

LIVING MOSAIC: A PATH FORWARD

Presented by



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Introduction

A Living Mosaic: A Path Forward is an effort to help ordinary people navigate through the well-intentioned, costly but bewildering maze of federal, charitable organization, non-profit, local, state, and other programs available to help reduce the misery, suffering, environmental despoliation and cost caused by foreseeable natural events impacting the human built environment. This White Paper has been assembled by the Natural Hazard Mitigation Association (NHMA), a non-profit organization dedicated to reducing the impacts of natural disasters by providing practical advice and resources to help everyone involved in the development of Disaster Risk Reduction strategies.

The theme of the *Living Mosaic* publication is explained in over one dozen modules that are the resource guide for a Disaster Risk Reduction Ambassador (DRR-A) curriculum. The DRR-A curriculum is explained in detail in a separate document of that name available on the NHMA website: [www.nhma.info].

These modules support the primary goal of reducing disaster risks by providing a “path forward” to act as a guide through the maze of programs available to help everyone understand and prepare for implementing programs and measures that deal with the entire disaster cycle (pre, during, and post disaster). In addition, and perhaps more importantly, *A Living Mosaic* directs the reader to websites and videos that share lessons learned from others who have experience in dealing with past disasters. We believe that the reader of this document will emerge with options for practical application of lessons learned to influence local leaders and convert risk reduction concepts into actions that make communities more disaster resistant.

A Living Mosaic: A Path Forward consists of two parts: The primary resource guide called *A Living Mosaic: A Path Forward*, and an addendum called “The Disaster Risk Reduction (DRR) Ambassador Study Program.” *A Living Mosaic: A Path Forward* updates an earlier White Paper, developed over multiple dozens of editions, with the input of approximately one hundred experts, called *The Patchwork Quilt*. *The Patchwork Quilt* serves as the basis of dozens of training sessions and has served as a key component of pre-and post-disaster development decision-making all over the nation. When NHMA decided to develop the Disaster Risk Reduction Ambassador Curriculum under an FY 2015 Cooperative Agreement with the Federal Emergency Management Agency, we determined that *The Patchwork Quilt* concept of using multiple different programs to develop solutions for individuals, families and communities, represented too static and fixed an approach for the ever changing, real-world situation confronted by people and communities as they consider how to make thoughtful development decisions. *A Living Mosaic: A Path Forward* supports the FEMA goal of facilitating efforts for committed community representatives to engage in the discussion of how the impact and volume of disasters can be reduced through local action; exposes the reader to other local experts and technical experts so that they can effectively influence the whole community; and enables the reader to acquire and use the best available data and analytic tools to make better risk-informed decisions before, during, and after disasters. As mentioned, *The Patchwork Quilt*

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went through multiple dozens of editions over the past 24 years, aided by the thoughtful comments of over one hundred experts. Like *Patchwork Quilt*, *A Living Mosaic* is expected to go through multiple editions to refine and update its information and approaches. Future editions will include a “Wall of Fame” listing those persons who assisted by making observations and suggesting meaningful updates and better approaches to the concept of Disaster Risk Reduction. Please consider writing us at nathazma@gmail.com to offer your comments and suggestions. You too can be on *A Living Mosaic* Wall of Fame in future editions!

For now, though *The Patchwork Quilt* will still be available on the NHMA website, *A Living Mosaic* is the updated version that provides the reader with a wider variety of strategies, networks and funding sources useful in mitigating hazards. The next edition of *Living Mosaic* will contain several items currently contained in *Patchwork Quilt*, such as a training exercise, an increased emphasis on technical support programs, a fuller explanation of the critically important role of the Voluntary Agencies Active in Disasters (VOAD), an expanded explanation of recent changes to federal pre and post disaster policies **and other improvements as suggested by folks like you.**

A Living Mosaic provides practical tools for those involved in any aspect of Community Development decision making and for Disaster Risk Reduction “Ambassadors,” who will help their communities identify, assess and address natural hazards that could produce catastrophic damage in the future. In addition, in the wake of a natural disaster that has already occurred, those conditions that produced economic, structural and social upheaval can be mitigated to lessen any future impact. All have the opportunity to become Resilient Communities by making changes in local zoning ordinances, building codes, emergency facilities and evacuation routes to minimize future damage and help protect their citizens from the trauma of a catastrophic natural disaster.

Who Can Become a DRR Ambassador?

Ambassadors can be drawn from the ranks of elected officials, disaster organizations, public health and safety personnel, business and community leaders and ordinary citizens who have an interest. Ambassadors will learn to collaborate with other officials, the media, the private sector, non-profit entities and other citizens willing to think seriously about protecting their community and work proactively to reduce risks from natural hazards. The *Living Mosaic* and the Disaster Risk Reduction Curriculum Program are posted on the Internet, complete with links to relevant resources and background material at: www.nhma.info.

Why Develop the *Living Mosaic* Now?

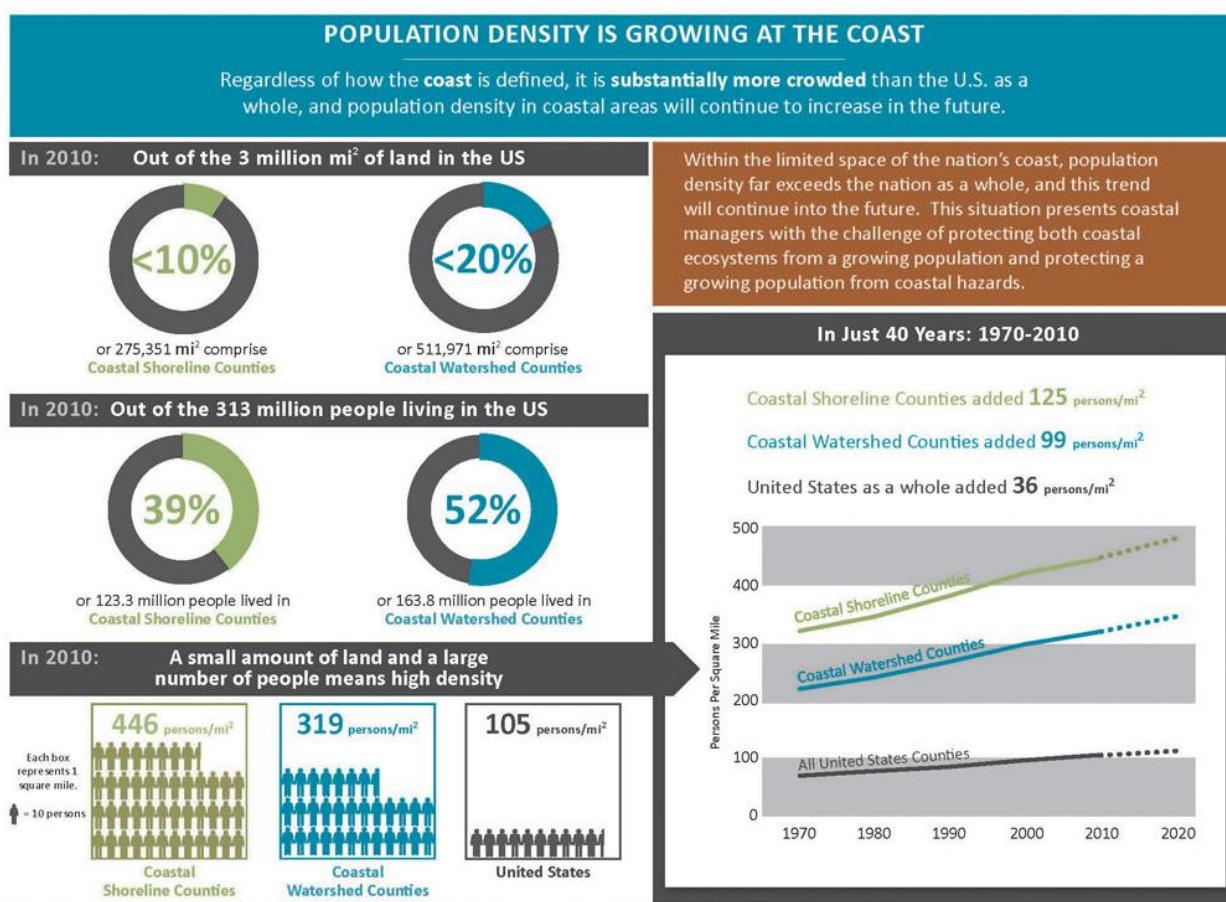
In the United States, there has been an unprecedented increase in the number of Americans moving to live near the nation’s shorelines over the past few decades. Combined with a measurable increase in violent weather events, these two phenomena have resulted in spiraling costs associated with helping disaster victims and replacing damaged infrastructure.

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A Crucial Turning Point

The program is being made available at a key point in U.S. history. The combination of an enormous movement of Americans toward the nation's shores and a measureable increase in violent weather events has resulted in stupendous upward spiraling of the price of helping disaster victims and replacing damaged infrastructure. As reflected on the charts on pages 6 and 7, more and more Americans are choosing to live in coastal floodplains. As those floodplains are expanding due to rising sea levels — added to the destruction of natural features and plant life that have in the past helped reduce storm surges and tidal peaks — funding requirements for assistance to towns and individuals in areas hit by natural disasters have soared.

And every credible forecast suggests that things will get worse. Experts predict that exposure to natural disasters will greatly increase in the United States during this century. Long-term weather trends indicate that many parts of the nation will see more dramatic weather patterns, exposing residents to far greater risks than in the past; while at the same time more people are moving into the areas most at risk of flood, wildfire, earthquake and other natural hazards. In addition, those moving to the riskiest areas are all too often developing extremely expensive properties in a manner not calculated to survive foreseeable natural events, although it's not just wealthy Americans retiring along these bodies of water who will be exposed to increased risk. Ports and transportation systems for petrochemical plants and other industries are linked to the coastline, attracting large numbers of people who live there to work, and the continual need for construction and services means many lower or middle income families will be affected as well.



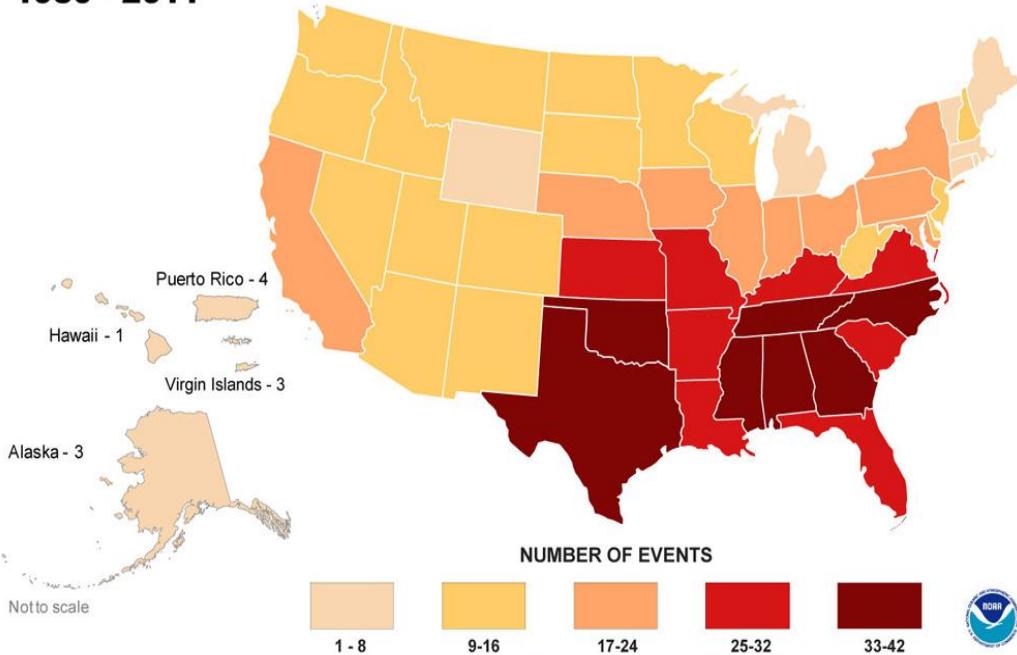
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A June 2013 report by the Federal Emergency Management Agency concluded that climate change is a major driver of increased flood risk. Rising seas and increasingly severe weather are expected to increase the areas of the U.S. at risk for floods by up to 45 percent by 2100. It is also estimated that the number of people in high-risk areas will double during this period. The report warned that sea level rises of 4 to 6 feet will cause shoreline erosion and recession, and create greater surge risk in the event of major storms. Flooding around rivers will likely become worse in a warming world due to changes in precipitation frequency and intensity.

We already live in the most severe-weather-prone country on Earth. According to the National Weather Service, Americans each year cope with an average of:

- 100,000 thunderstorms, 10,000 of which are severe;
- 5,000 floods;
- 1,000 tornadoes; and
- An average of 2 deadly hurricanes which hit land.

Billion Dollar Weather/Climate Disasters 1980 - 2011



Map: Places That Will Flood More Often Due to Global Warming." Sheppard, Kate and West, James. Visited 6/29/2013.

(http://www.slate.com/articles/health_and_science/climate_desk/2013/06/map_fema_study_shows_flood_hazard_areas_may_increase_45_percent_by_2100.html.)

Wallace Nichols, in his excellent book, *Blue Mind*, beautifully explains why more and more Americans have either chosen to live in floodplains, or have happily remained in inherited properties in floodplain areas, despite all risk associated with living in such a risky location. The nation's floodplains have expanded as watersheds and shoreline lowlands are utilized for development. Rising sea levels along with the destruction of natural features and plant life, that have in the past helped reduce storm surges and tidal peaks, create a formula that exacerbates the impacts from future disasters. Funding for assistance to towns and individuals in areas hit by natural disasters will continue to soar unless we change this paradigm, by making dramatically different development decisions.

American society is failing to properly manage the foreseeable results of natural hazards calculated on historic events, and projected climate change impacts are certain to further stress available resources. Disaster Risk Reduction Ambassadors need to work together to educate policy makers about ways to build safer and more resilient communities. Floodplain Management, Hazard Mitigation and Climate Adaptation professionals are groups with much in common, but in the past have too often failed to join forces. Uniting these groups, which have

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classically operated in different funding and organizational structures could, through unified action, help create synergies to address the problem of natural disasters with renewed vigor.

The Weather Service calculates that some 90 percent of all Presidential declared disasters are weather-related.

In the past, local, state and federal government agencies have frequently concentrated on responding to disasters, rather than working in advance to minimize their potential impact — focusing on huge outlays of recovery money rather than inexpensive, easily implemented prevention measures.

In some cases, hazard mitigation measures have included moving entire communities out of flood-prone areas to nearby higher ground and mandating that their old sites can never be used for permanent structures. In many coastal towns, homes rebuilt after storm-driven flooding are being raised on pilings, along with their utilities, leaving the ground level for parking or storage. In all these cases, local officials and residents recognized the need for proactive measures to mitigate the effect of future storms.

One particularly exciting facet of the *Living Mosaic* program is that mitigation projects can not only minimize future damage from natural disasters, but may also provide an opportunity for economic development and for a “green” approach to regional planning. Vacated town sites, for example, have been used for parkland or nature preserves, improving the area’s quality of life. Home building techniques that provide survivable shelters in storms can, at the same time, decrease energy use. The expansion of natural areas that can buffer storm surges and floods also increases wildlife habitat, which in turn can produce tourism revenue. This turns mitigation from an additional cost item into a crucial investment strategy.

A Living Mosaic: A Path Forward is a compendium containing concepts that can be used to train Disaster Risk Reduction Ambassadors while also providing a source of information for communities across the country that they can use to take an unflinching look at their vulnerability to a worst-case disaster scenario, identify possible key steps to take in advance of any incident and — in the process — form tighter bonds for stakeholders within their towns or regions. The matrix also provides opportunities for including “green” strategies in planning, as well as for developing potential economic initiatives.

Why Develop the *Living Mosaic* Now?

When local communities are in control of determining how local resources are used, the best form of Disaster Risk Reduction is created. A strong and important feedback loop can allow communities to reap the benefits, while careful study of the best practices from other locales can ameliorate unnecessary damages or waste of resources.

This approach acknowledges the sad reality that communities, their leadership and their organizations usually tend to step up only if there is a large impact event or a recent history of natural hazard disaster.

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Background: Population and Climate Change Predictions

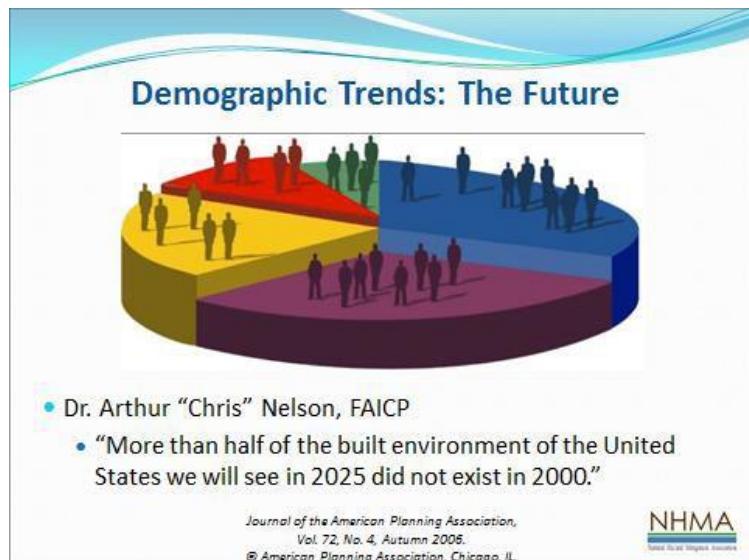
Noted Demographer Dr. Arthur C. (Chris) Nelson in his plenary presentations at the Rocky Mountain Land Use Institute in both 2011 and 2015, affirmed that fully one-half (50%) of the square footage of improved property that will exist in this Nation in 2050 does not exist today. This demographic fact affords an enormous opportunity to correct problems before they become future disasters. This means there is a choice: build safely and properly so as to not exacerbate existing problems caused by improper construction and development; or continue to do business as usual.

Ed Thomas, president of the Natural Hazard Mitigation Association, frames the challenges society faces in this way:

"As a nation, we have a choice: We can build safely and properly so as to not exacerbate existing problems caused by improper construction and development; or we can continue to do business as usual and build an unsustainable future of misery, waste and needless destruction.

Right now we are clearly on the path of mounting losses from foreseeable natural events. Our message of public safety and safe and resilient development and redevelopment must be delivered in an apolitical manner, crafted in a different manner to reach the hopes, fears, desires, and dreams of each of the various audiences which comprise our "Whole Community."

As part of that task, in addition to recognizing the positive economic aspects of this message, impediments must be recognized — including the fact that many local officials feel that “immunity” shields them from improper decisions which result in harm. For those officials only a concerted and informed movement involving significant members of the whole community can alter that assumption of immunity.



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The Three Legs of Disaster Risk Reduction

There are three major areas in which implementation of community measures could significantly reduce the growing toll of damage from disasters in our nation:

Undeveloped land that is being developed for the first time or land that is being completely redeveloped: In this situation, the challenge is to design and build development that is safe — that is, development which will not incur damage from foreseeable natural events. Carefully planning such development can result in these costs being placed on the appropriate party: the developer or property owner. Such planning practices can prevent improper externalization of those costs to society at large when inevitable natural processes take place.

Undeveloped lands or existing developed lands that face repeated risks from disasters: These need to be designated for uses that can withstand major damage from the foreseeable hazards. Zoning, subdivision regulations and building codes need to be modified in such a way that vulnerable development is discouraged. Carefully planning new development or redevelopment can ensure that the costs associated with development in vulnerable locations are borne by the developer or property owner and not the public.

Development or redevelopment of an area that is already impacted by a natural process: Many jurisdictions in the U.S. are confronted with developed areas located within natural hazard zones. Besides trying to reduce the amount of development within these areas, these jurisdictions need to carefully evaluate their readiness for facing future disasters, preparing detailed plans for evacuation, promoting the construction of safe rooms, and encouraging a wide range of community-based activities that promote maximum safety which are both coherent and economically sustainable. Mitigation measures such as rebates that support personal safety and measures that encourage elevated structures in flood-prone areas are proactive examples of actions that will reduce risks and the consequences of future natural events. On properties facing severe riverine or ocean erosion, or located in an area with landslide-prone soil, measures must be implemented that require the consideration and understanding of the natural processes at work in order to properly plan for the safety of any development. These measures must also prevent actions that might protect the initial development while causing damage to properties nearby. Such planning measures need to ensure that foreseeable natural events do not result in another natural disaster.

Nationally, there are countless examples of communities and their residents having made the decision to build, or rebuild, safely and wisely. This safe rebuilding includes voluntary relocation away from extremely hazardous areas, as well as more traditional approaches such as Firewise® protection of buildings, construction of tornado safe rooms, elevating buildings, or wet or dry flood-proofing structures. Wherever people are subject to repeated, devastating visits from natural processes, they are clamoring to find ways to safely reconstruct their homes and businesses, or even relocate away from the natural hazards in their locations.

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It CAN Be Done

The devastation may have taken many forms, and the recovery may take months or even years. But, by working together, balancing long- and short-term objectives, community leaders, residents; business owners and various governments, private and volunteer agencies, can work together to develop a common vision for their community and weave together a variety of different funding sources, technical support, lessons from other communities, and through synergy, create better tomorrows for their community.

Natural events, such as floods and landslides, are only disasters when they impact man. The challenge in creating resilient communities is to reduce the chance of *natural events* becoming *natural disasters*.

Local community leaders – Disaster Risk Reduction Ambassadors – can provide strong leadership to develop and implement a comprehensive plan that will integrate mitigation activities for future generations. To change the existing cycle of reacting to foreseeable hazardous events, local communities will need bold decision-making and sound mitigation planning that allows for and incorporates natural processes in such a way as to avoid damage. This paradigm modification requires an understanding that reliance on existing federal and state mitigation practices are often not enough to ensure a community's safety. Most existing federal standards should be viewed as minimum mitigation measures and should be evaluated to determine the benefits they provide locally.

MODULE 1: What is a Disaster Risk Reduction Ambassador?

The Disaster Risk Reduction Ambassadors program, developed by the Natural Hazard Mitigation Association in conjunction with the Federal Emergency Management Agency, outlines a process and provides resource materials to show a group of motivated people how to direct their efforts in a systematic way to promote safe, resilient and empowered individuals and communities.

The goal is to create dynamic resilient communities that work cohesively to make decisions, deal with conflicts, resolve issues, and manage individual and collective tasks and processes with long term, sustainable outcomes. Key to this work is the idea that preventing the worst impacts of natural disasters is easier, cheaper and less traumatic than trying to fix damage after the event. Since this approach is already being used successfully by communities across the U.S., reviewing “best practices” and case studies is a key part of the process. Additional strategies include positioning government, businesses, non-profits and individuals to be prepared for disasters, including readiness to take every advantage of the vast number of programs available to promote individual and community resilience, both pre- and post-disaster.

The Ambassador’s program consists of topic modules (webinars and best practices), resources (study guides, videos, and references for the modules), and training workshops offered by both the Natural Hazard Mitigation Association and FEMA. The ranks of DRR Ambassadors should include a wide variety of individuals, from interested citizens to elected officials to local staff working in towns, cities, counties, and regions across the country.

A curriculum for training Ambassadors, which uses these modules for source material and strategies, is currently being developed. As currently envisioned, it will be:

- **Cross-cutting:** Rather than focusing on one potential aspect of a disaster, it will address a broad set of natural hazards and risks, best mitigation practices to improve economic, social, and environmental quality of life, and protect public health and safety.
- **Multi-disciplinary:** Providing an overview of many expert disciplines to show connections gained through collaborative teamwork.
- **Tied to larger national and international efforts** that support Community Resilience. The curriculum will recognize the need to connect across the separate sectors of those engaged in the larger scope of climate science, emergency management, and comprehensive planning, to coordinate with others committed to build a more resilient future.
- **Focused on the “whole community”** by building local capacities and resources. Ambassadors will learn to build local community preparedness and Disaster Risk Reduction

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options, utilizing voluntary and combined private-, business- and public-sector resources inherent in communities that work together. It should be non-partisan, guided by economic prosperity, social equity, and community safety and health, addressing needs and opportunities based on sound economics and building a strong legal, moral and equitable basis of safe and proper development, redevelopment, and governance.

- **Facilitate community leadership and learning** using measurable outcomes. Progress toward the goal of supporting local leaders as they initiate effective grass-roots action in Disaster Risk Reduction can be measured by indices of community participation defined by the FEMA “Whole Community” approach.
- **Adaptive to rapidly changing needs and opportunities:** The curriculum modules and study plans can — and must — be custom-tailored and updated to local needs, to facilitate community progress over time. Focused on providing resources and curriculum via webinars and instructional media, accessible documents, and modules, to build confidence and capacity of DRR Ambassadors to effectively engage their local communities.

This document is meant to be used in conjunction with the topic modules and training workshops, but can also act as a stand-alone guide to access the resources necessary to understand and successfully achieve Disaster Risk Reduction. Note that *A Living Mosaic* is not intended as a recommendation for specific community action, but rather is intended to help government leaders, planning practitioners, key stakeholders and community residents identify the most appropriate and effective planning tools that will guide their communities more effectively toward resilient practices and development planning.

The DRR Modules parallel the existing FEMA Community Recovery Management Toolkit, conform to the post-Hurricane-Sandy changes in the rules that allow FEMA and other agencies to do both pre- and post-disaster work, add information on business resilience, as well as references to existing publications from the American Planning Association and lessons learned and insights from current resilient community experience. For more information on the program, see: <http://nhma.info/> and “Hazard Mitigation in Disaster Recovery,” by Edward A. Thomas, Esq., and Lincoln Walther, FAIA, in *Planning for Post Disaster Briefing Papers*, American Planning Association, 2015, located at: <https://www.planning.org/research/postdisaster/>.

What is a “Resilient Community?”

We define community resilience as “The capacity of a community to anticipate, plan and implement actions to mitigate the risk — and seize the opportunities — associated with environmental and social change.”

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For example, to build climate resilience, communities must simultaneously:

- Lessen overall demand for energy and increase the proportion derived from renewable energy sources;
- Anticipate and prepare for pressures and shocks that climate change will introduce or worsen; and
- Strengthen connections among individuals and networks while advancing social inclusion to foster social cohesion.

The Role of a Disaster Risk Reduction Ambassador

Ordinary citizens can be the leaders to create a community leadership in Disaster Risk Reduction. Here are case examples of successful efforts by local organizations working with available resources to anticipate catastrophic events.

Case Example One:

MYSTIC, Conn. – The residents of this coastal Connecticut region recognize the value of investing in disaster resistance. Nor'easters and hurricanes have in the past brought destructive erosion, storm surge, downed utilities and more. The communities have learned that “failing to plan is planning to fail.”

In recent years several public meetings have been held to plan, mitigate and adapt to climate change issues that could mean even greater challenges in the years ahead. Participants included town residents, businesses, appointed and elected officials from local, state and federal governments, municipal staff, and others. They work together to anticipate change, plan for their future and seize every chance to take action to reduce their vulnerabilities.

One unplanned opportunity came in 2000 after a devastating fire in the Village of Mystic destroyed several waterfront businesses. Firefighters were confronted with a tangle of live wires above the buildings that posed an extreme safety hazard and compromised the firefighting effort.

But the fire offered the Town of Groton an opportunity to mitigate future damage. The Mystic Streetscape Project, conceived in the late 1990s as an upgrade to sidewalks and parking along West Main Street, was expanded through the acquisition of additional funding from the Federal Highway Administration’s TEA-21-Transportation and Community Systems Preservation program to protect the electrical, telephone, and cable lines by burying them underground.

By 2009, the planning that had been done on the overall project meant the community was also eligible for financial help through the American Recovery and Reinvestment Act to supplement the utilities retrofit portion received from the highways grant. The disruption during construction was considerable and the expense enormous, but the project became a “once in a lifetime”

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effort to make the necessary improvements. The Mystic Streetscape and Utility Relocation project brought dramatic improvement to this historic and economically vital area. Pedestrian safety has been improved with innovative sidewalk and crosswalk design. Renovations also improved drainage. In keeping with the character of the village, old-style street lamps replaced poles, wires were placed underground, and power transformers that previously detracted from the scenery and could threaten lives during storms and fires were newly constructed at appropriate ground locations.

A severe test of these changes came during Hurricane Sandy in 2012, which brought a foot of water into downtown businesses. Buildings served by the new system never suffered any loss of power.

Groton and the surrounding region are actively and aggressively planning for Climate Change challenges and the town has prepared a model plan for use by other Northeast communities.

Source: FEMA Best Practices Region 1

Case Example Two:

One Vilonia, Arkansas family escaped an ES-4 tornado without injury even as their home was blown apart around them because their in-laws had installed a safe room, as recommended by FEMA and other disaster mitigation agencies.

Nicky Havens said he first sent his three children to his wife's parents' home across the street because he knew they had a small, metal safe room installed in their garage.

Havens and his wife joined them in the small space as the massive tornado moved into town.

"We'd seen it coming and we heard it coming, so we got in the safe room," he told a reporter for the local newspaper. "It beat it pretty bad, but it worked. I'm proud of it."

The house didn't fare as well. The tornado's winds ripped the roof off and downed walls, spewing splintered wood and crumbled brick around the yard. Wind hurled bricks through the windows of a car that had been parked next to the safe room.

Havens said the family didn't talk while they "hunkered down" in the safe room, their "hearts thumping" as they listened to the tornado wreak its havoc on the home.

"It felt like [the room] was just going to take off at any time," he said. "We knew the house was gone. You could hear it just take off."

The next day, the family was back at their in-laws' home working to salvage what items they could. It was hard to see it in such shape, Havens said. "But, hey, we're glad to be alive," he said outside his home, which was damaged but not destroyed.

Meanwhile, hundreds of Vilonia residents were sheltered in a massive safe room built with FEMA grant money received after a deadly tornado just three years before.

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Since the 2014 storm, FEMA has agreed to pay more than \$1 million in federal grant money to build a new community safe room in the town's intermediate school, which was destroyed in the storm. The grant will pay for a safe room to house up to 1,048 people and withstand winds up to 250 mph.

Sources: *Arkansas Online*, Associated Press

Case Example Three:

GALVESTON, Texas — When Hurricane Ike slammed ashore on Galveston Island in September of 2008, the storm's 100-mph winds and 11-foot storm surge took aim at one of the most important historic buildings in Texas — Moody Mansion. The mansion suffered some rainwater intrusion and flooding from Hurricane Ike's surge, but damage was minimized, thanks to hazard mitigation measures that dramatically reduced disaster losses, according to Betty Massey, executive director of the Mary Moody Northern Endowment, which owns the mansion. The measures are all part of the endowment's phased, systematic, strategic approach to protecting historic resources through disaster planning, preparation, and hazard mitigation.

The mansion is, by any standard, a priceless treasure. Construction spanned three years, from 1892 to 1895. The building is crafted of red brick generously iced with limestone, sporting bold arches, towers, dormers, and a pyramidal red-tile roof. It contains 31 rooms on three floors atop a raised basement.

Perhaps the most stunning feature is a 12-foot-tall leaded, stained-glass window overlooking the landing of the finely crafted staircase in the oak-paneled central hall. The glass portrays a family greeting visitors while a banner proclaims, "Welcome ever smiles."

During Hurricane Ike, winds hurled debris broadside into the stained-glass window — but careful planning as part of a mitigation strategy helped shrug off the storm's attack.

"Thank heavens, we had covered this special window with laminated glass to protect it in a storm," said Mary Hoehne, Moody Mansion facility manager. The laminated glass, which had been replaced in recent years, has a network of spider cracks, clearly recording the debris' impact. "The covering did its job. There's no question that without the laminated glass we would have lost that window," she said.

Broken windows would have allowed substantial water intrusion and damage throughout the home, but most of its other 50-plus windows are covered with clear storm coverings of polycarbonate, a kind of plastic shield that is nearly as clear as glass. The best of the polycarbonate glazing products are touted for their high-impact strength, flame resistance, insulation and clarity.

"Placing the storm shields on the windows protects the mansion's openings without detracting from the historic building's façade," Massey said. The window protection system has been a major investment that the mansion is continuing in installments, as funds are available.

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Moody Mansion stewards believe their responsibility to safeguard the property requires careful hazard mitigation measures, Massey said. But the challenge is to find creative ways to mitigate risks without marring the historic character of the buildings. “For example, we needed to prevent water from building up and damaging the porches, but we didn’t want to detract from the beautiful archways,” Massey said.

To solve the problem and still preserve the mansion’s status on the National Register of Historic Places, the mansion’s stewards funded an engineered system of drains and removable fabric shields that hang from permanent fasteners. “We put on the shields before a storm,” said Hoehne. “When we take them down, no one would even know the system was there.” Hurricane mitigation work also includes weather stripping and wooden shutters on windows.

“The idea is to think things through ahead of time and have a plan, even if you can’t do it all at once. One year, we add half the protective plastic and repair the old shutters on the other windows, and next year add another quarter and so on,” Massey said. “We keep a standing item in every year’s budget for hurricane mitigation.”

Those in charge of the museum review the plan every spring before hurricane season. It includes five pages of contractors lined up in advance.

“We are keeping a recovery diary every day. This allows us to compile insurance information and also will help us analyze how everything has gone so we can continue to improve our plan,” Massey said.

Massey considers mitigation a good investment, noting that wind-driven rain through even one broken window could easily cause losses costing \$50,000 to \$60,000. “It wouldn’t take many disasters to offset the entire cost of adding the plastic shields,” she said.

Dollar estimates can never completely describe the priceless value of historic resources, she said. “Our capability to prepare for and survive a storm has been vastly improved by taking the time for up-front planning. It’s certainly worth the investment to mitigate on the front end, to lessen the chances of damage and disaster.”

SOURCE: FEMA BEST PRACTICES / REGION VI DECEMBER 2008

Case Example Four

The small farming town of Greensburg sits on U.S. 54 in south-central Kansas, laid out in neat square blocks. It is farm country, home to wheat, soybeans and cattle growers.

On May 4, 2007, an EF-5 tornado swept through Greensburg, essentially destroying the town. The storm killed 13 people and injured more than 60 others ... and almost totally destroyed 95 percent of the structures in town.

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"We lost half the population [to relocation] right away," Greensburg Mayor Bob Dixson told reporters. "They had no place to live. A lot of older residents moved to neighboring communities. But we were very blessed — 2.8 million of our friends and neighbors (the population of Kansas) came to help us."

"The Kansas Department of Transportation, the Kansas National Guard, many cities, counties and towns sent trucks and ambulances and equipment and volunteers."

Work to clear the wreckage of the town and care for the surviving residents started immediately.

The U.S. Forest Service set up a base camp and served more than 36,000 meals in the four weeks after the tornado. The Federal Emergency Management Agency installed hundreds of mobile homes that eventually housed about 300 families.

Recovery from the wreckage and planning for the future took place amid scenes of almost unimaginable devastation. Throughout the summer, residents held weekly tent meetings to discuss plans. Since the tornado wiped out all communication systems, residents depended on the "yellow sheet," a paper printed and distributed twice a week to get the word out about recovery efforts. At sometimes-stormy public meetings, Greensburg's battered survivors grappled with the complexities of receiving federal disaster aid and the daunting task of adopting a long-term recovery plan.

What would the future hold for Greensburg? Would, could, the town rebuild — and how?

The result of this community effort is amazing: America's greenest town.

Greensburg is now the world's leading community in Leadership in Energy and Environmental Design (LEED)-certified buildings per capita. The town is home to a half-dozen LEED-platinum certified buildings, including a new City Hall and the new 48,500-square-foot Kiowa County Memorial Hospital. Renewable energy powers the entire community, and the streetlights are all LED.

The idea to "go green" was floated early on. At the very first tent meeting, held a week after the tornado, resident Daniel Wallach proposed rebuilding as a "model green community." That summer, he helped found Greensburg GreenTown, a nonprofit organization that became an information clearinghouse for the town's environmentally minded reconstruction.

Mayor Dixson concedes that some residents "cringed a little bit" at all the green talk. "For some people it sounded very 1967-1968, you know, powder-blue bell bottoms and tie-dyed shirts. The number one topic at those tent meetings was talking about who we are — what are our values?" he tells reporters.

"There was a lot of hard work, a lot of discussion. Some of it was positive, some of it was less than positive. Sometimes we agreed to disagree, but we were still civil to each other. And let's

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not forget that our ancestors were stewards of the land. My ancestors lived in the original green homes: sod houses."

An environmentally minded Kansas City design firm, BNIM, worked with the town and FEMA to help create a long-term recovery plan. Gradually, the notion to go green gained traction with town residents, and they came to embrace the possibility of turning the town into a living laboratory for sustainable development. Eight months after the tornado, the Greensburg City Council adopted a resolution: All large public buildings in Greensburg with a footprint exceeding 4,000 square feet must meet the LEED-platinum standards of the U.S. Green Building Council and utilize renewable energy sources.

One enormous infrastructure change was Greensburg's conversion to "100 percent renewable energy, 100 percent of the time," as Dixson describes it.

Today the wind that nearly destroyed Greensburg is what keeps the town's lights on. Turbines can be seen catching the wind throughout residential neighborhoods and the business community. The energy needs of the larger Greensburg community are met by a wind farm just south of town.

The decision to rebuild in green-friendly ways added to the cost of the town's reconstruction by as much as 20 percent. The expense attracted attention in Washington — the source of much of the reconstruction money — and in June 2008, Hewitt was asked to testify before Congress. His testimony was eloquent and compelling. "Green starts in rural America," he said, and the committee was convinced.

Mayor Dixson sometimes waxes philosophical about Greensburg's extraordinary rise from the rubble. "You have to do the best you can with the resources you have," he says. "We learned that the only true green and sustainable things in life are how we treat each other."

And he's pleased that many of the rebuilt homes in Greensburg feature roomy front porches. "We need to get back to being front-porch people."

Sources: The Associated Press; especially note: US Department of Energy (<http://www.nrel.gov/buildings/pdfs/53539.pdf>), USA Today (<http://www.earthgauge.net/>)

Proactive Planning Makes Sense

Certainly, as a community picks up the pieces after a disaster and begins to rebuild, there is a window of opportunity, as the Mystic, Conn. and Greensburg, Kan. cases described above show. However, the best possible time to develop safely and properly is before natural events cause destruction and devastation.

The Natural Hazard Mitigation Association Disaster Risk Reduction program emphasizes the nexus between the threats and impacts of natural hazards and disasters on human settlements, including those exacerbated by climate change. The concept of disaster resilience, or the ability

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to prepare and plan for, respond to, mitigate against, absorb, recover from, and more successfully adapt to adverse events serves as a key organizing principle.

Today — as the impact of climate change and shifting population centers combine to worsen the impact of future natural disasters — is the best time to change development practices from those that will continue to cause harm to individuals, businesses, the economy, and the environment to a “No Adverse Impact” approach, which emphasizes the need for carefully planned development for a sustainable future.

The curriculum is designed to assist DRR Ambassadors in presenting and applying lessons learned from a “Resilient Neighbors Network” to their own communities and to support FEMA’s natural hazard planning and floodplain management and mitigation. NHMA began the Resilient Neighbors Network program in 2010 as part of a strategy of encouraging peer-to-peer networking between and among professionals who are representing communities actively working towards reducing disaster costs, risks and consequences.

This sort of networking, of finding out what works in other places, is key. The options are bewildering. In the face of all of the many resiliency efforts out there, how does a community know which one to pick?

And what is the right mix of time and resources?

A big part of the problem is deciding which of the many different formats, tools and organizations that can help with whole-community approaches will be most useful for different audiences. For example, the Architects often sponsor design charrettes as intensive planning sessions where stakeholders (citizens, designers and others) collaborate on a vision for development of a project. Charrettes provide a forum for ideas and offer the unique advantage of giving immediate feedback. Such events attempt to resolve conflicts and map solutions and allow everyone who participates to be a mutual author of the plan.

This approach might be perfect for some communities, but for others that might not accept this type of process, town meetings or informal gatherings might work better.

The Ambassadors program can provide a third-party solution- and research-based orientation that can cross funding and organizational “silo” walls to address how to localize and regionalize what it takes to conduct a sound disaster resistant practice.

Even some five years ago, when the Resilient Neighbors Network program was first contemplated, the landscape of organizations promoting resilience was very different than it is today. At the time, fewer organizations and groups were directly involved in promoting resilience, or seriously thinking about climate adaptation. Today there are well over 100 organizations and groups involved in what they describe as resilience.

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For a list, see:

<http://nhma.info/wp-content/uploads/2016/03/OARS27.pdf>

Generally speaking, however, these groups have little experience with natural hazard mitigation, floodplain management, disaster relief, or land-use and building codes designed to reduce the ever mounting toll caused by improper and unsafe development in areas subject to foreseeable natural hazard.

A Disaster Risk Reduction Ambassador's goal is to bring a "Safe Development" message and expertise into these discussions.

MODULE 2: Risk Assessment as a Way to Achieve Disaster Risk Reduction

Municipalities and other entities too often tend to consider risks from natural events in terms of potential damage to structures and infrastructure, rather than, for example, potential impacts on residents, children, water quality, habitat or sustainable systems.

Disaster Risk Reduction Ambassadors who work to broaden this scope may choose to emphasize tangible goals & incentives, fiduciary responsibilities, and public safety, but at the same time attempt to ascertain how these are synergistically aligned with broader community interests. It is very difficult to engage in a community in comprehensive risk reduction conversation without considering taking these underlying factors into account.

To be useful, risk assessment has to consider the whole community, reaching across social, economic, built and natural environments. Risk is often seen as something external or abstract (the river is causing a flood, the tornado outside can happen anywhere so we can't do anything about it); and not as a result of human decisions (developing close to the water) or human failure to take actions (not heeding warnings and not building safe rooms/shelters).

There is a need to connect the potential event to what people are doing or can do to reduce the risk. Remember that citizens care about a very wide range of issues, and are also dealing with stressors ranging from poverty to chronic environmental degradation and accompanying health risks.

The public needs to be able to see how the risk relates to their daily lives — e.g., will it affect their home, kid's school or work. For example, will a disaster/hazard event cause an economic disruption that would damage the community and in the long-term, drive down the value of homes or cause employers to leave town?

And it helps when people can visualize the risk (e.g., see how high flooding could reach on a recognizable landmark or building).

Looking at the Whole Picture

This module introduces an asset-based risk assessment process that will focus on what really matters to a community by:

- Identifying assets beyond just built capital, by including natural and social capital; and
- Identification of mitigation, risk reduction and resilience opportunity.

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A truly comprehensive risk assessment process can provide information about risk to help governments, businesses, and communities make better risk management decisions. In order for community stakeholders to analyze risk, they must identify and consider what they value. Typically, when conducting risk assessment, the mapping of what is considered valuable and important to the broader community is not explicitly stated and debated among the majority of stakeholders. The most vulnerable are often left out of the discussion. Instead there is an often unfounded assumption that all stakeholders implicitly agree on community assets, including infrastructure that are both necessary and vulnerable. What is more important to a town, for example, fixing the town common or rebuilding a neighborhood playground?

An effective approach is one that engages community stakeholders; moves away from problem-based planning (that so often misses informal systems, which characterize social, cultural and natural capital of a community) to asset-based appreciative inquiry planning; identifies and assesses all risk to all assets that are necessary for each communities' human well-being; incorporates community goals and planning in the risk assessment process; includes capability and opportunity analyses; and helps address the need for inclusion of risk assessment and information into other community planning processes. This module employs case studies to illustrate how communities have addressed and incorporated values that can be compatible if understood and appreciated by all.

A Case Study

"We need stronger neighborhoods, increased walkability, greater sense of place, mixed land uses, closer neighbor and family ties and trust," read a set of conclusions drawn from tabletop exercises held in the cities of Redmond, Everett, and Neah Bay, Wash. These outcomes might have been expected if the exercise had been focused on smart growth, but stakeholders were addressing earthquake risk.

A Moving Target

As Maximilian Dixon writes, "Approaches to resilience require preparing for the unexpected, whereas risk assessment typically proceeds from the premise that hazards are identifiable and predictable. Current risk based approaches are unsatisfactory, even with known hazards. They emphasize risk probabilities that may be unknowable."

"Community systems exist within dynamic and unpredictable environments and estimates of risk probabilities are notoriously unreliable. Take for example, the estimating of the joint probability and synergy of two or more major events happening at the same time or back to back. Or look at cascading failures.

"... it is inadequate and not helpful to think of community resilience as achieving some static state of being. It should be approached as an ongoing adaptive process — not something that a system achieves or has, but a characteristic of the way it behaves. (Even) when restored, ecological systems do not revert back to their original states like a rubber band returning to its original shape after being stretched — and neither do community systems after an event. Conditions always change, even when we don't realize it."

Dixon, "How Can An Asset-Based Appreciative Inquiry Risk Assessment Model Improve FEMA's Risk MAP Process to Help Communities Become More Resilient?" *Thesis. University of Washington, 2014*

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True, individuals mentioned traditional earthquake mitigation measures such as retrofitting or strengthening structures, developing redundant energy sources, and improving emergency response, but those did not drive the discussions.

Instead, this new approach to measuring risk began with an inventory of community assets — built, natural, and social “capital” — instead of vulnerabilities, and it prompted stakeholders familiar with emergency preparedness to broaden their thinking about how to plan for disasters.

FEMA’s long-established Threat and Hazard Identification and Risk Assessment (THIRA), described at <https://www.fema.gov/THIRA>, is a 4-step risk assessment process that can help a whole community — individuals, businesses, faith-based organizations, nonprofit groups, schools and academia and all levels of government — understand its risks and estimate capability requirements.

Ultimately, the THIRA process helps communities answer the following questions:

- What do we need to prepare for?
- What shareable resources are required in order to be prepared?
- What actions could be employed to avoid, divert, lessen, or eliminate a threat or hazard?

The 4-step process¹:

- Identify threats and hazards of concern: Based on a combination of experience, forecasting, subject matter expertise, and other available resources, identify a list of the threats and hazards of primary concern to the community.
- Give the threats and hazards context: Describe the threats and hazards of concern, showing how they may affect the community.
- Establish capability targets: Assess each threat and hazard in context to develop a specific capability target for each core capability identified in the National Preparedness Goal. The capability target defines success for the capability.

¹ For more information, see:

Robert C. Freitag, Daniel B Abramson, Manish Chalana & Maximilian Dixon (2014) Whole Community Resilience: An Asset-Based Approach to Enhancing Adaptive Capacity Before a Disruption, *Journal of the American Planning Association*, 80:4, 324-335, DOI: 10.1080/01944363.2014.990480 and Hazard Mitigation in Disaster Recovery, by Edward A. Thomas, Esq., and Lincoln Walther, FAIA, in *Planning for Post Disaster Briefing Papers*, American Planning Association, 2015. Located at: <https://www.planning.org/research/postdisaster/>

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- Apply the results: For each core capability, estimate the resources required to achieve the capability targets through the use of community assets and mutual aid, while also considering preparedness activities, including mitigation opportunities.

Vulnerable Citizens: Lessons in Building Equitable Resilience

The Model Forest Policy Program is a national nonprofit organization that builds the capacity of communities to be climate resilient by sustaining water resources, productive forests, citizens' wellbeing, and thriving economies. In that planning process, urban and rural communities with a shared dependence on ecosystem services can partner with one another, working to protect vulnerable citizens and natural resources while increasing resilience to climate change.

Recently, the climate adaptation community has focused on efforts to address the disproportionately negative impacts climate change has on the most vulnerable citizens. Here are some of the lessons learned so far:

Lesson 1: *IDENTIFYING vulnerable populations isn't easy.* Building resilience for those most impacted by climate change requires clearly identifying who is most vulnerable. Vulnerability assessments generally rely on measuring key indicators related to health, social & economic status, physical security, and disaster preparedness. Although these indicators are monitored and measured by government and social service organizations, the process of compiling and analyzing relevant data requires a great deal of time and effort.

As the Center for American Progress reports, "Government resources exist that can help create a map of socio-climate vulnerability. Unfortunately, the resources span agencies, and there is little evidence that they have been used collaboratively."

Lesson 2: *INVEST in inclusion and authentic relationships.* Communities must engage vulnerable citizens before effective planning can begin. Successful engagement goes far beyond communicating intentions and soliciting input from stakeholders. Those who are most vulnerable to climate impacts are often marginalized by traditional planning approaches. In order to effectively build resilience for vulnerable people, planners must invest in learning from and empowering vulnerable people:

We must learn FROM (not just learn ABOUT) vulnerable people to understand the root causes of vulnerability and to recognize the social capital and assets within each community.

We must NURTURE community and social capital.

In a recent Climate Solutions University webinar, Tanya Harris, community outreach coordinator with the Make It Right Foundation in New Orleans, emphasized that a focus on strengthening

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existing social networks was a key factor of success in efforts to rebuild the Lower 9th Ward after Hurricane Katrina.

Lesson 3: Address INEQUITY. Equitable resilience cannot be achieved without addressing the existing inequities that are becoming more intense in our society each day. Confronting these inequities requires a cross-sector, holistic approach to address the economic, environmental, and social factors that are the root causes of climate vulnerability.

Jacqui Patterson, Director of the NAACP's Environmental and Climate Justice Program, believes these factors include:

- Equity in decision-making and the allocation of resources.
- Addressing disproportionate climate impacts.
- Ensuring outcomes that measurably increase resilience for those most vulnerable.

In summary, addressing climate vulnerability is just as much about building capacity in vulnerable communities as it is about preparing for anticipated future threats like natural disasters.

MODULE 3: What Works – The Resilient Neighbors Network

How Communities have met the need to be prepared & how that came about.

Once an individual or their organization has decided to assume the role described in *A Living Mosaic* and to become what we're calling a Disaster Risk Reduction Ambassador, their first question is probably "What do I do? How can I help my community move toward the goal of becoming a Resilient Community?"

The answer to that is contained in the concept of writing a Hazard Mitigation Plan. This may seem at first to be unnecessary paperwork — particularly if this is post-disaster and the community is struggling to pull itself together.

But working through the process includes a Risk Assessment — lifting one's focus from the immediate problem and looking at the wider view — and also committing to a careful, step-by-step weighing of the options that are available to either head off the worst of any future event, or to make sure another disaster would have less of an impact on the area and its citizens.

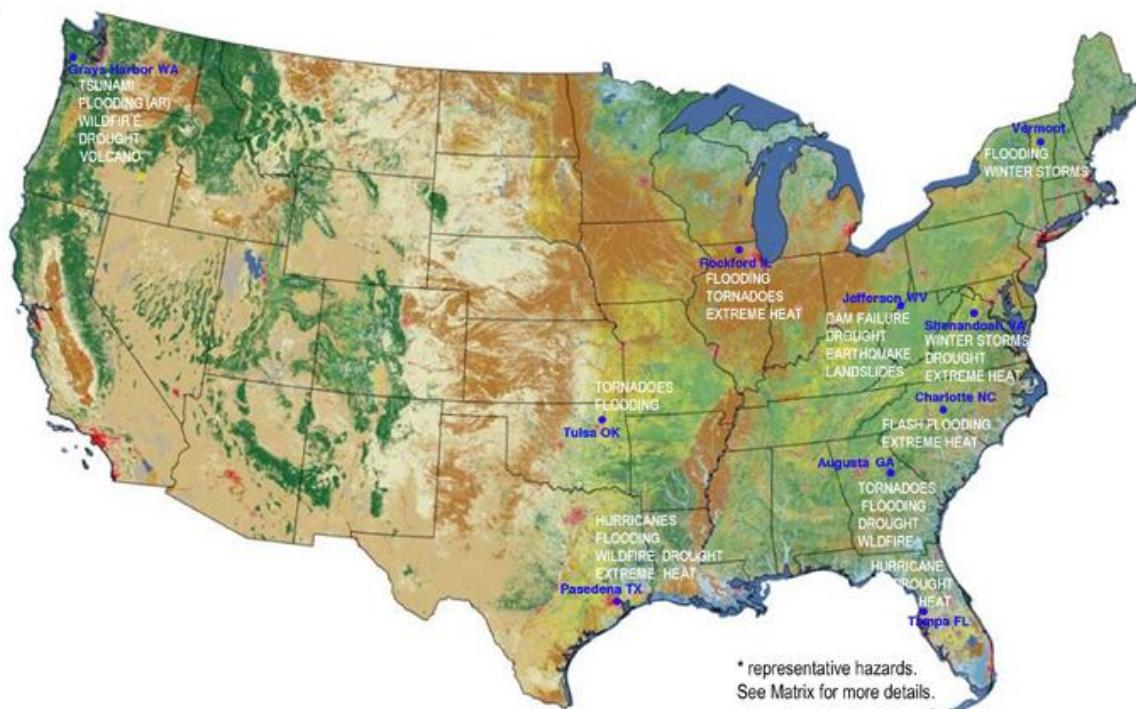
The Mitigation Planning process allows state, local, and tribal governments to identify policies, activities, and tools to implement mitigation — defined as any sustained action taken to reduce or eliminate long-term risk to life and property from a hazard event.

This process has four steps:

- Organizing resources;
- Identifying hazards and assessing risks;
- Developing a mitigation plan; and
- Implementing the plan and monitoring progress.

Additionally, local jurisdictions need to realize that a FEMA approved Hazard Mitigation Plan is an absolute prerequisite for at least seven different FEMA funding programs, and is also a nationally recognized standard ... there is no need to "re-invent the wheel" ... any jurisdiction drafting its first plan has scores of examples of approved plans throughout the country to learn from and use as a base. Communities that already have plans in place may also learn from each other in the process of completing the required five year updates. There are also numerous FEMA "how-to-guides" and tools to lead officials through the process of completing a plan. These tools, and the benefits of an approved plan, allow the process and the result to serve as a strong pattern for disaster mitigation, both before and after an event.

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RNN COMMUNITIES	Natural hazard risks that communities are expressly addressing in NHMPs and capital budgets.								
	TSUNAMI	FLOODING	DROUGHT	WILDFIRE	HEAT	TORNADO	EARTHQU.	LANDSLIDE	VOLCANO
Augusta GA									
Shenandoah VA									
Charlotte-Mecklenburg NC									
Greys Harbor WA	■								■
Hillsborough Tampa FL									
Jefferson County WV									
Pasadena TX									
Rockford IL									
Tulsa OK									
Vermont									

NATURAL HAZARD RISKS ADDRESSED BY RNN COMMUNITIES

NHMA

Reference: Katie Skakel "RNN Community Matrix" (July 1, 2015)

NATURAL HAZARD MITIGATION ASSOCIATION

GRAPHIC: Donald Watson

How to Begin

Who Will Be Involved ... Who Will pay The Bill?

The first decision in developing a Hazard Mitigation Plan is determining the jurisdiction — or combination of jurisdictions — that will participate in the planning process and then seek funding to support plan development. Multi-jurisdictional planning can be a way for local governments to save plan development costs. Multi-jurisdiction plans are appropriate for a combination of local governments with similar characteristics and usually confronted with the same types of natural hazards, but not for a state plan. Local governments are defined by FEMA as, “any county, municipality, city, town, township, public authority, school district, special district, intrastate district, council of governments (regardless of whether the council of governments is incorporated as a nonprofit corporation under state law), regional or interstate government entity, or agency or instrumentality of a local government; any Indian tribe or authorized tribal organization, or Alaska Native village or organization; and any rural community, unincorporated town or village, or other public entity.” FEMA has based this definition on local government authorities listed as communities with floodplain management ordinances within the National Flood Insurance Program.

Once the area the plan encompasses has been determined, developing a Hazard Mitigation Plan has six key steps:

- **The Planning Process:** Key stakeholders, including representatives from multiple agencies and levels of government, and the public need to be involved in the process of creating the plan so that the final product will be supported and used by the community. At the beginning of the plan development process, a local planning team, stakeholders committee, or steering committee must be established to lead or assist in holding public meetings, gathering input on local hazard and mitigation measures, reviewing the final plan, and assisting with implementation. The public involvement process must be documented as part of the plan. Stakeholder involvement is critical to ensuring that the plan truly addresses the needs and desires of the community.
- **Hazard Identification/Risk Analysis:** The process of identifying local hazards must address floods, windstorms, fire, tornadoes, coastal storms and geologic hazards. It is recommended that the plan also address other localized hazards. Some communities additionally choose to address technological and man-made hazards. The Hazard Identification/Risk Analysis combines hazard history with the possibility that a hazard can strike the area. Hazard information may be researched online, through historic records, and by reviewing plans completed by the state or neighboring jurisdictions. Accessing a Geographic Information System (GIS) can provide a good way to display the location, extent, and severity of the hazards. GIS is also useful in comparing hazards to vulnerable facilities. Module 2 contains more information on this facet of the planning process.

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- **Vulnerability Assessment:** A vulnerability assessment involves examining the facilities and populations that are most likely to be impacted by the identified hazards. Listing the buildings that are in the floodplain or likely to be damaged during a windstorm, or other hazard, allows communities to determine what are their most critical facilities to prioritize for mitigation projects. Overlaying the hazard history and probable occurrence shows the areas most vulnerable to hazards. This is often done using an algorithm to weigh and compare vulnerabilities of people, structures, and critical infrastructure, to specific hazards, as well as to the overall combination of hazards the state, region or community faces.
- **Multiple Hazard Mitigation Strategy:** The Vulnerability Assessment results in identification of priority areas for hazard mitigation. For instance, there may be several homes that have been flooded twice in the last decade, a power station that loses capacity in even mild windstorms, or a hospital that's accessibility is challenged by sink holes. The local planning team should lead the process of identifying goals, objectives, and the appropriate mitigation actions or strategies. Mitigation actions may be non-structural such as targeted planning, revision of building codes, or public education; or can be structural, such as wiring for generators or elevation of flood-prone structures. Mitigation actions must be reviewed by the public and evaluated to determine that they are cost effective and will result in the desired impact.
- **Maintenance:** The plan must address how it will be monitored, linked to existing plans already in use within the community, implemented, and must involve continued public input. Coordination with other planning efforts is critical to achieving success. It should also provide a schedule for evaluating and updating, at a minimum of every five years.
- **Approval and Adoption:** Hazard Mitigation Plans are reviewed by states and approved by FEMA. FEMA will provide "approvals pending adoption" that are the notice to proceed for jurisdictions to adopt their plan.

Hazard Mitigation Plans may be developed by local governments with technical assistance from their state, FEMA or a private consultant. Communities choosing to use a consultant should maintain active involvement with the process, remembering that this plan will be the community's plan long after any contract has ended. The plan must have flexibility to meet local needs ... even as they change. It may just meet the minimum requirements, but it must have the capacity to be robust and address additional local needs. The result can assist in matching the right combination of resources, or fabric, to make the community safer even if there is no perfect solution, and even if the community's vulnerabilities and resources change.

Climate Adaptation, Disaster Risk Reduction and Hazard Mitigation involve working with a moving target, which changes with development patterns, changing natural processes, the climate, the economy and human desires and visions of where we want to live and work.

Adaptation and Mitigation is Key After an Event

When a disaster does occur, Disaster Risk Reduction Ambassadors must concentrate on opportunities to properly plan for and mitigate *future* hazards; rather than focusing on quickly rebuilding so as to return to “the way things were.” Quick and irresponsible decision-making to build things back the way they were only serves to create future disasters. Remember, the post-disaster “window of opportunity” lasts a relatively short period of time … residents and business owners will exert pressure on their elected officials to let them return to normal living by quickly cleaning and rebuilding their homes and businesses.

But properly channeled, opportunities after a disaster to create greater resilience are only limited by the imagination and perseverance of the community. Not all hazard mitigation solutions have to be million dollar solutions. Improved codes and standards, pre-arranged agreements and local collaboration are important tools that can be used for hazard mitigation. Speed of recovery is not always effective in building a more resilient community. Taking time and doing proper deliberate planning is more important. Involvement of the “Whole Community” as defined by FEMA and all stakeholder groups, including underserved populations is essential to long-term recovery.

Accomplishing this in the wake of a community tragedy may seem to be a nice philosophical concept, but can lose its credibility in reality. There is little doubt the pressure to rebuild quickly may limit the opportunities for massive mitigation planning, but it should be possible to introduce and convey the need to build back better, and stronger, and there is an economic argument that this will actually aid in the recovery and restoration of a “new normal” post disaster. The module will address both pre and post event challenges and illustrate effective techniques for each circumstance.

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The 10 P's:

Even with help, this is not an easy or rapid process: It requires constant attention to what we refer to as the “10 Ps” of Post-Disaster Safe Recovery:

Posterity: We hold the earth in trust for future generations. We must think long term and broadly, finding creative, sustainable and resilient solutions. Just because something has “never been done that way before” does not mean it will not work now.

People: Put people first. Gather together and listen to the people, including victims, public officials (who may also be victims of the disaster), subject matter experts, and taxpayers. Establish goals including determining, in a collaborative way, what are the best solutions for the immediate situation and for future generations.

Patchwork: No single program exists to meet all the needs of the community or each individual. We need to take a bit of “this and that”.

Persistence: Never give up. Keep talking. Keep negotiating (and never start any discussion with a “no”). Keep searching for the right answers and the right programs to meet specific challenges and needs.

Problems: Keep focusing on problems. Synergy is important. Bring resources together. Bring stakeholders together. Communicate. Focus. How do allies, partners, and skeptics view the problem? How can differences be resolved and critical needs met?

Prudence: Focus efforts on achievable goals. Everyone’s time is limited. Do not squander time on roadblocks. Move on and come back later to issues that cannot be easily agreed upon.

Personal Decisions: Following a disaster, people must make critical decisions about their lives, their families and their futures. Remember that this is a democracy and decisions must be made within a participatory engagement framework involving all who have a stake in the future of a community. Disaster survivors will need resources; and will probably require additional help and support, such as mitigation counseling, as well as crisis counseling, which is often available, needed, and vital following a disaster.

Proactive: Take the initiative. Seek help. Expand your staff. Take advantage of the limited window of opportunity to create, fund, and complete the programs that will make a difference, long term, in your community.

Patience: This is a difficult time for everyone: victims, community leaders, and people assisting with the recovery. We need patience, particularly when systems are shattered beyond any possibility of quick repair. We need to maintain calm. Help is available for everyone. Remember that community leaders are often victims themselves. And when the task at hand seems overwhelming, remember to call a time out, whereby you can regroup and come back to the issue with a calm perspective.

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Plain Common Sense: We must describe our processes, plans and programs in a straightforward way. The concepts should “sound right.” They should provide logical solutions; that resonate as the “common sense” thing to do.

THIENSVILLE, WISCONSIN

For nearly 50 years, the downtown area in the Village of Thiensville, in Ozaukee County, Wisconsin, had been plagued with the constant flooding of nearby Pigeon Creek, which repeatedly affected ten residential and thirty commercial properties. After six major floods — four of which resulted in a federal disaster declaration — the village decided to do something proactive.

After going through the Disaster Mitigation Planning process in 2002 with help from FEMA, the townspeople came up with a project that remedied some of their worst woes.

“We had a storm in 1985 and previous to that there were several storms in the early seventies and eighties that flooded downtown Thiensville,” recalls Mike Campbell, project engineer. “As the consulting engineer, I identified major restrictions that had been placed in the creek, a lot of man-made obstacles. When it rained ... Pigeon Creek would overtop its banks and downtown would flood.”

In 2006, the City of Thiensville received a Pre-Disaster Mitigation grant totaling \$2.3 million, and the resulting project was executed in three phases. First, easements were obtained to detain some storm water at targeted intersections. A plate was installed on the upper half of each outlet culvert, and that limited the culvert’s outflow during high water events.

Next, two undersized culverts under a road from a parking lot to a commercial building were removed and replaced by a 50-foot clear span bridge.

Finally, the high flow channel of the creek was widened from a mere five to ten feet in some areas, to 60 feet. A meandering 25-foot-wide rock-lined low flow channel was created for fish passage. Invasive trees were removed and replaced with native species. Wetland and prairie plants were added along the creek’s bank to prevent erosion.

The project was costly and complex, but the town plowed ahead. Patience, perseverance and “political will” fostered completion of the project. “We had a

tough time coordinating with utility companies because the project was ‘on again, off again, resulting from a lack of a full commitment to move forward,’ said Campbell. “We had to fast-track the construction contracts, too. They were bumping into each other because of it.”

“A motivating factor included the fact that we had an original board (with no new members to question the project and reargue its value), who knew about all the years of flooding and who probably thought ‘If we don’t do it now, folks are going to be sitting here a 100 years from now dealing with the same thing.’” says Karl Hertz, village president.

And the plan worked According to Andrew LaFone, director of public works, the village has had three flood events since the work was done that would have normally caused road closures and property damage in the downtown area.

“Water flows from two directions into Pigeon Creek, northeast and northwest and it all dumps in about a block and a half before Pigeon Creek gets to the Milwaukee River,” said Hertz. “This project took care of the northwest water. We have executed two or three projects over the years to handle the northeast flow, including securing funding for the construction of detention ponds.

Heralded as a mitigation measure, residents say the project fostered other positive aspects including partnerships with a neighboring city, Mequon, for upper storage, private property owners who provided easements for the project and other state agencies such as the Department of Natural Resources. It also had a positive effect on fish habitat. “Would we do it again?” says Campbell. “Yes we would. We had an end goal in mind and we followed procedure ... the project is functional and it’s also beautiful.”

Sources: See FEMA’s Local Mitigation Planning Handbook at (<https://www.fema.gov/media-library/assets/documents/31598>) and Sample Local Mitigation Plan Scope of Work for Mitigation Grant Application (www.fema.gov/library/viewRecord.do?id=1858)

A Variety of Tactics

In some cases, hazard mitigation measures have included voluntary relocation of communities out of flood-prone areas to nearby higher ground and mandating that their previous sites can never be used for permanent structures. In many coastal towns, homes rebuilt after storm-driven flooding are being raised on pilings, along with their utilities, leaving the ground level for parking or storage. In all these cases, local officials and residents recognized the need for proactive measures to mitigate the effect of future storms.

One particularly exciting facet of establishing disaster resilient communities is that mitigation projects can not only minimize future damage from natural disasters, but may also provide an opportunity for economic development and for a “green” approach to regional planning.

Vacated town sites, for example, have been used for parkland or nature preserves, improving the area’s quality of life. Home building techniques that provide survivable shelters in storms can, at the same time, decrease energy use. The expansion of natural areas that can buffer storm surges and floods also increase wildlife habitat which in turn can produce tourism revenue.

The Three Segments of Disaster Risk Reduction

There are three major areas in which implementation of community disaster resilient measures can significantly reduce the growing toll of damage from disasters in our nation:

- Land that is being developed for the first time, or land that is being completely redeveloped: In this situation, we need to recognize the challenge to design and build safe development — that is, development which will not incur damage from foreseeable natural events. Carefully planning such development can result in costs that could be placed on the appropriate party: the developer or property owner. Such planning practices can prevent improper externalization of those costs to society at large when inevitable natural processes occur.
- **As the United States Supreme Court pointed out in the *Koontz* case (http://www.supremecourt.gov/opinions/12pdf/11-1447_4e46.pdf), prevention of a property owner from imposing costs on others is a hallmark of sound land-use planning and has long been sustained against constitutional attack. For further explanation of this key point please see: “Turning *Koontz* into an Opportunity for More Resilient Communities,” by Edward A. Thomas Esq., and Lynsey R. Johnson J.D., in *National Wetlands Newsletter*, March/April 2014, vol.36, no.2, located on the American Bar Association Website at:**
http://www.americanbar.org/content/dam/aba/administrative/state_local_government/land_use.authcheckdam.pdf.

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- Undeveloped lands or existing developed lands that face repeated risks from disasters: These lands need to be designated for uses that can withstand major impacts from the foreseeable hazards. Zoning, subdivision regulations and building codes need to be modified in such a way that vulnerable development is discouraged in state and/or local ordinances.
- Development or redevelopment of an area that is already impacted by a natural process: Many jurisdictions in the U.S. are confronted with developed areas located within natural hazard areas. Besides trying to reduce the amount of development within these areas, these jurisdictions need to carefully evaluate their readiness for facing future disasters, preparing detailed plans for evacuations, promoting the construction of safe rooms and encouraging a wide range of community-based activities that promote maximum safety in a coherent and economical way. Mitigation measures such as rebates that support personal safety and measures that encourage elevated structures in flood-prone areas or transfer of development rights out of floodplain areas are proactive examples of actions that will reduce risks and the consequences of future natural events. On properties facing severe riverine or ocean erosion, or located in an area with landslide-prone soil, measures must be implemented that require the consideration and understanding of the natural processes at work in order to properly plan for the safety of any development. These measures must also prevent actions that might protect the initial development while causing damage to properties nearby. Such planning measures need to ensure that foreseeable natural events do not result in another natural disaster.

Wherever people are subject to repeated, devastating visits from the natural processes, residents need to explore ways to safely reconstruct their homes and businesses or even relocate away from the natural hazards in their locations.

For example, this [checklist of steps for Disaster Risk Reduction Ambassadors](#) to follow in exploring disaster risk reduction may help communities to mitigate damage in advance of any future catastrophic event:

- Research and identify the risks the community may encounter;
- Assess risks to all assets within a community that are necessary for human well-being (including community goals and planning into the risk assessment process);
- Prioritize the risks based on their likelihood of frequency and severity to cause damage;
- Research and identify risk reduction opportunities and best practices — the linked modules can provide examples of possible mitigation opportunities for a community;
- Build local alliances;

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- Reach out to other communities and organizations that are doing similar disaster risk reduction efforts. Experts have found that peer-to-peer outreach through the Resilient Neighbors Network, for example, is quite helpful to local officials;
- Research and identify funding opportunities for disaster risk reduction and provide incentives for homeowners, low-income families, communities, businesses and the public sector to invest in reducing the risks they face;
- Incorporate risk assessment and disaster risk reduction measures into all community planning processes and regulations;
- Apply and enforce realistic but risk-compliant building codes;
- Encourage the community to join the Community Rating System (CRS) program run by the National Flood Insurance Program (NFIP), which rewards better floodplain management by reducing flood insurance premiums;
- Invest in and maintain critical infrastructure that reduces risk, such as flood management, and is resilient to climate change. This may routinely require taking the long view on short-term repairs;
- Maintain safe schools and campus programs; assess the safety of all schools, colleges/universities and health facilities and upgrade or relocate as necessary;
- Ensure education programs and training on disaster risk reduction are in place in schools and local communities;
- Protect ecosystems and natural buffers that mitigate floods, storm surges and other hazards that make jurisdictions vulnerable;
- Adapt to climate change by developing good risk reduction practices;
- Install early warning systems and emergency management capacities in your jurisdiction and hold regular public preparedness drills; and
- After any disaster, redevelop in ways that reduce future risk, instead of just rebuilding back to the way it was.

A Multi-Faceted, Multi-Targeted Approach

One especially helpful guide to the process of recovering from a community challenge is a guide written by FEMA, called “Effective Coordination of Recovery Resources for State, Tribal, Territorial and Local Incidents.” The guide does not confine itself to natural disasters, but also is

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pertinent to traumatic events such as man-made incidents (oil spill, terrorist attack or hazardous material release), economic incidents (the closure of a key employer) and ecological incidents (a sudden shift in spawning areas for key fisheries).

For anyone either trying to anticipate future problems, or working to recover from an event, it can be found at: <http://www.fema.gov/media-library-data/1423604728233-1d76a43cabf1209678054c0828bbe8b8/EffectiveCoordinationofRecoveryResourcesGuide020515vFNL.pdf>

MODULE 4: How to Achieve “Buy-In”

Building Successful Relationships with Elected Officials, Non-Profits and the Private Sector, and Negotiating a Successful Outcome

A Successful Regional Project

The elementary school in the Ocosta School District, Grays Harbor County, Washington, is the first vertical evacuation, tsunami-engineered, safe haven building in North America. Grays Harbor County lies within 20 to 30 minutes of a devastating tsunami, which could be triggered by an event along the Cascadia Subduction Zone earthquake fault line. The majority of the critical infrastructure along the coastal region of the county — such as schools, government buildings, business and industry, police and fire stations — is situated within the tsunami inundation zone. In addition, the county also lies within the earthquake region of the Pacific Northwest and is susceptible to inland earthquakes, severe winter storms with hurricane force winds and major flooding events.

Despite the fact that pre-disaster mitigation planning seems a given for an area with so many natural dangers, getting a diverse community to buy into a project that required demolishing a working school and spending millions on a new one was a daunting task.

Chuck Wallace, deputy director of emergency management for Grays Harbor County, was up to the task. Working with other concerned officials and citizens, Wallace helped push through the project. How?

Wallace shared some of the process in an interview with Emergency Management Magazine in December 2014. Here are some excerpts:

How do you feel about the general disaster readiness of governments, public safety agencies, businesses and individuals that live and work in your county?

If one looks at Japan, considered the best prepared country in the world for disaster and the impacts of the 2011 Tokyo earthquake and tsunami, and New York City, considered the most prepared area of the U.S. in terms of homeland security funding, training and preparation, and the impact of Superstorm Sandy in 2012, I don't believe any of us are prepared to handle our worst-case scenarios. However, continued attempts to lessen the impacts upon our communities remain the only option we have.

I see a movement toward improved disaster readiness from every aspect, but the continued depressed economic environment we all face remains a barrier for most to achieve greater resiliency.

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Pre-disaster mitigation is not always an easy sell to the people and organizations that have to fund it. How have you approached educating organizations about disaster mitigation and its benefits?

Continued education to all is the most significant approach I have seen. Many have never been told about the site specific impacts a disaster could have upon their family, their homes, business or the school their child attends. Without knowledge, how do we expect our citizens to make sound decisions for their family prior to and during disaster and emergency situations?

Presenting the economic impacts of a particular disaster event to government, industry and business greatly contributes to the significance on the discussion of pre-disaster mitigation. The process is slow and there are few current opportunities to move forward with necessary proposals. Opportunity presents itself from time to time such as following the Japanese earthquake and tsunami, Superstorm Sandy or recently the Carlton Complex wildfires and the Oso landslide. The ultimate goal is to eventually have all communities, governments and individuals prepared to withstand the major effects of any hazard, limiting the socio-economic impacts upon the whole community.

Since the threat of a tsunami is real, what have you done over the years to educate people about the risks of a tsunami impacting your ocean-facing coast?

Education is a continuous process. I try extremely hard to present issues that have become evident through tsunami modeling and geography to the public in a way that makes it personal to them. When you can speak about their site specific issues and impacts any disaster event could have on any citizen, it strikes home.

What role do you think the 2004 Boxing Day tsunami in Thailand or the 2011 Japan tsunami have had on motivating people to take action? Without those two events, do you think you could have been successful with selling tsunami mitigation?

Any time a catastrophic event impacts someplace in the world, it grabs headlines and becomes important to the public for that moment. In time, the media leaves the affected area and the momentum emergency managers had toward spreading essential preparedness information wanes. Our window of opportunity to educate the citizens interested in the issues slowly closes. Even the Japanese earthquake and tsunami with unbelievable media coverage including “in the moment” video feeds faded from the headlines after 18 months. The events provide great opportunity to educate the public and update plans but momentum does ebb.

“Selling” tsunami mitigation? I hope my citizens don’t view my attempts to educate them as “selling” an issue, but when you think about it, I guess all emergency managers have a bit of carnival barker in their system. We have to present issues to our public in such a way that it becomes personal to each person. Successful is a subjective term but the way I view it, is if you

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can get one more person to change and prepare for emergencies and disaster every time you speak or write an article or post online, that's progress.

You have had one significant success story for pre-disaster mitigation. How did you approach the idea of protecting K-12 school students in one community from a tsunami?

Constructing the first vertical evacuation, tsunami-engineered, safe haven building in North America, the elementary school in the Ocata School District, came to fruition because of the sheer will of Ocata School District Superintendent Paula Akerlund, the school board, the school district building committee and the voting citizens of the Ocata School District.

Using the principles designed in Project Safe Haven and an opportunity presented because the school district was meeting to work on a proposal to pose to the public to vote on whether they'd support to pay a bond to fund a new elementary school, I approached Supt. Akerlund with the idea.

She was extremely interested in the proposal to construct a safe haven building and asked if I could bring others to describe the process, costs and possible issues surrounding the project to the building committee. Once presented, the school district never hesitated in moving forward with the project.

What were the challenges you had in getting people to listen to you? And where did support for mitigation come from?

The greatest challenge was attempting to educate entire communities in two counties, and a Tribal Nation, on the tsunami issues the Ocata School District has ... including the fact that there is no other place to flee to except vertically — and that the two-story high school building may not be high enough, even if the students, faculty and employees were evacuated to the second floor during a tsunami event.

The South Beach Bulletin, the local weekly newspaper, ran numerous articles on the issues and plans for the school prior to the vote on the school bond. Community education programs were given by members of the school and local fire districts on the hazards surrounding the school, the children and the community. One of the greatest influences was a picture of an automobile on the second floor of a building after a tsunami. It told a story a thousand words couldn't have explained.

What did you achieve and why do you think you were successful?

This project is the first of its kind, not just in the U.S., but in North America. To think a small school district with just 725 students, faculty and employees ... could have such a historical impact upon all coastal communities worldwide still hasn't sunk in. This is the model all will use

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to protect citizens and critical infrastructure such as schools, government buildings, business, industry and police and fire stations currently situated in tsunami inundation areas.

Success of the Ocosta Elementary School project could never have occurred without three essential factors:

- First, a great deal of federal, state and local government, public and private cooperation and funding used to provide the tsunami inundation modeling for the entire Washington state coastline, which was a huge foundation for the ability to determine the engineering needs of the project.
- Second, Project Safe Haven (described at: www.hSDL.org/?view&did=786580 and also on Facebook at: www.facebook.com/ProjectSafeHaven) provided a basis to present the concept of building a tsunami-engineered, vertical evacuation, safe haven school building to the Ocosta school superintendent and the building committee.
- Third, the open minded, willing and concerned voting citizens of the Ocosta School District who decided their children were far more important than the few dollars it will take in taxes to build a tsunami-safe school in their community.

What advice do you have for other emergency managers regarding how to approach promoting disaster mitigation in their communities?

I think all emergency managers have a responsibility to be the advocate for all types of mitigation needed in our communities. We know our community, we know the issues and we know our limitations. We must accept our role as advocates for change and become vocal promoters by educating and building consensus within the public, business and industry and within local government.

How Could You Achieve a Similar Success Story?

To create Resilient Communities, the dialogue must address not only problems, but also be about solutions, creating a dialogue with local interested parties about how resiliency is interconnected with everything (the electrical grid, transportation, water, buildings) and that there is a cascading effect of disasters.

What is needed anywhere — whatever the primary threat facing a community — is the political leadership and courage to imagine the chaos and destruction that the worst case likely event could cause, consider what recovery or restoration efforts would be needed to get the social equilibrium (commerce, transportation, schools, employees, power, supply chains, etc.) back in balance, and how quickly that could be accomplished.

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This includes what new legal authority would need to be provided, what relocation or reoccupation decisions would be entertained, what financial burdens would be imposed, what businesses would be destroyed or badly damaged, and finally, what would they have wished they had thought of and done before all that happened.

And then, the community can begin to methodically address the mitigation, preparedness response and recovery challenges in advance.

But who will lead this inquiry? Who will cooperate with it? Who needs to be at the table? Can the public be engaged so they can participate and offer advice on the knottier issues that affect them directly, in their neighborhoods? Political leaders might be surprised to learn how smart their constituents really are if they try this.

Disaster Risk Reduction Ambassadors need to try to get beyond the “believers” ... planners, floodplain managers, code officials, and disaster agencies ... to reach out to private sector movers/shakers/influencers and political decision makers. We need to work at integrating both public AND private entities to work together to address resiliency and Disaster Risk Reduction. Too often, the private sector tends to consider the public sector as a *regulator*, not as a *partner*, and this friction extends to discussions about resiliency. When disaster mitigation advocates talk about cooperation, they hear a mandate to meet requirements.

The Ant That Moves the Mountain

“Local champion” is a cliché but it is often true: Most plans and ideas turn into real accomplishments when there’s at least one person (or a small group) that is committed to taking action and won’t give up when confronted by obstacles. Usually, that person is connected to several other stakeholders, has good access to correct information and knows how to get things done.

The Ambassador must develop appropriate tools for the job, and local connections and relationships are first and foremost.

Beginning at the “grass roots” is the most powerful approach, especially since using a top down strategy can very quickly run into political agendas that have nothing to do with preparing for a future disaster.

Ambassadors need to knock at doors, share many cups of coffee and get out of city hall. Meet one on one with a wide range of people, and then extend to people in small groups.

If you are the “outside expert,” rather than a local person working to protect their own community, that status can work both ways. Egos and local attitudes can come into play when an outsider comes to town, as though simply arriving is an implied criticism of the job that the local planners have done. It’s very important to get them on the facilitator’s side, sometimes by

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having them invite outsiders into the planning process, or giving them credit for bringing expertise in, and praising the work they've done in the past.

On the other hand, it's sometimes valuable to offer a neutral viewpoint, one not tied to one group or another. And having the knowledge and sources to offer outside funding can be a real boon.

Remember that it is difficult to make changes when key people wear many hats — they're too busy and they are faced with conflicting priorities.

What seems to work well is the tactic of linking Hazard Mitigation planning to issues like climate disruption/adaptation (although that can turn into a political football in some regions) as well as making a strong connection between natural event hazards and the requirements of their daily jobs ... for example, a local department of transportation or public works may find it easier to consider the risk from the viewpoint of its danger to roads and bridges they are tasked with maintaining.

By the same token, enlisting a local historical society or foundation in protecting precious landmarks may pay off by raising the awareness of an influential segment of the community. Historical preservationists are frequently a lightning rod in disputes with developers, so aligning with such groups could complicate the process of bringing other entities into the discussion.

For a greater chance of success, mitigation can be cast as an additional consideration in any community investment.

A Picture is Worth ...

Experienced Hazard Mitigation professionals/ practitioners find that words alone are not as effective in communicating the impact of resilience on improving people's lives as carefully chosen images and examples.

There are marvelous and highly sophisticated tools available today to democratize planning, help people visualize what must be done, what it would look like, etc. But it's important not to use technologies that intimidate the community, or make the target audience feel like outsiders.

Slick, professional presentations can actually work against buy-in versus community mitigation work sessions.

Sometimes it is more effective to use a simple flip chart or photo album than a sophisticated PowerPoint program, or scale models that people can touch and move around rather than sophisticated graphics software.

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Ambassadors must try to show or let the community come to those conclusions themselves on how a risk could actually impact a community, rather than offering a series of map overlays.

Here are some guidelines for Disaster Risk Reduction Ambassadors:

- Research and identify the risks your community faces
- Identify community assets (what really matters to the community) necessary for human well-being (the whole community should take part, especially the most vulnerable)
- Assess all risks to all assets within a community that are necessary for human well-being (included community goals and planning into the risk assessment process)
- Prioritize the risks based on what really matters
- Review and ensure generator and emergency power is adequate
- Build smarter
- Research and identify risk reduction opportunities and best practices
- Build local alliances and buy-in
- Ensure that all stakeholders understand their role in disaster risk reduction
- Reach out to other communities and organizations that are doing similar disaster risk reduction efforts
- Research and identify funding opportunities for disaster risk reduction and provide incentives for homeowners, low-income families, communities, businesses and public sector to invest in reducing the risk they face.
- Incorporate risk assessment and disaster risk reduction information into other community planning processes
- Invest in and maintain critical infrastructure that reduces risk, such as flood management, and is resilient to climate change
- Assess the safety of all schools, including colleges, universities, critical infrastructure and health facilities and upgrade these as necessary

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- Apply and enforce realistic, risk compliant building regulations and land use planning principles
- Ensure education programs and training on disaster risk reduction are in place in schools and local communities
- Protect ecosystems and natural buffers to mitigate floods, storm surges and other hazards to which your city may be vulnerable
- Adapt to climate change by building on good risk reduction practices
- Install early notification and warning systems and emergency management capacities in your city and hold regular public preparedness drills
- After any disaster, redevelop in ways that reduce future risk, instead of just re-building back to the way it was.

To summarize, remember that no one program will work to solve problems which have taken years to develop, so seek community leaders with vision and enlist them in change towards resilience. This is a process, not a cut-and-dried solution.

Focus on solving problems, creating synergy, bringing resources together and communicating. Try to imagine how your allies, partners, and skeptics view the problem, and then on how can differences can be resolved so critical needs are met.

Focus efforts on achievable goals. Everyone's time is limited, so don't waste it on single roadblocks ... bypass them, move on and come back later.

Describe available programs, processes and plans in a straight-forward way. If you mean to use language and methods that make sense to your audience, community, stakeholders etc., you must understand the material completely. As you strive to establish buy-in for mitigation efforts, identify — and focus on — community priorities for human well-being (especially for the most vulnerable: the poor and those with access/functional needs, children, elderly etc.). Keep the message focused on improving life by making assets and quality of life services more resilient in an everyday way, which also makes communities more resilient to disasters.

Finally: A community vision is an expression of possibility, an ideal future state that the community hopes to attain. Such a vision must be shared by the *entire* community so that it is truly owned by all — so that it is “ours” in the inclusive sense — if it is to be ultimately successful.

Public Participation Skills Module Available

As part of the development of the book “*Public Participation for 21st Century Democracy*” by Matt Leighninger and Tina Nabatchi, the authors created a Participation Skills Module to bring together the skills people can use to engage citizens in meaningful and productive ways. These include ten key talents for engaging citizens:

- Building coalitions and networks;
- Recruiting participants;
- Communicating about participation;
- Managing conflict;
- Providing information and options;
- Managing discussions;
- Helping participants generate ideas;
- Helping participants make group decisions;
- Supporting action efforts;
- Evaluating participation; and
- Build in follow-up dates and keep group engaged with agreed upon sunset date.

The module, which expands on these topics, is available for download at: bit.ly/PPskills.

(Please note: This is a Microsoft Word downloadable document. It contains excellent content; which we strongly recommend. One must copy and paste the url into their browser but it is worth the effort.)

MODULE 5: Getting The Message Out

How to Best Present Information to a Local Community, Using Town Meetings, the Media, Webinars & Lectures

As Disaster Risk Reduction Ambassadors work to achieve “buy-in,” as laid out in some detail in Module 4, one primary challenge is communicating with the larger community — getting the word out.

This task is a blend of public relations and marketing. Not only must the facts — the risk, the options for mitigation, the potential rewards — be clearly laid out for the town, county or region, but considerable effort must be made to reach interests in the community that may not normally engage in public policy questions. And while those facts should be explained clearly and truthfully, at the same time they should be used to advocate for a course of action that may involve changes that could seriously impact citizens through higher taxes, inconvenience or even major disruption of their daily lives.

This module will address the “fine line” that must be followed between presenting hard facts about potential hazards and overwhelming the target audience with a litany of seemingly insurmountable issues.

Communicating the Risk

The language of risk assessment can be difficult. The “100-year flood,” hydrographic topology, swift water dynamic environments – these concepts all may be necessary to discuss, but they often are baffling to laymen.

As the Hazard Mitigation planning process moves forward, the necessity to create common language and use all means of portraying the options and consequences of inaction in clear, dramatic (but not exaggerated) terms. This module will emphasize the importance for presenters to avoid the impulse to emphasize their expertise and to slide into governmental bureaucratese, such as resorting to mind-numbing acronyms and abbreviations.

Using All Available Local Media

The obvious avenues for community communication are the local newspapers (daily and weekly), local radio, community cable and any TV stations that reach the market.

Disaster Risk Reduction Ambassadors will be coached on the best approaches to these media outlets. Such outreach efforts need not be restricted to traditional media. In some circumstances, for example special purpose publications in languages common in the area are perfect vehicles. Or, in this day of desktop publishing, creating a weekly or monthly “newspaper,” a “Disaster Times” is not an insurmountable task.

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Local, low-power radio stations operate in many communities, as do cable channels fed into the local cable network. Amateur radio organizations have time and again demonstrated a selfless, competent and willing provider of an alternate communications network.

Of course, the Internet can fill a key role through the use of email, social media and even a “Disaster Mitigation blog.”

Programs like the “Disaster Ready Austin” provide a glimpse into what one community has undertaken.

More information can be obtained at:

<https://austintexas.gov/disasterreadyaustin>

As the Austin experience illustrates, there is no “one size fits all” template for getting the word out to a community about Hazard Mitigation planning. There are however, standard approaches that can reach most of a community.

The average person is overwhelmed by a blizzard of information — some of it important, some trivial, much inaccurate and some even malevolently motivated. And there are segments of any community that need fast, accurate information but who are isolated by language, custom or economic circumstances.

It's a Disaster Risk Reduction Ambassador's task to find ways to make sure that the whole community is informed — and convinced — of the need for proactive action before a natural event becomes a disaster.

MODULE 6: How Hazard Mitigation Planning Can Inform Local Community Planning and Ordinances

Local, county, regional, and state planning and zoning agencies, and others who craft building codes may provide the most useful and effective means through which hazard mitigation can be achieved.

By considering worst-case disaster scenarios in their areas of responsibility, researching best practices from around the country, and then modifying their approach to steering their community forward, members of these agencies and boards can help avoid the worst effects of natural disasters.

As we have often been reminded, natural events, such as floods and landslides, are only disasters when they impact structures and people. Proper planning can ameliorate that impact.

Freeboard Pays Off

Michener purchased her commercial building some 13 years ago and found that it had been elevated to provide a flood protection level of two feet of freeboard above the base flood elevation. Her 2,600 square foot, two-story business structure is located approximately 30 feet from the Big Thompson River.

There is no freeboard requirement for Estes Park, but, as an extra precautionary measure, Will Birchfield, city building official, always advises individuals to raise structures above the base flood elevation. "Of, course it's up to the individuals to decide," said Birchfield.

In Michener's case, the elevation certificate also helped reduce her flood insurance rate. "It always bugged me that there was this big swale between me and my neighbor at the end of the property, but now I get it," said Michener. During the flood of 2013, "It was like a four-foot river between me and my neighbor."

Recent destructive Colorado storms and flooding affected approximately 2,000 square miles of the state. Nine individuals died and there was nearly \$2 billion in property damage.

Michener's town, Estes Park, was hit hard. The town received more rain in five days than it usually does in a year. "We have lived in the city for 20 years and have never seen the rivers breach the banks until the September flood," said Michener. Besides owning the spa and retreat business, Michener, her husband Monty, and daughter Mia have a home near Fish Creek, not far away. On the day of the storm, they realized there was a strong possibility that their home might flood, so they packed up their belongings and moved into a vacation rental above the business. This proved to be a good decision — they lived in the building for three weeks while wet carpet was being ripped out of their flooded home and mud-soaked drywall was being removed.

"During the flood, it was like a huge river surrounding our building," recalls Michener. "We were totally an island. The entire cul-de-sac was an ocean and surrounding buildings were flooding except for the business next door, which also was elevated." "Not only were the banks of the Big Thompson River overflowing behind the business, but water was coming through the streets from another direction," she said.

Michener was grateful to get back in business without the clean-up other businesses were experiencing. "The loss would have been huge in so many ways if this building had flooded, even though we had flood insurance," said Michener. "I don't want to even think about the problems we would have encountered; not only financially, but emotionally as well."

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Planning Requires a Longer View

A community developed Disaster Risk Reduction effort involves government leaders and community residents working together to define a long-term vision for a safer community and developing a coordinated effort to secure funding and support to turn the mitigation community's vision into reality.

Although each community will have unique natural hazards and concerns, the process of identifying and addressing these concerns will be similar across all communities:

- Identify and adopt safe and sustainable practices;
- Identify and revitalize damaged ecosystems; and
- Identify practical and affordable retrofits for the existing structures and infrastructure.

While working through this process, FEMA experts have found certain common barriers and obstacles:

- Lack of awareness of hazard risks and mitigation solutions;
- Mitigation not seen as a community priority;
- Lack of political will to implement solutions;
- Lack of incentives for integrated planning;
- Lack of capacity or resources; and
- Insufficient framework for intergovernmental coordination.

Once a community decides to begin examining current planning process, it must begin looking closely for opportunities to mitigate. Each community usually has numerous exposures to multiple natural disasters whose risks can be reduced with thoughtful planning.

A good resource is the report "Hazard Mitigation: Integrating Best Practices into Planning", which was a joint effort by the American Planning Association and FEMA. It can be found at:

<https://www.planning.org/research/hazards/>

<https://www.fema.gov/media-library/assets/documents/19261>

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Risk assessment, obviously, is the first step in this process — and that is addressed in some detail in an accompanying *Living Mosaic* Module 2.

Currently, some 27,000 communities across the U.S. have adopted FEMA-approved Hazard mitigation plans. However, that leaves the rest of the country's towns, counties, regions and states, most of which do not adequately incorporate mitigation measures into their land use policies and regulatory standards. Hazard Mitigation Planning — a formal process informed by a variety of regulations and recommendations — is the first step in helping local governments prepare for a natural disaster.

Such a plan should be posted on county and local websites and should meet, or preferably exceed, state and federal requirements, as set forth in 44 CFR Parts 201 and 206. (It can be found at: <http://www.gpo.gov/fdsys/granule/CFR-2011-title44-vol1/CFR-2011-title44-vol1-part201>)

A Hazard Mitigation Plan is essential for multiple reasons: First, a hazard mitigation plan should be designed to ensure that development decisions do not make the existing risk and consequences of a foreseeable natural event even worse than it will be based on the current situation. Second, mitigation plans are required in order to be eligible to apply for certain federal grants for recovery reimbursement. Third, without a plan to reduce a community's risk, when the inevitable disaster occurs, damages will likely be far greater than if the local government had taken steps in advance to reduce damage levels.

Every community is different; there is no cookie-cutter plan. That's why elected officials and community leaders have to look at their own unique risks and assets well in advance of a disaster. This is no small undertaking; it costs time and money to assess a community's risks and formulate an effective hazard mitigation plan. Fortunately, there is help available. FEMA's Hazard Mitigation Grant Program funding can help finance a plan, and is usually available through a state's emergency management agency.

The federal law 44 CFR 201 lays out Hazard Mitigation Plan requirements that include:

- A requirement that the plan must include a process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans.
- Effective integration of hazard mitigation occurs when a community's planning framework leads to development patterns that do not increase risks from known hazards, but leads to redevelopment that reduces risk from known hazards.
- The admission that minimum NFIP floodplain regulations do not provide adequate long-term flood risk reduction for communities, and furthermore do not take into account

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future conditions (e.g. sea level rise, changing storm patterns or development in the watershed), do not address all hazards (e.g. coastal erosion), and do not protect against large flood or storm surge events.

- A statement that the benefits of flood risk reduction achieved by higher regulatory standards far outweighs the burden of administering them.
- The concept of “Freeboard” (defined as “a factor of safety usually expressed in feet above a flood level for purposes of floodplain management.”) is the single most effective method for reducing flood risk to a structure in the floodplain. Freeboard tends to compensate for the many unknown factors that could contribute to flood heights greater than the height calculated for a selected size flood and floodway conditions, such as wave action, bridge openings, and the hydrological effect of urbanization of the watershed. Communities are encouraged to adopt at least a one-foot freeboard, which results in significantly lower flood insurance rates due to lower flood risk.
- FEMA now requires that a proper Hazard Mitigation Plan must take into account a climate-informed science approach that uses the best available, actionable data and methods that integrate current and future changes in flooding. FEMA recommends:
 - Using an increased Freeboard value approach — adding an additional 2 feet to the base flood elevation ... or even an additional 3 feet for critical areas;
 - Building to the 500-year (0.2 percent-annual-chance) flood elevation, rather than the traditional 100-year standard;
 - Adding a higher floor elevation requirement that recognizes 1-2 foot freeboard; include http://www.fema.gov/media-library-data/1438356606317-d1d037d75640588f45e2168eb9a190ce/FPM_1-pager_Freeboard_Final_06-19-14.pdf
 - Requiring more restrictive, wider floodways;
 - Mandating that critical facilities be located outside the 500-year floodplain;
 - Prohibiting basements below flood level on filled lots;
 - Elevating parking lots for new, non-single family buildings; and
 - Placing many restrictions on levee construction.

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Good community planning is always supposed to look ahead — years down the road — and try to make sure that today's development does not prove to be tomorrow's headache. If Disaster Mitigation is fully taken into account during this process, there is the potential to save millions upon millions of dollars in future disaster relief.

But planners are also continually under pressure by elected officials, local developers and the business community to accommodate present-day plans. In some areas, this pressure has resulted in widespread "sprawl" that takes no notice of flood plain maps or potential wildfire

"There is now international acknowledgement that efforts to reduce disaster risks must be systematically integrated into policies, plans and programs for sustainable development and poverty reduction.... . Sustainable development, poverty reduction, good governance and disaster risk reduction are mutually supportive objectives and in order to meet the challenges ahead, accelerated efforts must be made."

— Hyogo (Japan) Framework for Action 2005-2015

risks. At its worst, it allows builders to create conditions that can literally mean the loss of human lives.

So planning officials — with the help of Disaster Risk Reduction Ambassadors — must resolutely use worst-case scenarios and the best available information when making decisions in a sometimes hostile environment. It is a tough job, but future generations will benefit.

A Flawed Emphasis on Reaction

As we consider changes in how best to reduce the mounting toll of damage from floods and other hazards, it begins by making better land use planning decisions regarding where development should and should not be allowed. The next step is to provide stronger building codes for buildings located in areas vulnerable to hazards and to require developers to meet more stringent construction standards designed to withstand or minimize damage from identified hazards.

Americans urgently need to do more to properly manage development to avoid foreseeable damage from natural hazards calculated from previous events. This is particularly important when considering the potential for increased damage from projected climate change impacts. Disaster Risk Reduction Ambassadors need to work together to educate policy makers about ways to build safer, more-resilient communities, working in advance of events, rather than responding to them.

"Policymakers need another story than 'We need to prevent a disaster!' The real story of adaptation is that it leads to improving things. It is the poor, not the rich, that are heavily affected by climate change. Developing countries need help to develop in a robust way. And there are a lot of investment opportunities out there."

— Stéphane Hallegatte,
Senior Economist in the Climate Change Group at the World Bank

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In the United States, we need to break down the artificial barriers between different agencies, different disciplines and different funding sources if we are to be able to respond effectively to these coming crises. Floodplain Management, Hazard Mitigation and Climate Adaptation professionals, for example, are groups with a lot in common, but are among those that in the past have often failed to share resources.

2011-OPPA-01 FEMA CLIMATE CHANGE

2011-OPPA-01 FEMA CLIMATE CHANGE ADAPTATION POLICY STATEMENT is to be integrated into our programs and operations. This policy statement identifies seven initial actions we will take to help integrate climate change adaptation considerations into our programs and operations. These actions also align with our vision of a Whole Community approach to emergency management, as it is expected that extensive collaboration with the public, all levels of government, the private sector, non-governmental organizations, and community organizations will be required.

Policy and Procedures

1. To enhance climate research, monitoring, and adaptation capabilities, FEMA will continue to establish partnerships with other agencies and organizations that possess climate science and climate change adaptation expertise. FEMA will continue to develop and maintain partnerships that enable the Agency to monitor the projected effects of climate change, and communicate climate science data and research needs related to emergency management and disaster resilience. FEMA will also collaborate with other Federal agencies, State, Local, Tribal and Territorial (SLTT) partners, intergovernmental organizations, nongovernmental organizations, the private sector, academia, and the international community to share lessons learned and develop best practices regarding climate adaptation.
2. FEMA will continue to study the impacts of climate change on the National Flood Insurance Program (NFIP) and incorporate climate change considerations in the NFIP reform effort. An initial 2-year study concluded that climate change is likely to have significant impacts on the NFIP; Special Flood Hazard Areas are projected to increase significantly across the nation, with impacts mounting over time as the number of policyholders are projected to double by 2100. In order to ensure the program serves the public most effectively, FEMA will continue efforts to understand the potential impacts of climate change on the NFIP and identify areas where future climate conditions can be included as part of the larger reform effort.
3. FEMA will evaluate how climate change considerations can be incorporated into grant investment strategies with specific focus on infrastructure and evaluation methodologies or tools such as benefit/cost analysis. FEMA will evaluate methods for addressing future climate conditions through its grant programs to SLTT entities. FEMA will also study how to introduce long-term climate change

risks into the benefit/cost analysis methods that guide the awarding of grants.

4. FEMA will seek to understand how climate change will impact local communities and engage them in addressing those impacts. FEMA will proactively engage and partner with SLTT communities to gain a greater understanding of their climate change adaptation challenges and activities, and look for ways FEMA can take action to support them in those efforts.
5. FEMA will promote building standards and practices, both within FEMA programs and in general, that consider the future impacts of climate change. FEMA currently promotes programmatic guidance and standards for use by SLTT partners to mitigate hazards through regulation of building and infrastructure construction. The current standards and guidance, based on today's climate, may not anticipate the risks structures will face as the climate changes. Therefore, it is important to review guidance and standards to determine the feasibility of incorporating future climate change considerations, and encourage the integration of adaptation measures into local planning and development practices.
6. Through partnerships with the climate science community, FEMA will evaluate the potential impact climate change may have on existing risk data and the corresponding implications for Threat Hazard Identification Risk Assessment (THIRA) development and operational planning. Changes in the climate will affect the accuracy and practice of using historical records to predict the magnitude, location, and frequency of future hazards—with significant challenges for important analytic processes and decisions. In response, FEMA will continue to work with the climate science and risk analysis community to evaluate the impacts of climate change on the viability of existing risk data.
7. FEMA will continue to pursue a flexible, scalable, well equipped, and well trained workforce that is educated about the potential impacts of climate change. Changes in the frequency and magnitude of severe weather events could potentially strain FEMA resources. FEMA will continue to assess and address its staffing and equipment needs to create a more flexible workforce by increasing employee readiness, cross-training staff, and increasing the pool of employees who are qualified and trained to respond to disasters or other events.

Responsibilities

Roles, responsibilities, and timelines for completing each of the above actions will be set forth in the follow-on FEMA Climate Change Adaptation Implementation Plan.

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Uniting these groups, which have classically operated in different funding, organizational and time frames, can help create synergies to address the problem of natural disasters with renewed vigor.

In the past, local, state and federal government agencies have all too often concentrated on responding to disasters rather than working in advance to minimize their potential impact — focusing on huge outlays of recovery money rather than relatively inexpensive, easily implemented prevention measures.

Grassroots Initiatives Can Be Key

When local communities are in control of determining how local resources are used, the best form of disaster risk reduction is created. A strong and important feedback loop can allow communities to reap the benefits, while careful study of the best practices from other areas can ameliorate unnecessary damages or waste of resources. But it's a sad fact that communities, their leadership and their organizations usually tend to step up only after a large-impact event or a recent history of natural hazard disaster.

This program supports the FEMA goal of facilitating efforts for committed community representatives to engage in the discussion of how damage from disasters can be reduced. This "mosaic" is a compilation of the Disaster Risk Reduction Ambassador Curriculum developed by the Natural Hazard Mitigation Association under a 2015 Cooperative Agreement with the Federal Emergency Management Agency. The two documents (the *Living Mosaic* and the DRR Curriculum) can be used in tandem or as stand-alone documents.

This document provides a guidebook for training Disaster Risk Reduction Ambassadors while also providing a source of information for communities across the country that they can use to take a long, hard look at their vulnerability to a worst-case disaster scenario, identify possible key steps to take in advance of any incident and — in the process — form tighter bonds for stakeholders within their towns or regions. The *Living Mosaic* also provides opportunities for including "green" strategies in planning, as well as in potential economic development strategies.

MODULE 7: Buildings and Infrastructure – Beyond Code

In many ways, the state, county or municipal building code is the cutting edge of hazard mitigation.

Together with long-range planning strategies, the codes that determine each detail of the way in which homes, business buildings, apartments, factories, warehouses and other structures must be built probably have more potential to ameliorate future damage from natural events than any other factor.

For example: When Hurricane Andrew roared ashore at Homestead, Fla. in 1992, its 150+ mph winds destroyed an estimated 63,000 homes, at a cost of \$25 billion in Florida alone. But within that swath of disaster, there were 27 homes in Dade County that stood up to the wind and survived with only minor damage, standing among the debris of their neighborhoods as if protected by some supernatural force.

Investigating this phenomena, state officials discovered the surviving homes had all been built by Habitat for Humanity, whose volunteer workers had carefully followed the most stringent existing hurricane zone building codes, including adding “hurricane straps” to secure the home’s roofs.

Unfortunately, surrounding homes too often had been hurriedly built during a building boom and many did not even conform to the stringent local codes. The difference in up-front cost was minimal, but the results were horrific.

It's not hard to find similar examples. A study done by the Insurance Institute for Business & Home Safety, the University of Florida and a FEMA Mitigation Assessment Team (MAT) <http://www.fema.gov/mitigation-assessment-team-program> following Hurricane Charley, which struck Florida in 2004, found that modern building codes reduced the severity of insurance losses by 42 percent and the number of insured losses by 60 percent.

But not all have learned that lesson. The same study found that although most states with strong building code systems (the code and its enforcement process) have continued to update their codes by examining storm damage and incorporating new materials, a number of states have not only taken no action to improve their code systems, some have weaker systems in place now than in 2012.

South Florida's counties, stung by the post Andrew revelations of weak codes and even weaker enforcement, have moved rapidly to change things. One of the most important additions to codes was the requirement of either missile-impact resisting glass, which can withstand high

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velocity impact from wind-borne debris during a hurricane, or substantive enclosures that protect windows and glass doors. Broken glass provides ingress for wind-driven water.

"Our main goal in the insurance industry is to prevent water from getting into the building," says one risk engineering consultant, noting that once water gets into a structure, the building can lose power and mold can develop within 24 hours.

Another immediate change to building codes after Hurricane Andrew was a reduction in the construction of "stick" frame houses in South Florida, according to Scott Trethewey, executive vice president of Aon Risk Solutions' construction services group, based in Miami.

Most of the houses built in South Florida since Andrew are cinder block masonry construction reinforced with concrete pillars, hurricane-strapped roof trusses, and codes requirements for adhesives and types of roofing.

"In large part, building codes establish a building's quality, safety and energy performance for years to come, because initial design and construction decisions determine operational and maintenance costs for the life of the building. Building equipment and other components may be replaceable and upgradeable, but many aspects of building performance are "designed in" at the beginning, and are too expensive and difficult to change."

— *The Value and Impact of Building Codes*
Ellen Vaughan, Policy Director, Environmental and Energy Study Institute

Jim Turner, *Former Chief Counsel, Committee on Science and Technology, U.S. House of Representatives*

What is the typical cost of these changes? They vary, according to the area in which the home is built, but generally range from an increase in the selling price of the house from 0.5 percent to 6.1 percent.

If impact-resistant glass is used, the estimated increase in selling price ranges from 6.5 percent to 10.1 percent.

But changes in building codes are usually not based merely on a cost-benefit analysis ... and their goals include more than minimizing the effect of a disaster.

They also can affect insurance rates for homeowners, ensure healthy living conditions for all citizens and help protect against catastrophic fires. In earthquake-prone regions, codes try to make sure that all buildings and infrastructure can withstand even severe quakes, and those areas where wildfires are a constant danger, local codes are written with that in mind.

There is a less-obvious advantage to a good building code... lowering building maintenance costs.

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Simple Strapping

In 2014, Bob had just gotten out of the hospital and they were celebrating his birthday at a friend's house when a tornado hit central Arkansas. Racing home, they found their dachshund, Jackie Sue, had ridden the storm out alone as the wind barreled around and through the house.

The wind had pulled kitchen cabinets from the wall, blown out all but two windows and torn bedroom doors off their hinges. Outside, the storm leveled their shed, wrecked two trucks, and did about \$5,000 in damage to the enclosed porch where they often entertained. The siding was stripped off their two-year-old, \$90,000 house and some 90 percent of the roof's shingles were gone.

But the roof itself remained intact, thanks to the hurricane straps bolted onto oversize rafters and to steel rods supporting the walls. Back when they decided to build their home, the couple had turned to a North Carolina builder familiar with storm codes. The cost of adding this extra protection was minimal — it's estimated to be at about \$.50 per square foot or \$1,000 in metal connectors installed in an average 2,000 square foot home.

So while the storm damaged their home, leaving them to sort and sift through the rubble inside, Beverly and Bob say they're grateful to have a roof — and a healthy dog — and they're also looking into a safe room just in case they're home when a future twister strikes.

This module will provide concrete examples of how a code provision can make a significant difference to an individual homeowner.

Coding Strategies

Responding to climate change by adopting new building codes in an era of rapidly changing building technology and increasingly dangerous weather means aiming at a moving target. Again, as in much of hazard mitigation, what's important is adopting a process, rather than trying to find the "perfect" building code and copying it.

The ultimate responsibilities for a community's building code rests with locally elected or appointed officials. But Disaster Risk Reduction Ambassadors must find ways to make sure they are provided with up-to-date information about the latest trends in codes, with risk assessment data for their area, and with best practices from across the country. And it's also important to mobilize public opinion at the grassroots to keep pressure on government not to bow to those business interests that might attempt to influence the process and dilute code practices in the name of economic development.

That was the climate in South Florida after Andrew, and the striking changes in both codes and attitudes toward enforcement owe their existence to recent memories of a major disaster. But other states along the Gulf Coast have resisted efforts at increased protection, despite the clear evidence of its worth. Attempts at adopting more stringent model codes died in committee — victims of legislative apathy or of political pressure.

Nonetheless, as Vaughn and Turner write, "The U.S. code development process is unique in the way it brings together all interested parties to participate and decide what is needed and

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feasible for the construction of new buildings. This cost-conscious, triennial look at what a safe building can be and how it should perform provides savvy builders and building suppliers with critical information on what consumers want and where the market is headed.

"Model codes allow building suppliers to target a national market. Since markets for building materials and technologies are becoming increasingly international, U.S. manufacturers require a strong domestic base in which to develop the new products they need to compete. Regularly upgraded building codes ensure new products and practices make their way into buildings when the time is right and the practices are no longer experimental. The code development process assesses the technology landscape and consumer demand, and creates a model code that can apply innovations gradually across the building sector, reducing the risk for individual builders and contractors.

"The process of updating model codes every three years is optimal to ensure that new technologies, materials and methods, as well as better approaches to health and safety, can be incorporated into the next generation of buildings with sufficient time for proof of performance. Regular, incremental improvements help us continue to build better, and smarter, buildings as cost effectively as possible."

So the trick for Disaster Risk Reduction Ambassadors is to make sure their local jurisdictions have bought into the three-year cycle, and are using the improved model codes that are best suited for their peculiar local hazards, climate, social situation, and economy.

In addition, local citizens must be made aware of the dangers to their own situation if government fails to adhere to this standard — keeping pressure on their elected representatives and monitoring news media for threats to the smooth adoption of updated codes designed to protect human life, as current codes are designed to do, as well as to ensure operability of critical components of the community's economy as well as to achieve reduction in economic losses from foreseeable natural events.

For more information on hazard mitigation building codes, go to <http://www.fema.gov> ; especially: <http://www.fema.gov/building-code-resources>

MODULE 8: Flooding Events & Storm Surges

Water rising from overflowing rivers and streams, driven by wind into structures, forced by hurricanes into storm surges that ravage coastal communities, is the single biggest destructive force of natural disasters:

- From 2010 to 2014, the average flood claim amounted to nearly \$42,000.
- From 2005 to 2014, total flood insurance claims averaged more than \$3.5 billion per year.

The same relentless natural phenomenon that shapes the land over geological time periods can — when blocked by man-made structures — exert unbelievable force and make a mockery of our attempts to “tame” its nature. Although wind, fire and earthquake shock contribute to the roster of natural disasters the U.S. must face each year, it is water and its capacity to damage or destroy the nation’s homes and infrastructure that preoccupies FEMA and other disaster agencies.

Water, Water Everywhere

It's not difficult to find examples of the damage water can do to humankind's works. Practically every week, the news media carries stories of rivers jumping their banks, overwhelmed storm drainage systems and fast-spreading floods that ravage communities even as citizens attempt to build sandbag levees to stem their advance.

When hurricanes strike land, driving storm surges before their howling winds,

Pleasures of Coastal Living

Take the story of Patricia Wojcik, of Bay Head N.J. Wojcik is one of tens of thousands of people who love the Jersey Shore and relish living close to the Atlantic Ocean. Her home sits less than 80 feet from a saltwater lake that connects to Barnegat Bay a short distance from the ocean ... typical of homes on the narrow barrier island that runs for miles, connected at regular intervals by bridges to the mainland.

When she built her home in 1997, Wojcik decided to elevate her living space two feet higher than Bay Head's floodplain ordinance required — she knew that storms had flooded the town in the past. “*I wanted to be prepared*,” Wojcik said, explaining why she paid the extra cost of giving her home 2 feet of extra freeboard. “*I knew more big storms would come and there would be flooding.*” She was right.

On Oct. 29, 2012, Hurricane Sandy slammed ashore in New Jersey and New York, causing widespread catastrophic flooding, billions of dollars in damages, and 38 deaths in her state. Sandy's storm surge brought high waves that destroyed miles of boardwalk, flooded thousands of homes and left longstanding floodwaters, but the interior of Wojcik's home was left dry and undamaged.

Bay Head, noted for its large Victorian-era beachfront homes and other historic structures, suffered an estimated \$200 million in damages in a town of less than 1,000 residents. Wojcik's home had almost four feet of water in her home's crawlspace and garage, but she had moved her furnace and hot water heater onto a platform in the garage, and they were undamaged. Wojcik's flood insurance paid for repairs caused by flooding to her crawlspace and garage, which were minimum flood repairs compared to her neighbors, many of whom were severely impacted.

Wojcik, who has lived in the town for 46 years, says she and her family have long enjoyed the beautiful beaches and special charm of Bay Head. “It's wonderful living here,” she said. And her elevated home reduces her flood risk and flood concerns and lets her focus on the pleasures of coastal living.

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coastal communities are damaged and destroyed. New inlets form on barrier islands, engulfing homes and businesses. But there are also success stories ... tales of proactive mitigation measures taken in advance of an event that make a positive difference in the amount and nature of the damage.

"You know, they straightened out the Mississippi River in places, to make room for houses and livable acreage. Occasionally the river floods these places. "Floods" is the word they use, but in fact it is not flooding; it is remembering. Remembering where it used to be. All water has a perfect memory and is forever trying to get back to where it was."

-Toni Morrison, American novelist, editor, and professor

Strategies

Perhaps because of the continual stream of stories about flooding, there is an increased public awareness about its dangers — but there also may be a larger sense of their inevitability.

Hazard mitigation experts, however, know that there are many ways to lessen the likelihood of flooding or of storm surge catastrophes, as well as of ameliorating their impact. Local authorities have a wide range of options at their disposal from relocating communities, to limiting development in flood plains, to raising freeboard requirements, to improving storm drainage systems. While it's true that some flood control programs have in the past actually contributed to the damage in unusually severe events, the vast majority of today's efforts are based on advanced engineering through the use of hydrological computer models.

It is the job of Disaster Risk Reduction Ambassadors to offer resource guides and best practices nationwide and point to innovative measures that might be applicable in their area. They should try to make sure that local citizens keep up the pressure on elected officials to adhere to the three-year building code adjustment model and to resist any efforts to reduce requirements.

Flood Map Improvements

FEMA has embarked on a multi-year effort to update and transform flood maps into more reliable, easy-to-use, and readily available digital products. This effort is now called Risk MAP (Mapping, Assessment, and Planning). The mission for Risk MAP is to deliver quality data that increases public awareness and leads to action that reduces risk to life and property. The program builds on current FEMA flood hazard data and maps and aims to enable communities and citizens across the country to more efficiently obtain flood hazard data, learn their flood risk, and make informed decisions about development, floodplain management and mitigation projects that will potentially limit damages in future flooding events.

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There are five goals to the program:

- Address gaps in flood hazard data to form a solid foundation for flood risk assessments, floodplain management, and actuarial soundness of the National Flood Insurance Program;
- Ensure that a measurable increase of the public's awareness and understanding of risk management results in a measurable reduction of current and future vulnerability to flooding;
- Lead and support state, local, and tribal communities to effectively engage in risk-based mitigation planning resulting in sustainable actions that reduce or eliminate risks to life and property from natural hazards;
- Provide an enhanced digital platform that improves management of limited resources, stewards information produced, and improves communication and sharing of risk data and related products to all levels of government and the public; and
- Align risk analysis programs and develop synergies to enhance decision-making capabilities through effective risk communication and management.

Properties located in Special Flood Hazard Areas (SFHA) – areas along the coast, along rivers, and in other low-lying areas and floodplains – are at the highest risk for flooding, but everyone is at some risk. Current flood maps can be viewed on the FEMA Map Service Center website at <http://msc.fema.gov>

A Wide Selection of Aid

Below is a list of programs that can help:

The National Flood Insurance Program (NFIP) enables homeowners, business-owners, renters, and governments to purchase flood insurance coverage for financial protection of buildings and contents damaged by floods, mudslides or flood-related erosion. The program reduces federal disaster expenses and requires wise floodplain management practices. Premium rates are generally lower than actuarial, risk based rates.

What is Covered by Flood Insurance – and What is Not

“One who knows the Mississippi, will promptly offer ... that ten thousand River Commissions, with the mines of the world at their back, cannot tame that lawless stream, cannot curb it or confine it, cannot say to it, ‘Go here,’ or ‘Go there,’ and make it obey; cannot save a shore which it has sentenced; cannot bar its path with an obstruction which it will not tear down, dance over, and laugh at.”

-Mark Twain (Samuel Clemens) American author, humorist & former river pilot

Generally, physical damage to your building or personal property “directly” caused by a flood² is covered by your flood insurance policy. For example, damages caused by a sewer backup are covered if the backup is a direct result of flooding. However, if the backup is caused by some other problem, the damages are not covered.

For general guidance on items covered and not covered by flood insurance see:

<http://www.fema.gov/national-flood-insurance-program> and refer to your policy for the complete list.

Most NFIP issued flood insurance policies include *Increased Cost of Compliance* coverage. Private market policies may well not have such coverage. This coverage can provide up to \$30,000 of the cost to elevate, demolish, or relocate a home. If a community declares a home “substantially damaged” or “repetitively damaged” by a flood, it may require bringing the home

-
- ² Flood--
 - A general and temporary condition of partial or complete inundation of 2 or more acres of normally dry land area, or of 2 or more properties (at least 1 of which is the policyholder's property) from:
 - Overflow of inland or tidal waters; or
 - Unusual and rapid accumulation or runoff of surface waters from any source; or
 - Mudflow; or
 - Collapse or subsidence of land along the shore of a lake or similar body of water as a result of erosion or undermining caused by waves or currents of water exceeding anticipated cyclical levels that result in a flood as defined above.

<http://www.fema.gov/national-flood-insurance-program>

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up to current community standards. The total amount of a building claim and an Increased Cost of Compliance claim cannot exceed the maximum limit for building property coverage (\$250,000 for a single-family home).

It is important for homeowners to understand the plan before buying a building or canceling, purchasing, or renewing flood insurance policies. It is also critical that those who are constructing new buildings, or repairing and rebuilding structures after storms, understand these changes so they can make sound and informed decisions about whether or not they want to place additional resources in harm's way — and so they can understand the financial implications of doing so. These include not only questions of rebuilding destroyed homes, but also of repairing them. For example, if a homeowner in a flood zone wishes to replace a damaged water-heater in their basement, should they consider moving it upstairs?

For guidance on recovering after a disaster, see: <http://recovery.stormsmart.org/>

Community Rating System (CRS)

The National Flood Insurance Program's **Community Rating System** is a voluntary program that recognizes and encourages community floodplain management activities that exceed the minimum requirements. When communities decide to practice enhanced mitigation, flood insurance premium rates for the area can be discounted to reflect the reduced flood risk.

- The system has three goals:
- Reducing flood damage to insurable property;
- Strengthening and supporting the insurance aspects of the National Flood Insurance Program;
- Encouraging a comprehensive approach to floodplain management.

A brochure, “*NFIP CRS: The Local Official’s Guide to Saving Lives, Preventing Property Damage and Reducing the Cost of Flood Insurance*,” explains the options. A copy can be obtained at:

<http://www.fema.gov/media-library/assets/documents/16104>

Disaster Risk Reduction Ambassadors are strongly encouraged to promote participation in the Community Rating System as a means for improving community resilience. Participation in CRS allows jurisdictions to take control of efforts to vastly reduce the risk presented by flooding. Encouraging active participation in CRS can give Disaster Risk Reduction Ambassadors the vehicle to generate community support for all disaster resilient effort because people that have

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flood insurance directly benefit from their community's participation. In addition, the CRS program provides an array of measures on which to improve disaster resilience.

US Department of Agriculture/Natural Resources Conservation Service (NRCS)

implements the Emergency Watershed Protection Program. This program provides financial and technical assistance to: 1) safeguard lives and properties, and 2) eliminate or reduce hazards created by natural disasters that suddenly impair a watershed. Technical assistance also includes engineering and design for soil and water conservation structures. Eligible applicants include state agencies, counties, municipalities, towns or townships, soil and water conservation districts, or any other organization with authority to acquire land rights and operate and maintain measures installed.

FEMA's Hazard Mitigation Grant Program (HMGP) provides grants to states, local governments, and Indian tribes for long-term hazard mitigation projects after a major disaster declaration. The purpose of the program is to reduce the loss of life and property in future disasters by funding mitigation measures during the recovery phase of a natural disaster.

Funds can be used to make improvements to both public and private property. To be eligible, a project must provide a long-term solution to a specific risk. Examples include:

Elevating flood-prone homes or businesses: The structure is rebuilt with a higher first floor. The crawl space is equipped with adequate vents per FEMA regulations. This allows floodwater to flow under the house rather than through it. Businesses have the option to flood-proof the area below the finished floor, however, the structure must be engineered to withstand hydraulic and hydrostatic forces.

Acquisition and demolition of flood-prone structures: The owner receives a check for the sale, and the local government becomes the new owner of the property, which must be maintained as open space in perpetuity.

Relocation of flood-prone structures to areas outside of the Special Flood Hazard Area if the structure can be safely moved. The owner receives support to acquire the new lot, build the necessary foundation, unhook utilities, transport the structure, and reconnect utilities. The abandoned property is deeded as perpetual open space owned and maintained by the sponsoring local government.

Retrofitting buildings to minimize damage from high winds, flooding, earthquakes, and other hazards, by strengthening existing buildings, construction of safe rooms, and even constructing new separate shelters. FEMA and other organizations have worked to develop model code requirements and building guides to aid in the process.

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Although funding for the program is federal, it is administered by the states. It is funded through allocation of 15 percent of eligible federal disaster recovery expenditures obligated within 12 months of the presidential disaster declaration to states with current approved standard Hazard Mitigation Plans.

States with enhanced approved hazard mitigation plans receive 20 percent. There are funding caps for extreme, catastrophic disasters. Immediately following the disaster, FEMA and the state mitigation program establish mitigation priorities for the state to implement projects, as well as support other innovative mitigation efforts to support community recovery. This is set forth in a disaster-specific mitigation strategy that details program priorities, application procedures, and timelines.

Local jurisdictions can select projects that could reduce property vulnerability. The local government or sponsoring jurisdiction should use its approved hazard mitigation plan goals and strategies to guide projects. If the community does not have an approved plan, the FEMA Regional Coordinator can allow a plan to be developed at the same time as the development of an application, as long as the plan is developed, approved, and adopted within one year of the declaration date.

FEMA will pay up to 75 percent of the project cost. Either the state, local government applicants or individual property owners must provide the remaining 25 percent match. In-kind services and materials can qualify, as can other sources of funding in certain cases, such as Community Development Block Grants through the Department of Housing and Urban Development.

Using in-kind services can make it much easier for a community to undertake mitigation projects. These can include staff time and the use of equipment already owned by the jurisdiction.

For more information, go to:

<http://www.fema.gov/hazard-mitigation-grant-program>

FEMA's Flood Mitigation Assistance Program

Provides funding to states and communities for measures that reduce or eliminate the *long-term risk* of flood damage to buildings, manufactured homes, and other structures that are insurable under the National Flood Insurance Program. The assistance program provides grants for mitigation planning, projects and technical assistance, with a goal of reducing claims under the Flood Insurance Program.

A priority of the assistance program is to fund flood mitigation activities that reduce the number of repetitive loss structures — those that have sustained two or more losses, each exceeding \$1,000, within a ten-year period — paid for by the flood insurance program.

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The FEMA Pre-Disaster Mitigation Program

Provides funds to states, territories, Indian tribal governments, communities, and universities, for hazard mitigation planning and the implementation of structural mitigation projects prior to a disaster event. Funding these plans and projects should reduce overall risk to the population and structures, while also reducing reliance on funding from actual disaster declarations. Grants are awarded on a nationally competitive basis with \$550,000 allotted to each state and territory that submits eligible projects. Funding is dependent upon Congress annually funding the program.

The states serve as program administrators and those with at least 70 recognized properties receive an annual allocation based on the number of severe repetitive loss properties in their state. A local match of 25 percent is required unless the state plan has been amended to address severe repetitive loss properties. States with a FEMA approved plan amendment receive a 90 percent federal match with 10 percent state or local match required.

The Flood Map Improvement Plan

FEMA has embarked on a multi-year effort to update and transform flood maps into more reliable, easy-to-use, and readily available digital products. This effort is now called Risk MAP (Mapping, Assessment, and Planning). The idea is to deliver quality data that increases public awareness and leads to action that reduces risk to life and property. Risk MAP builds on flood hazard data and maps produced during FEMA's Flood Map Modernization program, and aims to enable communities and citizens across the country to more efficiently obtain flood hazard data, learn their flood risk, and make informed decisions about development, floodplain management, and mitigation projects that will potentially limit damages in future flooding events.

For more information, go to: <https://msc.fema.gov/portal>.

Current flood maps can be viewed on the FEMA Map Service Center website at:
<http://msc.fema.gov>.

Teaming Floodplain Management, Hazard Mitigation and Climate Adaptation

Another way of leveraging programs and resources to promote hazard mitigation and resilience is by unifying the work of floodplain managers, hazard mitigation professionals and climate adaptation professionals. These groups have a lot in common, but institutional differences have hampered close cooperation. Until recently most hazard mitigation efforts have been based upon past events, while adaptation work is typically informed by future projections. For their part, floodplain managers have focused primarily upon flood hazards only. Uniting these groups can help create synergies.

Many state and regional governments, realizing this problem, are beginning to unify floodplain management, hazard mitigation and climate adaptation plans.

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Rain Gardens as a Storm Water Management Strategy

Rain gardens are a means of reducing storm water runoff and can be a component of a broader storm water management strategy incorporating low impact development. Not only do they aesthetically add to the landscape, but they also encourage ground infiltration of storm water, reducing the flow of pollutants to water sources via run off. Incentive programs are available to homeowners through many local/state organizations and/or foundations.

Examples of successful rain garden programs can be found below:

<http://www.12000raingardens.org/about-rain-gardens/>

- Watershed Management-Water Quality Improvement Program: Holmes Lake Watershed:
<http://www.lincoln.ne.gov/city/pworks/watrshead/educate/holmes/index.htm>
- City of Lincoln - Residents Can Apply for Rain Garden Grants:
<http://www.lincoln.ne.gov/city/mayor/media/2010/092310.htm>

Sources of funding for rain gardens include:

- EPA-Clean Water and Drinking Water State Revolving Funds:
http://water.epa.gov/grants_funding/eparecovery/
- EPA-Clean Water State Revolving Fund:
http://water.epa.gov/grants_funding/cwsrf/cwsrf_index.cfm

US Army Corps of Engineers Silver Jackets Program

The Corps of Engineers' "Silver Jackets Program" is an attempt to apply a more collective and long term approach to link lessons learned from a major disaster, and apply them to comprehensive solutions. With this program, the Corps, FEMA and other federal agencies create an interagency team at the state level to develop and implement solutions to state natural hazard priorities. The program's primary goals are to leverage information and resources, improve public risk communication through a united effort, and create a continuous mechanism to collaboratively solve issues and implement initiatives.

Active Silver Jackets teams now serve fifteen states, and discussions are ongoing to develop teams for an additional twenty-eight states. The ultimate goal is to offer a team to every state, but the intent is not to duplicate or take over similar efforts that may already exist within a state. This program supports existing efforts, strengthens partnerships that need improvement, and helps establish relationships where they do not exist. Current teams have succeeded not only

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in improving communication, but also in leveraging resources and programs between agencies. These teams also serve as an interagency technical resource to the state and local communities to develop strategies for long-term sustainability.

For more information on the Silver Jackets Program, see: www.nfrmp.us/state/.

US Army Corps of Engineers Floodplain Management Services Program

The objective of the Floodplain Management Services Program is to foster public understanding for dealing with flood hazards and to promote prudent use and management of the Nation's floodplains. Upon request, and without charge if funding is available, the Corps of Engineers will furnish to states, counties, and local communities, floodplain information and technical assistance needed in any aspect of floodplain management planning. Typical studies may include comprehensive floodplain management plans, flood warning/preparedness, or flood hazard evaluations. Under the Planning Assistance to State Program, the Corps can provide assistance to states, local governments, and other non-federal entities in the preparation of a wide variety of comprehensive studies to address water resources issues. These studies can include flood damage reduction studies or other related studies. Studies under this program are cost shared on a 50 percent federal and 50 percent non-federal basis.

MODULE 9: Fires and Wildfires

Horrific images of wildfires, particularly in the nation's West, raging on the skyline as traumatized homeowners grab a few possessions and run for their lives are all too familiar. Wildfires (a term applied to any unwanted, unplanned, damaging fire burning in forest or grasslands) are on the increase — according to the U.S. Forest Service — because of:

- Past fire suppression policies which allowed for the accumulation of fuel in the form of fallen leaves, branches, and excessive plant overgrowth in forest and wildland areas;
- Increasingly prolonged dry, hot weather;
- Changing weather patterns across the US; and
- Increased residential development in the wildland/urban interface.

Agriculture Secretary Tom Vilsack has warned that, for the first time in the agency's history, more than half of the Forest Service's annual appropriated budget is devoted to fighting wildfires — up from 16 percent in 1995. "Wildfire firefighting costs are rising at an alarming rate, and this trend is only expected to increase," said Cecilia Clavet of The Nature Conservancy. "We need to make sure these increasing fire suppression costs do not continue to eat up other, critical programs. The U.S. Forest Service could be decimated in the near future if nothing is done now to budget for the increasing ten-year average." "The ten-year average went up \$115 million in just one year, which means next year appropriators will have to find another area in the budget to fund suppression," she continued. "That \$115 million translates to a whole lot of forest management, from acres of wildlife habitat restored and miles of roads managed to creating safer forests and maintaining recreation areas. Those things will just stop happening if the money isn't there."

According to the National Wildlife Foundation, the frequency of large wildfires and the total area burned have been steadily increasing in the Western United States, with global warming being a major contributing factor. Experts believe that longer fire seasons will result as spring runoff occurs earlier, summer heat builds up more quickly, and warm conditions extend further into fall. Western forests are typically becoming combustible within a month of the end of snowmelt and snowpack is now melting 1 to 4 weeks earlier than it did 50 years ago. Summertime temperatures in western North America are projected to be 3.6 to 9 degrees Fahrenheit higher by mid-century, enhancing evaporation rates, while precipitation is expected to decrease by up to 15 percent. These drier conditions will be acute in the Southwest. To illustrate, warmer and drier conditions are conducive to widespread beetle and other insect infestations, resulting in broad ranges of dead and highly combustible trees. Higher temperatures enhance winter survival of mountain pine beetles and allow for a more rapid lifecycle. At the same time,

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moderate drought conditions for a year or longer can weaken trees, allowing bark beetles to overcome the trees' defense mechanisms more easily.

The anticipated increased frequency of lightning is expected as thunderstorms become more severe. In the western United States, a 1.8 degree Fahrenheit increase in temperature is expected to lead to a 6 percent increase in lightning. This means that lightning in the region could increase by 12 to 30 percent by mid-century. Scientists at the American Geophysical Union note that the number of wildfires over 1,000 acres in size — in the region stretching from Nebraska to California — increased by a rate of seven fires a year from 1984 to 2011. The total area these fires burned increased at a rate of nearly 90,000 acres a year — an area the size of Las Vegas. Individually, the largest wildfires grew at a rate of 350 acres a year, their research says. Over the last two decades, from 1993 to 2012, fires, including wildfires, accounted for 1.7 percent of insured catastrophes' losses, totaling about \$6.5 billion, according to insurance industry experts.

There are measures that can help reduce wildfires and provide greater safety to homes located in wildfire prone areas. The state of Oregon through their state land use program requires counties with forest zoning to adopt regulations that impose wildfire safety as part of the building permit process. Oregon is one of the Western states that has encountered severe wildfires throughout its history. As more people choose to live in remote, rural areas, the chances that home owners will experience wildfires has increased. Oregon's Land Conservation and Development Commission, the overseers of the state land use program, adopted administrative rules after hearing testimony from the Oregon Department of Forestry regarding modification of wildfire fighting strategies when homes exist within forested areas.

Fires in and around homes require extensive manpower and resources, often to save "insured" structures. Firefighters cannot use strategies, such as pre-burning lands to reduce fuel loads in order to diminish or eliminate fuels that prevent fire expansion, if homes are present. This strategy can save trees (which are not insured) and reduce losses for forest land owners. This strategy usually cannot be employed to save homes. When homes exist in and among forest lands, responders to wildfires have no choice but to protect homes first, regardless of the potential losses to timber land, habitat and the overall economic values present despite the fact that home owners' insurance policies may cover the damage to homes consumed by fire.

Fighting wildfires when homes exist often puts firefighters at greater risk. Firefighters may encounter homes that have explosive fuels, such as gasoline, or toxic chemicals which present additional dangers while fighting fires. Also fighting fires within wooded subdivisions, particularly those where wildfire precautions do not exist, add greater uncertainty to firefighting strategies. Firefighters may find homes located on long, dead end streets used for both ingress and egress. Homes on dead-end streets put home owners and firefighters at great risk of being trapped by wildfires.

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Also, firefighters may encounter homes on streets that are unsafe for fire-fighting vehicles or equipment. Roads need to be: wide enough, able to carry heavy vehicles; not too steep or built with enough space and surface to allow fire trucks to turn around.

Fire safety pre-cautions incorporated into land use regulations will reduce risks from wildfire for both home owners and firefighters. The Douglas County, Oregon Planning Department (http://www.co.douglas.or.us/planning/Plan_docs/LUDO/Ch3_6.pdf) and (<http://www.co.douglas.or.us/planning/>) and the Lane County, Oregon's Land Management Division (<http://www.laneounty.org/Departments/PW/LMD/LandUse/Pages/default.aspx>) provide examples of wildfire planning and zoning requirements designed to instill wildfire safety within the forest environment.

Lightning

Lightning strikes the ground in the U.S. an estimated 25 million times every year, carrying between 100 million and 1 billion volts, and billions of watts of energy. A single lightning strike can heat the air around it to between 18,000 and 60,000 degrees Fahrenheit, according to the National Severe Storms Laboratory. This awesome force of nature can be very beautiful, but it's also deadly and destructive.

In addition to industrial and household fires, lightning causes 15 percent of wildfires but is responsible for 60 percent of the acres of territory burned by them, according to the journal Science. To make matters worse, a recent study by ClimateCentral.org warns that for every degree Celsius increase in global warming there could be a 12 percent rise in the number of lightning strikes. This could amount to a staggering 50 percent increase by the end of the century.

After Fires, Come Floods and Landslides!

In the aftermath of the 2014 Carlton Complex Fire, the largest wildfire in Washington state history, state and local forest and emergency management experts knew that another threat would arrive with the next rainstorm — even if that rain promised relief from the wildfire season. The newly burned landscape had little or no vegetation left to soak up rainwater or hold existing soils together, creating a severe risk of flash floods, mudslides, debris flows, and other erosion. This danger — too often ignored by those intent on recovering from a recent fire — can persist for many years.

In Washington, the U.S. Forest Service promptly deployed its Burn Area Emergency Response team to measure soil quality, assess watershed changes, identify downstream risks, and develop recommendations on how to treat burned federal lands. Non-federal forests and properties would require a separate, yet integrated approach. These experts knew that state, county and private roads, infrastructure, and all downstream communities and property were in peril.

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With that critical need to collaborate across multiple jurisdictions and take coordinated and collective action in mind, FEMA and the state formed an Erosion Threat Assessment Reduction Team, which was tasked with working with the Forest Service team to address post-fire threats to vast areas of burned state, tribal and private lands. Biologists, engineers, hydrologists, mapping experts, range specialists, soil scientists and support staff from more than 17 entities were trained by the Forest Service and worked together to provide detailed assessments of changes in the landscape, identify risks, and develop recommendations for action across the entire burned area.

Local partners such as the Okanogan (County) Conservation District proved to be vital to the success of the mission, providing up-to-the-minute information on road conditions, knowledge about seed mixtures that work best for the area, etc. A wide variety of erosion control treatments were evaluated, including seeding and other ground treatments, debris racks, ditch protection, temporary berms, low water crossings, sediment retention basins, and other measures.

Other recommendations included better early flood warning systems, more warning signs on county roads, and electronic message signs to aid residents evacuating via highways. Even a short period of moderate rainfall on burned areas can lead to destructive and life-threatening flash floods, so the teams made a joint effort to quickly install 15 real-time portable rain gauges to monitor rainfall in and around the Carlton Complex Fire burn area. In the future, as conditions warrant, the National Weather Service will issue advisory outlooks, watches and warnings to the public and emergency management personnel through its Advanced Weather Information Processing System.

To pay for all this work, such as erosion control, the teams looked at FEMA's Public Assistance Grant program — available since there had been a federal disaster declaration issued.

For more information, see:

<http://centralwashingtonfirerecovery.info/>

<http://www.okanogancd.org/Carlton/>

or

http://landslides.usgs.gov/hazards/postfire_debrisflow/

What can be done?

Fire Adapted Communities use tools, supported by federal and state agencies, to prepare homes, neighborhoods, businesses, infrastructure, natural areas, and surrounding landscape

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for wildfire. At a minimum, the community's fire adapted actions should include the following plans and programs:

- A Community Wildfire Protection Plan
- Participation in FireWise
- Participation in Ready, Set, Go!

Ready, Set, Go!

This program seeks to develop and improve the dialogue between fire departments and the residents they serve. Engaging in this dialogue is particularly important for the fire service, because national studies have shown that firefighters are uniquely respected in their communities and can project a trusted voice to the public preparedness appeal. They can also explain what fire resources are available during an event and the role that individuals can play in preparedness and early evacuation — if called for by their local officials — to increase the safety of residents and responding firefighters to a wildland fire. There is further information at: www.wildlandfirersg.org/

Fire Adapted Communities Learning Network

The Network supports hub organizations and pilot communities across the United States that have committed to implementing, assessing and sharing the work that they are doing to increase their communities' resilience to wildfire. The Network is managed by the Watershed Research and Training Center and The Nature Conservancy. Fire Adapted Communities Learning Network: facnetwork.org. There is further information at: www.fireadapted.org or the Forest Service website: http://www.fs.fed.us/fire/prev_ed/

Firewise Communities

One approach for homeowners is the National Firewise Communities Program, a multi-agency effort designed to reach beyond the fire service by involving homeowners, community leaders, planners, developers, and others in the effort to protect people, property, and natural resources from the risk of wildland fires — before a fire starts. The Firewise Communities approach emphasizes community responsibility for planning in the design of a safe community as well as effective emergency response, and individual responsibility for safer home construction and design, landscaping, and maintenance. The program is intended to serve as a resource for agencies, tribes, organizations, fire departments, and communities across the U.S. who are working toward a common goal: Reduce loss of lives, property, and resources to wildfires by building and maintaining communities in a way that is compatible with our natural surroundings.

The program adapts especially well to small communities, developments and residential associations of all types. It offers a simple, three-pronged template that is easily adapted to different locales. It works in the following way:

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- Wildfire staffs from federal, state or local agencies provide a community with information about coexisting with wildfire along with mitigation information tailored to that specific area.
- The community assesses its risk and creates its own network of cooperating homeowners, agencies and organizations.
- The community identifies and implements local solutions.

There is further information at: www.firewise.org/usa

Douglas County, Oregon Wildfire Plans

http://www.co.douglas.or.us/planning/Wildfire_plans/default.asp

Douglas County, Oregon Wildfire Plan for North County

http://www.co.douglas.or.us/planning/Wildfire_plans/pdfs/AppendixD.pdf

Lane County, Oregon – Fuel Free Break

http://www.lanecounty.org/Departments/PW/LMD/LandUse/Documents/Handouts/Firebreak_Handout.pdf

Lane County, Oregon – Firebreak Photo Review

http://www.lanecounty.org/Departments/PW/LMD/LandUse/Documents/Handouts/Firebreak_Photo_Review.pdf

Lane County, Oregon – Fire Safety Standards for Roads

http://www.lanecounty.org/Departments/PW/LMD/LandUse/Documents/Handouts/Fire_Safety_Standards_Roads.pdf

Spokane – Best Practice Reducing Wildland/Urban Interface Risk

http://www.fema.gov/media-library-data/1456275993937-ba2f322d8fe69d75fc8e467d264a1627/Washington_Fire_Adapted_Communities_Learning_Network_BP.pdf

Insurance Institute for Business & Home Safety (IBHS)

<http://disastersafety.org>

MODULE 10: Tornadoes, Hurricanes & High Wind Events

Despite the consistent problem of flooding, hurricanes and tornadoes continue to occupy the public's imagination as archetypical natural disasters. Howling winds strong enough to move buildings off their foundation or rip roofs off not only provide spectacular images but are fickle and unpredictable.

"It sounded like a freight train, bearing down on us."

Battered and bewildered tornado survivors often use that phrase as they attempt to tell reporters what it was like to huddle in a corner or under a table while a twister ripped their home apart.

Some experts believe that global warming and climate change have—or will in the future—result in more frequent tornadoes and hurricanes, and that they will become even more dangerous.

Recent research, using sophisticated computer modeling, supports some, but not all of those predictions.

Daniel McCarthy and Joseph Schaefer of NOAA's Storm Prediction Center in Norman, Oklahoma, did a survey of reports on this issue and found that although the number of reported tornadoes has increased over the past 30 years, most of that increase is due to better reporting — and that there is considerable slippage in the statistics.

One study, for example, showed that only about half of all tornadoes are reported, and that half of those that were reported were really not tornadoes. One fact that seems to confirm this is that there were significant increases in tornado occurrence during two periods in the last 33 years — one in the early 1980s when the National Weather Service's warning verification system came into being, and the other in 1990 when the highly sophisticated WSR-88D weather radar sites became operational. Although there have been several "super outbreaks" in recent years, a close look at the numbers indicates that neither the number nor the severity of tornadoes has increased.

As for hurricanes, a survey by NOAA's Geophysical Fluid Dynamics Laboratory concludes that it is premature to conclude that human activities — and particularly greenhouse gas emissions that cause global warming — have had a detectable impact on Atlantic hurricane activity.

The study does predict, however, that by the end of the 21st century, we are likely to see hurricanes becoming more intense on average (by 2 to 11 percent according to model projections). This change would imply an even larger percentage increase in the destructive potential per storm, assuming no reduction in storm size. In addition, the experts believe that

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there are better than even odds that human activity engendered warming over the next century will lead to an increase in the numbers of very intense hurricanes in some basins — an increase that would be substantially larger in percentage terms than the 2-11 percent increase in the average storm intensity. Finally, anthropogenic warming will likely cause hurricanes to have substantially higher rainfall rates than present-day hurricanes, with a model-projected increase of about 20 percent for rainfall rates averaged within about 100 km of the storm center.

More rainfall, coupled with higher sea levels, means floods will assume an even greater level of threat to human life, structures and infrastructure.

Safe Rooms Save Lives

As we've seen in other modules, it's not difficult to find stories involving real people who've followed hazard mitigation advice and benefited when a natural disaster occurred.

Take Keith, Deborah, and Matthew Crumbley of Cullman, Alabama, who obtained funding for a safe room back in 2004. Seven years later, an EF5 tornado shattered their rural community, causing mass destruction and killing the Crumbley's next door neighbor. As the tornado raged over their community, Deborah, her son Matthew, both of her parents, and her cats were safely tucked inside their above-ground safe room. "Matthew and I had been in the shelter earlier that morning," recalled Deborah later.

"We kept hearing the weatherman say, 'It's going to be bad. It's going to be bad.' So we got in.

"Around lunch time, my parents came over ..." Nothing happened, so after a while, Deborah said, they began to think about leaving the shelter. But by the time she started to say something, "I felt the pressure," said Matthew. "My ears popped and I thought I'd seriously gone deaf. Then something started hitting against the front of the shelter. This was followed by 2 to 3 minutes of calmness. Then things were hitting against the back of the shelter."

"While we were in the eye of the storm," said Deborah, "we could hear everything hitting the shelter. It sounded like a train Then we heard one final loud bang. We knew, before we opened the door, that the garage was gone. We had no idea when we came out that the entire house was gone!"

Meanwhile, Deborah's husband, Keith, had ridden out the storm in a shelter at work. After the storm, he raced home. As he approached the area, "I couldn't see my house or the safe room. So I jumped out of my truck and started running. I just knew everyone was dead. Then I heard Debbie say, 'Here I am.'

"That's about the sweetest sound you could hear when you think somebody's gone."

As grant recipients, we had to go through a process," explained Deborah. "We had to choose a contractor from a list. Then, we had to make certain that the safe room was certified."

The total cost of the safe room was \$4,800; however, the Crumbley's were reimbursed 75 percent of the cost through FEMA's Hazard Mitigation Grant Program.

As the massive tornado passed directly over their home, however, the safe room became priceless.

What Can Be Done?

We have seen, in other modules, how a code-ordered set of hurricane straps and rafter-to-plate tie rods can keep a home together, even in the face of 100+ mph hurricane winds.

Sturdy storm shutters and a few other simple features such as break-away eaves and carefully following building codes when nailing roofs can help save homes from high wind events. They can stop wind-blown projectiles, keep broken windows from allowing storm-driven water to enter and prevent walls from buckling under the force of gale-force winds. Even storing pre-cut plywood window coverings, designed to be screwed on before a storm arrives, can do the job.

But what about the 250 mph winds of an EF-5 tornado? Can any normal home building approach resist that force? Yes, but only concrete walls with steel reinforcing can be expected to survive a direct hit. Even concrete block is no guarantee against winds that can strip the blacktop off a rural road.

Most areas turn to either individual tornado shelters, built into a home, or large shelters in schools or municipal buildings.

Individual safe rooms are usually not mandated, merely strongly urged for both new construction and retrofitting. However, some communities offer incentives (such as reduced property taxes) for owners who wish to build a FEMA-qualified safe room or an International Code Council storm shelter for their home. Some state and local governments engage in grant programs with the federal government to partially subsidize the construction of both residential and community safe rooms. In tornado-prone areas, some state building codes mandate that schools and other large buildings include shelters.

Disaster Risk Reduction Ambassadors can help in the effort to convince individual home owners to include or add safe rooms through a variety of strategies. The costs associated with building safe rooms may be a problem for some homeowners. One argument that can help is a discussion of the increase in the value of a home that includes a shelter. Kevin Simmons of Austin College and the Federal Alliance for Safe Homes has studied tornado safe rooms and found they can increase the sale price of a home by an average of about 3.5 percent. Well-built tornado safe rooms typically cost \$4,000 to \$5,000, but it's possible that community-backed large scale contracting could reduce that price.

For complete information on the process of designing and building a safe room, see:

http://www.fema.gov/media-library-data/1418837471752-920f09bb8187ee15436712a3e82ce709/FEMA_P-320_2014_508.pdf

Achieving Buy-In

Disaster Risk Reduction Ambassadors working in tornado prone areas should have little trouble convincing citizens of the need for safe rooms. The process begins by making sure that all available information is circulated, and that local officials are provided with current best practices from around the country on how best to promote and finance shelters.

“Outside the box” thinking about helping families afford a good shelter is what’s needed … and “mining” the internet for ideas can be a fruitful exercise.

Those who work in hazard mitigation in other regions of the country, however, can find their jobs more difficult, since the relative rarity of severe storms makes it easy to think “it can’t happen here” and avoid the question altogether.

One avenue to explore, particularly in urban or up-scale suburban areas, is the combination safe room/panic room. There are, of course, some differences between designs for the two types, but there is enough similarity to make them practical.

Panic rooms — a reaction to the possibility of home invasion robberies — have featured in a number of high profile situations lately. Although true home invasions are very rare, they are also highly publicized, and that can help with a campaign to espouse the combination approach. Panic rooms, it should be noted, can be considerably more expensive than a safe room, and studies indicate that they do not typically add much to a home’s equity — especially since they tend to be included in homes in the higher price ranges.

Large Capacity Shelters

One successful story about a community evaluating risk, checking possibilities and then moving proactively involves the Iowa State Fair campground — part of the Iowa State Fair complex, located outside Des Moines, an area vulnerable to tornadoes and high-wind events. Officials knew that in June 1998, a storm with winds in excess of 100 mph caused over \$465,000 in damage to the State Fair complex, severely impacting the campground with fallen trees and limbs. Fortunately, no one was hurt during this event, but the potential for disaster and loss of human life was obvious. According to the National Climatic Data Center, Iowa ranked sixth in the number of tornadoes across the nation with 1,974 events between 1950 and February 2004. In Polk County, Iowa alone (home to the Iowa State Fair and the capital city of Des Moines), 49 tornadoes have been confirmed since 1950.

So the State Fair board decided to construct a shelter at the campground. This project was undertaken in addition to other work by the board to protect fairgoers. The 160-acre campground is located approximately 600 feet from the outskirts of the fairground proper. The Iowa State Fair and the Iowa Emergency Management Division collaborated on the shelter construction project. The funding source was FEMA’s Hazard Mitigation Grant Program, split

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between federal (75 percent) and local (25 percent) monies. The federal portion consisted of a \$600,000 grant. The State Fair itself funded the remaining 25 percent.

The completed football-shaped shelter is 5,200 square feet in area and is 100 X 71 feet. It can accommodate 400 people. It is centrally located in the campground area, sited on the side of a hill between the campground and the fairground to serve as the fourth shower/restroom facility. The floor plan of the shelter is a mirror image of the two halves of the elliptical structure. When not in use as an emergency shelter, the building is used by both the fairground staff and campers for restrooms, showers, a laundry area, offices, and meeting room facilities.

The unique design of the shelter offers excellent wind resistance, and created interest from a design standpoint because it did not look or feel like a typical bunker. The curved surfaces force the wind around the shelter on all sides, thus alleviating wind pressure at specific points. The shelter was constructed in accordance with the criteria presented in FEMA publication 361 (P-361), *“Design and Construction Guidance for Community Shelters,”* and its curved walls were built using 12-inch-thick, precast concrete panels, connected with welded steel plates. The pie-shaped panels enable the roof to be the required width without exceeding a maximum span of 32 feet.

The interior partition walls are constructed of fully reinforced concrete masonry units. The central mechanical chase vents through to the roof. Surrounding the mechanical chase are reinforced walls designed to protect occupants from debris that may enter the chase, with “missile” strength, from the roof vent. To reduce the likelihood of debris entering the chase, the roof-mounted venting system is equipped with drainable stationary louvers. On the east side of the structure, a concrete canopy mounted on concrete piers provides weather protection. The canopy has been designed to withstand 250-mph winds and to prevent them from becoming a debris hazard themselves during a high-wind event.

The new shelter was planned as a prototype for other shelters across the state — and the nation. Nearly all U.S. state fairs are held in either July or August, which is not only during tornado season in the Midwest, but is also during the thunderstorm and hurricane season in the East, Southeast, and Gulf Coast region. In fact, tragedy struck at the New York State Fair in September 1998, when thunderstorms and high winds came through the fairground’s campground, killing two men asleep in their tents.

Sources:

Hazard Mitigation Grant Program

<https://www.fema.gov/hazard-mitigation-grant-program>

International Association of Fairs and Expositions

<http://www.fairsand expos.com/>

National Storm Shelter Association

<http://www.nssa.cc/>

Texas Tech - Wind Sciences and Engineering Research Center

<http://www.wind.ttu.edu/>

American Institute of Architects

<http://www.aia.org>

American Society of Civil Engineers

Minimum Design Loads for Buildings and Other Structures, ASCE 7-02, 2002, American Society of Civil Engineers

ISBN: 0-7844-0624-3

<http://www.asce.org/booksandjournals/>

MODULE 11: Who Pays for What's Needed?

Financing Mitigation, Before & After Disasters

Reeling from the trauma of a major disaster, survivors first consider the health and well-being of their family and friends. But soon they begin to worry about how they can find resources to repair their damaged property — to “put it back as it was.”

After a presidential disaster declaration, FEMA and other local, state, and federal agencies will be on-scene, providing up-to-date information about housing aid, small business loans, rental assistance, possible mitigation measures — a wide range of help will be offered.

Later, after the shock has diminished, individuals and communities may begin to think about how to make sure that “this never happens again.”

That’s where mitigation, and the idea of making the community more resilient, begins to take hold.

When homeowners decide to deal proactively with their hazardous situation, and have found appropriate resources for their solution, they will want to move quickly.

In the event that voluntary property acquisition is involved, whether acquisition funds are provided by the state programs using U.S. Dept. of Housing and Urban Development (HUD) Community Development Block Grants (CDBG) funds, Section 404 of the Stafford Disaster Relief and Emergency Assistance Act, or any other federal source, individuals can expect to be paid pre-damage fair market value for a damaged property. Flood insurance proceeds and any unspent federal funding provided for minimal repairs may be deducted from the final price.

Homeowners who wish to participate in a relocation or elevation project may qualify for financial help from a variety of sources, including:

- Grants from FEMA’s Individuals and Households Program may be called into play. The FEMA rental assistance program can provide lodging payments, to an annually set maximum amount, as individuals work on their specific housing plan. The individual’s plan may be to participate in a voluntary elevation or acquisition project.
- Increased Cost of Construction through NFIP in post disaster situation.
- Low-interest disaster loans from the Small Business Administration.
- Often, disaster survivors can get some cash relatively quickly by applying for refunds through the IRS Disaster Casualty Loss Program.

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- If they still have needs, Voluntary Organizations Active in Disasters (VOAD) such as the Red Cross or the Mennonites may be able to provide building materials, labor, or other types of assistance.
- In the aftermath of many disasters, there are also other charities and assistance programs set up on a local and regional basis that operate outside the VOAD umbrella. These organizations can often provide additional assistance.
- FEMA also has the Cora Brown Fund for situations for which there is insufficient disaster assistance available.

Funding for mitigation actions can come from a number of sources, including local funds, state and federal grants, and technical assistance programs. During the hazard mitigation planning process, reviewing a list of potential funding sources will help in prioritizing projects. Some hazard mitigation actions are inexpensive and can be done quickly while other solutions may become major projects that are very expensive, require federal assistance and take years to complete.

For any grant a community receives, grant management will be required. These grants will likely require meticulous record-keeping and reporting on how and what grant funds were spent. H2O Partners, a consulting firm, (www.h2opartnersusa.com) has developed a “Guide to Funding and Technical Assistance Programs that Support Hazard Mitigation.” This guide identifies and describes more than 90 federal and state grants and technical assistance programs that can be accessed to implement hazard mitigation plans. Planning and grant management work can be done in-house or through contractors who work in this area.

For support and counseling, agencies such as the state or local department of elder affairs can help. In many cases, the state department of mental health will implement a federally funded crisis-counseling program to address disaster survivors’ needs, especially those who are facing major changes.

Funds for the Community

Funding for mitigation actions for the wider community can come from a number of sources, including local funds, state and federal grants, and technical assistance programs. But the most effective approach for improving community resiliency is to implement mitigation actions, develop agreements and secure contracts before a disastrous event. There are several types of pre-planned opportunities in which communities and their governing bodies can commit to assist each other in times of disasters.

Writing agreements ahead of time can significantly increase the effectiveness of emergency responders and increase the possibility of receiving funding from federal agencies for costs incurred in a disaster. For example:

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Mutual Aid Agreements

Mutual Aid and Assistance Agreements are contracts between agencies, organizations and jurisdictions that provide a mechanism to quickly obtain emergency assistance in the event of a disaster. This assistance may be in the form of personnel, equipment, materials, and other associated services. The primary objective is to obtain additional manpower and resources and to facilitate rapid, short-term deployment of emergency support prior to, during and after a disaster.

Memorandums of Understanding between jurisdictions are, essentially, an example of governments helping governments. For instance, a school district may have an agreement to use another district's school buses in case of disaster, or an electric co-op may use another provider's repair crews to help restore power to its customers. These types of agreements are crucial to maintaining order and continuing services when disaster strikes, but they must be in place pre-disaster. Otherwise, valuable time is lost restoring services.

Pre-disaster contracts should be in place for certain services – such as debris hauling, mosquito spraying, and other services needed in the immediate period after a disaster.

Why is this important? Consider the fact that after a disaster, emergency managers are under immense pressure to know where to direct first responders, often to multiple damaged areas. This is not the time to find out whether other jurisdiction or agencies can provide assistance. Also, to obtain FEMA Public Assistance, an applicant (local governmental unit or eligible non-profit) must go through an open-bidding process. This is difficult to do after the disaster shuts down your electricity or floods your local government offices.

For best results:

- Identify, pre-disaster, the contractors or companies you will use for each response function. Then, when disaster strikes, the contract is triggered. This saves time. It also demonstrates to FEMA that the contract was awarded through a competitive bidding process, and was not a "brother-in-law deal." Further, trying to conduct the contractor selection process post-disaster just adds to the chaos.
- Enter into stand-by contracts for debris. In addition to contracting with a reputable debris hauler, local governments should have an agreement with a debris monitoring firm to observe and document debris operations from the collection point to final disposal. The monitor ensures that hauling is done safely, efficiently, and in compliance with FEMA Public Assistance eligibility rules. For the most accurate and efficient monitoring, select a firm that utilizes an ADMS (Automated Debris Monitoring System) instead of the antiquated paper-ticket system. Accurate documentation of debris removal is essential to receiving full reimbursement from FEMA. For more information on debris management see:
<http://www.fema.gov/pdf/government/grant/pa/demagde.pdf>

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Emergency Management Assistance Compacts

An interstate mutual aid agreement that allows states to assist one another in responding to natural and manmade disasters. It is administered by the National Emergency Management Association, which offers model legislation at: www.nemaweb.org.

In the wake of major natural disasters, large amounts of equipment and personnel move to the affected areas. This influx of assistance is largely the result of an Emergency Management Assistance Compact, a Congressionally-approved interstate mutual-aid agreement. A compact affords states providing and receiving post-disaster assistance the ability to move equipment and people across state lines rapidly by establishing systems and protocols for (1) the acceptance of out-of-state medical licenses; (2) the recovery of costs incurred by states providing assistance; (3) legal liability claims that arise from the activities of out-of-state workers; and (4) workers' compensation payments should those out-of-state workers be injured or killed while responding to the disaster.

In short, such a compact can provide for "mutual assistance between states ... in managing any emergency or disaster that is duly declared by the governor of the affected state(s), whether arising from natural disaster, technological hazard, man-made disaster, civil emergency aspects of resource shortages, community calamities or insurrections."

To take effect, the agreement requires the governor of the affected state to declare a state of emergency. In incidents that do not result in emergency declarations, these authorities and protections are very limited. Many local and state governments engage private sector businesses, including law firms, for disaster response and recovery operations. These engagements take various forms, but often include establishing Memorandums of Understanding for resources during and after an event.

Reimbursement Under an Emergency Management Assistance Compact (EMAC):

- The parties in an EMAC include: Requesting states, assisting states, resource providers (state agencies, units of local government and other entities deployed by an assisting state as legal agents of the state) and personnel deployed by a resource provider.
- The reimbursement process for the EMAC starts when deployed personnel return home and ends when a requesting state reimburses the assisting state. There are responsibilities during the mission such as the maintenance of documentation. Each party to the reimbursement process is dependent upon the prior party's completing its responsibilities promptly and effectively in order to complete its own role in the reimbursement process.
- Guidelines for reimbursement follow the compact's Articles of Agreement as well as member state and resource provider procedures. Certain types of costs are specified as eligible or ineligible for reimbursement. The guidelines also detail specific forms to be used and the

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types of documentation to be submitted with a claim for reimbursement, as well as the suggested timelines for each step of the reimbursement process.

- A properly executed Request for Assistance authorizes the mission and constitutes a contract between two states.
- Upon accepting resources offered by another member state, the requesting state is financially obligated to reimburse the assisting states for expenses incurred in performance of the mission. Self-dispatched resources that deploy without state authorization are not recognized under the compact and are not eligible for reimbursement.
- Reimbursement under the compact is not dependent upon receipt of disaster relief funds that are available through FEMA after the President declares a major disaster or emergency.
- The requesting state may seek funds from FEMA or any other sources, but its' obligations under the law to pay for services rendered are not contingent upon receipt of said funds.

Funding Sources

We have talked about funding sources for safe rebuilding. Yet, where do funds comes from to administer aid, handle permitting, build new infrastructure, and preserve historic properties?

For starters, if there is a presidential declaration for a public assistance disaster, FEMA funds can support demolition, environmental review, and possibly some legal work related to demolition and rebuilding. Other agencies that may provide funding include the U.S. Army Corps of Engineers, the Department of Energy, the Economic Development Agency, the Environmental Protection Agency, the Department of Housing and Urban Development, the Department of Transportation, and the National Trust for Historic Preservation, among other agencies listed in this article, as well as in the appendix.

Some funding sources require local and state matching funds. For example, cities may use municipal crews, donated time and materials such as gravel from a town-owned gravel pit as non-cash or "in-kind" services to satisfy the cost-share requirements of these programs. Other ways of raising funds for use as match for federal grants in a post-disaster context range from issuing tax-exempt bonds, counting the hours of volunteers working in disaster recovery, holding community fundraisers, and soliciting contributions of money and goods from local, state and regional businesses and industry.

For further details of the July 2015 GAO report on Hurricane Sandy can be found at: <http://www.gao.gov/products/GAO-15-515>

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To round out the package, private resources are sometimes available. Local fund-raising efforts can support such things as business development and historic preservation.

Remember that studies show that mitigation dollars can save more than four dollars for every dollar spent for disaster relief. In addition, returns derived through disaster risk reduction efforts can deliver lasting value through lower operating and maintenance costs as well as reducing the rate at which infrastructure capacity must be added.

What the GAO Found After Sandy

After the Hurricane Sandy relief effort was winding down, the Government Accounting Office, the fiscal watchdog of the government, was asked to review federal efforts to strengthen disaster resilience during Hurricane Sandy recovery. The report addresses (1) how federal recovery funds were used to enhance resilience, (2) the extent to which states and localities were able to maximize federal funding to enhance resilience; and (3) the actions that could actually enhance resilience for future disasters.

The report found, in part, that during the Sandy Recovery, five federal programs — the FEMA Public Assistance Program, Hazard Mitigation Grant Program, the Federal Transit Administration's Public Transportation Emergency Relief Program, the Department of Housing and Urban Development's Community Development Block Grant-Disaster Recovery Program, and the U.S. Army Corps of Engineers' Hurricane Sandy Program — helped enhance disaster resilience — the ability to prepare and plan for, absorb, recover from, and more successfully adapt to disasters.

These programs funded a number of disaster-resilience mitigation measures. For example, acquiring properties and demolishing at-risk structures, elevating flood-prone structures, and erecting physical flood barriers.

State and local officials from the states affected by Hurricane Sandy that were contacted reported that they were able to effectively leverage federal programs to enhance disaster resilience, but also experienced challenges that could result in missed opportunities.

The challenges fell into three categories:

- Implementation challenges with Public Assistance and Hazard Mitigation Grant Programs — opportunities to incorporate mitigation into permanent construction recovery projects proved elusive as applied to these programs;
- Limitations on comprehensive risk reduction approaches in a post-disaster environment — for example, officials reported difficulties with navigating multiple funding streams and various regulations of the different federal programs funded after Hurricane Sandy;

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- Local ability and willingness to participate — for example, officials reported that some home and business owners were unwilling or unable to bear the required personal cost share for a home-elevation or another mitigation project.

FEMA officials told researchers that they were aware of some of these challenges and recognized the need to further assess them. Assessing the challenges and taking corrective actions, as needed, could help enhance disaster resilience. There is no comprehensive, strategic approach to identifying, prioritizing and implementing investments for disaster resilience. This increases the risk that the federal government and nonfederal partners will experience lower returns on investments or lost opportunities to strengthen key critical infrastructure and lifelines. Most federal funding for hazard mitigation is available after a disaster.

For example, from fiscal years 2011-2014, FEMA obligated more than \$3.2 billion for the post-disaster hazard mitigation grant program while the Pre-Disaster Mitigation Grant Program obligated approximately \$222 million. There are benefits to investing in resilience post disaster. Individuals and communities affected by a disaster may be more likely to invest their own resources while recovering.

However, there are also challenges. Specifically, the emphasis on the post disaster environment can create a reactionary and fragmented approach where disasters determine when and for what purpose the federal government invests in disaster resilience. The Mitigation Framework Leadership Group was created to help coordinate hazard mitigation efforts of relevant local, state, tribal, and federal organizations.

A comprehensive investment strategy, coordinated by the group, could help address some challenges state and local officials experienced.

See [Resource 1: Master List of Disaster Assistance Resources](#), for more information and resources.

MODULE 12: Legal Aspects of Disaster Planning

This module will synthesize the complex issues arising out of a landmark decision (*Koontz* – see below) by the US Supreme Court, and will provide a clear understanding of legal issues surrounding mandatory insurance, mutual aid (in its different forms) legal liability in disaster preparedness and will help participants parse though issues in insurance and disaster recovery. The intent is to de-mystify complex issues into a layman's understanding, because both legal and non-legal Ambassadors for mitigation must have a common grasp of the issues and the stakes in disaster risk reduction as it relates to the law.

The American Bar Association (ABA) has taken the position that lawyers can, and should, play a key role in adopting and implementing hazard mitigation best practices in local communities — whose members are among the most likely to challenge mitigation measures at the state and local levels.

In 2009, the ABA's House of Delegates adopted resolutions that urged state, territorial and local governments to use a series of available tools to mitigate losses from future mega-catastrophes and to ensure the ongoing availability and affordability of insurance for natural disasters.

The ABA in Disaster

For more information, go to:

http://www.americanbar.org/content/dam/aba/events/state_local_government/2013/08/Disasters_materials.authcheckdam.pdf

Specifically the group urged the development of risk-appropriate, state-of-the-art building codes for new construction and cost-effective retrofitting measures for residences; adopting land use policies that discourage construction in areas that are difficult to evacuate or pose unusually high risks to personal safety of consumers and first responders and to property; enacting property tax credits that offer grants to homeowners and businesses that invest in catastrophe mitigation measures; and adopting and updating emergency management plans.

The ABA also urged the federal government to use the multiple tools available to it to mitigate losses from mega-catastrophes by, among other things, adopting “land use policies that discourage or prevent construction in areas that are difficult to evacuate or that pose unusually high risk to personal safety (to consumers and first responders) or property loss, and to require FEMA to incorporate the adoption and effective enforcement of statewide building codes in its Hazard Mitigation Grant Program.

In the past, courts have struggled with balancing Americans' right to develop their own property with the “greater good” of the wider community — particularly in regard to hazard mitigation concerns.

A recent New York Times article observed, “Because population density has been rising, behaviors with harmful side effects have been growing steadily more important. Our continued

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prosperity, and possibly even the planet's survival, will require thinking clearly about how to mitigate the resulting damage."

These side effects will need to be carefully managed in the future in order to ensure both economic and environmental gains. So much of the devastation we describe as "natural disasters" is in reality a failure of human design, construction, planning, and community development in areas subject to the natural processes called natural hazards. These failures externalize into environmental plundering, which leads to costs for disaster survivors, especially the most vulnerable populations, as well as harm to communities, and huge costs to the taxpayer.

U.S. Supreme Court's Decision in the Koontz vs. St. Johns River Water Management District Case

In 1994, Coy A. Koontz had requested a permit from the agency to develop more of his land than the original permit allowed. St. John's agreed to issue the permit on the condition that Koontz deed the rest of his property into a conservation area, and also do some mitigation work on the surrounding areas which he did not own. Koontz agreed to the deed but not to the mitigation work, so St. John's denied the permit application.

Koontz sued, and the trial court found in favor of Koontz, awarding damages. Florida's Fifth District Court of Appeal affirmed, but the Supreme Court of Florida reversed. The U.S. Supreme Court then found in Koontz's favor.

However, the wording of the decision compels local and state governments to more closely examine potential harm that may be caused by a development, then carefully craft conditions for that development to mitigate harm in a more open and transparent manner. Hazard mitigation experts view the Court's decision as an opportunity for the "Whole Community"— insurance professionals, emergency managers, community development staff, elected officials, climate adaptation and mitigation specialists, and floodplain managers — to understand the importance of safe development based on the ancient maxim of property law: "Use your property so you do not harm others."

The ruling endorsed the underlying philosophy of safe development-based planning. As Justice Samuel A. Alito Jr. wrote in the majority opinion, "Insisting that landowners internalize the negative externalities of their conduct is a hallmark of responsible land-use policy, and we have long sustained such regulation against constitutional attack."

In *Koontz*, the Court strongly endorses preventative government action as a hallmark of responsible land use policy, which will prevent one person or group of people being permitted to take actions that will result in a disaster.

Koontz almost guarantees and encourages future litigation. However, going forward, agencies can avoid litigation by changing their practices. Agencies will have a heavier burden in providing scientific data that supports the need for mitigation in order to avoid litigation. In the

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past, agencies have enjoyed a deferential approach to their decision making process. It is now vital for agencies to articulate the benefits, costs, and justifications for hazard mitigation. While agencies may view this extra work as a burden, providing this information can lead to increased community support for such projects. Communities will be able to witness firsthand the cost of development and the benefit of mitigation. In turn, this can lead to an increase in support for mitigation projects.

There are several ways to deal with the threat of increased litigation as a result of *Koontz*. Communities must practice principled, legal, sustainable, and safe development. Communities can look to follow the Safe Development for Resilient Communities principles promoted by the Natural Hazard Mitigation Association in this and other documents available at: www.nhma.info as well as the No Adverse Impact principles promoted by the Association of State Floodplain Managers. Communities can also accomplish principled development through planning, partnerships, negotiations, multi-use mapping and engineering, and fair regulations to prevent harm.

In the end, safe design and fair hazard regulation is a winning concept for the developers, agencies, and citizens of the community.

Koontz may have created a major incentive for communities and their representative agencies to say “no” to development in order to avoid possible litigation. However, in reality, communities cannot avoid development altogether; demographic pressures from an increasing population will force development. Our choice as a society is not either “development” or “no development.” Rather, our choices are more accurately framed as: Current practices that will lead to increased environmental despoliation, misery to disaster survivors, and huge costs to the taxpayer; or better planned, safer development that protects water resources, people, property, the environment, the economy, and the taxpayer.

All involved with development decisions can choose a win-win-win solution or a lose-lose-lose solution to inevitable development.

In the end, the *Koontz* case gives the floodplain management community validation. Essentially, the case is a ringing endorsement of hazard mitigation and climate adaptation.

Koontz provides a great opportunity for communities by allowing them to decide whether they want better standards to protect the economy and taxpayers or prefer to continue with current practices that will only lead to destruction and future litigation. *Koontz* does not hurt, but rather supports, mitigation efforts to build a safer, more sustainable nation and world.

Regulating Development

So, why are we not doing more to safely and properly regulate development?

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The National Oceanic and Atmospheric Administration commissioned a report based on interviews with community development officials around the nation. The conclusions of the report reveal that there are basically two reasons we are not doing more to lessen the severity of disasters. The primary reason is economics. Development near the water is more valuable, and local governments covet these high-value properties. Yet taxpayers pick up the costs post disaster, while the benefits go to the developers, local governments, mortgage companies, and engineering firms. The second reason local governments are not doing more to properly regulate development is fear of regulatory takings challenges. It is important to point out here, however, that research done by Jon Kusler, Ed Thomas, and others for the Association of State Floodplain Managers found that communities are most apt to pay when the developments they permit cause damages, not when the community denies a permit.

Such damage is easily predictable given current technology and better computer models. Further, Mr. Kusler was able to find only a few cases in which the landowner prevailed in a regulatory takings suit against a municipality's denial of use, when the proposed use would have had substantial offsite effects or threatened public safety. In fact, courts have broadly and consistently upheld performance-oriented floodplain regulations, including those that exceed minimum FEMA standards. Regulations that require additional freeboard, impose tighter floodway restrictions, or very tightly regulate high risk areas, have consistently been upheld by the courts.

Regulations based solely on considerations of climate change may be a different matter. Even very conservative legal scholars, such as those at the Cato Institute, agree that if a regulation prohibits wrongful uses, then no compensation is required. But what is a wrongful use? Will the courts accept the theory of climate change as a basis for severe restrictions on development?

Other considerations beyond concerns about climate change, especially in coastal areas, may well be more persuasive to a court, however. For example, in developing property in floodplain areas, flood elevations present many uncertainties. Generally, when an engineer makes a critical calculation, he or she strives to reach a confidence interval of 90 to 95 percent that the calculation is correct. For flood elevations on the FEMA Flood Insurance Rate Maps, a 50 percent confidence interval is the norm, which may be appropriate for a map designed for the purpose of rating an insurance policy, but it is not good enough for public safety. It is possible to adapt to the very real uncertainties in future flood heights by designing buildings and other infrastructure located in floodplains to take such events into account. Other considerations such as warning/evacuation time, life safety, and concerns about debris from coastal property destroyed by a storm causing harm to property that otherwise would not have been harmed, may also be quite appropriate for consideration in reviewing the worth of a coastal development.

Mandatory Insurance

The economics behind a disaster always involve the insurance market. With the increase in natural disasters, insurance is becoming a more frequent and, in many cases, a mandatory purchase. Under the National Flood Insurance Program, property owners in special flood hazard zones indicated by the Federal Emergency Management Agency *must* purchase flood insurance.

Before the program was created, only people with a high amount of flood risk bought insurance, despite the fact that flooding is the most common disaster in the U.S., according to Ernest B. Abbott, former General Counsel of FEMA, Washington, DC. This resulted in extremely high premiums and a lack of a private market for flood insurance.

Since this program forces many more people to get insurance, it can be politically reckless for officials to enact such requirements. “Congress is really annoyed because they don’t want to keep coughing up lots of money,” Abbott says, noting that nonetheless, Congress still cannot agree to substantial changes in the laws to help control costs. Jordan Fried, an Associate Chief Counsel for FEMA, Washington DC, who advises on the flood hazard mapping, says that after Hurricanes Katrina and Sandy, there were a plethora of difficulties that surrounded recovery and rebuilding.

“Historically, people have looked to FEMA or the federal government as a solution,” Fried said, and while the government provides public assistance and rebuilds public goods such as roads and schools, “government has never been there to pick up all the pieces like people may expect.” He said there has been a lot of scrutiny around government costs, which raises questions about who is bearing the risks and who will pay when something ultimately happens.

Experts agree that this developing field needs lawyers to define policy and procedures as well as help state and local government clients get grants to create plans for loss mitigation. Abbott suggested lawyers interested in this area help develop a proposal to present to the American Bar Association to build upon the current hazard mitigation recommendations, as well as to advance educational tools for the public with webinars or videos showcasing successful case studies.

Legal Issues Where Interstate Assistance is Requested in Non Declared Emergencies

As noted, Emergency declarations by governors allow them to implement the Emergency Management Assistance Compact, a multi-state agreement that facilitates the rapid sharing of equipment, personnel and other resources among states. There are instances where cross border assistance is needed, for example in some public health situations. Although states not infrequently face situations that threaten the health of their citizens and challenge the response capabilities of their public health infrastructure, those incidents rarely rise to the level of declared emergencies, preventing state officials from availing themselves of resources that may be located just across a state line. As a result, states may seek alternative methods to assist each

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other during public health situations that are not declared emergencies. Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended, and Related Authorities as of April 2013 (<https://www.fema.gov/robert-t-stafford-disaster-relief-and-emergency-assistance-act-public-law-93-288-amended>)

The use of out-of-state assets in non-emergency situations, however, is complicated by legal considerations that increase in complexity according to the level of assistance contemplated.

Information sharing efforts, for example, face few legal obstacles — but efforts to share equipment, use out-of-state laboratories, or utilize out-of-state doctors and nurses raise significant legal questions relating to:

- cost reimbursement;
- license and credential portability for medical or other personnel;
- liability; and
- workers' compensation.

Any cross-border mutual aid agreement that envisions the fast and efficient transfer of equipment and/or personnel will require participating states to resolve conflicts or contradictions among applicable laws and regulations. To achieve this compatibility, officials should consider the following strategies:

- Assessing whether the laws in their states allow for license portability from other states and consider joining existing multi-state agreements such as the Nurse Licensure Compact;
- Reviewing their state's policies for the use of volunteer disaster workers, particularly as those policies relate to workers' compensation claims;
- Assessing whether sovereign immunity, Good Samaritan laws or other statutes provide liability protections to volunteer health professionals;
- Assessing whether the laws in their state effectively deal with the issue of private health organizations' ability to credential and privilege out-of-state medical professionals and work with the private sector to develop policies and protocols to allow for the use of out-of-state professionals;
- Determining whether existing interstate agreements or arrangements address issues of cost recovery, liability, and workers' compensation and whether those arrangements might be applicable to situations affecting the public health;

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- Working with governors, legislators and public health officials in neighboring states to determine an appropriate strategy for aligning laws and regulations to facilitate the cross-border movement of public health professionals in non-emergencies.

Legal Liability in Disaster Preparedness

One of the most important underlying principles of modern legal actions about Hazard Mitigation and Disaster Resilient Communities is the **No Adverse Impact** (NAI) standard. As explained in the many seminars for floodplain managers by Dr. Jon A. Kusler and Edward A. Thomas, Esq.:

NAI is a principle that leads to a process which is: legally acceptable, non-adversarial (neither pro-nor anti-development), understandable, and palatable to the community as a whole. The process clearly establishes that the “victim” in a land use development situation which causes harm to others is not the developer, but rather the other members of the community who would be adversely affected by a proposed development. Once concerns about safety are identified, a developer is liberated to plan and engineer their way to a successful, beneficial development.

Kusler and Thomas further explain that courts are likely to uphold a No Adverse Impact standard because it is generally consistent with common law rights and duties. In past decisions, courts have reasoned that regulations take nothing from landowners when they enforce common law rights and duties, and they have broadly upheld regulations designed to prevent landowners from creating nuisances or undertaking activities which violate other common law private property concepts — such as a “taking” — in part because no landowner has a right to cause a nuisance or violate the private property rights of others, even when this may significantly impact the landowner.

They argued that courts are likely to not only uphold a broad No Adverse Impact performance goal or standard, but also more specific implementing regulations which tightly control development in floodways, coastal high hazard areas, and other high risk zones in order to implement such a standard. They are also, they reasoned, likely to uphold very stringent regulations for small strips of land (e.g., setbacks) and open space zoning for floodplains where there are economically viable uses such as transferable development rights, forestry, or agriculture. Communities are likely to encounter significant “taking” problems only where floodplain regulations *permanently* deny all or nearly all economic use of entire floodplain properties. To see a more complete explanation of NAI, go to:

http://www.floods.org/PDF/ASFPM_NAI_Legal_Paper_1107.pdf

Insurance and Disaster Recovery

Local businesses are the foundation of a community's economy, and their recovery is essential to the community's recovery. Without a plan, businesses can be cut off from supply systems, communication, facilities, and their important documents such as contracts, insurance policies, key contacts, and employee information. Planning can help alleviate panic when events occur.

But physical damage is only one way that a disaster can devastate and ultimately destroy a business.

Businesses also suffer financially when:

- Their employees cannot come to work after a disaster;
- Their customers cannot reach the premises due to infrastructure damage or order of civil authority;
- Their customer base has changed;
- They cannot open due to a disruption of essential utility services; or
- Their transactions with a critical supplier or a major customer are disrupted.

Successful recovery requires that businesses address these and other barriers. Timely access to financial resources can help businesses address the barriers to post-disaster recovery.

Businesses are faced with many competing financial needs after a disaster:

- They may need to repair or replace damaged business property, including premises, inventory and business equipment.
- Businesses also have fixed expenses such as rent, utilities, insurance, license/permit/franchise fees, loan payments, and property taxes, which continue even if a disaster disrupts their cash flow.
- Some businesses may also want to continue to pay skilled employees who are vital to the business and would be difficult to replace.

Businesses unable to address these needs may be forced to close, even if the business is viable in the long run, which makes the need for advanced financial planning, as well as risk assessment and mitigation measures, if possible. This can take several forms:

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- The business can purchase commercial insurance, which promises to pay the business for a covered loss in exchange for a premium. Such a policy can provide property coverage, automobile coverage, business interruption and extra expense coverage, workers' compensation and employee liability coverage. For more information, see "Risk Identification and Analysis: A Guide for Small Public Entities," Claire Lee Reiss, J.D., ARM, Public Entity Risk Institute Resource Library, at:
<http://www.csokenya.or.ke/site/uploads/resource/407.pdf>.
- A line of credit arranged in advance can provide businesses with access to needed funds after a disaster.
- Some businesses mistakenly rely entirely on federal Small Business Administration post-disaster loans, which:
 - Must be repaid;
 - May not be available to all affected businesses; and
 - Are not available unless the President declares a federal disaster or the SBA makes an administrative disaster declaration.

Of course, businesses can self-insure against possible losses from disasters, relying on their own internal resources to meet post-disaster financial needs. Self-insurance is most appropriate when the business can identify internal financial resources or other reliable sources of funding (line of credit, commitment to provide additional capital) for disaster losses.

Without secure funding sources, businesses that intentionally self-insure are in no better position after a disaster than businesses that self-insure by default. Both will be scrambling for funds after a disaster.

Note that business owners and executives often don't see that they have a role in a community's disaster preparedness effort. While local government has the legal responsibility to address disaster risks and make emergency management plans, a business owner or executive's busy schedule may dictate their minimal involvement with a business continuity plan.

However, in the event of a disaster, local government cannot act alone in addressing all the needs of the community, particularly those of an economic nature, and will rely on the private sector's resources. Government needs the business community to be involved in planning for and responding to emergencies. For instance, businesses should:

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- Routinely back-up computers and keep backups in a safe place away from the office; for example, use cloud storage. After Katrina, manufacturing firms in New Orleans had records destroyed.
- Have insurance policies scanned and stored offsite.
- Determine how they would deal with business continuity in all types of emergencies, from hurricanes to floods to a pandemic.

Here are some resources for businesses:

- The Institute for Business and Home Safety's *Open for Business Basic* is a free guide to business continuity planning for the small to mid-sized business with 13 forms and a property protection checklist. <https://www.disastersafety.org/open-for-business/ofb-basic/>
- *The Florida Business Disaster Survival Kit* was created by the Tampa Bay Regional Planning Commission to assist the local business community in business continuity planning, hazards analysis and response, recovery and mitigation, and other preparedness resources. http://www.tbrpc.org/fbusineskit/information_center/disaster_library.shtml
- Ready Business was created to educate and empower individuals, small businesses and interested parties to prepare for and respond to emergencies. This resource is focused specifically on business preparedness. <http://www.ready.gov/business>
- Sungard provides a number of free publications and case studies at their Knowledge Center on disaster preparation subjects such as business continuity planning, cloud computing, and data management. <http://www.sungardas.com/Pages/default.aspx>
- State Ready Business Programs: Be Ready Alabama; Florida Disaster; Ready Georgia; Kansas Ready; Be Ready Utah. <http://restoreyoureconomy.org/ready-business/>
- *Preparing Your Small Business for a Disaster* lists effective emergency planning activities and provides a short, straightforward checklist, as well as a list of resources and contact information. <http://www.preparemybusiness.org/planning>
- SBA & Nationwide Insurance's *Small Business Preparedness Guide* helps business leaders better handle a disaster situation. This guide provides common-sense solutions to protect assets. <https://ohsonline.com/articles/2007/12/sba-nationwide-produce-small-business-disaster-preparedness-guide.aspx>
- Prepare My Business is an SBA website that provides small business resources for disaster and business continuity planning and testing, and provides free educational resources on

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key topics to reduce your business's risk and quickly recover following a disaster situation.

<https://www.sba.gov/category/navigation-structure/starting-managing-business>

- *Community Resilience and Rapid Recovery of the Business Sector* by Mary Graham at Charleston Metro Chamber of Commerce provides practical ideas for how business stakeholders should play a more active role in disaster recovery planning, business continuity planning, and response at the community's emergency operations center after a disaster. <http://www.resilientus.org/publications/presentations/>
- Business Continuity Information Network is a web- based service where local businesses, county emergency management, and organizations that assist businesses can gather to share critical information and support continuity efforts before, during, and after a disaster. <http://www.bizrecovery.org>
- Disaster Preparation and Business Continuity Planning is a resource developed by the Central Florida Development Council that provides business continuity planning assistance, including resources on planning before, during and after a disaster. http://www.cfdc.org/CentralFlorida/media/Central-Florida/About%20CFDC/CFDC_Disaster-Prep-Plan-for-Website-2015.pdf
- The State of Florida's Business Disaster Planning website will better prepare a business for future disasters by assisting them in creating a Business Disaster Plan. <http://www.floridadisaster.org/dembusiness.asp>
- The Association of Business Contingency is the national association for business continuity professionals providing networking opportunities and a learning environment of programs, workshops and symposiums in the field of business continuity, disaster recovery, and emergency response. <https://www.acp-international.com>
- New York University's International Center for Enterprise Preparedness White Paper on business preparedness and insurance incentives. <http://www.nyu.edu/intercep/Insurance%20Incentives%20for%20Corporate%20Preparedness%2017%20Oct%2006.pdf>
- The Preparing a Business for a Pandemic course will assist small and medium-sized businesses in surviving a potential pandemic including the importance of business planning, communicating regularly with employees, and helping employees deal with a severe pandemic. <http://eden.lsu.edu/EDENCourses/Pandemic/Pages/default.aspx>
- Business USA provides information on a wide variety of opportunities for small businesses to compete for government contracts, including a list of state and federal procurement agencies, information on how to register as a contractor and bid on opportunities, as well as

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the rules and regulations that state and federal contractors need to follow.

<http://business.usa.gov>

Florida Atlantic University's Public Procurement Research Center provides online classes in public procurement while earning college credits at either the undergraduate or graduate level. www.fau.edu/cdsi

- Agility Recovery Solutions provides business continuity and recovery strategies, consulting services and testing options to businesses across the United States and Canada.
<http://www.agilityrecovery.com>
- National Federation of Independent Businesses (NFIB) hired the Gallup Organization in 2004 to poll small-business owners about whether specified types of natural disasters impacted their business operations in the last few years. The findings concluded that at least 30 percent of the 750 surveyed businesses had been closed 24 hours or longer at least once within the last three years. Almost 25 percent of those that had closed their doors were due to tornadoes, hurricanes, wind storms or floods, while 20 percent were due to blizzard or extreme cold conditions. <http://www.411sbfacts.com/sbpoll-about.php?POLLID=0023>

RESOURCE 1: Master List of Disaster Assistance Resources

Loans from The Small Business Administration

The **SBA Business Disaster Loan Program** offers low-interest, long-term loans to businesses to repair or replace damaged property owned by the business, including real estate, machinery and equipment, inventory, and supplies. Businesses of any size are eligible. Nonprofit organizations, such as charities, churches, and private universities, are also eligible. Business loan amounts are limited to \$1,500,000. Applicants must show the ability to repay all loans. Loan amounts may be increased by up to 20 percent for mitigation measures.

The **SBA Home Disaster Loan Program**: During times of disaster, the SBA becomes the “nation’s bank.” Disaster assistance loans are not just for businesses. Homeowners may also qualify for low-interest loans to help rebuild or repair their homes or repair or replace uninsured or underinsured flood damaged personal property. SBA loans are critical to personal disaster recovery as they can support repair or clean-up to accessory structures such as sheds, docks, gazebos, etc. that aren’t covered by traditional insurance. SBA loans can help with debris clearing, tree removal, and stream and river bank stabilization. Renters may qualify for loans to repair or replace personal property. In fact, the majority of all SBA disaster loans are made to homeowners.

The loan terms are designed to be affordable, with terms extending up to 30 years with interest rates around 3 percent. Loan amounts are based on the actual cost of repairing or rebuilding a flood-damaged home and personal property, minus any insurance reimbursements for the same loss.

Of particular interest to communities wishing to become more disaster resistant, the SBA can also increase an approved loan by up to 20 percent to cover approved Hazard Mitigation activities, above and beyond compliance with codes and standards. In the past, such approved mitigation activities have included voluntary elevation above flood levels, the construction of safe rooms in areas subject to tornadoes, dry-proofing basements and elevation of utilities in flood areas.

Current loan limits are as follows:

- Homeowners – Up to \$200,000 to repair or rebuild a primary residence to its condition before the disaster.
- Homeowners and renters – Up to \$40,000 to repair/replace personal property such as clothing, furniture and automobiles.

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In addition, businesses and non-profit organizations such as charities, churches and private universities may apply for business physical disaster loans up to \$1.5 million to repair or replace property owned by the business, including real estate, plus machinery, equipment, fixtures, and inventory not covered by insurance.

The SBA Economic Injury Disaster Loans: These are loans for working capital to small businesses and small agricultural cooperatives to assist them through the recovery period. Assistance is available only to applicants with credit unavailable elsewhere. Applicants must be eligible small businesses according to SBA size standards. Collateral is required on loans over \$5,000.

IRS Casualty Loss-Special Disaster Provisions

Taxpayers who have sustained a casualty loss from a declared disaster may deduct that loss on the federal income tax return for the year in which the casualty actually occurred, or elect to deduct the loss on the tax return for the preceding tax year. In order to deduct a casualty loss, the amount of the loss must exceed 10 percent of the adjusted gross income for the tax year by at least \$100. If the loss was sustained from a federally declared disaster, the taxpayer may choose which of those two tax years provides the better tax advantage.

The IRS can expedite refunds due to taxpayers in a federally declared disaster area. An expedited refund can be a relatively quick source of cash, does not need to be repaid, and does not need to happen during a disaster with an Individual Assistance declaration. It is available to any taxpayer in a federally declared disaster area.

FEMA Individual Assistance

The Individuals and Households Program is a combined FEMA and state program. When a major disaster occurs, this program provides money and services to people in the declared area whose property has been damaged or destroyed and whose losses are not covered by insurance. In every case, the disaster victim must register for assistance and establish eligibility. The toll-free telephone registration number is 1-800-621-FEMA (or TTY 1-800-462-7585 for the hearing or speech impaired). Eligibility and need must be verified before assistance is offered. Applicants can also register online at www.fema.gov. After a disaster, local Disaster Recovery Centers are established to provide support to disaster victims. Either in a stationary facility or a mobile unit, most of these centers now offer the capability for disaster victims to register online.

Individuals and Households Housing Assistance assures that people whose homes are damaged by disaster have a safe place to live.

Individuals and Households Other Needs Assistance provides financial assistance to individuals and households who have other disaster-related necessary expenses or serious

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needs and do not qualify for a low interest loan from Small Business Administration. These programs are designed to provide funds for expenses that are not covered by insurance. They are available only to homeowners and renters who are United States citizens, non-citizen nationals, or qualified aliens affected by the disaster.

This may include medical, dental, funeral, personal property, transportation, moving and storage, and other expenses that FEMA/EPR approves. The homeowner may need to apply for an SBA loan before receiving assistance.

The following is a list of the types of other assistance available through this program and what each provides:

- *Temporary Housing:* Homeowners and renters receive funds to rent a different place to live or a temporary housing unit when rental properties are not available.
- *Repair:* Homeowners receive grants to repair damage from the disaster that is not covered by insurance. The goal is to make the damaged home safe and sanitary.
- *Replacement:* Under rare conditions, homeowners receive limited funds to replace their disaster damaged home.
- *Permanent Housing Construction:* Homeowners and renters receive direct assistance or a grant for the construction of a new home. This type of assistance occurs only in very unusual situations, in insular areas or remote locations specified by FEMA/EPR where no other type of housing is possible.
- For additional information, see: http://www.fema.gov/pdf/rebuild/recover/dec_proc.pdf

or

http://www.fema.gov/pdf/assistance/process/help_after_disaster_english.pdf

Agricultural Assistance

Coverage comparable to that offered under the Federal Multi-Peril Crop Insurance Program, can be available to individual farmers through the US Department of Agriculture.

Conservation Reserve Program:

A voluntary program that offers farmers annual rental payments, incentive payments for certain conservation activities, and cost-share assistance to establish approved vegetation on eligible cropland. Available to individual farmers who agree to set aside and enroll environmentally sensitive land into the program for a 10-to 15-year period.

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EM Program:

Emergency low-interest loans to family farmers and ranchers to cover production losses and physical damage. Loans can be used for operating expenses and for other expenses necessary to return farming operations to a financially sound basis. The program is available to individual farmers with qualifying crop losses.

Emergency Conservation Program:

Includes cost-share payments to rehabilitate farmlands damaged by natural disasters. Payments are available to individual farmers to perform emergency conservation and rehabilitation measures. Payment from FSA is 64 percent (up to \$62,500); 40 percent (\$62,500 to \$125,000); and 20 percent (\$125,000 to \$200,000); the remainder is paid by the farmer.

Tree Assistance Program:

Includes cost-share payments to orchardists, producers, greenhouse operators, and vineyard growers who incurred losses due to weather.

Federal Multi-Peril Crop Insurance:

Provides direct payment of insurance claims. Insurance is available to protect producers against unavoidable causes of loss such as adverse weather conditions or other natural disasters beyond the producers' control. For a small administrative fee, individual farmers can get coverage that compensates a producer for losses exceeding 50 percent of their approved yield at a price equal to 60 percent of the commodity's expected market price.

Noninsured Crop Disaster Assistance Program:

Offers direct payments to reduce financial losses resulting from a natural disaster that causes production loss or prevents planting of crops grown commercially for food or fiber for which federal crop insurance is not available.

Economic Revitalization

Department of Commerce, Economic Development Administration (DOC/EDA) Planning Grants:

Grants to states and local governments to fund Economic Development Coordinators who: 1) assess economic injury and facilitate a locally developed, long-term economic recovery planning process for the impacted area; 2) provide a local on-site resource for effective economic development program coordination; and 3) carry out project implementation activities consistent with the long-term economic recovery plan.

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DOC/EDA Revolving Loan Fund (RLF):

Includes funding for local short-term “gap” financing for business recovery in affected communities. Grantees may provide assistance to businesses that: 1) are declined loans by SBA; or 2) need additional financing beyond SBA’s loan limits. Local Revolving Fund Lenders (lenders have the flexibility to provide financing to: 1) supplement traditional lending; 2) setup a local micro-lending program; or 3) develop a local public/private infrastructure lending program to implement local business recovery initiatives.

DOC/EDA Technical Assistance Grants:

Includes grants to state and local governments for strategic recovery planning and implementation. Recovery plans focus on job retention/creation to help offset the economic impacts of disasters. Grants may provide technical assistance to address industry-specific economic dislocations, e.g., marketing/promotional activities to revive the tourism industry, economic development feasibility studies, or professional expertise to assist local communities in recovery efforts.

FEMA Community Disaster Loan Program:

Provides direct loans to local governments to offset the loss of tax or other revenues as a result of a major disaster. The local government must demonstrate a need to maintain local governmental functions such as police and fire protection, or water and sewer services.

USDA Business and Industrial Loans:

The Department of Agriculture (USDA) Rural Development operates over fifty financial assistance programs for a variety of rural applications. USDA offers direct and guaranteed loans, grants, and rural business enterprise grants to businesses and cooperatives affected by natural disasters. Applicants must be in rural areas or in towns with populations under 50,000. Preference is given to applicants in open country, rural communities, and towns of 25,000 population and fewer. Assistance is subject to the availability of funds.

USDA Community Facilities Loans and Grants:

Includes loans and grants to develop community facilities for public use in rural areas. Towns or incorporated areas with populations under 50,000 are eligible for direct and guaranteed loans, and towns or incorporated areas with populations under 25,000 are eligible for grants. Funds may be used to construct, enlarge, or improve health care, public safety, fire and rescue services, transportation, and public services. All facilities financed shall be for public use.

USDA Water and Waste Grants and Loans:

Provides loans and grants to develop, replace, or repair water and waste disposal (including storm drainage) systems in rural areas or in towns with populations of 10,000 or fewer. Funds may not be used to pay interest on loans, operation and maintenance costs, or to acquire or refinance an existing system.

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USDA/Natural Resource Conservation Service Emergency Watershed Protection Program:

Financial and technical assistance to: 1) safeguard lives and properties, and 2) eliminate or reduce hazards created by natural disasters that suddenly impair a watershed. Technical assistance also includes engineering and design for soil and water conservation structures. Eligible applicants include state agencies, counties, municipalities, towns or townships, soil and water conservation districts, or any other organization with authority to acquire land rights and operate and maintain measures installed under this program.

Housing Assistance

Department of Energy Technical Assistance Programs:

DOE's Weatherization Assistance Program, Affordable Housing Partnerships, Building America, and Office of Building Technology State and Community Programs provide services to communities for the revitalization of single-family, multifamily, and commercial buildings.

FEMA Disaster Housing Assistance:

See description of *FEMA Individual Assistance programs above*.

Partnership for Advancing Technology in Housing:

A HUD-directed partnership that brings together various government programs dealing with home building, manufacturing, and insurance and financial industries. PATH designs and constructs examples of housing that include disaster mitigation measures and technology that enhances energy efficiency, environmental performance, and affordability.

HUD Community Development Block Grant Program (CDBG):

This extremely important and widely used program provides grants to develop decent housing, a suitable living environment, and to expand economic opportunities, principally for persons of low-and moderate-income. In a disaster, CDBG grantees may reprogram their funds to assist homeowners who: 1) are declined loans by SBA because they cannot carry any more debt and lack the ability to repay; or 2) need additional financing beyond SBA's loan limits to repair, rehabilitate, reconstruct, or replace their residences, while some disasters receive special Disaster CDBG Funding.

From time-to-time the Congress appropriates special Disaster Related CDBG funding. Such funds were for example appropriated following the Great Midwest Flood of 1993, Hurricane Katrina and “Superstorm” Sandy. These funds lose their federal identity when granted to the state and thus are of enormous value in leveraging other federal grants since they can be used as a local/state match for federal grants. In addition, these funds provide government an enormously flexible source of funds to meet needs otherwise unmet by other post-disaster recovery programs.

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HUD/Federal Housing Administration Title I Home Repair Loan Program:

This program will finance loans up to \$25,000 through participating lenders at prevailing interest rates.

HUD/FHA Section 203(k) Rehabilitation Mortgage Insurance Program:

Provides assistance to finance repairs or rehabilitation through participating lenders at prevailing interest rates. For disaster areas, HUD has expanded the debt ratio to 60 percent on FHA partial claims. Rehabilitation cost must be at least \$5,000.

HUD/FHA Section 203(h) Mortgage Insurance for Disaster Victims:

Provides mortgage insurance to protect lenders against the risk of default on loans to qualified disaster victims whose homes were destroyed or require reconstruction or replacement. Insured loans may be used to finance the purchase or reconstruction of a one-family home that will be the principal residence of the homeowner. Disaster victims are not required to meet the 3 percent minimum investment requirement.

HUD HOME Program:

Participating jurisdictions may reprogram funds to provide permanent housing for low-income homeowners and renters who have become disaster victims. Funds may be used for acquisition, new construction, rehabilitation, and tenant-based rental assistance.

HUD 5-H Homeownership Program:

Public housing sales proceeds (and interest earned on those proceeds) may be retained by the Public Housing Administration and be used for housing assistance to low-income families. Sales proceeds may be used to construct or acquire additional dwellings for sale to low-income families or to assist such families in purchasing other dwellings from public or private owners.

USDA/RHS Section 504 Repair Loans and Grants:

Includes grants and direct loans to very-low-income rural residents for the rehabilitation and repair of owner-occupied dwellings. Assistance is provided to very-low-income homeowners to remove health and safety hazards in their homes and to make homes accessible for disabled persons. Grants are available for persons age 62 and older who cannot afford to repay a loan. During an emergency, additional loans could be made to homeowners and to borrowers to repair housing facilities. Funds are available only to the extent that funds are not available from FEMA. Applicant's income for a loan may not exceed very-low-income limits (\$6,300 to \$22,650 for a single-person household, depending on an area's median income).

USDA/RHS Self-Help Housing Loans:

Loans for materials, site, and skilled labor to assist groups of six to eight low-income families to build each other's homes. Applicants must be a private or public nonprofit organization that will provide the developed sites to qualified borrowers on a cost-of-development basis in open

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country and towns with populations of 10,000 people or fewer. Places up to 25,000 population can be approved under certain conditions.

USDA Rural Rental Loans:

Guaranteed and insured loans to build or rehabilitate rental units for low-and moderate-income residents. Applicants must be lenders that are approved by Fannie Mae, Freddie Mac, and HUD, or be a state housing finance agency. Projects must be located in rural areas.

USDA Section 502 Single-Family Housing Direct and Guaranteed Loans:

Includes subsidized direct loans to very-low-and low-income rural residents and guaranteed loans to low-and moderate-income rural residents in need of housing. USDA may also make limited housing repair loans through the direct loan program. Existing borrowers are offered loan forbearance, when needed, to recover from the effects of a natural disaster.

Infrastructure Assistance

DOT/FHWA Emergency Relief Program:

The Department of Transportation Federal Highway Administration can provide assistance for the repair of federal-aid highways and roads on federal lands. The state match generally varies from 10 to 20 percent depending on the class of federal-aid highway. No state match is required for emergency repairs accomplished within 180 days of the disaster to restore essential travel. Additionally, no state match is required for repair of roads on federal lands.

DOC/EDA Infrastructure Construction Grant Program:

Provides grants for local public infrastructure projects. Projects must be either new construction or pre-disaster improvements to commercial and industrial facilities, or publicly owned infrastructure. Grants support job retention and job creation, leverage private investment, and directly contribute to the overall long-term economic recovery of the disaster area. Grant funding is cost-shared, 75 percent federal and 25 percent state.

FEMA Public Assistance Program:

See description of *FEMA Public Assistance programs, above*.

USDA Water and Waste Disposal Programs:

Grants, and direct and guaranteed loans to develop water and waste disposal systems in rural areas. During an emergency, funds would be made available for loans or grants for the repair of rural water and waste disposal systems damaged by natural disasters. Funds cover any facility that did not receive assistance from other sources, so that impacted communities can continue to provide safe drinking water and wastewater treatment facilities.”

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Department of Education

Readiness and Emergency Management Grants:

Grants are available to schools and local education agencies to improve and strengthen their emergency management plans. The funds can also be used for the development of plans to address all phases of emergency management. School districts are required to coordinate with emergency management.

Public Private Partnerships

Public private partnerships can be a great way to leverage existing resources and work towards a more resilient community. Local and national businesses, insurance companies, home builders, non-profits involved in sustainability, and others can be excellent partners.

NHMA has compiled a series of case studies on successful collaborative initiatives which can be found at: <http://nhma.info/resources/best-practices/>

Environmental Agencies and Nonprofits

Environmental agencies are excellent partners, in disaster Risk Reduction particularly in cases where there is alignment between their goals of preservation and the adaptation/floodplain management/mitigation actions being proposed. Environmental groups are often interested in species preservation, natural floodplain functions, maintenance of green space, and more. One example is the US Fish & Wildlife Service which can use funds from Migratory Bird Hunting and Conservation Stamps, also known as Duck Stamps, for land acquisition. Other potential partners include National Wildlife Federation, American Rivers, Environmental Defense Fund, and others.

Climate Change Adaptation

The following foundations and organizations provide technical assistance, information, and other sources for climate adaptation:

- ICLEI-local governments for sustainability, a global clearinghouse of information, has an international network, tool kits, and case studies: <http://www.iclei.org>
- EcoAdapt-Climate Adaptation Knowledge Exchange is a database of organizations, case studies and tools: <http://cakex.org>
- Georgetown Climate Center has an extraordinary adaptation clearinghouse of resources and organizations: <http://www.georgetownclimate.org/adaptation/clearinghouse>

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Federal agencies that provide funding opportunities for adaptation:

- EPA State and Local Climate and Energy Newsletter-listserv that shares state and local developments in policies, programs, and opportunities:
<http://epa.gov/statelocalclimate/newsletters/index.html#a01>
- EPA Grants and Department Open Announcements-list of current opportunities:
http://www.epa.gov/ogd/competition/open_awards.htm
- Grants.gov-database for all federal grants: <http://www.grants.gov/>
- Partnership for Sustainable Communities: Grants, Assistance & Programs-a list of opportunities through this interagency HUD-DOT-EPA partnership:
<https://www.sustainablecommunities.gov/partnership-resources>
- EPA Adaptation Tools for Public Officials-numerous tools and guidebooks:
<https://www3.epa.gov/climatechange/adaptation/tools.html>
- Federal and EPA Adaptation Programs-information and links about adaptation efforts across federal agencies: <https://www3.epa.gov/climatechange/adaptation/index.html> The Climate Change Adaptation for State and Local Governments Webcast Mini-Series covers:
<http://www.epa.gov/statelocalclimate/web-podcasts/index.html>

Federal Government Grant Opportunities

Fire Prevention and Safety Grants

Fire Prevention and Safety Grants are part of the Assistance to Firefighters Grants, and are administered by FEMA. They support projects that enhance the safety of the public and firefighters from fire and related hazards. The primary goal is to target high-risk populations and reduce injury and prevent death. Eligibility includes fire departments, national, regional, state, and local organizations, Native American tribal organizations, and/or community organizations recognized for their experience and expertise in fire prevention and safety programs and activities. Private non-profit and public organizations are also eligible. Interested applicants are advised to check the website periodically for announcements of grant availability. The typical application window for these grants is 30 days.

Pre-Disaster Mitigation Grant Program

The Department of Homeland Security administers Pre-Disaster Mitigation Planning and Project Grants. This competitive grant program, known as PDM, provides funds and technical assistance to state entities, tribes and local governments to help develop multi-hazard mitigation

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plans and to implement projects identified in those plans. Individual communities can apply for grants, but they are advised to work with their state contacts in emergency management or mitigation as they are developing their plans and projects.

Hazard Mitigation Grant Program

The Hazard Mitigation Grant Program provides grants to states and local governments to implement long-term hazard mitigation measures after a major disaster declaration. The purpose is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster.

Communities interested in the program should contact their state hazard mitigation officer, who serves as the state-level connection to various grants and assistance related to natural hazard preparedness and planning as well as some post-disaster activities.

Wildland Urban Interface Community and Rural Fire Assistance

Designed to implement the National Fire Plan and assist communities at risk from catastrophic wildland fires. The program provides grants, technical assistance, and training for community programs that develop local capability, including:

- Assessment and planning, mitigation activities, and community and homeowner education and action;
- Hazardous fuels reduction activities, including the training, monitoring or maintenance associated with such hazardous fuels reduction activities, on federal land, or on adjacent nonfederal land for activities that mitigate the threat of catastrophic fire to communities and natural resources in high risk areas;
- Enhancement of knowledge and fire protection capability of rural fire districts through assistance in education and training, protective clothing and equipment purchase, and mitigation methods on a cost share basis.

Self-Determination Act – Title III – County Funds:

The Self-Determination Act has recently been reauthorized and now includes specific language regarding the Firewise Communities program. Counties seeking funding under Title III must use the funds to perform work under the Firewise Communities program. Counties applying for Title III funds to implement Firewise activities can assist in all aspects of a community's recognition process, including conducting or assisting with community assessments, helping the community create an action plan, assisting with an annual Firewise Day, assisting with local wildfire mitigation projects, and communicating with the state liaison and the national program to ensure a smooth application process. Counties that previously used Title III funds for other wildfire preparation activities such as the Fire Safe Councils or similar would be able to carry out many of the same activities as they had before. However, with the new language, counties would be

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required to show that funds used for these activities were carried out under the Firewise Communities program.

For more information, visit the USDA Forest Service website: <http://www.fs.fed.us/>

RESOURCE 2: A Master List of Disaster Assistance Websites

Hazard Mitigation Sites:

Comprehensive Data Management System (CDMS) version 2.5

<http://www.fema.gov/library/viewRecord.do?id=3798>

Flood Hazard Mapping

<http://www.fema.gov/national-flood-insurance-program-flood-hazard-mapping>

Flood Smart

<http://www.FloodSmart.gov>

Flood Smart Risk Assessment Tool

https://www.floodsmart.gov/floodsmart/pages/flooding_flood_risks/defining_flood_risks.jsp

Flood Recovery Maps -LA and MS

<http://www.fema.gov/response-recovery/fema-flood-recovery-data>

Floodplain Management

<http://www.fema.gov/floodplain-management>

Grant Programs

<http://www.fema.gov/grants>

HAZUS MH

<http://www.fema.gov/HAZUS>

HAZUS Case Studies

<http://www.fema.gov/HAZUS#>

Map Service Center

<http://msc.fema.gov>

New Flood Insurance Maps

<http://www.newfloodmap.com/>

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Mapping Information Platform (MIP)

<http://www.hazards.fema.gov>

Mitigation

<http://www.fema.gov/what-mitigation/federal-insurance-mitigation-administration>

Mitigation Best Practices Portfolio

<http://www.fema.gov/mitigation-best-practices-portfolio>

Mitigation Planning

<http://www.fema.gov/hazard-mitigation-planning-overview>

National Flood Insurance Program (NFIP)

www.fema.gov/national-flood-insurance-program

National Flood Mitigation Data Collect Tool

<http://www.fema.gov/media-library/assets/documents/966>

Plan and Prevent

<http://www.fema.gov/what-mitigation/plan-prepare>

Pre-Disaster Mitigation (PDM) Grant Program

<http://www.fema.gov/pre-disaster-mitigation-grant-program>

Recover and Rebuild

<http://www.fema.gov/response-recovery/fema-flood-recovery-data>

Repetitive Flood Claims (RFC) & Severe Repetitive Loss (SRL) Programs

<https://www.fema.gov/repetitive-flood-claims-grant-program-fact-sheet>

Stay Dry

<http://www.fema.gov/library/viewRecord.do?id=3293>

NOAA Websites:

NOAA's Digital Coast <http://www.csc.noaa.gov/digitalcoast/>

NOAA's Land Cover Change Program

<https://coast.noaa.gov/digitalcoast/tools/lca>

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NOAA's Sea Level Trends

<http://tidesandcurrents.noaa.gov/slrends/slrends.shtml>

NOAA's Vulnerability Assessment Tool

<https://coast.noaa.gov/digitalcoast/tools/list/?redirect=301ocm>

US Army Corps of Engineers Websites:

Flood Risk Management Program

<http://www.nfrmp.us>

Risk Assessment

<http://www.usace.army.mil/Missions/CivilWorks/LeveeSafetyProgram/RiskAssessment.aspx>

Silver Jackets Program

<http://www.nfrmp.us/state/>

Other Useful Sites:

American Society of Civil Engineers

<http://www.asce.org>

Association of State Floodplain Managers

<http://www.floods.org>

Google Earth

<http://www.google.com/earth/index.html>

National Earthquake Hazards Reduction Program

<http://www.nerhp.gov/index.htm>

National Institute of Standards and Technology

<http://www.nist.gov>

National Interagency Fire Center

<http://www.nifc.gov/>

National Weather Service

<http://www.weather.gov/>

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Natural Hazard Mitigation Association

<http://www.nhma.info>

Storm Smart Coasts

<http://www.mass.gov/czm/stormsmart/>

USGS Risk Assessment

<http://www.usgs.gov/science/science.php?term=997>

RESOURCE 3: Acknowledgments and Sources

This document is intended to be a practical tool. This document is a key part of the Disaster Risk Reduction (DRR) Ambassador Curriculum developed by the Natural Hazard Mitigation Association (NHMA) under the 2014 Cooperative Agreement with FEMA. U.S. DHS/FEMA Grant No. EMW-2014-CA-00263 CTP 2014-2015. The document provides practical solutions, approaches, applications, and resources.

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This document is produced by the Natural Hazard Mitigation Association (NHMA). NHMA is a non-profit organization of professionals involved in natural hazard mitigation. NHMA serves as a respected voice in hazard mitigation policy both in the United States and throughout the world. We represent the interests of communities, governments, the research community, the insurance industry, and the fields of engineering, emergency response, water resources, planning and many other mitigation related fields. For more information about NHMA, or to join, please visit: <http://nhma.info>