



October 21, 2016

Submitted via www.regulations.gov

Adrian Sevier
Regulatory Affairs Division
Office of Chief Counsel
Federal Emergency Management Agency
8NE-1604, 500 C Street SW
Washington, DC 20472-3100

RE: Seeking Public Comment on FEMA's Proposed Implementation of the Flood Protection Standard; Docket ID: FEMA-2015-0006

Dear Mr. Sevier:

The Natural Resources Defense Council (NRDC) appreciates the opportunity to provide comment to the Federal Emergency Management Agency (FEMA) on the Proposed Rule on *Updates to Floodplain Management and Protection of Wetlands Regulations to Implement Executive Order 13690 and the Federal Flood Risk Management Standard*. (“Proposed Rule”). NRDC is an international nonprofit environmental organization with more than 2 million members and online activists. Our organization works to safeguard the earth—its people, its plants and animals, and the natural systems on which all life depends. Our organizational goals include curbing global warming, safeguarding human health, and ensuring safe and sufficient water for people and the environment.

Climate change is exacerbating our nation's susceptibility to disastrous flood events. The conventional approach to disaster preparation is no longer sufficient. The storms of our past are no longer reliable indicators of the storms of our future. Extreme precipitation events will become more common. Coupled with sea level rise, which is projected to be between two and six feet by the end of the century, flooding will become frequent and severe for many parts of the country. As a nation, we must account for these future climate impacts in the way we design and build our publicly-funded infrastructure—like our bridges, schools, and wastewater treatments plants—to avoid placing people and property in harm's way, and to save taxpayer dollars. From 1998 to 2014, \$48.6 billion in FEMA Public Assistance Grants were spent on flood-related disasters.¹ We cannot continue this trend. Executive Order 13690 and the Federal Flood Risk Management Standard (hereafter “flood protection standard”), if implemented faithfully, are an effective means by which to address this dilemma.

¹ *The Need for Flood Protection Standards*, NRDC, <http://www.nrdc.org/water/fema-assistance-grants.asp> (last visited Oct. 15, 2016).

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Thus, NRDC applauds FEMA for promulgating a draft rule to implement the flood protection standard. FEMA has shown leadership amongst Federal agencies by taking action to responsibly use Federal funds, and to ensure it does not needlessly rebuild the same infrastructure repeatedly after flooding events. NRDC supports FEMA's efforts to enhance the resilience of our communities and Federally-funded infrastructure to flood risks, especially in light of the anticipated effects of climate change.

NRDC also recommends that FEMA take the following actions when finalizing the Proposed Rule to better satisfy the intentions of EO 13690 and the flood protection standard to foster resilient communities and to protect and preserve the nation's floodplains:

- a) Utilize the Climate-Informed Science Approach as the baseline determinant of flood risk for critical actions, which constitute Federally-funded projects.
- b) Adopt a cumulative approach to calculate substantial damage.
- c) Develop guidance on the use of nature-based approaches, and the application of green infrastructure
- d) Narrowly define the term "emergency action," and clearly differentiate that term from the definition for "emergency work."
- e) Under section 9.5(c)(8)(i), clarify what constitutes an exemption for "housing needs and expenses."
- f) Add language to section 9.2(b)(3) to reflect FEMA must improve the resilience of communities and federal assets due to the impacts of climate change.
- g) FEMA's Proposed Change in Terminology Concerning Flood Probabilities is Sound Policy, but Should Consider How These Terms Under Represent the Risks of Flooding

I. Climate Change Is Exacerbating the Nation's Flood Risk

Climate change is exacerbating flooding nationwide, both inland and coastal, further straining the disaster-response capabilities of our communities and worsening post-disaster rebuilding costs. As of September 2016, there were four inland flood events with losses exceeding \$1 billion each across the United States this year.² This number does not take into account the damages associated with Hurricane Matthew, which will easily exceed \$1 billion. Each of these floods was associated with weather we would have thought of in the past as once in a lifetime occurrences or random Act of God' events, but are now becoming increasingly common as our climate changes. According to the United States Global Change Research Program, events considered "rare" today will only become more common in the future.³

Paralleling this trend will be an increase in the number of Federal disaster declarations, and the amount of assistance FEMA must provide to repair and rebuild our nation's infrastructure. And the costs of flood-related disaster declarations are already considerable. From 1998 to 2014, \$48.6 billion in FEMA Public Assistance Program grants were spent in the wake of major flood

² National Oceanic and Atmospheric Administration, *Billion-Dollar Weather and Climate Disasters: Overview* <http://www.ncdc.noaa.gov/billions> (last visited Oct. 15, 2016).

³ U.S. Global Change Research Program, *Extreme Weather Events*, <http://www.globalchange.gov/explore/extreme-events> (last visited Oct. 6, 2015).

events.⁴ The repairing or replacing of public buildings (\$12.6 billion), public utilities (\$7.4 billion), roads and bridges (\$5.5 billion), and water-control facilities like levees, dams, and pumps (\$1 billion) was the predominant use of these grants.⁵ The Public Assistance Program represents only a small portion of the total amount the Federal government has spent on rebuilding after a flood-related natural disaster; an amount that will only continue to grow as the impacts of climate change continue.

Riverine communities throughout the country are entering a future in which flood events will not only become more frequent, but more severe. Flood frequency has already started to increase for many regions. A recent study, *The Changing Nature of Flooding Across the Central United States*, by researchers from the University of Iowa found that the frequency of floods in Iowa is already on the rise.⁶ The study examined data from hundreds of stream monitoring stations throughout the Midwest and found that floods were becoming more frequent in a band stretching from North Dakota south to Iowa and Missouri and through Illinois, Indiana and Ohio. Additionally, a study commissioned by FEMA and conducted by AECOM found that flood prone areas along the nation's rivers could increase by 45% on average.⁷ This enlargement of the floodplain is attributed to the changing precipitation patterns, and varies widely on a regional basis; areas like the Great Lakes and the Northeast are forecasted to have a major expansion, whereas areas like the Southwest, a smaller expansion.⁸

Coastal communities face the added complication of sea-level rise, particularly on the East and Gulf Coasts where sea levels have already risen by nearly one foot. For some areas, like coastal Louisiana and the Chesapeake Bay, sea levels are already on pace to rise by three feet, although scientific evidence indicates that current rates of sea level rise will accelerate. By 2100, global mean sea level may rise between two and six feet depending on the amount of greenhouse gases (GHGs) ultimately emitted into the atmosphere.⁹ Six feet of sea level rise has the potential to inundate the homes of 5 million people who currently live along the nation's coastlines.¹⁰ Other studies have found that as many as 14 million people's homes could be inundated by the end of the century if population growth is taken into account.¹¹ Post-2100, sea levels will continue to rise between 12-15 feet or higher even if we limit warming to 2 degrees Celsius due to the timespan in which carbon dioxide remains in the atmosphere.¹² The above-cited population estimates only account for direct inundation at high tide and do not attempt to estimate the

⁴ Natural Resources Defense Council, *The Need for Flood Protection Standards*, <http://www.nrdc.org/water/fema-assistance-grants.asp> (last visited Oct. 15, 2016).

⁵ *Id.*

⁶ Iman Mallakpour & Gabriele Villarini, *The Changing Nature of Flooding Across the Central United States*, 5 *Nature Climate Change* 250, 250 (2015).

⁷ AECOM, *The Impact of Climate Change and Population Growth on the National Flood Insurance Program Through 2100* ES-6 (June 2013) (assessing climate change and population growth impact on floodplains throughout the United States)..

⁸ *Id.*

⁹ Climate Central, *Surging Seas*, <http://sealevel.climatecentral.org>

¹⁰ *Id.*

¹¹ Mathew E. Hauer, et al., *Millions Projected to be at Risk From Sea-Level Rise in the Continental United States*, 6 *Nature Climate Change* 691, 691-92 (2016)

¹² Benjamin H. Strauss, Scott Kulp, and Anders Levermann, *Carbon Choices Determine US Cities Committed to Futures Below Sea Level*, 112.44 *Proc. Nat'l Acad. Sci.* 13508, 13508 - 509 (2015).

number of people, and the infrastructure that supports them, which will also be at risk from flooding due to future coastal storms and more powerful storm surge.

In addition, sea level rise will compound the problem of tidal flooding as high tides will be able to reach farther inland. According to the Union of Concerned Scientists, long-term trends show that tidal flooding went from occurring every one to five years in the 1950s to occurring once every three months by 2012.¹³ This trend is accelerating, and by 2045, numerous communities along the East and Gulf Coasts may see tidal flooding occur roughly 180 times a year.¹⁴ When these events are combined with a coastal storm, the risk of flooding becomes severe.

The underlying trend is a negative one: riverine and coastal floodplains are expanding due to climate change, coastal storms will increase in their intensity, and sea-level rise will inundate large sections of the Eastern and Gulf Coasts. For these reasons FEMA's implementation of the updated flood protection standard is an essential component of a national strategy for protecting our infrastructure and communities from the effects of flooding and preparing the nation for the unavoidable consequences of climate change.

II. FEMA's Promulgation of the Proposed Rule Will Protect Taxpayer Investments and Preserve and Protect Floodplains

FEMA's use of the Freeboard Board Value Approach (FVA) for non-critical projects, which requires a higher vertical elevation and larger horizontal extent, will better protect taxpayer investments. Multiple states and local communities have already implemented elevation requirements that either meet or exceed the elevation requirements required under the flood protection standard. Indiana, Montana, New York, and Wisconsin have a two-foot freeboard requirement for all development, both private and public, occurring in a Special Flood Hazard Area.¹⁵ An additional 232 communities participating in the National Flood Insurance Program's Community Rating System have minimum freeboard requirements of two feet.¹⁶ As such, NRDC applauds FEMA for continuing to use higher state, tribal, territorial, or local government flood risk standards when such standards are more protective than those proposed by FEMA. Complying with higher state and local elevation requirements helps to encourage and support communities to adopt higher floodplain protection standards.

Additionally, the FVA's corresponding horizontal extent will increase the resilience of communities and federal assets. Currently, the 1 percent annual chance floodplain is mapped on FEMA's Flood Insurance Rate Maps. However, the area mapped is only founded on historical flood events and does not take into account the increasing risk of future flooding. Given that maps may not be updated for the next one or two decades, if public infrastructure is only built to

¹³Erika Spanger-Sieffred, Melanie Fitzpatrick, and Kristina Dahl, *Encroaching Tides: How Sea Level Rise and Tidal Flooding Threaten US East and Gulf Coast Communities Over the Next 30 years* 1 (2014).

¹⁴Id. at 52.

¹⁵ Association of State Floodplain Managers, *Federal Flood Risk Management Standard & EO 13690—Analysis*, 3 (2015) available at http://www.floods.org/acefiles/documentlibrary/FloodRiskMngmtStandard/FFRMS_EO_13690_analysis_by_ASFPM_4-13-15.pdf.

¹⁶Id.

protect against the 1 percent annual chance flood of the past, it may still be damaged by the 1 percent annual chance flood of the future. Future flooding will be influenced by factors such as altered precipitation patterns, sea level rise, and land use decisions.

Additionally, flood losses do not end at the boundary of the 1 percent annual chance floodplain; one-third of disaster assistance for flooding is spent on areas outside this boundary.¹⁷ The expanded horizontal extent will help address losses that occur on the fringes. NRDC approves of the methods described for determining the horizontal extent and advises FEMA to use relevant information from states, in addition to information from applicants or other federal agencies.

III. FEMA's Proposed Rule Requires Revision to Better Attain the Aims of EO 13690 and the Flood Protection Standard

a. Utilize the Climate-Informed Science Approach as the Baseline Determinant of Flood Risk for Critical Actions, which Constitute Federally-Funded Projects.

FEMA's proposal concerning the protection of critical, Federally-funded projects falls short. FEMA's proposed use of the Climate Informed Science Approach (CISA) as a secondary option for determining the flood protection standard floodplain and corresponding level of resiliency to which critical projects must be built is not acceptable. Given that critical projects, such as the rebuilding of hospitals and nursing homes after a flood, are deemed projects for which even a slight chance of flooding would be too great, these projects must account for the impacts of climate change. This assertion is especially true for coastal areas.

Sea level rise must be accounted for in planning and designing of critical projects to fully account for future flood risk. As noted above, sea level may rise between three to six feet by the end of the century. The FVA only requires critical infrastructure to be elevated to three feet above the BFE. If a Flood Insurance Rate Map, which FEMA proposed to use to determine the BFE, does not account for sea level rise and other climate impacts, as recommended by TMAC, then any critical infrastructure designed and built according to that baseline will be at risk of inundation. Failure to evaluate sea level rise over the next several decades would be an egregious oversight when deciding what to build, where to build, and how to build in coastal environments. The CISA should be the primary approach for determining the flood protection standard floodplain and the corresponding level of resilience to which critical infrastructure projects must be built.

As an alternative, and in response to the request in the Proposed Rule,¹⁸ NRDC supports FEMA calculating the CISA, freeboard and 0.2 percent flood for critical facilities and using the highest of those determinations.

¹⁷ Association of State Floodplain Managers, *Gilbert F. White National Flood Policy Forum 2004 Assembly: Reducing Flood Losses: Is the 1% Chance (100-year) Flood Standard Sufficient?*, 82 (2004).

¹⁸ 81 Fed. Reg. 57402, 57412.

b. Adopt a Cumulative Approach to Calculate Substantial Damage.

Implementing the determination of substantial damage on a cumulative basis is key for tracking flood damages to public infrastructure, identifying infrastructure that is increasingly vulnerable to flooding, and ensuring that it is relocated or upgraded and its risk to future floods reduced. In FEMA’s Proposed Rule, *Section V - Response to Leadership Intent Comments*, FEMA asserted it would not “adopt a cumulative approach to calculate substantial improvement because FEMA does not track improvements made by applicants, without FEMA funding, to their own public facilities.”¹⁹ While NRDC understands FEMA’s concern, we believe FEMA should be able to track and tally the damage that occurs to public facilities if they have received Public Assistance (PA) Program grants in the past. Through the PA Program, FEMA provides supplemental Federal disaster grant assistance for the repair, replacement, or restoration of disaster-damaged, publicly owned facilities. As part of an applicant’s completion of a Project Worksheet (FEMA Form 90-91), the Applicant must include a “detailed description of the disaster-related damage and dimensions and the associated scope of work and costs.”²⁰ FEMA does have a record of the amount of damage and the associated costs suffered by public facilities that have received PA grants. FEMA should be able to track this information and establish a cumulative substantial damage methodology for this situation. As FEMA stated in the proposed rule, “it is necessary to take action to responsibly use Federal funds, and FEMA must ensure it does not needlessly make repeated Federal investments in the same structures after flooding events.” A cumulative substantial damage approach for the PA Program would satisfy this objective.

c. Develop Guidance on the Use of Nature-Based Approaches, and the Application of Green Infrastructure

We support ensuring nature-based approaches, including green infrastructure, are included as practicable alternatives for preserving floodplains and floodplain function. However, the proposal neither describes how FEMA will incorporate natural systems, ecosystem processes and nature-based approaches nor provides guidance for applicants on how to accomplish this task. We urge FEMA to define how to consider natural systems, ecosystem processes and nature-based approaches and to direct recipients of FEMA grants who must comply with these standards to credible sources of information.

In addition, NRDC recommends FEMA require the consideration of nature-based approaches early in the Decision Making Process. Ideally, the consideration of nature-based approaches should occur in *Step (3) Practicable Alternatives*. Early consideration is important for mitigating damage to the floodplain.

d. Narrowly Define the Term “Emergency Action,” and Clearly Differentiate that Term from the Definition for “Emergency Work.”

In the proposed revisions to 44 CFR 9.7, FEMA proposes to adopt the flood protection standard exceptions outlined in Executive Order 13690 in their entirety, which includes an exception for

¹⁹ 81 Fed. Reg. 57402, 57421

²⁰ FEMA, *Public Assistance Program and Policy Guide*, FP 104-009-2, 127 (January 2016).

“emergency actions.”²¹ However, FEMA has failed to define and adequately differentiate the term “emergency action” from “emergency work.”

This latter term is defined as an exception to work performed under sections 403 and 502 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988 (Stafford Act).²² Further, in FEMA’s explanation of the aforementioned definition FEMA states it is changing the previous term for this exception from “emergency action” to “emergency work” to differentiate between the work performed under the referenced Stafford Act sections and the new exception to the application of the flood protection standard, which includes a “non-specific” reference to “emergency action.”²³

Inductively, if “emergency work” is specific to work performed under sections 403 and 502, and if as FEMA explains the two terms are different, then as a general rule “emergency action” likely applies to anything that could possibly be described as an emergency not covered by the “emergency work” definition.

Based on this distinction, FEMA is proposing to adopt an undefined exception to the application of the flood protection standard that is potentially very broad in scope. Section 502 of the Stafford Act provides a good indication of the true breadth of the “emergency action” exception. As 502 stipulates, federal agencies may be directed to assist state and local governments “to save lives, protect property and public health and safety, and lessen or avert the threat of a catastrophe.”²⁴ Already, this is a broad category of exemption, which includes the provision of assistance under section 408 of the Stafford Act, which encompasses the entire Individual Assistance Program.²⁵ The “emergency work” exception will already exempt a significant amount of work from the application of the flood protection standard. Thus, if as FEMA implies, the two terms “emergency work” and “emergency action” are different, then clarification must be provided to explain whether the actions covered under those exceptions overlap. If there is no overlap, then a definition must be provided for “emergency action” exception that clearly specifies what types of actions are exempted.

NRDC proposes the following language as a definition: emergency action – an action necessary to address an immediate threat that involves debris removal or the construction of emergency protective measures. For the later, emergency protective measures, FEMA must develop a methodology for their removal. Otherwise, actions that were meant to be temporary, such as the construction of temporary berms along a river to control flooding, become permanent, and thus should have been subject to the application of the flood protection standard.²⁶

²¹ 81 Fed. Reg. 57402, 57417.

²² 81 Fed. Reg. 57402, 57433.

²³ 81 Fed. Reg. 57402, 57415.

²⁴ 44 CFR 206.63.

²⁵ *Id.*

²⁶ B.A. Morelli, *Temporary berms could be in place for years in Cedar Rapids*, The Gazette available at <http://www.thegazette.com/subject/news/flood-2016/temporary-berms-could-be-in-place-for-years-in-cedar-rapids-20161004> (last visited Oct. 15, 2016).

e. Under Section 9.5(c)(8)(i), Clarify What Constitutes an Exemption for “Housing Needs and Expenses.”

FEMA has proposed to continue to exempt certain actions under section 408 of the Stafford Act, including, “[h]ousing needs or expenses, except for restoring, repairing or building private bridges, purchase of mobile homes and provision of structures as minimum protective measures....”²⁷ Section 408 of the Stafford Act establishes FEMA’s Individual Assistance Program.²⁸ Under the Individual Assistance Program, FEMA may provide financial assistance to homeowners to repair or to replace their home destroyed in a disaster.²⁹ According to the Proposed Rule, for “FEMA Federally Funded Projects,” FEMA proposes to use the updated definition of “floodplain” contained in the flood protection standard.³⁰ FEMA defines a “FEMA Federally Funded Projects” to mean actions where FEMA funds are used for new construction, substantial improvement, or to address substantial damage to a structure or facility.³¹ Per 44 CFR § 9.4, a structure means a walled or roofed building.³² Thus, FEMA should be applying the flood protection standard to the repair or replacement of primary homes, which are substantially damaged, and receive financial assistance under the Individual Assistance Program (Section 408), as private homes, would satisfy the definition of “structure.”

FEMA’s proposed Section 408 exemption is unclear as to whether Individual Assistance Grants that go to the repair or replacement of primary homes would be subject to FEMA’s implementation of the flood protection standard. Thus, FEMA must provide clarifying language to this effect. NRDC believes a private residence, which is substantially damaged, and is the recipient of an Individual Assistance Grant, should be subject to the FVA, as proposed by FEMA.

f. Add Language to Section 9.2(b)(3) that References the Impacts of Climate Change

FEMA proposes to add the following language to 44 CFR section 9.2(b)(3): “Reduce the risk of flood loss to life and property and improve the resilience of communities and Federal assets against the impacts of flooding based on the best-available and actionable science.”³³ FEMA has proposed adding the language to reflect EO 13690’s policy statement. However, FEMA’s reflection of EO 13690’s policy statement is incomplete as it fails to mention that the impacts of flooding are anticipated to increase over time due to the effects of climate change.³⁴

Referencing climate change specifically in the policy statement is an important recognition of one of the factors that is escalating flood risks across the nation. Furthermore, referencing

²⁷ 81 Fed. Reg. 57402, 57434.

²⁸ 44 CFR 206.110

²⁹ Federal Emergency Management Agency, *Individual Disaster Assistance* <https://www.fema.gov/individual-disaster-assistance> (last visited Oct. 15 2016).

³⁰ 81 Fed. Reg. 57402, 57403

³¹ 81 Fed. Reg. 57402, 57415

³² *Id.*

³³ 81 Fed. Reg. 57402, 57414

³⁴ 80 Fed. Reg. 6425

climate change underscores the Administration's justification for EO 13690 and the critical importance of the flood protection standard.

As an alternative NRDC proposes the following language: "Reduce the risk of flood loss to life and property and improve the resilience of communities and Federal assets against the impacts of flooding, which are increasing in frequency and severity due to climate change, based on the best-available and actionable science."

g. FEMA's Proposed Change in Terminology Concerning Flood Probabilities is Sound Policy, but Should Consider How These Terms Under Represent the Risks of Flooding

NRDC supports FEMA's proposal to replace references to the "100-year flood" and "500-year flood" with the terms "1 percent annual chance flood" and "0.2 percent annual chance flood." Labeling floods using the former terms can cause confusion, and an underestimating of the true flood risk. This change in terminology more accurately portrays the risk, but still provides a misleading underestimation. These probabilities, and the underlying scientific studies that define the areas vulnerable to floods of these frequencies, do not account for the growing risk of flooding attributable to increasingly erratic and severe weather patterns, nor do these probabilities account for future sea level rise projections. While this is a positive step, FEMA should acknowledge that these probabilistic terms still under-represent the actual and future risks of flooding. Doing so further justifies the importance of adopting these regulations, to ensure that an additional margin of safety is factored into FEMA's decisions and climate impacts are also accounted for, where appropriate.

IV. Over the Long-Term, Executive Order 13690 and the Flood Protection Standard, Will Significantly Reduce the Costs of Post-Flood Recovery and Promote Sound Investment of Taxpayer Dollars.

The risk of flooding is increasing throughout the country. As such, EO 13690 and the flood protection standard are a critical component of the nation's efforts to prepare for the unavoidable impacts of climate change. Overall, NRDC supports FEMA's proposed rule as a step in the right direction for building a more resilient nation. We look forward to working with you on this important matter.

Sincerely,



Joel Scata
Project Attorney