

A Watershed Approach to Flood Mitigation in the Raritan River Watershed

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Motivating Research Questions

This study examines the flood mitigation plans of the seven counties of the Raritan River watershed to better understand local government flood mitigation planning in the region. It examines how county agencies analyze flood risks and mitigation strategies at the watershed level, the challenges that hazard mitigation planners face when thinking and acting at the watershed scale, as well as the challenges that come with preparing for future conditions.

Introduction

Hazard mitigation is simply taking action before a natural hazard occurs to lessen the negative effects of the hazard on people, property, and the economy. A **Hazard Mitigation Plan** lays out how a government intends to take action to prepare for hazard events, including flooding (University of North Carolina Chapel Hill and Texas A&M University, n.d.). By federal law, local governments must create Hazard Mitigation Plans, to be reviewed and approved by FEMA, before their community can receive federal funding for hazard mitigation and disaster recovery (Frazier, Walker, Kumari, and Thompson, 2013).

Ninety-eight municipalities and seven counties control land within the Raritan River watershed boundaries (Malone, Lathrop, Pyshnik, Blum, Whyllaw & Bognar, 2018). These seven counties have what are called multi-jurisdictional Hazard Mitigation Plans, meaning that the county plan is then adopted by its municipalities and thus meets the federal mandate for that municipality (University of North Carolina Chapel Hill and Texas A&M University, n.d.). Thus, when analyzing flood mitigation policy across the watershed, approximately seven rather than ninety-eight separate plans apply.

Still, within one watershed there are multiple government entities with jurisdiction. This requires local governments to collaborate with one another to face challenges across the watershed.

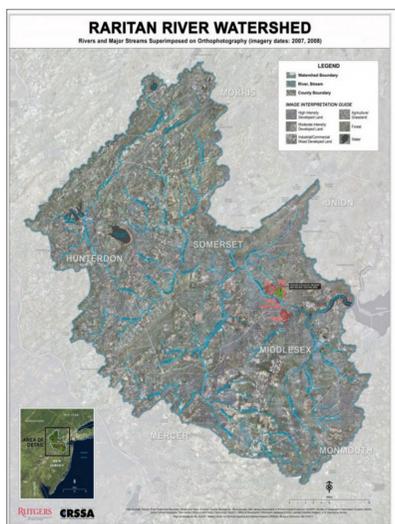


Figure 1. Raritan River Watershed (Rutgers, n.d.)

Table 1. Counties in the Raritan River Watershed

County	Number of Municipalities in the Watershed
Hunterdon County	19
Mercer County	9
Middlesex County	23
Monmouth County	7
Morris County	10
Somerset County	21
Union County	9

(Malone et al., 2018)

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Future Challenges to the Watershed

Climate change is expected to affect New Jersey watersheds through increased severity of major rainfall events (Broccoli, 2019). Flooding will likely be exacerbated in the watershed due to:

- increased impervious surface cover
- decreased of riparian areas
- increased pressure on streams and underperforming stormwater infrastructure (Malone et al., 2018; Frazer, 2005).

Creating flood policies that account for these future conditions are thus critical to adapting to a changing and increasingly dangerous environment.

Methodology

This study is being completed in two parts. The first part was an analysis of the Hazard Mitigation Plan Updates of the seven counties of the Raritan River watershed. The second part of this study will be a series of interviews with local public servants to supplement the information found in the Hazard Mitigation Plans.

Initial Findings

A review of the Hazard Mitigation Plans Updates has shown some cross-county collaboration. Counties coordinated with their counterparts as a means of stakeholder engagement during the planning process and in the plan review process. A number of multi-jurisdictional flood control commissions exist in the watershed:

- Green Brook Flood Control Commission
- South Central Middlesex County Flood Control Commission
- Raritan & Millstone Rivers Flood Control Commission

That said, the following constraints may hinder inter-county cooperation in basin-wide planning:

- Willingness to Collaborate
- Limits of Regulatory Authority
- Access to Scientific and Technical Information

The greatest challenge to effective hazard mitigation is the lack of direct authority, as municipalities, not the counties, have the legal authority in New Jersey to implement hazard mitigation actions through land use ordinances (Middlesex County OEM, 2015; Tetra Tech, 2016a; Tetra Tech, 2016b.; URS, 2014; Tetra Tech, 2015; Somerset County MPC, 2018; Union County Office of Emergency Management, 2016; Municipal Land Use Law (MLUL).

Case Study

FEMA recognizes both flood-only and multi-hazard plans; however, flood-only mitigation plans only authorize local governments to receive flood mitigation assistance but not funding applicable to all hazards (FEMA, 2011). In 2006, DRBC, along with NJDEP and NJOEM, created a Multi-Jurisdictional Flood Mitigation Plan for the Non-Tidal NJ Section of the Delaware River Basin. FEMA approved this plan in 2008 (DRBC, 2016). The DRBC plan sought to "meet the flood mitigation plan requirements of each municipality," but "also employ a watershed management approach to ensure that final mitigation actions address both local jurisdictional needs and regional multi-jurisdictional needs" (DRBC, 2008).

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Initial Policy Recommendations

A similar plan to the DRBC 2008 plan could be created for the Raritan River watershed. However, coordination on the scale of the entire watershed may be unruly due to the large area analyzed, the number of jurisdictions involved, and the demographic and geographic diversity across the watershed (Malone et al., 2018; United States Census Bureau, n.d.). I would recommend that the counties and municipalities of the three watershed management areas create a separate, regional flood mitigation plan around their respective WMA.

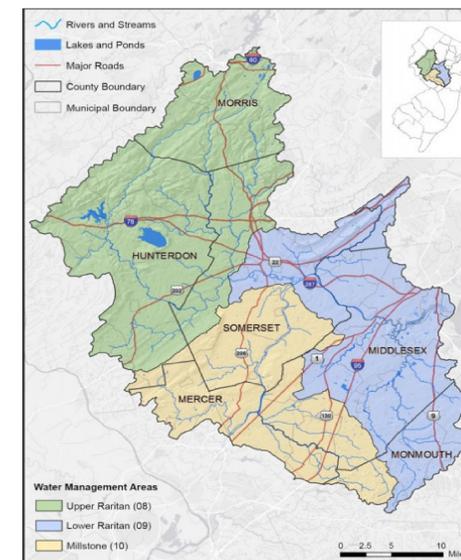


Figure 2. Raritan River Watershed by WMA (Giri, Krasnuk, Lathrop, Malone, and Herb, 2016)

Although WMA are not a regulatory body, working at this scale would:

- (1) Create a forum for cross-jurisdictional communication and coordination
- (2) Allow participating jurisdictions access to FEMA flood mitigation funding
- (3) Integrate scientific and technical analysis from the State of the Raritan River reports
- (4) Allow for the integration of WMA-based nonprofits as stakeholders in the process
- (5) Match the geographic scales of flood control and water quality control for a holistic, watershed-based approach to water-related issues

(FEMA, 2011; Malone et al., 2018; Weber, Muste, Bradley, Amado, Demir, Drake, ...and Thomas, 2018; Rutgers, n.d.; Malone, 2015a, Malone, 2015b, Malone, 2015c).

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