

## What's Inside

From the Chairman: Hurricane Matthew .....	2
Chapter News .....	4
2017 ASFPM Annual Conference .....	7
2016 ASFPM Annual Conference Report .....	7
Dry Floodproofing .....	8
Elevation Certification Clarified .....	9
NC FPM Update .....	10
2017 NCAAFPM Annual Conference .....	11
NCAAFPM/SCAHM Joint Conference Report .....	11
FIMAN Hits the Mark .....	12
NCAAFPM Board of Directors .....	12
Toolbox for Sustainable Investments .....	13
Thank You to our Newsletter Sponsors .....	15
CFM News .....	18
Regional Reports .....	21
NFIP Coordinator's Corner .....	24
News from ASFPM .....	26
Calendar .....	28
Resources .....	28



## Remembering the Great Flood of 1916

DAVID KEY, PE, CFM, ESP ASSOCIATES

As we recover from the flooding in the east due to Hurricane Matthew, 2016 also brings the centennial anniversary of one of the most devastating floods in North Carolina history. Beginning in mid-July 1916, the western portions of our great state experienced massive flooding that still remains the flood of record for many rivers. I thought it may be appropriate to share some important facts about this historic flood event.

- Over 22 inches of rain fell in Altapass (about half way between Blowing Rock and Asheville). This was the heaviest 24-hour rainfall total ever recorded in the U.S. at that time. It is still a state record.
- Much like 2004, the 1916 flood was triggered by back-to-back hurricanes. On July 5-6, a category 3 hurricane hit the Gulf Coast of Alabama and Florida. A few days later, July 7-8, the weakened storm dropped heavy rainfall over the foothills and mountains of North Carolina. One week later (July 14) a category 2 hurricane made landfall along South Carolina's coast, passing over the Charleston area. On July 15 and 16, this system reached the North Carolina mountains as a tropical storm. Sound familiar?
- The flood damaged nearly every mile of railroad from Asheville to Statesville. Many lines were not fully operating again until September.
- In Transylvania County, a 60-foot long boulder weighing 900-tons slid off the mountain and was carried downstream along the Toxaway River for more than half a mile!
- Water reached a height of nine feet deep at the gates of the Biltmore Estate.
- There were more than 80 fatalities. Many of these deaths were caused by massive landslides in the area.



*Downtown Asheville – July 1916. Photograph by Steve Nicklas, NOS, NGS; courtesy of National Oceanic and Atmospheric Administration/Department of Commerce*

As I look back on events such as the Great Flood of 1916, I realize that many of our state's hazards have not changed that much in a century. Fortunately, what has changed is our awareness to such hazards, our improved risk communications and years of proactive flood mitigation programs all across our state. ▲

# From the Chairman's Desk

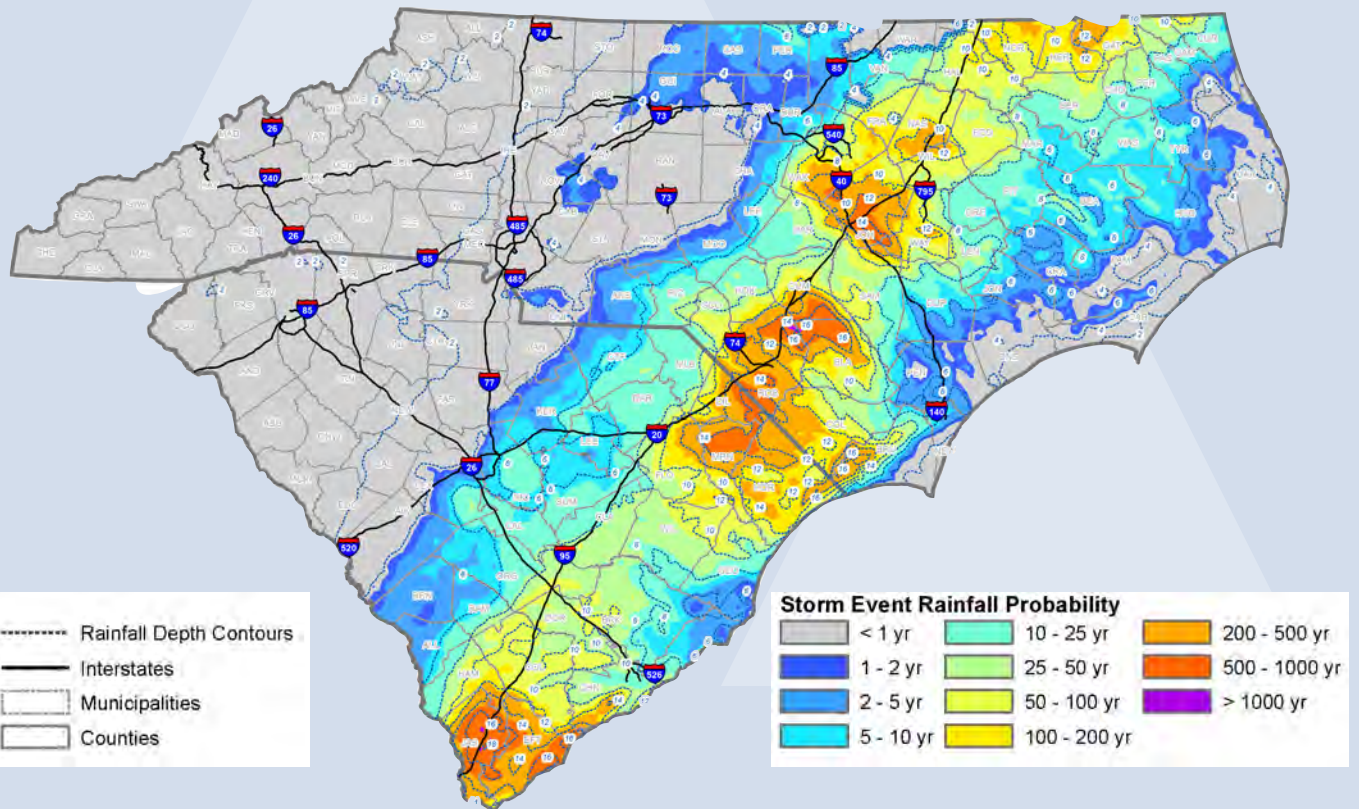


DAVID KEY, PE, CFM  
NCAFPM CHAIRMAN

## Hurricane Matthew – A Resilient East will Recover

Greetings North Carolina floodplain managers! I speak for the entire board that I hope you all had a relaxing and safe summer and are enjoying your fall. As you all know, October was a tumultuous month for our state. The flooding resulting from Hurricane Matthew was devastating across the eastern half our state. From Raleigh to the coast, rivers crested, levees did not hold, dams failed, crops and livestock were lost, tens of thousands of homes were damaged or destroyed and nearly thirty North Carolina citizens lost their lives. We all pray for the victims and families as the recovery continues.

The rainfall began in the state on Friday, October 7, but Saturday, October 8, brought the heaviest of rain as half of our state had tropical rainfall and winds that lasted all day. Hundreds of thousands of residents lost power for days. The figure below shows the rainfall totals and return periods for both North and South Carolina.



Slightly different than the rainfall from Hurricane Floyd (1999), the heaviest rainfall stayed to the south and central portions of our state. With the heaviest rainfall accumulations in Cumberland, Bladen, Robeson, Johnston and Hertford Counties. These counties experiences rainfall in excess of the 500-year return period (0.2% annual chance event). This flooding resulting from this rainfall accounted for record river stage peaks in many locations across the east. The table on the next page summarizes the peak on selected sites.

As the flooding continued throughout the weeks following the storm, I was able to witness firsthand the tireless efforts of our first responders and North Carolina Emergency Management staff at the Emergency Operations Center (EOC). A decade of elevation, modeling, mapping, and building data was leveraged to provide real-time answers for evacuations and other response decisions. The State's flood inundation mapping system (FIMAN) ([fiman.nc.gov/fiman](http://fiman.nc.gov/fiman)) was put to the test and provided valuable information about current and forecasted

River Name and Location	County	Peak Matthew Elevation (NAVD 88 ft)	Previous Record (NAVD 88 ft)	Approximate Return Period
Lumber River at Maxton	Robeson	186.5	184.5	100-year
Lumber River at Lumberton, (I-95)	Robeson	124.3	120.5	200-year
Lumber River at Lumberton (5th Ave.)	Robeson	119.3	115.8	75-year
Lumber River at Boardman	Columbus	85.5	81.8	>500-year
Little River at Manchester	Cumberland	155.0	151.8	>500-year
Cape Fear River at Fayetteville	Cumberland	78.6	88.6	100-year
Cape Fear River at Lock #1 near Kelly	Bladen	24.8	26.0	100-year
NE Cape Fear River near Chinquapin	Duplin	36.3	39.8	500-year
Crabtree Creek at Glenwood Ave (Crabtree Valley Mall)	Wake	225.5	230.5	50-year
Crabtree Creek at Old Wake Forest Rd	Wake	205.8	N/A	100-year
Neuse River near Clayton	Johnston	148.0	149.6	45-year
Neuse River at Smithfield	Johnston	127.4	125.7	200-year
Neuse River near Goldsboro	Wayne	71.6	70.8	90-year
Neuse River at Kinston	Lenoir	38.1	37.5	75-year
Hominy Swamp at Forest Hill Rd	Wilson	122.8	N/A	>500-year
Contentnea Creek at Hookerton	Greene	37.9	42.0	>500-year
Tar River at NC 97 at Rocky Mount	Nash	81.5	84.5	65-year
Tar River at Tarboro	Edgecombe	45.6	50.8	200-year
Tar River at Greenville	Pitt	21.0	26.2	45-year
Cashie River at SR1257 near Windsor	Bertie	19.8	21.7	250-year

**XX.X** = New Station Record

inundation levels and building impacts. Local news stations used the tool in their broadcasts and on social media to communicate flood levels and impacts like never before.

Recovery efforts have been underway in the east since the waters receded. I am confident that our state will rebuild from this event and apply even more lessons learned. There were some success stories from this event. One such story would be the Lincoln City area of Kinston. This neighborhood experienced devastating flooding from Hurricane Floyd in 1999. Following Floyd, over 800 homes were acquired and residents were relocated outside of harm's way. Today the area is vacant land. This is an example of 800 homes that were **not** flooded as a result of Hurricane Matthew.



*Governor McCrory viewing real-time impacts using FIMAN at the EOC.*

It's been 100 years since the great flood of 1916 in the western part of our state. It has been 17 years since Hurricane Floyd in the eastern part of our state. As we did in 1916, 1940, 1999, 2004, and 2016, the citizens of North Carolina will rebuild smarter and more resilient. As floodplain managers, we must continue to learn from events like Matthew and put into place higher standards to ensure that future losses are minimized or avoided. I thank you all for your dedication to protecting property and lives in this state. I am proud to call North Carolina home. ▲

*Dad*

## Education & Outreach Update

DAN TOMCZAK, EDUCATION AND OUTREACH COMMITTEE CHAIR

NCAFPM has been active in 2016 with reaching out to communities and organizations and becoming involved with promoting flood risk education. The NCAFPM Education and Outreach (E&O) Committee has been able to use the Ward's Flood Model at many activities as a means to help



*(left) Drew Blackwell demonstrates the flood model outdoors as part of Forsyth Creek Week in Winston-Salem.*

*(below) Kurt Golembesky discusses runoff and flooding with the students as part of Career Day in Raleigh.*

people better visualize rainfall runoff and flooding, which then promotes better discussions. Youth are especially engaged and interested in discussions on flooding through their interaction with the flood model (ex. where to build their house so that it doesn't get flooded). The flood model has even been used outdoors and set up on a sand bar


within a creek as part of the demonstration. Activities in 2016 where the flood model has been used in demonstrations included Transportation YOU, Engineer's Week, Career Day, Charlotte WeatherFest, Forsyth Creek Week, and the Hurricane Preparedness Safety and Open House. NCAFPM members assisting with the various events have really enjoyed the interaction with the youth and general public, and our participation with these activities has been greatly appreciated. (See the letter from Nags Head Fire and Rescue on the next page.)

As part of the Flood Risk Education in Schools Campaign, Outreach Process Partners LLC, (the organization from which NCAFPM received our flood model) organized a contest this past spring and requested that the various associations who have a flood model develop and submit a video that documents how each group uses the model in flood risk education. **The video submitted by NCAFPM won the contest!!** The announcement of NCAFPM winning the video competition was made at the Annual ASFPM Conference in Grand Rapids in June. Thanks has to go out to everyone involved with the making of this video who has helped with promoting flood risk education. If you haven't had a chance to see the video, check out



the link on the NCAFPM website at [ncafpm.org/resources/flood-model](http://ncafpm.org/resources/flood-model) or on the Flood Risk Education Facebook page at [facebook.com/floodriskeducation](https://facebook.com/floodriskeducation)

There are other outreach opportunities that the committee is interested in pursuing, including the Turn Around Don't Drown campaign, the High Water Mark initiative, the North Carolina King Tides study, as well as with training. If you are interested in potentially using the flood model for an upcoming activity or are interested in outreach for NCAFPM in general, please feel free to contact me at [daniel.tomczak@ch2m.com](mailto:daniel.tomczak@ch2m.com). ▲

<b>Kevin Zorc</b> Fire Chief		<b>John Kenny</b> Fire Captain
<b>Shane Hite</b> Deputy Fire Chief	<b>Nags Head Fire &amp; Rescue</b>	<b>Wayne Kidd</b> Fire Captain
<b>Chad Motz</b> Ocean Rescue Captain	Post Office Box 99 Nags Head, North Carolina 27959 Phone 252.441.5909 Fax 252.441.8268 <a href="http://www.nagsheadnc.gov">www.nagsheadnc.gov</a>	<b>James Moseman</b> Fire Captain
<b>John Harris</b> Fire Captain		<b>Phil Wolfe</b> Fire Captain
<b>Chip Holcomb</b> Fire Captain		

June 14, 2016

North Carolina Association of Floodplain Managers  
3120 Highwoods Blvd., Suite 214  
Raleigh, NC 27604

Attn: Dan Tomczak

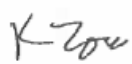
Dear Tom,

On behalf of the Town of Nags Head, thank you for your participation in the 2016 Hurricane Preparedness and Safety Open House held on May 20, 2016, at the Douglas A. Remaley Fire Station 16.

As an inaugural event, working with many others, we were collectively pleased to host a successful assembly that met the intended purpose and generated positive community reviews. The gathering of numerous exhibitors, governmental organizations, vendors and speakers provided a diverse and convenient opportunity for attendees to gather critical information and help Dare County prepare for, respond to and recover from an all hazards disaster event.

Please feel free to share any thoughts and ideas you may have that will contribute to the improvement of next year's event. Until then, stay safe and please feel free to call if we can be of any assistance.

Sincerely,



Kevin Zorc  
Fire Chief

**2016 FFI  
report from  
Bill Tingle,  
NCAFPM  
Executive  
Director**

## Fall Floodplain Institute

**NORTH CAROLINA ASSOCIATION OF FLOODPLAIN MANAGERS**

NCAFPM's 11<sup>th</sup> Annual Fall Floodplain Institute (FFI) was held October 18-21 at the Harrah's Cherokee Casino Resort. Cherokee welcomed the 100+ attendees with beautiful fall colors and ideal weather. Speakers at all sessions were able to present to rooms full of floodplain management professionals eager to learn about a variety of topics and issues.

The FFI events began with a golf outing at the Smoky Mountain Golf Club on Wednesday morning. The perfect weather and beautiful leaves made up for the numerous lost balls and high scores on the scenic and mountainous course.



(Above) Bill Tingle's presentation on the proposed private flood insurance bill.

All of the presentations were very well received. In this report, I am going to touch on a few of those that I attended.

The open session on Wednesday afternoon included a "Welcome to Cherokee" by Patrick Breedlove with the Eastern Band of Cherokee Indians. NCAFPM Chair David Key then welcomed everyone to the FFI and followed with a presentation on the impacts of Hurricane Matthew on North Carolina. The presentation demonstrated our state's leadership in floodplain management, response, and recovery. The quantity and speed of the flood inundation, depth, and damage information was amazing.

The presentation by Fred Malik with Fortified Building Programs was especially interesting (and of particular interest for those of us who like to see things blown up or smashed!). The Fortified Homes group operates a huge enclosed lab facility in South Carolina where full-sized buildings are constructed and then subjected to hurricane force winds, extreme rainfall, and hail storms to test the durability of building materials and building design techniques. Fred's presentation also included several cool videos.

All highlights of the FFI were not confined to the training sessions. A number of exhibitors were set up outside of the meeting rooms, which provided a backdrop for breaks and the Wednesday evening social. An excellent dinner was provided at the Events Center on Thursday evening. A few people may have spent significant time (and money) in the casino. Even though Harrah's provided each registrant with a \$20 voucher for use in slot machines, not many left with a profit. Others took advantage of the beautiful weather to do some hiking or fly fishing (after hours, of course).

**Continuing Education Certificates were emailed to all attendees on Wednesday, November 16.** If you did not receive your certificate, or if you have questions, please [contact Kelly Keesling](#). ▲

**NOTE:** We plan to have the 2016 FFI presentations available on the NCAFPM website in the next few weeks. We are working to get the information from our presenters.

# ASFPM 2017 Annual Conference

April 30-May 5, 2017, will be ASFPM's 41<sup>st</sup> annual national conference, "Managing Flood Risk in the Heartland" in Kansas City.

The ASFPM annual 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, they are the national conferences all community, state, and federal floodplain managers plan to attend. And because of that, many of the most important consulting firms and product vendors associated with floodplain management attend.

In recent years, the attendance has had about an equal number of private, local, state and federal participants from all over the U.S. and several foreign countries. ▲



## Report from ASFPM 2016 Annual Conference

The 2016 Annual Conference was ASFPM's 40<sup>th</sup> Anniversary. To commemorate our 40<sup>th</sup>, Mark Walton from the Michigan Stormwater-Floodplain Association built and donated this one-of-a-kind Adirondack chair you see pictured at left (*photo by Mark Walton*) to the silent auction in honor of ASFPM's 40<sup>th</sup> anniversary. To celebrate and commemorate this milestone, ASFPM is offering 40<sup>th</sup> Anniversary pins, which are available through the ASFPM Executive Office.



### Chapter Meeting

This year's chapter meeting at the #ASFPM2016 National Conference in Grand Rapids, MI was a success! So many chapters attended, presented, and contributed to the discussion. 70 people were in attendance at the chapter meeting representing 26 of our 36 chapters.

### 4th Annual Running of the Chapters

ASFPM would like to thank all the chapters who helped their board and members attend this year's meeting and conference. Many chapters had more than one representative in attendance. This year's conference and 4<sup>th</sup> annual Running of the Chapters took place alongside the picturesque Grand River in Grand Rapids. Many chapters helped sponsor this year's race which included 117 participants. Race participants received a race t-shirt, pint glass, and bottle opener finishing medal. By all accounts, this year's chapter race was a success!

### Greg Main Memorial Blood Drive

New this year, the Michigan Stormwater-Floodplain Association (MSFA) hosted a blood drive in memory of past ASFPM Chair and Indiana Chapter member Greg Main. Thanks to all who donated! ▲

## Way to Go, Dean!

Dean Goodison of Atkins was the third place men's finisher at the "Running of the Chapter" held during ASFPM's Annual Conference in Grand Rapids, Michigan in June.



# SMART VENT® Partners with NASA Space Suit Designers at ILC DOVER to Launch Line of Dry Floodproofing Products

Technology Will Save Billions of Dollars in Annual Property Damage Due to Flooding

Pitman, NJ and Frederica, DE – May 17, 2016 – Smart Vent Products, Inc. and ILC Dover LP have officially partnered to bring to market a new line of Dry Floodproofing products. Flex-Wall™ is a low cost approach that utilizes a high strength flexible wall, which can be deployed rapidly for flood protection of buildings and equipment. It is constructed from high tensile strength Kevlar® with stainless steel hardware and can hold back up to 14-feet of rushing floodwater. The Flex-Wall™ can be configured to surround buildings or to cover doorways, storefront windows, and garage entrances. All flood protection components are stored at the point-of-use for maximum efficiency that is rapidly deployed and retracted before and after a flood event eliminating costly down time at the facility.



According to the National Weather Service, between 2010 and 2014, flooding in the United States resulted in property damages and productivity loss of more than 24 billion dollars. The 2015-2016 El Niño has brought major flooding to California, Texas, and many other states and with hurricane season just around the corner it's fairly certain that states on the eastern seaboard and Gulf of Mexico are likely to incur water damage to property.

“For more than 15 years, Smart Vent has been protecting infrastructures with its state-of-the-art Wet Floodproofing solutions,” said Brad Walters, Vice President at ILC Dover.

“This vast experience as well as its industry-leading Certified Floodplain Managers make Smart Vent the perfect partner for ILC Dover's Flex-Wall™ Dry Floodproofing technology.”

Non-residential buildings located within high-risk FEMA-mapped flood zones are required to floodproof their buildings, which usually means using bulky pieces of aluminum logs or panels that must be carefully fit together in exact order to create a wall. In most cases, these need to be stored off-site due to their size, which is complicated and dangerous especially when a storm event is nearing.

“This partnership allows Smart Vent Products to be the one stop shop for all Floodproofing needs, whether a building designer is looking to incorporate Wet or Dry Floodproofing, or a combination of both. The innovative technology behind the Flex-Wall™ provides the security, performance, and ease-of-use that building owners are looking for when engineering to protect their asset,” says Tom Little, Vice President of Smart Vent Products, Inc.



## Dry Floodproofing (from previous page)

Flex-Wall™ systems are currently being installed in New York City to protect a major electrical utility in the city. ILC Dover's Flex-Wall™ is part of a family of flood mitigation products that protect subway entrances (Flex-Gate™), tunnel entrances (Portal Flex-Gate™) and vent openings (Flex-Cover™). ▲

## About SMART VENT PRODUCTS, INC.

Founded in 1997, Smart Vent Products, Inc. is the leading manufacturer of foundation flood venting systems and has an ICC-ES Certified product line with dual-function and insulated engineered models for residential and commercial applications. Smart Vent is providing over 80 million sq. ft. of certified flood protection around the world today. A new division called the Flood Risk Evaluator ([www.yourfloodrisk.com](http://www.yourfloodrisk.com)) was recently born to evaluate and provide detailed reporting to property owners on what can be done to reduce rising NFIP flood insurance premiums. For more information about Smart Vent Products, Inc., call 1-877-441-8368 or visit [www.smartvent.com](http://www.smartvent.com).

## About ILC DOVER LP

ILC Dover is a world leader in the innovative design and production of engineered products employing high-performance flexible materials. Since 1947, ILC has provided engineered solutions to complex customer problems. Known for the production of space suits for NASA, we leverage our vast materials, engineering, process, and design experience to create high performance systems for a wide range of industries. For more information about ILC Dover LP, call 1-800-631-9567 or visit [www.ilcdover.com](http://www.ilcdover.com). ▲

## Elevation Certification Clarified

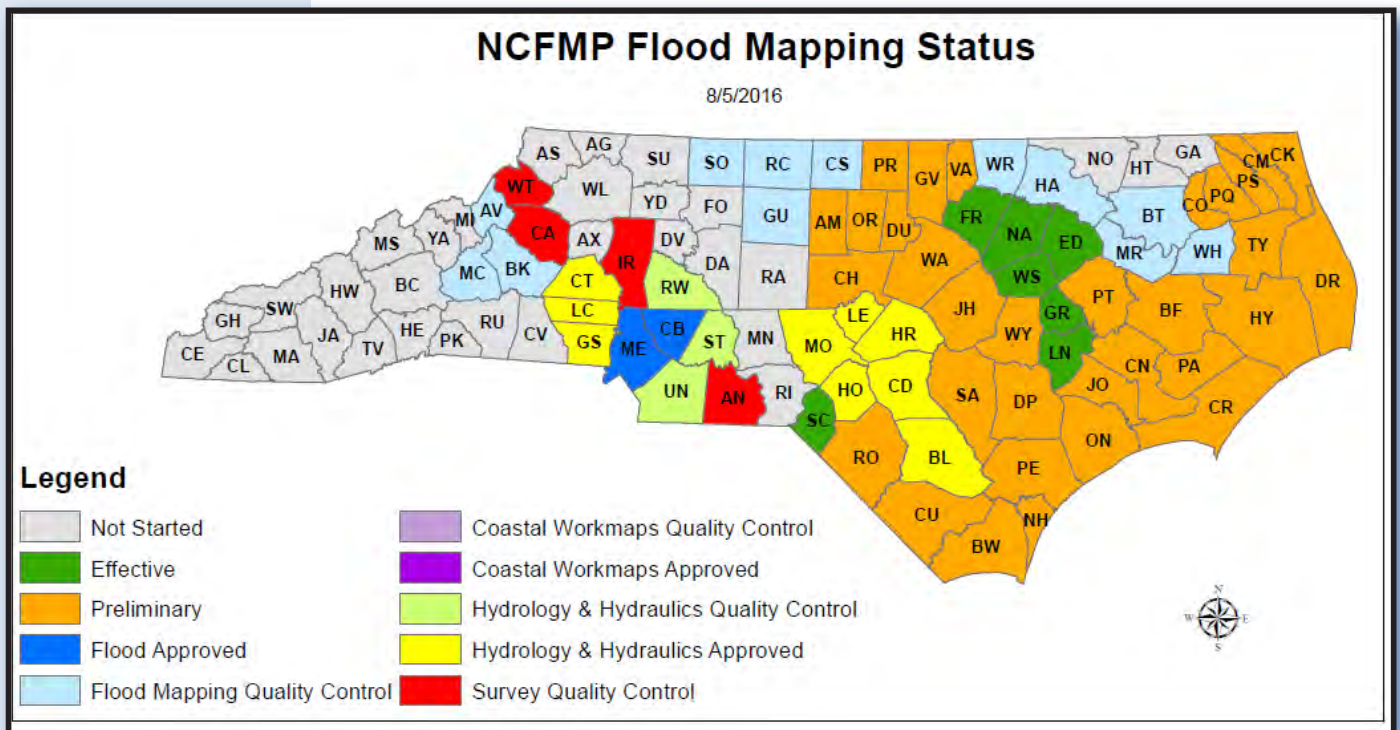
In North Carolina, Professional Engineers and Architects can only seal Elevation Certificates based on **Construction Drawings**. This is indicated on line C1 of the Elevation Certificate form. **Buildings Under Construction** or **Finished Construction** elevation certificates must be sealed by a Professional Land Surveyor. This follows the guidelines of the Engineering Surveys Policy prepared by the North Carolina Board of Examiners for Engineers and Surveyors. Put simply, if the data in Section C of the Elevation Certificate is based on data gathered in the field rather than on a set of plans, then it must be sealed by a surveyor. Note that this policy may vary from state to state, and is different from FEMA's guidance regarding the certification of elevation data. ▲

SECTION D - SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION			
This certification is to be signed and sealed by a land surveyor, engineer, or architect authorized by law to certify elevation information. I certify that the information on this Certificate represents my best efforts to interpret the data available. I understand that any false statement may be punishable by fine or imprisonment under 18 U.S. Code, Section 1001.			
<input type="checkbox"/> Check here if attachments.	Were latitude and longitude in Section A provided by a licensed land surveyor? <input type="radio"/> Yes <input type="radio"/> No		
Certifier's Name	License Number		
Title	Company Name		
Address	City	State	Zip Code
Signature	Date	Telephone	

# NC Floodplain Mapping Program (NCFMP) Update

RANDY MUNDT,  
AICP, CFM  
OUTREACH COORDINATOR  
RISK MANAGEMENT SECTION

The NCFMP has completed several projects across the state, from releasing optimized non-encroachment areas for Graham County in the western mountains, to the Preliminary issuance of updated flood hazard data for Cabarrus and Mecklenburg counties. Currently the NCFMP has 34 counties in the post-preliminary process, including all of the coastal counties. It is anticipated that revised preliminary data will be issued in December for a handful of those counties that submitted appeals and/or more detailed data. The revised data will carry a 30-day comment period. This past June, the last of the coastal Preliminary FIS/FIRMs were issued for Beaufort, Carteret, Craven, Dare, Hyde, Jones, Pamlico, Onslow, and Tyrrell Counties, and it is anticipated that the statutory 90-day appeal period will begin in December/January. The Cabarrus and Mecklenburg (PMR3) County Preliminary FIS/FIRMs were issued in August, and it is expected that the statutory 90-day appeal will begin in the winter of 2017. Below shows the current status of mapping updates for North Carolina.



The next round of counties that the NCFMP expects to release updated flood data for includes the coastal plain counties of Bertie, Halifax, Martin, Warren, and Washington, as well as the several in the Piedmont, to include Caswell, Guilford, Rockingham, and Stokes, which should be issued in March 2017.

With the resolution of appeals from Alamance, Chatham, and Orange Counties, we expect that FEMA will shortly be issuing letters of final determination (LFD) by the close of 2016. This will start the six-month compliance period for those counties to adopt the new data. The NCEM Risk Management staff will conduct Resilience meetings in these counties to release updated flood risk data to help them consider options for flood mitigation, as well as provide guidance to communities about adopting higher regulatory standards while they are in the process of updating their flood damage prevention ordinances. ▲

# NCAFPM 2017 Annual Conference

## April 23-26, 2017

NCAFPM will return to Atlantic Beach for our 2017 Annual Conference. The DoubleTree (formerly Sheraton) will be our host and a full program of instruction is already being planned. Room rates will be \$129 and our block of rooms will be available until April 3, 2017. Mark your calendar and watch our website for more information in early 2017.

*DoubleTree by Hilton Atlantic Beach Oceanfront  
2717 W Fort Macon Rd, Atlantic Beach, NC 28512*



## 2016 NC/SC Joint Annual Conference

# REPORT

JOHN FULLERTON, CFM  
NCAFPM AT-LARGE REP.

April's NCAFPM and SCAHM Joint Conference held in Myrtle Beach lived up to its name by being a unifying and relationship strengthening time for our two organizations.

From our survey results, the 294 participants enjoyed “communication time” (networking), “synergy created by being with other CFMs,” “SC and NC together,” “great location and topics,” “energized and interesting speakers,” “variety of topics,” and “the joint nature of the conference.” This post-conference survey showed an overall satisfaction rating of 98%.

Social events included the annual golf tournament at nearby Arcadian Shores, a silent auction, an exhibitor's social, Embassy Suites afternoon socials, and an evening at Ultimate California Pizza Game Zone. The hotel provided a large and well-equipped hospitality room which was highlighted by the presence of graciously prepared hot and cold snacks compliments of SC's **Alesia Hunter**. Thank you!

ASFPM Vice Chair **Maria Cox Lamm** and ASFPM Executive Director **Chad Berginnis** began the plenary session with a very well-received discussion on the SC October (2015) floods and ASFPM current activities, respectively. **John Dorman**, NCEM, then shared the latest news on progress and innovations in the NC Floodplain Mapping Program which continues to gain national attention and partnerships already established with several individual states. Two full days of presentations followed with often four occurring simultaneously. The variety and number of different presentations reflect the work of many presenters and the organizational skills of program co-chairs **Daryle Fontenot**, AECOM, and **Amit Sachan**, Alpha & Omega Group.

Both boards worked close together with continual communication both prior to and during the conference. The conference budget finished in the black, thanks in large part to our Platinum and Gold sponsors and exhibitors: Platinum — ESP, AECOM, Amec Foster Wheeler, Freese & Nichols, ATKINS, Dewberry, and Alpha & Omega Group; Gold — Flood Flaps, THC, Smart Vent, Inc., Stantec, and FDH Velocitel. ▲



North Carolina Association of  
Floodplain Managers  
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2016-2017

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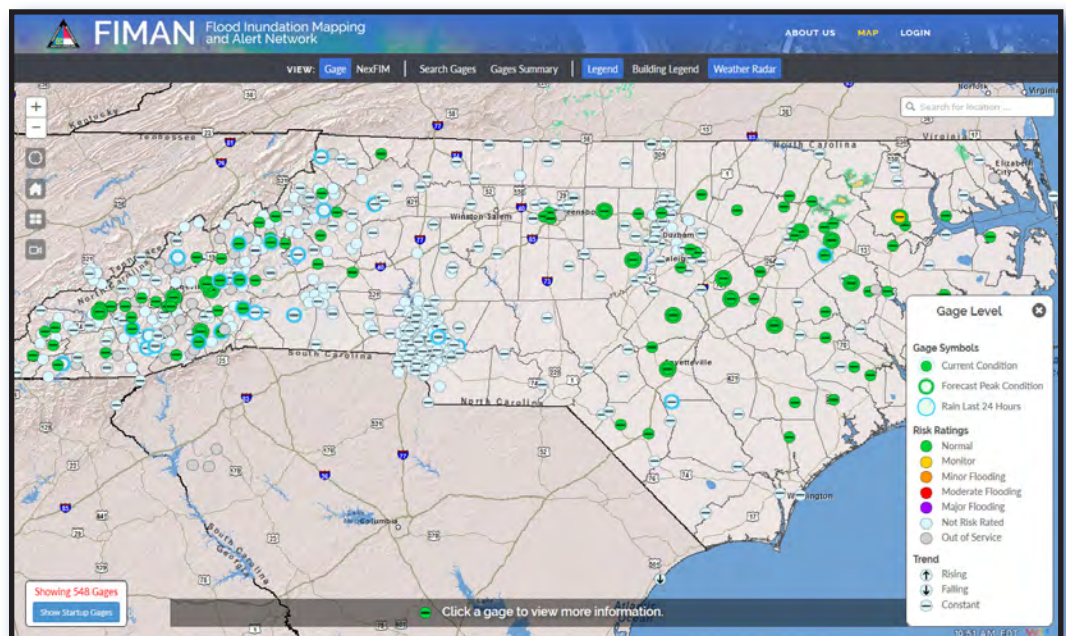
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# FIMAN Hits the Mark – Validation of Real-Time Floodplain Mapping

KURT GOLEMBESKY, PE, CFM, NORTH CAROLINA DIVISION OF EMERGENCY MANAGEMENT  
NEAL BANERJEE, PE, CFM, ESP ASSOCIATES, P.A.

## FIMAN – North Carolina’s Real-Time Flood Warning System

Since its inception, the North Carolina Floodplain Mapping Program (NCFMP), now under the Division of Emergency Management (NCDDEM), has been a pioneer in developing strategies to identify and reduce risk from natural hazards. One unique component of NCFMP’s program is its real-time flood warning system known as FIMAN (Flood Inundation Mapping and Alert Network). FIMAN is comprised of a physical network of over 550 stream/coastal gages integrated with sophisticated technologies, datasets, and tools that analyze, map, and communicate flood risks in real-time. The FIMAN website (<https://fiman.nc.gov/fiman>), which was rolled out in early 2016, is the primary information portal to disseminate information to the public.



FIMAN homepage with default statewide gage view.

One of the most powerful aspects of FIMAN is the ability to map areas that are being, or are expected to be, inundated by flood waters during a storm event in real-time as the event is happening. This information is an invaluable resource to public agencies, emergency responders, and the public to aide in assessing potential risk, allocating appropriate resources, and keeping people out of harms way.

## FIMAN in Action – Flood Inundation Area Verification

The real-time flood inundation mapping in FIMAN is based on a combination of gage information, pre-processed data sets, and sophisticated algorithms. There have been several significant storm events in 2016 in which resulted in significant flooding. As part of the response to these events, actual flood inundation areas and high water marks were identified in the field. In an effort to assess the accuracy and validity of the FIMAN pro-

— continued on page 16

# A Toolbox for Sustainable Investments

By EMILY DARR, CFM, ENV SP  
FREESE AND NICHOLS, INC.

As municipalities and agencies seek to invest in infrastructure that is cost-effective, efficient and resilient — both during construction and throughout its life cycle — many are turning to a new set of resources to guide them. The Envision® Sustainable Infrastructure Rating System is a comprehensive framework for evaluating the environmental, economic and social impacts of infrastructure projects, often referred to as the triple bottom line. Envision may be used on all kinds of stormwater projects, such as water quality projects, restoration projects and storm drain design, as well as on bridges, pipelines and other civil infrastructure.

The system measures sustainability through five categories, breaking them down into manageable pieces for which goals and metrics are well defined. Going beyond individual project performance, Envision also assesses the project's contributions to the sustainability of the community as a whole – environmentally, economically and socially. This holistic approach is crucial because of the way different infrastructure elements interact to serve multiple stakeholders. Envision enables public organizations to take a step back; instead of asking, “Are we doing the project right?” they start with, “Are we doing the right project?” A frequently cited example is a highway project: The most important sustainability consideration is not whether the construction materials are recycled, but whether a highway is the mode of transportation that would best meet the community's mobility needs.

The credibility of Envision is evidenced by the stature of its founders: the American Council of Engineering Companies, the American Society of Civil Engineers and the American Public Works Association. Seeing the critical need for sustainability in public infrastructure, those three organizations in 2011 founded the Institute for Sustainable Infrastructure (ISI), which in turn developed Envision in partnership with the Zofnass Program for Sustainable Infrastructure at Harvard University.

## Why Use Envision?

Envision provides a number of benefits for public entities and their infrastructure investments:

**Cost savings and long-term viability:** Envision can provide savings on initial project costs as well as savings through operational efficiency over the project's life cycle. In some instances, additional funding is available for projects that meet sustainability goals.

**Reduced negative impacts:** Envision enables owners to account for and minimize project impacts to natural resources and to the community.

**Social benefits:** Envision encourages public engagement in decision-making. It also provides the credibility of a third-party rating system, giving the public more confidence in the value of the project.

**Application toward all types of projects:** Envision is accessible across project types, sizes and complexities; it can be used on any type of infrastructure. Envision can also be used in conjunction with other ratings systems.

**Low initial investment:** Some Envision resources can be downloaded at no cost for project planning and self-assessments. One tool, the Envision checklist, enables owners to

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— continued on next page

## Toolbox (from previous page)

quickly compare project alternatives, which is helpful in the early planning stages, and familiarizes them with the sustainability criteria. (Later steps such as membership, project registration and verification do involve fees.)

## Developing In-House Expertise

By completing the Envision training course – seven one-hour online modules or a full-day workshop – and passing an exam, individuals receive the Envision Sustainability Professional designation, or ENV SP.

Sustainability professionals are trained to:

- Lead change in an organization by rethinking approaches to infrastructure projects
- Promote sustainable practices and consider how they can be implemented
- Identify current internal sustainable practices and determine improvement opportunities
- Actively participate in project planning and help project teams make informed decisions
- Speak a uniform language when working on interdisciplinary projects to improve project collaboration
- Take on a leadership role in promoting the long-term welfare of the public and the environment

The increasing number of professionals earning credentials demonstrates the momentum behind Envision and the growing awareness of infrastructure sustainability. There are more than 4,700 certified Envision Sustainability Professionals worldwide.

*The Line J, Section 1 Pipeline received an Envision Silver Award in 2014. Two processes that were evaluated for triple-bottom-line impact were the pipe manufacturing and its transportation to the project site.*



## Case Study: Line J, Section 1 Pipeline

The Tarrant Regional Water District (TRWD) received an Envision Silver Award for the Line J, Section 1 Pipeline in 2014. This 2-mile, 108-inch-diameter raw water pipeline is a vital component of TRWD's delivery system, which serves nearly two million people. Freese and Nichols, a charter member of ISI, designed the pipeline and provided sustainability guidance.

The team assessed a wide range of impacts associated such as fuel costs, traffic impacts, depletion of natural resources, employment in local communities, and carbon emissions from pipe production, delivery and installation. Then, by laying out different design combinations and comparing

them to the existing standard practice, Freese and Nichols helped TRWD select the design alternative that best fit its priorities and goals.

A number of other sustainable aspects also contributed to the Envision award:

- Stream banks were designed to reduce erosion, and wetland and surface water

— continued on next page

## Toolbox (from previous page)

functions were maintained at creek crossings.

- Envision places a high value on collaboration, which resulted in innovative contractual practices that accommodated an aggressive construction schedule.
- The project team worked with city officials to minimize the impact of road closures and prepare traffic control plans.

Perhaps the greatest testament to the benefits of Envision, TRWD and the City of Dallas followed the Line J project by implementing multiple sustainable initiatives on the \$2.5 billion Integrated Pipeline Project, which received an Envision Platinum award in July 2016.

## Next Steps for Your Organization

If you're interested in learning how Envision can benefit your community, the best place to start is the ISI website, [www.sustainableinfrastructure.org](http://www.sustainableinfrastructure.org). The website has a robust library of resources, including the complete Envision guidance manual, case studies and webinars, all available with a free account. One-day Envision training courses are also available. Sustainability professionals can visit your organization, provide a detailed look at each Envision credit category, teach how to apply the Envision checklist, and prepare the class to take the credentialing exam.

## Credits

*Emily Darr, CFM, ENV SP, is a stormwater engineer in Freese and Nichols' Raleigh office. She is a certified Envision Sustainability Professional. [Emily.Darr@freese.com](mailto:Emily.Darr@freese.com)*

*This article has been adapted from an article by Ms. Darr in the Summer 2016 issue of NC AWWA-WEA's NC Currents magazine. Additional sources include "The TRWD 108-Inch Line J – Lessons Learned from the IPL Prototype Project," by Russell Gibson and James Johnson. . ▲*



*A key sustainable component of Line J was the use of native controlled low-strength material (CLSM) rather than gravel for pipeline embedment. Pictured is field testing of CLSM with various proportions of soil and cement.*

Page  
23

TELICS

## Thank you to our FlashFlood News sponsors!

*FlashFlood News* is funded by sponsorships from consultants and vendors. Please see the [Media Kit](#) on our website with details about the newsletter, sponsorship options, and deadlines for submittal. We hope that you will consider sponsoring our next newsletter (which will be Spring 2017 as we publish two issues per year). If you are interested in sponsoring or would like more information, contact Kelly Keesling at [kgkeesling@carolina.rr.com](mailto:kgkeesling@carolina.rr.com).

Page  
20

ESP  
ESP Associates, P.A.

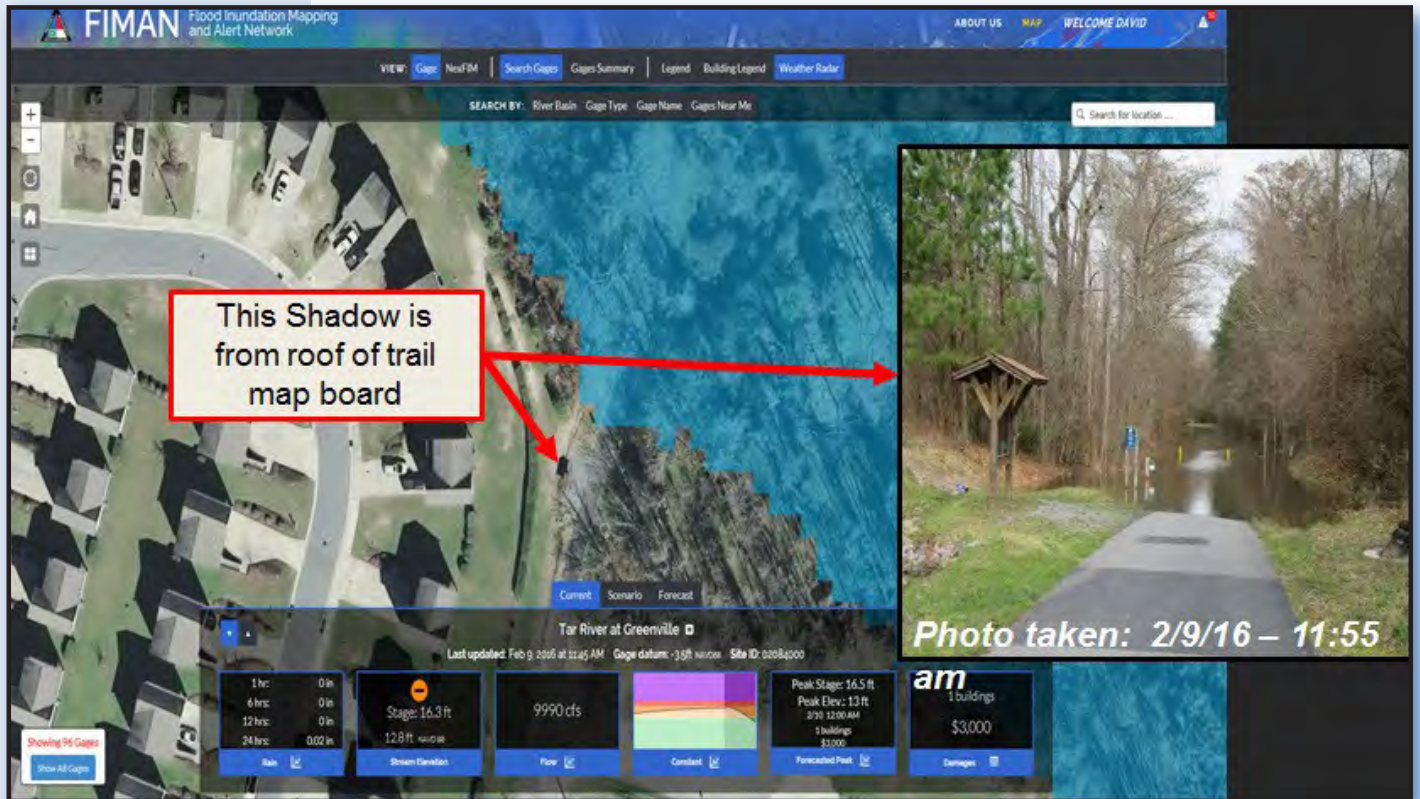
## FIMAN (from page 13)

cesses, flood inundation mapping generated in FIMAN during several large storms was compared with field information as discussed below.

For more information, contact Kurt Golembesky, NCFMP Engineer, at [kurt.golembesky@ncdps.gov](mailto:kurt.golembesky@ncdps.gov).

### February 2016 Event – Tar River Near Greenville

Heavy rainfall in the eastern portion of the State caused the Tar River to rise outside of its banks and flood low lying areas near Greenville. Flood waters inundated access to the Tar River Greenway off of Beech Street, which is approximately two miles downstream from the stream gage at Greene Street. The graphic below shows a comparison of the real-time FIMAN flood inundation area with a photograph taken at the greenway access point at the same time. As illustrated in the graphic, the FIMAN flood inundation area correlates very well with the field photograph.



*Comparison of FIMAN flood inundation and field photograph off Beech Street.*

### Tropical Storm Julia (September 2016) – Cashie River at Windsor

Remnants of Tropical Storm Julia stalled off the coast of North Carolina in September 2016, dropping over a foot of rain in portions of several counties. The maximum 24-Hour rainfall totals exceeded the 0.5% annual chance (200-year) event in several areas, and was generally at or above the 2% annual chance (50-year) event for much of the affected area as shown in the top graphic on the next page.

The Town of Windsor, located along the Cashie River, experienced significant flooding during the storm. Much of the downtown was inundated causing damage to numerous buildings and disruption to normal Town activity. Aerial imagery and high water marks were collected as part of the response to the storm. As shown in the graphics on the next page, a comparison of the real-time FIMAN inundation areas with the aerial photography and high water mark surveys shows very good correlation.



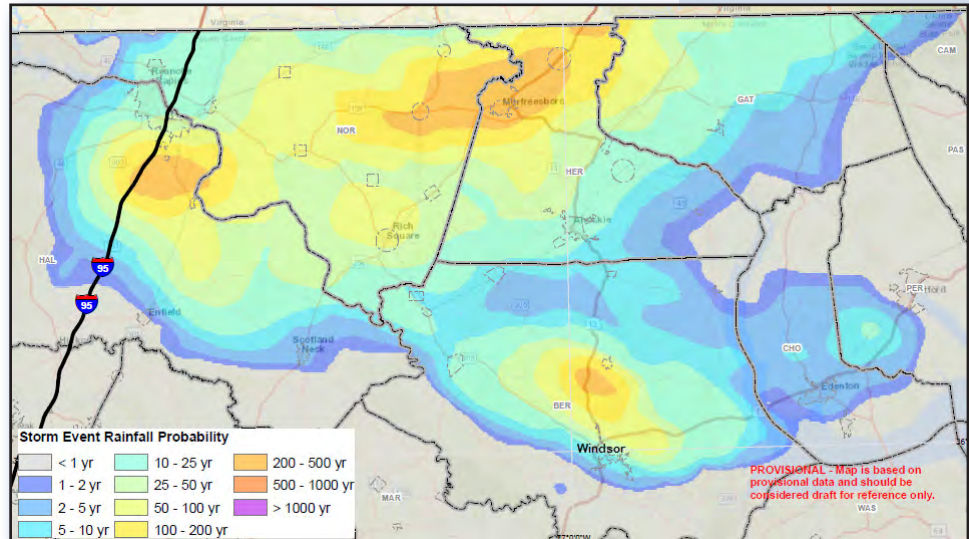
FIMAN (from previous page)

## Summary and Next Steps

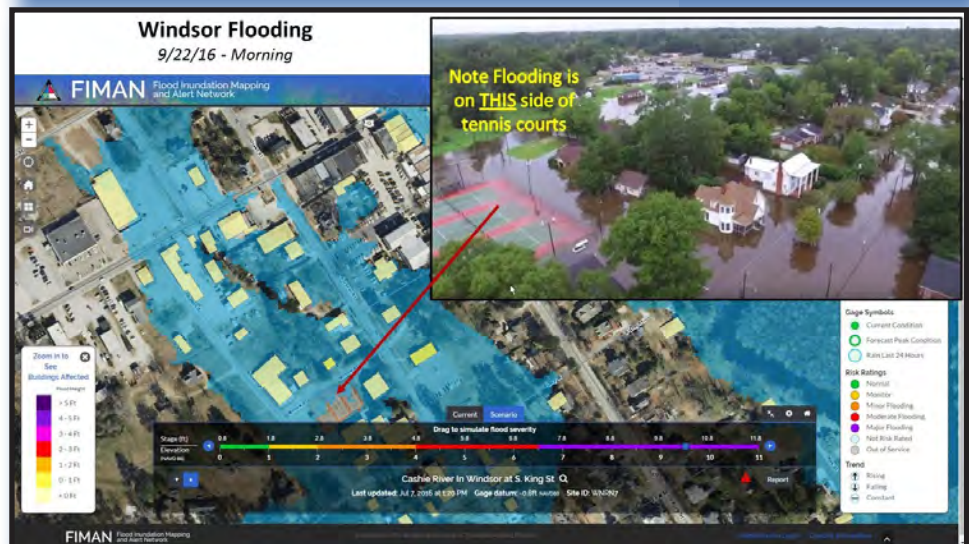
As described above, the real-time flood inundation areas generated by FIMAN show strong correlation with field observations and measurements from actual storm events.

This reinforces the value that FIMAN provides a tool to aide in emergency response and mitigation planning. NCDEM will continue to enhance FIMAN by adding/updating gages, flood hazard and risk information, and capabilities to the system. ▲

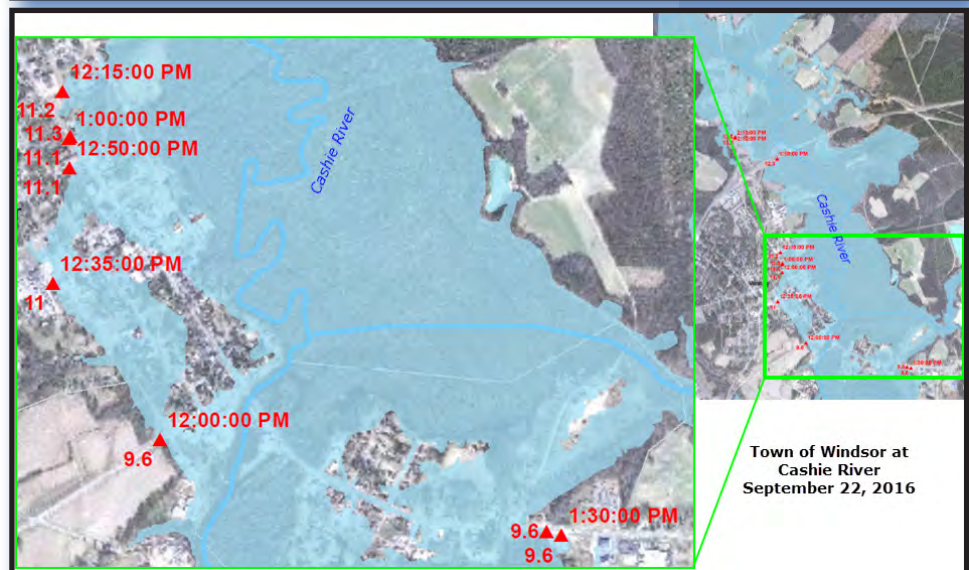
*Tropical Storm Julia storm event – 24-hr rainfall probability map.*



*Comparison of FIMAN flood inundation to storm event aerial imagery.*



*Comparison of FIMAN flood inundation to high water mark surveys.*



# CFM NEWS from ASFPM



## ASFPM Considering Elimination of Accredited Chapter CFM Programs

BILL TINGLE, PG, CFM  
NCAFPF EXECUTIVE DIRECTOR

The North Carolina Association of Floodplain Managers is one of six state chapters accredited by the Association of State Floodplain Managers (ASFPM) to maintain their own CFM program. In June of this year, ASFPM developed a discussion paper which presents what they believe are significant problems with continuation of the Accredited Chapter CFM program. Three major problem areas were cited by ASFPM: *loss of national consistency, inconsistency in fees, and the lack of revenue from accredited states* compared with ASFPM's investments/expenditures into the CFM program. Possible options mentioned in the discussion paper ranged from doing nothing and maintaining the current status quo, to the other end of the spectrum which would be eliminating the accredited chapters and absorbing all CFMs into the national program. "In between" options mentioned include cost-share options, a fee per CFM, requiring all chapter CFMs to be national members, and increasing annual fees, among many others.

ASFPM's development of the CFM program took several years of hard work and included input from a variety of stakeholders including representatives from six states which had existing state floodplain manager certification programs. The six states included North Carolina, Texas, Oklahoma, Arkansas, New Mexico, and Illinois. From the onset, ASFPM recognized the value of the six existing CFM programs and they were all allowed to keep their state programs. Each state program became accredited by ASFPM after their charters were modified to meet ASFPM national CFM standards.

Elimination of NCAFPF's CFM program could result in financial impacts for individual CFMs as well as NCAFPF itself. Elimination of the NC CFM program will likely require CFMs to pay the ASFPM annual membership fee (ASFPM – \$140/yr compared with NCAFPF – \$60/yr) to qualify for the discounted "member" biennial CFM renewal fee of \$50. If a CFM does not pay the \$140 ASFPM membership fee, the ASFPM "non-member" biennial CFM renewal fee is \$425.

NCAFPF has had an agreement with ASFPM since 2005 allowing ASFPM to administer the North Carolina CFM program. In exchange, ASFPM retains all CFM associated fees. In 2015, the NCAFPF board of directors began exploring the possibility of taking back administration of the CFM program. The Board's reasoning was that it could benefit NCAFPF by providing both a needed revenue source and likely result in better, more consistent service to NC CFMs regarding CECs, membership verification, etc. Elimination of accredited chapter CFM programs will prevent these benefits from occurring.

ASFPM has created an ad hoc committee to evaluate national consistency and investments of CFM program as administered by the six accredited chapters and ASFPM. The committee will be soliciting input from representatives of each accredited state in the coming months. We will keep NCAFPF members and CFMs informed of the proceedings from the committee. Please contact me (Bill Tingle) at [geomatics@carolina.rr.com](mailto:geomatics@carolina.rr.com) or any NCAFPF board member (see pages 12 and 13 for a list of all of our board members) if you have comments, questions, or concerns.

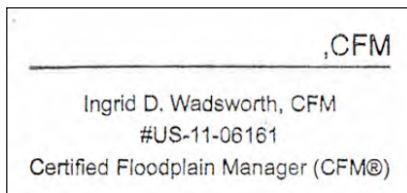
## “CFM-retired” Designation Approved by ASFPM

NEW! The Certification Board of Regents proposed and the ASFPM Board of Directors approved a “CFM-retired” designation for national CFMs. It is a new title that will be conferred on ASFPM members during the annual membership renewal cycle to retired CFMs who have been members for at least 10 years (may be non-consecutive). ASFPM CFM-retired members will be allowed to maintain their title and benefits of being a CFM without needing to keep up with Continuing Education Credits requirements or bi-annual renewals. However, they cannot perform paid floodplain management work. The NCAFPM Board of Directors will consider adding the “CFM-retired” designation for North Carolina CFMs at its next meeting in October.

## CFM Stamps Available for Order

Increase your professionalism with a signature line, or a round CFM stamp. CFM stamp use guidelines as well as an order form are available on the ASFPM website under “Certification Program.” The cost of either stamp is \$40.

### Sample Signature Stamp Design



### Sample Round Stamp Design



*Note: Stamps are not shown actual size. The actual size of the signature stamp is 1.5” x 3” and the actual size of the round stamp is 1.5” x 1.5”.*

## New Certified Floodplain Managers

The following people have passed the CFM exam in 2016. Congratulations!

Benjamin Andrea, New Hanover County  
Kathy Blake, Town of Aberdeen  
David Bowman, City of Burlington  
Chad Broadway, Charlotte-Mecklenburg  
Kristin Caracappa, Amec Foster Wheeler  
Dustin Creech, Wetherill Engineering, Inc.  
Lauren Dozier, Tetra Tech, Inc.  
Jimmy Fannin, City of Clinton  
Michael Glassman, AECOM  
Richard Godsey, Currituck County  
Jena Goodman, Gaston County  
Pamela Graham, Town of Aberdeen  
Jonathan Ham, Town of Garner  
Laura Hamilton, Gaston County  
Benjamin Hodge, Mecklenburg County  
Matthew Hubert, Town of Waxhaw  
Margaux Kerr, Town of Nags Head

Deborah LaShomb, Currituck County  
John Lineberger, City of Gastonia  
Abigail Lorenzo, Town of Carolina Beach  
Brad Loveland, Duke Energy  
Jon Mendenhall, Town of Carolina Shores,  
Andrew Neylon, Town of Leland  
Virgil Parrish, Perquimans County  
Wesley Perry, WithersRavenel  
Ashley Rodgers, City of Raleigh  
Ronald Schaecher, Currituck County  
Jerry Snead, NC Dept. of Transportation  
Rana Stansell, WSP/Parsons Brinckerhoff  
Nancy Watford, City of Asheville  
Sandra Watkins, Town of Morehead City  
Kevin Wester, Town of Wake Forest  
Michael Williams, Henderson County  
Quinn Woolard, NC DEM

— continued on next page

The CFM exam will be offered at the Annual Conference in April. Other opportunities will be listed on our website. Application must be submitted at least two weeks before the test. All information is available on the [NCAFPM Certification webpage](#).

## CFM News (from previous page)

**CFM Login**

Login:   
E-mail address or Certification Number

Password:

[Forgot Your Password?](#) Not a Member? [Join Now!](#)

01-02-2005 to 01-01-2007 16.00

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Upload supporting document for CEC approval

Describe the document and the course, seminar or conference to which it applies:

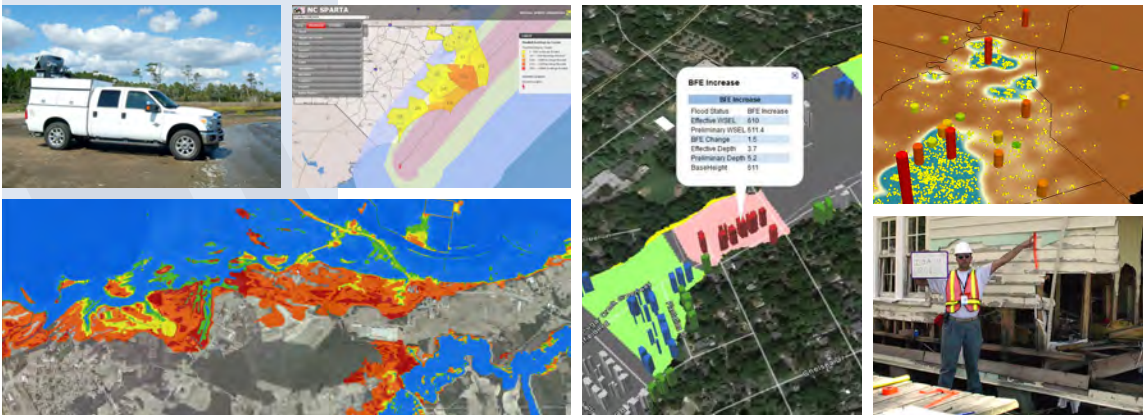
Upload File:  No file chosen PDF format is preferred.  
 Please allow 10 business days for us to review your CEC supporting documents.



All North Carolina CFMs now have access to the CFM portal developed by ASF-PM. You do not need to be a member of ASFPM to access the portal. A link to the portal is available from the [Certification page](#) of the NCAFPM website. If you have never created a login on the ASFPM website or if you forgot your password, just enter the email address you use for ASFPM records and they will send you login information. Once you log in, select “view” and then “view certification information.” The site then displays a page with your historical CEC activity. A method to electronically upload CEC information is available near the bottom of the same page. To help you know what qualifies, refer to the Guidance for Continuing Education Credit and new CEC Verification form, both available on our NCAFPM website (link above). Other questions and links to contacts are available on that page as well. ▲

(top) Screenshot of login page.

(bottom) Screenshot showing CEC activity. Note box at bottom to electronically upload your CEC information.



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- rapid response disaster recovery
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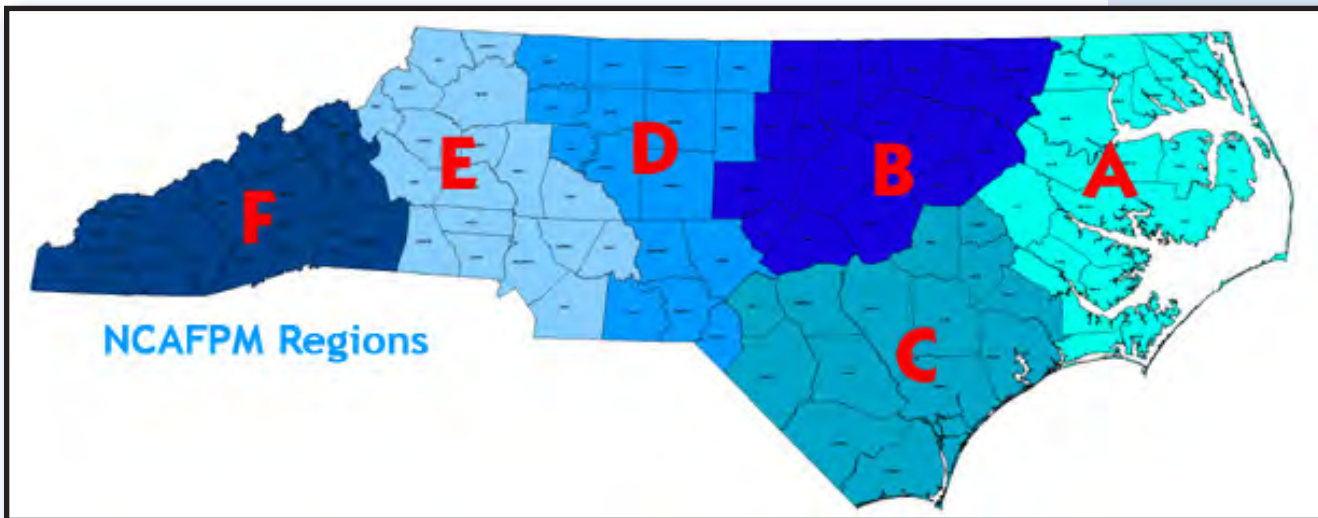
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# NCAFPM Regional Reports



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## Incorporation of Stormwater BMPS into the GIS: Public Data Viewer

*By Frank Park and Justin Gray, Guilford County*

Across North Carolina, rainfall runoff from impervious areas, Best Management Practices (BMPs), are required based upon site requirements for protection of the overall water quality within Guilford County's nine drinking water supply watersheds. These devices reduce water quality problems caused by increased impervious surfaces from changes in land use from development. There are a variety of traditional BMPs available: wet retention ponds, bio-retention areas, swales, stormwater wetlands, permeable pavement, rainwater harvesting systems, proprietary devices, and level spreaders.

On May 26, 2016, Guilford County implemented a new innovative approach to ensure compliance with stormwater BMP devices and reduced the time needed for researching associated documents and past records. The Watershed Protection/Stormwater Management Section of the Planning and Development Department in coordination with the Geographic Information Systems Department of Guilford County has worked to develop a superior product for the general public (*home owners associations, business/property owners, maintenance contractors*), design engineers, and staff that makes available a 24-hour service through the GIS: Public Data Viewer. This one-stop, user-friendly "virtual" platform location allows users to view associated documents along with current and past inspection reports, pictures, and site plans of each individual BMP device to enhance the efficiency and effectiveness of quality customer service. The GIS template provides citizens with

— continued on next page

## Region D

*Terry Kuneff, PE, CFM*

## Regional Reports (from previous page)

immediate access to an extensive catalog of resources and serves as a platform where they can further share information and best practices while understanding the existing conditions of each BMP device.

The development of this GIS-based platform is intended to provide the groundwork for electronic document management and reference for the Watershed Protection/Stormwater Management Section. In turn, as more documents are received electronically, the Section can continue with indexing BMPs to ensure rapid retrieval and having a digital association between the associated documents and their physical location within GIS. From this, the platform is useful as an overall repository for digital files, and to reduce the reliance on hard copy files. This project greatly assists with the overall documentation and record retention for each BMP device that the County is tasked with inspecting, while maintaining an organized and efficient process for conducting inspections.

### Forsyth Creek Week

During the Forsyth Creek Week (Winston-Salem, April 4-8, 2016), Dan Tomczak, Cindy Lancaster, and Drew Blackwell participated in outreach activities with 3<sup>rd</sup>-5<sup>th</sup> graders at Easton Elementary School. They discussed the impacts from development on flooding and stormwater run-off using the flood model. They also discussed developing and reading topographic maps. Drew Blackwell also participated in an event on April 9 at Washington Park in Winston-Salem that included a stream walk, using the model to discuss flooding and stream erosion, as well as organizing the rubber duck regatta.

### Gateway Nature Preserve Creek Stomp

*By Cornelia Barr*

On August 21, at the Gateway Nature Preserve (GNP) in Winston-Salem, kids and adults waded along about 400 feet of Salem Creek. Using the NCAFPM's stream scavenger hunt, they watched for deep pools, riffles, and signs of erosion. The crowning finale was a race where kids threw sticks in the creek to see whose would travel fastest.

The GNP is a 19-acre site along the Salem Creek. Our goal is to connect people with nature and to show how wildlife habitat can thrive in an urban area. The idea that a city stream can hold so much life was mind-opening for many of the participants and gave them a new appreciation for why we should protect our waterways. The kids who participated had the opportunity to do what kids have done for millennia but that too few can do today — play in a creek, make discoveries, sharpen their powers of observation, and just be kids.

This year, Drew Blackwell collaborated with GNP by participating in our Rubber Duck Regatta. NCAFPM donated rubber ducks for the regatta, which drew the biggest crowd of any of our events, and Drew demonstrated our flood plain model — which was as big a hit as the rubber ducks! We look forward to working with NCAFPM in years to come.

In efforts to lower flood insurance premiums or lower flood risks, the Mecklenburg County Flood Mitigation Program introduced the Retro FIT (Floodproofing, Improvements Together) Program to help their homeowners within the County reduce their flood risks or bring homes into compliance. Mecklenburg County Commissioners set aside \$250K for on-site mitigation funds to reimburse recipients up to 95% of qualifying floodproofing expenditures. Funding availability is limited to structures within the regulated floodplain. For fiscal year 2016, more than 80 homeowners applied for grant funds using an online application. The types of projects to be funded include structure eleva-

— continued on next page

## Region E

*Melonee Brock, CFM*

## Regional Reports (from previous page)

tion or relocation, wet floodproofing, dry floodproofing, equipment elevation, basement abandonment and demolition. The program provides on-site technical assistance to help owners throughout the application process and until project completion. The program is accepting applications for the 2017 fiscal year September 1, 2016 thru October 15, 2016. If you are interested in learning more about this program, you can visit the website at <http://charlottenc.gov/StormWater/Flooding/Pages/retroFIT.aspx>.

Region F was once again proud to host the annual Fall Floodplain Institute. This year's NCAFFPM FFI was held in Cherokee, October 19-21. Over 100 people attended this full program of flood-related issues. Next time you're in the area, don't forget to take advantage of the special venues in the area! The Cherokee "Unto These Hills" drama, the Cherokee Museum, and national renowned trout fishing in our 35 fishable miles of trout streams are just a few activities that the reservation has to offer. I was happy to welcome you to Cherokee during the first Plenary session and hope that all attendees had a great experience at the conference.

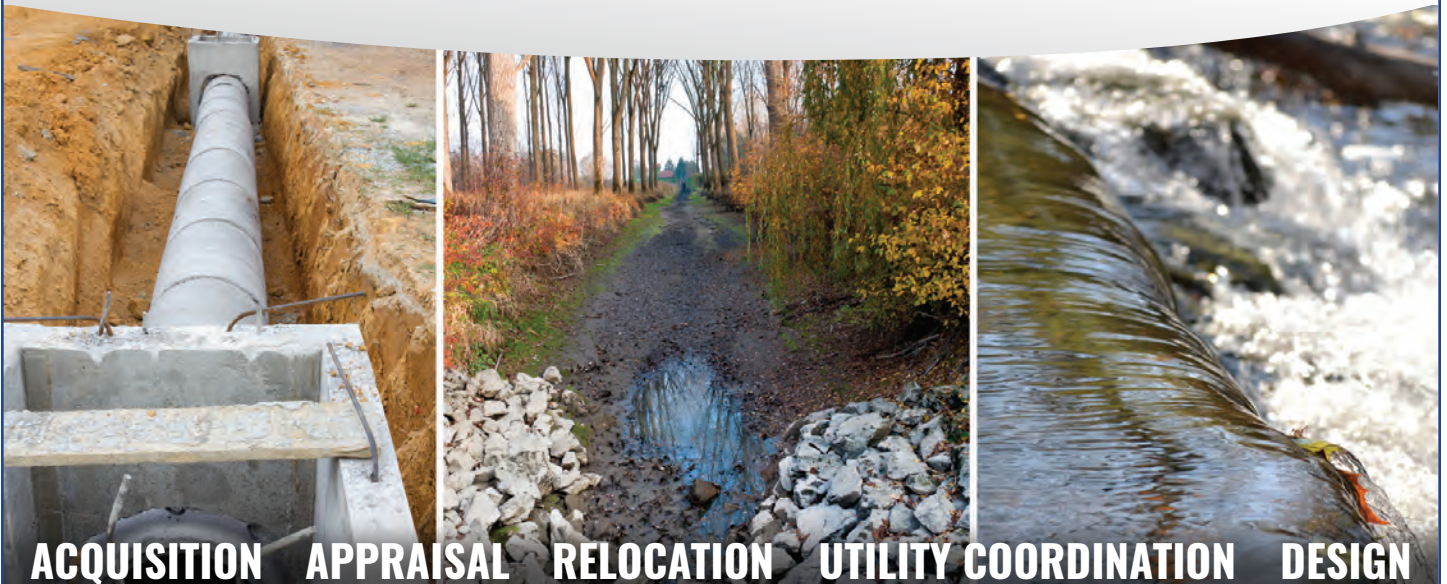
*Note: Patrick has been serving as our Region F representative, but must step down because of a change in his job duties. We appreciate his service to our Association. Thank you to Nathan Pennington, who will now be serving in this position.*

## Region F

*Patrick Breedlove, CFM*



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# NFIP Coordinator's Corner

John Gerber, PE, CFM  
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[www.ncfloodmaps.com](http://www.ncfloodmaps.com)



John sends out periodic updates on NFIP issues and training opportunities to those on his email distribution list. If you are not currently receiving these emails and would like to be kept informed, please email [john.gerber@ncdps.gov](mailto:john.gerber@ncdps.gov).

## Use of Preliminary Data

There are currently twenty-nine counties that have preliminary flood maps in the impacted area from Hurricane Matthew. As communities recover and rebuild, consideration should be given to adopting the preliminary maps and applying the more restrictive of either the effective or the preliminary flood data. Certainly where there are damages noted outside the effective SFHA but within the preliminary SFHA, the risk data for the preliminary maps should be considered for reconstruction. FEMA has developed guidance on using available flood hazard information for Hurricane Matthew recovery. In a nutshell, this guidance states that projects funded by FEMA must be designed to the best available information which is considered to be the source that provides the more restrictive flood hazard zone, highest base flood elevation, and/or greatest discharge. [Click here](#) to view the FEMA Policy: Guidance on the Use of Available Flood Hazard Information (pdf document), also available on the NCAFP website under [Resources](#).

## New Documents Available

These documents are also available on the NCAFP website under [Resources](#). You can also click the direct link within the descriptions to go to the pdf on our website. They are also available on the FEMA website.

- FEMA recently published a very thorough guidance document for LOMAs and LOMR-Fs titled Guidance for Flood Risk Analysis and Mapping, MT-1 Technical Guidance, May 2016. [Click here](#) to go to the pdf document.
- State Mitigation Planning Key Topics Bulletins: Risk Assessment – June 2016. [Click here](#) to go to the pdf document.

## Quick update on the Elevation Certificate

- The 2012 Elevation Certificate (EC) is still valid until 12/31/2016. After that date, the new 2015 EC must be used.
- The fillable pdf is available on the FEMA website. Please [click here](#). (A fillable MS Word version is not yet available.)
- There are still a number of issues with the new Elevation Certificate. Some of the more significant are:
  - Section A8 and A9 do not allow for alpha characters and therefore “N/A” cannot be entered when they don’t apply.
  - Cannot uncheck Section B12 if the CBRA or OPA box is inadvertently checked.
  - Section C2a-h and Section E drops the zero if the number is put in to the hundredth. For example, 5.06 becomes 5.6 instead of 5.1.
  - Unable to put “N/A” in C2b,c,d,e, and h if they are not applicable.
  - Once inserted, photos cannot be removed. They have to be copied over with a new one.
  - Watch out for copying and pasting. Although it may display in the field, it is often blank when printed.



## Certified Floodplain Surveyors Update

Many of you may not realize that North Carolina has a Certified Floodplain Surveyors (CFS) program and certification. This started as a pilot program in 2002 in partnership with FEMA, North Carolina Society of Surveyors (NCSS), and the North Carolina Emergency Management (NCEM). The certification requires 2½ days of training covering NFIP regulations, insurance, FRIS, elevation certificates and processing LOMAs and LOMR-Fs (MT-1s) and successfully completing the CFS exam. The CFS exam is similar to the CFM exam but is more challenging and includes the technical requirements for submitting Letter of Map Changes (LOMCs).

CFS submittals for a LOMA and LOMR-F will be fast-tracked to receive a determination in five business days rather than the typical 45 to 60 day process. We have received very positive feedback from permitting officials in reference to the quality of elevation certificates that are completed by a CFS compared to the surveyors that do not have the certification. We encourage you to become familiar with the CFSs in your area and refer them if someone is looking for a surveyor familiar with the NFIP requirements, Letter of Map Changes, and proper completion of the elevation certificates

Currently, there are 226 surveyors that have obtained their CFS certification and these can be found on the NCSS website at [ncsurveyors.com/education/cfs\\_program](http://ncsurveyors.com/education/cfs_program). North Carolina is working with other interested states in FEMA Region IV to establish a CFS program in those states.

## Hurricane Matthew Update

On October 8, 2016, Hurricane Matthew devastated many parts of eastern North Carolina. The impacts from the storm tragically resulted in 28 deaths and thousands displaced from their homes. Governor McCrory's Request for Federal Assistance for Hurricane Matthew's Recovery report contains a detail summary of the impact to North Carolina and can be found [by clicking here](#) (pdf file on [ncgovernor.s3.amazonaws.com](http://ncgovernor.s3.amazonaws.com)).

Many local floodplain administrators have the daunting task of determining if impacted structures are substantially damaged. The determination if a structure received damage exceeding 50% of the present market value (before damaged occurred) is required to not only meet the minimum NFIP requirements as defined in each local flood damage prevention ordinance but also mandated by the North Carolina Building Codes. Resources can be found on the FEMA website:

- Substantial Damage Estimator (SDE) (SDE) - software, worksheets and manual, FEMA P-784: [click here](#)
- Substantial Improvement/Substantial Damage Desk Reference, FEMA P-758 (Appendix D includes sample notices to property owners, sample affidavits, and other material): [click here](#)
- Substantial Damage Estimator Best Practices: [click here](#)
- Substantial Damage Estimator (SDE): [click here](#)
- Substantial Damage in the Disaster Recovery Environmental: [click here](#)
- Substantial Damage guidance documents for estimating percentages for residential and non-residential structures (downloadable forms) the NCEM NFIP SharePoint Site: [click here](#) (contact [John Gerber](#) for username and password).

FEMA has fielded teams to assist local governments in making inspections and using the FEMA Substantial Damage Estimator Program. In addition, volunteers from the Professional Engineers of North Carolina (PENC) assisted the FEMA teams. Currently, there have been over 830 structures inspected by these teams. ▲

## NFIP Coordinator's Corner

### The National Flood Insurance Program (NFIP) at a glance for North Carolina

There are 128,380 flood insurance policies in North Carolina. Of that figure, 77,784 are in an A-Zone and 6,197 are in a V-Zone, with the remainder in an X-Zone. \$104,100,291 in premium is paid to provide \$31,548,744,300 of total coverage. Over a billion dollars in claims have been paid since 1978.

## ASFPM State Flood Risk Symposia

### Background

The ASFPM Foundation has a strong presence in national discussions about flood risk. Over the past decade, the foundation has sponsored five “Gilbert F. White National Flood Policy Forums,” in which groups of 100 national and international experts and leaders convened in Washington, D.C.

The forums focused on reducing flood losses, managing flood risks and floodplain resources, the future of floodplain management, holistic coast approaches, and addressing new federal standards and requirements. The goal of each forum was to facilitate discussion on flood risk, establish priorities for improving policy and program implementation, and to formulate recommendations and directions for the future.

Based on the success of the national forums, in 2011 the foundation began promoting similar meetings at the state level. Since 2011, State Flood Risk Symposia have been held in Colorado, Indiana, Texas, Georgia, Florida, Illinois and Arizona. **For 2016**, New York, Texas (for a second time), and **North Carolina** were selected to host these State Flood Risk Symposia. In addition to productive discussions, there is a strong emphasis on proposed action items and how to measure progress in flood risk management at the community level.

### 2016 Symposia

In May 2016, the Texas Floodplain Management Association and North Carolina Association of Floodplain Managers, in collaboration with the ASFPM Foundation each hosted a one-day symposium to discuss the many concerns about recent flooding, climate change impacts, flood risk identification, and related topics in their respective states. The TFMA Symposium was held at the San Antonio Westin Riverwalk, and the NCAFPM Symposium was held at the Wake Tech Community College in Raleigh.

In recent years, North Carolina has experienced several flood-related hazards across the state, such as increased coastal flooding, coal ash dam spills and storm affects from Hurricane Joaquin. The state and several proactive communities have been working together for years to assess and analyze riverine and coastal flooding hazards. However, many within the emergency management and planning field recognize much more can be done within the state to further outreach, education and communication of these flooding hazards.

### North Carolina Flood Risk Symposium

For North Carolina, the following plenary speakers presented:

- **Dave Canaan**, Director of Mecklenburg County Storm Water Services in Charlotte, NC. He provides overall direction and guidance on financial, budgetary, organizational, planning, and regulatory matters related to storm water/floodplain management, and land development services in Mecklenburg County.
- **John Dorman**, Assistant North Carolina Emergency Management Director for Risk Management. He is responsible for all design, build, acquisition, analysis and dissemination of data, models, analysis, systems, and applications associated

— continued on next page

## Flood Risk Symposia (from previous page)

with hazard risk management. He is currently the chair of the National Technical Mapping Advisory Council.

- **Dr. Gavin Smith**, Director of the University of North Carolina at Chapel Hill, Department of Homeland Security's Coastal Resilience Center of Excellence, a consortium of universities located across the country. He is currently engaged in a number of planning and policy-related research projects within the center, including an assessment of the role governors and state agency officials play in disaster recovery.

Following the plenary presentations, the symposia attendees were separated into four groups for North Carolina, each group then led by facilitators from the foundation and group reporters and scribes from the chapter who helped lead discussions on the following breakout group topics:

- North Carolina has long been known for being a “data rich” state. Over the past 15 years, the state has acquired, updated and maintained vast amounts of flood-related data. In addition, applications and tools have been developed to view and use the data. Going forward, how can these assets be utilized/leveraged to improve resiliency and contribute to flood insurance affordability?
- Over the next 15 years, what should the state and local communities be working on to reduce risk and flood damage while increasing community resilience? Where are our training gaps and how do we close them? How do we deliver consistent and timely training to smaller and understaffed locations?
- Recent advancements in GIS mapping, federal and state maintained stream and coastal gaging stations, flood forecasting, H&H modeling as well as flood probability raster dataset have afforded the development of flood warning applications such as North Carolina's FIMAN site. What should the role of flood warning systems and weather forecasting play in today's floodplain management and emergency response?
- As we witnessed in October in South Carolina, some of the most devastating and life threatening flooding occurs following single and or multiple dam failures. It is widely known that the lack of dam breach inundation areas impact accurate and timely warning of such events. What are the lessons learned and data gaps revealed from the South Carolina floods with respect to dam failure? What are the existing and potential data, tools and processes that may be utilized to reduce future losses from dam failure?

These breakout groups were then given the opportunity to convene as a large group in the afternoon at each symposium, and provide group report-outs to all attendees. This was beneficial in allowing visibility to and input from all groups on all topics. The outcomes of these discussions will be captured in a final Flood Risk Symposia Report from each state, along with actionable goals to achieve in continuing the dialogues and outcomes.

In summary, it is clear that as the professionals who are considered “experts” in this field, we need to continue to reach outside of our comfort zone and have sustainable floodplain management conversations with a very diverse group of stakeholders to achieve the goal of protecting our communities from flood-related risk. As you are going about your work day, take a moment to think about collaboration, partnering and sharing resources. Who can you work with? How can you make sure all stakeholders are being supported? In addition to your projects and programs being successful, how can you develop a program to enhance and showcase other community interests as well? ▲

(Summarized with permission from ASFPM's *News & Views*, June 2016)

# Calendar

MEMBERSHIP INVOICES for 2017 will be e-mailed to current members in mid-December and are due in January. You can renew your membership at any time on our [membership page](#).

## April 23-26, 2017

NCAFPM ANNUAL CONFERENCE  
Atlantic Beach, NC  
[ncafpm.org](http://ncafpm.org)

## April 30-May 5, 2017

ASFPM ANNUAL CONFERENCE  
Kansas City  
[floods.org](http://floods.org)

## August 14-17, 2017

NATIONAL FLOOD MITIGATION & FLOODPROOFING WKSHP  
Iselin, New Jersey  
[floods.org](http://floods.org)

# Floodplain Management Resources

## Technical Assistance (State)

### NC Emergency Management National Flood Insurance Program

**NFIP State Coordinator:** John Gerber, PE, CFM  
[john.gerber@ncdps.gov](mailto:john.gerber@ncdps.gov) | 919-825-2317

**NFIP Engineer:** Dan Brubaker, PE, CFM  
[dan.brubaker@ncdps.gov](mailto:dan.brubaker@ncdps.gov) | 919-825-2300

#### NFIP Planners

**Central Area:** Milton Carpenter, CFM  
[milton.carpenter@ncdps.gov](mailto:milton.carpenter@ncdps.gov) | 919-825-2302

**Eastern Area:** Heather Keefer, CFM  
[heather.keefe@ncdps.gov](mailto:heather.keefe@ncdps.gov) | 919-825-2289

**Western Area:** Terry Foxx  
[terry.foxx@ncdps.gov](mailto:terry.foxx@ncdps.gov) | 828-228-8526

## NC CLOMR/LOMR Submittals

[www.ncfloodmaps.com/mt-2\\_forms.htm](http://www.ncfloodmaps.com/mt-2_forms.htm)

### LOMC Manager/Community Development

**Planner:** Steve Garrett, CFM  
[steve.garrett@ncdps.gov](mailto:steve.garrett@ncdps.gov) | 919-825-2316

## Maps & Flood Insurance Studies

### FEMA Map Information eXchange (FMIX)

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

## Meck. Co. CLOMR/LOMR Submittals

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

## NC Floodplain Mapping Program

919-715-5711  
[www.ncfloodmaps.com](http://www.ncfloodmaps.com)

## Technical Assistance (FEMA)

### National Flood Insurance Program Floodplain Management and Insurance Branch: FEMA Region IV

[www.fema.gov/about/regions/regioniv/](http://www.fema.gov/about/regions/regioniv/)

**Branch Chief:** Susan Wilson, CFM  
[susan.wilson@fema.dhs.gov](mailto:susan.wilson@fema.dhs.gov) | 770-220-5414

#### Natural Hazards Program Specialist

Roy McClure, CFM  
[roy.mcclure@fema.dhs.gov](mailto:roy.mcclure@fema.dhs.gov) | 770-220-8835

#### FEMA Region IV Insurance Specialist

Janice Mitchell  
[janice.mitchell@fema.dhs.gov](mailto:janice.mitchell@fema.dhs.gov) | 770-220-5441

## Individual Lot LOMA/LOMR

FEMA LOMA DEPOT  
3601 Eisenhower Avenue  
Alexandria, VA 22304-6425  
Attn: LOMA Manager

## Flood Insurance Policy Issues

**Regional Manager:** Lynne Magel  
[lmagel@ostglobal.com](mailto:lmagel@ostglobal.com) | 813-788-2624

**Regional Liaison:** David Clukie  
[dclukie@ostglobal.com](mailto:dclukie@ostglobal.com) | 813-767-5355

## Websites

NCAFPM..... [www.ncafpm.org](http://www.ncafpm.org)  
ASFPM ..... [www.floods.org](http://www.floods.org)  
FEMA..... [www.fema.gov](http://www.fema.gov)  
NFIP..... [www.floodsmart.gov](http://www.floodsmart.gov)  
NCEM ..... [www.nccrimecontrol.org/nfip](http://www.nccrimecontrol.org/nfip)  
NC Maps ..... [www.ncfloodmaps.com](http://www.ncfloodmaps.com)

**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, Editor ([kgkeesling@carolina.rr.com](mailto:kgkeesling@carolina.rr.com)).

For more information about the North Carolina Association of Floodplain Managers, see our website at [ncafpm.org](http://ncafpm.org).

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## MEMBERSHIP

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# FlashFlood NEWS

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