

The B.F.E*

*Base Flood Elevation

LESSONS AND CONSEQUENCES OF THE RECORD-SETTING 2017 HURRICANE SEASON

By Danielle Ling

In the wake of Hurricanes Harvey, Irma, and Maria, the 2017 hurricane season is projected to be the most expensive in history, with total estimated economic losses exceeding \$200 billion.

According to a new report from McKinsey & Company, each of these three major hurricanes are expected to rank among the 10 most costly insured natural catastrophes on record globally.

To make matters worse, the majority of the losses are uninsured. Going forward, determining who will pay for the recovery, along with how best to organize recovery funding, will be a major operation.

In their report, McKinsey & Company researchers Erwann Michel-Kerjan and Giambattista Taglioni focus on the economic impact the 2017 hurricane season will have on the insurance industry, and the industry's role in this season's and future natural disaster recoveries.

Anticipating the consequences

Based on their research, McKinsey & Company anticipates that these record-breaking disasters will have a number of effects on the insurance industry.

Here are the key effects of 2017's historic hurricane season, as outlined by McKinsey & Company researchers:

- **These disasters will, for most insurers and reinsurers, be a story of earnings volatility and not of capital due to the record-high surplus of the U.S. property and casualty industry.**
- **Personal-auto and business-interruption insurance will be the biggest unexpected losses, given that flooding is typically not covered in homeowners' contracts.**
- **These consecutive disasters will stress insurance operations, including large-volume claim management and loss creeps, due to spikes in adjustment expense.**
- **In the coming months, insurers will likely face a significant consumer experience and public relations risk. Insurers need to go into crisis-management mode and deliberately and proactively address the risk, starting now.**
- **The long-term impact on premium rates will depend on the willingness of investors to recapitalize and continue to invest. If investors get scared by a new trend of increased losses in the wake of natural disasters, rate increases may be substantial and contribute to the ending of a prolonged soft cycle.**

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New tactics for the future

Tactic No. 1: Ensure resilient operations. As part of the fallout from Hurricanes Harvey, Irma and Maria, several carriers will face challenges regarding their operating models and claims organizations, McKinsey & Company explains. To build the resilience needed to convert an operational challenge into increased productivity and customer loyalty, insurers can utilize ever-advancing digital technology, process automation, and effective talent deployment.

Tactic No. 2: Seize the opportunity. The majority of the total economic losses from the 2017 hurricanes are uninsured or underinsured. In Texas, the majority of residents affected by the flooding from Hurricane Harvey did not have flood insurance for their homes, since Houston and the surrounding areas are not at-risk areas, according to FEMA. The figure for small-business owners is likely to be even worse, who statistically are even less likely to have flood insurance. Insurers would be wise to work to reach these underinsured and uninsured people and businesses.

Tactic No. 3: Review a public-private partnership structure of the flood market. There is an on-going national debate on the structure of the National Flood Insurance Program (NFIP), which is sure to intensify as Congress voted to forgive \$16 billion of the program's debt in October. McKinsey & Co. poses the questions, "Should flood insurance be mandatory for all who live in flood-prone areas, independent of their risk level? Can insurance — public or private — be risk-based to signal risk level and encourage better risk-management practices? What is the role of the private sector in increasing the market and ensuring more Americans are protected financially?"

(Cont on Page 10)



MONICA CARDIN, CFM

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ALL OFMA MEMBERS ARE WELCOME AT THE MONTHLY BOARD OF DIRECTORS MEETING [...] THERE IS NO SHORTAGE OF OPPORTUNITIES FOR NEW MEMBERS TO GET INVOLVED.

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WORDS FROM THE CHAIR

by Monica Cardin, CFM, CCEA, CCEO

On behalf of the Association, thank you for attending the 2017 Annual Conference in Norman. The OFMA Board and Conference committee spent many hours planning the conference events and presentations, and your participation made the conference a huge success. We were very fortunate to have several academics present at the conference as well as a variety of vendors at the conference.

The conference theme was “Community Resilience: A Practical Guide for Local Implementation.” As we have seen in the past several months, resilience is extremely important. It needs to be at the forefront in all we do. OFMA will continue to incorporate community resilience into its approaches regarding disaster preparedness and response as well as encourage it with hazard mitigation. OFMA will continue to provide you with the most up to date training, through our conferences, advanced training workshops, email communications, and special events. We continue to develop new advanced training classes, such as the new class on ethics we will be rolling out in the Spring.

The OFMA Board held its Annual Strategic Retreat on October 25-27 in Tulsa. At the retreat, the Board discussed the programs we would like to continue sponsoring and new initiatives. The Board agreed to continue to work on the priorities as well as reaching out to the Floodplain Managers and Floodplain Administrators that are not members of OFMA and are not CFMS.

Much of the discussion at the retreat was focused on the five priorities that were established from the Flood Symposium. The Board was divided into groups to discuss the five subject areas and tasked with working on each item. We look forward to having some more substantive material to present to everyone in the coming months.

Planning is underway for next year’s conferences. The date of the 2018 Spring Technical Workshop is April 5, 2018 at the Hard Rock Hotel in Catoosa, Oklahoma. More information on the theme and request for presentations will be emailed out in the winter. The Annual Fall Conference is September 17-19, 2018 at the Stone Creek Conference Center in Broken Arrow, Oklahoma. Please save the dates!

All OFMA members are welcome at the monthly Board of Directors meeting. Each month, our board members and committee chairs dedicate their time to doing the business necessary to keep the Association moving forward. There is no shortage of opportunities for new members to get involved.

2018 BOARD OF DIRECTOR MEETING DATES

<u>Dates</u>	<u>Location</u>
January 25, 2018	Del City Training Room
February 22, 2018	Del City Training Room
March 22, 2018	Del City Training Room
April 26, 2018	Del City Training Room
May 24, 2018	Del City Training Room
June 28, 2018	Del City Training Room
July 26, 2018	Del City Training Room
August 23, 2018	Del City Training Room
September 16, 2018	Stoney Creek, Broken Arrow
September 19, 2018	Stoney Creek, Broken Arrow

NOTES FROM THE NFIP STATE COORDINATOR

by Yohanes Sugeng, PE, CFM, OWRB

There are several items that we would like to share for this issue. First, we are pleased to **welcome the Town of Burbank as the newest participating NFIP community** in Oklahoma. We are currently working with the towns of Ringling, Winchester, Shady Point, Fort Towson, and Grady and Okfuskee Counties. through meetings, outreach, and other things to allow them to participate in the NFIP. We are also finalizing our 2018 potential CAV communities.

Please visit our newly designed website at

<http://www.owrb.ok.gov/hazard/fp/floodplain.php>

for information regarding our free workshops in partnership with OFMA throughout the state. Don't forget to register for our once a year L-273 "Managing Floodplain Development through the National Flood Insurance Program" class. Participation in the L-273 class is a mandatory requirement in order to take the National CFM exam. Recognizing potential hardship for the smaller, remote communities in the state, OWRB, through a grant funded by DHS-FEMA, is offering a limited number of need-based attendance scholarships for local floodplain administrators to attend a weeklong L-273 course. This scholarship will cover hotel expenses for attendees that qualify for the award. Please contact Jonathan Phillips at jon.phillips@owrb.ok.gov or at 405-530-8902 to take advantage of this opportunity.

OWRB staff is working closely with FEMA Region VI to conduct Consultation Coordination Officer (CCO) meetings for Tulsa County and Grand Lake O' the Cherokees. Each year, FEMA initiates studies and restudies of flood hazards in communities across the U.S. for the creation, as well as the revision, of community flood hazard maps. CCO meetings are held by FEMA and its partners for communities after the issuance of the preliminary FIRM and the Resilience Meeting (if held). The purpose of the CCO meeting and associated public Open House is to present the preliminary FIRM and data to community officials and the general public. During this meeting, differences between the new and the effective FIRM will be presented, along with an overview of the appeals and map adoption processes. We conducted CCO meetings on November 29th in Tulsa for the Tulsa County PMR and November 30th in Langley for the Grand Lake O' the Cherokees PMR. These meeting are the next step in revisions to the FIRM and FIS for these areas.

We look forward to another successful year of partnership with OFMA!



YOHANES SUGENG, PE, CFM

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BILL SMITH, PE, CFM

DRT CORNER

by W. B. "Bill" Smith, PE, CFM

During the 2017 Annual Conference, members of the OFMA Disaster Response Team (DRT) and the Drone Support Team (DST) held a field training exercise at an abandoned structure that was purchased by the City of Del City. Though the structure was not specifically in the Special Flood Hazard Area (though the SFHA is on the lot) the mock exercise showed the participants the benefits of the use of the drone for observing structure conditions, assisting in rescue needs, and providing recorded video for historic review in the event of a flooding event that would prevent access to a flooded area.

We mocked the BFE elevations, and with several different scenarios discussed and described the field documentation that is collected immediately following the recession of floodwaters or clearing of debris to provide access for use in determining Substantial Damage assessments.

(Con't on Page 4)

DRT CORNER, con't.

There were about 15 participants in the exercise, both DRT/DST volunteers and others who were interested in the required assessments by the local FPA following a disaster. We discussed not only flooding assessments, but also other types of disasters that would require the local FPA to assess damages – fire, tornado, wind, hail, earthquake, etc.

La Nina is upon us and we may expect a slightly warmer than normal winter and a slightly wetter than normal winter. This could mean “ice”. The 2007 ice storm still looms in many of our minds – loss of power, inability to travel, etc. Ice storm damage is real and can significantly affect structures as the tall trees snap and break under the weight of ice and can cause great damage. You and your communities need to be prepared for such an event.

Remember if your community has not pre-signed for disaster response, please contact Bill Smith DRT Coordinator or Tom Leatherbee, DRT Assistant Coordinator for a community signup sheet. It will require a council or county commissioner board action to prepare and return the required letter of authorization to request the OFMA DRT/DST to come to your community so – be prepared.

CAPITOL RUMBLINGS

by Tom Leatherbee, MCP, AINS, CCEA, CFM

Here are a few “off-season” updates from Washington and Oklahoma City:

Short NFIP Reauthorization NFIP Authorization Extended Until January 19th. For the third time this fall, the NFIP was extended as part of broader legislation designed to keep the federal government operating in the absence of budget deal. On September 8th, the President signed the 2018 Continuing Appropriations Act, a portion of which provided significant disaster relief funding for FEMA’s hurricane response and extended the authorization of the National Flood Insurance Program to December 8, 2017. On December 7th, Congress passed a short NFIP extension as part of a broader federal spending stopgap measure, extending the program’s authorization until December 22nd. With the December 22nd deadline looming and FEMA already having issued guidance to Write-Your-Own Companies about how to handle a lapse in authorization, an NFIP extension was included as part of the continuing resolution passed on December 21st.

No Long Term NFIP Reauthorization in Sight. While the NFIP’s authorization has not lapsed due to multiple short-term extensions, there has been little progress toward long term reauthorization. On November 14th, the House passed H.R. 2874, the 21st Century Flood Reform Act. The vote was largely on party lines, with 227-189. While the bill provides long term reauthorization, it contains a number of reform provisions that have sparked criticism from legislators from coastal areas. While the bill does not appear to be a vehicle for long term reauthorization, it could serve as a starting point for discussions with Senate leadership about a compromise measure.

Special Session Swag Bill Fails, Again, But Lives On. In Oklahoma City, legislators were called into Special Session to address the State’s financial crisis. State Senator Rob Standridge (R-Norman) used the first special session to reintroduce his “anti-swag” bill that failed last spring. The bill’s author believed that the bill

could save as much as \$30 million per year by prohibiting state agencies from spending money on promotional items such as pens and coasters. OFMA did contact bill supporters to remind them of the important role that some promotional items play in raising awareness of critical issues, such as “Turn Around, Don’t Drown” and stormwater quality efforts. Even though the bill failed soundly, many of its provisions were quickly incorporated into an Executive Order issued by Governor Fallin on November 21st. The wording of this order seems to allow for promotional materials that serve a genuine educational purpose, but the ambiguity will result in agency counsel and leadership having to determine covered expenditures.

OFMA will continue to monitor developments on the federal and state levels and will work on behalf of its members to provide education about reduction of flood risk. For further information on any legislative issue, please feel free to contact Tom Leatherbee, OFMA Legislative Director, at legislative@okflood.org.



TOM LEATHERBEE, CFM

2017 STRATEGIC PLANNING WORKSHOP

by W. B. Smith, P.E., CFM, 2016-2017 OFMA Chair

On behalf of the participants of the 2017 Strategic Planning Workshop, we are preparing the 2017-2018 Strategic Plan which will be submitted for adoption at the January 2018 Board meeting.

The document presents a summary of the work by participants at the 2017 OFMA Strategic Planning Workshop held at the River Spirit Hotel and Casino in Tulsa, Oklahoma on October 25-27, 2017, and is intended to serve as a resource to guide our organization throughout the upcoming year.

As in years past, the plan contains areas of special focus – or strategies – which will set the tone of the organization for 2017-18. These strategies were purposefully selected to enhance member services – to serve our OFMA members. The OFMA’s 2017-18 strategies are developed to (1) implement recommendations from the ASFPM Oklahoma Symposium, (2) diversify training opportunities, (3) increase member participation and (4) provide opportunities for rural communities and local rural FPAs. These four strategies served as the foundation for the development of the committee work plans that were developed throughout the Strategic Plan workshop.

Twenty-seven participants attended the 2.5-day Workshop. Participants included members of the Board, Regional Representatives, Committee Chairs and special guests who came together to craft a plan to further OFMA’s mission. One primary focus was to review, develop, and present for adoption the five (5) recommended initiatives from the ASFPM Oklahoma Symposium held in March 2017 which are as follows:

- 1. Incorporate Economic Development and Community Revitalization into Hazard**
- 2. Mitigation and Disaster Recovery**
- 3. Expedite the Risk Identification Process and Remove Barriers to Product Release**
- 4. Restructure Training Curriculum to Address Intermediate Needs**
- 5. Offerings for County and Rural Floodplain Administration**

The strategic plan document will contain discussions related to OFMA’s short- and long-term goals, as well as a review of past performance and opportunities for improvement. The document’s Introduction reiterates OFMA’s vision and mission, as these represent the principles guiding the brainstorming of future initiatives and strategies. Similarly, attention is given to past year performance to identify successes as well as needs and/or opportunities for improvement in the upcoming year. Lastly, the document also provides a detailed listing of activities – complete with time tables and anticipated budget needs – to be undertaken by committees and volunteers to further OFMA and its members. Once reviewed and adopted the 2017-2018 OFMA Strategic Plan will be posted on the OFMA website for review by all of our members.

I would like to thank each and every one of those dedicated individuals that participated in the two and ½ day Strategic Planning workshop, and who contributed in the crafting of this document. OFMA exists to serve its members, and because of your efforts, OFMA continues to meet this need.



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THE CITY PREPARING FOR CLIMATE CHANGE WITHOUT EVER SAYING THE WORDS

by Alan Greenblatt

Along with millions of other people, Anna America was saddened by the devastation and loss of life that struck Houston in August. Like many others, she wondered whether the city's massive sprawl contributed to the damage from Hurricane Harvey. Thousands of acres in Houston that the U.S. Army Corps of Engineers had intended to use for a reservoir and other flood control projects had been paved over, taken up by homes that left flood waters with nowhere to go. That kind of thing wouldn't happen where America lives. "We haven't done that for decades," she says. "Since the 1970s, we have not built noncompliant homes in floodplains."

America is a member of the Tulsa, Okla., City Council. In recent decades, Tulsa has become an unlikely model for strong flood control efforts. Back in the 1970s, so-called 100-year floods occurred nearly every year, with creek beds overflowing and damaging property. Following a particularly devastating storm in 1984, which killed 14 people and damaged 5,500 homes, the city decided it was time to take a new approach. Since then, it has put in place a series of detention ponds -- excavated basins designed to hold water following severe storms -- and uses flood maps more demanding than those required by the Federal Emergency Management Agency (FEMA). It's also pursued an ambitious plan to move or tear down homes that have been subject to repeated flood damage. All told, the city has paid to transport or destroy roughly 1,000 houses, an effort that's ongoing.

Tulsa's flood issues aren't over. Although the city has gone a long way toward reducing the overflow of its creeks, it hasn't done much lately to deal with another potential problem: flooding along the Arkansas River, which runs through parts of town. Still, Tulsa has done more to address its exposure to a serious natural threat than just about any other city in the country. Not that long ago, Tulsa had the highest flood insurance rates in the nation. Today, its rates are just about the lowest. Other Oklahoma cities continue to suffer extensive damage when sudden storms known as "toad stranglers" pass through. But Tulsa hasn't flooded on those occasions, even during recent months that have been among the wettest on record. "In 2015, there was flooding in the suburbs, but we didn't have any," says Bill Robison, the city's floodplain manager.

As a conservative oil town sitting 500 miles north of Houston and the Gulf of Mexico, Tulsa is a surprising setting for one of the nation's most extensive climate adaptation efforts. Its example, though, shows that local leadership and investment can do a lot to prevent damage from the predictable threats that are likely to worsen with climate change.

Communities like Tulsa, far from any coast, still face increased risks from a variety of disasters, including fires and tornadoes. Coping with these problems may take decades of investment and political fighting. It can be a tough sell for local governments that

want to create a safer and more secure future. It seems to be human nature to believe that disaster will not strike one's own home. Even when the worst does happen, people have a hard time accepting that it could easily happen again. "A natural disaster is not enough, in and of itself, to push cities to make real policy change," says Rachel Krause, a political scientist at the University of Kansas who studies responses to climate change. "Frankly, it takes deaths."

What's more, progress won't always happen under the words "climate change." In Tulsa, environmentalists have learned that in a town founded and fueled by the oil economy, the term is a surefire way to shut down discussion. They talk instead about "extreme weather," emphasizing the need to plan for reoccurring storms.

The same is true in many places. Progressive coastal cities such as Boston and Seattle now formally worry about sea-level rise and other effects from climate change as part of their policymaking process. But in many areas of the country, the idea that the climate is changing in permanent and unpredictable ways is not an accepted fact. That doesn't mean, however, that no thought is given to recurrent problems such as flooding, hurricanes and wildfires. Every city has some plan in place for dealing with natural disasters and emergencies. Thinking about climate could simply mean taking possible effects into account as part of broader planning and response efforts. "We don't freak out, to use a highly technical term, if for political reasons, folks don't want to say 'climate change,' as long as they are taking steps to address climate change," says Otis Rolley of the Rockefeller Foundation, which has provided funding to Tulsa and other cities to support climate resilience efforts.



Anna America, a member of the Tulsa city council, says that since the 1970s the city hasn't allowed building in floodplains. "Because we haven't been hit by a major storm since 1984, people think we've solved the problem."

By its very nature, climate change will have unpredictable effects. But many of its main effects are entirely predictable. Places that are prone to natural disasters will likely see more of them. If a region experiences hurricanes, for example, it will have more intense hurricanes. If it is routinely hit by floods, there will be more flooding. And regardless of whether climate change is an accepted fact, it's clear that the gears of nature's disaster-making machinery are speeding up. During the 1980s, the nation endured, on average, fewer than three natural disasters per year that caused \$1 billion in damage, in constant dollars. Now, the annual count is higher than 10.

A decade ago, the idea that places should adapt and prepare themselves to endure new and strange effects, rather than working to prevent climate change by lowering their carbon emissions, felt to some environmentalists like an admission of defeat. Those days are over. Even if no more carbon were put into the atmosphere, cities and counties would still be facing a set of climactic circumstances unlike those they have seen in the past. Planning for the obvious stuff -- locally recurring issues such as floods or fires -- should be a given. It's possible that the season of destruction wrought by Harvey, Irma and Maria will lead the nation to think about taking steps to prepare for disasters in the places where they're most likely to occur. Prior storms such as Katrina and Sandy led to tighter building regulations. Two weeks

What the story of Tulsa shows is that protecting against climate effects is an effort that has to be more or less permanent, stretching across generations. It's doable, but it's certainly not easy, either from an engineering standpoint or a political one. The only places that will make the attempt are the ones where people realize that, practically speaking, there's no better choice. The alternative is continuing destruction and death. "We're never, ever going to be able to say we're done with disasters," says Tim Lovell, executive director of the Disaster Resilience Network, a nonprofit group in Tulsa. "Disasters are going to continue. The question is whether you can design your community so that they don't have the impact they might have."

When it comes to natural disasters, Oklahoma has it all. The state constitutes a central stretch of what's known as Tornado Alley. Thanks to oil industry fracking, Oklahoma has supplanted California as the place where residents are most likely to experience damage from earthquakes. The wind that comes sweeping down the plains causes damage. So do hail and ice storms. The sun shines most days, but storms are so common that the Tulsa Voice, the local alternative weekly, includes "Best Place to Wait Out Extreme Weather" as a category in its annual "Best of" awards. This year's winner, appropriately, was a basement bar called the Cellar Dweller.

"EVERYTHING CHANGED IN 1984. ON MEMORIAL DAY, 15 INCHES OF RAIN FELL WITHIN SIX HOURS, ACCORDING TO ONE GAUGE. IN ADDITION TO THE 14 DEATHS, 288 PEOPLE WERE INJURED AND 7,000 VEHICLES WERE DAMAGED OR DESTROYED."

before Harvey engulfed Houston, however, President Trump rolled back an Obama-era order making it easier for storm-struck communities to use federal emergency aid to rebuild structures in ways that strengthened them against future disasters. "Raising additional money is harder without the impetus of a catastrophe," says Janet Bly, general manager of the Miami Conservancy District in Dayton, Ohio, a flood control agency created a century ago. The lack of problems since then in her area have made it hard to keep people focused on the potential for devastation, she says. "We're almost the victim of our success when it comes to that."

There's kind of a pattern: A community endures one bad event after another, until finally it experiences something so catastrophic that it's ready to address the problem. That certainly held true in Tulsa. Residents put up with recurring floods for decades. It was the fatal flood of 1984 that led to change. Even with the 14 deaths and extensive damage fresh on everyone's minds, it took a dedicated band of individuals, inside and outside of government, who were willing to spend years pushing the issue. Their success has since bred complacency. Plenty of people now wonder whether it isn't time to rebuild along Mingo Creek, particularly a mile-long stretch that has since been denuded of homes. New projects are also being proposed along the Arkansas River, which has historically been prone to severe floods.

Tulsa sits on the edge of the 1930s Dust Bowl, but for most of the 20th century it was plagued by floods caused by sudden squalls or cloudbursts. The city experienced major floods in 1923, 1943, 1957 and 1959. "The river would flood routinely," says Tulsa Mayor G.T. Bynum. "My parents' generation, and certainly my grandfather's, all have stories about taking sandbags down to Brookside to keep stores from flooding." In response to repeated flooding in Brookside and other neighborhoods, the Army Corps of Engineers completed Keystone Dam, which is about 25 miles south of Tulsa, back in 1968.

But around that same time, Tulsa annexed unincorporated land to its east, tripling its size and taking in homes that had been built under next to no regulation whatsoever. The Mingo Creek watershed was a particularly popular place for development. Wooded streams are always a scenic place to be. Tulsa back then was making the same mistake Houston has since made, building without concern for where the displaced water was going to go.

Flooding seemed to intensify during the 1970s, back when Bynum's grandfather was serving as mayor. A total of nine federal flood disasters were declared between 1975 and 1980. People who'd been washed out of their homes would come to city hall to demand action, sometimes still covered in mud -- or so the local legend goes. Many of them also talked to Ann Patton, then a

The City Preparing for Climate Change..., con't.

reporter with the Tulsa World, whose articles helped keep up the pressure on the city government. Patton, who ended up working on flood issues for the city, became an ally of Tulsans for a Better Community, a citizens' group that pressed for serious flood management efforts from city hall. "We had a war going on between the citizens and the development community," recalls Ron Flanagan, a longtime planner in Tulsa. It was dubbed the "great drainage war" by the local media.

The city government passed some ordinances to address flooding, but homebuilders and developers pushed back, raising money to support candidates who were sympathetic to their needs. Their efforts helped lead to the election of James Inhofe as mayor in 1978. Inhofe would go on to national fame as the leading climate change denier in the U.S. Senate. He told Flanagan and others working on flood control efforts that their services wouldn't be required during his administration. Some stuck around, but several of them scattered to jobs in other states.

Everything changed in 1984. On Memorial Day, 15 inches of rain fell within six hours, according to one gauge. In addition to the 14 deaths, 288 people were injured and 7,000 vehicles were damaged or destroyed. Total losses were estimated at \$180 million (\$415 million in today's dollars). As it happened, many of the former officials and activists concerned with the flood issue -- they called themselves the "flood friends" -- had gathered in Tulsa over the holiday weekend for a reunion. Terry Young, who had been sworn in as mayor 19 days earlier, summoned Flanagan and two others that night to work out a plan to try to address flooding along the creeks once and for all.

Young, a one-time weatherman, had made stormwater management a centerpiece of his campaign, having heard so many complaints about flooding during his years on the county commission. While the typical response after a catastrophe was and is to help people rebuild, Young convinced a bare majority of the city council to pass an ordinance forbidding homes that had been damaged in that particular flood from being rebuilt. That ordinance gave him leverage to come up with a longer-term plan. It made no sense to keep rebuilding in the same place, Young had concluded. Some homes, then worth \$30,000, had received as much as \$100,000 in federal payments due to repeated losses. The mayor decided it was smarter to buy out the owners and tear down the houses. "When you have that kind of repetitive flooding, and the house is still there like a sitting duck -- it's just stupid policy," Young says.

The city's plan was to pay homeowners not only what their houses had been worth before the flood, but what they'd have been worth if they hadn't been built in a floodplain in the first place. The city would also pay moving and relocation costs, throwing in a \$1,000 bonus if people moved somewhere outside of a floodplain.

Selling the plan took a lot of work, both locally and at the federal level. Young argued that Tulsa faced significant legal exposure if it continued to approve permits in areas prone to flooding. The moratorium on rebuilding helped prod the development community and get it to agree to the new regulations. And the city was able to convince FEMA and Congress that it was cheaper in the long run to buy people out than to keep making them whole

after each storm, getting the feds to kick in a sizable percentage of the cost.

Local planners and environmentalists held what they called "wine and fees" parties, trying to convince residents and business owners it would be more cost effective in the long run if they paid monthly stormwater fees to help pay for infrastructure improvements, overseen by a stormwater management board created in response to the 1984 flood. Those fees have paid for maintenance of the concrete flood walls and detention ponds that dot the city. With the detention ponds, the city got creative -- it built floodwater basins that could also serve as recreational facilities. The students playing tennis at the University of Tulsa or the kids shooting hoops at McClure Park may not know it, but they're standing on detention ponds. Creating open space made the idea appealing to the public. "It would have been a killer to say we're buying land to hold water for one day every 10 years," says Flanagan, the planner who's designed several of the parks that are part of the flood control system.

During World War II, the Army Corps of Engineers reached a reasonable, if basic, conclusion: Oil and water don't mix. In order to protect Tulsa's oil operations, which were considered essential for the war effort, the Corps built a 20-mile-long levee system along the Arkansas River, protecting industry, railroad lines and housing. The barriers were thrown up fast. The levee, which was made of local clay, has been maintained since, but not updated. The seven pumping stations along the levee are dependent on the kind of parts you'd expect to find in the laboratory of an old horror movie: pulleys and levers and mercury switches of a kind that aren't even made anymore. "Parts? There are no parts," says Todd Kilpatrick, the levee commissioner. "We take the pieces to a machine shop and try to meld it together. Isn't it amazing in 2017 a city is relying on this to keep it safe from floods?"

Some of the levee's drains have been clogged for years. The levee is on the Corps' list of facilities at "very high risk" of failure. Kilpatrick traveled to Washington this summer in search of funding. At this point, he's seeking \$100,000 in federal funds for a



Planner Ron Flanagan has fought for decades to improve drainage -- and designed many much-used parks in the process.

The City Preparing for Climate Change..., con't.



Maybe this fall's set of deadly hurricanes will alert Washington to the need to protect areas at risk. That's the hope of Todd Kilpatrick, the levee commissioner.



Longtime resident Ted Marsh recalls getting flooded, but has no intention of leaving.

feasibility study to find out what updating the levee would cost. "We have an aged-out levee system that protects over \$2 billion worth of assets and thousands of people," Kilpatrick says. "You can fix this levee for a heck of a lot less than \$2 billion."

Kilpatrick is hoping that Harvey, Irma and Maria will convince Congress it makes more sense to be proactive and repair systems that are known to be at risk. But he's not especially optimistic. Common sense would tell you it's cheaper to prevent disaster than respond to it, but history shows that people are more willing to spend the money on response. Memories are short following a disaster. For instance, the levee was breached in 1986 in Sand Springs, just across the river from Tulsa. But when the Oklahoma University Climate Science Center sent interns out recently to interview area residents about their awareness of flood risk, many of those questioned didn't even know they were protected by a levee. It's hard to convince people that flooding is a real risk when the river's dry and they're looking at sand. When the water dries out, says Patton, the former reporter, so does the commitment. "With success come amnesia and overconfidence," she says.

Last year, Bynum convinced voters to support a redevelopment package that includes new dams on the river to create a lake and a park that will feature construction of a new island, with an inlet for water sports. The Arkansas River is now a dry riverbed most of the time as it runs through Tulsa, with water released once a day for hydropower. Filling parts of it with water makes sense, Bynum says. He's grateful to earlier generations of local leaders for taking creek flooding off the list of things he has to worry about. Now, he argues, it's time to restore one of the city's prime assets: access to the water.

Patton and some of the other old hands who crafted the city's flood management policies feel guilty in retrospect that their plan mainly addressed creek flooding and didn't do much to address potential dangers along the river. They worry that Bynum is making a mistake by putting obstacles into the river itself that may only worsen flooding at some later date. Young, the mayor back during the early days of the flood control efforts, is currently suing the city in hopes of blocking construction of a riverside strip mall.

Bynum insists that the development will be safe and that it comports with the Corps' master plan for the river.

But the question is always whether safe is really safe. This era of severe storms has eroded the sense that the old 100-year-flood maps are reliable. Tulsa refused a recommendation from the stormwater management board to adopt the 1986 Arkansas River flood as the flood of record. That would have required builders to elevate structures beyond that highwater mark. Last year, to remember the 30th anniversary of the storm, the city put up a sign noting where the highwater mark was. It was taken down by order of the previous mayor within 24 hours, due to political pressure from a developer who noticed that it clearly showed nearby homes would be flooded if water again reached that level. "The administration said we have to accept some level of risk," says Robison, the longtime city engineer, who himself was flooded out in 1984. "Probably, if you put it to a vote of the people, they'd agree, because of that feeling of complacency."

Despite the conviction among environmentalists that a great deal more must be done, the reality is that Tulsa has made great strides in protecting its residents from much of the foreseeable danger. Just ask Ted Marsh, who lives a few blocks from Mingo Creek. Back in 1984, his house took in 28 inches of stormwater. Since then, he's done what he can to fortify the place, piling up rocks and dirt in front and back of his house, and running a pipe alongside, out to the drainage ditch. But he knows his biggest break came when the city tore down the house next to his, along with others on the block. When it rains, those grassy homesites turn into ponds, holding the water and keeping it out of Marsh's living room.

Marsh likes things that last. He's replaced the engine several times on a 1953 Ford that now has more than a million miles on it. He believes that, with the city's help in creating open space along his block, his house will last, too. "I figure this will go to my son, or grandson," he says. "I'd like to keep it in the family as long as I can."

Source: Reprinted with permission from the November 2017 edition of Governing Magazine.

EDITOR'S NOTE: THE CITY OF TULSA, BILL ROBISON AND RON FLANAGAN WERE ALSO FEATURED ON NPR'S MORNING EDITION. TO LISTEN, GO TO: [HTTPS://WWW.NPR.ORG/2017/11/20/564317854/HOW-TULSA-BECAME-A-MODEL-FOR-PREVENTING-FLOODS](https://www.npr.org/2017/11/20/564317854/how-tulsa-became-a-model-for-preventing-floods)

Lessons and Consequences of The Record-Setting 2017 Hurricane Season, con't.

With the right products and pricing strategy, researchers say insurers could seize \$30 billion to \$50 billion in untapped revenue just on flood risk insurance.

"The past year's virulent hurricane season highlights the need for a structural answer to the longstanding national insurance gap," the McKinsey & Co. report states. "Indeed, the increasing threat of catastrophe coupled with the large number of uninsured and underinsured individuals and businesses creates an opportunity, if not a responsibility, for insurers and policymakers to act."

10-point executive checklist

The historic 2017 hurricane season posed a question to the insurance industry and the country about its readiness for future large-scale catastrophes like Hurricanes Harvey, Irma and Maria.

Researchers of the McKinsey & Company report offer a 10-point checklist for insurance practitioners to reflect on in the wake of future natural disasters. They are:

1. How fast did we have an accurate estimate of our losses? Were those aligned with our risk appetite and risk tolerance?
2. Are we satisfied with our claims process after the most recent catastrophes? How satisfied are our customers about their claims experience with us? Have we actually measured it? How has it affected our retention rate? How could we improve further?
3. Are we prepared for reputation risks? How so? Who is responsible and accountable for these risks?
4. Have the catastrophes revealed surprises about our underwriting process and pricing models? Have our underwriters taken more risk than we are compensated for?
5. What is the disaster's expected impact on rates? How is that impact influencing our underwriting strategy for the coming year and our financial targets?
6. How can we move our organization from "payer" to "partner" of our clients? What new services, capabilities, and organizational changes are required to do it at scale?
7. Can the industry, including InsurTech, significantly innovate to reduce the insurance gap, whether on flood/earthquake risk for homeowners and small businesses or by developing new products dedicated to local or state governments?
8. Would we support some states in establishing an opt-out policy for flood risk attached to homeowners and small-business property insurance?
9. How can the industry act together more effectively to propose a new paradigm for private-public risk sharing?
10. How can we engage our governing board (or equivalent) more proactively on these topics?

Source: Reprinted with permission from Danielle Ling, PropertyCasualty360.com.



Hurricanes Harvey, Irma and Maria contributed to the most costly hurricane season on record in 2017, as insured losses are expected to exceed \$200 billion. (Photo: Shutterstock)



Reflecting on the consequences of 2017's string of natural disasters, McKinsey & Company researchers offer 3 key tactics for insurance professionals to consider going forward. (Photo: AP Images)



Last year saw flooding in areas not on the federal flood map, like here in Houston, Texas after Hurricane Harvey. A majority of residents in these areas were uninsured or underinsured, making these natural disasters even more costly. (Photo source: Shutterstock)

2018 ADVANCED TRAINING SCHEDULE*

*Subject to change. Contact the Oklahoma Water Resources Board to register.

DATE	LOCATION	COURSE TOPIC	TRAINERS	FACILITATOR
2/21/2018	McAlester Eastern Oklahoma State University	No Adverse Impact State of The Art Green Building in The Floodplain Building Resilience/Fortified Homes Ethics in Floodplain Management Section 404 Permitting in The Floodplain	Ron Flannagan CFM Ellen Stevens P.E., CFM Tim Lovell Joe Remondini, P.E., CFM USACE	Joe Remondini, P.E., CFM
3/7/2018	Clinton Frisco Center	Green Building in The Floodplain Floodproofing Concepts Section 404 Permitting in The Floodplain Building Resilience/Fortified Homes Oklahoma Hazard Mitigation Programs	Ellen Stevens P.E., CFM Joe Remondini, P.E., CFM USACE Tim Lovell Matt Rollins, OEM	Joe Remondini, P.E., CFM
3/28/2018	Chickasha TBD	Community Support for Higher Standards Floodplain Code Variances Section 404 Permitting in The Floodplain Substantial Damage/ Disaster Response Ordinance Basics /NFIP Standards	Monica Cardin CFM Jeff Bigby, P.E., CFM USACE Bill Smith, P.E., CFM Tom Leatherbee, CFM	Bill Smith, P.E., CFM
4/17/2018	Langley GRDA Ecosystems and Education Center	Overland Flow Building Resilience/Fortified Homes Ethics in Floodplain Management Floodproofing Section 404 Permitting in The Floodplain	Ron Flannagan CFM Tim Lovell Jeff Bigby, P.E., CFM Joe Remondini, P.E., CFM USACE	Joe Remondini, P.E., CFM
4/24/2018	Edmond Oklahoma Employee Credit Union	Oklahoma Hazard Mitigation Programs No Adverse Impact State of The Art Substantial Damage/ Disaster Response Building Resilience/Fortified Homes Section 404 Permitting in The Floodplain	Matt Rollins, OEM Ron Flannagan CFM Bill Smith, P.E., CFM Tim Lovell USACE	Bill Smith, P.E., CFM
5/9/2018	Broken Arrow Central Park Community Center	Ethics in Floodplain Management Building Resilience/Fortified Homes Overland Flow Process for New Studies Section 404 Permitting in The Floodplain	Jeff Bigby, P.E., CFM Tim Lovell Ron Flannagan CFM Brandon Claborn P.E., CFM USACE	Jeff Bigby, P.E., CFM

TURN AROUND DON'T DROWN®

2018 CALENDAR POSTER CONTEST

The Turn Around Don't Drown® Poster Contest is held annually by the Oklahoma Floodplain Managers Association (OFMA) to promote flood hazards awareness and provide safety education to Oklahoma children. All Oklahoma's 3rd, 4th and 5th graders may participate, and winners are eligible for cash prizes and more!

Contest winners are chosen at three levels (school, regional, and state), and students are eligible to win a place at each level. Winners appear on the Turn Around Don't Drown® calendar published each fall and may receive \$150 for 1st prize, \$100 for 2nd prize or \$50 for 3rd prize plus trophies and certificates. Also, students and teachers receive a certificate of appreciation, and the school is provided a media release.

Poster submittals are due by April 1st, 2018. Visit <http://www.okflood.org/awards/poster-contest/> for additional information.

2018 SPRING TECHNICAL WORKSHOP • APRIL 5, 2018

WHAT'S GOING ON IN YOUR FLOODPLAIN?

OFMA is inviting speakers to present at our 2018 Spring Technical Workshop in Catoosa, Oklahoma. Topics of discussion should relate to one of the following:

- 1 Day-to-Day Floodplain Administration
- 2 Floodplain Management (stormwater quality, floodplain habitat, transportation or bridges, stream restorations, watershed groups, home buyouts, sewer projects, parks or other flood tolerant land uses, floodplain mapping or mapping revisions, green infrastructure, CRS activities, flood mitigation)
- 3 State and Federal Agencies and Programs (NFIP, FEMA, OWRB, OEM, ODEQ, OFMA or other)

Abstracts are due by February 9, 2018. If you are interested in presenting or know someone who would, please contact Jeff Bigby at (918) 259-7000 x 5243 or JBbigby@BrokenArrowOK.gov org.

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