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1989 George H.W. Bush becomes the first V.P to declare himself POTUS since Martin Van Buren (1837). Michael Jordan, in his 5th year in the NBA, scores his 10,000th point. GPS launches its first of 24 satellites. Exxon Valdez runs aground spilling 11+ million gallons of

Our 30th Year of NCAFPM

crude oil on the Alaska coastline. China's population reaches 1,100,000,000. A lone protester at Tiananmen Square holds up a column of tanks after hundreds are killed. AP names Wayne Gretzky and Martina Navratilova "Athletes of the Decade." Hugo comes ashore as a Cat 4 just north of Charleston, SC, causing billions in damages in NC and SC. For 1 second on June 7, the time is 01:23:45, 6-7-89.

2019 Plan now on attending the NCAFPM Annual Conference in Atlantic Beach, April 28-May 1, for a celebration of the 30th anniversary of NCAFPM. We welcome your ideas and assistance in making this event a truly memorable one. Some of the planned events include:

- Invitation to NC's Brock Long, FEMA Administrator, for keynote address
- 30 player golf tournament
- Anniversary "Silent Auction"

We are planning an event where vendors, program, social events, and field trips will reflect this special occasion. Help make this a great event by planning on attending, participating, volunteering, and/or offering ideas!

2019 Annual NCAFPM Spring Conference

Membership Renewals Due in January for all Members

It's almost time to renew your NCAFPM membership. You will soon receive an invoice via email for your 2019 membership. Payment is due by January 31 to keep your membership current.

The reason you may have joined NCAFPM in the first place was for the discounts to NCAFPM's two conferences and the CFM renewal discount. But many of you have been members for years and we want to remind you about why:

NCAFPM is an association that helps you broaden your knowledge base through webinars and conferences. Membership means belonging to a community of more than 400 state-wide passionate experts who are always ready to mentor and lend advice on navigating the sometimes tricky waters of floodplain management. Regional representatives are your point of contact for questions and for bragging rights after you've done a great project. Members of our association include government employees (state, local, FEMA), consultants, and manufacturers of products used in floodplain management. We also put out this bi-annual newsletter with timely information about what's going on in the floodplain management world.

From the Chairman's Desk



AMIT SACHAN, PE, CFM
NCAFPD CHAIRMAN

My Floodplain Manager Friends,

What a busy hurricane season it has been for our state! Among the most noted to make landfall were Hurricanes Florence and Michael in September and October, respectively. Communities in eastern North Carolina were hit especially hard during Hurricane Florence. Proactive planning and prompt action by various entities including the federal agencies, state departments (NCEM, NCDOT, etc.), and local community officials limited damage caused to the lives and properties in these communities. We are grateful to our fellow floodplain managers who worked tirelessly in these events.

On the heels of these hurricanes, floodplain managers across North Carolina gathered in the City of Asheville for the annual Fall Floodplain Institute. Many shared their experiences from Hurricane Florence, including some from the City of Lumberton and the City of North Topsail Beach. We were also fortunate to have David Maurstad, FEMA's Deputy Associate Administrator for Insurance and Mitigation, to speak about NFIP and federal funding. The conference also showcased technical sessions including two-dimensional (2D) dam break modeling and a field visit to the City of Asheville's stormwater, stream restoration, and greenway project sites. The board also honored visionary leader John Dorman for his years of service as NCFMP director before his retirement at the year end.

Going forward, we are gearing up for our 30th anniversary celebration at our Spring 2019 Annual Conference in Atlantic City. We also have several exciting initiatives in the works including a college scholarship program and a webinar series.

- **College Scholarship Program:** the NCAFPD board is offering a two \$500 scholarships to college students at North Carolina Schools to promote education in floodplain management-related fields (more about the scholarship initiative on page 5). Please encourage prospective candidates to apply for this inaugural scholarship program.
- **Live Webinar Series:** Another program that is gaining momentum is the NCAFPD's Live Webinar series. We had two sessions earlier this fall: the first presented by Dan Brubaker (NFIP Engineer) and the Jerry Snead (NCDOT Hydraulics Unit). Both were very well received. Due to the popularity of webinar series, the board has made it a member benefit. A third webinar is being planned for January 2019. See more about the webinar program and the upcoming webinar on the next page.

I can't be more excited about our planned programs, and I am confident that our membership will value them. Consider getting involved in the organization as a committee member, board member, or active participant. Our membership can benefit from your service, so please feel free to share your suggestions and comments on events and programs. We value your feedback and we consider it an opportunity to improve. I hope that you all have a safe and joyous holiday season and that you will join us at Atlantic Beach for our 30th Anniversary Celebration in the spring. ▲

A handwritten signature in blue ink that reads "Amit".



The North Carolina Association of Floodplain Managers now offers regular webinars on current topics in floodplain management. We have already had two successful webinars, and pdf files of their slides are included on the training page (under “Resources”) on the NCAFP website:

- July 10, 2018: Dan Brubaker, PE, CFM (NC Emergency Management)
“Floodplain Management Regulations”
- October 5, 2018: Jerry Snead, PE, CFM (NC Department of Transportation)
“NCDOT and NCFMP Collaboration”

Upcoming Webinar – January 31 at noon

Our next webinar will be led by Timothy J. Trautman, PE, CFM, Engineering & Mitigation Program Manager for Charlotte-Mecklenburg Storm Water Services. The topic will be “Planning for Future Hazards” and the webinar will be held Thursday, January 31, 2019 from 12-1 PM. Register by Monday, January 28. Cost is free for NCAFP members and \$20 for non-members. Registration is now open.

Planning for Future Hazards

This webinar will discuss floodplain management strategies aimed at reducing future damage from flooding. In recent years many North Carolina communities have been severely impacted by flooding on multiple occasions. Floods will come again to all NC communities. The only question is how much more or LESS damage will happen in your community the next time. In this webinar we will discuss planning and recovery strategies aimed at short term and long term risk reduction. In addition, we’ll discuss how setting a floodplain management vision, in partnership with local stakeholders, will lead to long term resilience. ▲

Tim Trautman, PE, CFM, is the Engineering & Mitigation Program Manager for Charlotte-Mecklenburg Storm Water Services in Charlotte, North Carolina. He is actively involved in national flood policy issues with the Association of State Floodplain Managers (ASFPM). Mr. Trautman oversees a \$10M annual program that includes water quality and flood mitigation capital improvement projects, local mitigation planning, flood warning, and floodplain map maintenance. He has B.S. and M.E. degrees in civil engineering from the State University of New York at Buffalo.

Education & Outreach

DAN TOMCZAK, CFM | NCAFPM EDUCATION AND OUTREACH COMMITTEE CHAIR



Melonee Brock of Mecklenburg County Storm Water working with students and the flood model at the Catawba River STEM Learning Fair in Huntersville in September 2018.

Catawba River STEM Learning Fair

NCAFPM teamed up with the Mecklenburg County Storm Water Department at the 8th Annual Catawba River STEM Learning Fair at the Duke Energy Explorium in Huntersville, NC. Deania Russo (Mecklenburg County Storm Water) and Melonee Brock (NCAFPM/Mecklenburg County Storm Water) were on-hand to demonstrate and discuss the different hazards caused from flooding. The event has grown to over 650 fifth grade students attending from Gaston, Mecklenburg, and Cabarrus Counties. The WARD Flood Model was used to demonstrate the hazards of flooding with various scenarios of what could increase the severity of flood events and what could be done to mitigate or prevent future flooding. The students were very enthusiastic while creating different examples of what could happen and how they could solve flooding issues. Be on the lookout for this new generation of talented modelers, engineers, and designers!

NC-APWA Storm Water Conference

Cindy Lancaster and Amy Black, both with JEWELL Engineering Consultants in Kernersville, led discussions and demonstrated the WARD Flood Model at the American Public Works Association (APWA)–North Carolina Chapter Stormwater Management Conference in

Winston-Salem in October 2018. The session at the conference in which they participated was attended mostly by stormwater professionals involved in public education and outreach efforts across the state. Several attendees indicated interest in using the flood model as part of their “Creek Week” public education programs being planned for 2019.

In addition, in October 2018, Cindy Lancaster demonstrated the flood model in the high school engineering class that her husband teaches at Westchester Country Day School in High Point. Cindy really enjoyed sharing with the students about the range of specialties and fields of study within civil engineering, and in particular the work of engineers in the area of water resources.

— continued on next page

(Right) Cindy Lancaster of JEWELL Engineering Consultants leading discussions with a high school engineering class at Westchester Country Day School in High Point, October 2018.



Other Opportunities

There are many other outreach opportunities for members to become more involved with NCAFPMP, including the High Water Mark Initiative, NFIP, community workshops, and the Catawba River STEM Festival. If you are interested in becoming involved in outreach for NCAFPMP or potentially using the Ward's flood model for an upcoming event, please feel free to contact daniel.tomczak@jacobs.com.

NCAFPMP College Scholarships for 2019

NCAFPMP is pleased to be offering two \$500 scholarships in 2019 for undergraduate college students interested in pursuing a field related to floodplain management (hydrology and storm water, engineering, planning and zoning, coastal management, hazard mitigation, emergency management, surveying, GIS and mapping, etc.). The application process will be open to all students attending a college or university in North Carolina, and we strongly encourage application submissions by students enrolled at Historically Black Colleges and Universities (HBCUs) or Minority Serving Institutions (MSIs) with a baccalaureate degree program as well as students enrolled at a technical community college with an associate degree program.

Application materials are on the NCAFPMP website's Education and Outreach webpage (under Resources). The deadline for submittal of the application is January 31, 2019, and the scholarship recipients will be formally announced at the NCAFPMP Annual Conference in April 2019. If you have any questions, please contact Dan Tomczak (daniel.tomczak@jacobs.com). ▲



Check out NCAFPMP on social media!



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[NCAFPMP](https://www.linkedin.com/company/ncafpmp)



[@NCAFPMP](https://twitter.com/NCAFPMP)

ELEVATION CERTIFICATE Forms

Current ELEVATION CERTIFICATE forms are set to expire November 30, 2018.

NCAFPMP has confirmed with ASFPM that direction has been received from FEMA that the current version should be used until further notice. FEMA is in the process of preparing an official Bulletin conveying this information.

(Thank you to Del Schalls, Region 4 Director and Kamille Valenzuela-Sanches, ASFPM Main Office, for this information.)

2018 NCAFPM Fall Floodplain Institute REPORT

JOHN FULLERTON, CFM
NCAFPM CONFERENCE CHAIR

NCAFPM returned to the Crowne Plaza Tennis & Golf Resort in Asheville, NC, October 17-19 for our 13th Annual Fall Floodplain Institute (FFI). The last time we were in this venue was 2009 and the hotel and grounds have gone through many changes since then. The facilities, grounds, food, and hotel staff helped to make this a very successful conference and much positive feedback has been received from the participants.

The conference started with a golf tournament on Wednesday morning at the Donald Ross-designed Asheville Municipal Golf Course. Seventeen golfers teed off (see related story on page 7) at “dawn’s early light” and finished in time for the opening session of the conference.



Highlights of the opening plenary session on Wednesday afternoon included outstanding presentations from FEMA’s David Maurstad, who flew in from Washington, D.C. to share his expertise on insurance needs and issues within FEMA and FIMA. He was followed by Joshua Palmer, Senior Service Hydrologist with the National Weather Service, and John Dorman who brought us up-to-date on North Carolina’s floodplain mapping program. The afternoon sessions led into an early evening Exhibitor’s Social before attendees were accorded time for dinner on their own with the plethora of fine Asheville eateries.

Thursday morning began with a plenary session presentation by NCEM’s Gary Thompson, who discussed NC geodetic survey and updates along with the partnership with

NCSS for high water mark collection. Timely presentations were then heard from John Dorman, Deborah Hill, and Brandon Love regarding the very recent hurricane Florence as experienced by NCEM, North Topsail Beach, and the City of Lumberton respectively.

John Dorman closed out the morning session with a review of NCEM’s disaster response and the data used and gathered for the hurricane event. Following John’s presentation, NCAFPM and the gathered audience recognized John’s incredibly great contribution to the state, its people, and the field of floodplain management, mapping, hazard mitigation, and resiliency. John was presented with tributes from several individuals along with a NC gift basket and plaque in recognition of his long time outstanding work. John retired from NCEM effective October 31, 2018, and has been a good friend and supporter of NCAFPM.

Breakout sessions filled the rest of Thursday’s program along with a CFM review session and a City of Asheville field trip (see related story in the Region F report on page 19). The breakout sessions continued Friday morning while ten people took the CFM exam.

Thanks to all our exhibitors and general sponsors: AECOM, Atkins, ESP Associates, Moffatt & Nichol, Muscle Wall, Quantum Spacial, Smart Vent, STEWART, and Surdex Corporation. Thanks also to our break sponsor, Freese and Nichols.

A special "Thank You" to all attendees. Your comments, suggestions, critiques, and participation are always welcome.



Fall Floodplain Institute Golf Tournament

Seventeen intrepid souls made their way through the dark and rain drenched streets of Asheville to arrive with the dawn at the Asheville Municipal Golf Course.

The previous night's showers did nothing to dampen spirits, and coffee and Dunkin' Donuts set the mood for some good camaraderie and fun. A modified shotgun start from holes #17, #18, and #1 was initiated at 7:50 a.m. and the five groups were off.

This Donald Ross-designed course is like playing two different courses as the front nine are all spread out before the golfers in an almost meadow appearance while the back nine takes them behind the clubhouse and into the "mountains."

Aaron Carver, John Gerber, Scott Homewood, and Bill Tingle came in with the lowest score in the Captain's Choice format while Butch Kun, Stephen Smith, Rick Wallace, and Nick "Tiger" Woods finished a close second. Bel Marquez (our only woman participant this year), Nathan Slaughter, and Gregg Way finished third. John Fullerton, Joe Kirby, and Patrick Ritchie, fourth. Fifth place was secured by Ken Ashe and Mike Hanson with front nine help from Amit Sachan. Ken and Mike had the advantage/disadvantage of having to take two shots on each hole of the back nine.

Closest to the pin honors went to Rick Wallace and Bel Marquez received the modified "longest drive" award.

Thanks to all participants and special thanks to Rick Wallace and Quantum Spatial for a gift of golf balls for each participant.

Everyone made it back for the opening session of the conference and we'll be looking for a great time in April 2019 at Atlantic Beach with a tournament that helps commemorate NCAFPM's 30th year. We'll be looking to host at least 30 golfers so start thinking about your foursome now! ▲

Presentations Available

The presentations from our speakers have been posted on our Conference webpage (ncafp.org/conference.html). Please send a note to [Kelly Keesling](#) if you have any trouble obtaining a presentation.

Continuing Education Certificates

The credits from the conference are currently have been processed and attendees should have received their certificates via email at the beginning of November. Contact [Kelly Keesling](#) if you have any questions. ▲



Congratulations John!

John Dorman was recognized for his contribution to North Carolina, its people, and the field of floodplain management, mapping, hazard mitigation, and resiliency. He was presented with a plaque in recognition of his long-time outstanding work. John retired from NCEM effective October 31, 2018.



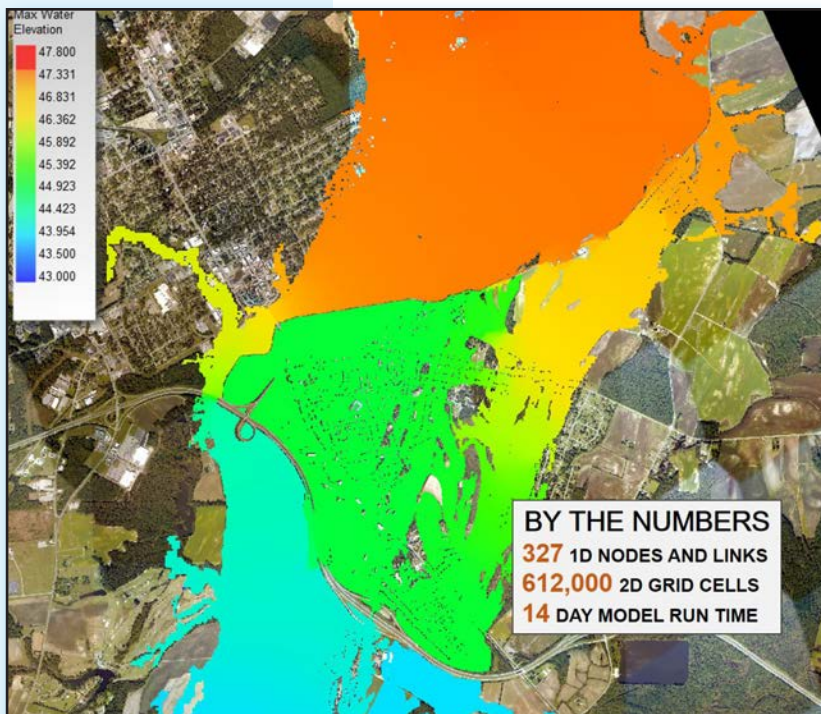
Flood Resiliency and Modeling in Princeville and Tarboro, NC

JOHNNY MARTIN, PE; RYAN SMITH, PE; ALLISON BRYAN | MOFFATT & NICHOL

The Town of Princeville was established in 1865 by freed slaves following the Civil War, making it the oldest town incorporated by African Americans in the United States. This history is a source of pride for Princeville residents and remains an important part of the town's identity today. The Town of Tarboro is located opposite Princeville on the western banks of the Tar River. Princeville and portions of Tarboro are situated in low-lying areas of the Tar River floodplain, making them susceptible to extreme flooding. The Town of Princeville is bordered by an earthen levee system constructed by the U.S. Army Corps of Engineers in 1967 to provide a heightened level of flood protection for its citizens. Since the construction of the levee, two major storm events have caused significant flooding in the area: Hurricane Floyd in 1999 and Hurricane Matthew in 2016.

During Hurricane Floyd, the Tar River basin received approximately 14 to 18 inches of rain, resulting in catastrophic flooding in Princeville and surrounding communities. Flood waters reached depths of up to 20 feet and the earthen levee system was overtopped. Flooding in the towns following Hurricane Matthew was less severe than during Floyd, but major flooding still occurred. Primary roadways remained inundated for several days before flood waters subsided, hindering travel through much of Princeville and Tarboro.

During large storm events, a considerable lag occurs between localized flooding due to storm rainfall in the towns and prolonged, severe flooding due to high flows and elevated stages in the Tar River. Following the rise of the river, water flows into Princeville through ungated culverts and ditches, around the levee system, and over existing roadways.



In order to fully understand the existing issues and develop potential solutions, it was decided to complete a detailed hydrologic and hydraulic study, including the development of a one-dimensional/two-dimensional (1D/2D) hydrodynamic XPSWMM model, to analyze flood vulnerability in Princeville and Tarboro. Culverts and storm drainage piping were represented in 1D and a topographic surface was created for the study area to model hydraulics in the Tar River and 2D overland flow. The decision to use a combined 1D/2D modeling approach allowed for a simultaneous analysis of one-dimensional flow through storm drainage infrastructure and two-dimensional surface flooding. The XPSWMM model was used to investigate the nature of flooding in Princeville and Tarboro and examine vulnerabilities in the infrastructure system, as well as develop a suite of potential flood countermeasures that could be implemented to increase resilience.

The one-dimensional/two-dimensional model environment allowed for the exploration of flood control alternatives using both 1D and 2D elements. One-dimensional modification consisted of modeling the effects of installing backflow prevention devices on selected

Flood Resiliency and Modeling (from previous page)

culverts, and investigated two-dimensional modifications included road raises, roadside berms, and bridge extensions.

Overall, the use of 1D/2D modeling was valuable in providing detailed information regarding flood behavior in Princeville and the surrounding area. The degree to which critical infrastructure components are impacted during flood events, as well as insight as to how these components can best be utilized to mitigate flood risk, is valuable information that can be used to guide how community infrastructure is managed during hurricanes and other large storm events.

For more information on this project, please feel free to contact Allison Bryan at abryan@moffatnichol.com. ▲

LESSONS LEARNED from Hurricane Florence

ED DICKSON, PE, CFM | FREESE AND NICHOLS, INC.

Whenever a major storm threatens the Carolinas, officials encounter multiple difficult decisions, including whether and when to evacuate, and where to deploy resources. As Hurricane Florence approached in September, the South Carolina Department of Natural Resources (SCDNR) Flood Mitigation Program assembled a team to provide near-real-time rainfall modeling to assess flooding risks and guide those decisions.

Beginning the Thursday before the storm and working continuously through the next two weeks, the team used publicly available elevation, land use, and precipitation datasets, combined with HEC-RAS 2D rain-on-mesh capability, to deliver detailed, model-backed inundation boundaries for several HUC-8 watersheds in the storm's path. With each new designated precipitation forecast, the team refined the previous iteration of the analysis based on model results, comparison to observed streamflow, and field information. The team utilized a variety of data processing and management tools including Python and VBA scripts to increase model efficiency.

The results guided state officials as they sent emergency alerts and staged law enforcement resources. Focusing and coordinating efforts helped to drastically reduce the number of water rescues by state emergency teams during Hurricane Florence, as compared to other recent flood events in the state.

Here are some lessons for storm preparation, as reinforced by Hurricanes Matthew and Florence:

1. Set up one emergency communication channel. During disasters the public needs to hear only one consistent message from one reliable source to limit confusion. Collaboration among officials during Hurricane Florence ensured that a unified message was amplified.
2. Establish a plan that outlines which key stakeholders should be involved in major decisions. Make sure the right people are included in calls where information is shared to determine the direction you should take in your preparation and response.
3. Understand and trust the data. Before any data is collected and processed, understanding what data you have and exactly what additional data you need are key aspects in creating successful and clear messaging. ▲

Ed Dickson, PE, CFM, is an Associate in Freese and Nichols' Charlotte office. He specializes in watershed-based H&H analyses and disaster rapid response services. For more information, contact ed.dickson@freese.com.

From the NCAFPM Executive Director



Bill Tingle, PG, CFM
NCAFPM Executive
Director

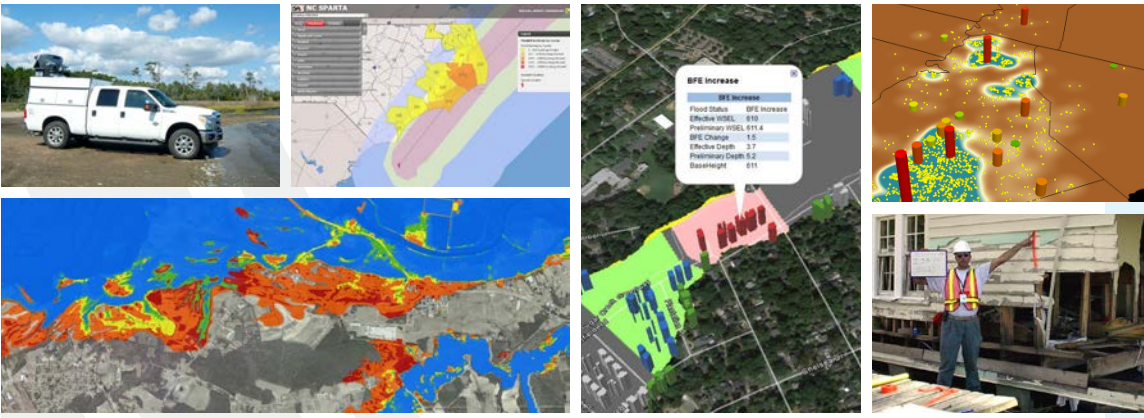
“Tell me again exactly what a 100-year flood is?” I imagine you have heard this question numerous times since Florence’s flooding devastated much of our state just two years after Matthew’s rainfall caused then-record flooding. We all know the 100-year term is supposed represent the 1% statistical probability of an event occurring in one year. But it seems like the 100, 500, 1000-year terms are now used more to compare the severity of different events without knowledge of true risk.

I will never forget the phone conversation I had with a prospective property owner while I was floodplain administrator for the City of Charlotte in the mid 1990s. The lady and her husband had just closed on a home in the floodplain of Little Sugar Creek in a desirable neighborhood just south of uptown. The house had been flooded a few months earlier from a tropical storm in August 1995 that dumped about nine inches of rain in a short period across the watershed. News reports following the flood confirmed that the flooding was considered the 100-year event. The house had been repaired and remodeled and they had gotten it for a great price. The lady was aware of the recent flood and called me to confirm it was actually the 100-year event, not a 10- or 20-year flood. She was ecstatic when I confirmed it. She could not believe their good luck as they had just missed the 100-year flood and they would be long gone before the next one hit in 2095! I tried explaining the 100-year concept, without much success. She likely got a better idea of the true meaning two years later when another tropical storm visited Charlotte. This storm resulted in over 12 inches of rain causing higher flood levels on Little Sugar Creek. Numerous homes were substantially damaged in the neighborhood, including hers.

Understanding the ever-changing concepts and terminology regarding floodplain management is not a simple task, even for those of us involved in the profession daily. Add climate change to the discussion and it’s even more muddled. One of the biggest challenges we face is informing the public of these complicated issues so they can make better informed decisions. The preparation and response to the flooding of Matthew and Florence at both the state and local level, shows how advanced we are in educating the public of flood risk and mitigation. I believe NCAFPM has played a part in this effort with the education opportunities and information sharing provided to our members and others through the conferences, webinars, website, and many other outlets. ▲

Bill

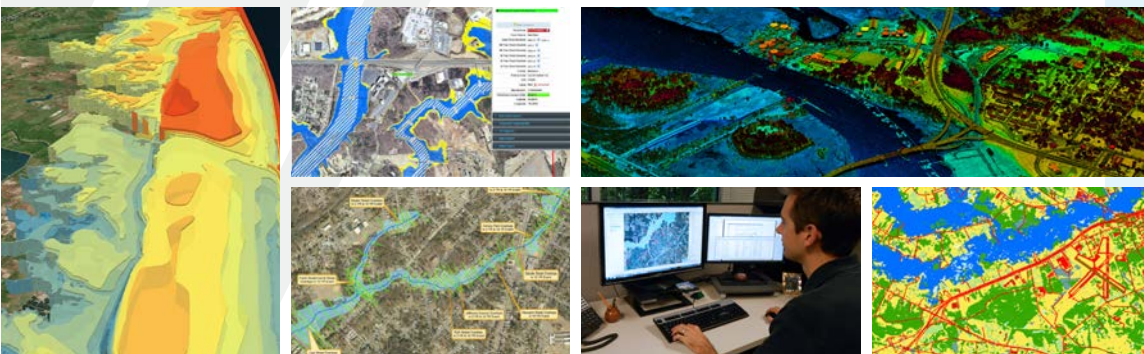
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Upcoming ASFPM Annual Conferences

Cleveland, Ohio
May 19-24, 2019

Fort Worth, Texas
June 7-12, 2020

Raleigh, NC
Spring 2021



ASFPM Annual National Conference Flood Fest 2019: The Mitigation & Resilience Tour May 19-23 | Cleveland, Ohio

Flood-risk professionals from all over the world attend the Association of State Floodplain Managers' annual floodplain management conference. This 43rd conference will be held May 19-23, 2019, at the Huntington Convention Center in Cleveland, Ohio. Join 1,000+ other attendees to network with local, state, regional, tribal and federal officials,

industry leaders, consultants and a wide variety of subject matter experts from diverse fields who will give presentations relevant to the theme, "Flood Fest 2019: The Mitigation and Resilience Tour."

The conference is conducted by the ASFPM, the world's leading voice for sound floodplain management, with 18,000+ practitioners, 10,000 Certified Floodplain Managers, 37 chapters and 79 corporate and agency partners worldwide.

This national conference includes concurrent session presentations. For an extra fee, you may attend 2-4 hour workshops targeted at offering continuing education for floodplain management professionals. The CFM exam is also offered during the conference — please submit your application as explained on the NCAFPM website's Certification page.

For more information, go to asfpmconference.org. ▲

ASFPM Conference Coming to Raleigh in 2021

Mark your calendar for spring 2021 — the ASFPM annual conference will be coming to Raleigh! This conference is recognized as the most important floodplain conference in the United States year after year. With more than 120 speakers and 1,200 participants, it is the national conferences that most community, state and federal floodplain managers plan to attend. 2021 will mark twenty years since North Carolina last hosted the ASFPM conference, held in Charlotte in 2001.

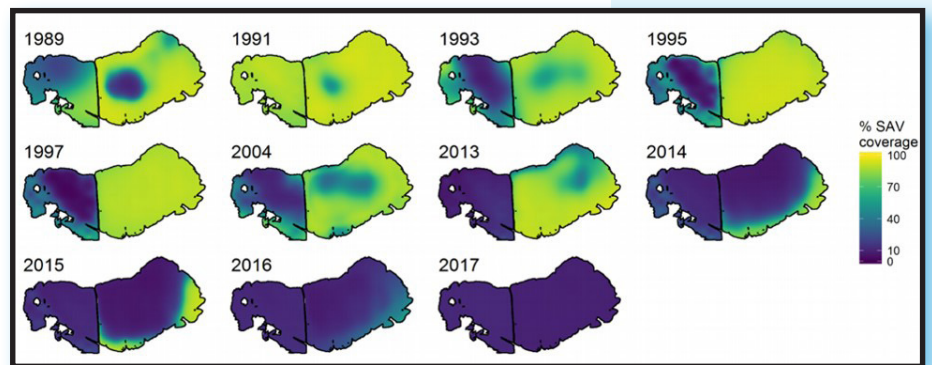
ASFPM will handle most of the logistics including hotel/meeting space, program design, exhibits, sponsors, meals, breaks, etc. However, as local host chapter, this will be a major undertaking for NCAFPM. Fortunately, Ken Ashe with Wood has agreed to serve as the local host team coordinator and will work with ASFPM and local volunteers to ensure a great conference. Some of NCAFPM's responsibilities will include: organizing "Welcome Fest" event, tours/transportation, chapter's race, memorabilia, promotion/PR, field trips, golf tournament, and more. This will be a huge task for NCAFPM and your help will be needed! There will be numerous volunteer and local sponsor opportunities available and more detailed information will be made available by mid-2019.

Lake Mattamuskeet Watershed Restoration Plan

MICHAEL FLYNN, CFM | COASTAL ADVOCATE - NORTH CAROLINA COASTAL FEDERATION

Lake Mattamuskeet is located in the heart of Hyde County and is the centerpiece of the Mattamuskeet National Wildlife Refuge. The health of the lake is critically tied to the health of the local people, wildlife, culture and economy. Flooding issues have become commonplace due to a drainage system that relies on gravity in a very low-relief area.

Drainage is further compromised by rising sea level. Water quality has also drastically declined due to increased nutrient levels that produce harmful algal blooms. In 2016, the lake was listed on the state 303(d) list for impaired waters due to elevated levels of pH and chlorophyll-a. A reduction in water clarity and total loss of submerged aquatic vegetation in the lake have also been observed.



Results of the annual SAV surveys conducted from 1989-2017 (Moorman et al., 2017)



Hyde County, N.C. Wildlife Resources Commission (NCWRC), and U.S. Fish and Wildlife Service (USFWS) partnered with the North Carolina Coastal Federation (federation) to develop a watershed restoration plan for Lake Mattamuskeet. Over the past 18 months, a team of stakeholders joined together to develop a plan that will restore the lake's health and improve conditions for people living around the lake. The draft is now complete and was presented for public comment at a public meeting in October at the Hyde County Government Complex.

The plan identifies three goals and various management actions to protect the current way of life in Hyde County, actively manage

the water level within the watershed (in coordination with the mission of the Refuge), and restore water quality and clarity within the lake. The draft plan is available for public review at nccoast.org/lakemattamuskeet.

A public symposium will be held to review the final draft of the Lake Mattamuskeet Watershed Restoration Plan on Monday, December 3, in Engelhard, NC. The agenda includes a summary of the development process and priority actions that were selected by the stakeholder team as well as research project updates and panel discussions focusing on drainage water management and conservation programs. To find out more visit nccoast.org/lakemattamuskeet or contact Michael Flynn at michaelf@nccoast.org. ▲

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2018-2019**

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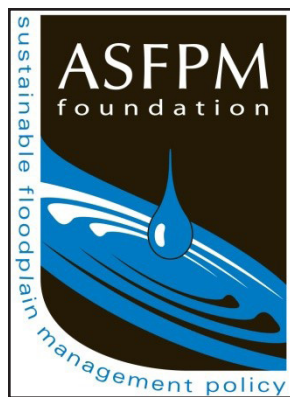
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continued on next page



How ASFPM Foundation Benefits Local FPMs

Best practices and case studies are effective tools to highlight state and local initiatives to reduce flood risks at the local and regional level. The ASFPM Floodplain Management Best Practices and Case Studies Compendium catalogues best practices and case studies in a searchable format for online viewing, which increases accessibility and usefulness to the reader. The project, funded by the ASFPM Foundation, was completed this summer and is now ready for prime-time use!

ASFPM's Flood Science Center collected twenty-five best practices and case studies that comprise the compendium. This project created a typology that established the means to organize and index case studies associated with best practices. Sources included the ASFPM's No Adverse Impact (NAI) How-to Guide, The Nature Conservancy's "Naturally Resilient Communities Project," and the FEMA Cooperating Technical Partners (CTP) mentoring project.

- **NAI How-to-Guides**

To further ASFPM's No Adverse Impact™ initiative, ASFPM developed a series of No Adverse Impact How-to Guides. These How-to Guides were developed for each of the Building Blocks in the publication entitled "No Adverse Impact: A Toolkit for Common Sense Floodplain Management."

- **Naturally Resilient Communities**

The Nature Conservancy (TNC) contracted with ASFPM to assist in developing a guide and case studies for the mainstreaming of natural infrastructure, such as comprehensive planning, education of developers, relocation of property, the raising of infrastructure, and floodplain regulations, to address coastal and riverine flooding.

- **CTP Support**

FEMA contracted with ASFPM to help support the Cooperating Technical Partners (CTP). The CTP Program is a partnership between FEMA and participating NFIP communities, regional agencies, state agencies, tribes, and universities that have the intent and capability to become a more active participant in FEMA's mapping program. The project involved documenting best practices and providing training, such as automatic engineering tasks.

These best practices and case studies can be important and very useful at the state and local levels in designing programs or projects to reduce their flood risks. The Best Practices and Case Studies Compendium can be found at the ASFPM Flood Science Center by going to floodsciencecenter.org/products/best-practices-case-studies-compendium. ▲

ASFPM Foundation's 9th Annual Collegiate Student Paper Competition

Do you know a university student enrolled in floodplain management-related courses? Encourage them to enter ASFPM Foundation's Student Paper Competition. Finalists win cash and a trip to Cleveland. Abstracts (500 words or less) should be submitted by January 12, 2019, as a PDF file to gigi@floods.org. Three semifinalists will be invited to submit a full paper by April 12, 2019, during the ASFPM conference on Tuesday, May 21. Learn more regarding paper requirements and topics of consideration at <https://tinyurl.com/yag657b4>.

Timing is Everything When It Comes to Communicating Flood Risks & Solutions

REPRINTED WITH PERMISSION FROM ASFPM's *News & Views*, OCTOBER 2018

As a flood risk professional, you know when your flood season begins. It's different all over the country. If you're in a mountainous area in the West, you know you're going to have snow melt in the spring. That means you need to plan a risk communication and outreach campaign well in advance of the event. And if your message is for people to make sure and buy flood insurance so they are prepared for potential flood, you also need to get that message out at least 30 days before floods could hit.

Here's a [30-second video of Montana Lt. Gov. Mike Cooney](#) warning people to get flood insurance before the spring snow melt. The commercial aired in March (a month before spring floods hit the state).



The public service announcement ran about 80 times in a two week period, according to **Traci Sears**, Montana's state flood-plain manager and ASFPM's Region 8 director. She also said there was an increase of 558 policies within this time period or a 6.17% increase. Montana is more than 147,000-square-miles (the fourth largest in the U.S.), with just over 1.05 million people. Sears said that number was a significant increase for such a rural state.

And seriously, you don't have to hire a production company to do this. Smart phones can be used, then it can be shared on a community's website and social media pages. Total cost? Zero.



Effective messaging with perfect timing means your people will be better prepared the next time flood season hits. [FEMA created a "starter kit"](#) to help you reach out to the media and public about purchasing flood insurance (and it includes a Spanish language kit). ▲

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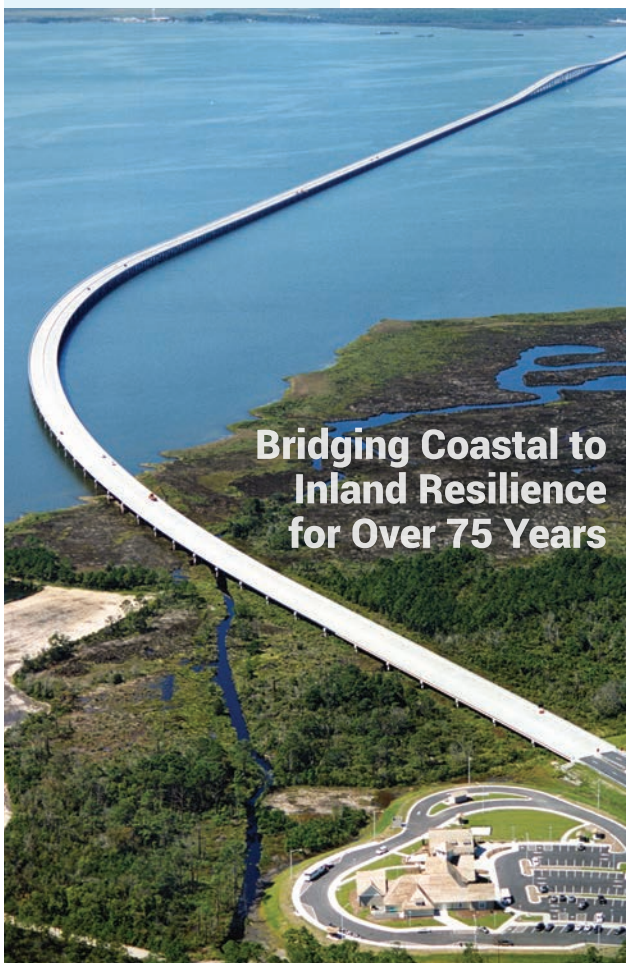
- > Design
- > Engineering
- > Environmental and ecological services
- > Floodplain studies and mapping
- > Hydrologic and hydraulic analyses
- > Stream stabilization and restoration
- > Permitting
- > Stormwater best management practices

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704.665.4408



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- Resilience Strategies
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- Stream Stabilization
- Transportation
- Urban and Waterfront Planning
- Vulnerability Assessment
- Watershed Restoration

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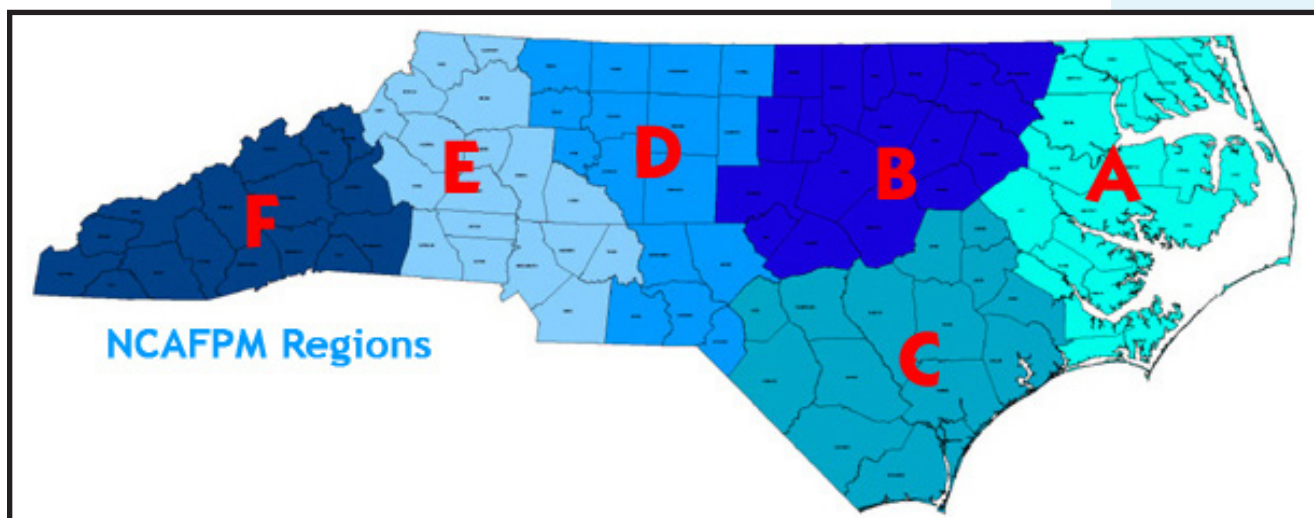


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NCAFPM Regional Reports



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Region E | David Goode, PE, CFM — david.goode@mecklenburgcountync.gov

Region F | Nathan Pennington, CFM — nathan.pennington@buncombecounty.org

North Carolina is divided into six NCAFPM regions. Our Regional Representatives give NCAFPM members in each region a “voice” on our board. Flood plain administrators in these regions can contact their representative who can bring regional issues to the board’s attention (ex. coastal erosion, flash flooding and landslides in the mountains, etc.). The map above shows the regions in a graphical format, and below is a list of the counties in each region.

Region A | Beaufort, Bertie, Camden, Carteret, Chowan, Craven, Currituck, Dare, Gates, Hertford, Hyde, Martin, Pamlico, Pasquotank, Perquimans, Pitt, Tyrrell, and Washington

Region B | Chatham, Durham, Edgecombe, Franklin, Granville, Halifax, Harnett, Johnston, Lee, Nash, Northampton, Orange, Person, Vance, Wake, Warren, and Wilson

Region C | Bladen, Brunswick, Columbus, Cumberland, Duplin, Greene, Hoke, Jones, Lenoir, New Hanover, Onslow, Pender, Robeson, Sampson, and Wayne

Region D | Alamance, Anson, Caswell, Davidson, Davie, Forsyth, Guilford, Montgomery, Moore, Randolph, Richmond, Rockingham, Scotland, Stokes, Surry, and Yadkin

Region E | Alexander, Alleghany, Ashe, Avery, Burke, Cabarrus, Caldwell, Catawba, Cleveland, Gaston, Iredell, Lincoln, Mecklenburg, Rowan, Stanly, Union, Watauga, and Wilkes

Region F | Buncombe, Cherokee, Clay, Graham, Haywood, Henderson, Jackson, Macon, Madison, McDowell, Mitchell, Polk, Rutherford, Swain, Transylvania, and Yancey

Region D

Terry Kuneff, PE, CFM

Regional Reports (from previous page)

Through Teamwork, High Point Residents Recover from Hurricane Michael

On October 10, 2018, Hurricane Michael made its way through High Point. Tens of thousands of High Point residents were without electric due to seven (7) electric substations that lost power due to downed power lines. Thirty-three (33) city streets were closed due to fallen trees, flooding, and debris left behind by Michael. Many trees fell onto residential lots. Residents cut and placed tons of debris along the curb for city forces to pick up and haul away. Some residents hauled debris to the city's Ingleside Compost Facility themselves. Due to the volume of residents attempting to clean up their properties from the storm, the City of High Point relaxed yard waste guidelines and opened the Ingleside facility, free of charge, to residents. The facility took in 2,502,000 pounds of debris caused by Hurricane Michael. Normally, this would have had a total cost of \$38,788 in fees. Teamwork with the City of High Point's Electric Department and Public Services Department, along with Duke Energy enabled the City of High Point to recover from the damage caused by Hurricane Michael in minimal time. ▲



Road closed due to debris.

Region E

David Goode, PE, CFM

We have new maps! On November 16, 2018, the preliminary floodplain maps became effective in Cabarrus and Mecklenburg Counties. In addition to new maps for future mapping, Mecklenburg County completed an evaluation of the method used to develop the future conditions floodplain known as the Community Floodplain (CF). The CF exists to provide an accurate floodplain prediction that protects property owners, infrastructure and the environment, providing confidence that building above or outside the CF is reasonably safe from flooding in the future. The CF is used to regulate construction in Mecklenburg County. The CF study made several recommendations to be incorporated in the analysis for future mapping projects including

- 1) removing storage for some ponds,
- 2) reducing the time of concentration for basins,
- 3) creating a new future land use category for undeveloped and unprotected areas,
- 4) and increasing the rainfall depth for the 100-year storm to account for rainfall uncertainty in the future.

Pilot studies in two basins show an increase of approximately 1-foot in the Flood Protection Elevation using these recommendations. ▲

Regional Reports (from previous page)

Greetings from the Land of the Sky. We just concluded a fantastic Fall Floodplain Institute (FFI) here in Asheville at the lovely Crowne Plaza Resort. This was a particularly challenging year across the state in regards to rainfall and specifically related to events triggered by tropical plumes and cyclonic events from both the Atlantic and Gulf of Mexico. While we spend a good amount of time preparing for flood events, reviewing models and hearing from professionals across the spectrum of traditional roles within the floodplain and emergency management fields, we were fortunate to have a meteorological perspective at the FFI this year. Josh Palmer who serves as the senior service hydrologist at the National Weather Service's local Greenville-Spartanburg (GSP) office, treated us to a presentation on the duties and responsibilities of the National Weather Service including the watch/warning systems employed by the Service.

Of specific interest to floodplain managers was his overview of meteorological phenomena including low/high pressure systems/troughs/antecedent conditions, the prevalence of moisture plumes on the eastern escarpment of the Blue Ridge Mountains, and other contributing factors that exacerbated flood events across the Southeast this year. Josh's presentation highlighted the importance of effective communication between governmental agencies, floodplain and emergency managers, consulting groups, business organizations and citizens. We look forward to hearing more from the National Weather Service at future conferences and thank Josh and his organization for the important work they perform.

You may have noticed that we are building more opportunities for site visits/field trips into the FFI and Spring Conference agendas. This year was no exception. In cooperation with the City of Asheville, we were able to organize a site visit to the Lake Craig/Azalea Park area to get a first-hand look at evidence of multiple flood events as well as constructed flood storage areas along the Swannanoa River. Also, conference attendees were able to visit a former stockyard that was re-developed as the East Coast location of New Belgium Brewery along the banks of the French Broad River. The site was tricky to develop as it is an active brownfields site that includes both floodway and fringe as well as a "blue line" stream that was restored to its natural state from one that had been altered, channelized and armored over the years. We would especially like to thank the City of Asheville's Development Services Department for organizing this event and specifically Nancy Watford and McCray Coates. ▲

Region F

Nathan Pennington, CFM



The 2018 Fall Floodplain Institute, held in Asheville, NC, was a success. Here is a picture of the participants.

NFIP

Coordinator's Corner

Dan Brubaker, PE, CFM

NFIP State Coordinator

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dan.brubaker@ncdps.gov

www.ncfloodmaps.com



Hello, everyone. It has been anything but a quiet summer and fall. Florence has sent us all into overdrive, and the recovery effort will be hard on everyone. The FEMA employees deployed to North Carolina will be here for months. Consultants and state staff will be compiling more data than, well, than I could ever process. And our local floodplain administrators have the hardest job: leading their neighbors and elected officials through the recovery process so the next time we get a 500-year storm (which seem to be on a 2-year interval, more or less), it will be an “event” and not a “disaster.”

Substantial Damage

One way to make this transition is to identify and mitigate substantially damaged structures. These are buildings that are damaged (from any source) whereby the cost of restoring the building exceeds half of the market value of the building itself.

The goal of substantial damage assessments is to reduce a community's exposure to flood risk. By mitigating structures that do not meet current code, property loss is reduced and disasters are, for lack of a better phrase, less disastrous. As a result, communities will not lose their residents and businesses following a flood, and won't have to spend months on the clean-up process.

The task can be streamlined with some effort before a disaster strikes. A floodplain administrator should maintain a list of identifying structures in the community that are located in the Special Flood Hazard Area AND that do not meet the current ordinance requirements. Basically, if the first floor elevation is below the community's regulatory flood protection elevation (base flood elevation plus freeboard), then it will need a substantial damage determination following a flood. Buildings that are not compliant due to inadequate vents or low mechanical equipment will also need a look.

Identifying structures in the SFHA is easy enough: ask your county GIS department to intersect the SFHA with building footprints. That should generate a list that you can then review. Structures that are pre-FIRM (built before the community adopted a flood ordinance) are likely not compliant with the local ordinance, and will probably need a determination following a flood. Post-FIRM structures can be verified by reviewing the elevation certificate. Recent structures should be compliant, but buildings built before the latest map or ordinance update may be non-compliant. Each one should be checked.

Sources of information on the damage estimates include:

- FEMA's Substantial Damage Estimator software;
- An itemized cost estimate prepared by a NC Licensed Contractor;
- Insurance claim information.

Sources of information for the market value include:

- Adjusted tax assessed value;
- Professional property appraisal;
- Actual cash value (replacement cost) including depreciation.

The community itself can inspect structures. Following Presidentially-declared disasters, FEMA personnel and contractors will be available to assist with the inspections, and will coordinate with the local floodplain administrators. They can give a percent damage based on the FEMA Substantial Damage Estimator software. However, it is then up to the local government to formally notify the owner whether or not the structure is substantially damaged.

Following a disaster, there is a lot of temptation to bypass this process. The workload can be overwhelming and there can understandably be political resistance to making these determinations. It has to be done, though. The aftermath of a flood is the best time for a community to focus on its flood resilience. It will only get more difficult as time passes.

Also, a structure that is substantially damaged but not elevated will be charged actuarial rates for flood insurance based on the actual floor elevation. If the flood policy is not changed to an actuarial policy, and a flood claim occurs, the claim amount can be reduced by the difference in premiums paid versus premiums owed. Depending on the elevations and amounts, this can effectively wipe out an insurance claim.

I can hear a voice from the back of the room ask, "Now look here: By 'Mitigation,' don't you just mean demolition?" The answer is "Not always." While demolition (buyout) is one alternative, others include elevation, relocation, and, in the case of non-residential structures, floodproofing. Communities will need to look at these alternatives in order to maintain their tax base and residential base while improving their resilience.

Finally, a substantial damage determination will allow a building owner to file a claim for Increased Cost of Compliance. If the structure was substantially damaged by flooding, is within the SFHA, and is currently not in compliance with the local ordinance (including freeboard), they can get \$30,000 to help get their building elevated, relocated, demolished, or floodproofed (for non-residential buildings). Hopefully, Congress will increase that amount with the next NFIP reauthorization.

Reauthorization

Speaking of reauthorization: The NFIP Reauthorization, was due by November 30, but was given a 7-day extension by the House and the Senate. There was hope that scheduling the reauthorization for after the mid-term election would allow for bipartisan cooperation. That may be, but the differences between the House and Senate versions of NFIP legislation are still wider than the Northeast Cape Fear River Floodway. Also, the Senate, by a voice vote, passed a 6-month reauthorization (S3628) of the NFIP until May 31, 2019. But whether the House will follow the Senate is unclear. The 1-week extension provides an opportunity to link short-term NFIP Reauthorization to necessary action to extend appropriations for the Department of Homeland Security beyond the December 7 appropriations expiration. ASFPM and many in Congress have been calling for reforms in the long-term reauthorization. ▲



**Substantial
SDE Damage
Estimator**

SDE is a tool to help local officials administer the Substantial Damage requirements of their floodplain management ordinances in keeping with the minimum requirements of the NFIP.



North Carolina Floodplain Mapping Program UPDATE

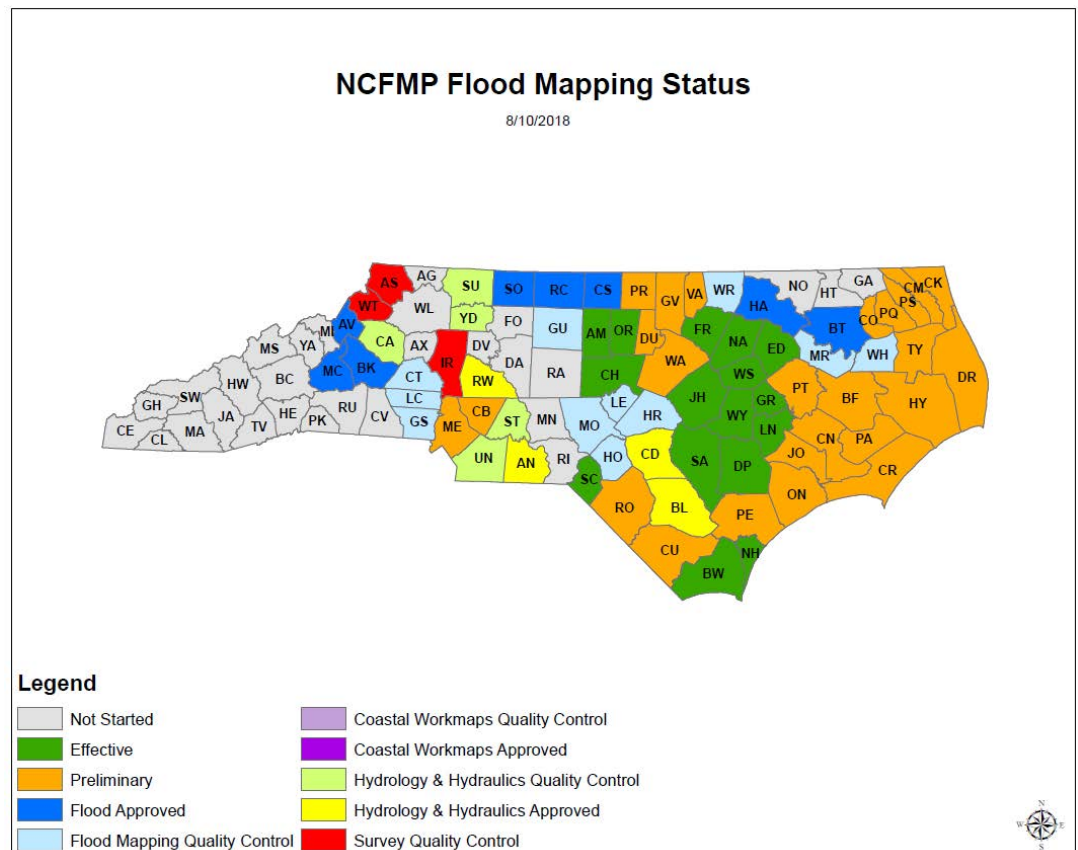
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Since November 2017 when Alamance, Chatham, and Orange became the three first counties in the country to have their updated FIS and FIRMs go all-digital, we've added 7 more counties: Duplin, Johnston, Sampson, and Wayne ('Effective' June 20th), Brunswick and New Hanover counties became the first coastal counties to be all-digital ('Effective' August 28th), and Durham County went into effect on October 19th. Following up on their heels, November 16th Cabarrus and Mecklenburg Counties will go 'Effective', and then on December 21st five more coastal counties (Chowan, Perquimans, Pasquotank, Camden, and Currituck) will also go into effect for insurance rating and floodplain management purposes. On November 30th we anticipate FEMA approving the issuance of revised preliminary data/mapping for Wake, Pender, Jones, Beaufort, Craven, Hyde, Pitt & Tyrrell Counties; based on the complexity of the revisions some will get a new 90-day appeal period, but others will only have a 30-day review period. We are coordinating with FEMA on developing the schedule for the next round of counties to receive a Letter of Final Determination (LFD), which should be for Columbus, Robeson, Granville, Person and Vance Counties; tentatively the LFD should be early in 2019, to become effective in the summer. We anticipate that 2019 will be a very busy year, including the next couple of groups of counties to receive preliminary FIS/FIRMs including Caswell, Guilford, Rockingham, & Stokes counties in the piedmont, and Bertie, Halifax, Martin, Warren, & Washington counties on the coastal plain; these likely will be issued in early-2019. ▲



flood.NC.gov

Accredited State CFM Discussions

JOHN FULLERTON & BILL TINGLE | NCAFPM

The future of the accredited state CFM programs has been a hot topic of discussion for the past two years between ASFPM and the six states with accredited CFM programs. The discussions primarily concern the autonomy of the six accredited chapters within the ASFPM organization, Texas, Arkansas, Oklahoma, New Mexico, Illinois, and North Carolina.

These six chapters adopted floodplain manager testing and certification programs prior to ASFPM's creation of the national CFM program. Currently, about 3,800 of the 10,000+ CFMs in the country are from the six accredited chapters. All of these states, by written agreement with ASFPM, are free to administer their own CFM program and collect the appropriate fees. Illinois and North Carolina have contracted with ASFPM to administer their respective program without giving up the right to do so upon notification to ASFPM.

ASFPM presented the issue to the six accredited states in a discussion letter in June 2016. ASFPM maintains there is a fairness issue because CFMs from accredited states pay lower initial exam and biennial renewal fees than other national CFMs. They also state that most CFMs in accredited states don't pay ASFPM membership fees, but still receive services from ASFPM. ASFPM maintains the infrastructure for all CFMs. The accredited states are concerned that ASFPM brought up the accredited state issue in 2016 because of the loss of potential revenue. Requiring all accredited state CFMs to become ASFPM members and pay the fee would add significant income to ASFPM's budget.

The accredited states are all proud of the CFM programs they developed over the years and are passionate that they should be able to maintain their own programs, approved and supported by ASFPM. Programs in Texas, Oklahoma, New Mexico and Arkansas are funded by their fees which pay for administration including paid staff in some states.

Discussions have led to the best-case scenario being the accredited states offering a formal financial formula to assist ASFPM to a worst-case scenario where state accreditation programs would be dissolved, possibly resulting in some chapters creating their own accreditation program.

NCAFPM will keep you advised as these discussions creep forward. For more detailed information please feel free to contact any NCAFPM executive board member. Their names and contact information are listed on the NCAFPM website, ncafp.org, on the Board webpage (under "About NCAFPM"). ▲

Calendar

DETAILS FOR MANY OF THE CONFERENCES listed below are available throughout this newsletter for NCAFPD events and on page 25 for other conferences and events.

February 11-14, 2019

COASTAL GeoTOOLS
Myrtle Beach, SC
ASFPDconference.org

February 19, 2019

ACEC-NC ENVIRONMENTAL
EDUCATION AND NETWORKING
Raleigh, NC
acecnc.org

April 28-May 1

NCAFPD 30th ANNUAL
SPRING CONFERENCE
Atlantic Beach, NC
ncafpd.org

May 19-23, 2019

ASFPD ANNUAL CONFERENCE
Cleveland, OH
ASFPDconference.org

October 16-18, 2019

NCAFPD 14th ANNUAL
FALL FLOODPLAIN INSTITUTE
Cherokee, NC
ncafpd.org

Floodplain Management

Resources

updated spring 2018

Technical Assistance (State)

NC Emergency Management National Flood Insurance Program

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Western Branch: Terry Foxx, CFM
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NC CLOMR/LOMR Submittals

www.ncfloodmaps.com/mt-2_forms.htm

LOMC Manager/Community Development

Planner: Steve Garrett, CFM
steve.garrett@ncdps.gov | 919-825-2316

Maps & Flood Insurance Studies

FEMA Map Information eXchange (FMIX)

1-877-336-2627 (1-877-FEMA-MAP)

Mecklenburg County CLOMR/LOMR Submittals

Technical assistance, LOMA/LOMR Requests
877-336-2627 (877-FEMA-MAP) (toll free)

NC Floodplain Mapping Program

919-715-5711

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flood.nc.gov (coming soon!)

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Technical Assistance (FEMA)

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ASFPDfloods.org

FEMA.....fema.gov

NFIP.....floodsmart.gov

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NC Mapsncfloodmaps.com
flood.nc.gov

FRIS.....fris.nc.gov/fris

FIMANfiman.nc.gov/fiman

FlashFlood NEWS is a semi-annual online publication which offers information and education on topics that are of current interest in the field of floodplain management and the National Flood Insurance Program.

Information and opinions do not necessarily reflect the views of the North Carolina Association of Floodplain Managers.

All inquiries and article ideas should be directed to Kelly Keesling at kgkeesling@carolina.rr.com.

For more information about the North Carolina Association of Floodplain Managers, see our website at ncafpd.org.

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For more information about becoming a member of NCAFPD or to apply for membership, go to ncafpd.org/membership.

FlashFlood NEWS

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(2018 #2)**

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