



Adapting to sea level rise: Emerging governance issues in the San Francisco Bay Region

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ARTICLE INFO

Keywords:

Sea-level rise
San Francisco Bay
Land-use conflict
Environmental governance
Wetland restoration
Local sea-level rise adaptation

ABSTRACT

San Francisco Bay, the largest estuary on the Pacific Coast of North America, is heavily encroached by a metropolitan region with over 7 million inhabitants. Urban development and infrastructure, much of which built over landfill and at the cost of former baylands, were placed at very low elevations. Sea level rise (SLR) poses a formidable challenge to these highly exposed urban areas and already stressed natural systems.

“Green”, or ecosystem-based, adaptation is already on the way around the Bay. Large scale wetland restoration projects have already been concluded, and further action now often requires articulation with the reinforcement of flood defense structures, given the level of urban encroachment. While levee setback, or removal, would provide greater environmental benefit, the need to protect urban areas and infrastructure has led to the trial of ingenious solutions for promoting wetland resilience while upgrading the level of protection provided by levees.

We analyzed the region’s environmental governance and planning structure, through direct observation, interviews with stakeholders, and study of planning documents and projects. We present two examples where actual implementation of SLR adaptation has led, or may lead to, the need to revise standards and practices or require uneasy choices between conflicting public interests.

Among the region’s stakeholders, there is an increasing awareness of the risks related to SLR, but the institutional arrangements are complex, and communication between the different public agencies/departments is not always as streamlined as it could be. Some agencies and departments need to adapt their procedures in order to remove institutional barriers to adaptation, but path dependence is an obstacle. There is evidence that more frank and regular communication between public actors is needed. It also emphasizes the benefits of a coordination of efforts and strategies, something that was eroded in the transition from central-government-led policies to a new paradigm of local-based adaptive governance.

1. Introduction

As many countries are adopting increasingly ambitious strategies to curb greenhouse gas emissions, implementation of climate-change adaptation measures is less consistent. Adapting to accelerated sea-level rise would seem an unavoidable imperative in the face of this most damaging impact of climate change (Wong et al., 2014; NRC, 2012; EEA, 2012; Church et al., 2008), but it is often addressed at a local scale with uneven results. Awareness of potential losses along exposed coastlines is increasing with publication of analyses depicting future inundation patterns and increased media coverage, especially following natural disasters (IPCC, 2012; Carey, 2011; Tollefson, 2012; Wenger,

2015), although the message is not always conveyed to the public in the most effective or compelling terms (Hulme, 2009). Most vulnerable shorelines still lack a coordinated effort in articulating overall adaptation strategies and their component site-specific interventions.

This paper results from a study of San Francisco Bay’s environmental governance framework as it faces the growing challenge of sea level rise. From examples identified through interviews with stakeholders and experts, we present two cases where conflicting public interests are testing the adaptive capacity of present institutional arrangements, and encouraging public agencies and local governments to revise their standards and practices, or revise the way they interact and communicate with each other.

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The Bay Area, having experienced extensive alteration of its shorelines, including widespread landfilling of wetlands and urban development over reclaimed lowlands, is now especially vulnerable to even moderate levels of sea level rise. As local, state, and federal agencies attempt to reconcile the need to defend low-lying urban development and wetland ecosystems from rising sea levels, the Bay Area is an early adapter of innovative non-structural flood management solutions. Building from a multi-decade experience in saltmarsh restoration (Williams and Faber, 2001), public institutions and environmental NGOs now experiment on how best to retrofit existing flood defense, protecting urban areas, while making accommodations to preserve existing ecosystems.

Our research focused on whether the existing regulatory instruments and institutional arrangements were able to be used in a multi-jurisdictional setting to effect change in protection design and, if corrections to current practices were necessary, whether the institutions were receptive of adjustments so as to facilitate the implementation of innovative adaptive solutions.

1.1. Complexity of local adaptation

Local adaptation lends itself to new challenges, posed by the specificities of local government/governance and the presence of multiple private actors and interest groups. Environmental policies adopted at a national scale must typically be implemented at the local level by multiple regional and municipal agencies. In what has been described as the “implementation dilemma”, many national policies must be implemented by state and local governments, who have different motivations and constraints than the national government (Kondolf and Lopez-Llompert, 2018, May 1984). Therefore, the success of implementation depends not only on the strength of the national commitment, but also local governance (Douglas, 2014). The impacts of climate change are “displaced across scales and do not adhere to conventional governance boundaries” (Steele et al., 2014), and alternative solutions for climate adaptation in urban contexts are often expensive, affect the rights of private property owners, may require major changes to existing planning systems, and constrain future property development options (Bulkeley, 2013).

This increased complexity is made all the more difficult to address because of the limited resources local governments often have at their disposal. Past decisions made by local governments now earmark significant portions of their budgets to the maintenance of aging infrastructure and constrain alternative investment options, and “path dependence” makes institutions reluctant to change past ways of doing business, even in face of new requirements such as the need to articulate multiple scales and an ever-increasing number of actors and interest groups (Matthews et al., 2015).

Within the modern “sanitary city”, each of the “specializations – sanitation, street services, planning – works in a bounded realm informed by specialized competences siloed into departments and agencies” (Pincetl, 2010: 46). Because of their “centralized, rigid infrastructures, many sanitary cities exhibit limited capacity to accommodate sustainable adaptations and practices” (Childers et al., 2014). Thus, it can be difficult to work across specializations and establish the new governance platforms required to coordinate the definition and implementation of adaptation solutions.

1.2. The expanded role of local governance

This should not be dissociated from an expanded role of local governments and, especially, local governance/collaboration platforms, often including several local actors, ranging from interest groups to environmental NGOs and individual citizens. In the past, deterministic political decisions from centralized government institutions were perceived as “the appropriate, legitimate and unchallenged vehicle for social change, equality and economic development (...) responsible for

environmental protection” (Pincetl, 2010), a role that came into question as social movements addressed the lack of accountability and transparency of that model (Graham and Marvin, 2001). Regional or local governance has taken up a big part of the role formerly performed by centralized government agencies. Governance can be led by government or regional public agencies, as they hold a coordinating role and should be able to balance competing interests (Pierre and Peters, 2000). The significance of having a leading agency coordinating efforts has to translate into granting that agency with enough resources (financial, human, legal) and a clear vision to effectively conduct its role, which is frequently not the case (May 1984).

While the increasingly collaborative decision-making process is certainly beneficial in terms of the transparency of planning efforts and budget decisions, we highlight a few issues that may remain undervalued, but have been identified by other authors: non-profits are often treated as proxies for residents’ interests where that may not always be the case (Pincetl, 2010), leading to a further disenfranchisement of the local community; private interest groups may exert an undue influence over the outcome of the process through a disproportionate capacity for lobbying and litigation and, under the veil of neutrality, “elevate the concerns of powerful actors over others” (Ciplet and Timmons Roberts, 2017); and the outcome of consensus-seeking in collaborative decision-making may in some cases result in a “least common denominator” type of solution that, while acceptable to all parties, may fail to address the issue at hand (Hanemann and Dyckman, 2009).

In the present paper we focus on emerging conflicts among public agencies and governments, as they each pursue their public mandates. Most conflicting perspectives fall short of escalating from an “emerging conflict” to a “manifest conflict”, which may not always be the case in other territorial contexts (Almeida et al., 2017) or when private actors are involved (Hanemann and Dyckman, 2009). Entrenched positions may be related to the relocation of uses, limits to future property and building rights, or the allocation of resources (economic or otherwise), which are prone to generate “intractable environmental conflicts” (Campbell and Marshall, 2003; Gray, 2003; Almeida, 2013). Elsewhere (Pinto, 2015), we contrast these *public vs. public* with *public vs. private* conflicts occurring in the San Francisco Bay, where intractable conflicts and entrenched positions appear to be already expressing themselves.

In the case of the United States (Svensson, 2008) and, more specifically, California, the added complexity of the legal and institutional arrangements surrounding adaptation and local planning makes for a puzzle of overlapping jurisdictions and often unclear mandates (Fulton and Shigley, 2012).

1.3. Environmental governance in the San Francisco Bay

The San Francisco Bay (Fig. 1) and its shorelines are managed through a particularly complex governance structure, involving three federal agencies (Environmental Protection Agency, Army Corps of Engineers, and US Fish & Wildlife), four state agencies (Bay Conservation and Development Commission, Water Quality Control Board, California Coastal Conservancy, and California Dept. of Fish & Wildlife) and well over 100 local governments and special districts (Fig. 2).

Just along the southern shoreline of the bay (where our cases are located) jurisdiction is split among 4 counties (San Francisco, San Mateo, Santa Clara and Alameda), 22 cities, 3 unincorporated territories, 3 flood control districts, and a multitude of city departments and special districts dealing with flood control, floodplain management, city planning, and infrastructure maintenance.

Adaptation and planning efforts are hindered by the existing “silos” or “stovepipes” resulting from narrow agency mandates, and the multiplication of single-purpose partnerships. Poor communication and lack of articulation of efforts among agencies may lead to a duplication of efforts and loss of efficiency (Fulton and Shigley, 2012).

Analyzing specific cases where local adaptation to sea level rise is already underway, may provide good insights into the potential

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