doing this. Then once we have sort of centered on the [idea that] it's a good use of the planners time and [gotten] all of the other department heads to move in this direction, then we need to take that message out to the public and then we have to say and 'this is why.' You know I mean, I can't imagine that any of them have any idea what adaptation planning is.

Very commonly in the interviews, and what has been less noticed in other research, is the challenge of acting in what can be considered 'radical democracy'—many of these towns have a town meeting form of government, in which citizens elect one hundred or more of their neighbors to represent them in annual meetings, and those town meetings are where budgets get approved and plans get adopted and, importantly, zoning gets changed—but for zoning, change requires a two-thirds majority, so it is quite a high barrier.

CC2: It is really difficult to get people to raise their hand at town meetings for something that really directly impacts their property in a way they might not be all that happy about. Because we are town meeting here, zoning passes town meeting by a two-thirds vote which is really difficult and if you are telling one hundred people that you are going to start impacting how they can use their property, the ability to actually pass regulations starts to drop a little bit [voice implies ironic understatement]. We do have a lot of people who are very environmentally aware and understand the need for doing these things. I'm not use how many of them actually have property that would be directly impacted, so we have a really good support system but it is a question whether or not we could get enough people to back it.

Private property interests and existing land use patterns

Very strongly related to the politics problem is the issue of invested property interests, and the influence they have on the ability of the planners to move agendas forward.

NS4: You always have the elected officials that are sort of pro development, you know they want to see economic development they recognize it is good for the community to have business that are successful. And the flip side of that is that they see regulations as an impediment and detriment to business, and so unless you can really convince them that it is a real public threat, and even often times then, it is difficult to convince them that it is worth adopting another layer of regulations or quote unquote bureaucracy.

One of the reasons this is such a challenge is the value of the coastal real estate; beach frontage increases values many fold. The result is that the most-affected residents have

the ability to concentrate resources to their advantage, and prevent change they consider undesirable.

CC3: At the (XX) Beach they want to live on the water and they don't care if it's there in 10 years, 20 years, 40 years, 50 years, they don't care, they want to live there today. And I don't mean to say they're bad people, I'm just saying that's their mind set. In the Craigsville Beach DCPC we have a very wealthy family that owns three properties in different areas of the DCPC. And we divided it up into four neighborhoods and this woman, and her family owned properties in three of those neighborhoods and one of the properties I'd like to point out had 13 bedrooms, and she's complaining that she couldn't have more bedrooms. I'm very serious.

CC4: It's not going to happen overnight, there is too much investment. CC4 has the Xth highest equalized evaluation per capita in the Commonwealth. That is because it has over 72 miles of coast and all these houses and all these businesses are developed here for that purpose, they are worth big dollars. The last thing anyone is going to say is that you need to take your house in (X town) or CC4 and move it back 50 ft. See you in court.

The high cost of actually implementing change brings on complex equity questions related to property interests and local power.

SS4: Whether it is paying for replacing the culvert or flood proofing our wastewater treatment plant, moving a parking lot back or a road, whatever, how are we going to pay for it? Right now we have two ways. We can go to the voters and ask them to spend money from the towns' general fund, ... or the betterment thing [taxing property owners in only the affected area] which causes a great deal of divisiveness amongst neighborhood residents depending what side of the [taxation district] line and between the rest of the people in town, [who think] why should we have to pay for the seawall protecting that guy's house down there and what am I going to get out of it? The argument to that is we are a coastal community, most of us go to the beach and enjoy it. Maybe we should all pay.

Local Values and Time Frame of Climate Change

Local values can provide an atmosphere of support for climate change adaptation, or alternately, can act as a barrier to that process. As would be expected, coastal communities are experiencing a range of local values, but overall the planners perceive the majority of their public as not very interested, with climate concern limited to a 'do-gooder' few. The connections here with the discussion of politics are strong.

CC5: There's still a lot of lack of belief in climate change ... nothing's happening, nothing serious is coming down from the federal government other than these occasional training programs to the believers already like the one they did at Wood's Hole [a local oceanographic institute]. But in terms of the general population there isn't a lot of education out there, there's not a lot of emphasis on it. You know a municipality and especially bosses are political creatures that respond to the citizens' concerns. There's not a big concern so obviously there's not a lot of effort put in. Probably should be. So, somebody's gotta get out there and do some more educating.

NS4: People just not understanding the issue. It seems kind of nebulous, it seems like oh but that's not going to happen for another hundred thousand years. You know people need to have better sense of what that timing is, and without any kind of mandate from state or the federal government to adopt regulations put those things in local plans, I think it [CCA] is unlikely. It will be one of the last things that communities are looking at because they have much more urgent concerns.

But the local is connected to the state and national situation:

SS2: I think if we can tell the story of what we think is going to happen. I think I still see a broader picture of trying to bring the greater community of the United States together to actually acknowledge this. I think there are groups like you working on this, but a lot of people just, there's not a lot of national awareness to this. I think the first thing needs to be national awareness and so you get to the local level where people start to feel there's something valid here.

Other levels of government

Four planners discussed the need for greater support or required actions by upper levels of government, with a general sense that this would provide the planner with political cover to start working on climate change:

NS4: Without any kind of mandate from state or you know the federal government to adopt regulations put those things in local plans, I think its unlikely that it will be one of the last things that communities are looking at because they have much more urgent concerns.

In the case above, the planner sought general support for CCA, but more specific changes in the regulations was also viewed as important:

NS1: Before we can do it [address CCA], you know, any sewer, significant sewer changes in the town, or significant water system changes in town, DEP [the state Department of Environmental Protection]

reviews all that. So they would have to tell us you have to put bigger pipes in, or whatever.

Other regulatory or institutional design issues were raised, but were clearly less significant from the planners' perspective, such as a desire for regional cooperation and concern about getting the right legal basis for CCA in plans. Perhaps most substantial is the challenge that the national Flood Emergency Management Agency (FEMA) is undertaking new mapping of flood risk, but not considering any changes that will arise from climate change. FEMA insurance policies also create perverse incentives for residents to rebuild homes after floods. A few interviewees experience frustration in working through other departments, and the lack of support for CCA goals among them.

Barriers Summary

These barriers can be arranged into the general categories as shown in Table 1, below. The groupings are arranged to argue that the first step is generating (or experiencing) local support, which will encourage political leadership by elected officials and the ability to overcome entrenched property interests, all of which will tend to encourage the allocation of resources to staff to ensure that they can engage with the newest science, which is likely to demonstrate that uncertainty is not as great as they may currently imagine. Once these elements are in place, the community can move toward addressing institutional issues.

A more nuanced approach clusters these into like-categories. There are challenges from perceptions of the overall science of climate change as uncertain and likely to occur far in the future, challenges from the linked issues of lack of local support for adaptation planning and unwillingness to challenge property interests in expensive coastal land, which leads to lack of local political leadership. The resource issue stands fairly alone, although clearly if leadership and local support were there, resources could be found for adaptation, so the issues are still linked. Finally, there are a cluster of challenges around institutional issues, including concern that there is no legal basis for actions, uncertainty about what changes could be made, lack of support from their regional bodies for doing adaptation plans, and most centrally, lack of any mandate to plan. The sense of the planners is that they need either local leadership, or top-down mandates; without one or the other, they do not have sufficient self-determinism in their job to move forward on adaptation planning, and they are pretty much stuck.

Institutional issues					
Other departments	Lack of regional planning	Legal basis for plans	State or federal mandate needed		
4	4	4	4		
	Resources	Science and forecasts			
	Staff and money	Uncertainty of science or projections	Time frame for change is too distant		
	13	13	6		
Politics, Values, Local Power					
Politics	Private property interests	Public support	Existing land use patterns	Local values	No recent problems
12	7	6	6	5	2

Figure 5: Barriers Clustered by Similar Responses Needed

Findings: Testing the Frameworks

How well did the existing literature frameworks describe the findings of this study?

Moser and Ekstrom's cross-cutting barriers were:

- *Leadership*: This was, interestingly, not an issue in our interviews.
- *Resources*: This was a very significant issue in these interviews.
- *Communication* and information, particularly understood to be public participation. Not an issue in these interviews, perhaps because no planning processes had yet begun.
- *Values and Beliefs*. This was a very significant issue in our interviews.

While Arnell and Delaney (21) characterized barriers as:

- *Missing operators (leadership)*: again, not such an issue among our interview pool.
- *Missing means*: A very significant range of barriers fell into this group.
- *Unemployed means*: This captures some, but not all, of the power-dynamics that interfered with planners' sense of empowerment, in that the wealthy coastal residents' subsidized flood insurance, for example, may have been part of why they

see no need to address CCA and were unwilling to accept any current costs for CCA aiding the future.

Clearly, these results relate across countries. In fact the results very closely echo the findings from Few, Brown and Tompkins (28 p. 265) in the U.K., which are worth quoting at length here:

Study respondents within the planning system pointed to the lack of concrete evidence on climate change impacts on which to base decisions as well as the technical ability within their offices to interpret that information. These factors acted together with other demands on limited human and financial resources within local government that tended to enforce a short-term outlook among planners and the prioritization of immediate urgent matters.....All of these issues worked against proactive long-term planning in the absence of a clear mandate on authorities to undertake such efforts.

The 'adaptation deficit' persists (29). Rather than focus on the barriers, our findings suggest the following as conditions necessary for forward movement on CCA in our small, relatively high-capacity coastal towns and cities:

Conditions supporting CCA

- A lever for progress; either:
 - Local voter demand sufficient to overcome vested property interests and generate mayoral support, or
 - Mandate from State or Federal government
- Resources
 - Allocated staff time or funds to hire consultants, and
 - Promise of funds being available to implement infrastructure plans
- Approved, defensible off-the-shelf, climate projections and standard CCA processes to be used.

Local voter demand is clearly based on local values and belief, which the Moser and Eckstrom model describes well. But overall the Arnell and Delaney approach seems to better capture the issues our respondents are experiencing. An important difference is our respondents' focus on the *real politic* of overcoming vested property interests and voters' propensity to prefer the status quo over change. This clearly support Meacham et al (17)'s finding regarding the importance of having a state or federal mandate to encourage action at the local level. While adaptation may be local, it will need political support from higher levels to spread very widely. Perhaps this focus is a result of the peculiarities of the New England governmental system, with very significant local land use powers. But issues of power and property seem to need further exploration.

Findings: Overcoming the Barriers

None of the towns interviewed reported having any of the conditions noted above – they had at best mixed public support for CCA planning and thus ambivalent elected official support, they have no mandates, they have no allocated staff time or funding, and they have no officially-approved projections they can use. It is not surprising that CCA is low on their priorities. Despite this, many communities are taking steps, which is a lesson in why barriers may slow, but need not halt progress. In the section below I return to the early discussion of CCA approaches, testing the connection between barriers and CCA practices to see if there is much connection.

Stealth approaches

One way for planners to address climate change is to undertake policies that they know will increase resilience, but that also serve other policy goals that may be easier to explain to the public – by definition, these are no-regrets policies. The interviews suggest that this is currently the most common way planners are addressing CCA.

SS3: We said sea level is rising, we know it is rising, it's been documented, it's measured, it's measurable, we have tracked trends. We don't know why it is happening and we are not saying it is from climate change but we are saying that sea levels rise is happening and it is measurable. We de-coupled these two issues and they have been able to kind of defuse some of the people on the fringe that don't believe it and say a yard stick doesn't lie, we have been measuring it and here are the trends.

NS2: We changed the wetlands bylaw . . . It did deal with climate change but it also dealt with the shore line and the public views from-to the water, that was a big issue. Some of our yard requirements are very little and this would increase it so the idea was we would be opening up corridors or maintaining corridors to the water. . . . It came at that time when we were seeing an enormous amount of teardowns and bigger houses and additions on these big houses and it was kind of obliterating some areas—the views of the water that you always took for granted. So that, I think, that's what made it pass

Logically, the barrier this approach can address is public support and values, which is subsumed in the 'lever for action' category above. But apparently, it is also a way to circumvent limitations on resources. For SS3, for instance, the primary challenge was getting local support for change, while for the NS2 community, the planner reported staff time and money were the primary barriers.

Planning

There was one town that indicated an aspiration to prepare a CCA chapter in their new master plan, which is now underway. Several Cape Cod towns are undertaking new Multi-Hazard Mitigation plans, at the urging of their regional planning body which has been providing technical support and encouragement for including climate change projections in the plans' vulnerability analyses. As a result, several towns are addressing climate as part of hazard risk reduction. Even towns that had made no progress saw value in including CCA in their comprehensive or capital improvement plans:

NS3: This idea of including a chapter on adaptation I think is important, and, again, when we're talking about educating the public and the municipal officials, I think that's an important starting point, you know. Acknowledging first off that this may be something we're facing, I think is the obvious first step.

SS4: In order to get one dollar of public money to do anything [infrastructure], we have to have a plan, we have to educate the people about our plan, and we have to sell our plan.

No particular pattern of which towns might want a full planning process and which might not is evident. The one town that is including a CCA chapter in its new master plan listed staff time as their primary barrier. The planner for this town first successfully applied for grant money to pay for a sea level rise study to provide the technical knowledge needed, and then also successfully applied for state funding to pay for the new master plan, and rolled the CCA chapter in that rather than asking for it as a separate funding item. It appears that one advantage of the planning approach may be the ability to request resources for CCA, and to develop an accepted climate projection for use in guiding policy.

Mainstreaming

A second approach to bringing CCA into municipal operations is to avoid discussion with the public or formal planning processes, and instead focus on changing regulations and technical specifications and including future climate as a normal variable in municipal management decisions—i.e., mainstreaming CCA. In our interview towns this was the least common choice. One counter example was in a town where the planner was also, as a private citizen, the sewer commissioner:

CC5: We have a fresh water lens that floats on top of salt water and if you dig down far enough you hit salt water on Cape Cod even if you're a couple miles inland and fresh water floats on that. So as the sea level rises, the fresh water is going to rise too and a lot of septic systems and most of the cape is on septic systems are going to find that they don't work anymore because you need four feet of separation between the bottom of your leeching area and the ground water table and all of a sudden, aside

from being flooded out in any significant storm, [with SLR] the septic systems aren't going to work ... So we have thought about sea level rise on the sewer commission -- I'm the [sewer commission] chairman and not subject to (chuckle) management by anybody. ... So that's one area where we've thought about it.

More planners might choose this route, except that it had many challenges. Many of the regulations that they would seek to change are governed by Commonwealth laws or public works regulations, over which they have little control. Working with public works staff was noted in two cases to be a barrier rather than an enabler, as the staff evidenced hard-line resistance to any changes to address climate change. The laws they have control over (local zoning, setbacks, etc.) require public hearings to change, so that mainstreaming can only occur with strong public support. In addition, without having state or locally approved climate projections, it is difficult to know on what basis they could select CCA guidelines.

Connecting the Dots: Barriers and Approaches

CCA action in the communities I studied is at too early a phase for strong conclusions. But some connections between barriers and approaches nevertheless emerges. In the community with a strong planner who has the support of his elected official and a commitment to CCA, CCA is going forward by plan. In places where the planner is weak, has less support from elected officials or is less knowledgeable, CCA is going forward by stealth. And surprisingly, mainstreaming appeared to be the least popular and effective approach for these municipal planners, regardless of their situations.

Conclusions

One implication of this research is that the strong calls for mainstreaming that are evidenced in, for instance, ICLEI's conferences and other approaches, may itself have more barriers than other approaches. Clearly, while stealth may get small steps done, it cannot respond to major CCA challenges. This leaves planning, or mainstreaming, or some combination of the two. It appears to me that either there needs to be a revival of support for the adaptation plan, or there needs to be more attention given to the ground conditions necessary to make mainstreaming work.

At the time we did these interviews, I was struck by how disempowered many of the planners felt about their ability to address anything beyond the daily grind of their work. Climate change, with its uncertain science, long time horizon, and lack of public or elected official support and indeed, outright public hostility to the idea, could have been seen as a trendy, but relatively unimportant, issue in a fiscal environment of constantly doing more with less. After reviewing the transcripts, my response is less pessimistic. The planners were quite anxious to know what it was they should, or could, do, and just where to begin. Planners did not think that their city managers or elected officials would prevent them from doing the work, and in fact in multiple communities CCA action of some sort is occurring, whether by plan, by mainstreaming, or by stealth.

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