

Climate Change and Emergency Management: Adaptation Planning

By Edward A. Thomas and Terri Turner

Climate change” generally elicits an emotional reaction in even the most mild-mannered audience. Insurance companies and respected journals, such as the *New York Times*, report increasing concerns about the damages that will occur if those who believe in climate change are later proven to have been prescient. See, e.g., Elisabeth Rosenthal, *Huff and Puff and Blow Your House Down*, N.Y. TIMES, Week in Review, Feb. 12, 2011, at 2. Many believe that climate change is part of a vast left-wing conspiracy to take away property rights and fund the current political agenda. Sea level rise is well-documented, however, and temperatures are setting records all over the planet. Regardless of the debate, a fundamental principle of emergency management provides a basis for action: “Hope for the best and plan for the worst.”

“Natural” Disasters

To begin, consider whether “natural disasters” are really natural. Can we throw the blame at Mother Nature when humans build improperly in areas subject to natural hazards? The late Dr. Gilbert F. White, often known as the Father of Modern Floodplain Management, often said, “Floods are acts of nature, but flood losses are largely acts of man.”

Those occurrences we call “natural” disasters are usually quite unnatural. Predictably, Mother Nature will do what she does with earthquakes, wildfires, floods, high winds, and other natural phenomena. Unfortunately, many people and cities build poorly designed structures in inappropriate locations where natural phenomena are likely to occur. Rather than blame Mother Nature for “natural disasters,” we should acknowledge Pogo’s words of wisdom: “We have met the enemy, and he is us.”

There is no question that wind and flood disasters are increasing at a dramatic pace around the world. Dr. Roger Pielke has researched what would happen if actual historic floods took place in today’s highly developed floodplains. He determined, for example, that a repetition of the 1926 Miami hurricane would cause approximately \$160 billion dollars in damages and untold misery to the vulnerable population in that area. A repetition of the 1900 Galveston hurricane would cause damage totaling about \$100 billion dollars. Other researchers estimate that a repetition of the historic 19th century New York City hurricane would cause between \$500 billion to \$1 trillion in damages.

Irresponsible land use patterns and building practices are significant contributing factors to increased damages. Think of Miami today and compare it to the city in 1926, the last time it was hit directly by a significant hurricane. The difference is palpable. Millions of people are in harm’s way, and they will suffer horribly when Mother Nature does what Mother Nature is most surely going to do, someday.

Hurricane Katrina, hopefully, taught an important lesson: there is no possibility of a sustainable economy, or for that matter, any economy at all, unless we plan and prepare for natural disasters. Improper or unsafe development in inappropriate locations is not inevitable, but the result of very deliberate actions and decision making. Developers and engineers that design, and the local governments that approve, such development must wise up.

Demographic trends along our coasts and in other vulnerable areas indicate greater challenges in the future because of sea level rise and the more frequent occurrence and greater intensity of storms. Poorly designed development in the wrong location can exacerbate the effects of Mother Nature’s fury. Paul Farmer, APA executive director, recommends that “we need to take a look at both where we build and how we build. We can’t just build in bad locations. We must build safely and properly.” Farmer urges local government officials to “just say no to building on barrier islands or in wildfire prone areas.”

Risk

Risk is calculated by multiplying the probability of the flood times the consequences. Think of Sacramento, California. A major levee is located on the Sacramento River. On one side is farmland and on the other is the capital of California. How can the flood risk be changed here? On the one hand, if a flood takes place on the farmland, the farmers will have a horrible, miserable event in their lives. Their land may be rendered permanently unable to grow crops because of the volume of sand that will flow out of the levee. On the other, if Sacramento is almost entirely underwater, it becomes a very different situation with incredible misery and devastation, which may also include loss of life.

The Army Corp of Engineers in California has pioneered efforts to buy down flood risk through programs of warning and evacuation, insurance, improved building codes, resilience, improved levees, continued stewardship plans, and outreach—recognizing that significant risk still remains. Unfortunately, what is really going on around the nation is the opposite—we are increasing risk because insufficient attention to building codes, warning and evacuation programs, insurance, and other risk reduction efforts.

Damages are going to increase even if the current minimum standards of the National Flood Insurance Program (NFIP) are perfectly implemented. Although the NFIP has succeeded in significantly reducing our nation’s exposure to flood losses, nevertheless our appetite for development and our proclivity to develop larger and higher value structures, especially in hazardous locations like floodplains and in areas subject to wildfires, has resulted in mounting losses. Good engineering science enables us to calculate the likely effects of development on flood heights and velocities, as well as how to design to resist reasonably foreseeable wind loads,

earthquakes, and wildfires. These calculations can be made before development and used to help design safe, sustainable developments, or they can be made following a flood, earthquake, or wildfire to assist in litigation. Making the calculations before a disaster is much more cost effective and reduces the probability of many kinds of misery, including litigation.

Even if the climate stabilizes, millions of people are still at risk and that risk is still growing because natural hazards continue to be ignored when development decisions are made.

Regulating Development

So, why aren't we doing more to safely and properly regulate development?

The National Oceanic and Atmospheric Administration (NOAA) 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 Jon Kusler, Ed Thomas, and others have done for the Association of State Floodplain Managers (ASFPM) found that communities are most apt to pay when developments they permit cause damages, not when the community denies a permit. That 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%–95% that the calculation is correct. For flood elevations on the FEMA Flood Insurance Rate Maps, a 50% confidence interval is the norm. A 50% confidence interval 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.

Joining the Call

Many organizations are joining the call for improved consideration of how we develop, particularly in areas prone to predictable natural events such as floods, wildfires, and earthquakes. The American Bar Association has adopted a series of resolutions addressing hazard mitigation. The Federal Emergency Management Agency has started looking at how to reform the National Flood Insurance Program, to make the program even better and more effective. The Army Corps of Engineers is moving away from the concept of "flood control" to the much more practical and nuanced approach of "flood risk management."

The American Planning Association's (APA) Paul Farmer has written extensively on the subject of flooding and APA's Jim Schwab has authored a new APA publication, *Hazard Mitigation: Integrating Best Practices into Planning*, PAS No. 560.

There is now a National Hazard Mitigation Collaborative Alliance, borne out of the NEMA white paper and charged with providing "Recommendations for an Effective National Mitigation Effort Building Stronger Partnerships, Increased Resilience, and Disaster Resistance for a Safer Nation" and a Natural Hazard Mitigation Association (www.nhma.info/index.html) that hopes to bring the same education and outreach for all hazards that the Association of State Floodplain Managers (ASFPM) has done for floods.

Successfully Confronting Disasters

The United States has a track record of successfully confronting disasters—airplane crashes and wildfires are two examples. Airline disasters have been reduced at the same time that the number of flights has increased phenomenally. Although wildfires are still a challenge, the incidence of urban wildfires has been reduced tremendously through zoning, building code standards, and communities striving to improve fire protection to secure better insurance rates for all of their citizens.

Following a flood, if we take a serious look at the disaster, and accept that it is not a natural disaster but an unnatural disaster, we can begin to think about how zoning and building codes can prevent misery and devastation. We may find a solution to the mounting toll of floods and other natural disasters. Such thinking has reduced the incidence of plane crashes and urban fires.

We can do better; we have to do better. Already millions of Americans live in areas subject to harm from a mere repetition of actual historic floods, earthquakes, and wildfires. Many more people are expected to move into these areas in the near future. While the debate about climate change rages on, flood heights are increasing, levees are overtopping, catastrophic flood events are occurring, and documentation of sea level rise continues. Development in at-risk areas, especially in high-risk coastal areas and in highly sought

after locations “near the water,” continues at an alarming rate. If communities continue to encourage at-risk development and ignore their effects on others, can we accept the consequences . . . and, are we willing to pay for them?

In our opinion, the loss of even one life is much too high a price to pay!

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This commentary summarizes and expands on a presentation Mr. Thomas made at the Section Fall Meeting in Providence, Rhode Island, in October 2010. Mr. Thomas may be reached at ethomas@mbakercorp.com. Ms. Turner may be reached at tturner@augustaga.gov.