

**CREATING A CLIMATE RESILIENT AMERICA:  
REDUCING RISKS AND COSTS**

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**HEARING**  
BEFORE THE  
**SELECT COMMITTEE ON THE  
CLIMATE CRISIS**  
**HOUSE OF REPRESENTATIVES**  
ONE HUNDRED SIXTEENTH CONGRESS  
FIRST SESSION

HEARING HELD  
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## **CREATING A CLIMATE RESILIENT AMERICA: REDUCING RISKS AND COSTS**

**WEDNESDAY, NOVEMBER 20, 2019**

HOUSE OF REPRESENTATIVES,  
SELECT COMMITTEE ON THE CLIMATE CRISIS,  
*Washington, DC.*

The committee met, pursuant to call, at 1:32 p.m., in Room 1334, Longworth House Office Building, Hon. Kathy Castor [chairwoman of the committee] presiding.

Present: Representatives Castor, Bonamici, Levin, Casten, Graves, Carter, and Miller.

Ms. CASTOR. The committee will come to order.

Without objection, the chair is authorized to declare a recess of the committee at any time. You know, decisions are made every day about where and how to build, what home to buy, and how to prepare for the impacts and costs of the climate crisis, and, today, we will talk about the kinds of climate risk information standards and tools that communities need to reduce the risks and costs of climate change, including more extreme floods and wildfires.

So I will recognize myself for 5 minutes for an opening statement. Last week, the committee heard from members directly about the impacts of the climate crisis on the communities they represent all across America, and today we will examine the Federal Government's role in helping communities reduce the risks and costs of climate fueled disasters. States, cities, and Tribes across the country are taking bold action to adapt to climate change. They need a strong Federal partner, whether it is through scientific information or technical assistance tools, the Federal Government has an opportunity to help communities grow stronger in the face of the climate crisis with a particular eye to communities that are on the front lines.

Every community is different, which is why the best role for the Federal Government is to empower local communities to give them the right tools and data to build strong and to rebuild smart. The Federal Government also can lead by example by requiring that federally funded projects avoid areas that are prone to the worsening effects of the climate crisis. One thing we can't do is move backwards.

In 2017, President Trump decided to rollback a Federal flood standard meant to protect communities from damage. Ten days later, the necessity of those protections was made evident when Hurricane Harvey struck Texas in the Gulf Coast causing massive loss of life and property. Across the Nation, more than 20 states and hundreds of communities have adopted higher standards to re-

duce flood losses through establishing higher elevation requirements or limiting development in flood-prone areas.

Now the Federal Government must modernize the National Federal Flood Standards to ensure the resilience of federally supported development, redevelopment, and rebuilding. To help local decision-makers better protect their citizens, we must also make sure they know how climate change is increasing risks in their communities. Whether it is flooding, wildfires, or extreme heat, they need to know what to anticipate as well as the best ways to prepare their residents for a changing climate.

We must also establish clear, uniform national standards that are grounded in robust climate science. With better guidance, local officials can make better decisions about where to build homes, schools, and hospitals. Maps that integrate climate risk will help us make better decisions today so our buildings can meet the demands of the future. As more and more climate risk data becomes available, the Federal Government will need to develop new maps to take into account the increasing effects of the climate crisis, including future sea level rise and stronger storms.

We also need to better understand how the risk of wildfires threatens communities, forests, and Federal assets. Experts across the country are working on rebuilding and landscape designs to help families and communities respond to the growing risk of wildfires, but that research doesn't always prompt better choices at least at the scale needed to reduce wildfire losses. We can change that. We can enhance our current maps, codes, and standards in order to protect Americans against floods and wildfires, we can equip local governments with the tools they need to build resilient infrastructure, and we can make sure the Federal Government leads by example.

We need to act quickly. Natural disasters in the United States have become more frequent and more severe and more costly over the past two decades. In fact, since the year 2000, flood-related disasters in the United States caused more than \$845 billion in losses, making it the costliest disaster threat in the Nation, and during the last three hurricane and wildfire seasons, our country experienced \$330 billion in damages from six hurricanes as well as over \$40 billion from eight wildfires.

But here is the good news: Through serious climate action, we can reduce these costs. Resilient communities attract investments, reduce dependence on Federal disaster aid, and protect their public credit ratings, which can reduce the cost of capital. Resilient communities can make sure land use decisions avoid flood and wildfire-prone areas. They can adopt and enforce good codes and standards. They can make sure residents are well prepared for storms and wildfire seasons. They just need our help to get there.

The solutions we discuss today will uplift communities, protect valuable natural resources, and reduce the cost of the climate crisis. I look forward to hearing from this great panel of experts to help guide our decisionmaking. And at this time, I will recognize the ranking member, Mr. Graves, for 5 minutes.

[The statement of Ms. Castor follows:]

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**Opening Statement (As Prepared for Delivery)**

**Rep. Kathy Castor (D-FL), Chair  
U.S. House Select Committee on the Climate Crisis**

**“Creating a Climate Resilient America: Reducing Risks and Costs”  
November 20, 2019**

Last week we heard from Members directly about the impacts of the climate crisis on the communities they represent all across America. Today we’ll examine the federal government’s role in helping communities reduce the risks and costs of climate-fueled disasters.

States, cities and tribes across the country are taking bold action to adapt to the changing climate. They need a strong federal partner. Whether it’s through scientific information on what the future holds, climate risk data, resilience standards or technical assistance tools, the federal government has an opportunity to help communities grow stronger in the face of the climate crisis—with a particular eye to communities that are on the front lines.

Every community is different. Which is why the best role for the federal government is to empower local communities, to give them the right tools and data to build strong and rebuild smart.

The federal government also can lead by example, by requiring that federally-funded projects avoid areas that are prone to the worsening effects of the climate crisis.

One thing we can’t do is move backwards. In 2017, President Trump decided to roll back a federal flood standard meant to protect communities from damage. Ten days later, the necessity of those protections was made evident when Hurricane Harvey struck the Texas Gulf Coast, causing massive loss of life and property.

Across the nation, more than 20 states and hundreds of communities have adopted higher standards to reduce flood losses, through establishing higher elevation requirements or limiting development in flood-prone areas. Now the federal government must modernize the national federal flood standards to ensure the resilience of federally-supported development, redevelopment, and rebuilding.

To help local decision-makers better protect their citizens, we must also make sure they know how climate change is increasing risks in their communities. Whether it’s flooding, wildfires or extreme heat, they need to know what to anticipate, as well as the best ways to prepare their residents for a changing climate.

We must also establish clear, uniform national standards that are grounded in robust climate science. With better guidance, local officials can make better decisions about where to build homes, schools and hospitals.

Maps that integrate climate risk will help us make better decisions today, so our buildings can meet the demands of the future. As more and more climate risk data becomes available, the federal government will need to develop new maps that take into account the increasing effects of the climate crisis, including future sea-level rise and stronger storms.

We also need to better understand how the risk of wildfires threatens communities, forests, and federal assets. Experts across the country are working on building and landscape designs to help families and communities respond to the growing risk of wildfires. But that research doesn’t always prompt better choices, at least at the scale needed to reduce wildfire losses.

We can change that. We can enhance our current maps, codes and standards in order to protect Americans against floods and wildfires. We can equip local governments with the tools they need to build resilient infrastructure. And we can make sure the federal government leads by example.

We need to act quickly. Natural disasters in the United States have become more frequent, more severe, and more costly over the past two decades. In fact, since 2000, flood-related disasters in the United States caused more than \$845 billion in losses, making it the costliest disaster threat in the nation. During the last three hurricane and wildfire seasons, our country experienced \$330 billion dollars in damages from six hurricanes, as well as over \$40 billion from eight wildfires.

Here’s the good news: through serious climate action, we can reduce these costs across the nation. Resilient communities attract investments, reduce dependence on federal disaster aid, and protect their public credit ratings, which can reduce the cost of capital. Resilient communities can make sure land-use decisions avoid flood and wildfire-prone areas. They can adopt and enforce good codes and standards. They can make sure residents are well-prepared for storms and wildfire seasons. They just need our help to get there.

The solutions we discuss today will uplift communities, protect valuable natural resources, and reduce the costs of the climate crisis. I look forward to hearing from our great panel of experts.

Mr. GRAVES. Thank you, Madam Chair. I want to thank you all for being here today. I am very much looking forward to your testimony. We have votes going on right now in the Transportation Committee where I am supposed to be, and I have a bill on the floor in a little while so I am going to be bouncing around a bit, but this topic, I think, while the chair and I don't see eye to eye on everything, almost everything, though, right? This is an area where we do have very strong, I think, consensus among the members of the committee. No matter what we do with emissions, we are going to continue to see our seas rise and our coastal communities being more vulnerable. As we have discussed in this committee before, you can look around at the coastal counties, parishes, and boroughs around the United States and those only constitute about 10 percent of the land area of this country, yet over 40 percent of the population lives there.

With sea rise, as the chair noted, increasing disaster response and recovery cost, it is not an option, I think, with that percentage of the population living there and the number going up, for us to just say, well, you all are going to have to move or there is nothing we can do. The reality in my opinion is that we have got to get good at resilient living. We have got to get good at doing that. We also need to make sure that we are being very thoughtful about new development. A recent analysis by the Congressional Budget Office found that the majority of increased disaster costs were actually attributable to development in those areas, meaning we are developing in areas that are vulnerable and not being thoughtful about how to do it.

Now, President Obama's executive order related to floodplain rebuilding and standards was mentioned by the chair earlier, and I have to say that I actually did not support that and I did support the withdraw, but let me clear: I supported the intention of it, but I think it was the right move to withdraw and think a little bit more about how to properly do it because of this. The folks that I represent in south Louisiana, we drain two-thirds of the United States, two-thirds. When folks send us more water, we become more flood-prone or more vulnerable. Hurricanes are exacerbated, the impact are exacerbated by the 2000 square miles of coastal land loss we have experienced, not because of anything we did, because of what the Corps of Engineers did.

So, if you were to apply that executive order, you had some parishes in Louisiana, where I think they said 80 percent of the parish you couldn't live there. That is not right. What you have to do—and Administrator Fugate and I have had this discussion. You have got to integrate an offense and a defense strategy into the Flood Insurance Program. For example, let's look at the fact we have \$100 billion backlog in Corps of Engineer projects, many of which are designed to address resiliency. How are we out there talking about telling communities they can't live in certain areas whenever there is a Corps of Engineers' authorization that has been sitting out there in the books for decades, and we can't figure out how to move forward on it? How are we going to move in a di-

rection of resiliency when we made so much progress last year with the Disaster Recovery Reform Act, with all of the funds through the Community Development Block Grant Disaster Recovery Flood Mitigation program through the Corps of Engineers, construction general program last year record funds and then move into this year whenever we are doing a Community Development Block Grant Disaster Recovery bill—just this week, we put prohibitions in there and say that you can't use the funds on authorized Corps of Engineer projects that actually make your community more resilient. It doesn't make sense. It doesn't. And, obviously, not thoughtful policy has been progressed by this House within the last few months.

This is an area where we should all be working together. This isn't a fight over who is right, who is wrong. We all agree. We all agree that our coastal communities are more vulnerable. We all agree that adaptation measures make sense. We all agree in bipartisan support for the legislation last year, for the appropriations last year, bipartisan support, but we have got to continue building upon that progress because the district that the chair represents, the district that I represent, the district that Mr. Levin represents, we represent coastal areas, coastal communities, people that are vulnerable, and you will not find a divide among us in terms of us wanting to make sure—do you have a coast?

Mr. CASTEN. No.

Mr. GRAVES. I didn't think so. A little coastal envy over there. I see it. You come vacation in our districts. It is fine. You can keep coming. But we need to make sure that we are being thoughtful and that all the policies of this Congress are continuing to move—and I think this committee is a great place to do it—continuing to move in this direction of ensuring that we can have resilient communities, resilient ecosystem, but that we have that offense and defense at the table and aren't just coming in and drawing areas and say "You can't live here." I think that there is a smart way of doing it. I think, in some areas, we are going to have to tell people that you can't populate these areas, and we have done that in South Louisiana, but I think that we have got to be very thoughtful using all the tools in the toolbox as we move forward. Looking forward to you all's testimony.

And I yield back the time that I don't have.

Ms. CASTOR. Thank you, Mr. Graves.

Without objection, members who wish to enter opening statements into the record may have 5 business days to do so.

Now, I want to welcome our witnesses.

Welcome, Craig Fugate. He was the administrator of the Federal Emergency Management Agency for nearly 8 years in the Obama administration and also served as the Florida Emergency Management Director under Governor Jeb Bush. He is more popular in Florida than a rock star. Maybe not Jimmy Buffett, but he currently provides senior level advice and consulting in the area of disaster management and resiliency policy.

Alice Hill is the Senior Fellow for Climate Change Policy at the Council on Foreign Relations. Judge Hill's work focuses on responding to the risks and consequences of the climate crisis. Prior to joining the Council on Foreign Relations, she served as Special As-

sistant to President Obama and developed national solutions as Senior Director for resilience policy for the National Security Council staff.

Chad Berginnis is the Executive Director for the Association of State Floodplain Managers and previously worked in the Ohio floodplain management program and was Ohio's State hazard mitigation officer. He is recognized as an expert in floodplain management with more than 25 years of experience in natural hazard management, flood loss reduction, and land-use planning.

Without objection, the witnesses written statements will be made part of the record.

With that, Mr. Fugate, you are now recognized to give a 5-minute presentation of your testimony.

**STATEMENTS OF THE HONORABLE W. CRAIG FUGATE, CRAIG FUGATE CONSULTING LLC, FORMER FEMA ADMINISTRATOR; THE HONORABLE ALICE HILL, SENIOR FELLOW FOR CLIMATE CHANGE POLICY, COUNCIL ON FOREIGN RELATIONS; AND CHAD BERGINNIS, EXECUTIVE DIRECTOR, ASSOCIATION OF STATE FLOODPLAIN MANAGERS.**

**STATEMENT OF THE HONORABLE W. CRAIG FUGATE**

Mr. FUGATE. Well, thank you, Chair Castor and Ranking Member Graves, and the other members of the committee. First of all, I need to acknowledge that, you know, when you leave Federal Government and you are by yourself, you don't have much of a support system, so I did enlist some help in getting ready for this hearing. Lars Anderson, Blue Dot Strategics, I worked with very closely, and we worked with The Pew Charitable Trusts on flood policy. So, full disclosure, I do work for those folks, but my space and area that I really have focused on is asking the question, why are disaster costs going up exponentially?

We are not necessarily seeing more disasters, but the impacts of the disasters have been climbing to the point where the General Accounting Office has now put climate change impacts, particularly the cost of disaster, on the high risk list. If we talk about the \$850 billion, which are both direct and indirect, the General Accounting Office points out, since 2005, almost half a trillion dollars in direct Federal funding has gone to disaster response. And I like to remind people that those costs are uninsured losses. FEMA does not pay for insured losses. They only pay for uninsured losses. And as this committee wrestles with how do we build resilience, I think we need to answer a fundamental question: Why did the Stafford Act see a disincentive in maintaining insurance in local- and government-owned buildings at the state and transfer that risk to the taxpayer? Think about it. Every time you see these big FEMA disaster dollars going out the door, it is either because families didn't have insurance or were underinsured or and the big dollars are the massive amounts of money that go out because local and State governments are self-insured, which is really not insurance. It is a game they play that says, if it is really bad, we hope somebody else will bail us out at 75 percent on the loss.

And because FEMA's program under the Stafford Act goes back to the first dollar, there has been no virtual increase in state and

local spending on reducing these impacts. And as long as we continue to set the threshold so low on disasters, we are encouraging States not to take action and we are subsidizing the development in high-risk areas, as Representative Graves says. You know, South Carolina sees one of the fastest growing areas in flood-prone areas that can only occur because we subsidize it through the National Flood Insurance Program and through our disaster programs. Just look in your time here the appropriations that were required for both FEMA and HUD, the Corps and others to respond to disasters. Think about what we could be doing with that other money or the fact that we have not had to borrow that money and grown the deficit? And so we need to look at not only policy here, but also I think we need to bring the private sector back into this, and we need to start pricing risk. There is a lot of things we got to do with the Flood Insurance Program and FEMA's trying with Flood Risk 2.0. I think it is a good step. I also caution that it needs to be means-tested because we have a lot of people who don't live on the coast, many in rural parts of the country, agricultural based, and if we go to full actuary value without providing an index of affordability, we are going to price people out of their homes, which I do not think is the intention of Congress. But those that can should be paying what it costs, but I have a simpler solution: Why don't we just stop writing flood insurance for new construction? Let's take care of the folks we got because that program, as much as you have dealt with reauthorization in the short-term program to get that going, it is going to be hard to do any serious reform. There are so many issues we are not going to get to, so let's just take a first step. Let's quit making it worse. If you want to build in a high-risk flood zone, then buy it from the private sector. And it may be a sign that the private sector won't make insurance available or affordable, you shouldn't be building there the way you want to build. And I want to come back to our Federal floodplain management standard.

In 2012, as we were getting ready to go to New Jersey for the infamous non-hug with Governor Christie with President Obama, he turned to me and said: Craig, the debate about climate change is over. We got to start talking about adaptation.

Our problem was we had no tools to say what these impacts looked like and then go, well, what should we be building to? So the Federal flood plain management standard was a very simple idea. It wasn't that you couldn't build in a floodplain; it just said double the amount of height you had to have in the first place. If you were in the National Flood Insurance program, you have to build one foot above base flood elevation. It never said you can't build in a Zone A. All we were saying that if you were taking Federal dollars and building infrastructure with Federal dollars, you had to go to 2 feet, a doubling of that, and if it was a critical facility, like maybe a hospital, a jail, or a 911 center, my first question is, why are you building it in a flood zone in the first place? Build it 3 feet above, and we would provide that additional funding. It did cost more money, but think about the savings we would get. It has been repealed. They are studying it. They have been studying it now since 2017. That tells me we are probably not anywhere close to doing it, and I got bad news for them. I really think we

undershot the whole estimate. We should have been talking maybe 3 to 4 feet if you are going to build in a flood zone, and we should have basically said: Stop building in the flood zone, and we need to increase this outside of the 100-year flood zone, which turns out to be not a 100-year flood event anyway. In Houston, they are thinking that may be a 40-year event, and we need to look at what the flood-prone areas are and raise our standards.

The last thing, as I am over, we have a lot of tools that are forecasting the types of climate impacts we are going to have, yet we have not been able to translate that down to decision support tools to local and state governments to go: Well, if you are talking about sea level rise, what does that mean to my community? What does it mean to what I am preparing to do? And so I think these are areas that, again, I have been looking at this problem is, there is no debate about what climate change is being caused by. The only debate is can we adapt fast enough.

Thank you, Madam Chair.

[The statement of Mr. Fugate follows:]

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**Testimony of The Hon. W. Craig Fugate**  
**Principal, Craig Fugate Consulting LLC; Former FEMA Administrator**  
**Before the U.S. House of Representatives, Select Committee on the Climate**  
**Crisis**  
**“Creating a Climate Resilient America: Reducing Risks and Costs”**

**November 20, 2019**

Chair Castor, Ranking Member Graves, and Members of the Select Committee, thank you for inviting me to testify today about climate resiliency, and what steps need to be taken to reduce the risks and costs of making our communities more resilient.

As many of you know, I do not mince words when it comes to this topic: The climate has changed and we are seeing more climate driven extreme weather events. It is not something that is 30 years down the road. As a result, we need to start talking about adaptation. Time has run out for debate, action is required.

The stark financial reality today is that the federal government spends billions of dollars annually to deal with the effects of climate change and extreme weather while not spending nearly enough to combat future risk. It is critical that we build in funds for resilience on the front-end of these federal investments. There is a huge cost-benefit to the taxpayer, and the outcome is that disaster relief spending should ultimately be reduced in the out years because it costs significantly less to fund recovery for resilient construction following a disaster.

*Disaster cost are growing at an unsustainable rate*

From the GAO High Risk Report for 2019, Limiting the Federal Government's Fiscal Exposure by Better Managing Climate Change Risks. “Since 2005, federal funding for disaster assistance is approaching half a trillion dollars (about \$430 billion), most recently for catastrophic hurricanes, flooding, wildfires, and other losses in 2017 and 2018.”

*Climate Change impacts are occurring and getting worse*

Some Highlights from the Findings of the U.S. Global Change Research Program Climate Science Special Report 2017

- **Heavy precipitation events in most parts of the United States have increased in both intensity and frequency** since 1901 (high confidence). There are important regional differences in trends, with the largest increases occurring in the northeastern United States (high confidence).
- **Extreme temperatures** in the contiguous United States are projected to increase even more than average temperatures (very high confidence).
- **The incidence of large forest fires in the western United States and Alaska has increased since the early 1980s** (high confidence) and is pro-

jected to further increase in those regions as the climate warms, with profound changes to certain ecosystems (medium confidence).

- Global mean sea level (GMSL) has risen by about 7–8 inches (about 16–21 cm) since 1900, with about 3 of those inches (about 7 cm) occurring since 1993 (very high confidence).
- As sea levels have risen, the number of tidal floods each year that cause minor impacts (also called “nuisance floods”) have increased 5- to 10-fold since the 1960s in several U.S. coastal cities (very high confidence). **Rates of increase are accelerating in over 25 Atlantic and Gulf Coast cities** (very high confidence). Tidal flooding will continue increasing in depth, frequency, and extent this century (very high confidence)

*The past is not preparing us for the future*

As much as we need to learn from past disasters, the topline lesson that needs to be understood is that ***we must build, and rebuild after a disaster, for our future risk***. In these scenarios, the past isn’t the best indicator of what these risks have been. Many of you all have seen this, unfortunately, in your home districts: we build something back, and it ends up getting destroyed again. We ought to do it differently, and we need to do it better.

RECOMMENDATIONS

*Build better climate impact models and analysis tools for States and Local Governments*

I have often said that I am not going to debate the merits of climate change. And I saw the effects of it through disaster responses I oversaw at FEMA. It is critical that the risks and effects of climate change are identified and understood so that we can take immediate action.

To that end, the Committee should think about how to accelerate more scientific data and recommendations from a broad cross section of technical and scientific experts, and to consider the need for additional resources to support and improve platforms and models that can forecast and/or characterize sea level rise, flooding probabilities, wildfire risk, drought impacts, and other vulnerabilities associated with extreme weather and changing precipitation patterns.

*The Nation lacks uniformed tools to measure resilience*

As a first step in creating a resiliency standard, develop tools to measure a community’s resilience of its Tax Base to natural hazards.

When local officials try to measure resilience, they often talk about critical infrastructure (Power, Water, Communications, etc.). I think a better measure is the resiliency of their tax base to natural hazard risks. From Hurricane Andrew (and the closing of Homestead USAF Base), Hurricane Katrina and the Gulf Coast, Hurricane Michael and the Florida Panhandle, The Camp Fire in California (Paradise), all have seen reductions in their tax base making recovery difficult or delayed. Loss of housing, jobs, and businesses compound the impacts of the disaster and can mean a failure or long delay to recovery

*How and where will we build matters*

Building codes and land use planning are key steps in building resilient communities. Florida has seen the effects of its building codes reducing storm damage. California’s 2008 updates to its building codes for wildfire mitigation contributed to homes surviving wildfires in 2017 and 2018. Organizations such as the Institute of Building and Home Safety’s Fortified Home program show how building over minimum code requirements can save homes from multiple hazards <https://disastersafety.org>. Congress should continue to support research in developing model building codes that address climate risk.

*Preparing for Extreme Flood Risk*

Since leaving FEMA, I have been working with the Pew Charitable Trusts’ Flood-Prepared Communities initiative on these very issues. Our work aims to decrease the impact of flood-related disasters through cost reduction policies.

I use this as an example of how we need to shift our thinking, investments, and actions as **flooding is our nation’s most costly natural disaster and affects all 50 states**—in areas both inland and coastal. It is something that is impacting constituents in each of your districts and home states. According to the National Oceanic and Atmospheric Administration, flood and coastal storm events have caused, since 2000, nearly \$850 billion in overall losses when accounting for impacts

such as business interruptions, physical damage to buildings, agricultural losses, and damage to public infrastructure.<sup>1</sup>

Resilience and adaptation are essential to lowering the costs to taxpayers and the risks to our communities. Congress is extraordinarily generous in funding disasters each year to ensure that our communities can recover. However, the challenge in this is the inherent bias towards post—disaster assistance over adaptation and pre—disaster mitigation.

It is essential that the federal government alter the long-existing bias that favors post-disaster assistance over federal support for adaptation and pre-disaster mitigation. Investing in resilience is not only good policy that leads to better protection for people and infrastructure, it is a *better* investment in terms of actual dollars. **According to one study by the National Institute of Building Sciences, investing in mitigation saves society \$6 for each \$1 invested.**<sup>2</sup>

Congress needs to look at not only the amount of funding for mitigation, but also the types of funding vehicles available. The mitigation needs in one part of the country are different from another, but the underlying commonality is that both the amount of funding and the type of funding is lacking across the board.

We all understand the difficulty in assessing the costs associated with investing in mitigation. This Committee, in particular, and Congress in general, should consider how we are currently looking at mitigation and adaptation costs. Currently, nearly 90 percent of funding for flood risk reduction comes in the aftermath of a big flood. (This is true for most disasters, with the passage of the Disaster Recovery Reform Act of 2018 (DRRA) Federal Fire Management Assistance Grants now included post event mitigation dollars). Obviously, that it is a good thing to rebuild the right way, but we also have to prepare *before* disasters because those investments will be more effective and well-thought out. I would encourage you all to look at how the current analytical approaches may not fully account for the benefits of adaptation and pre-disaster mitigation.

The built environment is, of course, critical to our lives and well-being. However, we must also look at how non-structural solutions can also support adaptation and mitigation efforts in our country. Various nature-based solutions, such as wetlands and parks, can provide self-sustaining flood defenses that support ecosystem restoration while providing recreational space for communities. These have been proven to be across the board ‘wins’.

One way the federal government has helped communities create or restore natural open space within floodplains is through FEMA’s Pre-Disaster Mitigation (PDM) Program. Through the PDM Program, FEMA has invested in the acquisition of disaster prone or damaged properties with the goal of moving people out of harm’s way while creating permanent open space in the process. In theory, this program is a good tool that states, and communities can use to prepare beforehand, but it just doesn’t get the funding to make enough of a difference. This needs to change, and I hope that as the Select Committee considers its recommendations, that it encourages increased funding for this at FEMA, as well as support other federal agencies in their evaluation and use of non—structural infrastructure wherever feasible.

A second way for Congress to support resilience is pass the State Flood Mitigation Revolving Loan Fund Act of 2019 (H.R. 1610)

#### *Update Flood Risk Maps and Communication of Flood Risk*

I recommend that Congress provide funding to update flood maps to portray **all the areas at risk of flooding**. For example, many of the homes that flooded in Hurricane Harvey were outside zones where flood insurance was required, which understandably caught homeowners by surprise. The worst thing we can do is create a false sense of security for homeowners and communities. Under the current structure, that’s exactly what is happening.

Terms such as a 100-year flood and flood insurance rate maps have led too many to underestimate their flood risk. How to communicate flood risk in terms that homeowners will understand can lead to more purchasing flood insurance outside of the Special Flood Risk Areas.

Congress should also require that to participate in the NFIP, the National Flood Insurance Program, **states adopt flood hazard disclosure requirements for home sales** that provide home buyers a right to know about flood history and risk

<sup>1</sup> National Oceanic and Atmospheric Administration, *Billion-Dollar Weather and Climate Disasters: Summary Stats*, National Centers for Environmental Information, (accessed October 1, 2019) available at <https://www.ncdc.noaa.gov/billions/summary-stats> (considering tropical cyclone to be flood-related disasters).

<sup>2</sup> <https://www.nibs.org/page/mitigationsaves>.

before going to closure. Currently 29 states have some form of flood risk/history disclosure, 21 states have no requirements.

A key step for homeowners to be resilient is the purchase of flood insurance, either from the NFIP, or from private flood insurers. This action can be taken now by the public, as a first step in developing financial resilience in the face of more extreme flood events.

*The Federal Government should not be the first financial responder to frequent disasters.*

I would also encourage the Committee to look at how the Federal government response can act as a disincentive for state and local leadership on mitigation and adaptation. The federal government has multiple authorities for providing disaster response and recovery with programs housed in various agencies across the government. For example, direct grants to repair and rebuild public facilities, loans to businesses, families, and local governments, unemployment assistance, special tax treatment of losses, and financial aid to affected individuals all support our communities. A significant portion of this assistance flows through the Disaster Relief Fund (DRF) to function as a complement to state and local resources when disasters overwhelm local and state capacities.

This is critical support that should not be discounted in any way. However, the downside is the increasing number of disaster declaration requests and growing reliance on the federal government. We see this as problematic, not only in terms of federal spending, but also in creating a strong disincentive for local and state leadership on adaptation.<sup>3</sup> ***I would encourage the Committee look at the proposals for a “disaster deductible” that FEMA released in 2016 and 2017.***

*Stop Growing the Risk*

Strengthen requirements for local and state governments, as well as eligible non-profits, to insure their risk. Too many claim to be self-insured, but have instead transferred their risk to the federal taxpayer when disaster strikes. When the President declares a Federal Disaster under the Stafford Act. No less than 75% of their eligible uninsured losses are required to be covered. This has been an unintended consequence of the Stafford Act, growing the uninsured risk of state and local governments.

One final point I would like to make is about NFIP, the National Flood Insurance Program. As you know, I oversaw this program when I served as FEMA’s administrator, and that program has faced a lot of criticism. I am not here to debate the merits of NFIP, as it certainly plays a role in the immediate term to insure existing properties that aren’t otherwise insurable. However, when discussing resiliency and mitigation, part of that conversation must include a discussion about ***not providing NFIP coverage to new construction in flood zones*** that only grows the risk. The question I ask, if the private sector will not insure the risk of new construction is flood prone areas, why should the taxpayer?

Thank you for the opportunity to be here today, and I look forward to answering any of your questions.

Ms. CASTOR. Thank you very much. Judge Hill, you are recognized for 5 minutes.

#### STATEMENT OF THE HONORABLE ALICE HILL

Ms. HILL. Thank you very much, Chairwoman Castor and Ranking Member Graves and members of the committee. I am delighted to have a chance to speak with you today. As we have discussed, natural disasters are on the rise and according to the fourth national climate assessment, they will continue to rise as climate change occurs. The costs of climate-driven events is also rising. We have heard about the staggering figures between 1980 and 2018, the National Oceanic and Atmospheric Administration estimates that the costs have been \$1.7 trillion. Now, when communities suffer this type of devastation, Americans are generous. The Congress

<sup>3</sup>A 2015 review of state budgeting for disaster concludes that natural disasters and emergencies have not had a significant effect on state finances, “. . . because states relied on the federal government to provide most of the funding for recovery.” <https://www.gao.gov/assets/670/669277.pdf>.

has increasingly authorized supplemental appropriations to provide relief to local and State governments overwhelmed by disasters, to small businesses and individuals who have suffered losses, and to repair damaged Federal assets.

Some of the damage that is wrought by these climate-driven extremes stems from decisions made about how and where people build. Those decisions rest almost entirely with the states and often with local governments. That means that, even though the Federal Government currently has comparatively little say in state and local choices about land use and construction quality, it frequently picks up the tab for those choices after disaster strikes.

The Federal Government's growing generosity to victims of disaster creates a moral hazard. Communities and people place themselves at greater risk because the Federal Government, the Federal taxpayers will bail them out. In the face of accelerating climate change, the Federal Government must reduce the incentives for people to settle in at-risk areas and to build in risky ways. We have heard a lot about flood here today, but let's talk about California's recent experience with wildfire as well. Ten of the most destructive fires in the State of California have occurred since 2015, and the state is currently fighting a vicious wildfire season. Pre-emptive power shutdowns were occurring in California today. California holds the dubious record for having more buildings destroyed by wildfire than all other States combined. A recent study has estimated that it has more than 2.7 million people and 1.1 million homes located in areas already determined to be at very high risk of fire without looking at the added risk from climate change.

In 2008, California enacted a strict new building code designed to reduce fire risk. During the devastating 2018 Camp Fire, only 18 percent of the 21,100 homes destroyed that were built to older versions of the code survived the fire, but of those houses that were built to the new stricter code, they performed better, but only 50 percent survived. With only half of the homes built to the latest code withstanding climate-fueled wildfires, California cannot assume that its building codes will keep people and property safe. California faces worsening wildfire risk. Its own climate assessment estimates that climate change will expand the burned areas 77 percent by 2100, yet just days after the Camp Fire, Los Angeles County board of supervisors approved a 19,000 home development in an area that the State had already determined is at high or very high risk without considering climate change.

To avoid this moral hazard, the Federal Government should set as its objective that Federal taxpayer dollars provided to States, communities, businesses, or individuals either pre- or post-disaster be spent resiliently. The Federal Government should not subsidize new development that is constructed in less than resilient ways or in areas at high risk from climate impacts. The government can make immediate progress in this area by focusing on three issues that have been touched upon already—the creation and enforcement of resilient building codes, the provision of accurate risk assessments to inform land use decisions, and the provision of technical assistance to decisionmakers. Thank you very much.

[The statement of Ms. Hill follows:]

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**Testimony of The Hon. Alice C. Hill**  
**Senior Fellow for Climate Change Policy, Council on Foreign Relations**  
**Before the U.S. House of Representatives, Select Committee on the Climate**  
**Crisis**  
**“Creating a Climate Resilient America: Reducing Risks and Costs”**

**November 20, 2019**

Thank you, Chairwoman Castor, Ranking Member Graves, and Members of the Committee for inviting me to testify today. It is an honor to appear before you and I look forward to answering any questions you may have.

Natural disasters are on the rise. According to the Fourth National Climate Assessment, climate change has already brought more extreme weather and will continue to bring greater extremes in the foreseeable future. The nation will experience a range of climate impacts, including more intense storms, bigger wildfires, and greater temperature and precipitation extremes in the coming decades. Sea level rise has accelerated since the 1990s and will continue to do so in the years ahead.

The costs of weather and climate-related disasters are also rising. Between 1980 and 2018, the United States suffered 254 weather and climate-related disasters carrying a price tag of over \$1 billion each, according to the National Oceanic and Atmospheric Administration (NOAA). The total cost of these events is more than \$1.7 trillion dollars. From 1980 to 2013, the nation averaged 6.3 such billion-dollar events per year. For the years from 2013 to 2018, however, the annual average leapt to 12.6 events. In 2019, the United States has already experienced ten weather and climate-related disasters over \$1 billion each, not even counting the wildfires in California. This year is also the fifth consecutive year in which the total number of events has reached ten or more. These figures support the finding of the Fourth National Climate Assessment that the nation’s efforts to prepare for climate change impacts have not yet reached the necessary scale to avoid substantial damage to the economy, environment, and human health.

When communities suffer devastation, Americans respond with generosity. The Congress has increasingly authorized supplemental appropriations to provide relief to local and state governments overwhelmed by disasters, to small businesses and individuals who have suffered losses, and to repair damaged federal assets. According to the Government Accountability Office (GAO), between 2007 and 2013, federal appropriations for natural disasters increased 46 percent as compared to the previous six years. In just the last three years, supplemental appropriations for disasters has totaled \$183 billion. In light of the growing fiscal exposure to the federal government, the GAO has identified climate change as a “high risk” since 2013.

In addition to greater climate-driven extremes, the increase in damages also stems from decisions made about where and how people build. Those decisions rest almost entirely with the states, and often with local governments. That means that, even though the federal government currently has comparatively little say in state and local choices about land use and construction quality, it frequently picks up the bill for those choices after disaster strikes. The growing propensity of the federal government to absorb the costs of disasters means that state and local governments, developers, and individuals can build in riskier areas and in ways that provide less protection because they believe the federal government will cover the damage when the disaster occurs. In other words, the federal government’s growing generosity to victims of disaster creates a “moral hazard”: communities and people place themselves at greater risk knowing that federal taxpayers will bail them out. In the face of accelerating climate change, the federal government must reduce the incentives for people to settle in at-risk areas and to build in risky ways.

Take, for example, California’s recent experience with wildfire. Ten of the most destructive fires in the state of California have occurred since 2015 and the state is currently fighting a vicious wildfire season. California holds the dubious record for having more buildings destroyed by wildfire than all other states combined. A recent study has estimated it has more than 2.7 million people and 1.1 million homes located in areas at very high risk of fire. In 2008, California enacted a strict new building code designed to reduce fire risk. During the devastating 2018 Camp Fire, only 18% of the 21,100 homes built to older versions of the code survived the fire. Those built to the new, stricter code performed much better, but only 50% of those homes survived.

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With only half of the homes built to the latest code withstanding climate-fueled wildfires, California cannot assume that its building codes will keep people and property safe. California faces worsening wildfire risk. Its own climate assessment estimates that climate change will likely expand burn areas 77% by 2100. Just days after the Camp Fire, however, Los Angeles County approved a new 19,000 home development in an area that the state had determined is already at “high” or “very high” fire risk based on past risk and without consideration of the increased fire risk from climate change. If those houses should burn under the worsening conditions brought by climate change, it could be the federal government that pays, not those who made the decision to build in an area at high risk.

To avoid this moral hazard, the federal government should set as its objective that federal taxpayer dollars provided to states, communities, businesses, or individuals—either pre- or post-disaster—be spent resiliently. The federal government should not subsidize new development that is constructed in less than resilient ways or in areas at high risk from climate impacts. The government can make immediate progress in these areas by focusing on three issues: (1) creation and enforcement of resilient building codes, (2) provision of accurate risk assessments to inform land-use decisions, and (3) provision of technical assistance to decision-makers.

#### *Resilient Building Codes*

Building codes reduce risk of damage. According to the 2019 Edition of the ISO National Building Code Assessment Report, Florida’s implementation of a statewide windstorm building code reduced losses by approximately 72 percent. Effective building codes also “have a strong positive effect on disaster preparation and resilience,” as the recently released National Mitigation Strategy noted. A 2018 study by the National Institute of Building Sciences (NIBS) found that designing buildings to meet the latest model building codes yields a national benefit of \$11 for every \$1 invested. In light of the proven value of building codes in reducing damage, the federal government must insist on compliance with resilient building codes where federal taxpayer money underwrites construction.

The United States does not have a national building code. Instead, non-governmental organizations, develop model codes and revise them periodically. The decision as to whether and which model building codes to adopt rests with states and, in many instances, local jurisdictions. Despite the case for strong building codes, however, the Federal Emergency Management Administration estimates that only 32 percent of disaster-prone jurisdictions have adopted disaster-resistant building codes. That means that close to 70 percent of disaster-prone jurisdictions are at greater risk of damage, damage for which the federal government will often be called upon to pay. The federal government must require state and local jurisdictions to use the latest model building codes when building with federal money, either pre- or post-disaster. Enforcing requirements to adopt and comply with the most recent model codes would save the federal Treasury substantial funds and spare local communities unnecessary damage.

Notably, virtually none of the current model codes, however, yet incorporate consideration of the future risk of climate change. Rather, they rely on historical risk to determine the extremes which structures should withstand. The nation urgently needs model codes that account for the future risk from climate change impacts over the life of a structure. Estimates for when the building code organizations will have developed such codes range to as long as decade. The nation cannot afford to wait that long. As those model codes are in the process of development, the federal government should create its own climate-resilient code for two of the most damaging impacts from climate change—wildfire and flood. Those codes would apply to construction where federal taxpayer dollars are used.

The federal government already has experience with creating climate-resilient codes. Because no model code for climate-exacerbated flooding exists in the United States, the Obama administration, in the wake of Superstorm Sandy and based on the recommendation of the Hurricane Sandy Rebuilding Task Force, developed the first national flood standard, the Federal Flood Risk Management Standard (FFRMS). The FFRMS required that where federal taxpayer money was used to build structures in or near flood plains, those structures had to be elevated to avoid future climate-exacerbated flooding. Ten days before Hurricane Harvey poured approximately four feet of rain on the Houston area causing record flooding, President Trump rescinded the order creating the FFRMS. With the FFRMS, the federal government proved it was capable of producing such standards quickly and efficiently. The nation needs to take advantage of that capacity.

*Risk Assessment in Land-Use Decisions*

Just as building codes reduce risk, restricting new development in at-risk areas reduces risk. The federal government should not use taxpayer dollars to support new development in high risk areas. Doing so contributes to the moral hazard that those making the decisions to allow development in risky areas do not bear the risk of those decisions.

There is abundant evidence that people are moving into high risk areas. People like to live along our coasts—40 percent of Americans now live in a coastal county—and alongside rivers and streams. These areas face growing flooding risks from climate change, be it more intense storms bringing higher storm surge, sea-level rise, or extreme precipitation, or all of the above. For example, in the state of New Jersey, developers have built almost three times as much housing in coastal flood areas as in less risky areas since 2009. Yet the seas are rising. An estimated 360,000 homes are at risk of permanent inundation by 2050 and 3.4 million homes nationwide could face regular inundation by 2100. People also like to live near forests and grasslands, or what is known as the Wildland-Urban-Interface (WUI), areas. Although living in the WUI often carries a higher fire risk, it is the fastest growing land-use type in the United States. For example, the state of California has more people and property located in the WUI than all the other states combined. It has close to 4.5 million homes and 11 million people in the WUI. Yet, according to the state's own climate assessment, the areas burned by wildfire are expected to grow by 77% by 2100.

The federal government has already acted, albeit in a limited way, to restrict federal subsidies for development in risky areas. In the 1970s and 1980s, Congress realized that the federal government's support of development on high-risk coastal barriers did not make economic sense. The Coastal Barrier Resources Act of 1982 (CBRA) makes certain areas ineligible for federal investments and financial assistance which would encourage development in designated areas. This means that those who want to live and invest in those areas bear the full cost of development and rebuilding after a disaster. According to one Department of Interior Study from 2002, the estimated savings to the federal government would reach almost \$1.3 billion from 1983 to 2010. This legislation could serve as a model for restricting support for new development in other at-risk area in the United States. At a minimum, the federal government should not provide financial support for new development in at-risk areas.

To help communities better understand their risks and to guide decisions by the federal government as to which areas are safe to invest in, the federal government needs to provide comprehensive risk maps that include future risk from climate change. That means an immediate concerted effort to create flood and wildfire maps that are updated on a regular basis. Having clear assessments of risk readily available should improve local decision-making and better protect federal investments. Where areas are at high risk from climate impacts like wildfire and flooding, the federal government should restrict its investment in new development in those areas and post-disaster assistance. Where states have already invested in mapping, the federal government can adopt those maps where appropriate.

*Technical assistance*

The federal government has enormous amounts of data and information regarding climate change risk. Yet those resources are not often easily understood or even accessible to local decision-makers on the ground. As one part-time mayor of a small town in Alabama, which faces risks of coastal erosion from sea-level rise and more intense hurricanes, lamented in 2014, "I don't have a big planning staff, grant writers, or any resources. So how can I even know the size of the threats we are facing—and what can I do to protect the people of my town?" This mayor is not alone. Communities across the nation need help deciding how best to prepare for climate impacts. Doing so has the potential to save enormous amounts of money. According to a recently updated study conducted by NIBS, investment in risk mitigation can save an average of \$6 in damage for every \$1 spent in risk reduction.

The federal government urgently needs to increase its technical assistance to local decision-makers. In 2015, the GAO concluded that the federal government's network of climate data remains so disjointed that "decision-makers are vastly underserved." Although decision-making tools and databases rest on numerous federal government websites, it is hard to imagine how busy local officials can make sense of them without guidance as to their merits and applicability. Similarly, the federal government supports various information hubs, including NOAA, the Department of Agriculture, the Department of the Interior, and the Federal Emergency Management Administration. This approach serves various constituencies but fails to provide a customer-centric approach. Those that wish to take advantage of the information must wade

through the differing formats, locations, and approaches that each individual agency has chosen to pursue. As the GAO recently noted, because of this uncoordinated approach, “federal, states, local, and private sector decision-makers may be unaware that climate information exists or may be unable to use what is available.”

As the National Mitigation Strategy recommends, the government “should support nonfederal partners by providing guidance, useable tools, and resources.” The lack of readily available authoritative and actionable information has meant that in many locations and settings, adaptation efforts are stalling. Making climate information easy to obtain and understood would accelerate the updating of codes, the revising of zoning maps, improve engineering and architectural design, and speed revision of cost/benefit analysis. In the absence of current federal leadership in this area, attempts have been made by other entities to fill the void, including a civil-society-based network for assessing, sharing, and supporting applications of climate science called Science for Climate Action Network (SCAN) (for which I serve as an advisor). However, these efforts alone cannot possibly address the increasing demands for actionable information from across the nation. This should be a core function of the federal government.

One immediate step toward accomplishing this goal is to develop a system for providing technical assistance. Such assistance could help guide state and local governments, businesses, and individuals, through the maze of federal programs and information centers already available. Such a system could also aid identification of ways to combine funding sources and navigate differing program requirements. Assisting decision-makers with on-the-ground choices will save not only them, but also the federal government, from substantial damage and leave the nation safer. Federal assistance in this area can yield substantial savings in post-disaster recovery costs if better decisions about where and how to build are made pre-disaster.

In the longer term, the federal government needs to develop comprehensive climate services to support local planning and investment.

Ms. CASTOR. Thank you very much.

Mr. Berginnis, you are recognized for 5 minutes.

#### **STATEMENT OF CHAD BERGINNIS**

Mr. BERGINNIS. Thank you, Chair Castor, Ranking Member Graves, and the members of the committee. On behalf of the Association of State Floodplain Managers, thank you for the opportunity to testify. Our written testimony details 40 recommendations for you to consider regarding policy changes and priorities to make a more climate resilient America. For the balance of my time, I will weave those recommendations together and highlight some of them by telling the story of Pecan Acres, Louisiana, which has been in the press recently and compelled me to tie a lot of these things to that story. I first became aware of Pecan Acres by reading an article a couple years ago where I read about the plight of an elderly African American homeowner who couldn't afford to maintain flood insurance coverage as required when they get disaster assistance. The tradeoff would be to go without medication. She was on a fixed income and living in a very flood-prone area. In fact, Pecan Acres developed in 1968 as a community of 40 homes in a very flood-prone area having 17 floods in 30 years, and this was before there were any NFIP maps. So would Pecan Acres have been developed had flood risks been known? In fact, there are thousands of these neighborhoods from Florida to California to Illinois and everywhere in between, and yet we still don't have a complete picture of the flood risk either present or in the future. Among our recommendations related to data is that we need to get job done mapping the Nation, we need to have a regular program to update our rainfall frequency data, and we need to pass commonsense legislation, like the Digital Coast Act, to empower local decision makers.

Back to Pecan Acres. Flood after flood and seemingly no program could help. Flooding misery, the loss of hope. Structural projects from the Corps of Engineers are likely not cost-effective for such a small and low-dollar-value area. FEMA is only available after a Federal disaster declaration and not after local flood events exacerbated by more extreme rainfall events due to climate change. People are stuck. There is a moral hazard. Those least able to withstand disasters are the ones squarely in harm's way. Today there is lots of programs—the Corps, FEMA, NRCS, even the Federal Highway Administration needs to make sure that we have more resilient roads, but they don't necessarily work well together, and they are definitely not timely.

In actuality, we don't even have a good idea of disaster costs, nor do we do a good job of investigating disasters like we do things like aircraft accidents. Congress has authorized interagency groups, like the Federal Interagency Floodplain Management Task Force, but it has few resources to operate, and we haven't had a unified national program for floodplain management report since 1995, so it is hard to put emerging threats, like urban flooding, in context.

Finally, the last administration's effort to have forward-looking solutions for Federal agencies and the things they fund was repealed in 2017. In other words, there is a lot of room for improvement in aligning Federal programs and resilience goals.

Now back to Pecan Acres. A plan started to come together to use two programs, maybe not traditionally thought of, an NRCS Emergency Watershed Protection Program and Community Development Block Grant to acquire, demolish, relocate, and rebuild households out of harm's way. This raises a couple important points when it comes to adaptation and mitigation.

First, we do not emphasize avoidance enough, whether initially when subdivisions are being built or in considering how we deal with the future threat of flooding. Second, our current approaches need to be improved through strength and resilience standards, accounting for social factors and environmental justice, not just benefit costs and creative ways to help, whether it be through mitigation tax credits or programs like the Department of Defense innovation readiness training program or leveraging new flood proofing technologies, such as those tested to the ANSI 2510 standards. Luckily for the folks in Pecan Acres, there is now hope. When the project is completed, the area will be reverted back to wetlands, harnessing the power of green infrastructure to reduce flood risk.

While the project is not complete, it is under way and can serve as an example for other projects. You see there are thousands of these situations across America, and as sure as I sit here today, all of the communities and neighborhoods under present and future threat of flooding will not make it. We are already behind in our planning. Complete community adaptation is measured in decades, and it is imperative that we generate forward-looking actionable data, align programs, create new approaches, and come to grips that there will be places too hazardous to occupy and do all of this in such a way that doesn't leave the most vulnerable behind. Thank you for the chance to testify, and I will be happy to answer any questions.

[The statement of Mr. Berginnis follows:]

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**Testimony of Chad Berginnis**  
**Executive Director, Association of State Floodplain Managers**  
**Before the U.S. House of Representatives, Select Committee on the Climate**  
**Crisis**  
**“Creating a Climate Resilient America: Reducing Risks and Costs”**  
**November 20, 2019**

INTRODUCTION

The Association of State Floodplain Managers (ASFPM) appreciates the opportunity to share our views on adapting to climate change, and being a more resilient nation in the face of this new future condition.

The ASFPM and its 37 Chapters represent over 19,000 state and local officials as well as other professionals engaged in all aspects of floodplain management and flood hazard mitigation including management of local floodplain ordinances, flood risk mapping, engineering, planning, community development, hydrology, forecasting, emergency response, water resources development and flood insurance. All ASFPM members are concerned with reducing our nation’s flood-related losses. For more information on the Association, its 14 policy committees and 37 State Chapters, our website is: [www.floods.org](http://www.floods.org).

OUR NATION’S FLOOD RISK IS INCREASING DRAMATICALLY

Floods are the nation’s most frequent and costliest hazard. Every year the costs to taxpayers continue to increase. ASFPM estimates that in the 1990’s average annual flood losses were about \$5.6 billion. This increased to an average annual flood loss of \$10 billion in the 2000s and in this decade will likely double again to around \$20 billion per year.

Climate change is manifesting itself in several ways as it relates to flood risk. But the two primary ways are sea level rise and more intense storms. For the former, the impact of rising sea levels depends on the pace and magnitude of the change—two factors about which there is great uncertainty. For instance, a 2016 study updated the estimates on the amount of ice melting in Antarctica concluded that the increase in sea level may be twice the level that was previously estimated. And, an additional source of uncertainty is the willingness and ability of the world’s nations to change the trajectory of climate change. The success of agreements like the Paris Climate Conference and future agreements hold the potential to mitigate some of the projected impacts of climate change.

In inland areas, all across the country, local officials are observing more intense rainfall events. And this is showing up in the data<sup>1</sup> too. Warming conditions mean more water vapor in the air. When rain-triggering conditions are favorable more saturated air leads to heavier precipitation. One public works official from Arkansas recently noted “It was easier when we could plan for and put in stormwater infrastructure that can handle 1–2 inches of rain each hour, but now we are seeing events where you might get four inches of rain in a half hour, I am not sure how we are going to handle that.” Recent research<sup>2</sup> by Climate Central reinforces this observation showing an upward trend with more days with 1”, 2” or 3” or even more rainfall events.

To meet today’s challenges planning for future flooding conditions, while there are promising approaches, overall we are already behind as a nation. ASFPM would like to discuss several areas where improvement is needed. We will address:

- Data, Analysis and Information
- Federal Agency Programs and Policies
- Adaptation and Hazard Mitigation

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<sup>1</sup> <https://www.climate.gov/news-features/featured-images/prepare-more-downpours-heavy-rain-has-increased-across-most-united-0>.

<sup>2</sup> <https://www.climatecentral.org/news/report-pouring-it-on-climate-change-intensifies-heavy-rain-events>.

## DATA, ANALYSIS AND INFORMATION

If we do not have robust systems in place to provide updated and anticipated hydrologic data, track disaster losses, analyze events, and provide sufficient resources going to research and development, we will simply never get ahead of new development in flood risk areas.

One trend that we are seeing all over the country is that rain events are getting more intense. To compound matters, our nation tends to use outdated hydrology which only further underestimates the risk. The National Oceanic and Atmospheric Administration's (NOAA) National Weather Service (NWS) has been updating precipitation frequency estimates for various parts of the United States and affiliated territories. Updated precipitation frequency estimates, accompanied by additional relevant information, are published as NOAA Atlas 14 and are available for download from the Precipitation Frequency Data Server (PFDS). It is these data that are used in everything from hydrologic modeling for producing flood maps to thousands of design decisions every day for development and redevelopment in our communities throughout the nation. However, NOAA has neither the budget nor mandate to provide this in a timely way. In fact, a note in NOAA's most recent progress report which was through March 2019 indicated that "No funding is available to extend NOAA Atlas 14 coverage to the remaining five northwestern states: ID, MT, OR, WA, WY in Volume 12."<sup>3</sup>

Consider the new Atlas 14 data<sup>4</sup> for Texas that came out last fall. That data basically determined that the 100-year rainfall amounts for Houston is now about a 25-year event. In Austin, the previous 100-year rainfall amount is now about a 50-year event. As one of ASFPM's Texas members put it, "pretty much all of the flood maps in the state of Texas are now outdated." *And this particular Atlas 14 update was not even looking at the future; rather it is updating 40–50 year old data that was developed in the 1960s and 1970s.* ASFPM is supportive of current NOAA efforts to test the feasibility of incorporating future climate projections into precipitation frequency analysis examining the inclusion of such data into future Atlas 14 updates.

• **NOAA should be given the mandate and full budget to update our nation's rainfall frequency information at least every 10 years and this update must include future climate projections into precipitation frequency analysis.**

Stream and tidal gages are the stethoscopes of our hydrologic network. Ask any local official about a critical data need and most will say that there needs to be more streamgages. Yet funding for even those deemed critical by the federal government is in short supply. For example, the Federal Priority Streamgages (FPS) Network (previously known as the National Streamflow Information Program) was conceived in 1999 to be a core, federally funded network. The original network design included 4,300 then active, previously discontinued, or proposed new gages that were strategically positioned across the country to address long-term Federal information needs (such as supporting NWS flood forecasts, or interstate and international compacts and decrees). At present (2018), more than 4,700 locations meet the criteria for inclusion in the FPS network, but only about 3,600 FPS are active because of funding limitations. These active FPS are supported through a combination of Federal and partner funding—less than one-quarter are fully funded by the United States Geologic Survey.

• **Congress should fully fund our critical national stream gauge and tidal gauge networks.**

Another critical piece of data that influences thousands of development decisions every day as it relates to flood resilience are FEMA's flood maps. Since 2012, FEMA has been mandated to not only provide flood maps for the entire nation<sup>5</sup> but also provide future conditions flood risk information. Why future conditions? A 2013 study prepared for FEMA estimated that the 100-year floodplain area would increase by 45% nationally by the end of this century. Yet, little progress has been made on either since that time. In the continental United States, we have 3.5 million miles of streams rivers and coastlines. Yet, FEMA has only mapped floodplains on 1.2 million miles of them. While the FEMA Technical Mapping Advisory Council (TMAC), a congressionally-authorized advisory committee is helping FEMA oversee

<sup>3</sup>Hydrometeorological Design Studies Center Progress Report for Period OCTOBER 2018 to MARCH 2019, page 4. [https://www.nws.noaa.gov/oh/hdsc/current-projects/progress/201904\\_HDSC\\_PR.pdf](https://www.nws.noaa.gov/oh/hdsc/current-projects/progress/201904_HDSC_PR.pdf).

<sup>4</sup><https://www.noaa.gov/media-release/noaa-updates-texas-rainfall-frequency-values>.

<sup>5</sup>Statute requires FEMA to provide 100 and 500 year flood data in developed areas and areas that have the potential for future development. Since the owner of a tract of land has the legal right to develop, this mandate can be construed as needing data for the entire nation.

the nation's flood mapping program, completed the Future Conditions Risk Assessment and Modeling<sup>6</sup> report in December 2015, it appears little has been done and we have yet to have these data appear on FEMA flood maps or in the data provided to communities. ASFPM has previously prepared a programmatic cost estimate for implementing FEMA's National Flood Mapping Program which includes both of the aforementioned mandates, concluding it will cost between \$4.5 billion and \$7.5 billion to "get the job done" in initially mapping the nation. We note and appreciate Chairwoman Waters' and Castor's efforts to highlight this issue by circulating and signing a dear colleague letter in March 2016 calling for an infusion of funding over five years to complete the job of mapping the nation.

**• Congress should provide adequate funding to finish the job of providing flood mapping for the nation, to include future conditions mapping, in a short (5- to 10-year) timeframe.**

Today's flood maps are based on models that incorporate hydrologic information and topographic information. Good progress has been made on high quality topographic information for the nation through the United States Geological Survey (USGS) 3D Elevation Program (3DEP). These high quality topographic data inform critical decisions that are made across the nation every day ranging from immediate safety of life, property and long-term planning for infrastructure projects. Currently at 60% complete, the goal of 3DEP is to complete the acquisition of nationwide high resolution elevation data by 2023.

**• Congress should ensure that the USGS 3DEP program is fully funded to provide nationwide high quality topographic information for the entire nation.**

Even if good flood data is developed, there are some policy hurdles preventing it from being publically available. For example, the US Army Corps of Engineers (Corps) new policy<sup>7</sup> on Emergency Action Plans (EAPs) requires several types of flood inundation mapping (EC 1110-2-6074). This policy standardizes inundation mapping and establishes inundation mapping requirements for dams and levees. In theory, having inundation mapping available to the public can help avoid debacles like those we witnessed around Barker and Addicks Reservoirs post-Harvey when thousands of homes in inundation areas of those structures were impacted. Had local land use planners, property owners and others been aware of these risks, steps could have been taken to reduce that risk. However, the new EAP policy includes the following statement: *EAP maps are considered sensitive data and must be marked "For Official Use Only" according to AR 380-5 and DoDM 5200.01*. In other words, inundation maps associated with EAPs are not publically available. Why would we be withholding this vital information on flood risk from property buyers and owners?

The 2016 TMAC report National Flood Mapping Program<sup>8</sup> Review, identified a legacy DHS policy through its Security Classification Guide for the Protection of Critical Infrastructure and Key Resources, which listed dam failure inundation maps as "For Official Use Only." However, this policy conflicts the National Flood Mapping Program requirements that such areas be provided on Flood Insurance Rate Maps and on publically-available databases such as NLD and NID. As noted in the report, a Virginia law passed in 2008 essentially requires that all inundation mapping developed for state-regulated dams be made available to communities and the public. This has now been implemented for a decade without issues and state officials there believe in supporting wider public availability of these data. More recently, when speaking to agency officials, there has been a mistaken belief that this issue had been dealt with. It is clear to ASFPM that it has not and the unwillingness of agencies to act on it demands congressional intervention.

**• Congress should mandate that any flood risk data, including all dam/levee inundation mapping, developed by the federal government and/or associated with any federal program be made publically available.**

As a nation, we neither have the system to effectively track disaster losses nor analyze them comprehensively in order to learn lessons that we can apply to future resiliency efforts.

Despite the frequency and expenses of natural disasters, there exists no system in either the public or private sector for consistently compiling information about their economic impacts. Any data collection effort should focus on the losses as a

<sup>6</sup> [https://www.fema.gov/media-library-data/1454954261186c348aa9b1768298c9eb66f84366f836e/TMAC\\_2015\\_Future\\_Conditions\\_Risk\\_Assessment\\_and\\_Modeling\\_Report.pdf](https://www.fema.gov/media-library-data/1454954261186c348aa9b1768298c9eb66f84366f836e/TMAC_2015_Future_Conditions_Risk_Assessment_and_Modeling_Report.pdf).

<sup>7</sup> [https://www.publications.usace.army.mil/Portals/76/Publications/EngineerCirculars/EC\\_1110-2-6074.pdf?ver=2018-01-22-100438-250](https://www.publications.usace.army.mil/Portals/76/Publications/EngineerCirculars/EC_1110-2-6074.pdf?ver=2018-01-22-100438-250).

<sup>8</sup> [https://www.fema.gov/media-library-data/1474555532007-c063547ff6f48026feb68c4bcfc41169d/TMAC\\_2016\\_National\\_Flood\\_Mapping\\_Program\\_Review\\_Updated.pdf](https://www.fema.gov/media-library-data/1474555532007-c063547ff6f48026feb68c4bcfc41169d/TMAC_2016_National_Flood_Mapping_Program_Review_Updated.pdf).

result of natural disasters, or negative economic impacts. The loss from a disaster is a broader concept than its cost, a term that conventionally refers only to the losses that are reimbursed by insurance companies and governments through disaster relief. A National Academies of Sciences report<sup>9</sup> on this topic made several good recommendations that ASFPM supports including recommendations for also tracking disaster payouts incurred by federal agencies to improve tracking federal disaster spending—not only to individuals and businesses but also to communities and even spending on repairing federal facilities such as levees or Dept of Defense facilities.

• **One agency of the federal government should be made responsible for compiling a comprehensive database containing the losses of natural disasters and disaster spending.**<sup>10</sup>

One vital, yet inexpensive, doable step is to adopt the culture of learning from mistakes that we show in other contexts. Consider aircraft accidents. After each crash, we don't gather around the crash site, mourn, confine our blame to the hapless pilots, and solemnly promise to "rebuild the aircraft just as before." The investigation is handled by a standing, independent federal agency, the National Transportation Safety Board (NTSB). Investigators immediately report to the crash scene. They analyze flight recorders and other data to understand the actions of pilots and crew in response to the emergency conditions, but they do not stop there. They go on to consider possible design flaws in the air frame, errors in equipment manufacture, irregularities or shortcomings in airline inspection and maintenance, air traffic control procedures, the prevailing weather—in short, all aspects of aviation that might have any bearing on the incident. Moreover—and this is not so generally appreciated—the NTSB coordinates and leads the team, but the team includes experts from all the stakeholders—the airframe manufacturer, the airline, the FAA, etc. Finally, though NTSB findings and recommendations do not carry the force of law, stakeholders ignore them at their peril. The result? A safety record that has steadily improved over the years with very few aircraft deaths resulting. Something similar is needed with respect to analysis and evaluation of the entire range of all major natural disasters.<sup>11</sup>

• **Congress and the administration ought to work together to explore the establishment of a standing National Disaster Reduction Board (NDRB), to analyze and report on disasters. Each report would provide opportunities and incentives for communities and businesses, and state and federal governments, as well as policy makers like Congress to learn from mistakes and make ongoing adjustments to decisions and policies.**

For the past decade, a novel approach to data management, tool development and data dissemination has been piloted at NOAA through the Digital Coast Partnership. Developed and maintained by NOAA, hundreds of organizations and federal, state, and local agencies have contributed to this curated collection of high-quality authoritative data and tools focused on coastal and ocean issues. "More than Just Data" is the slogan of the Digital Coast because data alone is not enough, especially when users of that data do not know how it can be used, or what steps to take to get information they need. Digital Coast tools and training help users turn data into powerful information that continues to increase the coastal knowledge of our nation.

For example, one of the most popular tools being used by practitioners today on the Digital Coast website<sup>12</sup> is the Sea Level Rise viewer. ASFPM was a founding member of the partnership and strongly believes that to better understand the future flooding risk in coastal areas and manage that risk, programs like Digital Coast will be vital.

• **Congress should pass the Digital Coast Act.**

The House bill (HR 2189) was reported favorably out of committee in September, last week the Senate bill was reported out of committee.

<sup>9</sup><https://www.nap.edu/read/6425/chapter/1>.

<sup>10</sup>The National Academies of Science Report identifies the Bureau of Economic Analysis (BEA) within the U.S. Department of Commerce, in consultation with FEMA and other federal agencies involved in natural disaster preparedness, response, and mitigation activities, as best suited for this purpose.

<sup>11</sup>For a more in-depth discussion on this concept (and from where this text was excerpted), please see the June 2006 essay by Gina Eosco and Bill Hooke in the Bulletin of the American Meteorological Society. <https://journals.ametsoc.org/doi/pdf/10.1175/BAMS-87-6-751>.

<sup>12</sup><https://coast.noaa.gov/digitalcoast/>.

## FEDERAL AGENCY/PROGRAMS AND POLICIES

While there are numerous programs and federal agencies that address the threat of flooding and floodplain management, most do not take into consideration the future flood condition that will be exacerbated by climate change.

In 1975, Congress established the Federal Interagency Floodplain Management Task Force (FIFMTF). Its purpose was to carry out the responsibility of the President to prepare for the Congress proposals necessary for a Unified National Program for Floodplain Management. For more than 40 years, some form of an inter-agency group has worked to better understand the appropriate roles of local, state and federal governments in reducing flood losses, the interactions between human actions and natural systems in the floodplain environment and to make recommendations to reduce the loss of life and property caused by floods. Also, the task force is useful to identify and address policy or programmatic conflicts among federal agencies that may be resulting in poor floodplain management decisions. The main report of the FIFMTF, a Unified National Program for Floodplain Management was first written in 1979, then updated in 1986 and last updated<sup>13</sup> in 1995. Unfortunately, the report hasn't been updated in almost 25 years while the threats resulting from flooding have exploded. Not only is research showing significant social impacts of flooding, new flooding types like urban flooding are emerging.

In 2012, ASFPM analyzed more than 130 federal programs that had some impact on the use and development of floodplains. At the time, our evaluation also looked at climate adaptation as it pertained to these programs which, for most was either non-existent or just beginning to be explored.

## ADMINISTRATION/CONGRESS

- **Update the Unified National Program for Flood risk management to define the appropriate role of local, state, tribal and federal governments in managing flood risk including future impacts of climate change and the emerging threat of urban flooding.**

- **Convene a task force of national economic experts to review and make recommendations for possible changes regarding economic planning and evaluation for flood-related projects; including application of discount rates, treatment of residual risks, land valuation, lost opportunity costs, valuation of green infrastructure and ecosystem services and functions, future conditions and other considerations regarding structural and non-structural approaches in evaluating flood risk reduction and flood hazard mitigation projects.**

- **Codify Executive Order 13653—the Federal Government, as well stakeholders, must manage climate change risks with deliberate preparation, cooperation, and coordination in order to effectively improve climate preparedness and resilience.**

- **Codify an effective federal flood standard when using fed funds to build/rebuild that would address ordinary and critical facilities (e.g. hospitals, water supply, etc) and include consideration of future conditions and a requirement for agencies to consider natural infrastructure alternatives.**

## INTERAGENCY COORDINATION

- **Adequately resource the Federal Interagency Floodplain Management Task Force (FIFM-TF) to better equip it to undertake its role in inter-agency coordination.**

- **Direct the Federal Interagency Floodplain Management Task Force to determine how the federal agencies can collaborate on data, programs and funding to reduce flood risk and flooding costs for taxpayers at all levels.**

- **Ensure that projects conducted or funded by federal agencies are reflected on FEMA floodplain maps in a timely manner.**

## DEPARTMENT OF DEFENSE/U.S. ARMY CORPS OF ENGINEERS

- **Investigate the resiliency based standards passed in the McCain Defense act last year that in essence require DOD facilities to be looking to higher standards and future climate standards. Determine to what extent DOD has developed rules, is implementing, and is complying with the Congressional mandate and intent.**

<sup>13</sup> <https://www.fema.gov/media-library/assets/documents/18472>.

- **Require the development and transition federal planning principles to a National Economic Resilience and Sustainability standard instead of the current National Economic Development (NED) standard to explicitly incorporate the values of multiple ecosystem services, including the non-market public values provided by the nation's floodplains, and future climate conditions.**
- **Require a minimum design standard of the 500-year flood or PMF level protection for levees protecting urban areas.**
- **Cease federal taxpayer funding of beach nourishment if benefits are primarily for recreation. Those who benefit should pay for this temporary benefit. The entire beach nourishment policy should be revisited in light of a changing climate and sea level rise. In particular, the cost share for these projects should reduce federal taxpayer costs share to no more than 50%.**

#### FEDERAL HIGHWAY ADMINISTRATION

- **Improve sharing post disaster highway data and best practices to improve resilient reconstruction of non-federal/state highways. Develop guidelines to assist local highway departments to help them in reconstruction following flooding.**

#### HOUSING AND URBAN DEVELOPMENT

- **Permanently authorize the CDBG-DR program to avoid HUD having to write rules after every disaster supplemental to streamline the rebuilding process.**
- **FEMA Public Assistance and HUD CDBG and other disaster funding should require net zero carbon emissions for project eligibility.**

#### FEDERAL EMERGENCY MANAGEMENT AGENCY

- **Under NFIP, consider extending the mandatory purchase requirement for flood insurance to all areas. At a minimum, it should be expanded to other known flood hazard areas such as residual risk areas, urban flooding areas, .2% chance (500-year) floodplain, etc.**
- **Under NFIP, flood maps must include future flood conditions for NFIP regulation as directed by Congress. Added future flood layers for 2040, 2060 and 2100 projections can be in the digital data for community use for planning or risk commination or other community needs.**
- **Emphasize the most basic but most important resilience strategy for the NIFP: "avoidance". We should not invest any mitigation money in a community unless they first adopt higher standards that prevent adding any structures or assets within high risk areas. Simply put, we have to stop the vulnerabilities from increasing first and only then start chipping away from what we can then call legacy vulnerabilities.**
- **Require all Class 7 and better in the NFIP's Community Rating System communities to consider and plan for anticipated climate change in their floodplain management plans. Class 1 communities should prepare maps and regulations using best available data to address the impacts of changing climate for the next 100 years.**
- **Establish a national flood risk disclosure law to all potential buyers know the past history and future flood risk potential of all properties.**
- **Require utility companies (eligible for PA) to analyze the full range of mitigation options and account for current and future flood risk in planning, design, construction and reconstruction of facilities. Future federal assistance should be prohibited unless such requirements have been adequately incorporated.**

#### ADAPTATION AND HAZARD MITIGATION

Community and individual adaptation to climate change will not be quick nor easy. Any community facing flood risk often is also facing a multi-decadal timeframe to reduce that risk enough that they will be resilient in the face of current and future flood threats. Property owners facing increased sea level rise have a very real prospect of their property value plummeting to nothing—for the single asset that,

for most Americans, is their most valuable.<sup>14</sup> To say we have an adaptation problem in this country is vastly understating the issue and delay will only add hundreds of billions of dollars in estimated flood related damages that will already likely occur due to climate change.

In some communities, coastal in particular, it is not going to be feasible to stay along the coast given the risks from sea level rise and resources available to adapt. We will need to take proactive strategies and provide technical assistance to help communities make more informed decisions on when to rebuild more smartly vs when it would be time to start phasing in relocation. Developing innovative assistance programs like the Digital Coast to support the evaluation process, decision making and potential infrastructure/community moves would be important to advance progress. Below are some recommendations:

- **Develop national hazard resilience standards for the location, design, construction, and reconstruction of all public infrastructure and buildings that consider: alternative locations, future conditions, green or nature based options, mitigation and a No Adverse Impact approach. These standards should then become a condition of federal funding.**

- **Minimize use of federal taxpayer dollars to rebuild in areas we know have greatly increasing flood risk.**

- **Incentivize mitigation through changes to the tax code like a mitigation tax credit.**

Flood mitigation actions like buyouts and relocations in particular, will be effective in adapting to climate change, especially in communities where the flood hazard area becomes too difficult for continued occupation. However, our current programs for buyouts and relocations have several issues which make them too time consuming and complex to be done in the manner that they need to be implemented. Congress should examine the buyout and relocation programs that are offered by multiple agencies (FEMA, HUD, USACE, NRCS) to ensure that they are streamlined to the maximum extent possible and also support area wide or community wide buyouts/relocations. In fact, largely due to the complexity of such a project and the inability of federal programs to work together, we rarely see these options used on a large scale. An exception to this is the community relocation project<sup>15</sup> of Newtok, Alaska where both FEMA Hazard Mitigation Grant Program and Pre-Disaster Mitigation grant funds are being used, as well support from the Bureau of Indian Affairs and the U.S. military through the innovative DoD Innovative Readiness Training (IRT) program.

- **Place priority on buyouts and relocation as a way to adapt to climate change.**

- **Ensure buyout programs/projects pair buyout assistance with the development of affordable housing in less flood-vulnerable areas.**

- **Fund research on evidence based buyout practices and dissemination of the results to practitioners. Require the FIFM-TF or other task force to examine the hurdles to community wide or neighborhood buyouts / relocations, with a focus on federal programs working together.**

- **Explore a more widespread usage of the DoD Innovative Readiness Training Program for flood mitigation projects, especially community/neighborhood relocations.**

- **Permanently authorize the Community Development Block Grant—Disaster Recovery program.**

Congress needs to address the lack of buyout program for flood-prone land in rural areas. Such areas are often those places next to be developed and it would be significantly less costly to acquire either permanent easements or the properties outright then to do so after development occurs. In many areas of the country more floodplain land is needed to safely accommodate flood water through leveed stretches of river. While urban buyouts will improve public safety and reduce property damage, portions of floodplain that are currently protected from flooding by levees must be utilized to convey floodwaters away from towns and critical infrastructure. At the moment, no comprehensive program for land acquisition to improve flood management in rural areas exists. Agencies like the USDA, the Army Corps, and FEMA have various limitations and restrictions on acquisition or easements that make land acquisition a primary barrier to floodplain reconnection projects.

<sup>14</sup> An insightful 2016 article by Freddie Mac's Economic and Housing Research Group (Life's a Beach), discusses potential impacts of climate change that may be unavoidable when it comes to flooding and concludes that they will likely be greater in total impact than the housing crisis and Great Recession. [http://www.freddiemac.com/research/insight/20160426\\_lifes\\_a\\_beach.page](http://www.freddiemac.com/research/insight/20160426_lifes_a_beach.page).

<sup>15</sup> <https://content.govdelivery.com/accounts/USDHSFEMA/bulletins/2692581?reqfrom=share>.

One example would be to improve the USDA Emergency Watershed Protection-Floodplain Easement Program (EWPP-FEP). Floodplain easements allow for restoration of natural and beneficial functions of floodplains on land that has been damaged by flooding and allows for floodplains to be utilized to safely convey flood water on undeveloped land. However, this emergency funded program is only activated when infrastructure damages reach a critical threshold to automatically trigger a Stafford Act Federal Emergency Declaration, or if Congress declares easement funding to be available through an emergency appropriation. Unfortunately, both avenues are difficult to achieve. First, the critical infrastructure damage thresholds are almost impossible to reach in many rural counties. Second, if flood damage is localized it can be hard to garnish the requisite national attention needed for an emergency appropriation bill. This can leave rural landowners with unfarmable, flood-prone land following a flood disaster.

• **The EWPP-FEP program should be reformed to allow for the release of funding based on more locally based flood damage thresholds or set up as a non-disaster easement program.**

While buyouts and relocations are good long-term solutions, there must also be options available in the short to medium term. One approach in the short and medium term timeframe is to use the latest floodproofing technologies. There is an incredible amount of innovation occurring right now as new technologies are coming online to help solve flooding problems. However, are these technologies as good as promised? For buyers, one way to achieve some certainty is to ensure that the product has met the ANSI 2510 standard. ASFP, in partnership with FM Approvals, assisted with the creation of the 2510 standard over a decade ago. The standard applies to floodproofing technologies such as perimeter barriers, opening barriers, flood mitigation pumps, backflow valves, and now sealants and glazing systems. ASFP, in partnership with FM Approvals and the Corps oversees the National Flood Barrier Testing and Certification program where products that have been tested and certified to the 2510 standard can be found on the website: <https://nationalfloodbarrier.org/>.<sup>16</sup> ASFP is encouraging communities to adopt the 2510 standard and also incorporate it into the nation's building codes.

• **Require federal agencies who purchase and use flood fighting products and federal grant programs that authorize the use of such products ensure such products are 2510 certified and are used in floods that meet that certification.**

#### SOCIAL AND HOUSING CONSIDERATIONS

More and more, there is a nexus of issues surrounding disaster losses, climate change, social issues (i.e., the effects on low/moderate income (LMI) populations and social justice) and housing. The moral issue is this: How/why do we put those who have the most to lose during a flood in harm's way through our housing, zoning, infrastructure, and other policies? Unfortunately, this is exactly what federal policy does. For example, the Department of Housing and Urban Development does not have a universal policy against paying for housing in flood prone areas. At the same time, we recognize that much of the nation's affordable housing stock was built before climate change was well understood, and many affordable housing options are at risk of flooding. Thus, under current policies, the extreme shortage of affordable housing for low income families is squarely at loggerheads with the realities of flood risk. According to a recent study,<sup>17</sup> nationwide about 450,000 government subsidized households are in mapped floodplain.<sup>18</sup> Therefore, if HUD were to withdraw support from all properties in the floodplain it would create a new crisis of homelessness creating a whole new set of problems.

• **HUD should examine its housing programs and create innovative mechanisms (i.e., targeted flood mitigation programs for existing at-risk affordable housing units) to incentivize communities, housing authorities, and landlords to undertake mitigation actions with a long-term goal of substantially reducing or eliminating flood risk.**

• **Incentivize the location of new affordable housing to ensure that it is in flood risk free areas.**

The Association of State Floodplain Managers appreciates this opportunity to share our observations and recommendations with this Committee. For any questions, please contact Chad Berginnis, ASFP Executive Director at

<sup>16</sup> <https://nationalfloodbarrier.org/>.

<sup>17</sup> <https://furmancenter.org/research/publication/housing-in-the-us-floodplains>.

<sup>18</sup> As stated earlier in this testimony this is likely a gross underestimate of the housing units at risk given that the nation's flood maps are not yet completed and they do not account for future conditions.

cberginnis@floods.org (608 828-3000), or Larry Larson, ASFPM Sr. Policy Advisor at larry@floods.org (608-828-3000).

Ms. CASTOR. Well, thank you all very much. All right. So we have a climate emergency. We do not have time to wait and what we are—what you all—your message to this committee is that we have got to figure out some ways to incentivize local communities and states to do better, to integrate the climate risk into all of the decisions they make. Before I came to Congress, I was a county commissioner, and it was difficult enough, notwithstanding climate factors, just to have sound land use decisions and planning decisions.

How do you all recommend that we from the Federal level here build in the incentives that local communities need or disincentives to ensure that they are in every decision they make in their capital improvement programs, land use decisions, that climate risk is a part of that decisionmaking? Mr. Fugate, if you would start.

Mr. FUGATE. It may not even be Congress that does that. The institutional lenders, the raters, such as Moody's, are already putting local governments on notice that bond ratings may be affected about the resiliency of their tax base and that State and local governments that are not taking steps to address the resiliency of that tax base, the ability to service that long-term debt, may result in higher bonding cost. As you know as a county commissioner, your bond rating is a golden standard for the ability to operate. So I think the private sector's actually further along than we are. Their big question is they don't even know how big the exposure is, but the fact they are asking the question, I think, is the first step. I think the other part of that is, the incentives that we currently have in the disaster programs are such as you have heard from everybody, it is a disincentive for governments to change what they are doing. I think we need to look at things like disaster deductible in the Stafford Act. I think we need to look at quit writing policies for new construction, and I think we need to make investments where we are able to make investments at standards not based upon past weather and past history, but what potentially is going to be the impact.

Ms. CASTOR. Thank you.  
Judge Hill.

Ms. HILL. I agree with everything that Craig has said. One of the important things is for—we need to make sure that we are informing Americans about their risk. This is a task that I think the Federal Government is particularly well suited to with its strong strength in science and research, to provide the mapping of two American citizens to have better knowledge. And then, once that mapping is in place, which must include the future risk from climate change, we must create carrots and sticks for local communities in terms of signaling that Federal taxpayer dollar will not support new development in areas that are at extreme risk. We will define what that risk level is, but no Federal taxpayer money should support new development in those areas. And then, of course, we will have to address the substantial development that has already occurred, as Chad has indicated, in areas that were not known to be a risk, but we must address their needs as well.

One of the important things we need to do as a nation is develop model building codes that reflect the risk of climate change. We have currently no such model building codes available. Estimates have run that it will take a decade. The Federal Government could provide incentives to our model building code organizations to speed up, to accelerate the development of codes that will help individuals protect themselves as well as communities. Without those codes, we are at risk of building things that will be destroyed in the next flood.

We also need to require that communities who want Federal support follow those codes. And, finally, as has been touched upon, we need to make sure that we are providing the assistance on the ground to people like yourself, Chairwoman Castor, who are trying to make important decisions but may not have all the information needed or all the—

Ms. CASTOR. And there are plenty of communities that are on the front lines that don't have the wherewithal, that don't have even a planner on staff, those kind of issues.

So, Mr. Berginnis, what does this mean for Federal flood standards, and how would communities deal with that?

Mr. BERGINNIS. Well, I think the starting point has to be data and one of the roles—an appropriate role of the Federal Government is to provide good, actionable data and decisionmaking tools, and so, whether it is finishing the job of mapping the nation, whether it is—and this is probably the most egregious issue, is that we don't even have a mandate nor budget to update our rainfall frequency information.

So, in Texas in 2018, they got a new Atlas 14, which essentially basically said, what was the 100-year rainfall event in Houston is now the 25-year event. In Austin, it is a 50-year event, and one of our member's comment is, like, okay, all the flood maps in Texas are now invalid. We are basing thousands of decisions on data that is old and not usable. And so, we need to have that investment of data and one thing that this Congress could do right now, there is the Digital Coast Act that is pending in Congress to work on that data need.

Once we have data in terms of standards, we still have—we still have not done a good job of tying our disaster assistance programs, for example, to the requirement of having standards. What would happen if public assistance, which is by far the biggest amount of disaster assistance we have, was conditioned on the fact that you have latest codes?

I guarantee you almost every single community in the Nation would have the latest codes pronto because you can't turn down that much assistance, but we don't tie appropriate disincentives to our programs.

Ms. CASTOR. Great. Thank you very much.

Mr. Carter, you are recognized for 5 minutes.

Mr. CARTER. Thank you, Madam Chair. I appreciate the opportunity, and thank all of you for being here. I appreciate it very much. Do we want to pause?

[Disturbance in hearing room.]

Ms. CASTOR. Thank you very much. You heard me already in my opening remarks say we have a climate emergency, so will you—

thank you very much for participating in this great democratic process. Can we proceed to get to the solutions? But thank you very much. Mr. Carter, you are recognized—thank you.

[Disturbance in hearing room.]

Ms. CASTOR. Thank you very much. Mr. Carter, you are recognized for 5 minutes.

Mr. CARTER. Thank you, Madam Chair, and, again, thank all of you for being here.

I want to ask you something that I continue to remind my colleagues of. Do you know what the number one forestry state in the nation is?

Mr. FUGATE. No, sir. We grow trees in the South like people grow corn in the Midwest.

Mr. CARTER. Absolutely. We are blessed in the State of Georgia. We have the number one commercially available timberland, number one in annual timber harvest volume; number one in the exporter of pulp, paper, and paper board mill products; number one exporter of wood fuel; and the number one exporter of wood pellets. And I say that to tell you that, in the First Congressional District, we have got some of the most competitive timberland in the Nation, and I am very proud of that, and I am very proud of the resiliency that is offered through our sustainable forest. And I want to point that out because Mr. Fugate, would you agree that working forests can help to bolster the resiliency of local landscapes, both through reducing soil erosion and improving water quality as well as a number of other things?

Mr. FUGATE. Yes, sir.

In the South, we grow to silviculture. It is not a natural process. It grows trees for production. However, they are not as resilient as we would like. The timber industry in the Florida panhandle and what we call the 850 has been devastated and will take decades to recover. Southwest Georgia saw the same thing. During extreme droughts, all that timber becomes major wildfire areas, and as we continue to see our communities build into the interface, we have developed wildfire risk on the East Coast that may not be as great as the West Coast, but is certainly changing the dynamics of that area.

But that crop and that ability to plant trees obviously does a lot to put land that may not otherwise be usable into productive use, absorb carbon, and help build resilient economies, but it is not totally resilient to the impacts of climate.

Mr. CARTER. Absolutely. And I understand that, but that brings me to a point that I want to bring up. I have got some legislation. It is H.R. 1444, the Forest Recovery Act. Currently, under current law if a working forest is struck by catastrophic loss, as you point out, often happens, hurricanes, wildfires, whatever it may be, 70 percent of timber farmers must simply eat the cost of that. What my bill does is to say that, if they are to repurpose their land that they could get a tax deduction for that and that this would help us. The key there is repurposing it. What we don't want to see happen is for them to lose the land or to turn it to some other use. We want to see them continue to have it to be forest land, and that is what my bill does and what it encourages because resiliency is

extremely important and our forests are extremely important to that as well.

Let me move on to talk about community resiliency because it is important today to understand—I also have the honor and privilege of representing the entire coast of Georgia, including 110 miles of pristine coastline, and our coast has been hit by these natural disasters that you mention. Three years in a row, we had hurricanes and this year we just barely missed one with Dorian, but we did miss it, but we still—this is something that impacts us very much.

Mr. FUGATE, how urgent do you believe it is that we bolster our communities and make them more resilient to withstand these types of weather events?

Mr. FUGATE. I think we can't talk about it anymore; we need to do it. My mama's from Screven. I used to go down—

Mr. CARTER. Your mama's from Screven.

Mr. FUGATE. Yeah. We used to go down to Jekyll Island. I grew up on that part of the world. And what we know, both across all of the Gulf Coast areas and the Atlantic Coast is, we built communities for the past. And when people talk about resiliency, we don't have a good measure. So I would like to introduce a measure because I think this would go right in line of what you are looking at. We need to start looking at the resiliency of the tax base of these communities because we are talking about infrastructure and other things, but what it ultimately comes down to and what Moody's and others are concerned about is, what is the financial risk that communities have and what are they doing to offset that risk.

And this goes back to where and how we build means that tax base will be there after disaster. We are seeing in the 850 parhandle right now Jackson County, Marianna, and other places that their property values have decreased and are not coming back. We saw this in Hurricane Andrew in Homestead City when the Air Force base closed. We are seeing this in Paradise from the wildfires in California. Those communities don't have a tax base. And as the chair will tell you, when you are a local official and your tax base is decreasing at the same time demand for services are increasing, you go into a death spiral and you can't recover. So I think we need to talk about resiliency of tax base and use that as the first nationwide measure of where our vulnerabilities are and where we need to be investing to ensure that communities have resilient tax bases.

Mr. CARTER. And that is a great point. And probably the most important point there is just how we should be working with local communities as well, and that is extremely important. Madam Chair, I am out of time, but thank you very much.

And I yield back.

Ms. CASTOR. Thank you, Mr. Carter. Thank you.

[Disturbance in hearing room.]

Ms. CASTOR. We are—thank you very much. We are working on climate solutions. We don't have time to waste and that is why I am going to go to Mr. Levin for 5 minutes. Thank you very much.

Mr. Levin, you are recognized for 5 minutes. Please. I don't want to have to ask you to leave. I really don't, so would you let Mr. Levin ask—no, no, no. We get to ask the questions. We will be happy to—

[Disturbance in hearing room.]

Ms. CASTOR. Yeah. Thank you very much. True. We have had those hearings. Okay. Mr. Levin.

Mr. LEVIN. Thank you, Chair Castor. I want to echo your earlier comments. I believe we are in a climate emergency, and I am on the resolution—I am on the resolution stated as such. There is a—all right, please.

[Disturbance in hearing room.]

Ms. CASTOR. Please, I don't want to have to ask you all to leave. Can you please listen to the testimony, and then help us develop these solutions? Mr. Levin.

Mr. LEVIN. In California, we are experiencing a climate emergency firsthand in real time, and it is not some scientific theory. It is not some hypothetical. We are seeing it every single day with extreme wildfires, year-round wildfires that are causing unprecedented problems in our state. Ms. Hill, you said it well. We see planned power blackouts affecting millions of residents, and I am trying, as best as I can along with our California delegation, understand how we best deal with it from the Federal level, so I would like to ask both Ms. Hill and Mr. Fugate. Mr. Fugate, thank you for your service during the Obama administration. What sorts of wildfire mitigation projects have been the most effective in your experience at reducing the risks and costs of wildfires?

Mr. FUGATE. Actually, two programs that are not Federal. The first one was California coming up with better building codes. We know particularly in the Camp Fire that the fire started in embers. The roof materials were a big factor in flame spread, and so I think California's taken that, but we have a built infrastructure of homes that aren't there yet. Another one was a program that was instigated by the National Fire Protection Association called Fire Wise. Steps we can take right now to reduce vulnerability to homes such as landscaping, just managing debris around homes, ladder fuels, and things that can reduce the impacts of wildfires, and then you as Congress, after the disaster 2017, reauthorized or made changes to the Stafford Act. For the first time, we have permanent authorization to provide mitigation dollars under fire management grants that can again go back, but we also have to look at the fire risk as a two-stage threat. It is the fire that does the initial devastation. Then it is the flood risk and the mud flows afterwards that will be caused by all the scar burn.

So, again, I think what California took was a first step. I think there are programs like Fire Wise that can give us immediate tools to help communities and homeowners reduce their risks, but I also think we need to look long term, as was pointed out by Judge Hill. Where we build and how we build is the future, but how do we take care of the people that are already in the interface.

Mr. LEVIN. So, at the Federal level, how can we supplement some of those best practices.

Mr. Fugate. Again, I think you are providing mitigation dollars which will allow communities to now start doing things other than structural mitigation. We have learned a lot about how we can control fuels around our yards, the vegetation management. I know this is a controversial issue, and I am from Florida where we do silviculture. We do a lot of controlled burning to manage vegeta-

tion. We learned after 1998 that if we don't do control burns, we end up in the interface with uncontrollable wildfires. That is not a very easy discussion to have in California, but I think it is one that has to be looked at, is fuel reduction during the extreme wet periods so that when you go into the drought periods, there is less fuel available, it is managed when it can be managed, and it will help reduce as we have seen in other parts of the world as well as Florida. It can reduce the severity of the wildfires, but it is not a silver bullet. There is a lot of things you have to bring together to start seeing that curve bend.

Mr. LEVIN. Ms. Hill, briefly, if you can answer the same question because I would like to move on to some other things, but what are best practices you have seen in terms of mitigating wildfires? What can we do on the Federal level to be most supportive?

Ms. HILL. Thank you. I do agree that it is a difficult area, but prescribed burns are proven to reduce the fuel, and that would keep the fires to be less hazardous. I also think that we need to look at supplementing or helping communities look at their risk as a community because it is not—if one house catches fire, it may well be that other houses catch fire. And if in a community you have an individual living in a home who does not have the means, for example, to replace a wood shake roof, which is like piling kindling on top of your roof, according to firefighters, we need to help that community come together to make the entire community safe as a result of fire.

We are just at the beginning of this. I don't think there is deep understanding of how these fires interact with the built environment, and we need to fuel more money to have research in fire dynamics so we understand better how we can safely build and live in a wildland-urban interface.

Mr. LEVIN. Mr. Berginnis, I want to follow on and talk about the effects of floods in the areas that have experienced wildfires. Could you talk about whether Federal programs really appreciate the risks of floods that follow the wildfires, or what should we be doing differently—in particular, you know, providing adequate support to the communities that are working to address both the risk of the fires and the floods.

Mr. BERGINNIS. Sure. I think the Federal Government is beginning to figure that out. The passage of the DRRRA in 2018, of course, now triggers hazard mitigation with any FMAG declaration, fire declaration, and it is kind of two sides of the coin, right? After a wildfire, your next biggest threat, of course, is going to be flooding and dealing with that. And also Craig had talked about Fire Wise as a program, and, again, I kind of go back to the concept: Congress can implement these things in terms of a technical or financial incentive or take away disincentives for not doing things. And so, again, a program like Fire Wise is a voluntary program right now much like in the Flood Insurance Program, the community rating system is, but at what point in our communities that are facing extreme risks, at what point do we try to normalize those programs or make them required or mandatory so that they are incorporating the latest risk reduction approaches as part of community's business. And so I think far too communities are on Fire Wise much like—or far fewer communities are in Fire Wise

that need to be and similar with the CRS. So whether the Congress does that by linking that as a requirement in order to get financial assistance or whether it incentivizes it through some sort of additional financial or technical assistance are two options.

Mr. LEVIN. I am over time, but I thank you all very much for your answers. Look forward to working with you.

I yield back.

Ms. CASTOR. Ms. Bonamici, you are recognized for 5 minutes.

Ms. BONAMICI. Thank you so much, Chair Castor.

Thank you to our witnesses for being here today. I just want to mention briefly that the group exercising their First Amendment rights has left the room at present, but I want to say: We hear them. We understand. They are really concerned, and they have a lot of anxiety about what they see for their future for this planet. So I am a cosponsor of my Oregon colleague Representative Blumenauer's bill to declare a national climate emergency. We need to send a message that we must take action, so I just wanted to put that on the record that there is that bill, but we really need to take this seriously. And I understand, although I don't agree with the disruption, I do agree with them raising their voices in a peaceful way to get the message across.

So, according to the fourth national climate assessment, by 2025, if we don't address our aging and deteriorating infrastructure, it is going to cost up to \$3.9 trillion, close to \$4 trillion to repair and replace it. More than 60,000 miles of our roads and bridges are already experiencing extreme storms and hurricanes that are costing billions to repair. We know that sea levels are rising. Could be one to four feet by the end of the century, devastating many coastal communities including—I represent the north coast of Oregon. The frequency and depth and extent of tidal flooding is expected to continue to increase in the future with coastal storms and today's infrastructure and building standards simply do not take those future trends into account, and that is why we are here today to talk about that.

Current levels of infrastructure investment in the United States are not enough to respond to the threats of the climate crisis, and I don't know if this was brought up before I arrived, but my other Oregon colleague, Mr. DeFazio, who chairs the Transportation and Infrastructure Committee is talking about making those infrastructure investments in a sustainable way.

Ms. Hill, in your testimony you discuss how the Federal Government's resources and data on climate change risks is not often easily understood or even accessible to local decision makers on the ground. The example you provided of the mayor in Alabama that sort of echoes the concerns that I often here from communities across Northwest Oregon, especially those smaller communities where, as Chair Castor was saying, they might not have planning staffs and people to do this work to sort out and decipher all the Federal information.

So how can Congress better support a synthesis of existing Federal research and assessments and identify gaps to help especially our local governments?

Ms. HILL. We need to have a customer-focused approach. After Hurricane Sandy, the Hurricane Sandy Rebuilding Task Force

worked hard to make our programs comprehensible to those who needed to access them. Right now, we have datacenters across the United States set up by various agencies—FEMA, HUD, agriculture. Those all service their particular constituencies and fulfill their missions, but for that part-time mayor or that planner who has got a busy schedule, it is very difficult to make sense of our programs. They sometimes have conflicting requirements. We need to streamline this with a view to making it accessible to those who need Federal support, and we also need to make sure that every single one of our programs is screened for climate resilience to make sure that we are not inadvertently supporting development that is not resilient.

I would say, in the area of infrastructure as well. We need to look at our cost-benefit analysis. Our cost-benefit analysis is not permitting us to make the types of investments in resilience that we need to have for very long-lived structures.

Ms. BONAMICI. Right. It requires some long-term thinking.

Ms. HILL. Yes.

Ms. BONAMICI. You suggested providing better technical assistance. I absolutely agree that that be done in a way that is accessible to those, especially those front line communities. I hope we can all work together on that.

Mr. FUGATE, did I say your name properly.

Mr. FUGATE. Yes, ma'am.

Ms. BONAMICI. In your testimony you referenced a study by the National Institute of Building Sciences that found that investing in mitigation saves society \$6 for every dollar invested. In the Pacific Northwest, we don't see climate change as a distant threat. It is our reality. It is important to support those communities as they make those investments in resiliency, but when facing multiple threats, wildfires like my California colleague talked about, sea level rise, flooding, extreme weather, warmer temperatures, it could be challenging for local decisionmakers to determine where to put their money first and how to set priorities. How can we better assist communities in determining which aspects of the built environment are most immediately vulnerable to climate change, and do we need to develop some best practices for use on a regional scale?

Mr. FUGATE. Yes. I know the National Institute of Standards has been working on this. We have a lot of people talking about resiliency. We don't have a measuring stick. I don't think we can wait for perfection. We just need something that we can apply uniformly across the Nation, across multiple risks. That is why I look at tax base. There is a cautionary tale to that, though. As Judge Hill points out, cost-benefit analysis is always looking backwards, but it also favors the highest value property. So for Chair Castor, what we would see if I am planning mitigation projects, all things being equal? I tend to apply mitigation projects to the more affluent areas in my communities because they have the highest tax value, and I tend to underprice the more vulnerable communities because they are not going to save as much tax dollars. So I think we need to be making sure that when we talk about resiliency, it is not for the affluent alone.

Ms. BONAMICI. Thank you. I know I am over time, but if I could briefly follow up on that. We are also, in the Pacific Northwest, overdue for earthquake and tsunami because of the Cascadia subduction zone, and I think of places like Seaside, Oregon, a small town over on the Oregon coast where, for years, they worked to pass a bond measure so they could move their schools out of the tsunami zone, and it took a very long time because it takes people stepping up and saying: I am willing to pay more to make sure that my kids are going to go to a school in a place where they are going to survive an earthquake and tsunami. They finally were able to pass that bond. There was some land donated, and they are opening their new school outside of the tsunami zone, and it was students who really made the case. Some high school students made a video and said that we are starting the clock now, and now, 15 minutes later, we are active, healthy high school students, and we are still on flat land, and we are going to be underwater. So it was really compelling, again, the voice of youth helping to make the case. It is resiliency because of a natural disaster, but certainly analogous to what we are facing with the climate crisis. And thank you for your indulgence.

And I yield back.

Ms. CASTOR. Mr. Graves, you are recognized for 5 minutes.

Mr. GRAVES. Thank you. Thanks again for being here, and I apologize that I was unable to be here for your testimony, but I will finish going through your written testimony. Administrator Fugate, you and I have had the opportunity over the years to talk about this appropriate balance of proactive efforts, and you were a big advocate of predisaster mitigation, and we did the BRIC program last Congress. Could you talk about your thoughts on where and how do you strike that right balance for coming in and making resilient investments versus picking up the pieces after a disaster and based on your extensive experience in disaster management and recovery efforts, how do we do a better job with that?

Mr. FUGATE. I don't think we start on the backs of people who already live in flood-prone areas or other risky areas that are not affluent. I am a big supporter of Risk 2.0 that FEMA's looking at to price risk, but also think it has to be means tested.

Mr. GRAVES. You might be one of the only people who actually knows what it is because everybody else calls it a black box, but please, go ahead.

Mr. FUGATE. But it is the idea that we should be pricing risk closer to what market value puts on it, but in your state, in particular, but throughout much of the country, it isn't coastal property with expensive homes that I am most concerned about with this program. It is the existing homeowners that were built in many cases before we had flood data or is underestimated flood risk that if we priced them out of their homes, I don't think that is good policy. But then you have to have the balancing act that is actually now subsidizing development in coastal areas for affluence that is increasing the exposure and risk, so to me we need to take care of what we got. We need to quit growing the risk, and I think that is where pricing market moving back to the private sector, providing less incentives for the Federal Government to step in every time you are having recurring events and then start mak-

ing investments, not that we are not going to build, but we are going to build differently in ways that are sustainable against future risk.

Mr. GRAVES. How do you—what you just hit on and again going back to conversations years ago, those are tools that are often controlled by the State or the local governments. How do you integrate those into your overall toolbox and planning efforts?

Mr. FUGATE. I am from local and state government and being up here at the Federal level gave me a different perspective, but I always go back to, our theory is decisions are best made closest to where people live. However, Congress has a big checkbook and people are responsive to the availability of funds or disincentives in those funds to change behavior. And I think that is those levers that Congress has, like the National Flood Insurance Program. It requires local governments to adopt building codes that no other program has because the program says if you want to be in the program, you got to adopt the codes, otherwise, we are not going to provide it. I think those are the tools, Congressman, you have to look at is, what are things that governments at the local and state level would be most responsive to and can we give them—not immediately “you got to change, or you are done”—but can we give them a glide path that says, “We are going to give you a chance to start moving in this direction.” But if you don’t move in this direction, there is going to be pain.

Mr. GRAVES. What do you do for people in south Louisiana, for example, communities that have been there for hundreds of years sustainably that, all of a sudden, because of changes that they didn’t have anything to do with, more water coming down, Gulf of Mexico encroaching on them as a result of river management practices by the Corps, how do you treat them? They didn’t have anything to do with the vulnerability they are experiencing today. How do you treat those people? How do we address that from a fair policy perspective?

Mr. FUGATE. I don’t know if there is fair, and I don’t know if there is an easy answer. And I am afraid we are going to be telling far too many people in your state, my state, and others that we are not going to be able to rebuild back the way we were after the disaster and that some communities are not coming back the way they were that have been there for centuries. We are seeing this in the Florida Gulf Coast.

So we have to look at where we can come back, what we can do differently, but what we cannot come back or doesn’t make sense, how do we provide the transition for people to pick up and move on with their lives with some certainty versus the inevitable delays and buyout programs and promises that never materialize, and they are back where they were to get hit again.

Mr. GRAVES. Under our coastal master plan, we did just that. We effectively drew a line in the sand and said: If you are below here, we don’t have the resources to protect you for whatever other reason we can’t, but we did say, we will help provide assistance to elevate homes or to relocate. And I will tell you, that is a really tough decision because people don’t deserve it, and it is not fair, as you have indicated.

Ms. Hill, would you care to comment on that balance issue that I asked the Administrator about?

Ms. HILL. I fervently agree with his comments. We are going to have to have a glide path for those who are in areas that will no longer be safe to live in. The land will either be too soggy or too at risk of wildfire for them to be there or some areas will be too hot. We haven't looked at all this. It will be an equal opportunity disaster for many in America, and we have to address how do we help them get out of situations, which, as you have pointed out, were not of their making? It simply reflects decisions made on historical risk.

We now know that the climate is changing. Building to the past will not keep us safe. Land use decisions made on past—based on—past extremes will not keep us safe, so what do we do with those that are already there? The one thing that is clear: Let's not add any more to those that are at risk. So that should be a bright line rule going forward just as you have said, but we need to figure out how we will help those who are already at risk find safer ways to live and thrive.

Mr. GRAVES. Thank you.

Madam Chair, in closing, I do want to make note, I heard Mr. Berginnis in his opening statement reference Pecan Acres, and I do want to be very clear that we are the ones who secured the funds through NRCS as well as the FEMA funds that are being used for the relocation. I want to give a shout out to General Honore; our chief of staff, Paul Sawyer; and others that have been working on getting that package put together; and Pat Forbes at the state, but thank you for mentioning.

I yield back.

Ms. CASTOR. Mr. Casten, you are recognized for 5 minutes.

Mr. CASTEN. Thank you, Madam Chair. Got here in perfect timing. Thank you all so much for coming.

I really want to dig into this conversation about flood insurance. I sit on the Financial Services Committee. We have had hearings on this. We all, I think, around this whole room understand the core issues that this program that was created as an insurance program, which is really well suited for things that are expensive, rare, and unpredictable, doesn't work as well when they are only expensive. And I think we also all recognize that there is—there is a fundamental equity problem that, if we charge the market rate for insurance, people aren't going to have insurance, not the people in the low-lying areas who most need it and I don't think we have a choice as human beings about whether or not we look out for those in need when they do get flooded. So we still end up paying; we just pay through a different mechanism.

I appreciated your testimony, Mr. Berginnis, and I am going to put you on the spot for the million-dollar question, because if you solve this question, we can all have fewer hearings in Financial Services. How do we solve that basic equity problem? We can't force people to move to the expensive parts of town if they can't afford to live there. We can't charge a rate that is market rate and expect them to pay, but we do have to look out for our fellow man. How would you like to see us solve that?

Mr. BERGINNIS. So I think it is making changes to multiple programs starting off with the National Flood Insurance Program. I agree with Craig 100 percent, risk rating 2.0 is important from the psychological aspect to communicate to folks what risk is based on what the full risk rate is. Now, of course, as you are well aware, within the NFIP, we have a safety net against that with the rate caps, and I think one of the things that Congress is looking at is changing those, once again, which would in effect lengthen the glide path, and so, for folks that may not be able to afford it, it really buys time to be able to do that. Also, I know, in the House legislation, there is a means tested approach to help those that can't afford the insurance. I am always struck by the name of the NFIP because I actually think it is the worst named program in Federal Government. Because in working with it my whole career, it is four programs in one. It is an insurance program. It is a land use and planning program. It is a hazard mitigation program, and it is a data and mapping program. And I would urge Congress that, as you are thinking about changes into one knob, think how it affects the other pieces, right.

And so, for instance, the whole discussion on private flood, one of the concerns that we have raised is the fact that, you know, you have too much going to private flood. It is the NFIP policies that fund 100 percent of the floodplain management efforts within the program. So we have got to figure out how to do that. But then, outside of the NFIP, so you have those lower income property owners that are having a hard time with paying for the insurance. They are making the decision between the medications, food, and insurance. They are in a really horrible situation, and how can we help mitigate that? We have not in our mitigation programs put enough emphasis on kind of end-to-end resiliency and what I mean by that is that we tend to focus on, okay, you know, what is the safe and what is the most cost-beneficial approach? What we don't focus on is the fact that folks need affordable, safe sanitary housing to be able to go to. And so we need to make sure that we are marrying up, whether it is a mitigation program by FEMA with HUD programs to make sure that we are funding the relocation assistance that they need or else even, I think in the Pecan Acres approach, they are actually funding to build new affordable houses for folks to live in, and I think we have got to look at that end of it.

Mr. CASTEN. So I totally agree with you on that. Do you think that that program is sufficient if we don't also have covenants on the redevelopment of the land after we move them off those low lying areas?

Mr. BERGINNIS. No. I don't think it is sufficient from the standpoint either of the resources we have and the one thing that I do have a concern about, and it goes back to the data issue, and even on the example I talked about with Pecan Acres, what is the flood risk in 50 or 100 years on the site that they are going to? So we are making big investments now, but if we don't have the data we are still flying blind. And so we got to have that data too.

Mr. CASTEN. As Mr. Graves started by saying that I was not in a coastal area, hopefully, this will all increase property values in Illinois sixth as people come to an area that is not—

Ms. CASTOR. Flooding is everywhere.

Mr. CASTEN. Yes. Thank you so much.  
I yield back.

Ms. CASTOR. Thank you. Mrs. Miller, you are recognized for 5 minutes.

Mrs. MILLER. Thank you, Chairman Castor, and thank you—well, he is gone. And thank you all for being here today. In 2016, West Virginia suffered catastrophic floods that resulted in the loss of lives of 23 people. Our communities are still in recovery mode today. We currently have critical infrastructure that needs to be rebuilt, and I want to ensure that, as we move forward, that this process when we are rebuilding, that we have resilience at the top of our mind.

Mr. Fugate, in your testimony you discussed about how after a disaster we must rebuild for our future risk. How can we better engage with our State and local governments on this topic?

Mr. FUGATE. Well, part of it is FEMA, but I remember we went round and round not to rebuild those elementary schools back where they flooded. We got heat from local officials, we got heat from parents, people that lived there all their generations didn't want to move those schools. They would be further away. And we stood our ground, but we also were fighting an internal battle at FEMA that our cost-benefit analysis wasn't supporting the decision to relocate them, just repair them as they were, and I am like: Are you insane? We are going to put elementary schools back where it flash flooded? We were fortunate school was not in session, but what would have happened if those schools had been occupied.

We have to give clearer guidance to FEMA that cost-benefit analysis isn't about an insurance policy looking at how much it saves the taxpayer if we do something different. It is about the function. It is about the life safety. And in many cases, it won't even be the dollar value. It is the societal impacts of not doing something that we need to address.

Mrs. MILLER. While pre-disaster mitigation helps save money after a disaster occurs, the upfront investment can be cost prohibitive for local communities. What can be done to make pre-disaster mitigation more affordable?

Mr. FUGATE. If we are only going to spend money to fix stuff we didn't do right the first time, it ain't going to work. We have to invest in pre-disaster mitigation for built infrastructure, but we also have to encourage local and state governments to adopt the building codes and land use standards to quit making it worse, and that means we have to build to the future.

The other thing is we got to do a better job disclosing risk. You know that most states don't require you to disclose prior flood risk? That I can go buy a home that has been flooded, and there is no requirement to disclose it? We need truth in advertising. I think this is something else that is pretty straightforward we could do, but either here or in the flood insurance bill is required, if you are going to participate in the National Flood Insurance Program, you disclose flood risk and flood history before you go to close.

Mrs. MILLER. In certain states, vulnerable or low-income populations usually do live in areas that are more at risk for a natural disaster. How can we empower this population to engage in pre-disaster mitigation on their homes?

Mr. FUGATE. Bring them to the table. I remember a Deputy Secretary said: Nothing about you without you.

And I think we do not engage the public and the communities at risk in these discussions. I think when they make the decisions, we are much more successful. When they look at the information, they look at what the options are, but if you look at most of our programs it is always government to government, and we tend to leave out the communities we are trying to serve.

Mrs. MILLER. Well said.

Ms. Hill, in your testimony, you discussed how local communities lack technical assistance. I know many communities in rural Appalachia that could certainly benefit from such a program. How would you suggest deploying such a program around the United States, particularly in rural communities?

Ms. HILL. We need a cadre of trained personnel who can take the tools and data that currently exist and help communities understand how those materials can assist them in their decisionmaking, but if we only leave our information and our data on the web for some busy person to flip through screens to try to determine what decisions they should make, a community should make, I do not believe we will get to success. We need to have individuals who represent the Federal Government, not necessarily their solely their agency, but are familiar with all the programs that will help communities be stronger and can wade through the different regulations, the different requirements to get them to success.

Right now, our approach is solely based on what is convenient, in my opinion, for the Federal Government. We need to flip this. It is what works for our communities. We need to have invest in their interests in learning what their risks are and how they can do better.

Mrs. MILLER. That is good. From your experience in this field, do you think the public and community leaders adequately know what resiliency means and what role they have in preventing it?

Ms. HILL. No. I don't think most leaders have the opportunity to learn about climate risk and what it may mean for their community. It is difficult to find accurate information, even based on past risk much less future risk. This is an urgent issue because we are seeing—and forgive my framing it this way—stupid decisions being taken across the United States now in very expensive investments. There is no way to screen currently to make sure that Federal investments in infrastructure are resilient, and that means that we see many examples that have occurred in recent history with huge dollar price tags attached which will not be resilient to risks that will unfold during the life of the structure.

That seems to me irresponsible use of taxpayer dollars, not to insist that, if we hope the bridge lasts 50 years, we understand what the risks are to that bridge, and build a bridge that can withstand it.

Mrs. MILLER. With so many different types of geography in our country—and I know in my particular area, most people are settled down at the base of mountains, but when you start talking coastal and just—you can't have the same plan everywhere, and so, when you talk about having educated people for X, Y, and Z, you

wouldn't send the Z people to the X; you would send the right people to the right district to help educate them.

Ms. HILL. Absolutely. One of the best ways to start is scenario-based planning with the community. Meet with the leaders and stakeholders in the community, have the charts, the maps, the visualization of what the future risk is and work through what is your hazard mitigation plan, what is your future plan, and what is it going to look like after you have the next flood, and we need to make the decisions about where you will rebuild in a safe manner for those who enjoy your community.

Mrs. MILLER. Thank you.

I yield back.

Mr. BERGINNIS. May I—

Ms. CASTOR. Go ahead.

Mr. BERGINNIS. If I could add just a little bit to the questions, Congresswoman. I wanted to underscore something that Craig had said in terms of both codes and land use standards and understanding that land use standards are as important as having strong codes. So, for example, when you are laying out and designing new subdivisions—and I worked in Ohio, so next door neighbors to West Virginia in the Appalachian foothills, I worked with those communities, and there is a lot that can be done. One of the things that ASFPM developed is a guide on 60 optional higher standards to make your subdivisions safer and we provide that to States and communities, but the other piece of this that I think is missing that hasn't been talked about yet is State capacity.

The best way we helped our smaller communities, our more impoverished communities in Ohio is, when we have the state capacity at the state level, that knowledgeable cadre of experts in the state floodplain program or in the state mitigation program to help do that. And so, in the National Flood Insurance Program, there is something called the Community Assistance Program, CAP-SSSE and, in fact, Mr. Casten's committee, Financial Services, in the NFIP reform bill is looking to make that a statutory program.

In the mitigation side, we don't have anything that is parallel, and what CAP does, it actually helps fund state level floodplain management experts who can in turn help communities. On the mitigation side, when you look at most state mitigation programs, they have maybe one, two, three people in there. They probably need to have ten or 20 people, and I would argue that having an incentive program like CAP-SSSE for mitigation can help get you to the objective that you are seeing.

Mrs. MILLER. Thank you. I hope I get one of those books.

Ms. CASTOR. Great. I have just a few questions before we close out, but everyone will have an opportunity if you all would like to ask some other questions as well. I have been able to go to various communities across the country and ask them what they would need as we develop recommendations for a climate action plan involving adaptation, and to a community, they have said, we need more predisaster mitigation resources to help us with this.

Do you all know what scale are we talking about? What should we be considering as we follow through with that recommendation?

Mr. FUGATE. I will give you a number, and you are not going to like. If you look at what the backlog currently nationally of infra-

structure projects and you look at mitigation and what it would take for predisaster mitigation to adapt, you are talking a trillion or more dollars. That is why we got to quit growing the risk. We are never going to get caught up. Things such as National Flood Insurance Program, we got to take care of what we got, but we got to quit growing the risk. Just stop writing flood insurance for new construction and let the private sector market manage that.

We need to get stronger building codes and land use planning, and then we need to start looking at—it will not be an equal impact with climate change across the country. And if you look at the identifiable threats we are going to see first, it is the extreme rainfall events, the extreme heat, drought, and wildfires, and sea level rise will not affect every area the same. And this is easier to talk about in this body, but next door in the Senate, they are very much 100 divided by two is how they calculate financial distribution. And as much as we fought this with Homeland Security, we are going to have to make prioritization on our limited funds that we are not going to be able to fix everything in every community, but we are going to have to come up with a bench mark of how do we measure our resilience exposure. Our tax base would be one way, and then make investments to start buying down that risk where one technology exists, the practices occur, and we have good data. Quite honestly, some of this we don't even have yet, and I am not sure making investments there would give us the fastest return.

As the folks in the back said, even if you stop all of your emissions today, we are not going back. The only question is, how much worse is it going to get?

Ms. CASTOR. What else can you all add on the scale of pre-disaster mitigation?

Mr. BERGINNIS. When I think about the scope of just repetitive flood loss properties in the country, we have over 150,000 of those. That means those are the ones that are going to be more vulnerable than the ones that just have flood insurance and really not had the claims. And then you multiply out the value of the home, and you are talking an astronomically huge number. I think we also need to think about the concept of kind of a force multiplier and how can we incentivize States to invest in mitigation programs.

You know, the State of Texas just earlier this month passed a constitutional amendment that sets up State-funded mitigation program basically for flooding. Finally, I think after 3 years of 500-year floods, Texas got it, and they are now beginning to invest some of their own funding, and I think part of the solution is making sure that the State has mitigation—has their own mitigation program available that can help, especially things that are not declared at all.

The other thing I would say is that, even though there is the theory and the desire of predisaster mitigation investment, we have to always remember the psychology of disasters, and I have been to communities, I have tried to sell FEMA's predisaster program, and on a sunny day when nobody is displaced, most of the time, they say: We don't need to do mitigation. We don't want to go through that hassle of elevating.

And so there is always going to be a role for postdisaster because, unfortunately, it takes the disaster to change the mindset that, hey, we actually need to be more resilient as property owners.

Ms. CASTOR. Judge Hill, do you want to add—I have one more question after this.

Ms. HILL. Sure. As has been noted, the scale is really massive, but we must remember: If we don't start mitigating and making these investments now what is the economic cost to the United States as you project this out. And, of course, that is what is behind the Government Accountability Office—of their concern—of placing this on the high risk. One of the bright line rules I think we should adopt immediately is we will not spend in a way that is not resilient going forward. So the limited funds that we have that may not be marked as mitigation—it may be just simply an investment in a grant program—we are not going to spend unless we are assured it is resilient to the future impacts that we expect.

Ms. CASTOR. One last question for me, and then Ms. Bonamici can close us out. So a lot of local communities and states have reserves and rainy day funds, but the Federal Government doesn't do that. Instead, we have a natural disaster and then an emergency aid bill that doesn't really sometimes arrive in a community on an emergency basis. Gosh, we have had partisan food fights and even Hurricane Michael, those folks were left out to dry. So, when it comes to the Department of Defense, they have a multibillion dollar overseas contingency fund for contingencies when it comes to defense issues. Isn't it time to be reconfiguring Federal budgeting so that we actually have a rainy day fund of some sorts or catastrophe fund that is front-end loaded and we have those resources ready to deploy?

Mr. FUGATE. Chair Castor, when we went through sequestration we ran out of money for Hurricane Irene and Disaster Relief Fund, we came up with a good plan. I think Jack Lew and Speaker Ryan, and that actually has worked and balanced out, and, except for extreme events, has not required Congress to do immediate funding. In fact, money was there for the Michael response recovery. Unfortunately, the bureaucracy is slowing down getting that money.

But there is one area that I think Congress should act on—the ranking member has been talking about this; he has been looking at how to do this—is, if we are going to use HUD as a major funding for long-term cost of disaster impacts, they need permanent authority. This, every time they get appropriations starting from scratch, delays getting money out for a year or more.

HUD if they are going to be part of this team, they need permanent authority and they need staff. And this should not be we have to create the wheel every time Congress uses that mechanism to address the longer term issues that communities face.

Ms. CASTOR. Any other comments? All right.

Ms. Bonamici, you are recognized.

Ms. BONAMICI. Thank you very much. I just want to add another point. Once we get the policy and the funding, we absolutely need the workforce because when we are doing all this work, we have to have the people with the skills out there to actually put it in place. So I have a bipartisan bill, the BUILDS Act, which is about making sure that we have a workforce when we invest in infra-

structure. So I came here from a hearing on apprenticeships. It is just a challenge with so many of these, whether it be housing or infrastructure, we need to have the people to do the work so we need to fill that gap as well, the skills gap, so I just wanted to add that.

If we really want to get the work done, we have to have people to do the work, and I thank the chairwoman for allowing me to add that point.

Ms. CASTOR. Well, thank you very much. Thank you to our witnesses. This was an outstanding hearing. I am sorry that there is so much else going on on the Hill today. We couldn't have a full panel of members. And this is a reminder to everyone who is tuned in here that we are seeking policy proposals on the greenhouse gas mitigation side and on the adaptation side. We have a request for proposals, request for information on our website. Please if you have policy proposals for the committee, please send them to us. The deadline is the end of this week. Thank you again for being here. The committee is adjourned.

[Whereupon, at 2:58 p.m., the committee was adjourned.]

**United States House of Representatives  
Select Committee on the Climate Crisis**

**Hearing on November 20, 2019  
“Creating a Climate Resilient America:  
Reducing Risks and Costs”**

**Questions for the Record**

**The Hon. W. Craig Fugate  
Principal**

**Craig Fugate Consulting LLC  
Former FEMA Administrator**

THE HONORABLE KATHY CASTOR

**1. In your testimony, you emphasized the importance of being able to measure community resilience. How does the tax base of a community affect its resilience? What sorts of climate-related metrics should the federal government use to measure the resilience of a community, institution, or system?**

Measuring the Resilience of a community's tax base is a key vital sign of vulnerability to climate change impacts. Global warming immediate and long-term impacts include extreme rainfall events, droughts and increased wildfire risk, more destructive tropical storms, and sea level rise.

Think of the tax base as a vital sign, like a pulse, it will not tell you everything about the community, but like a pulse, lack of one is death. A slow or weak pulse, like a tax base below the cost of running the community's government, will impede the recovery after a disaster or loss of tax base due to sea level rise.

My observations of recent disasters underscore the risk to housing stocks at risk from weather related hazards. From the devastation of wildfires to Paradise, Ca<sup>1</sup> to the impacts of Hurricane Michael on the Florida Panhandle,<sup>11</sup> loss of housing impacts tax base revenues, workforce housing, and the speed of recovery.

Tax Base as a measure of resilience provides the ability to measure multiple hazards and their impacts to a community. Key vulnerabilities to housing, businesses, and critical infrastructure by floods, hurricanes, wildfires, and other natural hazards are based on:

- Hazard Impacts (areas at risk)
- Vulnerability (how and where a community built)
- Restoration time (how long before infrastructure is restored, businesses re-open, and homes are repair or replaced)

Current disaster risk models will need to be updated to look at future climate driven risk.

**2. What sorts of wildfire mitigation projects are the most effective at reducing the risks and costs of wildfires? What can the federal government do to encourage communities to undertake wildfire mitigation projects?**

In three board areas that can reduce the losses of life and structures in the wildland urban interface or WUI:

- Model building and development codes for development in the WUI.<sup>iii</sup>
- Fuel reduction<sup>iv</sup>
- Homeowner Actions to maintain defensible space around their home<sup>v</sup>

The National Fire Protection Association Firewise program developed guides for homeowners and communities to reduce the risk and impacts of wildfire in the WUI.<sup>vi</sup>

**3. How well do the model codes address the impacts of climate change, including flood and wildfire risks?**

We have seen where enhanced building codes have reduce the impacts of major hurricanes in the Florida Keys during Hurricane Irma and the epic wildfires of 2017 and 2018 in California.<sup>vii</sup>

Current building codes should be seen as a minimum standard, they are often based on past hazard events. This was evident during Hurricane Michael in 2018, the area of impact used a lower wind standard than the rest of Florida based on the past history of hurricanes on the region.<sup>viii</sup>

With Climate Change increasing the risk of more extreme weather hazards, building codes based on past weather risk history will not build resilient communities.

The Institute for Business and Home Safety (IBHS) has developed a standard called Fortified that uses current building codes as the minimum and enhances the code for specific hazards related to Hurricanes and strong winds. From their web site “FORTIFIED is a nationally recognized building method that goes beyond building codes to strengthen residential and commercial buildings against specific natural hazards such as high winds and hurricanes. FORTIFIED standards are based on more than 20 years of scientific research and real-world testing by IBHS.”<sup>ix</sup>

**4. How can Congress redesign federal disaster assistance to move funds more quickly while also assuring more resilient outcomes?**

1. Provide guidance to federal agencies to balance oversight with speed of approval of funding projects under federal review.

2. Provide HUD with authority to permanently authorize the Community Development Block Grant—Disaster Recovery (CDBG–DR) Program. From the GAO “Without permanent statutory authority and regulations such as those that govern other disaster assistance programs, CDBG–DR appropriations require HUD to customize grant requirements for each disaster in Federal Register notices—a time-consuming process that has delayed the disbursement of funds. In a July 2018 report, the HUD Office of Inspector General found that as of September 2017, HUD used 61 notices to oversee 112 active CDBG–DR grants. Officials from one of the 2017 grantees told us that it was challenging to manage the multiple CDBG–DR grants it has received over the years because of the different rules. CDBG–DR grantees have faced additional challenges such as the need to coordinate the use of CDBG–DR funds with other disaster recovery programs that are initiated at different times and administered by other agencies. HUD officials said that permanently authorizing CDBG–DR would allow HUD to issue permanent regulations for disaster recovery. Permanent statutory authority could help address the challenges grantees face in meeting customized grant requirements for each disaster, such as funding lags, varying requirements, and coordination with multiple programs. The expected increase in the frequency and intensity of extreme weather events underscores the need for a permanent program to address unmet disaster needs.

3. Establish by legislation the requirements of the former Executive Order 13690 and the Federal Flood Risk Management Standard for federal grant program involving the construction of infrastructure and buildings in flood prone areas.

The FFRMS gave agencies the flexibility to select one of three approaches for establishing the flood elevation and hazard area they use in siting, design, and construction. They could:

- Use data and methods informed by best-available, actionable climate science;
- Build two feet above the 100-year (1%-annual-chance) flood elevation for standard projects, and three feet above for critical buildings like hospitals and evacuation centers; or

- Build to the 500-year (0.2%-annual-chance) flood elevation.

## REFERENCES

<sup>i</sup> Wildfire's destruction of California town creates uncharted credit territory <https://www.bondbuyer.com/news/california-wildfire-destruction-may-devastate-credits>.

<sup>ii</sup> With 80 percent destroyed by Hurricane Michael, Mexico Beach struggles to stay livable <https://www.wdrb.com/in-depth/with-percent-destroyed-by-hurricane-michael-mexico-beach-struggles-to/article-efab6e5c-33da-11e9-93e5-c75d91998d95.html>.

<sup>iii</sup> Institute of Business and Home Safety—IBHS supports the use of wildland-urban interface (WUI) codes to help reduce the potential for wildland fires to spread into the built environment.

The Wildfire Codes & Standards—State-by-State Reference Guide is a comprehensive assessment of wildfire building codes in each of the 50 states. In addition to the assessment of wildfire-focused codes in each state, the members-only guide includes a glossary of wildfire terminology and IBHS guidance on wildfire-resistant building construction.

*Key Findings*

- Only four states have WUI specific building codes adopted statewide
- Eight states have guidelines or programs to reduce wildfire risk
- Where WUI codes exist, enforcement of those codes remains a challenge
- <https://ibhs.org/wildfire/wildfire-building-codes-and-standards/>

<sup>iv</sup> California In a 45-Day Report to Governor Gavin Newsom in response to Executive Order N-05-19, CAL FIRE systematically identified high priority fuels reduction projects and other measures to immediately begin to protect over 200 of California's most wildfire-vulnerable communities and put the state on a path toward long-term wildfire prevention and forest health. <https://www.fire.ca.gov/about-us/45-day-report/>.

<sup>v</sup> Example from Institute of Business and Home Safety (IBHS)

Create Defensible Space.

Maintain 3 zones around your structure, collectively called defensible space.

- Remove dead vegetation.
- Trim branches overhanging roof.
- Remove combustible materials in the 0–5 FT zone.

<sup>vi</sup> NFPA's Firewise USA<sup>®</sup> program teaches people how to adapt to living with wildfire and encourages neighbors to work together and take action now to prevent losses. [www.firewise.org](http://www.firewise.org).

<sup>vii</sup> Keys homes, battered but standing, may be a model for reducing damage in Florida <https://www.miamiherald.com/news/weather/hurricane/article173408496.html>.

*California Wildfire Building Codes*

How a building code change could be a pivotal moment in California's wildfire fire <https://www.denverpost.com/2019/04/11/california-building-code-wildfires/>.

<sup>viii</sup> Hurricane Michael exposes building-code weakness in Florida's Panhandle.

Until 2007, building-code standards for windstorm resistance were more rigorous in South Florida than in the Panhandle, where major hurricanes have been rare <https://therealdeal.com/miami/2018/10/13/hurricane-michael-exposes-building-code-weakness-in-floridas-panhandle/>.

<sup>ix</sup> Fortified Home—A National Standard for Resilient Construction <https://fortifiedhome.org/>.

**Questions for the Record**

**The Hon. Alice C. Hill**  
**Senior Fellow for Climate Change Policy**  
**Council on Foreign Relations**

THE HONORABLE KATHY CASTOR

**1. You discussed in your testimony the role of building codes in community resilience. How well do the model codes address the impacts of climate change, including flood and wildfire risks?**

Model building codes in the United States do not yet address the impacts of climate change. The codes tend to rely on historical weather events to account for risk and focus on life/safety rather than building performance. Efforts are underway to create climate-resilient building codes, but it may be years before such model codes exist.

**2. How should Congress define resilience and integrate resilience into the laws we are enacting? How can we better prioritize federal investments around measurable resilient outcomes?**

The federal government currently uses multiple definitions for the word “resilience.” The Disaster Recovery Reform Act of 2018 directed the Federal Emergency Management Administration to issue a rulemaking defining the term. This is a welcome development. Any definition of the term must, however, specifically account for future impacts of climate change. One definition that would accomplish this is: “the capacity to reduce, absorb, and recover from events, including the future impacts of climate change.” Without consideration of future risk, resilience efforts will prove futile in the face of worsening climate impacts.

Federal-wide adoption of a common scoring system to measure the resilience of particular investments would assist in the prioritization of those investments. Projects receiving the highest score could receive funding priority.

**3. In your testimony, you discussed the role of communities in managing land use and the challenges that communities are facing when the available maps of flood and wildfire risk do not consider climate change and the conditions communities will face in the future. How important are maps that show climate risks into the future to community land use and zoning decisions? How can the Federal government help address these challenges?**

Maps can assist in identifying areas at high risk from climate change impacts. Maps can also help state, local, and federal decision-makers, as well as ordinary citizens, better evaluate whether taxpayer dollars should support new or continuing investment in high-risk areas.

The federal government should undertake a nation-wide effort to develop maps that reflect future risk from climate change. A good place to start would be accurate mapping of future risk from flood and wildfire. The federal government should also commit to updating these maps on a routine basis such as every five years.

**4. How can Congress increase community insurability and the use by communities of private insurance for assets that would be insured if they were privately owned, such as buildings?**

Congress can increase community insurability by providing incentives to states to permit the use of models of future risk to determine insurance pricing. Incentives could take the form of making available additional levels of federal disaster aid, for example, if the state permitted the use of future modelling to help determine pricing. In the absence of insurance pricing that reflects future risk, current pricing practices could result in underpricing insurance and make it less attractive for insurance companies to offer insurance in certain areas. The ability to consider future risk in pricing could ultimately increase the likelihood of insurance companies continuing to offer insurance.

**Questions for the Record**

**Chad Berginnis**

**Executive Director**

**Association of State Floodplain Managers**

THE HONORABLE KATHY CASTOR

**1. What is the appropriate role for the federal government in managing flood risk?**

The federal government has multiple roles in managing flood risk. Three primary roles are listed below. Perhaps the most important role is the *provision of data and information*. Given the large reach of federal agencies, data is key to effective decision making. That is why ASFPM wholeheartedly supports FEMA’s National Flood Mapping Program, the USGS 3DEP program to collect LIDAR (topography) for the nation, USGS and NWS streamgaging, and the Digital Coast Act (which focuses on curating coastal data sets). We testified that a critical gap or need is to have a robust program to update precipitation frequency information. While NOAA produces Atlas 14, there no substantial ongoing funding or mandate to have that data updated every 5–10 years which is what ASFPM thinks is needed.

Another role is *providing leadership* through promoting effective standards, effective program execution, and eliminating perverse incentives to not be flood resilient in federal programs. In 2012, ASFPM research determined that over 150 federal programs had the potential to impact sound floodplain management objectives; how-

ever, not all of these are oriented to ensure long term flood resiliency. For example, the tax code casualty loss deduction provides relief to individuals who did not take the step to purchase flood insurance, even if they were required to. An example of a perverse incentive is the authorization of a new flood control project by the USACE as long as it meets National Economic Development objectives. This may mean, a new levee that is built to less than a 100-year standard versus having a minimum standard or requirement for levee resiliency based on public safety (for example the Netherlands uses a 10,000 year standard). ASFPM strongly supported Executive Order 13690 which would have required agencies to consider future flood conditions and adhere to a higher standard than the NFIP is presently. An example of effective program execution is how FEMA does not hold its on-the-ground Federal Coordinating Officers to account for any kind of minimum requirement for building hazard mitigation into public assistance programs or for ensuring hazard mitigation projects get to a certain state of development before making decisions to close or scale back Joint Field Offices. Yet the policy goal of both Congress and FEMA is that both should be implemented fully and expeditiously.

Finally, a role is to provide incentives and resources to build and local capacity in flood risk management. The Federal government cannot do it all, nor should it. Flood risk management is a joint federal, state, local, individual and private sector responsibility. Too often these days federal program try to be implemented directly at the community level while states are either not included or overlooked. It is much more efficient and effective to build capacity and delegate authority to states.

**2. What role should states play in assisting communities to build resilience to climate change? Are all states capable of providing such assistance? If not, how could that capability be improved?**

(1) Developing more specific, downscaled data; (2) providing state resources through state level resilience programs, (3) developing state plans and standards for resilience, and (4) providing training and building capacity at the local level. Presently few states are capable of providing this assistance. However this capability could be improved through a mix of carrots (incentives) and sticks (penalties). For example, if the availability of public assistance (by far the largest source of post-disaster aid) was conditioned on the requirement that a community had to have a valid mitigation plan as well as participate in additional resiliency program depending on the hazards they face, they undoubtedly would do it (stick approach—currently if a community doesn't have a hazard mitigation plan the only penalty is that hazard mitigation funding is unavailable). In fact, many more forms of disaster assistance, including CDBG-DR should be tied to hazard resilience activities.

**3. How might states and communities use information about future sea-level rise and flood risk to manage flood risk and reduce future losses?**

In a lot of ways. ASFPM and the American Planning Association just released a new report<sup>1</sup> on incorporating flood resilience into capital improvement planning (because infrastructure projects are typically a community's largest investment). Future Sea Level Rise information is beginning to be used in communities along the U.S. Coastline (i.e., New York City, Norfolk VA, State of California) for planning and to implement both land use and building standards. It is being used by state Department of Transportation to do long-range repair/replacement planning.

**4. How can federal programs that use a Benefit-Cost Analysis better measure and integrate resilience into those analysis, and prioritize mitigation investments toward more resilient outcomes?**

A couple of thoughts. First, is that the discount rate, at least for FEMA's benefit-cost analysis needs to be lowered. The effect of the artificially high discount rate in the FEMA BCA methodology limits FEMA's ability to approve mitigation projects that are, in fact cost effective. This is a recommendation recently made in the November 2019 FEMA National Advisory Council report<sup>2</sup> which recommended the discount rate be lowered from 7% to 2-3%. Second, is that most benefit-cost analysis modules do not account for social impacts.

<sup>1</sup> <https://www.planning.org/publications/report/9192800/>.

<sup>2</sup> [https://www.fema.gov/media-library-data/1576076713587-c1ae1017f2adb4b836ad3db0c26d3578/November\\_2019\\_NAC\\_Report\\_final.pdf](https://www.fema.gov/media-library-data/1576076713587-c1ae1017f2adb4b836ad3db0c26d3578/November_2019_NAC_Report_final.pdf).

**5. How well do the consensus-based model codes address flood risk? What sorts of changes would you recommend to the model codes to address sea-level rise and extreme rain events? Why do you think the model codes haven't integrated the sorts of freeboard requirements that are already in place in so many states and communities?**

While consensus based codes have progressed over the years to begin to more proactively address flood risk, they are still far from what is desirable, especially as it comes to resiliency against future flooding conditions. Given that two trends we are seeing in the science is that sea level rise estimates are likely too conservative and slow, a meaningful requirement should reflect the useful life of the type of building which the code applies. For a residential home, this may be well over 100 years. That means we need to begin to build estimates of SLR out to 2125 and beyond. Because model building codes are not land use codes (how to build in a risky area more safely versus whether you should be building there in the first place), the minimum freeboard requirement should be 2 feet and in coastal areas should be 3 feet. Critical facilities should be 3 feet or the 500-year elevation which-ever greater. One trend ASFPM is beginning to see is communities adopting the 500-year flood level above the FEMA mapped floodplain as a proxy for future conditions. Another requirement would be to use future conditions floodplains especially for critical facilities.

Model codes haven't integrated the sort of freeboard requirements that are already in place in many states and communities because the process is very hard to get forward thinking ideas approved. And this is typically due the outsized presence of the homebuilding industry in the process.

**6. What are the most effective ways to assist communities so that they can build resilience to climate change into their plans and actions?**

The most effective way is to have FEMA map future conditions floodplains and include them in the package of information they give communities immediately. While FEMA has been required to include future conditions into their flood map updates as a result of the 2012 reform of the NFIP (after they had been advised by the TMAC as to how to do it), FEMA has yet to implement this future conditions requirement. As was answered in question 1, another aspect of this is that as a nation we must have a mandatory, frequent update of rainfall-frequency information (currently the program to update Atlas 14 does not have consistent funding nor a mandate). Another critical aspect is to help them interpret future conditions scenarios. For example, today, New York City is planning for 6 feet of Sea Level Rise by 2100, while the State of Hawaii is planning for 3.2. Why? This is partially due to the future condition scenario that was picked. Another effective way is to invest in quality datasets and tools that can be used by communities. A great example of this is the Digital Coast initiative by NOAA.<sup>3</sup> In fact, ASFPM supports Congressional passage of the Digital Coast Act (already passed by the House) which would build success on the initiative.

**7. How do communities use Hazard Mitigation Plans before and after disasters? What is the relationship of Hazard Mitigation Plans to comprehensive plans, zoning, and building codes?**

Hazard mitigation plans are typically developed prior to a disaster but are hardly ever referenced after the disaster or adjusted in the immediate aftermath of a disaster (which would be a best practice). Even worse, there has not been a lot of success integrating these plans into comprehensive plans, zoning, and building codes. There are numerous reasons for this but one of the primary ones is that hazard mitigation plans are often produced by the local emergency manager and comprehensive plans, zoning are led by the local planning department—these silos do exist at the local level too. The FEMA publication<sup>4</sup> Integrating Hazard Mitigation Into Local Planning pages 2-4 and 2-5 is a good summary of where these points of intersection and opportunities for integration exist.

<sup>3</sup> <https://coast.noaa.gov/digitalcoast/>.

<sup>4</sup> [https://www.fema.gov/media-library-data/20130726-1908-25045-0016/integrating\\_hazmit.pdf](https://www.fema.gov/media-library-data/20130726-1908-25045-0016/integrating_hazmit.pdf).

In an ideal world, the hazard mitigation plan, once developed or updated, would be used to then feed into the update of a community comprehensive plan which would, in turn, lead to updated zoning and building code standards. A new approach, the Plan Integration for Resilience Scorecard or PIRS created at Texas A&M University is a hands on, facilitated approach that gets participation from different local government agencies and uses a scorecard to identify points of consistency and points of inconsistency. A link to a webinar on this approach can be found here.<sup>5</sup>



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<sup>5</sup> [https://www.floods.org/ace-files/training/SLIDES\\_PlanIntegration\\_PIE\\_Webinar\\_10.4.2017.pdf](https://www.floods.org/ace-files/training/SLIDES_PlanIntegration_PIE_Webinar_10.4.2017.pdf).