



NATURAL RESOURCES DEFENSE COUNCIL  
NATIONAL WILDLIFE FEDERATION



**Petition Requesting That the  
Federal Emergency Management Agency  
Comply with the Stafford Act  
and Disaster Mitigation Act of 2000  
By Approving Only State Hazard Mitigation Plans  
That Adequately Address Climate Change;  
Amend Its Regulations to Confirm that Climate Change  
Must Be Addressed in Hazard Mitigation Plans;  
and Provide Agency Guidance to States  
Regarding How to Address Climate Change  
in Hazard Mitigation Plans**

October 2, 2012

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# **Petition to FEMA to Enforce Stafford Act & Disaster Mitigation Act Requirement for States to Consider Climate Change in Hazard Mitigation Plans**

I.	Introduction.....	4
II.	Petitioners.....	6
III.	Basis for the Petition: Statement of FEMA Authority.....	6
IV.	Actions Requested.....	8
V.	Factual Background: Disaster Mitigation Requires Sound Planning, Which Must Account for the Substantial Effects of Climate Change on Natural Hazard Risks.....	10
	A. Disaster Mitigation Planning Is Critical to Protect People and Property From Harm.....	10
	B. The Current FEMA Grant Scheme for Hazard Mitigation Assistance Fails to Require That States Plan for Climate Change Impacts.....	13
	C. Climate Change Poses Serious Threats to Water Resources and Human Health, With the Potential for Considerable Financial Costs.....	15
	1. More Frequent and Severe Water-Related Impacts: Coastal Flooding, Riparian Flooding, and Drought.....	17
	2. More Frequent and Severe Health-Related Impacts: Heat-Related Illnesses, Air Pollution Effects, Pollen Allergies, and Drinking Water Contamination.....	20
	3. Climate-Related Disasters Can Have Enormous Financial Costs.....	24
	D. The Federal Government Has Acknowledged the Natural Hazard Threats Posed by Climate Change.....	26
	E. Climate Change Adaptation Must Be Integrated Into Hazard Mitigation Planning.....	28
VI.	Legal Argument: FEMA Must Comply With Its Non-Discretionary Duty to Require States to Consider Climate Change in Hazard Mitigation Plans.....	30
	A. FEMA has a non-discretionary legal duty to require state consideration of climate-change related risks in state hazard mitigation plans as a precondition to awarding federal HMA funding.....	30

**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning  
October 2, 2012**

B. FEMA’s own climate change adaptation policy bolsters this statutory interpretation and requires that FEMA approve only those state hazard mitigation plans that assess and prepare for risks related to climate change.....	34
C. FEMA fails to meet its non-discretionary legal duty to require that states incorporate climate-change related risks in their hazard mitigation plans, and acts contrary to its own policy, by approving state hazard mitigation plans that do not adequately assess risks related to climate change.....	37
1. Some states have addressed climate change in their hazard mitigation plans, and those that have are empowered to better protect human health and property from future disasters.....	38
2. Other states’ FEMA-approved hazard mitigation plans fail to incorporate climate change, unnecessarily putting human health and property at risk.....	42
D. FEMA must honor its legal and policy obligations to approve <i>only</i> those state hazard mitigation plans that incorporate an assessment of climate-related risks, and provide regulations and guidance to states on how to seize the opportunity to effectively account for climate change in hazard mitigation planning before disasters occur.....	58
1. FEMA must recognize its legal obligations and policy commitments by approving only those state hazard mitigation plans that incorporate climate change.....	59
2. FEMA should initiate a new rulemaking amending 44 CFR § 201.4 to confirm explicitly the need to incorporate the effects of climate change in hazard mitigation plans.....	59
3. FEMA should provide agency guidance to ensure that states clearly understand this state hazard mitigation requirement, in order that they can better protect against risks to public health and property damage.....	60
VII. Conclusion.....	61
VIII. Appendix 1: Total HMA Obligations by State or Territory as of May 2012.....	63
IX. Appendix 2: List of Exhibits.....	65

## **I. Introduction**

Every year, natural disasters in the United States cause billions of dollars in property damage, and they are often deadly. Additionally, ongoing changes in the Earth's climate are making many kinds of disasters predictably more frequent and more severe. Across the country, climate change is putting water supplies at risk, increasing flooding and drought, and raising human mortality and morbidity rates. As atmospheric greenhouse gas concentrations rise, these risks will only increase, presenting grave challenges to our nation's cities, towns, and neighborhoods when a natural disaster strikes. Current scientific reports indicate that climate change impacts will increase the vulnerability of water supplies throughout the fifty states and exposure to a range of threats to public health. The U.S. Global Change Research Program (USGCRP) reported that "climate change has already altered, and will continue to alter, the water cycle, affecting where, when, and how much water is available for all uses."<sup>1</sup> The USGCRP also reported that "there are many ways that climate change can lead to potentially harmful health effects,"<sup>2</sup> including "heat waves and severe storms, ailments caused or exacerbated by air pollution and airborne allergens, and many climate-sensitive infectious diseases."<sup>3</sup> The scientific evidence demonstrates that climate change will significantly enhance natural hazard risks, and that it will increasingly continue to do so over the next century.

The impacts of natural disasters are needlessly exacerbated when state and local governments fail to plan ahead and take precautions. However, just as a failure to plan can increase the financial and human costs of disasters, smart planning can significantly reduce those costs. Comprehensive hazard mitigation planning minimizes damage and loss of life when disasters occur via a proactive response to reducing risks.

The Federal Emergency Management Administration (FEMA) plays a critical role in approving state and local hazard mitigation plans that are required for eligibility under select federal funding programs for disaster mitigation. For a state to be eligible for hazard mitigation

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<sup>1</sup> U.S. Global Change Research Program (USGCRP), *Global Climate Change Impacts in the United States* 41 (Thomas R. Karl, Jerry M. Melillo, and Thomas C. Peterson eds., 2009), available at <http://www.globalchange.gov/publications/reports/scientific-assessments/us-impacts/>. See also Ben Chou, Steve Fleischli, & Jenna Schroeder, Natural Resources Defense Council (NRDC), *Ready or Not: An Evaluation of State Climate and Water Preparedness Planning* 1-2 (2012), available at <http://www.nrdc.org/water/readiness/files/Water-Readiness-full-report.pdf>.

<sup>2</sup> USGCRP, *supra* note 1, at 41.

<sup>3</sup> *Id.* at 89.

**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning  
October 2, 2012**

funding, FEMA is required to approve its mitigation plan.<sup>4</sup> In so doing, FEMA must require state plans to analyze and plan for a state’s vulnerability, present and future (including climate risks), to *all* natural hazards that can affect the state. According to the Natural Resources Defense Council (NRDC) report *Ready or Not: An Evaluation of State Climate and Water Preparedness Planning*, some states, such as Connecticut and California, are leading the way in preparing for climate change impacts with integrated and comprehensive hazard mitigation plans that address all relevant sectors and state agencies.<sup>5</sup> Regrettably, other states are falling behind when it comes to consideration of potential climate change impacts—or have yet to formally address climate change preparedness in their state hazard mitigation plans at all. As a result, climate-related disasters have the potential to create greater and more damaging impacts when states fail to plan ahead.

Given the credible – and still mounting – scientific evidence of the impacts of climate change on disaster risks, we can no longer afford hazard mitigation plans that do not comprehensively address climate change and prepare communities for the threats that climate change presents. These insufficient plans lead to the inefficient use of resources both before and after natural disasters strike. If states receive federal funds for their disaster mitigation efforts, national taxpayers have a right to demand that the states engage in thoughtful planning to reduce the ultimate federal cost.

Smart policy and federal law both mandate that FEMA require states to consider climate change-related risks in state hazard mitigation plans, as the Robert T. Stafford Disaster Relief and Emergency Assistance Act does not authorize FEMA to approve state plans unless they identify *all* of “the natural hazards, risks, and vulnerabilities of areas in the State.”<sup>6</sup> . This obligation includes a duty to consider the impact of climate change on current and future disaster risks. Thinking ahead in this way gives states the opportunity to anticipate and reduce disaster impacts, saving lives and money.

Through this petition, NRDC and the National Wildlife Federation (NWF) request that FEMA (1) immediately comply with its existing non-discretionary duty to approve only those state hazard mitigation plans that consider the impact of climate change on natural hazard risk; (2) initiate a new rulemaking under its authority under the Stafford Act, 42 U.S.C. §§ 5121-

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<sup>4</sup> Robert T. Stafford Disaster Relief and Emergency Assistance Act (amended by the Disaster Mitigation Act of 2000), 42 U.S.C. §§ 5121-5207 (2006).

<sup>5</sup> Chou et al., *supra* note 1, at 49-54.

<sup>6</sup> 42 U.S.C. § 5165(c)(1) (2006).

**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning  
October 2, 2012**

5207,<sup>7</sup> to confirm explicitly that an assessment of future climate risks is required for FEMA approval of state hazard mitigation plans; and (3) in the meantime, issue interpretive guidance providing more detailed information about how states are to consider climate change risks in their plans for the upcoming 2013 round of plan approvals.

## **II. Petitioners**

Petitioner NRDC is a national, non-profit environmental and public health membership organization with more than 1.3 million members and online activists. NRDC's organizational goals include curbing global warming, safeguarding human health and ensuring safe and sufficient water. NRDC's members are at risk of harm from FEMA's failure to ensure that states are planning for future climate-related hazards. These hazards include those identified by the FEMA-organized Strategic Foresight Initiative, including rising temperatures, increased storm intensity and frequency, rising sea levels, changing drought and fire risk, and shifting threats to human health and disease patterns.<sup>8</sup>

Petitioner NWF is the nation's largest conservation education and advocacy organization with more than four million members and supporters and affiliates in 47 states and territories. NWF has been advocating for changes to the FEMA and related federal disaster assistance and resource management programs to address these concerns for several decades. NWF has a keen interest in seeing that climate change hazards are addressed and existing disaster-related plans include up-to-date science and allow communities adapt to the challenges of global warming that threaten NWF's members and their interests.

## **III. Basis for the Petition: Statement of FEMA Authority**

Pursuant to the Administrative Procedure Act<sup>9</sup> and FEMA's governing regulations,<sup>10</sup> NRDC and NWF hereby petition FEMA (1) to comply with its legal obligations under the

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<sup>7</sup> 42 U.S.C. §§ 5121-5207 (2006).

<sup>8</sup> Strategic Foresight Initiative, *Climate Change: Long Term Trends and their Implications for Emergency Management* (2011), available at [http://www.fema.gov/pdf/about/programs/oppa/climate\\_change\\_paper.pdf](http://www.fema.gov/pdf/about/programs/oppa/climate_change_paper.pdf).

<sup>9</sup> Administrative Procedure Act § 4(e), 5 U.S.C. § 553(e) (2006).

<sup>10</sup> 44 C.F.R. § 1.18 (2012).

## NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning October 2, 2012

Stafford Act as amended by the Disaster Mitigation Act of 2000;<sup>11</sup> (2) for the promulgation of a rule; and (3) for the issuance of interpretive guidance.

The Federal Emergency Management Agency (FEMA), a division of the Department of Homeland Security, exists “to ensure that as a nation we work together to build, sustain, and improve our capability to prepare for, protect against, respond to, recover from, and mitigate all hazards.”<sup>12</sup> Pursuant to this mission, Congress has authorized FEMA to administer several federal mitigation grant programs to states under the Stafford Disaster Relief and Emergency Management Act<sup>13</sup> (“Stafford Act”) and the Disaster Mitigation Act of 2000<sup>14</sup> (“DMA2K”), among other statutes. FEMA currently administers these non-emergency grants through its Hazard Mitigation Assistance (HMA) programs. Grants awarded to states under the program include the Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (PDM), Flood Mitigation Assistance (FMA), Repetitive Flood Claims (RFC), and Severe Repetitive Loss (SRL).

Under the Stafford Act as amended by DMA2K, FEMA must confirm that states meet several criteria before they are eligible to receive grants under the HMA program. In relevant part, the statute requires that a state have a FEMA-approved hazard mitigation plan, detailing a state’s “natural hazards, risks, and vulnerabilities,”<sup>15</sup> before it may be eligible to receive most types of federal non-emergency mitigation funding. FEMA calls the hazard mitigation plan “the foundation for a community’s long-term strategy to reduce disaster losses and break the cycle of disaster damage, reconstruction, and repeated damage.”<sup>16</sup> The mitigation planning requirement has accordingly been codified and explained by FEMA in its implementing regulations. Most importantly, FEMA now requires that states have a FEMA-approved hazard mitigation plan on file before they are eligible for *any* of the HMA grants.<sup>17</sup> FEMA also has prescribed form,

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<sup>11</sup> 42 U.S.C. §§ 5121-5207 (2006).

<sup>12</sup> Federal Emergency Management Agency (FEMA), About FEMA, <http://www.fema.gov/about-fema> (last modified Mar. 13, 2012).

<sup>13</sup> 42 U.S.C. §§ 5121-5207 (2006).

<sup>14</sup> *Id.*

<sup>15</sup> *Id.*

<sup>16</sup> FEMA, Multi-Hazard Mitigation Planning, <http://www.fema.gov/plan/mitplanning/index.shtm> (last modified Aug. 11, 2010).

<sup>17</sup> 44 C.F.R. § 201.4 (2012). *See also* FEMA, *FY 2011 Hazard Mitigation Assistance (HMA) Unified Guidance* 19 (2010), available at <http://www.fema.gov/library/viewRecord.do?id=4225>.

**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning  
October 2, 2012**

content, and procedural requirements for state hazard mitigation plans.<sup>18</sup> These requirements mandate analysis of the probability of future hazard events<sup>19</sup> and consideration of any federal and state agency reports relevant to hazard risks in the state.<sup>20</sup>

This federal statutory scheme, its implementing regulations, and FEMA’s guidance documents vest it with a non-discretionary duty to require state planning for the water-related and health-related risks associated with climate change as part of the hazard mitigation planning process. However, in the twelve years since the passage of the Disaster Mitigation Act, FEMA has never formally imposed such requirements as part of its plan review process. Instead it has released billions of dollars in HMA grant funding to states whose hazard mitigation plans do not adequately, or at all, consider the hazard risks associated with climate change.<sup>21</sup> FEMA, as the sole administrator of the HMA grant programs, must require state hazard mitigation plans to address the water-related and health-related impacts of climate change.

## **IV. Actions Requested**

Pursuant to the Right to Petition Government Clause contained in the First Amendment of the United States Constitution,<sup>22</sup> the Administrative Procedure Act (APA),<sup>23</sup> and FEMA’s regulations for petitions for rulemaking,<sup>24</sup> NRDC and NWF request that the agency take three actions:

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<sup>18</sup> 44 C.F.R. § 201, *et seq.* (2012). *See also* FEMA, *Multi-Hazard Mitigation Planning Guidance Under the Disaster Mitigation Act of 2000* 1-19 (2008), available at <http://www.fema.gov/library/viewRecord.do?id=3115> [hereinafter *The Blue Book*].

<sup>19</sup> 44 C.F.R. § 201.4(c)(2)(i) (2012).

<sup>20</sup> *The Blue Book*, *supra* note 18, at 1-19.

<sup>21</sup> Emails from FEMA Federal Insurance and Mitigation Administration (FIMA) staff to NRDC (May 22, 2012 and June 1, 2012) (on file with authors). *See* Appendix 1 for a state-by-state breakdown of funding awarded by program.

<sup>22</sup> “Congress shall make no law . . . abridging . . . the right of the people . . . to petition Government for a redress of grievances.” U.S. Const. amend. I. The right to “petition for a redress of grievances [is] among the most precious of the liberties safeguarded by the Bill of Rights.” *United Mine Workers of Am., Dist. 12. v. Illinois State Bar Ass’n et al.*, 389 U.S. 217, 222 (1967). It shares the “preferred place” accorded in our system of government to the First Amendment freedoms, and has “sanctity and a sanction not permitting dubious intrusions.” *Thomas v. Collins*, 323 U.S. 516, 530 (1945). “[A]ny attempt to restrict those First Amendment liberties must be justified by clear public interest, threatened not doubtfully or remotely, but by clear and present danger.” *Id.*

<sup>23</sup> 5 U.S.C. § 553(e) (2006).

<sup>24</sup> 44 C.F.R. § 1.18 (2012).

## NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning October 2, 2012

First, begin complying with its extant statutory and regulatory mandates by approving, in the 2013 plan renewal cycle and beyond, only those state hazard mitigation plans that consider and plan for the current and future natural hazard risks associated with climate change. Furthermore, FEMA must not release federal Hazard Mitigation Assistance grants to states without approved plans.<sup>25</sup>

Secondly, initiate a new rulemaking amending 44 CFR § 201.4 to ensure states clearly understand the need to incorporate an assessment of climate-related risks in their state hazard mitigation plans. FEMA's rulemaking should confirm that the existing laws and regulations require consideration of climate change impacts on hazard risks, for example:

“Statewide risk assessments must characterize and analyze natural hazards and risks, **including hazards and risks related to projected climate change impacts, such as coastal flooding, riparian flooding, drought, heat-related illness, air pollution, pollen allergies and drinking water contamination, among others,** to provide a statewide overview. ... The risk assessment shall include the following: ... An overview of the type and location of all natural hazards that can affect the State, including ... the probability of future hazard events, **including natural hazard events intensified by or more likely to occur due to climate change.**”

Finally, while the aforementioned rulemaking is pending, amend relevant sections of the FEMA “Multi-Hazard Mitigation Planning Guidance Under the Disaster Mitigation Act of 2000” interpretive guidance document, also known as “The Blue Book,” to explain in more detail how states must consider climate risks in their hazard mitigation plans in time for the states to use this information during the upcoming 2013 round of plan approvals. This should include amending the Risk Assessment section<sup>26</sup> to assert that reliance on past disaster events alone is insufficient to assess upcoming hazard vulnerabilities, and instead clarify that relevant climate prediction data must be consulted when available. Specifically, states should be directed to use, at a

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<sup>25</sup> The Supreme Court's recent healthcare ruling, *National Federation of Independent Business v. Sebelius*, No. 11-393 (U.S. June 28, 2012), which limits the ability of the federal government to withhold funding from the states as a sanction for non-compliance with a federal requirement, does not affect FEMA's ability to grant this petition, for at least three reasons. First, FEMA would not be “commandeering” a state's regulatory apparatus by requiring states to consider climate change in their hazard mitigation plans. Second, the conditions placed on the receipt of hazard mitigation funds would pertain to the use of those same funds, not any other programs. Third, the amount of funding that would potentially be withheld is a tiny fraction of a state's budget, hardly comparable to the “gun to the head” of the significant Medicaid funding that would have been withheld in the healthcare case.

<sup>26</sup> The Blue Book, *supra* note 18, at 1-14 - 1-33.

**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning  
October 2, 2012**

minimum, the most recent National Climate Assessment data when assessing their hazard risks.<sup>27</sup> Further, the Risk Assessment should require (1) an assessment of the impact of climate change on past, current, and future natural hazard risks in the state, (2) consideration of state and federal reports regarding climate change impacts on the state, and (3) a description of the sources and methods used to reach these conclusions. It should also include amending the Mitigation Strategy section to specify that the state mitigation “goals” and “objectives” identified in the plan must accord with the climate change-related risks identified in the Risk Assessment.<sup>28</sup> It should finally include amending the “Crosswalk” rubric for evaluating standard and enhanced plans to reflect the added criteria.<sup>29</sup>

## **V. Factual Background: Disaster Mitigation Requires Sound Planning, Which Must Account for the Substantial Effects of Climate Change on Natural Hazard Risks**

Disaster mitigation planning is a critical tool to reduce the economic and human health costs of disasters by proactively addressing natural hazard risks. FEMA awards grants to states and local governments for disaster mitigation planning and implementation under a number of different programs, almost all of which are contingent on approval of a state’s hazard mitigation plan. Although there is scientific consensus on many of climate change’s water-related and health-related impacts on natural hazard risks, and although significant costs are associated with these impacts, FEMA has not yet explicitly required climate change impacts to be addressed in hazard mitigation plans. Yet multiple agencies within the federal government have publicly recognized the significant risks climate change poses to public health and property, and the need to integrate climate change adaptation into hazard mitigation has become increasingly clear within the scientific and emergency management communities. It is time that FEMA recognize and comply with its DMA2K obligation to only approve hazard mitigation plans that sufficiently address climate change.

### **A. Disaster Mitigation Planning Is Critical to Protect People and Property From Harm**

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<sup>27</sup> See U.S. Global Change Research Program, National Climate Assessment, <http://www.globalchange.gov/what-we-do/assessment/> (last visited Aug. 16, 2012).

<sup>28</sup> The Blue Book, *supra* note 18, at 1-34 - 1-38.

<sup>29</sup> *Id.* at 4-1.

## NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning October 2, 2012

While natural disasters may not be entirely avoidable, the economic and human health costs of disasters can be reduced through effective planning, mitigation, preparation, response, and recovery. As an agency, FEMA emphasizes a collaborative partnership with local partners to do precisely that: “FEMA’s mission is to support our citizens and first responders to ensure that as a nation we work together to build, sustain, and improve our capability to prepare for, protect against, respond to, recover from, and mitigate all hazards.”<sup>30</sup> This mission helps to comply with the instructions of Presidential Policy Directive “PPD-8,” which states the president’s goal of “strengthening the security and resilience of the United States through systematic preparation for the threats that pose the greatest risk to the security of the Nation, including . . . catastrophic natural disasters.”<sup>31</sup>

Mitigation efforts, which reduce or eliminate potential losses from future disasters, are one key component of an integrated strategy to minimize the deleterious effects of disasters. As the National Research Council has stated, “Creating a culture of disaster resilience for the nation is a proactive, rather than a reactive, approach to the problems caused by disasters. Such a culture can provide a pathway for reducing vulnerability and the impacts of disasters before they occur, with the potential to decrease the costs of disasters at all levels.”<sup>32</sup>

Benefits from mitigation are often defined as losses avoided, such as reduced direct property damage, reduced direct business interruption loss, reduced indirect business interruption loss, reduced nonmarket damage (including ecological damage), reduced human losses (including health and death), and reduced emergency response.<sup>33</sup> Under the Stafford Act and the DMA2K, FEMA awards significant grant funding to states and localities seeking to engage in hazard mitigation planning or implement disaster mitigation projects. Such funds totaled approximately \$8.5 billion since the Stafford Act was enacted in 1988.<sup>34</sup> As the Council on

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<sup>30</sup> FEMA, *About FEMA*, *supra* note 12.

<sup>31</sup> Presidential Policy Directive/PPD-8, *National Preparedness* 1 (Mar. 30, 2011), available at <http://www.dhs.gov/xlibrary/assets/presidential-policy-directive-8-national-preparedness.pdf>.

<sup>32</sup> The National Academies, Committee on Increasing National Resilience to Hazards and Disasters & Committee on Science, Engineering, and Public Policy, *Disaster Resilience: A National Imperative*, Summary 1 (2012), available at [http://www.nap.edu/html/13457/13457\\_summary.pdf](http://www.nap.edu/html/13457/13457_summary.pdf).

<sup>33</sup> Multihazard Mitigation Council, National Institute of Building Sciences, *Natural Hazard Mitigation Saves: An Independent Study to Assess the Future Savings from Mitigation Activities* 1-2 (2005), available at [http://www.nibs.org/client/assets/files/mmc/Part1\\_final.pdf](http://www.nibs.org/client/assets/files/mmc/Part1_final.pdf).

<sup>34</sup> Emails from FEMA Federal Insurance and Mitigation Administration (FIMA) staff to NRDC (May 22, 2012 and June 1, 2012) (on file with authors). See Appendix 1 for a state-by-state breakdown of funding awarded by program.

**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning  
October 2, 2012**

Environmental Quality noted, FEMA finds that every dollar it spends on hazard mitigation provides the nation with about four dollars in future benefits.<sup>35</sup>

In order to effectively mitigate the adverse effects of a disaster, and efficiently reap the benefits of mitigation, states and local communities need to collaborate and plan effectively. The hazard mitigation plan is the key document that states and localities use to prepare and coordinate their mitigation efforts, and it represents “the foundation for a community’s long-term strategy to reduce disaster losses.”<sup>36</sup> FEMA hazard mitigation assistance grants are typically awarded to projects that are based on or developed via hazard mitigation plans. As FEMA explains in the Blue Book, “[t]he implementation of planned, pre-identified, cost-effective mitigation actions based on a sound hazard identification and assessment of risk will make a major contribution” to “streamlining the mitigation planning and implementation process.”<sup>37</sup> As a result of sound hazard mitigation planning, states, localities, and the federal government can save money – and possibly lives – in the long run by investing in cost-effective, proactive mitigation strategies.

FEMA further makes clear that the “DMA 2000 mitigation planning provisions, along with other sections of the Act, provide a significant opportunity to reduce the Nation’s disaster losses.”<sup>38</sup> Yet this opportunity can only be maximized if planning is comprehensive and utilizes all of the most current and credible scientific information available to assess risks and possible mitigation options. If a state fails to fully arm itself with the true picture of its risks of potential hazards, or inadequately plans for those hazards, it will at best fail to take advantage of the full opportunity offered by the DMA2K, and at worst, put human health and property at an increased risk, as the state remains under-informed and under-invested in disaster mitigation. Further, poor planning may also reduce the cost-savings of mitigation if projects – like dams or bridges, for instance – later need to be reconstructed or renovated because they were built in response to an initial risk assessment that was outdated or did not adequately capture the full picture of the risk.

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Note that prior to the DMA2K, hazard mitigation planning was not required. Note also that the RFC and SRL programs were not initiated until after DMA2K.

<sup>35</sup> White House Council on Environmental Quality, *Progress Report of the Interagency Climate Change Adaptation Task Force: Federal Actions for a Climate Resilient Nation* 9 (Oct. 28, 2011), available at [http://www.whitehouse.gov/sites/default/files/microsites/ceq/2011\\_adaptation\\_progress\\_report.pdf](http://www.whitehouse.gov/sites/default/files/microsites/ceq/2011_adaptation_progress_report.pdf) (citing Multihazard Mitigation Council, *supra* note 33).

<sup>36</sup> FEMA, Multi-Hazard Mitigation Planning, *supra* note 16.

<sup>37</sup> The Blue Book, *supra* note 18, at iv.

<sup>38</sup> *Id.*

## NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning October 2, 2012

The scientific and government consensus about the threats posed by climate change merit strong consideration in hazard mitigation planning. Firmly established scientific evidence, described in more detail in Part V.C. *infra*, links climate change to increased risk of water-related and health-related natural hazards including flood, drought, and extreme heat – all of which have consistently been interpreted by FEMA as “natural hazards” under the Stafford Act and DMA2K. In fact, the National Research Council lists, as one of the reasons for investing in national disaster resilience, the fact that “impacts of climate change and degradation of natural defenses such as coastal wetlands make the nation more vulnerable.”<sup>39</sup> Consequently, the NRC recommends taking into account during risk management planning “the potential impacts of climate change that could affect the intensity or frequency of the hazard.”<sup>40</sup>

By complying with its legal duty to only approve those hazard mitigation plans that address climate change, FEMA can provide effective leadership and ensure that states take full advantage of the opportunity to comprehensively plan for disaster as well as the federal funds that FEMA provides for mitigation planning and implementation.

### **B. The Current FEMA Grant Scheme for Hazard Mitigation Assistance Fails to Require That States Plan for Climate Change Impacts**

FEMA annually awards a significant amount of money to individual states, localities, and tribal areas through its Hazard Mitigation Assistance (HMA) grant programs, which are “non-emergency” grants to fund state planning and action to mitigate *future* harms. There are five key HMA grant programs for which FEMA awards funds: Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (PDM),<sup>41</sup> Flood Mitigation Assistance (FMA), Repetitive Flood Claims (RFC), and Severe Repetitive Loss (SRL) grants.

The FMA program provides three types of grants for mitigation projects in advance of disasters, contingent on a 25% non-federal match, and based on the total number of National

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<sup>39</sup> The National Academies, *Disaster Resilience: A National Imperative* 12 (2012), available at [http://www.nap.edu/catalog.php?record\\_id=13457](http://www.nap.edu/catalog.php?record_id=13457).

<sup>40</sup> *Id.* at 26.

<sup>41</sup> Though FEMA has proposed to eliminate the Pre-Disaster Mitigation grant program in fiscal year 2013, this does not make NRDC’s proposed rulemaking moot, even assuming the cut is made. This is because, as FEMA explains, “[t]here is no impact from this reduction due to duplication with other FEMA grant programs, including the Hazard Mitigation Grant Program.” FEMA, *FY2013 Proposed Budget* 154 (2012), available at [http://www.fema.gov/pdf/about/budget/fema\\_fy2013\\_bib.pdf](http://www.fema.gov/pdf/about/budget/fema_fy2013_bib.pdf). Since the hazard mitigation plan requirement still applies to the Hazard Mitigation Grant Program, our proposed regulation is still necessary.

**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning  
October 2, 2012**

Flood Insurance Program (NFIP) policies in the state.<sup>42</sup> “FEMA provides FMA funds to assist States and communities implement measures that reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insured under the National Flood Insurance Program.”<sup>43</sup> The HMGP provides funds after a disaster to prevent future disasters through the implementation of long-term hazard mitigation strategies.<sup>44</sup> Through the RFC program, FEMA grants up to \$10 million annually to states and communities to reduce flood damage to properties that have had one or more NFIP claims.<sup>45</sup> Under the PDM program, FEMA awards competitive grants to states, territories, Indian tribal governments, communities, and universities for planning and implementation of pre-disaster hazard mitigation projects.<sup>46</sup> The SRL program is intended to reduce or eliminate the long-term risk of flood damage to structures that have suffered severe repetitive losses via project activities that will result in the greatest savings to the National Flood Insurance Fund.

States must individually apply for these grants on an annual basis. The HMGP, PDM, FMA, RFC, and SRL programs are “non-emergency” grants that are not used to respond to the immediate consequences of a natural disaster but rather fund state planning and improvements to mitigate *future* harms.<sup>47</sup> All of these pre-disaster funding programs help to reduce overall risks to the population and structures, while also reducing reliance on post-disaster funding when disasters are declared.

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<sup>42</sup> The Blue Book, *supra* note 18, at 1-52.

<sup>43</sup> FEMA, Flood Mitigation Assistance Program, <http://www.fema.gov/government/grant/fma/index.shtm> (last visited Aug. 16, 2012).

<sup>44</sup> The Blue Book, *supra* note 18, at 1-52; FEMA, Hazard Mitigation Grant Program, <http://www.fema.gov/government/grant/hmgrp/index.shtm> (last visited Aug. 16, 2012).

<sup>45</sup> FEMA, Repetitive Flood Claims Program, <http://www.fema.gov/government/grant/rfc/index.shtm> (last visited Aug. 16, 2012).

<sup>46</sup> FEMA, Pre-Disaster Mitigation Grant Program, <http://www.fema.gov/government/grant/pdm/index.shtm> (last visited Aug. 16, 2012).

<sup>47</sup> 44 C.F.R. § 201.4(a) (2012) (“In any case, emergency assistance...will not be affected”). *See also* FEMA, Hazard Mitigation Planning Resources, <http://coop.fema.gov/plan/mitplanning/resources.shtm> (“[States] are required to develop hazard mitigation plans as a condition for receiving certain types of *non-emergency* disaster assistance” (emphasis added)). FEMA maintains a separate funding pool and application process for disaster victims, with no Hazard Mitigation Plan requirement. The agency actions sought in this petition will therefore not affect emergency or disaster funding, even though a prior disaster declaration is required for HMGP eligibility.

## **NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning October 2, 2012**

In three recent years, total awards under these HMA programs have totaled approximately \$245 million (2010), \$575 million (2009), and \$1.5 billion (2008),<sup>48</sup> and since their inception in 1988 through May 2012, the HMA programs have awarded roughly \$8.5 billion.<sup>49</sup>

FEMA approval of a state hazard mitigation plan, which must be renewed every three years, is a precondition to a state award under any of the HMA grant programs except RFC,<sup>50</sup> the smallest of the grant programs by a wide margin. In the three-year period from 2008 to 2010, the most recent years for which data is available, FEMA dispensed more than \$2.2 billion in grant dollars that, by law and FEMA policy, could only be awarded if the recipient state or locality had an approved mitigation plan on file with FEMA.

Despite these very high fiscal commitments, FEMA has nonetheless approved plans that fall short of the legal requirements. Specifically, FEMA has awarded millions of dollars in grants to states like Texas, Alabama, Iowa, and Ohio whose approved plans do not adequately – or at all – evaluate and prepare for the well-documented impacts of climate change on the risk of hazards like drought, coastal flooding, riparian flooding, extreme heat, air pollution, increased allergens, and drinking water contamination. FEMA’s approval of these states’ inadequate plans contravenes the agency’s legal obligations. The hundreds of millions of dollars in hazard mitigation funding awarded annually on the basis of hazard mitigation plans should only be granted to states like Connecticut and California that are conducting adequate due diligence and planning appropriately for climate change impacts on disaster risks. Furthermore, it is a wasted opportunity, for while these grant funds are intended to assist states and local governments in minimizing the risk of future disasters, many grant recipients are leaving significant threats unaccounted for.

### **C. Climate Change Poses Serious Threats to Water Resources and Human Health, With the Potential for Considerable Financial Costs**

Climate change poses a significant threat to the nation’s water resources and to public health, and it will multiply the damages caused by natural disasters. The links between climate

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<sup>48</sup> FEMA, *FY 2011 Hazard Mitigation Assistance (HMA) Unified Guidance*, *supra* note 17, at 5; NRDC Communication with FEMA Federal Insurance and Mitigation Administration (FIMA), May 22, 2012. Fiscal data for 2011 is not available from FEMA at this time.

<sup>49</sup> Based on NRDC staff communication with FEMA Federal Insurance and Mitigation Administration (FIMA), May 22, 2012 and June 1, 2012. See Appendix 1 for a state-by-state breakdown of funding awarded by program.

<sup>50</sup> FEMA, *FY 2011 Hazard Mitigation Assistance (HMA) Unified Guidance*, *supra* note 17, at 19.

## NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning October 2, 2012

change and both water-related hazards and human health have been proven by the scientific community. Scientists have reached a consensus on many of the impacts of climate change. In its latest report, the Intergovernmental Panel on Climate Change (IPCC) states with high confidence in its latest report that climate change has the potential to “seriously affect water management systems.”<sup>51</sup> The IPCC identifies water management as a sector with a greater risk of severe impacts of extreme events, and notes that climate-related extremes are expected to produce large impacts on infrastructure.<sup>52</sup> “In many places, the nation’s water systems are already taxed due to aging infrastructure, population increases, and competition among water needs for farming, municipalities, hydropower, recreation, and ecosystems.”<sup>53</sup> Furthermore, the IPCC states that “[i]t is virtually certain that increases in the frequency and magnitude of warm daily temperature extremes and decreases in cold extremes will occur in the 21st century at the global scale” and that “[i]t is very likely that the length, frequency, and/or intensity of warm spells or heat waves will increase over most land areas.” Extreme high temperatures have been linked with increased mortality in a number of studies, and warmer temperatures also provide conditions that facilitate “the development of stagnant air masses... that reduce air quality, trapping pollution and raising morbidity.”<sup>54</sup> Additional health impacts are also anticipated due to increased prevalence of infectious diseases such as malaria, West Nile virus, and Lyme disease, and respiratory diseases including asthma and allergic diseases.<sup>55</sup>

While some outside the prevailing scientific consensus have questioned the extent to which climate change is responsible for extreme events today, “there is there is very little debate about its effect in the future,” according to Michael Wehner, staff scientist at Lawrence Berkeley National Laboratory and member of the lead author teams of the interagency U.S. Climate Change Science Program's Synthesis and Assessment reports on climate extremes.<sup>56</sup> As scientists

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<sup>51</sup> Intergovernmental Panel on Climate Change (IPCC), *Special Report: Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation* 16 (2012), available at <http://www.ipcc-wg2.gov/SREX/>.

<sup>52</sup> *Id.*

<sup>53</sup> USGCRP, *supra* note 1, at 9.

<sup>54</sup> Center for Integrative Environmental Research at the University of Maryland, *The US Economic Impacts of Climate Change and the Costs of Inaction* 12 (2007), available at <http://www.cier.umd.edu/documents/US%20Economic%20Impacts%20of%20Climate%20Change%20and%20the%20Costs%20of%20Inaction.pdf>.

<sup>55</sup> The Center for Health and the Global Environment, Harvard Medical School, *Climate Change Futures: Health, Ecological, and Economic Dimensions* 32-52 (Paul R. Epstein & Evan Mills eds., 2005), available at [http://coralreef.noaa.gov/aboutrcrp/strategy/reprioritization/wgroups/resources/climate/resources/cc\\_futures.pdf](http://coralreef.noaa.gov/aboutrcrp/strategy/reprioritization/wgroups/resources/climate/resources/cc_futures.pdf).

<sup>56</sup> John Carey, *Our Extreme Future: Predicting and Coping with the Effects of a Changing Climate*, *Scientific American*, June 30, 2011, available at <http://www.scientificamerican.com/article.cfm?id=extreme-future-predicting-coping-with-the-effects-of-a-changing-climate&print=true>.

## NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning October 2, 2012

now agree that significant changes in precipitation and temperature are already happening and will continue, the message to policymakers is clear: “stationarity is dead and should no longer serve as a central, default assumption.” Instead of relying on historical trends, planners must instead look to the increasingly expanding body of climatic predictions that account for climate change.

### **1. More Frequent and Severe Water-Related Impacts: Coastal Flooding, Riparian Flooding, and Drought**

Climate change has already altered the water cycle and will continue to do so in the future, with implications for disaster planning and mitigation. Changes in precipitation patterns have been observed in the U.S.: “heavy downpours have become more frequent and more intense, the frequency of drought has increased over the past 50 years in the southeastern and western United States, while the Midwest and Great Plains have seen a reduction in drought frequency.”<sup>57</sup> In fact, in July 2012 the U.S. Department of Agriculture declared that more than 1,000 counties in 26 states were drought disaster areas, the largest such declaration in history.<sup>58</sup> Climate change will continue to affect water availability, in terms of timing, quantity and location for water users. Water impacts of climate change will include too much water in some places, too little in others, and degraded water quality in many. Some locations may experience all of these impacts. According to the U.S. Global Change Research Program, climate change will place additional burdens on already stressed water systems.<sup>59</sup>

A number of recent scientific studies have demonstrated that many regions of the world have already seen the effects of a changing climate, with statistically significant increases in the total amount of precipitation, the amount of precipitation falling during heavy precipitation events, and the frequency of heavy precipitation events.<sup>60</sup> Some of the strongest evidence of these changes is available for North America. In Canada, the U.S. and Mexico, there has been an increasing trend in precipitation extremes over the last half century, with heavy precipitation

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<sup>57</sup> National Research Council, *America’s Climate Choices* 19 (2011), available at [http://www.nap.edu/catalog.php?record\\_id=12781](http://www.nap.edu/catalog.php?record_id=12781) (citing USGCRP, *supra* note 1, at 32 (reporting that “The amount of rain falling in the heaviest downpours has increased approximately 20 percent on average in the past century” in the U.S. and that the increase explains most of the overall precipitation trend)).

<sup>58</sup> See Alan Bjerga, *Disaster Declared in 26 States as Drought Sears U.S.*, Bloomberg, July 12, 2012, available at <http://www.bloomberg.com/news/2012-07-11/usda-declares-disaster-in-26-states-as-drought-sears-midwest.html>.

<sup>59</sup> USGCRP, *supra* note 1, at 41.

<sup>60</sup> IPCC, *supra* note 51, at 142.

**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning  
October 2, 2012**

becoming both more common and more intense.<sup>61</sup> At the same time, the average amount of precipitation on days when precipitation occurs has also increased in North America.<sup>62</sup> As the Intergovernmental Panel on Climate Change explains, there is thus substantial evidence of “increased heavy precipitation in many regions in North America,” accompanied by a “general increase in total precipitation in most areas of the country.”<sup>63</sup>

The U.S. Global Research Program warns that: “The magnitude of the projected changes in extremes is expected to be greater than changes in averages, and hence detectable sooner.”<sup>64</sup> This means that extreme weather events and natural disasters are our introduction to an altered climate. These events will take many different forms in different locations. Anticipated changes in the water cycle include: changes in precipitation patterns and intensity, changes in the incidence of drought, widespread melting of snow and ice, increasing atmospheric water vapor, increasing evaporation, increasing water temperatures, reductions in lake and river ice, and changes in soil moisture and runoff.<sup>65</sup>

The 2010 U.S. Census reported that 159,600,000 Americans live in coastal counties.<sup>66</sup> Sea level rise is therefore one of the most threatening impacts of climate change facing the United States. The IPCC finds that “it is likely that there has been an increase in extreme coastal high water related to increases in mean sea level” and that “it is very likely that mean sea level

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<sup>61</sup> U.S. Climate Change Science Program, *Weather and Climate Extremes in a Changing Climate: Regions of Focus: North America, Hawaii, Caribbean, and U.S. Pacific Islands* ch. 2 (Thomas R. Karl et al., eds., 2008), available at <http://downloads.climatechange.gov/sap/sap3-3/sap3-3-final-all.pdf> (reporting an increasing trend in precipitation extremes in the last fifty years); Thomas C. Peterson et al., *Changes in North American Extremes Derived from Daily Weather Data*, 113 J. of Geophysical Research – Atmospheres DO7113 (2008), available at <http://www.agu.org/pubs/crossref/2008/2007JD009453.shtml> (documenting increasing precipitation in North America for the period of 1950-2004); Arthur T. DeGaetano, *Time-Dependent Changes in Extreme-Precipitation Return-Period Amounts in the Continental United States*, 48 J. of Applied Meteorology and Climatology 2086-2099 (2009), available at [http://www.hydrology.bee.cornell.edu/BEE3710Handouts/DegaetanoAPPMETCLI09\\_extremeprecip.pdf](http://www.hydrology.bee.cornell.edu/BEE3710Handouts/DegaetanoAPPMETCLI09_extremeprecip.pdf) (showing a 20% reduction in the window of time between recurrences of precipitation events of similar magnitude).

<sup>62</sup> Peterson et al., *supra* note 61, at 113 (documenting increasing precipitation in North America for the period of 1950-2004).

<sup>63</sup> IPCC, *supra* note 51, at 142 (citing S.C. Pryor, J.A. Howe, and K.E. Kunkel, *How Spatially Coherent and Statistically Robust Are Temporal Changes in Extreme Precipitation in the Contiguous USA?*, 29 Int’l J. of Climatology 31-45 (2009)).

<sup>64</sup> USGCRP, *supra* note 1, at 44.

<sup>65</sup> *Id.* at 41.

<sup>66</sup> U.S. Census Bureau, *Statistical Abstract of the United States: 2012* 33 tbl. 25 (2012), available at <http://www.census.gov/compendia/statab/2012/tables/12s0025.pdf>.

**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning  
October 2, 2012**

rise will contribute to upward trends in extreme coastal high water levels in the future.”<sup>67</sup> While there is much uncertainty around how much sea levels will rise, recent studies suggest that 2.5 to 6.2 feet of sea level rise is possible by 2100,<sup>68</sup> with variation based on geographic location and the degree to the international community reduces greenhouse gas emissions.

Many regions of the country will experience more intense storms than those they have experienced in the past. Though less frequent, storms will generate greater amounts of precipitation and heavy precipitation will represent a larger proportion of overall precipitation leading to periods of both drought and flooding.<sup>69</sup> As seasonal precipitation patterns change, rainfall will become more concentrated into heavy events, with longer, hotter dry periods in between, causing floods and droughts to become more common and more severe with less precipitation during those periods.<sup>70</sup> This trend is evident in weather patterns already. “In the past century, averaged over the United States, total precipitation has increased by about 7 percent, while the heaviest 1 percent of rain events increased by nearly 20 percent.”<sup>71</sup> Climate change will intensify this pattern. It is likely that floods and drought will become more common and more intense as regional and seasonal precipitation patterns change and rainfall events become more concentrated, with longer, hotter dry periods in between.<sup>72</sup> This type of precipitation even often leads to riparian flooding, especially when heavy precipitation persists from weeks to months in large river basins.<sup>73</sup> This pattern of heavy precipitation is particularly likely in high latitudes and tropical regions, and in winter in the northern mid latitudes.<sup>74</sup>

While heavy precipitation events are projected to become heavier and represent a greater proportion of all precipitation in all regions of the United States, these changes will be the most pronounced in areas in which average precipitation increases the most.<sup>75</sup> Regions of particular concern for flooding include the Midwest and Northeast, where increases in annual precipitation, runoff and soil moisture, and the largest increases in heavy precipitation events are predicted.<sup>76</sup> Increased precipitation is predicted in the Northeast, Alaska, and notably, the

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<sup>67</sup> IPCC, *supra* note 51, at 15.

<sup>68</sup> Martin Vermeer & Stefan Rahmstorf, *Global Sea Level Linked to Global Temperature*, 106 Proc. of the Nat’l Acad. of Sci. 21527 (2009), available at <http://www.pnas.org/content/106/51/21527.full.pdf+html>.

<sup>69</sup> USGCRP, *supra* note 1, at 41.

<sup>70</sup> *Id.*; IPCC, *supra* note 51, at 144-145.

<sup>71</sup> USGCRP, *supra* note 1, at 44.

<sup>72</sup> *Id.*

<sup>73</sup> *Id.*

<sup>74</sup> IPCC, *supra* note 51, at 13.

<sup>75</sup> USGCRP, *supra* note 1, at 44.

<sup>76</sup> *Id.*

**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning  
October 2, 2012**

Midwest,<sup>77</sup> where flooding in 2008 and 2011 alone caused over \$17 billion dollars in damages to crops, buildings, and infrastructure.<sup>78</sup> The Northeastern United States has experienced the greatest increase in the annual number of days with very heavy precipitation in the past fifty years.<sup>79</sup>

Drought risks associated with climate change also pose a significant threat to states. Declines in precipitation are anticipated in the western United States, while extreme heat is likely to accelerate evaporation and increase the likelihood of droughts.<sup>80</sup> Drought severity and duration are thus also predicted in the West, especially in the Southwest, where water scarcity is already a threat.<sup>81</sup> Longer dry periods and higher temperatures are expected to increase water demands.<sup>82</sup>

**2. More Frequent and Severe Health-Related Impacts: Heat-Related Illnesses, Air Pollution Effects, Pollen Allergies, and Drinking Water Contamination**

The adverse health impacts of climate change are also strongly supported by scientific evidence, and are already being experienced as well. While there are many different potential mechanisms through which climate change may threaten human health, the scientific community has identified several public health risks that are highly likely, including heat-related illnesses and premature mortality due to increased extreme heat events, greater air pollution and associated health effects, proliferating pollen and associated allergies, and more frequent drinking water contamination.<sup>83</sup> The EPA Administrator has considered many of these impacts

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<sup>77</sup> *Id.* at 45.

<sup>78</sup> National Climatic Data Center, National Oceanic Atmospheric Administration, *Billion Dollar U.S. Weather/Climate Disasters 1980-2012* (Apr. 26, 2012), available at <http://www.ncdc.noaa.gov/billions/events.pdf>.

<sup>79</sup> USGCRP, *supra* note 1, at 42.

<sup>80</sup> *Id.*; Gerald A. Meehl et al., *Trends in Extreme Weather and Climate Events: Issues Related to Modeling Extremes in Projections of Future Climate Change*, 81 *Bull. of the Am. Meteorological Soc'y* 427, 428 (2000), available at <http://journals.ametsoc.org/doi/pdf/10.1175/1520-0477%282000%29081%3C0427%3ATIEWAC%3E2.3.CO%3B2>.

<sup>81</sup> USGCRP, *supra* note 1, at 42.

<sup>82</sup> *Id.* at 49.

<sup>83</sup> See, e.g., NRDC, *Climate and Your Health: Addressing the Most Serious Health Effects of Climate Change* (2011), available at <http://www.nrdc.org/health/files/climatehealthfacts.pdf>; Mark E. Keim, *Building Human Resilience: The Role of Public Health Preparedness and Response as an Adaptation to Climate Change*, 35 *Am. J. of Preventive Med.* 508, 508 (2008), available at <http://trig.squarespace.com/storage/Keim.pdf>.

**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning  
October 2, 2012**

to be effects on public health and welfare within the meaning of the Clean Air Act, and accordingly released an endangerment finding.<sup>84</sup>

Rising temperatures, and particularly more frequent and intense heat waves, are directly linked to increased morbidity (illnesses) and mortality (premature deaths) and due to extreme heat. Increased heat extremes have already been documented in the U.S., including in the past year: the July 2011 to June 2012 period was the warmest twelve-month period the nation has experienced since recordkeeping began in 1895, with over 40,000 heat records broken in the first half of 2012 alone.<sup>85</sup> A recent study published in the *Proceedings of the National Academy of Sciences* concludes that recent heat waves and extreme summers were very likely caused by climate change.<sup>86</sup> These heat extremes are projected to become even more frequent, with “summertime mean temperatures that occurred historically only 5% of the time are projected to occur at least 70% of the time everywhere in the 48-state region” of the continental U.S.<sup>87</sup> Furthermore, recent heat waves in Europe in 2003 and 2006,<sup>88</sup> in California in 2006,<sup>89</sup> in Russia in 2010,<sup>90</sup> in the Eastern U.S. in 2010,<sup>91</sup> and in many parts of the Southern Plains and the Southwest in 2011<sup>92</sup> underscore the significant toll that extreme heat can take on human health. Extreme heat can lead to illness due to dehydration or heat stroke, and it can also contribute to a range of cardiovascular, respiratory and cerebrovascular illnesses, as it puts stress on several different organ systems, including the heart, lung, and kidneys.<sup>93</sup> Many of these illnesses can lead

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<sup>84</sup> Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act; Final Rule, 74 Fed. Reg. 66,496 (Dec. 15, 2009), available at <http://www.gpo.gov/fdsys/pkg/FR-2009-12-15/pdf/E9-29537.pdf>.

<sup>85</sup> National Oceanic and Atmospheric Administration, National Climatic Data Center, State of the Climate National Overview, June 2012, <http://www.ncdc.noaa.gov/sotc/national/2012/6> (last visited Aug. 16, 2012).

<sup>86</sup> James Hansen, Makiko Sato, and Reto Ruedy, *Perception of Climate Change*, Proc. of the Nat’l Acad. of Sci., (Aug. 6, 2012) (published online before print), available at <http://www.pnas.org/content/early/2012/07/30/1205276109.full.pdf+html>.

<sup>87</sup> P. B. Duffy & C. Tebaldi, *Increasing Prevalence of Extreme Summer Temperatures in the U.S.*, 111 Climatic Change 487, 491 (2012).

<sup>88</sup> IPCC, *supra* note 51, at 44.

<sup>89</sup> Kim Knowlton et al., *Six Climate Change-Related Events In The United States Accounted For About \$14 Billion In Lost Lives And Health Costs*, 30 Health Affairs 2,167, 2,167 (2011), available at <http://content.healthaffairs.org/content/30/11/2167.full.html>.

<sup>90</sup> IPCC, *supra* note 51, at 134.

<sup>91</sup> Carey, *supra* note 56.

<sup>92</sup> National Climatic Data Center, *supra* note 7878.

<sup>93</sup> Environmental Protection Agency (EPA), *Excessive Heat Events Guidebook* (2006), available at [http://www.epa.gov/hiri/about/pdf/EHEguide\\_final.pdf](http://www.epa.gov/hiri/about/pdf/EHEguide_final.pdf) (developed collaboratively with NOAA, CDC, and FEMA); The Center for Health and the Global Environment, *supra* note 55, at 55; Knowlton et al., *supra* note 89, at 2,169.

**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning  
October 2, 2012**

to premature death. For example, during a 1995 heat wave in Chicago, over 700 deaths were attributable to extreme heat.<sup>94</sup> Since more frequent, more intense, and longer-lasting heat waves are expected, heat-related sickness and premature death will continue to be among the most significant public health impacts of climate change.<sup>95</sup> While extreme heat is one of the greatest drivers of increased mortality and morbidity due to climate change, effective hazard mitigation and preparedness could help to reduce these harmful impacts on human health.

In addition to heat illnesses, warmer temperatures and longer, more intense heat waves are also associated with increased stagnant air and increased concentrations of air pollutants, such as ozone. Poor air quality is linked to increased rates of asthma, chronic obstructive pulmonary disease (COPD) and other respiratory diseases.<sup>96</sup> Exposure to ozone in particular “reduces lung function and inflames airways, leading to increased rates of emergency department visits, hospitalizations, and premature mortality—especially among people with respiratory illnesses, young children, and the elderly,”<sup>97</sup> and has also been shown to be accompanied by increases in allergies, hospital admissions for asthma, hospital admissions for COPD and other respiratory diseases, and ultimately, mortality.<sup>98</sup> In addition, increased wildfires due to warmer

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<sup>94</sup> Steven Whitman et al., *Mortality in Chicago Attributed to the July 1995 Heat Wave*, 87 Am. J. of Pub. Health 1,515, 1,515 (1997), available at <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1380980/pdf/amjph00508-0117.pdf>; Jan C. Semenza et al., *Excess Hospital Admissions During the July 1995 Heat Wave in Chicago*, 16 Am. J. Prev. Med. 269, 271 (1999), available at <http://download.journals.elsevierhealth.com/pdfs/journals/0749-3797/PIIS0749379799000252.pdf>; The Center for Health and the Global Environment, *supra* note 55, at 58. See also Jan C. Semenza et al., *Heat-Related Deaths During the July 1995 Heat Wave in Chicago*, 335 New England J. of Med. 84, 84 (1996), available at <http://www.nejm.org/doi/pdf/10.1056/NEJM199607113350203>.

<sup>95</sup> Gerald A. Meehl & Claudia Tebaldi, *More Intense, More Frequent, and Longer Lasting Heat Waves in the 21st Century*, 305 Science 994 (Aug. 13, 2004), available at <http://www.sciencemag.org/content/305/5686/994.full.pdf>; Kim Knowlton et al., *The 2006 California Heat Wave: Impacts on Hospitalizations and Emergency Department Visits*, 117 Env'tl. Health Persp. 66 (2009), available at <http://ehp03.niehs.nih.gov/article/info%3Adoi%2F10.1289%2Fehp.11594>; EPA, *supra* note 93, at 9-17.

<sup>96</sup> Kent E. Pinkerton et al., on behalf of the American Thoracic Society Environmental Health Policy Committee, *Official American Thoracic Society Workshop Report: Climate Change and Human Health*, 9 Proc. Am. Thorac. Soc. 3, 4-5 (2012), available at [http://ehs.sph.berkeley.edu/krsmith/publications/2012/2012\\_PATS.pdf](http://ehs.sph.berkeley.edu/krsmith/publications/2012/2012_PATS.pdf); Michelle L. Bell et al., *Climate Change, Ambient Ozone, and Health in 50 US Cities*, 82 Climatic Change 61-76 (2007), available at <http://sage.wisc.edu/pubs/articles/M-Z/Patz/BelletalCC2007.pdf>.

<sup>97</sup> Knowlton et al., *supra* note 89, at 2,168.

<sup>98</sup> Bell et al., *supra* note 96, at 13; Kent E. Pinkerton et al., *supra* note 96, at 1, 3-5, 12; USGCRP, *supra* note 1, at 91-94; Jeffrey Levi et al., Trust for America's Health, *Health Problems Heat Up: Climate Change and the Public's Health* 25, 27 (Oct. 2009), available at <http://www.healthyamericans.org/reports/environment/TFAHClimateChangeWeb.pdf>.

**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning  
October 2, 2012**

temperatures and longer and more severe drought conditions can also contribute to air pollution, causing respiratory illness and even death from smoke inhalation.<sup>99</sup>

Further contributing to respiratory health problems are the anticipated increases in pollen and aeroallergens, which are driven by the increased temperatures and rising carbon dioxide levels associated with climate change.<sup>100</sup> Allergies and asthma currently cost the U.S. healthcare system an estimated \$32.6 billion annually in direct health care costs and lost productivity,<sup>101</sup> and this is likely to increase with climate change.<sup>102</sup> Combined with other threats to respiratory health associated with climate change, increased pollen counts will lead to significant adverse health impacts.

Another key mechanism through which climate change affects public health is through stress on drinking water: either by reducing availability, due to drought conditions described above, or by reducing quality as water sources are contaminated, potentially under conditions of drought or due to flooding. A number of secondary agricultural, economic, and health effects are associated with drought, and stressed drinking water supply is often among the most significant of these impacts on human health.<sup>103</sup> Extreme precipitation events – particularly in cities with combined sewer systems, where sewage may intermix with stormwater during heavy rains – and floods can also cause additional public health vulnerabilities, providing opportunities for waterborne pathogens to proliferate.<sup>104</sup> Pathogenic parasites such as cryptosporidium and giardia,

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<sup>99</sup> Martine Dennekamp & Michael J. Abramson, *The Effects of Bushfire Smoke on Respiratory Health*, 16 *Respirology* 198, 207-208 (2011), available at <http://www.fire.uni-freiburg.de/vfe/Dennekamp-Bushfire-Respiratory-Review-2011.pdf>; USGCRP, *supra* note 1, at 93, 95; Levi et al., *supra* note 98, at 9, 19, 48. See also Max A. Moritz et al., *Climate Change and Disruptions to Global Fire Activity*, 3 *Ecosphere* 49 (2012), available at [http://democrats.naturalresources.house.gov/sites/democrats.naturalresources.house.gov/files/2012-06\\_Moritzetal\\_Ecosphere\\_.pdf](http://democrats.naturalresources.house.gov/sites/democrats.naturalresources.house.gov/files/2012-06_Moritzetal_Ecosphere_.pdf).

<sup>100</sup> USGCRP, *supra* note 1, at 89-98.

<sup>101</sup> National Wildlife Federation & the Asthma and Allergy Foundation of America, *Extreme Allergies and Global Warming* 1, 3, 7 (2010), available at [http://www.nwf.org/~media/PDFs/Global-Warming/Reports/NWF\\_AllergiesFinal.ashx](http://www.nwf.org/~media/PDFs/Global-Warming/Reports/NWF_AllergiesFinal.ashx) (The authors estimated \$11.2 billion in allergic rhinitis direct medical costs, \$0.7 billion in lost productivity from hay fever allergy, \$15.6 billion in direct medical costs due to asthma, and \$5.1 billion in lost earnings due to asthma.). See also The Center for Health and the Global Environment, *supra* note 55, at 55.

<sup>102</sup> The Center for Health and the Global Environment, *supra* note 5555, at 52.

<sup>103</sup> Keim, *supra* note 83, at 512.

<sup>104</sup> *Id.*

## NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning October 2, 2012

bacteria such as *E. coli* and salmonella, and viruses such as hepatitis A can all be found in contaminated waters.<sup>105</sup>

### 3. Climate-Related Disasters Can Have Enormous Financial Costs

The increases in water-related disasters and adverse human health effects have significant financial implications. Economic losses from weather- and climate-related disasters have been generally increasing since 1980.<sup>106</sup> Insured losses from such disasters in North America alone for the first half of 2011 were estimated at \$17.8 billion,<sup>107</sup> and three of the top 15 most expensive disasters in the world happened in 2010-2011.<sup>108</sup> The major cause of this long-term trend is increasing exposure of people and economic assets to weather and climate related disasters.<sup>109</sup>

The National Climatic Data Center tracks climate events in the United States that have great economic and societal impacts.<sup>110</sup> The map depicted below shows the geographic distribution of weather and climate disasters with a cost exceeding one billion dollars from 1980 to 2011. Many of the states with high numbers of billion dollar disasters are the same states which are highlighted later in this petition as failing to comply with FEMA regulations and denying or underestimating the impacts of climate change, which may underscore the importance of factoring climate change into disaster planning.

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<sup>105</sup> NRDC, *Rising Tide of Illness: How Global Warming Could Increase the Threat of Waterborne Diseases* (July 2010), available at [http://www.nrdc.org/health/files/GWillness4pgr\\_08.pdf](http://www.nrdc.org/health/files/GWillness4pgr_08.pdf); Jonathan Yoder et al., *Surveillance for Waterborne Disease and Outbreaks Associated with Drinking Water Not Intended for Drinking – United States, 2005-2006*, MMWR Surveillance Summaries 57(SS09) 39 (2008), available at <http://www.cdc.gov/mmwr/preview/mmwrhtml/ss5709a4.htm>; Jonathan S. Yoder et al., *Surveillance for Waterborne Disease and Outbreaks Associated with Recreational Water Use and Other Aquatic Facility-Associated Health Events – United States, 2005-2006*, MMWR Surveillance Summaries 57(SS09) 1 (2008), available at <http://www.cdc.gov/mmwr/preview/mmwrhtml/ss5709a1.htm>.

<sup>106</sup> IPCC, *supra* note 51, at 9.

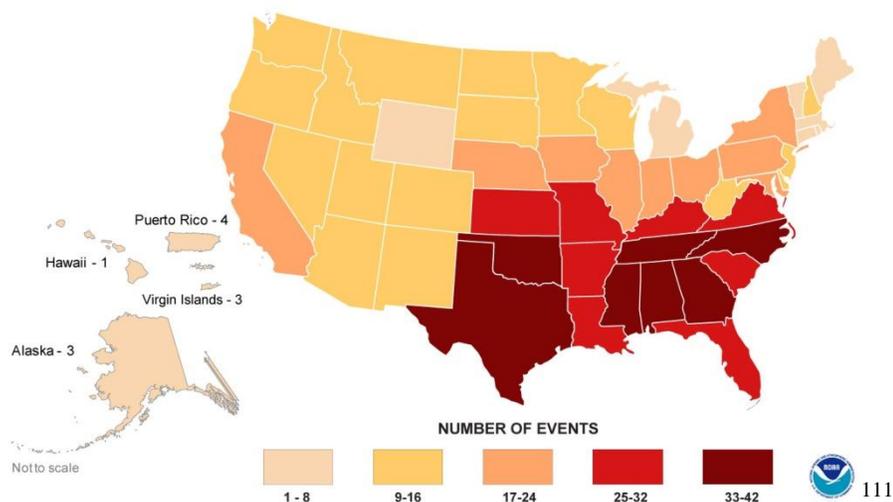
<sup>107</sup> Peter Höpfe, Geo Risks Research /Corporate Climate Center, Munich Re, Presentation at Munich Re 2011 Half-Year Natural Catastrophe Review: Global Natural Catastrophe Update (July 12, 2011), available at [http://www.munichreamerica.com/webinars/2011\\_07\\_natcatreview/MR\\_III\\_2011\\_HalfYear\\_NatCat\\_Review.pdf](http://www.munichreamerica.com/webinars/2011_07_natcatreview/MR_III_2011_HalfYear_NatCat_Review.pdf).

<sup>108</sup> Robert P. Hartwig, Insurance Information Institute, Presentation at Munich Re 2011 Half-Year Natural Catastrophe Review: Economic & Financial Implications of Natural Catastrophe Losses First Half 2011 (July 12, 2011), available at [http://www.munichreamerica.com/webinars/2011\\_07\\_natcatreview/MR\\_III\\_2011\\_HalfYear\\_NatCat\\_Review.pdf](http://www.munichreamerica.com/webinars/2011_07_natcatreview/MR_III_2011_HalfYear_NatCat_Review.pdf).

<sup>109</sup> *Id.*

<sup>110</sup> U.S. National Oceanic and Atmospheric Association, National Climatic Data Center, <http://www.ncdc.noaa.gov/oa/ncdc.html> (last visited Aug. 16, 2012).

## Billion Dollar Weather/Climate Disasters 1980 - 2011



Evidence also indicates that there are substantial health costs associated with climate change. In fact, in the November 2011 issue of *Health Affairs*, an interdisciplinary research team estimated that there were \$740 million in direct health costs, and an estimated mortality valuation of \$13.3 billion related to 1,689 premature deaths, resulting from six different climate-related case studies of events that occurred from 2000-2009:<sup>112</sup>

Climate-related Health Stressor	Premature Death (\$ thousands)	Hospitalization (\$ thousands)	Emergency department visit (\$ thousands)	Outpatient visit (\$ thousands)	Total Health Costs (\$ thousands)	Normalized Cost (\$ per 1000 people)
Ozone air pollution	6,280,500	36,212	314,000	217,616	6,534,642	22,705
Heat wave	5,174,500	28,435	14,110	136,380	5,353,425	148,792
Hurricane	1,137,600	18,321	4,365	232,547	1,392,833	80,162
Infectious disease outbreak	189,600	12,935	104	4,808	207,447	46,449
River flooding	15,800	839,000	232	3,486	20,357	145,495
Wildfires	545,100	9,952,000	1,050	22,538	578,640	28,819

<sup>111</sup> *Id.*

<sup>112</sup> Knowlton et al., *supra* note 89, at 2171.

**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning  
October 2, 2012**

Total	13,343,100	10,886,903	333,861	617,375	14,087,344	472,422
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Accordingly, the costs attributable to climate-related disasters are significant. As the purpose of the DMA2K was, in part, to take advantage of the life-saving and cost-saving benefits of disaster mitigation rather than to simply react to disasters after the fact,<sup>113</sup> it is incumbent upon the agency responsible – FEMA – to consider these climate-change-related threats in hazard mitigation.

**D. The Federal Government Has Acknowledged the Natural Hazard Threats Posed by Climate Change**

In addition to the numerous studies described above, many of which were performed or funded by federal agencies, the federal government has also explicitly acknowledged the significant impacts posed by climatic changes and has begun to recognize the importance of climate change adaptation measures. Following the Supreme Court’s decision in *Massachusetts v. EPA*,<sup>114</sup> the EPA Administrator made an endangerment finding regarding greenhouse gases under section 202(a) of the Clean Air Act.<sup>115</sup> The Administrator’s endangerment finding is based on sound technical and scientific data that reveals that severity of risks and impacts is likely to increase over time with accumulating greenhouse gas concentrations and associated temperature increases and precipitation changes. The Administrator particularly recognized that evidence concerning adverse climate change impacts in the areas of water resources and sea level rise and coastal areas provides the clearest and strongest support for an endangerment finding.<sup>116</sup> This statement is a public recognition of the effects of climate change on public health and welfare both for current and future generations. Even further, the finding declares that even areas of the country where an increase in water flow is projected could face water resource problems due to the water quality and quantity problems associated with temperature increases and precipitation

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<sup>113</sup> See generally 146 Cong. Rec. H9562-01 (daily ed. Oct. 10, 2000) (statement of Rep. Fowler); 146 Cong. Rec. S7298-02 (daily ed. July 29, 2000) (statement of Sen. Inhofe).

<sup>114</sup> *Massachusetts v. Environmental Protection Agency*, 549 U.S. 497 (2007).

<sup>115</sup> 74 Fed. Reg. 66,496 (The EPA Administrator issued an endangerment finding that the current and projected concentrations of the six key well-mixed greenhouse gases – carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF<sub>6</sub>) – in the atmosphere threaten the public health and welfare of current and future generations, and a cause or contribute finding that the combined emissions of these well-mixed greenhouse gases from new motor vehicles and new motor vehicle engines contribute to the greenhouse gas pollution which threatens public health and welfare.).

<sup>116</sup> *Id.*

**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning  
October 2, 2012**

variability; these areas also face the increased risk of serious adverse effects from extreme events, such as floods and drought.<sup>117</sup>

In addition, on October 28, 2011, the Interagency Climate Change Adaptation Task Force<sup>118</sup> released the 2011 Interagency Climate Change Adaptation Task Force Progress Report outlining the Federal Government's progress in expanding and strengthening the Nation's capacity to better understand, prepare for, and respond to extreme events and other climate change impacts.<sup>119</sup> Convened by President Obama in 2009, the task force has a number of different members, including representatives from FEMA and its parent agency, the Department of Homeland Security.<sup>120</sup> An earlier 2010 Task Force Report determined that the federal government has a responsibility to safeguard federal services and resources and to help states, tribes, and communities manage climate-related risks by improving access to climate information, enhancing coordination and capacity, and leading and supporting actions that reduce vulnerability and increase resilience.<sup>121</sup> According to the 2011 Progress Report, "The Obama Administration is committed to reducing the magnitude of future climate impacts by curbing greenhouse gas emissions and advancing a clean energy economy. However, a range of climate impacts are unavoidable. To manage these risks, we must identify key threats, prioritize activities that reduce our vulnerability, initiate actions that promote resilience, and enhance preparedness capabilities."<sup>122</sup>

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<sup>117</sup> *Id.*

<sup>118</sup> The Obama Administration convened the Interagency Climate Change Adaptation Task Force in 2009, co-chaired by the Council on Environmental Quality (CEQ), the Office of Science and Technology Policy (OSTP), and the National Oceanic and Atmospheric Administration (NOAA), and including representatives from more than 20 federal agencies. On October 5, 2009, President Obama signed Executive Order 13514 on Federal Leadership in Environmental, Energy, and Economic Performance called for federal agencies to participate actively in the Interagency Climate Change Adaptation Task Force directing the Task Force to develop a report with recommendations for how the federal government can strengthen policies and programs to better prepare the nation to adapt to the impacts of climate change. Exec. Order No. 13514, 74 Fed. Reg. 52117.

<sup>119</sup> White House Council on Environmental Quality (2011), *supra* note 35.

<sup>120</sup> See White House Council on Environmental Quality, *Progress Report of the Interagency Climate Change Adaptation Task Force: Recommended Actions in Support of a National Climate Change Adaptation Strategy* (Oct. 5, 2010), available at <http://www.whitehouse.gov/sites/default/files/microsites/ceq/Interagency-Climate-Change-Adaptation-Progress-Report.pdf>.

<sup>121</sup> *Id.* at 7-12.

<sup>122</sup> White House Council on Environmental Quality (2011), *supra* note 35, at 3.

## E. Climate Change Adaptation Must Be Integrated into Hazard Mitigation Planning

Many of the risks associated with climate change can be mitigated by forward-looking hazard mitigation planning. The implementation of comprehensive local disaster risk management strategies at the state level is a crucial component of this. In its latest report, the IPCC states: “Developing strategies for disaster risk management in the context of climate change requires a range of approaches, informed by and customized to specific local circumstances (high agreement, robust evidence). These differences and the context (national to global, urban to rural) in which they are situated shape local vulnerability and local impacts.”<sup>123</sup> Furthermore, the report emphasizes the need for closer integration of disaster risk management and climate change adaptation to facilitate long term adaptation to climate extremes.<sup>124</sup> By granting this petition, FEMA can assist states in this process by requiring climate change to be adequately addressed in their hazard mitigation plans as a condition of approval, and by awarding non-emergency HMA grants only to states implementing mitigation measures on the basis of those approved plans.

Recognizing the role of climate change in shaping exposure to future hazards is the first step for states in developing hazard mitigation plans that will prepare their populations for the risks associated with climate change. The IPCC’s recent report on managing the risks of extreme events and disasters highlights that “local response to climate extremes will require disaster risk management which acknowledges the role of climate variability and change and the associated uncertainties and that will contribute to long-term adaptation.”<sup>125</sup> The interagency U.S. Global Change Research Program recommends implementing improved impacts monitoring, which would include “information on the physical and economic effects of extreme events (such as floods and droughts), available, for example, from emergency preparedness and resource management authorities.”<sup>126</sup> The degree to which states are successful in doing this will in large part determine the degree to which they are affected by the impacts of climate change.

Increases in exposure to hazards due to climate change will result in higher direct economic losses.<sup>127</sup> “The severity of the impacts of climate extremes depends strongly on the

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<sup>123</sup> IPCC, *supra* note 51, at 11.

<sup>124</sup> *Id.*

<sup>125</sup> *Id.* at 300.

<sup>126</sup> USGCRP, *supra* note 1, at 49.

<sup>127</sup> IPCC, *supra* note 51, at 16.

**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning  
October 2, 2012**

level of exposure and vulnerability to these extremes.”<sup>128</sup> Hazard mitigation planning that takes climate change into account, and that recognizes that past risk is not a good predictor of future risks, can decrease a state’s vulnerability. The assumption that the past is a reasonable guide to for future management of natural hazards is no longer valid.<sup>129</sup>

Climate change will alter the water system in ways that will require water managers, public health officials, state administrators, and disaster preparedness experts to re-think their management strategies. Climate change will add an additional stressor to existing water management and public health challenges.<sup>130</sup> For example, the National Oceanic and Atmospheric Administration described an example in a recent report of climate change impacts in the United States: “Heavy downpours and urban floods can also overwhelm combined sewer and storm-water systems and release pollutants to waterways. Unfortunately, for many cities, current planning and existing infrastructure are designed for the historical one-in-100 year event, whereas cities are likely to experience this same flood level much more frequently as a result of the climate change projected over this century.”<sup>131</sup> Adapting to extreme events such as these will be more difficult than adapting to gradual changes.<sup>132</sup> As NOAA acknowledges, the past century is no longer a reasonable guide to the future of water management.<sup>133</sup> Climate change will significantly modify the water cycle, making the assumption of an unchanging climate inappropriate for many aspects of water management and disaster planning.<sup>134</sup> For instance, State hazard mitigation plans which neglect sea level rise expose millions of people, homes and businesses to unnecessary risk from storm surge when coastal storms occur.

Integrating climate change adaptation into disaster mitigation planning is thus critical to ensure that new mitigation projects effectively address the changing vulnerabilities of a world in climatic transition. Perhaps in recognition of this, FEMA initiated an intergovernmental collaboration called the Strategic Foresight Initiative (SFI), which identified climate change as driving a shift in risks that necessitates action toward meeting future needs, particularly with respect to disaster preparedness, resilience and mitigation.<sup>135</sup> Though this public recognition of

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<sup>128</sup> *Id.* at 10.

<sup>129</sup> P. C. D. Milly et al., *Stationarity Is Dead: Whither Water Management?*, 319 *Science* 573 (Feb. 1, 2008), available at [http://www.paztcn.wr.usgs.gov/julio\\_pdf/milly\\_et\\_al.pdf](http://www.paztcn.wr.usgs.gov/julio_pdf/milly_et_al.pdf); USCGRP, *supra* note 1, at 41.

<sup>130</sup> USCGRP, *supra* note 1, at 47.

<sup>131</sup> *Id.* at 102.

<sup>132</sup> *Id.* at 47.

<sup>133</sup> *Id.* at 49.

<sup>134</sup> *Id.*

<sup>135</sup> Strategic Foresight Initiative, *supra* note 8, at 1, 6, 8.

the issue is a step in the right direction, it is not sufficient. The conclusiveness of scientific research around climate change, the rapid pace of climate change, and the significant benefits of disaster mitigation together make it imperative that FEMA comply with the DMA2K and only approve those hazard mitigation plans that effectively address climate change.

## **VI. Legal Argument: FEMA Must Comply With Its Non-Discretionary Duty to Require States to Consider Climate Change in Hazard Mitigation Plans**

Both the law and FEMA’s own policy position obligate it to require states to consider climate change-related risks in state hazard mitigation plans. Under the DMA2K, FEMA approval of these plans is required for states to self-administer plans and for states to be eligible for increased hazard mitigation funding, but FEMA’s regulations make hazard mitigation plans a near necessity for states, as they condition all HMA funding on the existence of an approved state hazard mitigation plan. Thus, FEMA must require state plans to account for and analyze climate risks before it can award federal mitigation grants that are conditioned upon the approval of such plans. FEMA has failed to do so and has instead approved deficient state plans, putting states and communities at risk of being inadequately prepared for disasters.

### **A. FEMA has a non-discretionary legal duty to require state consideration of climate-change related risks in state hazard mitigation plans as a precondition to awarding federal HMA funding.**

The Stafford Act,<sup>136</sup> as amended by the Disaster Mitigation Act of 2000 (“DMA2K”),<sup>137</sup> as well as FEMA’s implementing regulations,<sup>138</sup> vest FEMA with a non-discretionary, mandatory duty to require state planning for climate change-related natural hazards as a precondition to awarding Hazard Mitigation Assistance (HMA) funding. The plain language of these laws and regulations *requires* FEMA to only approve those state hazard mitigation plans that account for climate change-related natural hazard risks: all state plans *must* “identify the natural hazards, risks, and vulnerabilities of areas in the State.”<sup>139</sup> In light of the scientifically

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<sup>136</sup> Robert T. Stafford Disaster Relief and Emergency Assistance Act (amended by Disaster Mitigation Act of 2000), 42 U.S.C. §§ 5121-5207 (2006).

<sup>137</sup> *Id.* (amending Stafford Act).

<sup>138</sup> 44 C.F.R. § 201, *et seq* (2012).

<sup>139</sup> 42 U.S.C. § 5165(c)(1) (2006).

## NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning October 2, 2012

established connection between climate change and risk of water-related and health-related natural hazards, FEMA is legally bound to reject hazard mitigation plans – and thus any federal funding, including the HMA grant programs, conditioned on plan approval – unless the plans adequately address such risks. By complying with this duty, FEMA will ensure that states appropriately consider risks impacted by climate change in hazard mitigation planning, thus better protecting human health and property at reduced costs, as intended by the DMA2K.

The DMA2K authorizes FEMA to provide financial assistance to states for hazard mitigation.<sup>140</sup> Under the statute, Congress established requirements that FEMA must follow in administering hazard mitigation grant programs. Most importantly, DMA2K ties funding to FEMA approval of state hazard mitigation plans in two important ways.<sup>141</sup> First, among the criteria for states to self-administer any hazard mitigation funding they are awarded, there must be “in effect an approved mitigation plan.”<sup>142</sup> Second, if a state “has in effect an approved mitigation plan...the President may increase to 20 percent...the maximum percentage specified” in the DMA2K. States are eligible for a significantly increased amount of federal funding under the program if they have submitted an approved hazard mitigation plan.<sup>143</sup> DMA2K therefore imposes a clear statutory requirement that states create an approved hazard mitigation plan as a precondition to self-administering the funds and to receiving additional grant funding for mitigation.

Furthermore, DMA2K imposes additional related requirements on FEMA’s administration of Pre-Disaster Mitigation (PDM) grants. The Act specifies that “[i]n determining whether to provide technical and financial assistance to a State... government under this section, [FEMA] shall take into account . . . (2) the degree of commitment by the State . . . government to reduce damages from future natural disasters . . . [and] (7) the extent to which the [mitigation

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<sup>140</sup> 42 U.S.C. § 5133 (2006) (authorizing pre-disaster mitigation grants, now administered as PDM program); 42 U.S.C. § 5170c (authorizing general hazard mitigation grants, now administered as HMGP program). The other three HMA grant programs have their statutory basis in other laws but, per FEMA regulation, are still subject to the hazard mitigation plan requirement. 44 C.F.R. § 201.4(a) (2012).

<sup>141</sup> Note that FEMA’s regulations, discussed later in this subsection, further necessitate FEMA-approved state hazard mitigation plans for the receipt of *any* HMA grants.

<sup>142</sup> 42 U.S.C. § 5170c(c)(2)(B) (2006) (“(c) Program administration by States... (2) Criteria... The President, in consultation and coordination with States and local governments, shall establish criteria for the approval of applications submitted under paragraph (1). The criteria shall include, at a minimum—... (B) there being in effect an approved mitigation plan under section 5165 of this title”).

<sup>143</sup> 42 U.S.C. § 5165(e)(1) (2006) (“(e) Increased Federal share for hazard mitigation measures...(1) In general... If, at the time of the declaration of a major disaster, a State has in effect an approved mitigation plan under this section, the President may increase to 20 percent, with respect to the major disaster, the maximum percentage specified in the last sentence of section 5170c(a) of this title.”).

**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning  
October 2, 2012**

activities] are consistent with the mitigation plan.”<sup>144</sup> Planning for the increased future risk of natural hazards generated or aggravated by climate change must, in light of the scientific evidence, be considered a key element of the requisite “commitment . . . to reduce damages from future natural disasters.”<sup>145</sup> Similarly, developing mitigation activities that address the identified climate-related risks must be necessary for FEMA to find that a state’s programs are “consistent with [a] mitigation plan”<sup>146</sup> that correctly assesses such risks. The Stafford Act therefore imposes additional planning and action requirements, both of which require engagement with climate-related risks, before a state may be eligible for PDM funding. These requirements for PDM grants are *in addition to* the general hazard mitigation plan requirements described above.

Consistent with its authority under the DMA2K,<sup>147</sup> FEMA has established in its implementing regulations even broader requirements for states to have FEMA-approved state hazard mitigation plans. FEMA’s regulations condition receipt of *all* HMA grants on the existence of a FEMA-approved plan: “[s]tates *must* have an approved Standard State Mitigation Plan . . . as a condition of receiving non-emergency Stafford Act assistance and FEMA mitigation grants” (emphasis added).<sup>148</sup> This regulatory requirement applies not only to PDM grants, but to HMA grants in general (with the minor exception of RFC grants, discussed above). Consequently, every state currently now has a hazard mitigation plan on file with FEMA, subject to updates by the state and renewal by FEMA every three years.

DMA2K and FEMA’s implementing regulations also prescribe requirements for the *content* of hazard mitigation plans, clarifying what a plan must contain before FEMA may legally approve it. These requirements mandate state planning for climate change-related natural hazard risks. The basic requirement of a hazard mitigation plan under DMA2K is that it “identify the natural hazards, risks, and vulnerabilities of areas in the State.”<sup>149</sup> FEMA’s regulations further require that plans must include “an overview of the type and location of *all* natural hazards that can affect the State, including . . . the *probability of future* hazard events,”<sup>150</sup> as well as “an overview and analysis of the State’s vulnerability to [these hazards]”<sup>151</sup> and “a Mitigation

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<sup>144</sup> 42 U.S.C. § 5133(g) (2006).

<sup>145</sup> 42 U.S.C. § 5133(g)(2) (2006).

<sup>146</sup> 42 U.S.C. § 5133(g)(7) (2006).

<sup>147</sup> 42 U.S.C. § 5164.

<sup>148</sup> 44 C.F.R. § 201.4(a) (2012).

<sup>149</sup> 42 U.S.C. § 5165(c)(1) (2006).

<sup>150</sup> 44 C.F.R. § 201.4(c)(2)(i) (2012).

<sup>151</sup> 44 C.F.R. § 201.4(c)(2)(ii) (2012).

**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning  
October 2, 2012**

Strategy that provides the State’s blueprint for reducing the losses identified in the risk assessment”<sup>152</sup> (emphasis added).

A state mitigation plan that does not assess the impact of climate change on natural hazard risk is deficient not only because it violates the statutory and regulatory scheme, but also because it fails to comply with FEMA’s own agency guidance. FEMA’s guidance to states on hazard mitigation planning (“The Blue Book”) establishes criteria that require states to plan for the natural hazard implications of climate change. First, FEMA specifies that states *must* incorporate studies and reports from state or federal agencies relating to the probability of future hazard events.<sup>153</sup> Because FEMA has produced several statements connecting climate change to water-related and health-related natural hazard risks,<sup>154</sup> and because many other federal agencies and state agencies have also acknowledged, in other contexts, the impacts of climate change, state plans must be required to address climate change impacts to secure FEMA approval. Secondly, FEMA requires that states demonstrate that the methodology used in identifying natural hazard risks is “thorough and comprehensive,” including a justification for deeming any particular risk not significant enough to warrant study and inclusion.<sup>155</sup> Since the connections to natural hazard risks are so firmly established in the scientific literature, a state plan that does not account for risks impacted by climate change must be rejected as not “thorough and comprehensive” unless the omission is properly justified. FEMA acts inconsistently with its own official interpretive guidance by approving any plans that do not meet these criteria.

Full consideration of the state’s natural hazards, risks, and vulnerabilities in future disasters was at the heart of Congress’ intent in enacting DMA2K. The bill’s sponsor in the House of Representatives, Representative Tillie Fowler, explained the benefits of the bill by noting that “[w]ith more emphasis on mitigation we will have less to fear from natural disasters

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<sup>152</sup> 44 C.F.R. § 201.4(c)(3) (2012).

<sup>153</sup> The Blue Book, *supra* note 18, at 1-19.

<sup>154</sup> See, e.g., FEMA, *FEMA Climate Change Adaptation Policy Statement*, 2011-OPPA-01 (Jan. 23, 2012), available at <http://stormsmart.org/wp-content/blogs.dir/1/files/group-documents/22/1328980794-FEMACCAPolicyStatement12312.pdf>; Tina Ramos, *FEMA Administrator On Climate Change: ‘We Need To Forcefully Communicate The Risk We Face,’* Think Progress: Green, Feb. 29, 2012, <http://thinkprogress.org/green/2012/02/29/435162/fema-administrator-we-need-to-forcefully-communicate-the-risk-of-climate-threats/> (quoting FEMA Administrator Craig Fugate, in his statement at the National Leadership Speaker Series on Resilience and Security in the 21st Century hosted by the U.S. Green Building Council and Local Governments for Sustainability (ICLEI), as saying, “When I talk about climate resilience, I’m talking about how we need to forcefully communicate the risk we face in not building resilience to climate change at the local level, which might not have been in anyone’s experience previously.”); Strategic Foresight Initiative, *supra* note 8, at 1.

<sup>155</sup> The Blue Book, *supra* note 18, at 1-15.

**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning  
October 2, 2012**

and reduce the threat to our families and property.”<sup>156</sup> In the Senate, Senator James Inhofe elaborated on the bill’s value to both better protect against disasters and to do so more economically:

Too often, we think of disaster assistance only after a disaster has occurred. For the very first time, we are authorizing a program to think about preventing disaster-related damage prior to the disaster. We believe that by spending these small amounts in advance of a disaster, we will save the federal government money in the long-term.<sup>157</sup>

Senator Inhofe further described the bill as a “forward thinking approach” and as “revolutionary in terms of the way the federal government responds to a disaster.”<sup>158</sup>

In accordance with both the plain language of the statute and legislative intent, the forward-thinking approach of the DMA2K requires that all future events, including those projected due to climate change, be adequately considered in state hazard mitigation plans. By only approving hazard mitigation plans that include and address climate change risks, FEMA would both comply with its legal duty and also ensure that states maximize the opportunity that such plans provide to reduce threats to human life, public health, and property. In short, FEMA cannot legally approve a hazard mitigation plan that does not analyze and plan for a state’s vulnerability, present and future, to *all* natural hazards that can affect the state – including those impacted by climate change.

**B. FEMA’s own climate change adaptation policy bolsters this statutory interpretation and requires that FEMA approve only those state hazard mitigation plans that assess and prepare for risks related to climate change.**

FEMA’s legal obligation to not approve climate change-deficient state plans is also consistent with the agency’s unequivocal position to incorporate climate change adaptation into agency decision-making on all levels. The FEMA Administrator has issued an official policy statement for coordinating agency climate change efforts, and the agency has collaborated with other federal agencies and emergency managers to facilitate climate risk planning and

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<sup>156</sup> 146 Cong. Rec. H9562-01 (daily ed. Oct. 10, 2000) (statement of Rep. Fowler).

<sup>157</sup> 146 Cong. Rec. S7298-02 (daily ed. July 29, 2000) (statement of Sen. Inhofe).

<sup>158</sup> *Id.*

**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning  
October 2, 2012**

management.<sup>159</sup> However, as this petition demonstrates, many states still lack a comprehensive strategy to adapt to future climate change risk through their state hazard mitigation plans. Despite FEMA’s official policy statements and collaborative federal efforts, the agency has failed to comply with its authority under the Disaster Mitigation Act to guide the states by promulgating regulations to prepare every state for natural hazards from climate-related risks.

FEMA’s policy statements and administrative materials should be given deference in interpreting the meaning of its regulations.<sup>160</sup> On January 23, 2012, FEMA Administrator Craig Fugate issued an agency-wide directive to integrate climate change adaptation planning into all agency policies, procedures, and programs.<sup>161</sup> In this *Climate Adaptation Policy Statement*, Administrator Fugate strongly declared that “the need to address risks associated with future disaster-related events, including those that may be linked to climate change, is inherent to FEMA’s long-term vision of promoting physical and economic loss reduction and life saving measures.”<sup>162</sup> Not only did the Administrator acknowledge that incorporating climate change adaptation into FEMA’s disaster mitigation efforts is part of the long-term vision for the agency because of the economic risks and risks to human life, but also that the agency will work within existing statutes and authorities to ensure consistency with climate change adaptation plans and actions.

Beyond issuing the official *Climate Adaptation Policy Statement*, the FEMA Administrator has made numerous statements about assessing environmental risks associated with climate change, such as taking rising sea levels into account in the built environment. For example, in a speech at the National Leadership Speaker Series on Resilience and Security in the 21st Century in February 2012, Mr. Fugate explained that, “When I talk about climate resilience, I’m talking about how we need to forcefully communicate the risk we face in not building resilience to climate change at the local level, which might not have been in anyone’s experience previously.”<sup>163</sup> The Administrator asserted publicly that when buildings do not consider climate-

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<sup>159</sup> FEMA, *supra* note 154.

<sup>160</sup> See *Christensen v. Harris County*, 529 U.S. 576, 577 (2000) (stating that interpretations contained in formats such as opinion letters are “entitled to respect” under the Court’s decision in *Skidmore v. Swift & Co.*, 323 U.S. 134, 140 (1944), but only to the extent that those interpretations have the “power to persuade”). See also *Holowecki v. Federal Express Corp.*, 440 F.3d 558, 562 (2d Cir. 2006) (holding that holding that a questionnaire and accompanying affidavit satisfied the Equal Employment Opportunity Commission’s interpreting regulations specifying required content showed the intent to activate an administrative process).

<sup>161</sup> FEMA, *supra* note 154.

<sup>162</sup> *Id.* at 1.

<sup>163</sup> Tina Ramos, *supra* note 154.

**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning  
October 2, 2012**

related risk, taxpayers end up subsidizing the damages.<sup>164</sup> Failing to consider climate change is thus inconsistent with the purpose of the DMA2K, which emphasizes the life-saving and cost-saving benefits of a proactive disaster mitigation approach for the agency over a more reactive approach that is limited to disaster recovery.<sup>165</sup> The FEMA Administrator has made it very clear that the United States cannot afford, in any respect, to ignore the effects of a changing climate and that hazard mitigation planning must fully consider risks impacted by climate change.

FEMA has also initiated and funded programs and actions linking climate change adaptation as essential to natural hazard mitigation planning. For example, FEMA facilitated a collaborative effort of federal, state, and local emergency managers called the Strategic Foresight Initiative (SFI).<sup>166</sup> In August 2011, SFI released its preliminary findings on “Climate Change: Long Term Trends and their Implications for Emergency Management,” which identified five key trends and drivers linked to climate change – increased global temperatures, intensified hurricanes, sea level rise, more frequent floods and droughts, and human health effects – and discussed their impact on emergency planning and preparedness.<sup>167</sup> To act consistently with the purpose of the SFI, FEMA must take action to ensure that these vulnerabilities are taken into account in state hazard mitigation plans such that HMA grant-funded projects and other mitigation initiatives adequately consider these risks.

FEMA also collaborates with other federal agencies to monitor projected climate change and communicate climate science data and research needs related to emergency management and disaster resilience. FEMA signed a Memorandum of Agreement with the Environmental Protection Agency (EPA) on hazard mitigation planning and creating more long-term climate resilient communities in 2010.<sup>168</sup> The Memorandum reflects the mutual desire of both agencies to coordinate networks of nationwide, regional and community-based expertise, practices,

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<sup>164</sup> Lacey Johnson, *FEMA Head Says Greener Buildings Save Taxpayers Money*, E&E News: ClimateWire, Mar. 1, 2012, <http://www.eenews.net/climatewire/2012/03/01/10> (citing FEMA Administrator Craig Fugate’s Statement About Building and Rebuilding in Response to Natural Disasters).

<sup>165</sup> See generally 146 Cong. Rec. H9562-01 (daily ed. Oct. 10, 2000) (statement of Rep. Fowler); 146 Cong. Rec. S7298-02 (daily ed. July 29, 2000) (statement of Sen. Inhofe).

<sup>166</sup> Strategic Foresight Initiative, *supra* note 8, at 1.

<sup>167</sup> *Id.* at 2, 3.

<sup>168</sup> Department of Homeland Security, FEMA, & EPA, *Memorandum of Agreement Between the Department of Homeland Security, Federal Emergency Management Agency, and Environmental Protection Agency* (May 12, 2010), available at [http://www.fema.gov/library/file?type=publishedFile&file=final\\_signed\\_moa\\_with\\_fema\\_and\\_epa\\_sm.pdf&fileid=e9cae2e0-5f22-11e1-a256-001cc456982e](http://www.fema.gov/library/file?type=publishedFile&file=final_signed_moa_with_fema_and_epa_sm.pdf&fileid=e9cae2e0-5f22-11e1-a256-001cc456982e) (documenting an agreement among the Department of Homeland Security, FEMA, and EPA on hazard mitigation planning and creating more climate resilient communities).

**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning  
October 2, 2012**

initiatives, and programs to help communities reduce vulnerability to natural hazard events, recover from disasters that do occur, and achieve economic, environmental, and public health outcomes as part of redevelopment and recovery efforts.<sup>169</sup> Through this Memorandum, FEMA has recognized that it is critical for state-level decision makers to “have information and expertise available” regarding climate change impacts.<sup>170</sup>

Collectively, FEMA’s official policies, its Administrators’ comments, and its various sector and interagency collaborations leave no room to doubt to that FEMA recognizes that climate change is a key driver impacting natural hazards in a number of different ways. Furthermore, these policy statements and initiatives demonstrate the agency’s appreciation of the value of addressing climate change in hazard mitigation projects and planning. The agency’s acknowledgement of the threats posed by climate change and the need to plan for them and mitigate appropriately make it clear that climate change must be addressed in state plans.

**C. FEMA fails to meet its non-discretionary legal duty to require that states incorporate climate-change related risks in their hazard mitigation plans, and acts contrary to its own policy, by approving state hazard mitigation plans that do not adequately assess risks related to climate change.**

Although the Stafford Act, the DMA2K, and FEMA’s own regulations, policy statements, and guidance documents all vest the agency with a clear obligation to require that states plan for climate risks as a necessary precondition for hazard mitigation plan approval, FEMA has nonetheless neglected to carry out this duty. FEMA has and continues to breach its legal duties by approving state hazard mitigation plans and awarding HMA grant funding to states that fall short of the requirements of the DMA2K and the associated implementing regulations. FEMA thus imposes unnecessary economic and human health risks on states with deficient hazard mitigation plans, as HMA grants are awarded to projects that may insufficiently mitigate against future disasters because they are based on deficient state hazard mitigation plans that failed to account for climate change.

Several examples of state hazard mitigation plans are discussed below, including two satisfactory examples and several deficient ones. Although FEMA calls the hazard mitigation

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<sup>169</sup> *Id.*

<sup>170</sup> *Id.* at 5.

**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning  
October 2, 2012**

plan “the foundation for a community’s long-term strategy to reduce disaster losses,”<sup>171</sup> and although the agency itself has acknowledged the significant disaster vulnerabilities associated with climate change, all of these state plans, even the inadequate ones, have been approved by FEMA. Given the failure of past plans to address climate change, FEMA must give clear direction to the states in the form of amended regulations.

**1. Some states have addressed climate change in their hazard mitigation plans, and those that have are empowered to better protect human health and property from future disasters.**

California and Connecticut are prime examples of states that have demonstrated their willingness and capacity to integrate climate change risks into their hazard mitigation plans. States whose plans integrate climate change into their risk assessments are more likely to be prepared for natural hazards because they have a greater understanding about how climate change is affecting freshwater resources, droughts, floods, extreme heat, air pollution, and associated health impacts. These states serve as an example to other, less prepared states that it is feasible and desirable to plan for climate risks as the law requires, and they also serve as a baseline for what FEMA must legally require of all states in their hazard mitigation plans.

(a) *California*

California adopted its current hazard mitigation plan in 2010.<sup>172</sup> The plan provides historical data and detail on the current mitigation efforts for a variety of natural and non-natural hazards and supplements this historical detail with information about the impacts of climate change. The “primary hazards” are defined as those that have caused the greatest losses or disruptions: earthquakes, wildfires, and floods. California is the nation’s largest agricultural producer and the world’s eighth largest economy.<sup>173</sup> Its economy represents 13 percent of the U.S. gross domestic product,<sup>174</sup> making the importance of comprehensive disaster preparedness both a state and national imperative.

The state’s hazard mitigation plan explicitly addresses the increasing role that climate change plays in all hazard mitigation efforts, including water resilience planning, and finds that

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<sup>171</sup> FEMA, Multi-Hazard Mitigation Planning, *supra* note 16.

<sup>172</sup> California Emergency Management Agency, *State of California Multi-Hazard Mitigation Plan* 198 (2010), available at [http://hazardmitigation.calema.ca.gov/docs/2010\\_SHMP\\_Final.pdf](http://hazardmitigation.calema.ca.gov/docs/2010_SHMP_Final.pdf).

<sup>173</sup> *Id.* at 12.

<sup>174</sup> *Id.* at 83.

**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning  
October 2, 2012**

climate change would likely lead to more limited water supplies and greater competition between agricultural, domestic, and environmental uses. The plan references California's efforts to reduce greenhouse gas emissions (noting the public health benefits of doing so),<sup>175</sup> along with the 2009 California Climate Adaptation Strategy's (CAS) findings that:

“Climate change is already affecting California. Sea levels have risen by as much as seven inches along the California coast over the last century, increasing erosion and pressure on the state's infrastructure, water supplies, and natural resources. The state has also seen increased average temperatures, more extreme hot days, fewer cold nights, a lengthening of the growing season, shifts in the water cycle with less winter precipitation falling as snow, and both snowmelt and rainwater running off sooner in the year. In addition to changes in average temperatures, sea level, and precipitation patterns, the intensity of extreme weather events is also changing. Extreme weather events, such as heat waves, wildfires, droughts, and floods, are likely to be some of the earliest climate impacts experienced.”<sup>176</sup>

The CAS concluded that California has the capacity for climate adaptation to manage its risks as informed by existing climate science.<sup>177</sup> It also identified new and changing hazards resulting from climate change. The CAS outlined “twelve preliminary recommendations for climate adaptation strategies.”<sup>178</sup> One of the recommendations is aiming to stabilize water supplies and to achieve a “20 percent reduction in per-capita water use statewide by 2020,”<sup>179</sup> and to take steps to education and inform the public about climate change. The CAS also gives “priority to adaptation strategies that initiate, foster, and enhance existing efforts that improve,” *inter alia*, public health. State action items reflect this approach: “To build resilience to increased spread of disease and temperature increases, the California Department of Public Health will develop guidance by September 2010 for use by local health departments and other agencies to assess mitigation and adaptation strategies, including strategies to address impacts on vulnerable populations and communities and cumulative health impacts.”

Floods represent the greatest water-related hazard for California: “Increased flood frequency in California is a predicted consequence of climate change.”<sup>180</sup> However, the state also

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<sup>175</sup> *Id.* at 83.

<sup>176</sup> *Id.* at 103-110.

<sup>177</sup> *Id.* at 107.

<sup>178</sup> *Id.* at 108.

<sup>179</sup> *Id.*

<sup>180</sup> *Id.* at 283.

**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning  
October 2, 2012**

faces a wide range of other water-related hazards that threaten the viability of public and private sector resources, including the agricultural industry. Sea level rise and higher floodwaters will have a direct effect on the massive delta levee system that is protecting residential and agricultural lands. In response to climate change predictions, there is currently a statewide push “to mitigate the most egregious hazards to levees,”<sup>181</sup> and to map sea level to be able to respond to hazards related to sea level rise, such as coastal erosion.<sup>182</sup>

Wildfires are another significant hazard for California. The state provides the following guidance to agencies combating wildfires, noting the public health concerns as well: “State fire-fighting agencies should begin immediately to include climate change impact information into fire program planning to inform future planning efforts. Enhanced wildfire risk from climate change will likely increase public health and safety risks, property damage, fire suppression and emergency response costs to government, watershed and water quality impacts, and vegetation conversions and habitat fragmentation.”<sup>183</sup>

In July 2012, California supplemented its hazard mitigation plan and CAS with its third statewide climate change assessment, which explores local and statewide vulnerabilities to climate change and highlights opportunities for taking concrete actions to reduce climate change impacts.<sup>184</sup> The assessment recognizes potential climate impacts to public health, including more frequent and intense heat waves, and identifies adaptation strategies to minimize those impacts, such as cooling centers in cities. The assessment also recognizes that climate change will affect the risk of water-related disasters, such as sea level rise-related flooding, which could put hundreds of thousands of people and billions of dollars of property at risk.

In sum, California assesses a wide range of potential hazards and incorporates climate change impacts into its hazard mitigation plan, and has continued to prepare for climate-related disasters through other statewide planning efforts. FEMA has awarded nearly \$1.12 billion in various HMA grants (FMA, HMGP, LPDM, PDM, and SRL programs) to California since the

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<sup>181</sup> *Id.* at 284.

<sup>182</sup> *Id.* at 309.

<sup>183</sup> *Id.* at 110.

<sup>184</sup> California Energy Commission, California Climate Change Center, *Our Changing Climate 2012: Vulnerability & Adaptation to the Increasing Risks from Climate Change in California* (July 2012), available at [http://www.climatechange.ca.gov/adaptation/third\\_assessment/](http://www.climatechange.ca.gov/adaptation/third_assessment/).

**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning  
October 2, 2012**

Stafford Act was enacted in 1988, making the state second only to Louisiana in total grants received.<sup>185</sup>

(b) *Connecticut*

Connecticut updated its natural hazard mitigation plan in 2010, and it integrates climate change throughout its risk assessment. The plan makes a clear and unequivocal statement about the effect of climate change on the state:

“Climate change will very likely have an increasingly significant impact on some types of natural disasters in Connecticut. The state and municipalities must consider scientists’ projections of climate impacts on sea level, precipitation, storm intensity, flooding, drought and other natural disasters as they plan for the future.”<sup>186</sup>

Connecticut “is committed to reducing future damage from natural disasters through mitigation”<sup>187</sup> and identifies enhanced “planning and research of the rate of climate change and adaptation principles and responses” as one of the state’s major natural hazard mitigation goals for 2010-2013.<sup>188</sup> To achieve this goal, the Department of Environmental Protection (DEP) has been tasked with serving as the clearinghouse for climate change adaptation approaches and with performing a long-term (3-10 year) study on increased vulnerability due to climate change.<sup>189</sup>

The plan predicts that climate change will affect the winter snow season by shortening the winter season by as much as two weeks, decreasing the number of snowstorms and the number of snow-covered days, with more precipitation falling as rain rather than snow. The plan projects that the state’s suburbanizing population will be at increased risk for snow-related hazards from strains on utility services and the state’s transportation infrastructure.<sup>190</sup>

Connecticut is a water-rich state that is vulnerable to flooding. Flooding has caused a greater loss of life and damage in the past 100 years than any other natural hazard in the state.<sup>191</sup>

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<sup>185</sup> Emails from FEMA Federal Insurance and Mitigation Administration (FIMA) staff to NRDC (May 22, 2012 and June 1, 2012) (on file with authors). See Appendix 1 for a state-by-state breakdown of funding awarded by program.

<sup>186</sup> Connecticut Department of Environmental Protection, *Connecticut’s 2010 Natural Hazard Mitigation Plan Update* 18 (2010), available at [http://www.ct.gov/dep/lib/dep/water\\_inland/hazard\\_mitigation/2010\\_nhmp.pdf](http://www.ct.gov/dep/lib/dep/water_inland/hazard_mitigation/2010_nhmp.pdf).

<sup>187</sup> *Id.* at 250.

<sup>188</sup> *Id.* at 252.

<sup>189</sup> *Id.* at 255.

<sup>190</sup> *Id.* at 99-100.

<sup>191</sup> *Id.* at 184.

**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning  
October 2, 2012**

“The future projections by climate change models and their studies that project an increase in more intense precipitation events punctuated by periods of drought conditions.”<sup>192</sup> Connecticut has started to “monitor climate change predictions as they affect the number of and severity of heavy rain events.”<sup>193</sup> However, the state is also highly vulnerable to drought, and “climate change may increase the number and intensity of wildland fires which may occur in Connecticut.”<sup>194</sup> The trend of warming temperatures has increased the threat of invasive species and pests.

“Currently the State of Connecticut is proactively working, through the Governor’s Steering Committee (GSC) on Climate Change, to assess the risks and impacts of climate change on the State of Connecticut.”<sup>195</sup> The GSC has a subcommittee for adaptation that looks at the impacts of climate change on the state’s natural resources and infrastructure, and makes recommendations for adaptation strategies.

Connecticut has received \$12.7 million in HMA grants (FMA, HMGP, LPDM, PDM, RFC, and SRL programs) since the Stafford Act was enacted in 1988.<sup>196</sup>

**2. Other states’ FEMA-approved hazard mitigation plans fail to incorporate climate change, unnecessarily putting human health and property at risk.**

Unlike California and Connecticut, states with hazard mitigation plans that poorly address or fail to address climate change typically rely excessively on historical climate data without considering relevant climate projections. Focusing on historical disasters alone ignores the large body of scientific evidence that warns of significant changes to climate patterns all across the U.S., and thus leaves states less prepared to mitigate disasters in the future. State plans that rely solely on past disaster data are thus fundamentally flawed as they: (1) deny or avoid discussion of the impacts of climate change; (2) underestimate the severity of potential hazards in their risk assessments; and (3) put forth unclear or undeveloped plans to mitigate potential hazards. The FEMA-approved hazard mitigation plans of Texas, Alabama, Iowa, Ohio, and Virginia feature prime examples of each of these three errors. The lack of realistic risk

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<sup>192</sup> *Id.* at 126.

<sup>193</sup> *Id.* at 142.

<sup>194</sup> *Id.* at 152.

<sup>195</sup> *Id.* at 164.

<sup>196</sup> Emails from FEMA Federal Insurance and Mitigation Administration (FIMA) staff to NRDC (May 22, 2012 and June 1, 2012) (on file with authors). See Appendix 1 for a state-by-state breakdown of funding awarded by program.

**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning  
October 2, 2012**

assessment and planning displayed in these plans puts people and property at risk, and it burdens FEMA with unnecessary and avoidable costs in post-disaster situations.

(a) *Texas*

The State of Texas Hazard Mitigation Plan was last updated in 2010 and approved by FEMA as a requirement for federal Pre-Disaster Mitigation funding. The plan insufficiently addresses climate change, relies on low risk estimates, and provides weak and vague mitigation strategies.

Climate change is mentioned in the Texas plan in relation to sea level rise but nowhere else.<sup>197</sup> In the context of mitigation of coastal flooding impacted by sea level rise, the plan notes that “[w]ith increased populations along our coastlines and growing awareness of coastal risks associated with climate change, the GLO [General Land Office] will expand the assistance it provides coastal communities to assist coastal communities in being better prepared,” but no other detail is given.<sup>198</sup> This ill-defined assistance is insufficient to be considered a true mitigation effort.

No other risks are discussed in relation to climate change. Given the state’s recent history, perhaps the most notable omission is the lack of mention of climate with regard to the impacts of extreme heat, drought, and wildfires on the state. Last year, Texas suffered the worst one-year drought on record, the hottest month ever recorded since 1895, and severe to exceptional drought in 99 percent of the state in September, wildfires that caused \$100 million in direct damages and a total agricultural loss of \$5.2 billion, and water restrictions in 1 out of every 5 water systems in the state.<sup>199</sup> Drought in particular is given very little treatment in the plan, and the only mitigation strategies cited are:

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<sup>197</sup> Texas Division of Emergency Management, *State of Texas Hazard Mitigation Plan 2010-2013* 74 (2010), available at <http://www.txdps.state.tx.us/dem/documents/txHazMitPlan.pdf>.

<sup>198</sup> *Id.* at 222.

<sup>199</sup> Chou et al., *supra* note 1, at 264 (citing Chris Hooks, *State Climatologist: Drought Officially Worst on Record*, Texas Tribune, Aug. 4, 2011, available at <http://www.texastribune.org/texas-environmental-news/environmental-problems-and-policies/state-climatologist-drought-officially-worst-recor/>); National Drought Mitigation Center, U.S. Drought Monitor: Texas, [http://www.drought.gov/portal/server.pt/gateway/PTARGS\\_0\\_2\\_426\\_223\\_0\\_43/http%3B/droughtmonitor.unl.edu/DM\\_state.htm?TX,S](http://www.drought.gov/portal/server.pt/gateway/PTARGS_0_2_426_223_0_43/http%3B/droughtmonitor.unl.edu/DM_state.htm?TX,S) (last visited Aug. 16, 2012); Aaron Smith, *Texas Wildfire, Drought Damages Exceed \$5 Billion*, CNNMoney, Sept. 8, 2011, available at

**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning  
October 2, 2012**

- “TDEM will provide training and educational programs focusing on the preparation of Emergency Management Coordinators to respond to natural hazards and to teach them the best ways to mitigate the affects of those hazards. TDEM continues to provide training in the G-710 & G-720 classes. This strategy is on-going.”<sup>200</sup>
- “The Texas Department of State Health Services maintains a web site that provides health tips and actions for citizens, governments and medical facilities. This strategy is on-going.”<sup>201</sup>

Given the extreme impact that drought has had on Texas recently, these drought mitigation strategies prove woefully inadequate. The state’s 2012 water plan, “Water for Texas,” does mention climate change and water supply uncertainty, suggesting that the state may be moving in the direction of recognizing climate change impacts on drought. However, it does not recommend any adaptation strategies and still relies on the historical “drought of record” until better information to determine the impacts of climate variability on water supplies becomes available.<sup>202</sup>

Texas’s Hazard Mitigation Plan provides particularly low estimates for the costs of hazards. The chart below, copied directly from the plan’s summary, shows the extent to which the report minimizes the threat of natural hazards, especially in light of anticipated and ongoing climate change impacts. Though the language is unclear, it appears that this chart only refers to direct costs of *physical losses to state facilities* on an annual basis.

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[http://money.cnn.com/2011/09/08/news/economy/damages\\_texas\\_wildfires/index.htm](http://money.cnn.com/2011/09/08/news/economy/damages_texas_wildfires/index.htm); Texas Commission on Environmental Quality, Map of Water Systems Under Water Use Restriction, <http://tceq.texas.gov/drinkingwater/trot/location.html> (last visited Aug. 16, 2012).

<sup>200</sup> Texas Division of Emergency Management, *supra* note 201, at 232.

<sup>201</sup> *Id.*

<sup>202</sup> Texas Water Development Board, *2012 Water for Texas* 151-153, 231-232 (2012), available at [http://www.twdb.state.tx.us/publications/state\\_water\\_plan/2012/2012\\_SWP.pdf](http://www.twdb.state.tx.us/publications/state_water_plan/2012/2012_SWP.pdf).

**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning  
October 2, 2012**

Natural Hazards Facing Texas According to the State's 2010 Hazard Mitigation Plan<sup>203</sup>

	Natural Hazard	Annualized physical losses, State/local
1	Inland Riverine Flooding	\$5.5 million / \$2.0 million
2	Hurricane & Tropical Storm	\$1.4 million / \$4.7 million
3	Tornado	\$2.8 million / \$3.1 million
4	Drought	minimal /
5	Local Windstorm (non-tornado)	\$0.5 mil /
6	Hailstorm	\$0.1 mil /
7	Wildfire	\$0.1 mil /
8	Dam Failure	\$0.2 mil /
9	Severe Winter Storm	minimal /
10	Extreme Heat	minimal /
11	Expansive Soils	minimal /
12	Coastal Erosion	minimal /
13	Land Subsidence	minimal /
14	Earthquake	minimal /

These costs seem vastly low, amounting to only \$20.4 million annualized for state and local facilities. Other disaster-related costs are mentioned in other parts of the report. For instance, fire suppression and staging for the wildfires in 1996, 1998, 1999, 2000 and 2006 cost the state approximately \$88,486,604, plus an additional \$10 million in costs to local governments. Drought is responsible for an estimated \$325 million, mostly in crop damage. This estimate is far below the actual cost of damages associated with the 2011 drought. The Texas AgriLife Extension Service estimates that the 2011 drought caused \$7.62 billion dollars in damages, breaking the 2006 record of \$4.1 billion.<sup>204</sup> In addition, nearly 20 percent of all public water systems in the state were forced to implement water use restrictions.<sup>205</sup> The state erred in anticipating and planning for minimal levels of damage. The disconnect between the level of planning and the actual hazards the state faced just a year after the Texas Hazard Mitigation Plan was approved by FEMA demonstrates the degree to which the state underestimated the potential

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<sup>203</sup> Texas Division of Emergency Management, *supra* note 201, at Executive Summary.

<sup>204</sup> Texas AgriLife Extension Service, *Updated 2011 Texas Agricultural Drought Losses Total \$7.62 Billion*, AgriLife Today, Mar. 21, 2012, available at <http://today.agrilife.org/2012/03/21/updated-2011-texas-agricultural-drought-losses-total-7-62-billion/>.

<sup>205</sup> Texas Commission on Environmental Quality, *supra* note 203.

**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning  
October 2, 2012**

damages associated with climate change. In so doing, the state exposed its population to undue risks.

The state also clearly underestimates the impact of coastal erosion. Rates of coastal erosion in Texas are among the highest in the U.S.: 64 percent of the Texas coast is eroding at an average rate of 6 feet per year, with erosion in some areas exceeding 30 feet annually.<sup>206</sup> On average, the coast as a whole is eroding at a rate of more than 2 feet per year.<sup>207</sup> When the state of Texas does recognize the hazards, it is not reflected in state policies. For example, though the state does recognize the threats of coastal erosion, sea level rise, and land subsidence in its hazard mitigation plan, “[n]o specific local mitigation actions have yet to address coastal erosion, expansive soils or land subsidence.”<sup>208</sup> Furthermore, the state continues to allow for new development in threatened areas.<sup>209</sup> This short-sighted and inadequate planning could eventually place an unnecessary burden on FEMA – and the American taxpayer – in the wake of a disaster.

Despite the recent miscalculations about drought and erosion risks, according to the Texas Hazard Mitigation Plan, the state “does a good job of availing itself of federal mitigation funding opportunities” and routinely expands the funding allocated to it by FEMA’s Flood Mitigation Assistance and Severe Repetitive Loss grant programs, and even captures unused funding allocations from other states.<sup>210</sup> Texas has received \$880.6 million in HMA grants (FMA, HMGP, LPDM, PDM, RFC, and SRL programs) since the Stafford Act was enacted in 1988.<sup>211</sup>

(b) *Alabama*

The Alabama State Hazard Mitigation Plan was last updated in 2010, but no substantive changes were made to incorporate the latest science, particularly with regard to climate change. The state of Alabama recognizes floods, tornadoes and windstorms, hurricanes, earthquakes, winter/ice storms, landslides, land subsidence, drought, hail, wildfires, extreme temperatures, lightning, dam failure, hazardous materials, and manmade hazards to be threats to public safety

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<sup>206</sup> Texas General Land Office, Coastal Erosion, <http://www.glo.texas.gov/what-we-do/caring-for-the-coast/coastal-erosion/index.html> (last visited Aug. 16, 2012).

<sup>207</sup> *Id.*

<sup>208</sup> Texas Division of Emergency Management, *supra* note 201, at 235.

<sup>209</sup> *Id.* at 189.

<sup>210</sup> *Id.* at 188.

<sup>211</sup> Emails from FEMA Federal Insurance and Mitigation Administration (FIMA) staff to NRDC (May 22, 2012 and June 1, 2012) (on file with authors). See Appendix 1 for a state-by-state breakdown of funding awarded by program.

**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning  
October 2, 2012**

and wellbeing. Each of these hazards was examined in the report based on three sets of criteria:<sup>212</sup>

- the nature of the hazard: basic information about the hazard;
- history of the hazard: information on previous occurrences in Alabama; and
- the possibility of the hazard: the probability (frequency) of the hazard, based on a commonly accepted design event, i.e. the 100 year flood.

These criteria are inadequate for assessing future risks. Climate change is altering historical weather patterns, and it is therefore no longer possible to make assumptions about future hazards based on their previous occurrences. For example, the Gulf Coast is expected to experience more frequent and intense tropical storms and hurricanes.<sup>213</sup> By looking backward at previous storms, the Alabama State Hazard Mitigation Plan underestimates the potential damage to life and property caused by changing climatic conditions.

Similarly, when assessing the risk of drought in Alabama, the State Hazard Mitigation Plan does not consult climate models or forecasts, but rather relies on historical data: “The future incidence of drought is highly unpredictable, conditions may be localized or widespread, and not much historical data is available making it difficult to determine the future probability of drought conditions with any accuracy.”<sup>214</sup> However, climate scientists predict that increasing incidence of drought due to climate change may also threaten water supplies and increase groundwater overdraft while decreasing aquifer recharge rates.<sup>215</sup> In fact, in 2011, a drought emergency was called for every county in the state,<sup>216</sup> and a recent study suggests that by 2050 Alabama could face a loss of \$29 billion in GDP and a loss of 246,000 jobs due to reduced water availability associated with climate change.<sup>217</sup>

Much of the Alabama State Hazard Mitigation Plan is descriptive of past storms and disasters, rather than focusing on future risks and hazards. Climate change is mentioned only

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<sup>212</sup> Alabama Emergency Management Agency, *State Hazard Mitigation Plan Update, September 2010* 57 (2010), available at <http://www.ema.alabama.gov/filelibrary/AL%20Standard%20State%20Mitigation%20Plan.pdf>.

<sup>213</sup> USGCRP, *supra* note 1, at 114.

<sup>214</sup> Alabama Emergency Management Agency, *supra* note 216, at 56.

<sup>215</sup> USGCRP, *supra* note 1, at 113.

<sup>216</sup> *How Bad Is Alabama's Drought? More Than 75 Percent of State Abnormally Dry*, Associated Press, June 9, 2011, available at [http://blog.al.com/wire/2011/06/how\\_bad\\_is\\_alabamas\\_drought\\_mo.html](http://blog.al.com/wire/2011/06/how_bad_is_alabamas_drought_mo.html).

<sup>217</sup> George Backus et al., Sandia National Laboratories, *Assessing the Near-Term Risk of Climate Uncertainty: Interdependencies Among the U.S. States* 22 (2012), available at [https://cfwebprod.sandia.gov/cfdocs/CCIM/docs/Climate\\_Risk\\_Assessment.pdf](https://cfwebprod.sandia.gov/cfdocs/CCIM/docs/Climate_Risk_Assessment.pdf).

**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning  
October 2, 2012**

once in the 479-page document: “The probability and severity of hurricanes in Alabama is fairly well established and likely to remain constant, notwithstanding the potential effects of global warming on weather patterns.”<sup>218</sup> This statement is contradicted by the work of the U.S. Global Change Research Program, which predicts increases in the intensity of Atlantic hurricanes.<sup>219</sup> Similarly, cost estimates appear to be based on historical records of losses, but only limited information is provided.

By disregarding peer reviewed climate science and effectively omitting climate change from its Hazard Mitigation Plan, Alabama puts its citizens at undue risk and places an undue burden on FEMA resources. In spite of this, Alabama has received \$155.7 million in HMA grants (FMA, HMGP, LPDM, PDM, RFC, and SRL programs) since the Stafford Act was enacted in 1988.<sup>220</sup>

(c) *Iowa*

The Iowa State Hazard Mitigation Plan was adopted in 2010 and approved by FEMA soon thereafter. The plan calculates hazard risk using an unscientific methodology in which categories of hazards are rated on a scale of one through four (it is unclear what these numbers represent), and then arbitrarily assigns weights to them based on “state priorities.”<sup>221</sup> This methodology is used to assign values for “magnitude/severity,” “probability,” “warning time,” and “duration,” which are each then given an arbitrary weighting and summed to give a final hazard assessment score.<sup>222</sup> One of many critical flaws in this assessment strategy is that the “probability” of a hazard is determined by how often this hazard has occurred in the past.<sup>223</sup> This methodology for assessing future risk is inadequate, as climate change fundamentally alters future weather patterns such that the past does not provide accurate predictions of future hazards. Climate change is not mentioned once in the plan. In fact, the plan asserts that “Many times the historical occurrence can be extrapolated into the future using best available data.”<sup>224</sup>

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<sup>218</sup> Alabama Emergency Management Agency, *supra* note 216, at 123.

<sup>219</sup> USCGRP, *supra* note 1, at 112 (noting that the “intensity of Atlantic hurricanes is likely to increase during this century with higher peak wind speeds, rainfall intensity, and storm surge height and strength”).

<sup>220</sup> Emails from FEMA Federal Insurance and Mitigation Administration (FIMA) staff to NRDC (May 22, 2012 and June 1, 2012) (on file with authors). See Appendix 1 for a state-by-state breakdown of funding awarded by program.

<sup>221</sup> Iowa Homeland Security, *Iowa State Hazard Mitigation Plan* (2010), available at [http://www.iowahomelandsecurity.org/documents/hazard\\_mitigation/HM\\_StatePlan\\_1-3\\_RiskAssessment.pdf](http://www.iowahomelandsecurity.org/documents/hazard_mitigation/HM_StatePlan_1-3_RiskAssessment.pdf).

<sup>222</sup> *Id.* at 7-9.

<sup>223</sup> *Id.* at 7.

<sup>224</sup> *Id.*

**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning  
October 2, 2012**

The lack of realistic and predictive information about climate change in the plan ignores recent studies and recent experience. Iowa lies between the Mississippi and Missouri river basins, boasting 72,000 miles of rivers and streams and more than 160,000 acres of lakes, reservoirs, and ponds.<sup>225</sup> Precipitation in Iowa has increased by 4.2 inches in the last hundred years.<sup>226</sup> Over the past 136 years, this change represents an approximate 8 percent increase in precipitation.<sup>227</sup> Further, among regions of the U.S., the upper Midwest and Great Plains region in which Iowa sits experienced the largest trends toward increased annual total precipitation, number of rainy days, and intense precipitation” according to the Intergovernmental Panel on Climate Change.<sup>228</sup>

Because Iowa lies at the confluence of many different climatic patterns, projected drying patterns to the west and south and projected wetter conditions to the north and east could cause more extreme interannual variability in Iowa’s precipitation.<sup>229</sup> Climate model projections indicate that winter and spring precipitation could increase by 30 percent and that summer precipitation could decrease by 10 to 35 percent by the end of the century.<sup>230</sup> Although total precipitation during the summer may decline, this precipitation is likely to come in the form of heavy rainfall events.<sup>231</sup> In fact, there has been a 33% increase in frequency of extreme precipitation storms in Iowa over the last 10 years, and a 34% increase in rainfall from extreme precipitation.<sup>232</sup> The years 2007, 2008, and 2010 all rank among the top 6 of the last fifty years for both number of extreme precipitation events and total rainfall, and rainfall from each of those three years resulted in flooding disasters.<sup>233</sup>

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<sup>225</sup> Iowa Department of Natural Resources, *Iowa’s Water Resources*, Iowa Nonpoint Source Management Program 1, available at

<http://www.iowadnr.gov/portals/idnr/uploads/water/watershed/files/nonpoint%20plan/nps04.pdf?amp;tabid=781>.

<sup>226</sup> Midwestern Regional Climate Center, *Climate Change and Variability in the Midwest*,

[http://mrcc.isws.illinois.edu/climate\\_midwest/mwclimate\\_change.htm](http://mrcc.isws.illinois.edu/climate_midwest/mwclimate_change.htm) (last visited Aug. 16, 2012).

<sup>227</sup> Iowa Climate Change Impacts Committee, *Climate Change Impacts on Iowa 2010* 8 (2011), available at

[http://www.iowadnr.gov/portals/idnr/uploads/air/environment/climatechange/complete\\_report.pdf?amp;tabid=1077](http://www.iowadnr.gov/portals/idnr/uploads/air/environment/climatechange/complete_report.pdf?amp;tabid=1077).

<sup>228</sup> IPCC, *supra* note 51, at 142 (citing S.C. Pryor et al., *supra* note 63).

<sup>229</sup> Iowa Climate Change Impacts Committee, *supra* note 231, at 9.

<sup>230</sup> Susanne Moser, Katharine Hayhoe, & Michelle Wander, Union of Concerned Scientists, *Climate Change in the Hawkeye State: Potential Impacts on Iowa Communities and Ecosystems* 8 (2004), available at

[http://www.ucsusa.org/assets/documents/clean\\_energy/climate\\_change\\_in\\_iowa\\_-long-\\_final-\\_and\\_formatted.pdf](http://www.ucsusa.org/assets/documents/clean_energy/climate_change_in_iowa_-long-_final-_and_formatted.pdf).

<sup>231</sup> *Id.* at 3.

<sup>232</sup> Stephen Saunders et al., The Rocky Mountain Climate Organization & NRDC, *Doubled Trouble: More Midwestern Extreme Storms* 11 (2012), available at

<http://www.rockymountainclimate.org/images/Doubled%20Trouble.pdf>.

<sup>233</sup> *Id.*

**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning  
October 2, 2012**

The Iowa Department of Natural Resources (IDNR) has also recognized these climate trends and acknowledged projected changes to Iowa's climate on its website.<sup>234</sup> Further, the IDNR has worked with the legislature and the governor's office to assess climate change risks. As the IDNR website notes, "On April 27, 2007, the Iowa Legislature passed a bill to create the Iowa Climate Change Advisory Council to help determine the best strategies for reducing greenhouse gas emissions."<sup>235</sup> Informed by these strategies, the Iowa Climate Change Impacts Committee to the Iowa governor and Iowa General Assembly released a report in January 2011 entitled, "Climate Change Impacts on Iowa."<sup>236</sup>

The report highlights the long-term upward trend in temperature, patterned changes in precipitation, and other indicators of climate change, and prescribes specific policy recommendations that should be adopted by the state government. According to the report, enhanced streamflow and greater flooding risks are expected in the future as areas upstream of the state receive more precipitation and more frequent extreme precipitation events.<sup>237</sup> A projected 21 percent increase in precipitation by the 2040s would lead to a 50 percent increase in streamflow in the Upper Mississippi River Basin.<sup>238</sup> Communities along rivers and those unable to manage stormwater runoff from extreme precipitation events could be at risk of landslides, flooding, and property damage.<sup>239</sup> In 2008, weather-related disasters led to more than \$1.3 billion in damage to property, nearly \$1 billion in agricultural and environmental losses, and more than \$600 million in damage to infrastructure.<sup>240</sup> Public health risks could also increase if waters inundate facilities that contain hazardous materials and if overwhelmed wastewater treatment facilities discharge raw sewage.<sup>241</sup>

Despite the fact that the state of Iowa is aware of many of the impacts of climate change (particularly after the release of the "Climate Change Impacts on Iowa" report), there is no

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<sup>234</sup> Iowa Department of Natural Resources, Climate Change 101, <http://www.iowadnr.gov/Environment/ClimateChange/ClimateChange101.aspx> (last visited Aug. 16, 2012).

<sup>235</sup> Iowa Department of Natural Resources, Iowa's Challenge, <http://www.iowadnr.gov/Environment/ClimateChange/ClimateChange101/IowasChallenge.aspx> (last visited Aug. 16, 2012).

<sup>236</sup> Iowa Climate Change Impacts Committee, *supra* note 231.

<sup>237</sup> *Id.* at 10.

<sup>238</sup> *Id.* at note 41.

<sup>239</sup> Moser et al., *supra* note 234, at 7.

<sup>240</sup> Iowa Climate Change Impacts Committee, *supra* note 231, at 29.

<sup>241</sup> *Id.* at 23.

**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning  
October 2, 2012**

statewide adaptation plan,<sup>242</sup> and there has been no integration of this information into the hazard mitigation plan at all. The failure of the plan to recognize climate change, coupled with its arbitrary methodology for calculating vulnerability, lead to an incomplete picture of the water-related risks facing Iowa. Flash flooding is given a relatively low rating of 2.65 by the Iowa State Hazard Mitigation Plan,<sup>243</sup> despite the clear risks described above. The plan itself acknowledges the potential inadequacy of this methodology: “The historical occurrence can be extrapolated into the future, but this methodology may result in inaccuracies.”<sup>244</sup> The data used in this report “may or may not have a complete documented historical record.”<sup>245</sup> By neglecting to include future climate risks in its assessment of vulnerability, and by relying on an insufficient methodology, the Iowa State Hazard Mitigation plan exposes Iowans to unnecessary risks and fails to comply with FEMA regulations. Nonetheless, Iowa has received \$359.5 million in HMA grants (FMA, HMGP, LPDM, and PDM programs) since the Stafford Act was enacted in 1988.<sup>246</sup>

(d) *Ohio*

Completed in January 2011, Ohio’s State Hazard Mitigation Plan details the state’s highest priority hazards, including riverine flood, landslide, dam/levee failure, wildfire, seiche/coastal flooding, coastal erosion and drought among others. However, Ohio fails to adequately address mitigation measures to account for climate-change-impacted risks. Ohio, like its neighboring states in the Great Lakes region, is already experiencing temperature and precipitation increases.<sup>247</sup> In fact, there has been a 30% increase in the frequency of extreme precipitation storms in Iowa over the last 10 years, and a 30% increase in rainfall from extreme precipitation.<sup>248</sup> The years 2004, 2006, 2007, and 2010 all rank among the top 10 of the last fifty years for both number of extreme precipitation events and total rainfall, and rainfall from three out of those four years resulted in flooding disasters.<sup>249</sup>

As in Iowa, these observable trends have generated discussions and studies in state government. In fact, the Ohio Department of Natural Resources, Division of Wildlife hosted a

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<sup>242</sup> Chou et al., *supra* note 1, at 104.

<sup>243</sup> Iowa Homeland Security, *supra* note 225, at 31.

<sup>244</sup> *Id.* at 11.

<sup>245</sup> *Id.* at 10.

<sup>246</sup> Emails from FEMA Federal Insurance and Mitigation Administration (FIMA) staff to NRDC (May 22, 2012 and June 1, 2012) (on file with authors). See Appendix 1 for a state-by-state breakdown of funding awarded by program.

<sup>247</sup> Chou et al., *supra* note 1, at 219.

<sup>248</sup> Saunders et al., *supra* note 236, at 15.

<sup>249</sup> *Id.*

## NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning October 2, 2012

conference on December 15, 2011 to “provide an overview of climate science and trends, projected impacts on wildlife and habitats and tools and strategies for adaptation.”<sup>250</sup> Nonetheless, the state lacks a state climate adaptation plan,<sup>251</sup> adaptation planning does not appear to be under way in any state regulatory agency,<sup>252</sup> and little information on climate change has been included in the state hazard mitigation plan. The plan briefly mentions that climate change may lead to more frequent and severe drought and flood events, but it fails to include any impacts on human health and neglects to provide flexible and adaptive strategies as a part of its mitigation strategy to address climate change.<sup>253</sup>

Ohio Emergency Management refers to the definition of a *mitigation strategy* that contains goals, objectives and an action plan to implement priority mitigation actions that reduce risk. However, the Ohio Plan does not mention how it will plan for severe climate-related risks such as drought and coastal flooding that it presented in its Hazard Risk Assessment section.<sup>254</sup> In addition, Ohio also bases many of its hazard risk assessments on historical data for severe weather events. According to the Plan, “based on historical trends, Ohio can reasonably expect at least one storm every two years large enough to trigger a federal declaration, as well as numerous smaller events.”<sup>255</sup> The hazard mitigation strategy makes no mention of conservation and efficiency measures to reduce threats on water supply or green infrastructure to reduce coastal, riverine, and flash flooding that Ohio considers as hazard risks to which the state will be vulnerable in the future.<sup>256</sup>

Ohio’s hazard mitigation plan relies on historic data for its hazard risk assessment for drought. According to the plan, the drought of the late 1980s showed what the impacts might be if climate change leads to a change in the frequency and intensity of droughts across the United States.<sup>257</sup> From 1987 to 1989, losses from drought in the United States totaled \$39 billion.<sup>258</sup>

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<sup>250</sup> Ohio Department of Natural Resources, Ohio’s Wildlife in a Changing Climate Conference Slated for December 15th, news release, [http://www.ohiodnr.com/home\\_page/NewsReleases/tabid/18276/EntryId/2583/Ohio-s-Wildlife-in-a-Changing-Climate-Conference-Slated-for-December-15th.aspx](http://www.ohiodnr.com/home_page/NewsReleases/tabid/18276/EntryId/2583/Ohio-s-Wildlife-in-a-Changing-Climate-Conference-Slated-for-December-15th.aspx) (last visited Aug. 16, 2012).

<sup>251</sup> Chou et al., *supra* note 1, at 219.

<sup>252</sup> *Id.*

<sup>253</sup> Ohio Emergency Management Agency, *State of Ohio Hazard Mitigation Plan 2011* 218-219, 272-276 (2011) available at [http://ema.ohio.gov/Mitigation\\_OhioPlan.aspx](http://ema.ohio.gov/Mitigation_OhioPlan.aspx) (stating that “with a warmer climate, droughts and floods could become more frequent, severe, and longer-lasting. The potential increase in these hazards is a great concern given the stresses being placed on water resources and the high costs resulting from recent hazards”).

<sup>254</sup> *Id.* at 272-276.

<sup>255</sup> *Id.* at 228.

<sup>256</sup> *Id.* at 272-276.

<sup>257</sup> *Id.*

**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning  
October 2, 2012**

More frequent extreme events such as droughts and floods could end up being more cause for concern than the long-term change in temperature and precipitation averages.<sup>259</sup> Currently, agriculture is a \$7 billion annual industry in Ohio, and one in every seven people in Ohio is employed in the agricultural sector.<sup>260</sup> Although the growing season is expected to lengthen by three to seven weeks, depending on the emissions scenario, the longer growing season will be accompanied by higher temperatures, decreased soil moisture, and increased extreme weather events.<sup>261</sup> These changes will result in heat stress for crops and an increase in the quantity of irrigation water needed, thus causing problems for Ohio.<sup>262</sup> Ohio's plan does not mention how the state will mitigate these severe risks based on a drought like the 1980s, but only mentions how climate change could make droughts more severe.

Similarly, few mitigation strategies are provided for flooding. Many types of flooding occur in Ohio, including riverine, flash flooding, coastal flooding, and shallow flooding.<sup>263</sup> Ohio communities experience riverine flooding on both large basins and smaller tributary streams throughout the state, which has the potential to last for longer periods of time.<sup>264</sup> Ohio's Appalachian region is particularly vulnerable to flash flooding because of the steep terrain and narrow stream valleys. Ohio's urban areas also experience flash flooding that may be attributed to inadequate or poorly maintained storm water infrastructure, increased impervious area, and lost wetland areas. Flash flooding is generally characterized by high velocity water that rises and recedes quickly allowing little or no warning time to evacuate.<sup>265</sup> While Ohio's mitigation strategy encourages protection of floodplain areas, it does not account for increased precipitation and extreme precipitation events, which will exacerbate existing flooding concerns.

Ohio's hazard mitigation plan mentions coastal flooding that occurs in the counties that border Lake Erie but presents no plan for any mitigation due to changes in water levels. The plan declares that annual fluctuations in Lake Erie water levels are the result of seasonal changes and the amount of water flowing into and out of the lake.<sup>266</sup> Toward the end of the century, water levels in Lake Erie are projected to decline, from less than 1 foot under a low-emissions scenario

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<sup>258</sup> *Id.* at 74.

<sup>259</sup> *Id.*

<sup>260</sup> Union of Concerned Scientists, *Confronting Climate Change in the U.S. Midwest: Ohio* 8 (2009), available at [http://www.ucsusa.org/assets/documents/global\\_warming/climate-change-ohio.pdf](http://www.ucsusa.org/assets/documents/global_warming/climate-change-ohio.pdf).

<sup>261</sup> *Id.*.

<sup>262</sup> *Id.*

<sup>263</sup> *Id.* at 191.

<sup>264</sup> *Id.* at 73.

<sup>265</sup> *Id.*

<sup>266</sup> Ohio Emergency Management Agency, *supra* note 257, at 74.

**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning  
October 2, 2012**

to almost 1.5 feet under a high-emissions scenario, as a result of greater evaporation during the summer and reduced ice cover in the winter.<sup>267</sup> However, Ohio's State Plan does not mention any related concerns about reduced water resources, changes in water level quality, or coastal erosion. In addition, reduced winter ice cover is anticipated to increase coastal shoreline erosion risks from wave action, especially during storms.<sup>268</sup> By failing to assess these significant impacts of climate change and the potential risks they present to water resources and property values, let alone mitigation strategies, Ohio's hazard mitigation plan fails to adequately address the natural hazard risks for the state. However, Ohio has received \$74.6 million in HMA grants (FMA, HMGP, LPDM, PDM, RFC, and SRL programs) since the Stafford Act was enacted in 1988.<sup>269</sup>

(e) *Virginia*

Completed in January 2010 and approved by FEMA two months later, Virginia's Standard Hazard Mitigation Plan serves as one part of the larger Commonwealth of Virginia Emergency Operations Plan.<sup>270</sup>

Virginia sits in the middle of the Atlantic coast of the U.S., with much of its coastline wrapping around the Chesapeake Bay, which at 200 miles long is the largest estuary in the U.S.<sup>271</sup> The economic value of the Chesapeake is estimated to be more than \$1 trillion, and Maryland and Virginia share annual economic benefits of more than \$60 billion.<sup>272</sup> Climate change represents a severe threat to the region. Sandia National Laboratories estimates that between 2010 and 2050, Virginia is at risk of losing more than \$45 billion in GDP and more than 300,000 jobs due to climate change impacts.<sup>273</sup>

Climate change is already observable in Virginia, with precipitation having changed significantly over the last 100 years: fall precipitation is about 30% greater, but summer and

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<sup>267</sup> Union of Concerned Scientists, *supra* note 264, at 7.

<sup>268</sup> Stephen Saunders et al., Rocky Mountain Climate Organization & NRDC, *Great Lakes National Parks in Peril: The Threats of Climate Disruption* 16 (2011), available at <http://www.rockymountainclimate.org/images/GreatLakesParksInPeril.pdf>.

<sup>269</sup> Emails from FEMA Federal Insurance and Mitigation Administration (FIMA) staff to NRDC (May 22, 2012 and June 1, 2012) (on file with authors). See Appendix 1 for a state-by-state breakdown of funding awarded by program.

<sup>270</sup> Virginia Department of Emergency Management, *Standard Hazard Mitigation Plan* (2010), available at <http://www.vaemergency.gov/em-community/plans/supportannex-3SHM>.

<sup>271</sup> Chou et al., *supra* note 1, at 130.

<sup>272</sup> USGCRP, *supra* note 1, at 111.

<sup>273</sup> Backus et al., *supra* note 221, at 22.

## NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning October 2, 2012

winter precipitation have been substantially reduced, increasing the risk of drought.<sup>274</sup> Among the anticipated climate change impacts in Virginia over the next century are: increased annual precipitation, water supply challenges, increased flooding, sea level rise, increased erosion, and saltwater intrusion.<sup>275</sup> In 2007, former Virginia Governor Timothy Kaine convened the Governor's Commission on Climate Change to assess and respond to climate change. The Commission's report, released in 2008, documented many of the vulnerabilities associated with climate change, including risks to the built and natural environments and to human health, and it recommended, *inter alia*:<sup>276</sup>

- the development and implementation of a Climate Change Action Plan;
- climate change preparation and adaptation measures for state agencies and local governments; and
- “a thorough review of state agency and local government authority to account for climate change in their actions.”

Unfortunately, little progress has been made on the implementation of these recommendations since the election of a new governor in 2010, and they have not been integrated into the Virginia Hazard Mitigation Plan.<sup>277</sup>

The state plan does rank natural hazard risks, based primarily on an aggregate of local rankings. The state's plan ranks flooding as highest overall hazard risk, and drought is characterized as a medium risk.<sup>278</sup> Flooding is indeed a significant concern for Virginia, and it is currently and will continue to be exacerbated by climate change.<sup>279</sup> However, the Virginia plan relies on historical data to estimate flooding concerns, and hence it is likely that the state is still underestimating this risk, as explained in the context of sea level rise below. The state plan also includes annualized cost loss estimates for the disasters to which it suggests Virginia is most vulnerable.

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<sup>274</sup> USGCRP, *supra* note 1, at 111.

<sup>275</sup> Chou et al., *supra* note 1, at Executive Summary 7.

<sup>276</sup> Virginia Governor's Commission on Climate Change, *Final Report: A Climate Change Action Plan* (2008), available at [http://www.vims.edu/research/units/programs/icccr/\\_docs/gov\\_commission\\_report.pdf](http://www.vims.edu/research/units/programs/icccr/_docs/gov_commission_report.pdf).

<sup>277</sup> Chou et al., *supra* note 1, at 283; Virginia Department of Emergency Management, *supra* note 274.

<sup>278</sup> Virginia Department of Emergency Management, *supra* note 274, at Sections 3.16, 3.

<sup>279</sup> See, e.g., Daniel Nasaw, *Virginia's Dying Marshes and Climate Change Denial*, BBC News Magazine, June 5, 2012, available at <http://www.bbc.co.uk/news/magazine-17915958>.

**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning  
October 2, 2012**

Virginia Plan's Annualized loss values (from NCDC and additional sources):<sup>280</sup>

Hazard Type	NCDC				Other Source	
	Years of Record	Annualized Property Damages	Annualized Crop Damages	Total Annualized Loss	Total Annualized Loss	Data Source
Flooding	1993-2008	\$39,898,487	\$7,678,093	\$47,576,580	\$78,791,612	Floodplain Analysis
Non-Rotational Wind	1989-2008	\$49,858,487	\$5,531,894	\$55,390,380	\$85,434,542	FEMA HAZUS
Drought	1993-2008	\$0	\$23,445,256	\$23,445,256	<i>Not Available</i>	
Earthquake	<i>Not Available</i>				\$17,429,103	FEMA HAZUS
Tornado Wind	1993-2008	\$12,131,359	\$3,446	\$12,134,805	<i>Not Available</i>	
Winter Storm	1995-2008	\$4,107,779	\$103,825	\$4,211,604	<i>Not Available</i>	
Wildfire	1993-2008	\$331,522	\$160,099	\$471,621	\$7,189,330	VDOF (1999 - 2008)
Landslide	1993-2008	\$14,081	\$0	\$14,081	<i>Not Available</i>	
Land Subsidence (Karst)	<i>Not Available</i>				<i>Not Available</i>	
<b>Total</b>		<b>\$106,341,715</b>	<b>\$36,922,613</b>	<b>\$143,244,327</b>	<b>\$188,844,587</b>	

These low estimates of \$143-189 million total do not seem to comport with the much greater risk estimated by scientists at Sandia Laboratories, as cited above.

In the accompanying text in the plan, extreme heat is also characterized as negligible, and health impacts are not considered anywhere in the plan. This is cause for alarm given Virginia's position as a state in the warm southeast of the U.S.: the Intergovernmental Panel on Climate Change has also stated that "[i]t is virtually certain that increases in the frequency and magnitude of warm daily temperature extremes and decreases in cold extremes will occur through the 21st century at the global scale,"<sup>281</sup> and Virginia is no exception. The state experienced 0-45 days per year with peak temperature over 90 degrees Fahrenheit in the latter half of the last century and is

<sup>280</sup> Virginia Department of Emergency Management, *supra* note 274, at Sections 3.16, 8.

<sup>281</sup> IPCC, *supra* note 51, at 142.

**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning  
October 2, 2012**

expected to experience 60-105 by the end of the this one.<sup>282</sup> In addition, the U.S. EPA has documented a combined mortality due to extreme heat in several U.S. metropolitan areas at “well above 1,000 deaths per year,”<sup>283</sup> and it is unlikely that Virginia is not at significant risk for heat-related health effects.

With respect to sea level rise, the Commonwealth’s assessment of risk fails to comport with scientific estimates, largely because it relies on historical data. The Standard Hazard Mitigation Plan reports that the “Virginia Institute for Marine Sciences has indicated that in Virginia’s lower Chesapeake Bay area, sea level rise averages 3.6 to 7.0 mm per year, which is equivalent to 1.18 to 2.3 feet per century,” but does not consider any increases above this past sea level rise for the coming century.<sup>284</sup> In contrast, credible scientific estimates recognize that Virginia’s coastline will be disproportionately impacted by global sea level rise.<sup>285</sup> The Scientific and Technical Advisory Committee (STAC), Chesapeake Bay Program (CBP) – as cited by the Virginia’s Governor’s Commission on Climate Change<sup>286</sup> – places the low end of sea level rise estimates through 2100 at 2.3 feet, and suggests it could be more than double that.<sup>287</sup> As more than 60% of the state’s population resides in coastal areas, which are also responsible for more than three quarters of the state’s GDP,<sup>288</sup> sea level rise carries a significant risk of coastal flooding, which threatens Virginians’ health and property. Sea level rise compounds storm surges, which the Virginia Hazard Mitigation Plan acknowledges to be an increased threat, particularly after suffering the impacts of the Hurricane Isabel in 2003.<sup>289</sup> A federal interagency

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<sup>282</sup> USGCRP, *supra* note 1, at 112.

<sup>283</sup> EPA, *supra* note 93, at 7.

<sup>284</sup> Virginia Department of Emergency Management, *supra* note 274, at Sections 3.7, 3.

<sup>285</sup> *See, e.g.*, USGCRP, *supra* note 1, at 149; Chou et al., *supra* note 1, at 2.

<sup>286</sup> Virginia Governor’s Commission on Climate Change, Presentation to Joseph F. Bouchard, Ph.D., Virginia House of Delegates, 83rd District: Sea Level Rise in Chesapeake Bay – The Economics of Energy Independence (Oct. 6, 2008), available at <http://www.vcnva.org/anx/ass/library/28/cccoverview.pdf>.

<sup>287</sup> Chesapeake Bay Program, Scientific and Technical Advisory Committee, *Climate Change and the Chesapeake Bay: State-of-the-Science Review and Recommendations* 18 (2010), available at <http://www.chesapeake.org/stac/Pubs/climchangereport.pdf>.

<sup>288</sup> National Ocean Economics Program, Coastal Economy Data, <http://www.oceaneconomics.org/Market/coastal/coastalEcon.asp> (last visited Aug. 16, 2012).

<sup>289</sup> Virginia Department of Emergency Management, *supra* note 274, at Sections 3.7, 3. *See also* U.S. Army Corps of Engineers, National Oceanic and Atmospheric Administration, & FEMA, *Hurricane Isabel Assessment: Review of Hurricane Evacuation Study Products and Other Aspects of the National Hurricane Mitigation and Preparedness Program (NHMPP) in the Context of the Hurricane Isabel Response* 1 (2005), available at [http://www.csc.noaa.gov/hes/docs/postStorm/Isabel\\_PostStorm\\_Summary.pdf](http://www.csc.noaa.gov/hes/docs/postStorm/Isabel_PostStorm_Summary.pdf) (reporting that storm surge was responsible for a significant portion of the \$925 million estimate for insured property damage in Virginia attributable to Hurricane Isabel).

**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning  
October 2, 2012**

damage assessment of Hurricane Isabel acknowledged that storm surge was responsible for a significant portion of the \$925 million estimate for insured property damage in Virginia attributable to Hurricane Isabel. Further, the state's Standard Hazard Mitigation Plan also notes that "[n]ine out of ten hurricane related deaths are attributed to storm surge."

By ignoring the impacts of climate change on flooding, heat-related health risks and sea level rise and storm surge in its hazard mitigation plan, Virginia unnecessarily puts people and property at risk, and fails to comply with the requirements of FEMA's HMA regulations. Nonetheless, Virginia has received \$61.9 million in HMA grants (FMA, HMGP, LPDM, PDM, RFC, and SRL programs) since the Stafford Act was enacted in 1988.<sup>290</sup>

**D. FEMA must honor its legal and policy obligations to approve *only* those state hazard mitigation plans that incorporate an assessment of climate-related risks, and provide regulations and guidance to states on how to seize the opportunity to effectively account for climate change in hazard mitigation planning before disasters occur.**

A hazard mitigation plan that does not plan for climate-related natural hazard risks falls short of statutory and regulatory requirements, as well as agency guidance. FEMA may not legally approve such a plan nor provide non-emergency HMA funding in the absence of an approved plan.

As several states have already submitted, and are relying on, hazard mitigation plans that fail to adequately address all relevant natural hazard vulnerabilities by unsatisfactorily addressing climate change, FEMA must immediately begin to remedy its failure to regulate hazard mitigation planning in accordance with its statutory and regulatory obligations, in advance of the upcoming cycle of state plan updates that will be submitted to FEMA for approval. The petitioners request that FEMA provide a remedy by:

- (1) approving only those state hazard mitigation plans that adequately address climate change impacts on hazard risks;
- (2) initiating a new rulemaking under its authority under The Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C. §§ 5121-5207, to

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<sup>290</sup> Emails from FEMA Federal Insurance and Mitigation Administration (FIMA) staff to NRDC (May 22, 2012 and June 1, 2012) (on file with authors). See Appendix 1 for a state-by-state breakdown of funding awarded by program.

**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning  
October 2, 2012**

- confirm explicitly that an assessment of future climate risks is required for approval of state hazard mitigation plans; and
- (3) in the interim before amended regulations are finalized, issuing agency guidance providing more detailed information about how states are to consider climate change risks in their plans.

**1. FEMA must recognize its legal obligations and policy commitments by approving only those state hazard mitigation plans that incorporate climate change.**

Under the Stafford Act, as amended by the DMA2K, and under the regulations FEMA promulgated to implement it, FEMA must approve only those state hazard mitigation plans that consider and plan for the current and future natural hazard risks associated with climate change. Accordingly, FEMA also may not release federal Hazard Mitigation Assistance grants to states without approved plans. Such an approach would conform with current FEMA policy initiatives, including the Climate Adaptation Statement and the initial progress report of the SFI.

FEMA should publicly and immediately declare that it will only approve hazard mitigation plans that account for climate change going forward.

**2. FEMA should initiate a new rulemaking amending 44 CFR § 201.4 to confirm explicitly the need to incorporate the effects of climate change in hazard mitigation plans.**

While states are already obligated to consider all threats, risks, and vulnerabilities in their hazard mitigation plans, some states – like Texas, Alabama, Ohio, Iowa, and Virginia –have not yet done so. Further, FEMA has contributed to this confusion by approving earlier plans that insufficiently addressed climate change impacts on disaster risks. Accordingly, FEMA should eliminate this confusion by modifying the existing regulations in 44 CFR § 201.4 to make this obligation more explicit. FEMA should initiate a new rulemaking in order to make this change.

One suggestion for the appropriate language would be to adjust the text of 44 CFR § 201 as follows:

“Statewide risk assessments must characterize and analyze natural hazards and risks, **including hazards and risks related to projected climate change impacts, such as coastal flooding, riparian flooding, drought, heat illness, air pollution, pollen allergies and drinking water contamination, among others,** to provide a statewide overview. ... The risk assessment shall include the following: ... An overview of the type

**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning**  
**October 2, 2012**

and location of all natural hazards that can affect the State, including ... the probability of future hazard events, **including natural hazard events intensified by or more likely to occur due to climate change.**

- 3. FEMA should provide agency guidance to ensure that states clearly understand this state hazard mitigation requirement, in order that they can better protect against risks to public health and property damage.**

In order to ensure that states fully understand what is required under the DMA2K and associated regulations, FEMA should also provide to the states new agency guidance describing how to effectively integrate climate change impacts into their hazard mitigation plans. This guidance should be provided immediately so that states can use this information as they prepare their revised 2013 plans. This guidance could be provided, *inter alia*, in the guidance document “Multi-Hazard Mitigation Planning Guidance Under the Disaster Mitigation Act of 2000,” known as “the Blue Book,” which was last updated in early 2008. The guidance should specify that, to be most effective, updates to state plans should account for risks related to a variety of projected climate change impacts, including coastal flooding, riparian flooding, drought, heat-related illness, air pollution, pollen allergies, and drinking water contamination, among others.

In an amended Risk Assessment section of the Blue Book, these sorts of risks should be addressed individually, with guidance to states on how to assess those vulnerabilities relevant to them, and a requirement that states do not rely solely on historical data, but also incorporate the well-supported climate projections by the scientific community and any government reports that address climate-related changes and risks. One way to ensure that states are considering up-to-date climate data is to recommend that they base their risk assessments on the most recent data from the National Climate Assessment. Risk assessments should include (1) a state assessment of the role of climate change in exacerbating past natural hazards and the impact of climate change on current, and future natural hazard risks, (2) consideration of state and federal reports regarding climate change impacts on the state, and (3) a description of the sources and methods used to reach these conclusions. Similarly, FEMA should also amend the Mitigation Strategy<sup>291</sup> section to specify that the state mitigation “goals” and “objectives” identified in the plan must incorporate the climate change-related risks identified in the Risk Assessment. Finally, FEMA should update the “Crosswalk” rubric<sup>292</sup> for evaluating standard and enhanced plans to reflect the added criteria.

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<sup>291</sup> The Blue Book, *supra* note 18, at 1-34 - 1-38.

<sup>292</sup> *Id.* at 4-1.

## VII. Conclusion

The body of science connecting climate change to increased risk of water-related and health-related natural hazards underscores the need for informed and comprehensive state planning. Numerous studies, including federal and state agency reports, prove a substantial connection between climate change and an increased risk of drought, flooding, and other natural phenomena dangerous to human health and property. While some states are considering and planning for these risks in a satisfactory manner, many are inadequately addressing them or ignoring them altogether.

State hazard mitigation plans, approved by FEMA, are not only an ideal vehicle for this kind of planning, but a legally mandatory one if the states wish to receive certain non-emergency disaster funding, which, thus far, all states have. Although the Stafford Act, the Disaster Mitigation Act, and FEMA's own regulations, policies, and guidance documents all require the inclusion of climate change-impacted risks in state hazard mitigation plans, FEMA has neglected to enforce this requirement, instead approving plans and awarding plan-contingent funding to states that are not complying with their legal obligations. FEMA's inaction has led the agency to release billions of dollars in federal Hazard Mitigation Assistance funding to states that have failed to properly address climate change related hazards. We therefore request that FEMA:

- (1) Comply immediately with its legal and policy obligation to only approve state hazard mitigation plans that contemplate and adequately address natural hazard risks associated with climate change impacts, and subsequently withhold HMA grant funding from states that do not comply;
- (2) Initiate a rulemaking amending 44 C.F.R. § 201.4 to confirm that inclusion of climate risks is a mandatory criterion for FEMA plan approval; and
- (3) Amend its Blue Book guidance manual to confirm that states must address climate-related hazard risks in their plans at both the Risk Assessment and Mitigation Strategy levels.

Because many state hazard mitigation plans are scheduled to expire in 2013, we request that FEMA implement these changes promptly, so as to be in effect for states preparing for the 2013 cycle of hazard mitigation plan updates.

**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning  
October 2, 2012**

Respectfully submitted,

NATURAL RESOURCES DEFENSE COUNCIL  
NATIONAL WILDLIFE FEDERATION

Dated: October 2, 2012



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**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning  
October 2, 2012**

**Appendix 1: Total HMA Obligations by State or Territory  
as of May 2012<sup>293</sup>**

State or Territory	Flood Mitigation Assistance (FMA)	Hazard Mitigation Grant Program (HMGP)	Legislative Pre-Disaster Mitigation (LPDM)	Pre-Disaster Mitigation (PDM)	Repetitive Flood Claims (RFC)	Severe Repetitive Loss (SRL)	TOTALS
Funds distributed since:	1996	1989	1992	1992	2006	2006	
Alabama	\$1,924,763	\$138,078,661		\$15,697,222			\$155,700,646
Alaska	\$1,208,245	\$24,900,100		\$3,362,094	\$121,004		\$29,591,443
American Samoa		\$17,134,277		\$1,620,393			\$18,754,670
Arizona	\$246,661	\$11,966,155		\$7,289,467	\$176,924		\$19,679,207
Arkansas	\$1,451,395	\$94,026,340		\$20,571,170			\$116,048,905
California	\$12,654,052	\$1,005,844,992	\$5,015,406	\$85,410,201		\$8,791,175	\$1,117,715,826
Colorado	\$5,375,345	\$3,220,154	\$220,000	\$25,259,094	\$196,456		\$34,271,049
Connecticut	\$1,736,874	\$1,980,321	\$291,225	\$4,001,505	\$362,450	\$4,372,736	\$12,745,111
Delaware	\$7,364,303	\$3,679,106		\$3,690,774			\$14,734,182
District of Columbia	\$169,325	\$811,034		\$563,533			\$1,543,892
Federated States of Micronesia		\$6,706,030					\$6,706,030
Florida	\$45,080,143	\$683,912,072	\$8,045,845	\$41,735,197	\$7,518,107	\$15,801,369	\$802,092,733
Georgia	\$6,645,727	\$137,571,252	\$1,463,125	\$32,513,884			\$178,193,988
Guam		\$56,104,841		\$317,975			\$56,422,816
Hawaii	\$14,310	\$10,134,616		\$5,523,990			\$15,672,916
Idaho	\$805,897	\$8,327,288	\$605,259	\$6,634,598			\$16,373,041
Illinois	\$4,181,290	\$99,884,141		\$7,171,300		\$58,500	\$111,295,230
Indiana	\$2,779,034	\$50,440,714	\$937,562	\$5,271,994			\$59,429,304
Iowa	\$943,676	\$353,853,681	\$647,837	\$4,087,243			\$359,532,438
Kansas	\$448,962	\$119,503,319		\$1,685,250			\$121,637,531
Kentucky	\$1,870,362	\$82,662,329	\$5,537,230	\$4,414,609		\$716,744	\$95,201,274
Louisiana	\$18,618,255	\$1,139,883,448		\$2,512,844		\$93,213,817	\$1,254,228,364
Maine	\$342,237	\$17,257,241		\$7,357,684			\$24,957,162
Marshall Islands		\$1,581,966					\$1,581,966
Maryland	\$2,289,361	\$13,552,027	\$1,222,594	\$4,411,239			\$21,475,220

<sup>293</sup> Emails from FEMA Federal Insurance and Mitigation Administration (FIMA) staff to NRDC (May 22, 2012 and June 1, 2012) (on file with authors).

**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning  
October 2, 2012**

<b>Massachusetts</b>	\$5,419,560	\$28,980,093	\$624,576	\$12,913,600		\$714,993	\$48,652,822
<b>Michigan</b>	\$2,383,896	\$39,912,161	\$1,877,981	\$5,176,814			\$49,350,852
<b>Minnesota</b>	\$2,813,160	\$92,105,626	\$832,950	\$8,750,703			\$104,502,439
<b>Mississippi</b>	\$5,009,872	\$316,079,368	\$1,127,394	\$1,742,420			\$323,959,054
<b>Missouri</b>	\$2,387,832	\$117,691,223	\$1,998,382	\$41,966,283	\$1,525,880	\$155,181	\$165,724,781
<b>Montana</b>	\$464,479	\$3,499,152		\$11,436,482			\$15,400,113
<b>Nebraska</b>	\$849,501	\$52,903,651		\$820,047			\$54,573,199
<b>Nevada</b>	\$34,889	\$6,551,741		\$2,789,398			\$9,376,029
<b>New Hampshire</b>	\$6,449,297	\$14,606,067	\$217,866	\$3,942,582	\$857,670	\$120,669	\$26,194,150
<b>New Jersey</b>	\$21,799,304	\$74,416,416	\$550,000	\$7,680,400	\$2,960,697	\$62,097,656	\$169,504,473
<b>New Mexico</b>	\$42,559	\$2,342,042		\$674,862			\$3,059,462
<b>New York</b>	\$7,068,972	\$373,359,161	\$66,261	\$8,841,449		\$328,606	\$389,664,449
<b>North Carolina</b>	\$8,255,336	\$172,761,660	\$6,540,469	\$21,611,289	\$1,849,885	\$2,008,363	\$213,027,000
<b>North Dakota</b>	\$10,209,384	\$103,960,366		\$4,544,453			\$118,714,203
<b>Northern Marianas Islands</b>	\$20,000	\$5,157,481		\$1,475,839			\$6,653,320
<b>Ohio</b>	\$3,151,587	\$57,047,440	\$638,649	\$12,323,544	\$1,227,236	\$221,605	\$74,610,060
<b>Oklahoma</b>	\$1,292,640	\$106,915,626		\$2,369,354	\$5,249,664	\$1,635,080	\$117,462,364
<b>Oregon</b>	\$16,149,131	\$35,174,110		\$24,533,085			\$75,856,326
<b>Palau</b>		\$398,737					\$398,737
<b>Pennsylvania</b>	\$3,436,621	\$76,563,016	\$2,411,009	\$6,322,031	\$2,099,780	\$6,752,509	\$97,584,966
<b>Puerto Rico</b>	\$1,111,637	\$266,070,723		\$3,850,782			\$271,033,142
<b>Rhode Island</b>	\$444,123	\$1,408,588		\$920,583			\$2,773,294
<b>South Carolina</b>	\$2,462,648	\$21,954,631	\$2,256,756	\$17,348,952			\$44,022,987
<b>South Dakota</b>	\$622,062	\$32,695,397		\$2,053,531			\$35,370,990
<b>Tennessee</b>	\$1,274,586	\$108,457,171	\$817,300	\$10,776,928			\$121,325,985
<b>Texas</b>	\$53,808,199	\$692,877,440	\$6,356,838	\$36,043,834	\$4,427,747	\$87,054,828	\$880,568,887
<b>Utah</b>	\$441,976	\$669,696	\$1,188,991	\$17,222,579			\$19,523,242
<b>Vermont</b>	\$576,124	\$8,473,903		\$2,376,286			\$11,426,313
<b>Virginia</b>	\$2,448,714	\$51,155,857	\$485,000	\$2,184,009	\$2,612,858	\$3,060,525	\$61,946,963
<b>U.S. Virgin Islands</b>	\$394,700	\$70,516,852		\$8,083,292			\$78,994,844
<b>Washington</b>	\$3,960,700	\$100,112,438	\$1,338,986	\$20,735,058		\$2,854,352	\$129,001,534
<b>West Virginia</b>	\$1,441,410	\$50,933,160	\$360,000	\$5,510,631		\$272,263	\$58,517,464
<b>Wisconsin</b>	\$1,721,766	\$59,220,186	\$461,392	\$7,625,363			\$69,028,707
<b>Wyoming</b>	\$2,128,178	\$299,426		\$5,195,861			\$7,623,465

## Appendix 2: List of Exhibits<sup>294</sup>

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<sup>294</sup> A digital copy of each exhibit document has been included on compact disc with a hard copy of this petition via mail and is hereby incorporated by reference as an attachment.

**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning  
October 2, 2012**

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FEMA, *FY 2011 Hazard Mitigation Assistance (HMA) Unified Guidance* (2010).

FEMA, *FY 2013 Proposed Budget* (2012).

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**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning  
October 2, 2012**

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**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning  
October 2, 2012**

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**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning  
October 2, 2012**

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**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning  
October 2, 2012**

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**NRDC & NWF Petition to FEMA: Climate Change & Hazard Mitigation Planning  
October 2, 2012**

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