GEORGETOWN CLIMATE CENTER

Local Ordinances for Climate Adaptation & Mitigation | Oct. 2025

Local Ordinances to Exceed Minimum Floodplain Standards

The Opportunity

Over the past 50 years, scientists have observed a significant surge in climate and weather-related disasters due to climate change, including rising coastal sea levels and increased intensity of storm surges and precipitation. Each year, flooding from storms becomes more frequent and severe. As the climate continues to change, so will the intensity of storms and their impacts to riverine and coastal communities. With each new catastrophic flooding event, people are displaced, insurance prices rise,[1] municipal bond ratings fall,[2] infrastructure is

[1] *Can FEMA and Flood Insurance Keep Up with the Rising Tide of Risks?*, U.S. Government Accountability Office (Nov. 12, 2024) https://www.gao.gov/blog/can-fema-and-flood-insurance-keep-rising-tide-risks.

[2] Cindy Zhang, *Climate Change and Municipal Bond Ratings*, Massachusetts Institute of Technology (May 2024) https://dspace.mit.edu/handle/1721.1/156037; Camilo Sarmiento & Ted R. Miller, *Costs and Consequences of Flooding and the Impact of the National Flood Insurance Program*, American Institutes

less able to withstand the damage.[3] Preventing more development in areas at risk of consistent flooding will help coastal and riverine communities save money and lives. States and localities can steer construction away from flood-prone areas with forward-thinking floodplain ordinances.

Historically, responsibility for large-scale hazard mitigation has primarily sat at the federal level with the Federal Emergency Management Agency (FEMA) funding and providing capacity for adaptation projects. However, in the current political climate, responsibility for hazard mitigation is falling to states and localities due to federal actions[4]. Federal flood management standards have been revoked.[5] Hazard mitigation grants are being paused or eliminated.[6] Disaster declarations are being denied.[7] All of this is happening at a time when floods are becoming more damaging, often taking place while a community is recovering from a previous disaster. Local communities need to begin looking outside the federal programs to mitigate flood risk. It is now more important than ever that localities use their authority to establish floodplain ordinances tailored to their local conditions. The first step to mitigating this risk is to understand and quantify it.

Protecting communities from dangerous flooding requires adjusting a community's understanding of its flood risk and development and zoning policies to take climate change impacts into account. Flood maps, required for communities participating in the National Flood

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for Research (Oct. 2006)
https://biotech.law.lsu.edu/disasters/insurance/nfip_eval_costs_and_consequences.pdf.

[3] *America's aging flood control infrastructure is failing – federal funding is coming, but too often new construction relies on old data*, The Conversation (May 10, 2023)
https://theconversation.com/americas-aging-flood-control-infrastructure-is-failing-federal-funding-is-coming-but-too-often-new-construction-relies-on-old-data-204237.

[4] *Achieving Efficiency Through State and Local Preparedness,* The White House (Mar. 18, 2025)
https://www.whitehouse.gov/presidential-actions/2025/03/achieving-efficiency-through-state-and-local-preparedness/.

[5] Harvard Law School, Environmental & Energy Law Program, *President Trump, FEMA Terminated Funding Programs to Address Vulnerable Communities' Disaster Risk* (2025)
https://eelp.law.harvard.edu/tracker/fema-issued-new-building-resilient-infrastructure-and-communities-bric-policy/.

[6] Will Curran-Groome, Andrew Rumbach, & Sara McTarnaghan, *FEMA Is Eliminating Hazard Mitigation Programs, Leaving Americans Nationwide at Risk as Disasters Worsen*, Uban Wire (Apr. 18, 2025)
https://www.urban.org/urban-wire/fema-eliminating-hazard-mitigation-programs-leaving-americans-nationwide-risk-disasters.

[7] Cassandra Stephenson, Phillip Powell, Lucas Dufalla, & Illan Ireland, *Uncertainty about federal disaster aid looms as storms roll in*, Stateline (May 26, 2025)
https://stateline.org/2025/05/26/uncertainty-about-federal-disaster-aid-looms-as-storms-roll-in/.

Insurance Program (NFIP), are a fundamental tool to assess and plan for flood risk. Knowing what areas are at risk of inundation allows localities to protect people and property already in harm's way, and slow future risky development. This knowledge is also important for communicating risk to property owners who may or may not be aware that they reside in a hazardous flood zone.

Having good, up to date maps is a prerequisite for the recommendations posed here. Floodplain maps outline the geographic area(s) that would flood during different types of storms. Standard flood maps detail the required 100-year floodplain, the area that has a 1% chance of flooding in any given year. It is possible for maps to cover a greater area of risk (like the 500-, 750-, and 1000-year floodplains, or the areas that would be covered by water during a flood that has a 0.2 percent, 0.13 percent, or 0.1 percent chance of happening in any given year, respectively) but it is unusual for communities to go beyond the 100-year floodplain, because a larger regulated zone means more people and businesses subject to regulations, and the costs that come with compliance. Overall, maps help communities understand where water will rise, what homes will and will not be impacted by flooding, and how sea-level rise will change flood conditions.

Communities can develop and update flood maps in a few ways — through the federal government, statewide mapping, local-level mapping (if they have the resources), or by partnering with other adjacent communities. It is most common to use maps from the NFIP, which is managed and administered by FEMA. NFIP's Flood Insurance Rate Maps (FIRMs) characterize flood risk, set minimum floodplain standards, and determine eligibility for the National Flood Insurance Program. The NFIP was established in 1968 to provide two services to the public: (1) federally backed flood insurance to properties with significant flood risk; and (2) methods to reduce flood risk through the adoption of floodplain management standards. If a community wishes to participate in the NFIP, they are required to use a FIRM. Unfortunately, FEMA flood maps are largely out of date, take years to update, and are updated on a priority basis (i.e., maps that are the most out of date are updated first). This means that local communities must strategize about how to protect themselves from flooding in the meantime.

However, FEMA is required to review community flood maps every five years, and communities can request map updates through the Cooperating Technical Partners program or other revision processes. When communities are undertaking these standard required mapping updates, we recommend they include the 500-year floodplain in their revised maps and adopt ordinances that establish regulatory standards for this expanded area.

Municipalities can invest in their own floodplain mapping, or use currently available FIRMs to enact more protective floodplain standards. Regarding the first strategy, local flood mapping can be prohibitively expensive and time consuming (it can cost thousands of dollars to map one section of the coast[8]), so it is only realistic if initiated at the state level, by large counties or municipalities with sufficient revenue and resources,[9] or by a conglomerate of smaller cities. FEMA offers a limited number of grants[10] for local mapping initiatives. Nevertheless, accurate maps are critical to managing flood risk, and an initial sizeable investment could result in significant long-term cost savings considering flooding events can cost millions, sometimes billions, in damages. Since updating maps may be financially or politically unfeasible for some communities, we focus our recommendations on using current FIRMs.

Proposed ordinance

Local governments can adopt an ordinance that expands the area subject to regulations to encompass the 500-year floodplain, including unmapped areas adjacent to the floodplain. Those ordinances should also consider establishing minimum distances from bodies of water for new development.

Once communities adopt this expanded regulatory framework, they can apply three types of regulations within the broader area:

1. Redefining the regulatory floodway from the 100-year to the 500-year floodplain
2. Extending regulations to unmapped areas when 500-year flood maps are not available
3. Establishing mandatory setbacks from bodies of water

These regulatory tools, individually or in combination, will help flood-prone communities significantly reduce their exposure to the impacts of repetitive flooding.

Communities should consider implementing these recommendations when they are already

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[8] *Maine Floodplain Management Program*, Maine Department of Agriculture, Conservation & Forestry (2021) https://www.maine.gov/dacf/flood/mapping.shtml

[9] *Flood Mapping for the Nation: A Cost Analysis for Completing and Maintaining the Nation's NFIP Flood Map Inventory,* Association of State Floodplain Managers (Jan. 2020) https://asfpm-library.s3-us-west-2.amazonaws.com/FSC/MapNation/ASFPM_MaptheNation_Report_2020.pdf

[10] *NFIP's Pricing Approach*, Federal Emergency Management Agency (Aug. 13, 2025) https://www.fema.gov/flood-insurance/risk-rating

updating their flood maps through FEMA's required five-year review cycle or through community-initiated map revision processes. While federal minimum requirements do not mandate mapping the 500-year floodplain, communities can request that this expanded area be included when they are conducting standard map updates. This approach allows communities to build more comprehensive flood protection into their regular mapping and regulatory processes rather than treating it as a separate initiative.

Where has this been tried?

Localities across the country have proposed and implemented floodplain management standards that address local climate risks and community needs. Our analysis started with comprehensive review of state-level floodplain ordinances, and was supplemented by evaluating selected local ordinances recommended by experts we consulted. Here we outline examples of floodplain management practices at the state and local levels in Virginia, Maryland, New Jersey, and Florida. These practices provide instructive examples for localities looking to use floodplain mapping to protect communities from current and future risks.

Our recommendations may be adopted either statewide or locally, but local implementation makes sense for a couple of reasons. Ultimately, floodplain management standards should address the specific needs and risk tolerance of the communities they are implemented within. State governments are likely to take a more conservative approach to climate risk mitigation since they represent the interests of the entire populace, not only the most at-risk and/or risk-averse coastal and riverine towns. Adopting floodplain mapping and setback requirements at the municipal level is a sensible way to ensure that ordinances address the particular geographical and other factors that may increase the risk to a particular community, as well as the cultural and other priorities of that community's residents.

General best practices

Redefining the Regulatory Floodway

All FIRMs map the 1 percent (100-year flood) regulatory floodway, or the area that would be covered in water during a 100-year storm.[11] Commonly, restrictions apply to development in this

[11] *Flood Zones*, Federal Emergency Management Agency (Jul. 8, 2020) https://www.fema.gov/about/glossary/flood-zones

zone. Some existing FIRMs also include a boundary marker for the 0.2 percent (500-year flood) flood zone, or the geographic area covered by floodwaters during a 500-year storm, but it is rare for regulations to be applied to properties located between the 1 percent and the 0.2 percent boundary lines. However, 100-, 500-, and even 1000-year storms are becoming more common (and damaging) than their names would suggest.[12] Establishing development rules beyond the standard 100-year floodplain fosters long-term protection from flood risk for coastal and riverine towns. This strategy will become even more pertinent in coming years as storms and flooding encroach further and further into the currently regulated floodplain. In those areas where the 0.2 percent floodway is already included on the FIRM, local jurisdictions could enact zoning and building code regulations that limit new development or reconstruction. In our memo on local freeboard standards, we discuss the application of freeboard regulations to the 500-year flood zone, which generally happens at the local level and is adapted to local conditions. As mentioned earlier, mapping the 500-year floodplain requires the effort of a large, well-resourced community, a conglomerate of localities, or the entire state.

The following are two examples of communities that have enacted ordinances to expand the regulated floodplain. In 2018, Norfolk, Virginia, overhauled its zoning ordinance to reduce the impacts of coastal flooding and increase resilience.[13] The new ordinance regulates construction in the 500-year floodplain, requiring building elevation either three feet above the ground or 1.5 feet above the 500-year flood elevation, whichever is higher.[14]

Satellite Beach, Florida, a small barrier island town in Florida's "Space Coast", similarly regulates development in the 500-year floodplain. The city's Building Code states that new development shall not be built within the 100- or 500-year floodplain, unless absolutely necessary (i.e., no alternative locations are feasible).[15] When construction does happen within these zones, buildings must be elevated one foot above the 500-year flood elevation, or to the

[12]Jeffery Kluger, *Why 'Hundred-Year' Weather Events Are Happening More Than Once Every 100 Years*, TIME (May 30, 2025) https://time.com/7289719/hundred-year-weather-events-happen-more-often/

[13] *Zoning Ordinance Overhauled to increase Community Resilience to Flooding*, National Oceanic and Atmospheric Administration (Oct. 6, 2025) https://coast.noaa.gov/digitalcoast/training/norfolk-zoning-ordinance.html

[14] *Norfolk's Revised Zoning Ordinance Aims to Improve Flood Resilience*, Pew (Nov. 19, 2019) https://www.pew.org/en/research-and-analysis/issue-briefs/2019/11/norfolks-revised-zoning-ordinance-aims-to-improve-flood-resilience

[15] *Chapter 3 - Adoption of Building Codes*, Satellite Beach, FL | Municode Codification (Oct. 2, 2025) https://library.municode.com/fl/satellite_beach/codes/code_of_ordinances?nodeId=PTIICICO_CH3ADBUCO

community's elevation standard that incorporates sea-level rise (whichever is higher). Norfolk and Satellite Beach are just two examples among many localities that have chosen to limit development in the 500-year floodplain.

Regulating Unmapped Areas

Given the challenges to creating or acquiring up-to-date flood maps, communities may have to get creative in protecting areas at risk for flooding. Our recommendation of expanding the flood hazard zone from the 100- to the 500-year floodplain is more effective if climate-change-adjusted data on the 500-year floodplain is already available via the state or a federal agency such as FEMA. If a local community does not have the resources or political support to map these flood risk zones, and/or their FIRMs are out of date (FIRMs are meant to be updated every 5 years), the jurisdiction should consider extending floodplain regulations to areas outside the standard 100-year floodplain. The local government might also consider particularly vulnerable regions, such as those near the 100-year floodplain that are undergoing significant new development.

New Jersey has taken both approaches — state-level mapping and applying floodplain regulations outside of the 100-year floodplain. The New Jersey Department of Environmental Protection (NJDEP) implements the New Jersey Flood Hazard Area Control Act (FHACA), which regulates development within the floodplain, including unstudied areas in most riparian zones and large watersheds.[16] NJDEP is responsible for managing flood risk within the area covered by the New Jersey Flood Hazard Area Design Flood (100-year flood level plus various local freeboard values), which they mapped with federal funding from FEMA, and State Flood Hazard Areas, the horizontal area covered by a 100-year flood plus a 0.2 foot factor of safety.[17] Localities in New Jersey have also adopted regulations that go beyond the standard mapped zone — for example, the town of Westfield determines its flood hazard areas using data such as "high water elevations from flood events, groundwater flooding areas, studies by federal or state agencies, or other information deemed appropriate" (Westfield Code § 8-25(c)).[18] While not regulatory in nature, the flood ordinance of Woodbridge states "The degree of flood protection

[16] *New Jersey Model Code Coordinated Ordinances*, NJ Department of Environmental Protection (Oct. 9, 2025) https://dep.nj.gov/wlm/drec/flood-engineering/ordinances/

[17] *Floodplain Mapping Unit*, NJ Department of Environmental Protection (Apr. 9, 2024) https://dep.nj.gov/wlm/drec/flood-engineering/floodplain-guidebook/.

[18] *NJ Storm Water Control and Flood Plain Ordinance - Applicability*, Town of Westfield, NJ (Apr. 2023) https://ecode360.com/33918532#42508269.

required by these regulations is considered reasonable for regulatory purposes... Larger floods can and will occur. Flood heights may be increased by man-made or natural causes. Enforcement of these regulations does not imply that land outside the special flood hazard areas, or that uses permitted within such flood hazard areas, will be free from flooding or flood damage".[19] NJDEP also published its proposed New Jersey Protecting Against Climate Threats (NJPACT) regulations in August 2024, outlining their plan for dealing with climate change in the next 75 years.[20] Part of the NJPACT regulations is the Resilient Environments and Landscapes (REAL) rules. These rules expand the area of flood-prone zones, "to better protect roads, buildings, and other structures for both today's anticipated flood events, as well as floods of the future" (56 N.J.R. § 1282(a), at N.J.A.C. § 7:7-9.25), and are currently pending adoption.

Mandatory Setbacks

Floodplain setback standards create minimum distances that structures must be positioned from rivers and coastal shorelines. Building near the water can expose buildings to inundation or coastal erosion. These can be exacerbated if development or other activities disturb the vegetation that provides bank stability and stormwater attenuation. The NFIP does not establish a minimum setback distance, nor did the now-revoked Federal Flood Risk Management Standard (FFRMS) establish a setback distance for federally owned or leased properties. Therefore, any setback established by communities would be more aggressive in managing flood risk than required by current federal law or policy. We recommend setbacks because they reduce the likelihood that properties will flood, and protect the environment.

Even when the state maintains setback requirements, local requirements can vary greatly among communities because appropriate setbacks depend on the specific topography of the site in question, and local politics. Maryland requires development to be set back 50 - 100 feet from waterways.[21] Localities within the state may create more restrictive setbacks, and consider

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[19] *NJ Flood Damage Prevention - Ordinary Building Maintenance and Minor Work*, Town of Westfield, NJ (Feb. 2022) https://ecode360.com/35052585#38596818.

[20] Kate Zaffarese, *Breaking down NJDEP's New REAL Regulations*, South Jersey Climate News (Jan. 28, 2025) https://sjclimate.news/5216/news/breaking-down-njdeps-new-real-regulations/.

[21] *Regulations for Floodplain Development*, Maryland Department of the Environment (Accessed Sep 2025) https://mde.maryland.gov/programs/water/StormwaterManagementProgram/FloodHazardMitigation/Pages/floodplainregs.aspx

local variances.[22] For example, Prince George's County requires that development be set back 25 feet from the 100-year floodplain.[23] Frederick requires 25 to 100 feet of setback depending on the water body.[24]

New Jersey's proposed REAL rules similarly create setback requirements for new development, redevelopment, and substantial improvements to buildings. Future construction must be built at least 25 feet from the top of the bank of a body of water (with some exceptions). Currently, New Jersey's Flood Hazard Area Control Act Rules require setbacks for a number of facilities, and vegetation must be protected within 25 – 150 feet from the top of the bank.[25] REAL rules also propose improved protections for wetlands and their buffer areas through setbacks.[26] The state coastal and riverine model floodplain ordinances mandate setting back development from waterways, and note that the setback zone may vary based on the characteristics of the water body.[27] Locally, coastal towns such as Milburn and Avalon require setbacks by prohibiting development in the riparian zone, which ranges from 50 – 300 feet from the water line (similar to the state model ordinances).[28]

Satellite Beach, Florida, also passed a floodplain ordinance in 2018 that established required setbacks for rebuilding after disasters.[29] The city's Comprehensive Plan was amended such that

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[22] *Ibid.*

[23] *Division 4 - Floodplain Ordinance - Coastal and Wetland Floodplain Regulations*, Prince George's County, MD | Municode Codification (Apr. 8, 2022) https://library.municode.com/md/prince_george's_county/codes/code_of_ordinances?nodeId=PTIITI17PULOLAPRGECOMA_SUBTITLE_32WAREPRGRCO_DIV4FLOR_S32-208.01COWEFLRELOSIPR

[24] *Division 1. Floodplain District Regulations*, Frederick County, MD American Legal Publishing (Jul. 2024) https://codelibrary.amlegal.com/codes/frederickcounty/latest/frederickco_md/0-0-0-35741

[25] *Technical Manual: Flood Hazard Area Control Act Rules NJAC 7:13*, New Jersey Department of Environmental Protection Watershed & Land Management (2023) https://dep.nj.gov/wp-content/uploads/wlm/downloads/fha/fh_044.pdf

[26] *New Jersey's Regulatory Response to a Changing Climate*, NJ Protecting Against Climate Threats Resilient Environments and Landscapes (May 22, 2024) https://dep.nj.gov/wp-content/uploads/njreal/real-session-2-enviro-enhancement-20240522.pdf

[27] *New Jersey Model Code Coordinated Ordinances*, NJ Department of Environmental Protection (Oct. 9, 2025) https://dep.nj.gov/wlm/drec/flood-engineering/ordinances/

[28] *Article 7 Floodplain Management Regulations*, Millburn, NJ (Oct 2, 2023) https://ecode360.com/35143716#44926479; *Chapter 19 Flood Damage Prevention*, Avalon, NJ (Jul. 27, 2022) https://ecode360.com/34661677#40518448

[29] *Ordinance No. 1159 Coastal Management-Conservation Element Goals, Objectives and Policies*, Satellite Beach, FL City Council (Jul 2018)

construction within areas at high risk for coastal erosion must be set back at least 15 feet from a construction restriction line established in 1981. These same restrictions apply to new development and redevelopment. Setback regulations such as those in Maryland, New Jersey, and Florida acknowledge the risk exposure faced by infrastructure near the water line. Impacts from flooding, storm surge, and sea-level rise are reduced when construction and redevelopment are prevented from taking place too close to a body of water.

Identifying potentially promising local jurisdictions

We identified criteria by which to evaluate whether a community is a good candidate for adopting more stringent freeboard standards as part of its local floodplain ordinances. Starting with the universe of coastal and riverine areas within each state, we next looked for indications that a community has demonstrated a commitment to implementing stronger flood protection standards already. Finally, we looked for smaller cities, since larger communities face greater political and procedural barriers to implementing new flood protection policies because of their larger size and greater range of competing interests.

To identify jurisdictions that are well positioned to adopt increased freeboard ordinances, we first located coastal and riverine counties using FEMA's National Risk Index.[30] While we focus on local-level ordinances here, counties also play an important part in floodplain management. County-level Comprehensive or Hazard Mitigation Plans address regional flood risks and vulnerabilities, and make recommendations for mitigating said risk. We used U.S. Census data to sort the population size of cities within the identified counties from smallest to largest, calculating the median population. Then, we found the most recent FEMA NFIP Community Rating System (CRS) scores[31] (as of April 2025)[32] to identify coastal and riverine cities (per the CRS definition) that have voluntarily adopted floodplain management practices beyond the federal minimum.

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https://www.flseagrant.org/wp-content/uploads/2022/10/OCR-Ord-No-1159-AmendCompPlan_EAAA-CCA-Setbacks-07-18-18.pdf

[30] *National Risk Index*, Federal Emergency Management Agency (Accessed Sep 2025) https://hazards.fema.gov/nri/map

[31] *Community Rating System*, Federal Emergency Management Agency (2017) https://www.fema.gov/floodplain-management/community-rating-system.

[32] *CRS Eligible Communities*, Federal Emergency Management Agency (Apr. 1 2025) https://www.fema.gov/sites/default/files/documents/fema_crs_eligible-communities_apr-2025.pdf.

Communities achieve different CRS classifications by actively participating in different flood risk mitigation activities, such as mapping, regulation, and public outreach about flooding risks.[33] The lower a community's CRS score, the higher the discount on flood insurance a community is eligible for (ranging from 5% to 45%), so this provides a good indication that a city is proactively focused on reducing its flood risk. To assess which communities have gone beyond the federal or state minimums, and therefore may have momentum to adopt further floodplain management standards, we looked for medium-sized CRS-eligible cities with scores below 8. Scores 9 and below are considered participating communities in the CRS program. Cities with a score of 7 and below have performed enough flood information and warning, mapping, regulation, damage reduction, and response activities to earn a 15% discount on their flood insurance. Our recommendations are well-suited for the cities that fit these criteria for geography, population, and CRS scoring. Additionally, the low CRS scores indicate that a city has become eligible for discounts on their flood insurance for voluntarily taking action to reduce their community flood risk. The practices we put forth here will be more easily adopted into localities that have already fostered momentum for flood preparedness and risk mitigation.

Small to mid-sized towns (with populations of less than 65,000) are generally easier to build consensus within and pass changes to state laws and building codes. Larger cities will have to consider a wider range of environmental and community impacts — and related public engagement challenges — when expanding their floodplain management maps. For example, states and large communities may have greater ability to participate in the CTP Program compared to smaller communities with limited resources, personnel, and bandwidth. However, the important element to achieve real resilience to flooding is connectivity. The more jurisdictions that pass ordinances protecting the floodplain (especially adjacent jurisdictions), the less risky development will take place. Ultimately, a range of small, medium, and large cities and counties adopting these guidelines will benefit communities that face ever-increasing risk from flood hazards.

[33] *Community Rating System*, Federal Emergency Management Agency (2017) https://www.fema.gov/floodplain-management/community-rating-system.

About this Research

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