

Regional Flood Hazard Mitigation

Literature Review

Addressing flooding at a regional level is critical. According to NJDEP, “Stormwater challenges are regional in nature and require regional solutions” (NJDEP BFR, 2019). The National Academies of Science, Engineering, and Medicine concur, saying, “Actions to shape flooding in one location can have impacts on flood stages (i.e., flood risk scenarios) at other locations...” (NRCNA, 2013). On issues of hazard mitigation, the National Association of Counties recommend, “Look at the watershed as a whole. You do not want the mitigation work you do in one area of the county to negatively affect another area downstream” (NAC, 2017).

Though critical, coordination across a watershed to address a variety of flood and flood-related hazards is difficult (Andrea et al., 2018). Three challenges in managing watersheds to mitigate hazards are communicating the risks from hazards with accuracy, in language that the audience can understand, and in a way that fosters transdisciplinary and transboundary communication and trust (Andrea et al., 2018).

In a study of river basins around the world, researchers found common challenges among water managers in Africa, Asia, South America, and Australia. These common challenges are “cooperation, trust-building mechanisms and political will; stakeholder engagement; reliable data and monitoring; cooperative benefits; and flexibility between multiple uses in water allocations” (Eriksson et al., 2015). Among the top constraints are political will and time. In regard to political will, governments must be willing to cooperate, and benefits should be mutual but fair. In regard to time, both creating a trusting relationship among governments and implementing policy takes time. Other lessons in transboundary watershed cooperation from this study include the importance of regional agreements, the utility of river basin organizations as a setting for cooperation, the importance of community and stakeholder engagement, establishing long-term funding for accessible data collection and application, and the importance of incentivizing participation in regional actions by catering to communities’ interests and sense of fairness (Eriksson et al., 2015).

In addition to the challenge of transboundary coordination on multi-hazard mitigation is the integration of climate policies. Climate change is expected to affect New Jersey watersheds through increased extreme heat events (which could strain drinking water supply), increased heavy rainfall events, increased length of droughts, and increased extent of flood events (Broccoli, 2019; UCS, 2017). Federal Emergency and Management Agency (FEMA) issued a statement in 2011 urging government entities to integrate climate adaptation strategies into their plans (Hu et al., 2018). According to FEMA, “the size of the nation’s floodplains will grow between 40 and 45 percent over the next 90 years and double the number of needed flood policies by the end of the century,” thus necessitating that FEMA account for climate impacts in flood mapping (NRCNA, 2013).

A comprehensive review of state hazard mitigation plans in every state in the United States found, unsurprisingly, great variation in how states integrate climate science and policy into their state hazard mitigation plans. How well the state integrated climate change into their plans was measured by how well the state communicated climate science and its relation to natural hazards (“awareness”), how well the state “measures the impacts of climate change on hazards, vulnerability, risks, and costs of disasters from environment, social, and economic perspectives” (“assessment”), and how well the states

“evaluate strategies for building adaptive capacity to reduce climate risks” (“action”) (Hu et al., 2018). New Jersey was above average in its integration of climate policies, but still not at the top (Hu et al., 2018).

Precedents

The following are some of the actions that were previously taken or are currently being taken by the State of New Jersey to take regional action on flood mitigation:

- **Resilient NJ** – New Jersey Department of Environment Protection (NJDEP) is working on an initiative called Resilient NJ, with the purpose of soliciting talented engineers, scientists, and planners to tackle regional flooding issues in different parts of New Jersey. Currently, teams are tackling Jersey City and a few municipalities in Middlesex County (NJDEP OCLUP, 2019).
- **Meadowlands, NJ** – “New Jersey has received National Disaster Resilience (NDR) funding from U.S. Department of Housing and Urban Development's (HUD) for resilient housing and infrastructure projects in the wake of major disasters, such as Hurricane Sandy. Administered by the NJDEP, these funds are being utilized to develop a regional stormwater infrastructure toolkit, which will be piloted in five municipalities within the Meadowlands region of Bergen County: Carlstadt, Moonachie, South Hackensack, Teterboro, and Little Ferry” (NJDEP BFR, 2019).
- **DRBC Hazard Mitigation Plan** – In 2006, the governors of the four states in the Delaware River Basin Commission (DRBC) co-signed a statement saying, “...we believe that through coordinated effort on a regional basis, we can do more to reduce flood loss within the Basin than we could accomplish acting separately, on our own. The DRBC is the obvious vehicle for developing flood loss reduction and flood mitigation plans that cannot be accomplished created the Interstate Flood Mitigation Task Force (DRBC, 2016). In that same year, a FEMA grant enabled NJDEP, New Jersey Office of Emergency Management (NJOEM), and DRBC to create a Multi-Jurisdictional Flood Mitigation Plan for the Non-Tidal NJ Section of the Delaware River Basin. Municipalities in Hunterdon, Mercer, Sussex, and Warren counties that experienced flooding along the Delaware River were analyzed as a part of this 2008 FEMA-approved plan. A Draft Feasibility Statement by the United States Army Corps of Engineers (USACE) from 2015 was found related to this region (DRBC, 2016).

Case Studies

The following are case studies in how other regions across the United States have collaborated on regional and watershed-based hazard preparedness, mitigation, and response strategies:

- **Central Valley Flood Protection Plan:** (June 2012)- “This plan promotes integrated, systemwide wise flood management, a key implication of which is that flood management investments (e.g., levees) will not result in an increased risk of flooding in other areas” (NRCNA, 2013).
- **Iowa:** The Iowa Flood Center (IFC), at the IIHR-Hydroscience & Engineering at the University of Iowa created a flood map for the whole state. Water management authorities (WMAs) in Iowa pool resources among local government entities and other stakeholders in a watershed (Weber et al., 2018).

- **Illinois**: The Illinois Rapid Assistance Flood Team (RAFT) allows Certified Floodplain Managers (CFM) to contact the Illinois Association for Floodplain and Stormwater Management (IASFM) during an emergency or disaster to call for volunteer CFMs from other communities for rapid assistance (FEMA, 2018).
- **Milwaukee, WI**: The Milwaukee Metropolitan Sewerage District Resilience Plan calls for the creation of a regional resource center (Frank, 2019).

The following are best practices for integrating climate science and policy into hazard mitigation plans:

- **Baltimore, MD**: *Beyond the Basics* deemed Baltimore a best practice in its Capability Assessment as Baltimore's 2013 HMP principles were clearly integrated into other comprehensive plans in the city, including the city's Climate Change Adaptation Plan. Climate science was also integrated into Baltimore's hazard profiles and migration actions, communicated climate science effectively through graphics, and reiterates climate change mitigation and adaptation goals outlined in Baltimore's 2012 Climate Action Plan (CHC et al., n.d.).
- **Barnstable County, MA**: "Barnstable County's plan includes extensive data on possible hazardous effects of climate change in the US in graphical and descriptive forms (CHC et al., n.d.).
- **Brunswick County, NC**: "Brunswick County went above and beyond the standard and required that identified critical facilities be protected at least two feet about the 500 year elevation level." (CHC et al., n.d.).
- **Lewes, DE**: "Lewes is one of few municipalities that completely integrated its Hazard Mitigation Plan and Climate Change Adaptation Policy." (CHC et al., n.d.).
- **San Francisco, CA**: San Francisco's plan included a map that identified populations especially vulnerable to extreme heat events." (CHC et al., n.d.).

Resources

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