



Flood Response: Policy and Resilience in Action

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Introduction

After exploring technology solutions in the US Ignite blog, this document highlights both policies and best practices that work and real-world examples of municipalities that have successfully integrated advanced tools, forward-thinking regulations, and community-driven planning into their flood resilience strategies.

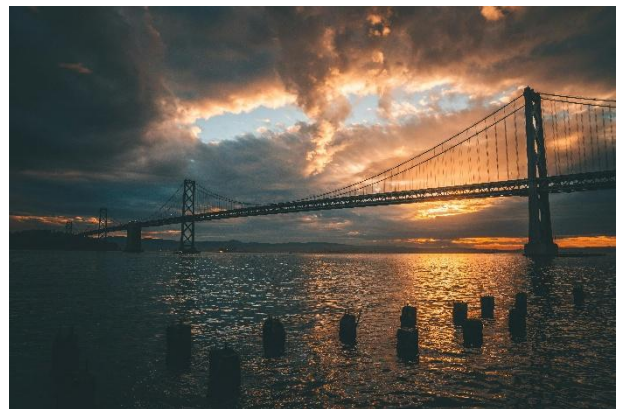
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Real-World Success in Flood Resilience Across the U.S.

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San Francisco, CA

Rising sea levels and heavy rainstorms make flood management a critical priority for San Francisco. Recognizing its vulnerabilities to sea-level rise, heavy rainfall, and potential flooding, the city has adopted new mapping systems to create precise flood risk models. These systems use real-time data to forecast which areas are most at risk, allowing city planners to ensure resources are allocated effectively. San Francisco has also implemented smart infrastructure programs that address urbanization with initiatives like rain gardens to absorb stormwater runoff and permeable paving.



Moreover, San Francisco is actively working to enhance the floodplain of the Sacramento River by restoring its natural ecosystems, specifically in a large wildlife area known as the Yolo Bypass. Projects include wetland reconstruction, native vegetation planting, and habitat restoration for migratory species. The restored bypass not only prevents flooding in nearby urban areas but also provides critical ecological benefits, creating a diverse habitat for fish and birds.

San Francisco has also enacted progressive zoning laws that require flood-resistant features like elevated structures and on-site water retention systems in new developments, especially in high-risk areas. The city regularly engages these neighborhoods in its flood mitigation initiatives

through multilingual workshops and educational programs that help residents understand flood risks and participate in shaping local solutions.

Norfolk, VA



Situated in the low-lying Hampton Roads region, Norfolk faces rising sea levels more than double the global average. High tides, hurricanes, and heavy rains result in frequent floods. Like San Francisco, Norfolk has adopted AI-driven scenario modeling, which allows city planners to simulate future flooding scenarios under conditions like storm surges or precipitation extremes. Their mapping features numerous detailed flood maps that are readily accessible to the public. In addition, as part of their Coastal Storm Risk Management Project, the city has also integrated smart infrastructure solutions, such as sensor-equipped drainage systems and adaptable levees, which can dynamically respond to changing water levels in real-time. These technologies work together to improve the efficiency and effectiveness of Norfolk's flood mitigation strategies.

Norfolk also implemented zoning laws that restrict development in high-risk zones and require flood mitigation features such as elevated building designs in new construction projects. Their comprehensive flood mitigation plan recognizes their critical location and aims to educate the community through workshops and councils. Moreover, Norfolk's Vision 2100 plan consists of long-term strategies that position it as a "dynamic, water-based community" as the sea level rises.

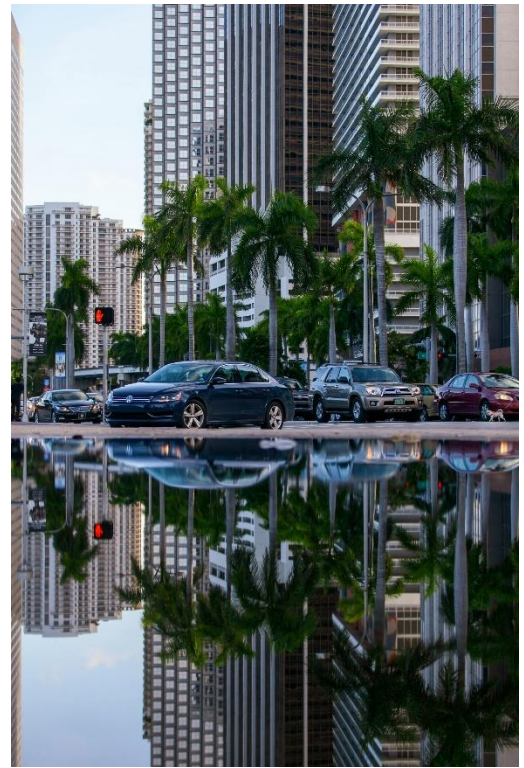
Miami, FL

Miami is a city widely recognized for its vulnerability to sea-level rise and frequent flooding resulting from tropical storms, hurricanes, king tides, and rainfall. Despite it all, Miami has emerged as a leader in innovative flood resilience planning through the integration of advanced technology and comprehensive policies.

The greater Miami region spans dozens of municipalities, unincorporated areas, and several counties, which have contributed to the creation of highly comprehensive flood zone maps. These flood zone maps are primarily used for understanding risks and insurance needs by the community. Additionally, after a disaster, Miami uses drones to identify damage from storms and flooding, even providing emergency supplies in specific scenarios.

Miami's Smart City programs heavily invest in flood control systems, artificial reefs to weaken waves, and grants for projects that manage stormwater and sea-level rise. Moreover, Miami is also investing in restoration projects that blend natural and engineered systems to restore its mangrove trees. Mangrove trees serve as a significant absorber of carbon dioxide and protect shorelines from flooding with sturdy trunks and roots that act as sponges, absorbing storm surges, slowing erosion, and providing critical buffers against rising waters.

The city has implemented zoning laws that mandate flood-resilient construction practices, such as elevated buildings, stormwater retention systems, and the use of water-resistant materials. Developers are incentivized with tax benefits and expedited permitting to encourage widespread adoption of flood mitigation strategies. Recognizing the disproportionate impact flooding has on low-income communities, Miami has also adopted policies to retrofit homes in vulnerable areas so that they can withstand flooding, as well as to provide tailored assistance for residents displaced by storm damage.



Key Takeaways for Cities to Consider

Flood resilience is achievable when cities approach it as an ongoing, integrated effort. Three priorities emerge for communities seeking to strengthen their defenses against flooding:

1. **Harness Technology for Prediction and Response:** Investments in tools such as AI-powered mapping, real-time monitoring systems, and drones can dramatically improve a city's ability to anticipate floods, coordinate responses, and protect vulnerable populations.
2. **Adopt and Enforce Forward-Looking Policies:** Zoning laws, building codes, and development incentives must reflect modern flood risks, incorporating climate projections and promoting resilient infrastructure. Policies should ensure consistency across jurisdictions and take precautions so that all communities benefit equally.
3. **Preserve and Restore Natural Defenses:** Wetlands, floodplains, mangroves, and other natural systems are irreplaceable in slowing runoff, absorbing storm surges, and reducing damage. Pairing these nature-based solutions with engineered infrastructure creates more comprehensive protection.



Policies and Best Practices for Flood Resilience in Cities

Texas is just one of the many states that have a significant need for improved flood mitigation policies. While technology can provide powerful tools for prediction and response, the importance of relevant policies and resilient planning cannot be overstated. Here is what future policies should take into consideration regarding flooding:

Zoning Regulations and Land Development

Zoning policies are one of the most critical tools in flood mitigation, as they dictate where and how land can be developed. In Texas, improper zoning designations and insufficient laws contribute to flood risks, allowing construction in floodplains and other vulnerable areas.

One of the areas most affected during the July 2025 floods was Camp Mystic. The Federal Emergency Management Agency (FEMA) previously designated it as a special flood hazard area due to its location on the floodplains. However, Camp Mystic owners requested an exemption from this designation, and FEMA exempted it. A 2017 study revealed that 90% of exemption requests were successful due to a lack of resources and detailed flood maps of certain zones. Camp Mystic, along with many other exempted structures in the area, was in one of these less-detailed zones. The exemption likely contributed to a false sense of security and lesser preparations.

Zoning regulations should restrict development in high-risk areas and be complemented by policies that create detailed local maps to support FEMA's flood risk estimates. Updated floodplain maps should incorporate climate change and future weather projections.

Future land development policies should also prioritize flood-resilient practices, especially in regions with a high risk of flooding. For example, Portland offers green infrastructure incentives that align with flood-resilient practices. Under Portland's Percent for Green program, developers who implement stormwater management systems, like green roofs and rain gardens, to reduce urban runoff, are eligible for funding support. Additionally, the city provides discounts on stormwater utility fees for properties that include natural stormwater management systems or retain a portion of excessive stormwater onsite.

For best results, zoning and land development policies should be coordinated between jurisdictions to provide a unified flood risk management approach.

Whole Community Planning and Equity in Flood Mitigation

Flooding does not impact all communities equally. Historically, flooding events disproportionately impact low-income populations both in the immediate aftermath and in the long term. Due to historic patterns of urban development, lower housing costs, or a lack of enforcement of zoning laws, these communities may be located in flood-prone areas. Moreover, the homes there may be older, less maintained, or not built to withstand the impacts of flooding, leaving residents with higher rates of property damage and displacement.

Hurricane Katrina highlighted this phenomenon as the flooding disproportionately affected predominantly Black neighborhoods, which were located closer to the water and below sea level. The lack of resources for recovery and reconstruction exacerbated the challenge. It is critical to reflect on the lessons of Katrina and prioritize planning that considers every single neighbor, whole community planning.



Meaningful community engagement lies at the center of whole community planning. Participatory planning practices such as community workshops, town hall meetings, neighborhood advisory councils, and the inclusion of underrepresented groups in planning committees can help policymakers gain a better understanding of the region and improve community relations. Effective planning identifies not only the risks but also the resources and resilience already present in the community, and involving residents from the wider community

ensures that they feel actively engaged in improving their neighborhoods.

Environmental Sustainability and Natural Resiliency

Policies that favor nature-based solutions should be considered in flood prevention. Wetlands, forests, and rivers function as natural buffers, absorbing excess rainfall and slowing water runoff. Projects that focus on preserving and restoring natural systems could reverse the negative environmental impacts of land development. Over the years, Texas has lost significant portions of its wetlands and other natural ecosystems due to urban growth and agricultural activities, exacerbating flooding risks in many areas. River and wetland restoration projects can reverse decades of damage by reintroducing natural barriers to flooding, replacing concrete man-made structures with natural water channels. Simultaneously, reforestation and urban greening initiatives create vegetative buffers that prevent soil erosion, a significant factor.

Building a More Resilient Future with Relevant Policies

Addressing flood risks requires a comprehensive, multi-faceted approach that combines policy reform with innovative practices. By revising zoning policies, fostering resilient modern infrastructure, and investing in environmental preservation, cities can create a strong foundation for flood resilience.

Combining innovative technology, proactive policy, and environmental stewardship can help cities move beyond reactive measures and toward long-term resilience. The US Ignite Communities team is ready to help any community leader interested in diving deeper on flood preparedness or other infrastructure planning topics. Send a message with your questions, comments, and thoughts to communities@us-ignite.org.

Works Consulted

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CBS News: <https://www.cbsnews.com/news/maps-texas-flash-flooding-camp-mystic/>

Houston Chronicle: <https://www.houstonchronicle.com/projects/2025/kerr-county-floods-camp-mystic-fema-maps/>

City of Portland: <https://www.portland.gov/bes/grants-incentives/percent-green>

California Department of Fish and Wildlife: <https://wildlife.ca.gov/Lands/Places-to-Visit/Yolo-Bypass-WA>

National Weather Service: <https://www.weather.gov/mob/katrina>

FEMA: <https://www.fema.gov/>

Brookings Institution: <https://www.brookings.edu/research/fixing-hurricane-katrina>

NAACP: <https://naacp.org/>

Nature Conservancy: <https://www.nature.org/>

Association of State Floodplain Managers: <https://www.floods.org/>

National Institute of Building Sciences: <https://www.nibs.org/>

Policies and Best Practices for Flood Resilience in Cities

USGS: <https://www.usgs.gov/news/state-news-release/new-tool-informs-flooding-and-sea-level-rise-solutions-san-francisco-bay>

City of San Francisco: <https://www.sfpuc.gov/programs/san-franciscos-urban-watersheds/what-green-infrastructure>

City of Norfolk: <https://www.norfolk.gov/1949/Flood-Zones>, <https://www.resilientnorfolk.com/>

Adaptation Clearinghouse: <https://www.adaptationclearinghouse.org/resources/norfolk-vision-2100.html>

Executivegov: <https://www.executivegov.com/articles/norfolk-naval-shipyard-uses-drones-to-support-disaster-recovery>

Chesapeake Bay magazine: <https://www.chesapeakebaymagazine.com/norfolk-plans-16-ft-high-floodwall-stirring-controversy/>

NOAA: <https://oceanservice.noaa.gov/facts/kingtide.html>

Miami-Dade County: <https://www.miamidade.gov/global/economy/resilience/sea-level-rise-flooding.page>, <https://www.miamidade.gov/environment/flood-maps.asp>, <https://www.miamidade.gov/environment/flood-protection.asp>

ZAG Daily: <https://zagdaily.com/zag-air/orca-drones-to-be-used-for-disaster-relief-in-florida-and-puerto-rico/>

Miami Local: <https://miamilocal.com/miami-smart-city-transformation-2025/>

Ocean (Smithsonian): <https://ocean.si.edu/ocean-life/plants-algae/miami-connects-art-and-mangrove-restoration>